Real Estate Securitization and the Debt Maturity Structure: Evidence from J-REIT

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Abstract

This paper investigates the relationship among asset liquidation value, liability term structure and ownership concentration of J-REITs. By employing new proxies of asset liquidation value, we derived two major implications. First, J-REITs with high ratios of real estate investment assets in frequently traded areas have longer debt maturity. Second, J-REITs with high concentration ratios of real estate assets traded in small units such as residential properties also have long term debt maturity . These relationships are enhanced when the ownership is concentrated. In summary, the regional characteristics and type of usage of real estate assets are validated as asset liquidation proxies which influence the liability term structure of J-REITs. However, the existence of a blockholder is a necessary condition to support this hypothesis.

JEL Classification Code: L85, G30, G32
Keywords: REIT, Liability Structure, Capital Structure

Introduction

Many recent empirical literatures concerning real estate investment trust are focusing on determinants of capital structure. But, REIT sample data are more persuasive in examining the theoretical hypothesis because REIT has only one type of assets, i.e., real estate investment asset. Generally, a firm has a complex line of business and the fixed assets are also owned for a variety of type of production. REIT is one of a few industries that have a simple asset structural pattern and this is the reason why recent literatures prefer this appropriate sample for the verification of corporate balance sheet.

Existing literatures have discussed the determinants of capital structure for the long-term period. Trade-off and pecking order theories are the two prominent theories in determining capital structure. The trade-off theory considers capital structure to be determined by a balance between the benefits and costs of the selected funding schemes. On the other hand, the pecking order regards information cost imposed on corporate outsiders as influencing the managerial choice of debt and capital. The capital structure also influences the corporate fixed asset. Creditors desire avoiding risky investments when the financial leverage is high and this brings an underinvestment problem to the firm.

Recent literatures pointed out that fixed asset investment and other investment activities are influenced not only by capital structure, but also by other factors. For instance, it is said that underinvestment problem is mitigated when the asset liquidity is high even though the financial

leverage is high. High asset liquidation enables creditors to liquidate the asset when the firm turns to be insolvent. This means that a firm with less liquid asset must fund by using short-term debt tools since long-term debt imposes credit risks to banks and others for the long-term period. In this regard, recent literatures are focusing on how liquidity of asset influences the relationship between underinvestment problem and capital structure.

Besides, based on the preliminary interview surveys that the author made to REIT practitioners, a common consistent testimony is that a concentrated ownership structure is one of the J-REIT uniqueness and this might strongly influence the balance sheet of J-REITs. Hence, this paper employs J-REIT data as a sample in verifying the hypotheses concerning the relationship among asset liquidity, liability structure and ownership concentration. This paper obtains additional contribution to the existing literatures by verifying how ownership structure influences liability structure coupled with the asset liquidity. The next sectionpresents a series of existing literatures on the relationship between asset value liquidation and liability structure and explains how this papercontributes to them. In the third section, we show our hypothesis reflecting existing literatures and recent practical trend in a J-REIT market. We explain the data in the fourth section and then, provide explanations of methodology of the empirical study and results in the fifth section. In the sixth and the final sections, we provide our discussion and conclusion from the empirical results.

2. Existing Literatures

Real estate securitization is financially used for commercial purpose by issuing securities. All the firms generally face refinancing risks every time the redemption date of external borrowing arrives. The purpose of this real estate asset liquidation is mainly to increase the number of funding schemes thus minimizing the refinancing risks. This asset liquidation scheme enables the firm to fund depending not on its own creditworthiness, but on real estate value which is independent from the individual firm's creditworthiness. Real estate investment trust, as a result, can collect a number of retail funds from individual investors in a financial market.

Many existing literatures pointed out that a change in asset liquidation value of a firm influences the capital structure. Originally, Fama and French (2002) organized the related theories and categorized the determinants of capital structure as trade-off theory and pecking order theory. As noted in the previous section, trade-off theory suggests that corporate capital structure is determined by a balance between costs and benefits of the funding schemes. Examples of the cost are a high probability of underinvestment and liquidation cost. The benefits include minimizing the free-cash flow problem and mitigating the tax expenditure. However, Myers (1977) and Hart (1993) have suggested that information cost also influences the corporate capital structure, and a firm can choose a funding tool depending on the degree of information asymmetry.

Recent literatures focused on both financial leverage and term structure of a firm's liability. Barclay et al. (2003) pointed out that a firm is likely to face underinvestment when its financial leverage is high. This is because creditors do not desire managers to choose aggressive investment even though its future profitability is expectedly high when the leverage is high. In this case, risk adverse creditors may prevent professional managers from seeking high profitable investment project. On the other hand, Williamson (1988) mentioned the term structure of liability

in addition to the above relationship. Williamson (1988) suggested that a firm with high liquid assets is allowed to choose various funding tools even though the financial leverage is high. In this case, the liquidation cost is not expensive even when the debtor turns to be insolvent. Shleifer and Vishny (1992) supported this idea of Williamson (1988) and further suggested that asset liquidation value and financial leverage are positively related. A contribution of Shleifer and Vishny (1992)to the theoretical literature is in finding that an increase in asset liquidation value mitigates principal-agent problem.

Recent literatures extended the above theoretical approaches to empirical studies. Benmelech (2005) picked up a funding scheme of the 19th century's railroad project and empirically examined the relationship between asset liquidity and financial leverage. Benmelch et. al. (2005), on the other hand, used commercial mortgage loan data and verified the relationship between residential mortgage loan maturities and zoning regulation. In addition, more studies are increasingly using data from REIT market to verify the theoretical frameworks of Williamson (1988) and Shleifer and Vishny (1992). By using REIT data, Brown and Riddiough (2003) and Giambona et. al (2008), examined the relationship among asset liquidation value, debt to equity ratio and liability structure.

In existing studies on the relationship between asset liquidation value and liability structure, the discussion focused on how researchers should estimate asset liquidation value as elaborated in the previously presented three methodologies. First, Geltner and Miller (2001) regarded lease contract period of REIT properties as liquidation value and examined if this contract period influenced the liability structure. Geltner and Miller (2001) emphasized that managers can improve profitability of the property through renovation and other maintenance efforts when asset liquidity is high. The paper concluded that financial leverage of high asset liquid REIT could be allowed to be high. The second methodology estimates real estate asset value by using data from commercial mortgage backed securities (hereafter CMBS) market. As CMBS market progresses, researchers can obtain asset liquidation price data directly from the market. Recent statistical development in the CMBS market contributed to further development of the methodology. The third approach calculates indicators using various quantitative and qualitative information on real estate assets. The information includes real estate price, zoning regulation and probability of future liquidation of the real estate. Since this methodology reflects comprehensive qualitative information that others do not include, the indicators are regarded as useful information by researchers. Tis methodology was first developed by Society of Industrial Realtors (1984) and Urban Land Institute (1982). In recent years, Benmelch et. al. (2005) added information of zoning regulation while Giambona et. al (2008) reflected the possibility for liquidation and term structure of rental and lease agreement of the assets in addition to information on regulation.

This paper examined the existing literatures on the methodology of asset liquidation value . The first methodology, i.e., term structure of lease maturity as a proxy of asset liquidation value, is very objective. However, the lease and rental contract maturity is often determined by each individual reason of the lessor and tenant. Though objective, the value may not always mean common universal market liquidity. The second methodology of CMBS market data is frequently used by the media and credit rating agencies such as Standard & Poor's and Moody's Investors Service, but not by academia. The reason is that there is a limited number of real estate assets that are transacted, and low liquidity real estate is not traded in the CMBS market. Our review shows

that the data could have contained sample biases. Our study also finds the third methodology containing very comprehensive information on real estate assets. However, we cannot reject the possibility of the indicator's arbitrariness.

3. Hypothesis

As seen in the previous sections, there are many existing literatures concerning REIT and its capital structure. Against these literatures, this paper employs a new methodology to estimate real estate asset liquidation value and examines the relationship between the value and the liability structure. In addition, this paper also verifies the above relationship and ownership structure of J-REIT. The existence of blockholders is J-REIT's unique characteristicand is made as part of J-REIT market development.But, market participants practically regard the concentrated ownership structure as still influencing the credit side of REIT balance sheet.

Based on a series of discussions of Barclay et. al. (2003), Williamson (1988) and Shreifer and Vishney (1992), it is considered that asset liquidity of REIT also influences the debt to equity ratio and term structure of the liability. In other words, our hypothesis is that creditors of REIT who monitor debtor's repayment capability allow REIT managers to have high debt to equity ratio when the asset liquidity value is high enough. We hypothesize that liquidity of REIT assets is determined by regional characteristics and type of usage and these consequently influence the liability structure. Although Benmelch et. al. (2005) regarded zoning regulation as one of the elements of real estate asset liquidity, our regional and usage concentration data involved the qualitative information. Since Tokyo metropolitan area has high real estate transaction frequency per area, we assume that the concentration in this frequently traded region enables the REIT to hold high debt to equity ratio and long maturity of liability.

In addition, the concentration and dispersion of real estate investment assets are also regarded as important factors of liquidation value, even if it is concentrated in the Tokyo metropolitan area. We hypothesize that J-REITs with low concentration of the top five largest real estate assets in terms of face values are highly liquid and find it easier to make cash than REITs with high concentration of the top five real estate assets. Third, we also hypothesize that real estate asset liquidation values are not only related with liability structure, but also with ownership structure of REITs, particularly in the case of J-REIT. In existing literatures, Pound (1988), Brickley et al. (1988), McConnell and Servaes (1990) and Palia and Lichtenberg (1999) mentioned that the existence of blockholders improves managerial discipline of the firm through mitigation of divergence of interests among the shareholders. The above literatures did not discuss the relationship among asset liquidation value, liability structure and ownership concentration, but we considered such relationship in our study. Our hypothesis is that REITs with high asset liquidation are allowed to have long maturing debts when the ownership is concentrated. We believe investors in J-REIT market feel this is plausible. In the process of J-REIT market development, major real estate firms and financial firms established REITs and remained as the largest shareholders. In fact external investors regard the shareholders and the REITs to be on the same side, i.e., the debt of J-REITs are implicitly guaranteed by the founder who are the largest blockholders.

4. Data

This paper uses REIT's financial statement and ownership data from Thomson Reuters and the real estate investment asset values of each REIT by region and type of usage are taken from the Japanese Annual Securities Financial Report. Total value of the top five investment assets are also obtained from the report. The sample period of the data covers 2003 to 2008. As for real estate asset data, the Japanese Ministry of Finance which supervises Japanese Annual Securities Financial Report requests all the REITs to disclose complete information on each individual property that the REIT has. However, since the definition of regional classification are sometimes different by REIT, we re-categorized and re-aggregated the data as follows: (1) Tokyo with 23 wards,(2) Tokyo metropolitan area excluding 23 wards plus neighboring prefectures, and (3) other local cities. The usage of real estate assets in the report is commonly defined among the 41 REITs. Therefore, we use these data directly in calculating the concentration ratio of (1) residential, (2) office building, (3) commercial facility, and (4) hotels and others. We also obtained REIT ownership data from Thomson Reuters and calculated the top five ratios and foreign ownership ratios from the data as proxies of ownership concentration.

5. Empirical Analyses

5.1 Asset Concentration and Liability Structure

The first empirical study examines the relationship among the concentration of real estate investment to the small number of assets, debt to equity ratio and liability structure of J-REITs. Here, we proxied the concentration as an inverse value of asset liquidation. The latest raw J-REIT data suggested that some J-REITs have a small limited number of real estate properties, i.e, a few big properties, and others have many small value of properties. The former group has high ratio of top five asset concentration and the latter has low ratio, naturally. Our hypothesis is that J-REITs with a large number of small valued properties are allowed to have high debt to equity ratio or long maturity of liability compared to REITs with one big property. This hypothesis assumes that debtors can request managers for either asset liquidation or reallocation of the existing portfolio as each real estate assets are in small lots when the asset concentration is low. Prominent literatures of Barclay et. al.(2003) and Williamson (1988) said that a firm with high debt to equity ratio is likely to face underinvestment problem. This theoretical background assumes that creditors request managers to take risk adverse investment. To examine the above hypothesis, we employed the following equation models.

$$ShortDebt = const + + \phi_1 DER + \phi_2 Concentration + \phi_3 Ownership + \varepsilon \quad (5.1)$$

$$DER = const + \theta_{11} ShortDebt + \theta_{12} ROA + \theta_{13} MBR + \theta_{14} FirmSize + \zeta_1 \quad (5.2)$$

ShortDebt: Short-term Borrowing Outstanding divided by Total Liability, *DER:* Total Liability divided by Market Value of Capital, *Concentration*: Top Five Investment Asset Concentration divided by Total Investment Assets, *Ownership*: Top five ownership ratio, *ROA:* Return on Total Assets, *MBR*: Total Liability plus Market

Value of Capital divided by Book Value of Total Assets, *FirmSize:* Natural Logarithm of Total Assets

This analysis employed simultaneous equation system of two stage least squares that includes top five asset concentration as an instrument variable. In this model, short-term debt divided by total liability and debt to equity ratio are endogenous variables. Judging from the Hausman specification Test, we employed the results of fixed effect model. Following results are derived from the estimation. First, our empirical results indicate that REITs with high debt to equity ratio statistically depend on short-term borrowing. Second, parameter of top five concentration is significantly positive in model (a). In other words, REITs with large number of relatively small properties can find financing through long-term borrowing. This is consistent with our hypothesis that dispersion of real estate assets contributes to an increase in long-term liability maturity.

Table. 1 Empirical Result 1: Real Estate Asset Concentration and Liability Structure

	(a) Dep. Var.= ShortDebt		(b) Dep. Var.= DER	
	Fixed Effect Model		Fixed Effect Model	
Endogenous Variables				
ShortDebt			1.320	(0.640)
DER	0.046 **	(2.020)		
Instruments Variables				
ROA			-0.819 ***	(-6.650)
FirmSize			0.875 ***	(3.970)
MBR			1.844 ***	(3.670)
Concentration	0.001 **	(2.200)		
Ownership	-0.004 ***	(-2.770)		
Dum04	0.135	(0.560)	-1.727	(-0.340)
Dum05	0.122	(0.640)	-1.908	(-0.460)
Dum06	0.111	(0.550)	-0.826	(-0.280)
Dum07	0.119	(0.580)	-0.932	(-0.450)
Const	-4.668	(-0.520)	13.835	(0.340)
F Statistic	2.420 ***		2.440 ***	
Hausman Specification Test	20.420 *		22.520 **	
Observations	111		111	
Firms	38		38	

Note 1: ***. ** and * indicate statistical significance at 1 percent, 5 percent and 10 percent levels, respectively
Note 2: Dum04-Dum07 are year dummy variables.
Note 3: Sample includes bankrupt REITs.

5. 2 Regional Concentration as Asset Liquidation Value

The second hypothesis of our study is on the relationship between regional concentration of real estate investment assets and liability structure. According to the fiscal year 2007 version of White Paper on Land, Infrastructure and Transportation (footnote this source), the total number of real estate transactions was 1.6 million deals in 2005, but Tokyo accounts for more than thirty percent of this total. In addition, Japan's average size of area traded was 69 thousand hectares, with one-fifteenth of the all-Japan average in Tokyo. In other words, the number of deals per one hectare was 42.7 deals in Tokyo which is four times as large as that of Japan's total average.

Intuitively, these basic statistics suggest that real estate asset liquidation values of these areas are high. This section examines the relationship between regional concentration of real estate investment assets and liability term-structure. Here, we regard regional investment concentration as a proxy of asset liquidation value. In other words, asset concentration to metropolitan area equals high asset liquidity. To verify the relationship between this variable and liability structure, an empirical equation model is employed as follows:

$$LongDebt = const + \alpha_1 DER + \alpha_2 AREA + \alpha_3 Ownership + \alpha_4 AREA * Ownership + \alpha_5 (AREA)^2 + \alpha_6 (Ownership)^2 + v \quad (5.3)$$

$$DER = const + \theta_{21} LongDebt + \theta_{22} ROA + \theta_{23} MBR + \theta_{24} FirmSize + \zeta_2 \quad (5.4)$$

*LongDebt: L*ong-term Debt divided by Total Liability, *DER:* Total Liability divided by Market Value of Capital, *AREA*- 1) *Tokyo23*: Real Estate Assets Invested in Tokyo 23 wards divided by Total Investment Assets, *AREA*- 2) *MetroArea*: Real Estate Assets Invested in Tokyo excl. 23 wards plus neighboring prefectures divided by Total Investment Assets, *AREA*- 3) *LocalCity:* Real Estate Assets Invested in Local Cities other than Tokyo23 and MetroArea divided by Total Investment Assets, *Ownership*: Top five ownership ratio, *ROA:* Return on Total Assets, *MBR*: Total Liability plus Market Value of Capital divided by Book Value of Total Assets, *FirmSize:* Natural Logarithm of Total Assets.

We also employed simultaneous equation system of two least squares for this model. Hausman specification statistics suggest that models (a) and (b) should not be estimated by fixed effect model, but it is allowed in model (c). In case of simultaneous equation system of two least squares, we cannot technically implement Breush Pagan test. Therefore, Table 2.reports the result of the error component two-stage least squares of random effect model. The results of another possible methodology, i.e., OLS pooling estimation results are shown in Appendix 1. We employed both long-term borrowing and short-term borrowing divided by total liability as dependent variables, but we report the former since the overall performance of the empirical results is better. Empirical results are as follows.

Empirical results of random effect models of (a) – (b) suggest that the parameters of Tokyo23 and MetroArea are significant. And in case of Model (b), the intersected variables between regional concentration and ownership are significantly positive. This means that REITs with high investment ratio in Tokyo 23 wards or Tokyo excluding 23 wards plus neighboring prefectures promoted long-term liability maturity. The existence of a blockholder is necessary in case of Tokyo excluding 23 wards plus neighboring prefectures. On the other hand, the parameter of Local city and the intersected variable with ownership are insignificant and this means that investment concentration in local cities is not related with liability structure.

Table 2. Empirical Result 2: Regional Asset Concentration and Liability Structure

	(a) Dep. Var.= LongDebt		(b) Dep. Var.= LongDebt		(c) Dep. Var.= LongDebt	
	Random Effect Model		Random Effect Model		Fixed Effect Model	
Endogenous Variable						
DER	-0.015 ***	(-4.320)	-0.016 ***	(-4.280)	-0.015 ***	(-4.350)
Instruments Variables						
Tokyo23	0.178 **	(2.330)				
MetroArea			0.012 **	(2.070)		
LocalCity					-0.410	(-0.880)
Ownership	0.112 *	(1.800)	0.110 *	(1.810)	0.111 *	(1.810)
Ownership*Tokyo23	0.222	(0.710)				
Ownership*MetroArea			0.307 ***	(2.660)		
Ownership*LocalCity					1.744	(0.370)
{Tokyo23}^2	0.112	(0.470)				
{MeroArea}^2			0.044	(0.810)		
{LocalCity}^2					0.100	(0.740)
{Ownership}^2	-0.322	(-0.770)	-0.321	(-0.870)	-0.344	(-0.910)
Dum04	0.085	(0.980)	0.069	(0.920)	0.067	(0.970)
Dum05	0.026	(0.860)	0.018	(0.740)	0.017	(0.720)
Dum06	0.033	(0.780)	0.046	(0.760)	0.034	(0.920)
Dum07	0.041	(0.970)	0.042	(0.960)	-0.047	(0.910)
Const	-1.026	(-1.420)	-0.916	(-1.060)	-0.897	(-1.040)
F Statistic					7.510 ***	
Hausman Specification Test	15.260		16.020		35.960 ***	
Observations	119		119		119	
Firms	38		38		38	
	(a)' Dep. Var.= DER		(b)' Dep. Var.= DER		(c)' Dep. Var.= DER	
	Fixed Effect Model		Fixed Effect Model		Fixed Effect Model	
Endogenous Variable						
LongDebt	-2.111	(-0.410)	-2.111	(-0.410)	-2.111	(-0.410)
Instruments Variables						
ROA	-0.774 ***	(-5.450)	-0.774 ***	(-5.450)	-0.774 ***	(-5.450)
FirmSize	0.747 ***	(3.440)	0.747 ***	(3.440)	0.747 ***	(3.440)
MBR	1.119 ***	(3.970)	1.119 ***	(3.970)	1.119 ***	(3.970)
Dum04	-0.004	(-0.050)	-0.004	(-0.050)	-0.004	(-0.050)
Dum05	-0.019	(-0.370)	-0.019	(-0.370)	-0.019	(-0.370)
Dum06	0.041	(0.610)	0.041	(0.610)	0.041	(0.610)
Dum07	0.029	(0.790)	0.029	(0.790)	0.029	(0.790)
Const	0.176	(0.490)	0.176	(0.490)	0.176	(0.490)
F Statistic	5.420 ***		5.110 ***		5.420 ***	
Hausman Specification Test	39.210 ***		39.210 ***		39.210 ***	
Observations	119		119		119	
Firms	38		38		38	

Note 1: ***. ** and * indicate statistical significance at the 1 percent, 5 percent and 10 percent levels, respectively
Note 2: Dum04-Dum07 are year dummy variables.
Note 3: Sample includes bankrupt REITs.

5.3 Usage of Real Estate Assets as Asset Liquidation Value

This empirical analysis focuses on the relationship between usage of real estate assets invested by REIT and the liability term structure. As noted by Giambona et al. (2008), it is regarded that asset liquidation value of real estate property is different by usage and purposes. Giambona et al. (2008) categorized real estate assets into four types, i.e., industrial usage, apartment, hotel, and office in descending order of asset liquidation value. The Japanese Annual Securities Financial Reportdiffers from the definition of Giambona et al. (2008), following four definition is common,

i.e., residential real estate, office, commercial usage and hotel. This paper accordingly employed the common definition of Japanese Annual Securities Financial Report and examined the relationship between investment ratios of the above four types of usage and liability maturity considering the influence from ownership structure.

$$LongDebt = const + \beta_1 DER + \beta_2 Type + \beta_3 Ownership + \beta_4 Type * Ownership + \beta_5 (Type)^2 + \beta_6 (Ownership)^2 + \sigma \quad (5.5)$$

$$DER = const + \theta_{31} LongDebt + \theta_{32} ROA + \theta_{33} MBR + \theta_{34} FirmSize + \zeta_3 \quad (5.6)$$

*LongDebt: L*ong-term Debt divided by Total Liability, *DER:* Total Liability divided by Market Value of Capital, *Type-Residence*: Real Estate Assets Invested in Retail Residence divided by Total Investment Assets, *Office:* Real Estate Assets Invested in Office Building divided by Total Investment Assets, *Hotel*: Real Estate Assets Invested in Hotel divided by Total Investment Assets, *Commerce*: Real Estate Assets Invested in Commercial Facilities divided by Total Investment Assets, *Ownership*: Top five ownership ratio, *ROA:* Return on Total Assets, *MBR*: Total Liability plus Market Value of Capital divided by Book Value of Total Assets, *FirmSize:* Natural Logarithm of Total Assets.

The following empirical results are obtained from the estimation. In this analysis, we also estimated a model by fixed effect and find out if the methodology is appropriate by looking at Hausman specification test. The statistics suggest that we should employ results of fixed effect estimation in models (a)-(d). The results of fixed effect models show that the parameter of retail residential usage ratio was significant and also the parameter was significantly positive when the variable intersected with ownership concentration. This means that REITs investing in residential properties are allowed to finance through long-term debts. On the other hand, parameters of office and commercial usage are insignificant. Parameters of these variables are also insignificant when those are intersected by ownership concentration. A parameter of hotel is also insignificant.

Table 3. Empirical Result 3: Asset Concentration by Usage and Liability Structure

	(a) Dep. Var.= LongDebt		(b) Dep. Var.= LongDebt		(c) Dep. Var.= LongDebt		(d) Dep. Var.= LongDebt	
	Fixed Effect Model		Fixed Effect Model		Fixed Effect Model		Fixed Effect Model	
Endogenous Variable								
DER	-0.011 ***	(-4.410)	-0.010 ***	(-4.980)	-0.014 ***	(-4.810)	-0.012 ***	(-5.010)
Instruments Variables								
Residence	0.001 *	(1.790)						
Office			-0.248	(-0.360)				
Hotel					4.758	(0.720)		
Commerce							-0.001	(-0.030)
Ownership	0.101 *	(1.880)	0.126 *	(1.710)	0.111 *	(1.900)	0.140 *	(1.810)
Ownership*Residence	0.270 ***	(2.640)						
Ownership*Office			-0.311	(-0.910)				
Ownership*Hotel					0.010	(1.100)		
Ownership*Commerce							-0.519	(-1.100)
{Residence}^2	-0.223	(-0.360)						
{Office}^2			0.154	(0.220)				
{Hotel}^2					-0.040	(-0.140)		
{Commerce}^2							-0.570	(-0.580)
{Ownership}^2	-0.444	(-0.270)	-0.764	(-0.330)	-0.649	(-0.410)	-0.991	(-0.640)
Dum04	0.061	(0.630)	0.065	(0.740)	0.086	(0.990)	0.063	(0.650)
Dum05	0.009	(0.140)	0.013	(0.210)	0.020	(0.350)	0.009	(0.150)
Dum06	0.047	(0.840)	0.056	(0.940)	0.064	(0.550)	0.077	(0.640)
Dum07	0.015	(0.960)	0.042	(0.950)	0.030	(0.700)	0.042	(0.960)
Const	-0.919 **	(-1.960)	-0.921	(-1.070)	-1.028	(-1.210)	-0.922	(-1.060)
F Statistic	6.700 ***		6.220 ***		7.200 ***		7.440 ***	
Hausman Specification Test	30.280 ***		39.160 ***		39.390 ***		38.960 ***	
Observations	119		119		119		119	
Firms	38		38		38		38	

	(a) Dep. Var.= DER		(b) Dep. Var.= DER		(c) Dep. Var.= DER		(d) Dep. Var.= DER	
	Fixed Effect Model		Fixed Effect Model		Fixed Effect Model		Fixed Effect Model	
Endogenous Variable								
LongDebt	-2.111	(-0.410)	-2.111	(-0.410)	-2.111	(-0.410)	-2.111	(-0.410)
Instruments Variables								
ROA	-0.774 ***	(-5.450)	-0.774 ***	(-5.450)	-0.774 ***	(-5.450)	-0.774 ***	(-5.450)
FirmSize	0.747 ***	(3.440)	0.747 ***	(3.440)	0.747 ***	(3.440)	0.747 ***	(3.440)
MBR	1.119 ***	(3.970)	1.119 ***	(3.970)	1.119 ***	(3.970)	1.119 ***	(3.970)
Dum04	-0.004	(-0.050)	-0.004	(-0.050)	-0.004	(-0.050)	-0.004	(-0.050)
Dum05	-0.019	(-0.370)	-0.019	(-0.370)	-0.019	(-0.370)	-0.019	(-0.370)
Dum06	0.041	(0.610)	0.041	(0.610)	0.041	(0.610)	0.041	(0.610)
Dum07	0.029	(0.790)	0.029	(0.790)	0.029	(0.790)	0.029	(0.790)
Const	0.176	(0.490)	0.176	(0.490)	0.176	(0.490)	0.176	(0.490)
F Statistic	5.420 ***		5.420 ***		5.420 ***		5.420 ***	
Hausman Specification Test	39.210 ***		39.210 ***		39.210 ***		39.210 ***	
Observations	119		119		119		119	
Firms	38		38		38		38	

Note 1: ***. ** and * indicate statistical significance at the 1 percent, 5 percent and 10 percent levels, respectively
Note 2: Dum04-Dum07 are year dummy variables.
Note 3: Sample includes bankrupt REITs.

5.4 Asset Liquidation Value and the Ownership Structure

The empirical studies of sections 5.2 and 5.3 focused on the relationship between new proxies of asset liquidation value and liability maturity. In this section, we elaborate the influence from ownership structure to enhance a comprehensive understanding of J-REIT capital structure. In existing literatures, Pound (1988) and Palia and Lichtenberg (1999) pointed out that the existence of a blockholder mitigates divergence of interests of shareholders and strengthens disciplines of managers. We hypothesize that ownership concentration by real estate business firms coupled with asset liquidation proxies influences liability structure. In other words, we assume that

concentrated J-REIT owners of financial institutions and foreign investors do not relate to the liability structure. The first reason for this hypothesis is that converged interests of the small number of J-REIT shareholders enable them to request REIT managers to revise their property asset allocations. The second reason is that the owners have expertise of real estate asset allocations when the big owners are real estate business firms. The third reason is that the existence of a big real estate business owner reflects that the creditworthiness of REIT is guaranteed since many market participants know the big owners were often involved as founders of the REIT.

$$LongDebt = const + \chi_1 DER + \chi_2 AREA(orType) + \\ + \chi_5 Ownership\_1 + \chi_6 Ownership\_2 + \chi_7 Ownership\_3 + \eta \quad (5.7)$$

$$DER = const + \theta_{41} LongDebt + \theta_{42} ROA + \theta_{43} MBR + \theta_{44} FirmSize + \zeta_4 \quad (5.8)$$

*LongDebt: L*ong-term Debt divided by Total Liability, *DER:* Total Liability divided by Market Value of Capital, *AREA- MetroArea*: Real Estate Assets Invested in Tokyo excl. 23 wards plus neighboring prefectures divided by Total Investment Assets,*Type-Residence*: Real Estate Assets Invested in Retail Residence divided by Total Investment Assets, *Ownership 1*: Ownership ratio of a Top Real Estate Firm, *Ownership 2*: Ownership ratio of a Top Financial Institution, *Ownership 3*: Ownership ratio of a Top Foreigner, *ROA:* Return on Total Assets, *MBR*: Total Liability plus Market Value of Capital divided by Book Value of Total Assets, *FirmSize:* Natural Logarithm of Total Assets.

Empirical analysis of this section employed two variables, i.e., investment ratio of Tokyo excluding 23 wards plus neighboring prefectures and that of residential real estate property as proxies of asset liquidation value. Three ownership data are obtained from Thomson Reuters. The first is the largest ownership ratio of real estate business firms to the total stock issued. The second is the largest ownership ratio of financial institutions to the total stock issued. The third is foreign ownership concentration, i.e., foreign ownership concentration to the total stock issued. Judging from Hausman specification tests, we employed fixed effect model for both (a) and (b). Following results are obtained from the empirical study.

First, the relationship between ownership concentration to real estate business firms and long-term debt to the total liability are positively significant. On the other hand, parameters of ownership concentration of financial institutions and foreigners are both insignificant.

Table 4. Empirical Result 4: Ownership Concentration and Liability Structure

	(a) Dep. Var.= LongDebt		(b) Dep. Var.= LongDebt	
	Fixed Effect Model		Fixed Effect Model	
Endogenous Variable				
DER	-0.011 ***	(-4.520)	-0.011 ***	(-5.000)
Instruments Variables				
MetroArea	0.169 **	(2.220)		
Residence			0.004 **	(2.100)
Ownership by Real Estate	0.992 ***	(4.200)	0.989 ***	(3.020)
Ownership by Financial Institutions	-0.141	(-0.840)	-0.090	(-1.100)
Ownership by Foreigners	0.400	(0.810)	0.745	(0.410)
Dum04	-0.170	(-1.280)	-0.185	(-1.430)
Dum05	-0.291	(-0.710)	-0.293	(-0.720)
Dum06	-0.371	(-0.760)	-0.375	(-0.780)
Dum07	-0.125	(-0.780)	-0.128	(-0.820)
Const	0.634	(0.780)	0.649	(0.790)
F Statistic	8.820 ***		8.550 ***	
Hausman Specification Test	31.860 ***		32.040 ***	
Observations	99		99	
Firms	32		32	
	(a) Dep. Var.= DER		(b) Dep. Var.= DER	
	Fixed Effect Model		Fixed Effect Model	
Endogenous Variable				
LongDebt	-1.722	(-1.000)	-1.722	(-1.000)
Instruments Variables				
ROA	-0.661 ***	(-3.450)	-0.661 ***	(-3.450)
FirmSize	0.574 ***	(2.940)	0.574 ***	(2.940)
MBR	1.226 ***	(2.990)	1.226 ***	(2.990)
Dum04	-0.239	(-1.240)	-0.239	(-1.240)
Dum05	-0.322	(-1.450)	-0.322	(-1.450)
Dum06	-0.390	(-0.980)	-0.390	(-0.980)
Dum07	-0.135	(-0.820)	-0.135	(-0.820)
Const	0.256	(0.320)	0.256	(0.320)
F Statistic	9.100 ***		9.100 ***	
Hausman Specification Test	39.780 ***		39.780 ***	
Observations	99		99	
Firms	32		32	

Note 1: ***, ** and * indicate statistical significance at the 1 percent, 5 percent and 10 percent levels, respectively
Note 2: Dum04-Dum07 are year dummy variables.
Note 3: Sample includes bankrupt REITs.

6. Liability Structure and Ownership Concentration: An International Comparison

This study tries to determine if the empirical results the relationship between ownership structure and the liability term structure are also true for other REIT markets of the world. This section employs individual REIT financial data from the United States, Canada, Australia and Singapore that are the four world largest REIT markets. While the number of the listed REITs in

Japan totaled4 41 investment trusts as of the end of December 2008, those were 151 in the United States, 31 in Canada, 69 in Australia and 20 investment trusts in Singapore, respectively. Of course, the larger the number of the sample countries the better it is to compare the results internationally. Although the REIT markets in the United Kingdom, Malaysia and Hong Kong are relatively large, the numbers of listed trust funds are less than 20. These four markets were then compared with the above four markets to Japan.

Similar to the empirical analyses in other sections, we obtained both financial data and ownership data from Thomson Reuters. The estimated simultaneous equations are as follows:

$$ShortDebt = const + \phi_1 DER + \phi_2 MBR + \phi_3 Ownership + \phi_4 MBR \times Ownership + \phi_5 MBR^2 + \phi_6 Ownership^2 + \vartheta \quad (5.9)$$

$$DER = const + \theta_{51} ShortDebt + \theta_{52} ROA + \theta_{53} MBR + \theta_{54} FirmSize + \zeta_5 \quad (5.10)$$

ShortDebt: Short-term Debt divided by Total Liability, *DER:* Total Liability divided by Market Value of Capital, *Ownership*: Top Five Shareholder Ownership Concentrations, *ROA:* Return on Total Assets, *MBR*: Total Liability plus Market Value of Capital divided by Book Value of Total Assets, *FirmSize:* Natural Logarithm of Total Assets.

In the case of Japan, Canada and Australia, the empirical results of the fixed effect models are employed since the Hausman Specification Tests are significant. Results of random effect estimation are shown in the case of the United States and Singapore, while OLS pooling results of these two countries are indicated in Appendix 2. The empirical results suggest that parameters of the top five ownership concentrations are significantly negative in Japan, the United States, Canada and Singapore. Only Australia is the exception. Earlier, the background of this paper assumed that ownership concentration in REIT market is a unique character of J-REITs, but these results suggest that the concentration statistically influences to the liability term-structure in the major world REIT markets.

Table 5. Empirical Result 5: Liability Term Structure and Ownership Concentration

	(a) Japan		(b) United States		(c) Canada		(d) Australia		(e) Singapore	
	Fixed Effect Model		Random Effect Model		Fixed Effect Model		Fixed Effect Model		Random Effect Model	
Endogenous Variable										
DER	0.044 **	(2.020)	0.120 ***	(4.950)	0.332 ***	(3.680)	0.441 ***	(2.940)	0.110 ***	(4.550)
Instruments Variables										
MBR	1.022	(0.440)	-0.116	(-0.310)	0.043	(0.440)	0.026	(0.170)	-0.556 *	(-2.000)
Ownership	-0.006 **	(-2.360)	-9.977 ***	(-3.390)	-0.418 *	(-1.770)	0.432	(0.320)	-1.719 *	(1.990)
Ownership*MBR	0.908	(0.710)	0.034	(0.670)	-0.064 *	(-1.930)	-1.166	(-0.950)	-0.417	(-0.460)
Ownership^2	-0.152	(-0.490)	4.499	(1.450)	-0.406	(-1.560)	1.365 *	(1.900)	-1.153	(-1.080)
MBR^2	0.024	(0.260)	0.010 *	(1.850)	0.037	(1.470)	-1.036 *	(-1.680)	0.020	(0.140)
Dum01			1.158 *	(1.880)	-0.216 **	(-2.400)	0.862 ***	(3.810)	-0.144	(-0.100)
Dum02			-1.017 *	(-1.740)	0.103	(1.610)	0.309	(1.400)	-0.230	(-0.840)
Dum03			-0.931	(-1.630)	0.021	(0.340)	0.041	(0.200)	-0.470	(-0.930)
Dum04	0.119	(0.440)	-0.842	(-1.560)	-0.012	(-0.220)	0.095	(0.049)	-0.147	(-0.660)
Dum05	0.141	(0.540)	-0.643	(-1.280)	-0.033	(-0.650)	0.123	(0.680)	-0.075	(-0.370)
Dum06	0.159	(0.520)	-0.399	(-0.850)	-0.061	(-1.260)	0.154	(1.020)	-0.105	(-0.540)
Dum07	0.146	(0.510)	-0.223	(-0.500)	-0.068	(-1.630)	0.069	(0.570)	-0.030	(-0.200)
Const	-4.298	(-0.700)	4.771 *	(2.020)	0.224	(1.340)	-2.874 **	(-2.540)	2.372 *	(1.860)
F Statistic	2.320 ***				1.740 *		1.460 *			
Hausman Specification Test	30.750 ***				56.650 ***		57.730 ***			
Observations	120		923		89		134		42	
Firms	41		149		18		34		16	

	(a) Japan		(b) United States		(c) Canada		(d) Australia		(e) Singapore	
	Fixed Effect Model		Random Effect Model		Fixed Effect Model		Fixed Effect Model		Random Effect Model	
Endogenous Variable										
ShortDebt	0.920	(1.020)	-0.011	(-0.520)	-0.040	(-0.120)	0.711	(0.890)	1.810	(0.710)
Instruments Variables										
ROA	-0.818 ***	(-4.650)	-0.295 **	(-2.280)	-0.252 **	(-2.080)	1.726 **	(2.470)	0.125	(0.690)
FirmSize	0.628 ***	(2.780)	-0.085	(-0.320)	0.638	(0.470)	1.454	(1.550)	1.081	(1.040)
MBR	1.636 ***	(2.860)	-0.171	(-0.550)	0.004	(0.210)	0.023	(0.270)	-0.378 *	(-2.130)
Dum01			1.873 ***	(3.670)	-0.086	(-1.030)	0.436 ***	(2.770)	-0.110	(-0.550)
Dum02			-0.413	(-0.830)	0.122 *	(1.910)	-0.024	(-0.150)	-0.021	(-0.460)
Dum03			-0.398	(-0.810)	0.059	(1.080)	-0.216	(-1.330)	-0.300	(-0.140)
Dum04	-1.735	(-0.440)	-0.372	(-0.720)	0.021	(0.440)	-0.139	(-0.890)	-0.082	(-0.370)
Dum05	-1.834	(-0.340)	-0.283	(-0.620)	-0.010	(-0.200)	-0.068	(-0.460)	-0.054	(-0.280)
Dum06	-0.867	(-0.180)	-0.170	(-0.380)	-0.045	(-1.000)	0.005	(0.040)	0.026	(0.160)
Dum07	-0.968	(-0.510)	-0.088	(-0.200)	-0.042	(-1.000)	-0.044	(-0.380)	0.081	(0.660)
Const	13.537	(0.410)	2.518 ***	(3.330)	0.121	(1.340)	-0.377	(-0.580)	0.815	(1.510)
F Statistic	1.920 ***				1.740 *		1.460 *			
Hausman Specification Test	30.450 ***				56.650 ***		57.730 ***			
Observations	120		923		89		134		42	
Firms	41		149		18		34		16	

Note 1: ***, ** and * indicate statistical significance at the 1 percent, 5 percent and 10 percent levels, respectively
Note 2: Dum01-Dum07 are year dummy variables.
Note 3: Sample includes bankrupt REITs.

7. Discussion

This section discusses the implications obtained from the empirical results of the study. First, the proxies used based on regional characteristics and the type of usage as asset liquidation values are appropriate. Historically, as shown by Ministry of Land, Infrastructure, Transport and Tourism, Tokyo, including 23 wards and other districts, has the highest frequency of real estate transaction per unit area.. There is no doubt that real estate assets in this area has relatively been easy to convert to cash when needed. Another important information from our empirical results is that the real estate assets traded by a small unit can also be converted to cash rather easily. Here, real estate assets of J-REIT in Tokyo's 23 wards are mostly office buildings and commercial facilities that are traded by a big unit. The liquidation of these assets is harder than those of residential properties traded by a small unit. Small size REITs cannot hold a complex of office buildings, but can hold a number of residential apartments. Our empirical analysis confirms the

significance of the positive relationship among investment ratio of Tokyo (excluding 23 wards plus neighboring prefectures),residential property assets, and liability maturity.

At the beginning of this study, we felt the Japanese Annual Securities Financial Report did not disclose enough information about trust contract period of real estate properties. Therefore, we could not employ the same proxies as those in other literatures. However, we also felt that the proxies of trust contract period used by other literatures is not always an appropriate variable of the asset liquidation value. For instance, the existence of individual factors between lessor and lessee and traditional business practice also influence the period of trust contract. Consequently, regional investment ratio and the usage as proxies of asset liquidation values contain various qualitative information. Those ratios do not only include information on frequency of transaction, but also the result of zoning regulation, individual contract factors and traditional business practice and other possible factors that might influence the asset liquidation value. Finding out the relationship between this variable and liability structure under the high ownership concentration is one of the contributions of this paper.

Another contribution of this paper is in finding that the existence of large shareholders is an important factor in influencing the relationship between the debit and credit side of the J-REIT balance sheet. Our empirical results suggest that J-REIT managers could possibly find funds through long maturity debt when ownership is concentrated. As the historical process of J-REIT development might influence this, ownership concentration in real estate industry is important.

Our empirical results also suggest that foreign investors that account for more than 70 percent of J-REIT market turnover in Tokyo Stock Exchange do not have to do with debt maturity of J-REITs. We found that foreign investors preferred and purchased J-REITs that have high asset liquidation values in the secondary market, but they do not influence the managerial issues of the J-REITs. This must be a consequence of the behavior of the foreign institutional investors. Foreign investors most likely feel that J-REITs with high liquidation values are implicitly guaranteed by mother companies of the real estate industry and the creditworthiness is often more than those of mother firms. For instance, foreign institutional investors compare the price of Hankyu REIT, Inc. and the stock price of owner, i.e., Hankyu Realty Co. Ltd. We obtained information on arbitrage activities of foreign investors from our interview survey at Chuo-Mitsui Trust Corp, Ltd. on April 3, 2009. The results of the survey revealed that the foreign owners do not intervene in the management of the REITs since the foreigners always focus on the secondary market. In summary, while the primary market of J-REITs is historically involved in real estate industries and the blockholders influence the internal management, foreigners transact in the secondary market and do not intervene as owners.

Furthermore, our empirical results provide other implications as follows. First, the continuing excessive concentration in Tokyo real estate market also increases the asset liquidity of J-REIT balance sheets. This has also encouraged the potential participants to take part in this concentrated market since the market has a high liquidity. On the other hand, according to our study, the central part of Tokyo area does not always have the highest liquidity, because only a limited number of large asset sized J-REIT can participate in the concentrated office building market. In fact, asset liquidity of Tokyo (excluding23 wards and neighboring prefectures is rather high and investment concentration in these areas also influences the liability structure of J-REIT. In the case of J-REIT market, the existence of big owners is important in finding the linear relationship

between asset liquidation value and liability structure. In summary, under the excessive market concentration in the Tokyo metropolitan area, zoning regulation allows the establishment of residential property preferred by investors. Hence, the number of market participants of J-REITs is large as a result.

Concluding Remarks

The balance sheet of REIT provides various useful information and this paper obtained several implications from the results of our empirical analyses. The main contribution of this paper is in finding a significant relationship between new proxies of asset liquidation values and liability term-structure. The newly employed proxies are variables of regional characteristics and the usage of real estate property. Although existing literatures picked out various proxies of the liquidation value, we applied the ideas for alternative variables. Another implication of this paper is that under the recent excessive concentration of real estate market in the metropolitan area, the combination of regional characteristics and the type of usage is the most important in influencing the liability structure of J-REITs. However, the regional characteristics and the type of usage have nothing to do with the liability structure by themselves, but the ownership structure can smoothen their funding activities. Although few literatures covered the liability term-structure, as well as ownership structure, we stepped into this area in our study. We sampled J-REITs because REIT holds only one type of assets in the balance sheet, i.e., real estate investment assets. Although manufactures hold various types of assets as a result of fixed asset investment, we assume the asset liquidation of these fixed tangible assets could also influence the liability structure. In recent years, the commodity markets of semiconductor, liquid crystal panel and flash memory device developed secondary markets. The secondary market of basic materials also experienced a dramatic progress. We expect future studies to attempt treating the above assets as liquidation values and verify the relationship with liability and ownership structure.

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Appendix 1: OLS Pooling Results of Regional Concentration as Liquidation Value

	(a) Dep. Var.= LongDebt		(b) Dep. Var.= LongDebt	
	OLS Pooling Model		OLS Pooling Model	
Endogenous Variable				
DER	-0.010 ***	(-7.010)	-0.009 ***	(-6.420)
Instruments Variables				
Tokyo23	0.161 *	(1.910)		
MetroArea			0.015 **	(2.100)
LocalCity				
Ownership	0.095 **	(2.220)	0.080 *	(1.830)
Ownership*Tokyo23	0.140	(0.410)		
Ownership*MetroArea			0.311 ***	(2.740)
Ownership*LocalCity				
{Tokyo23}^2	0.144	(0.350)		
{MeroArea}^2			0.034	(0.710)
{LocalCity}^2				
{Ownership}^2	-0.224	(-0.780)	-0.241	(-0.990)
Dum04	0.076	(0.910)	0.044	(0.910)
Dum05	0.019	(0.790)	0.007	(0.640)
Dum06	0.028	(0.660)	0.057	(0.510)
Dum07	0.037	(0.780)	0.085	(0.480)
Const	-0.097	(-1.310)	-0.840	(-1.040)
F Statistic	4.090 ***		3.880 **	
R2	0.039		0.044	
Observations	119		119	
	(a)' Dep. Var.= DER		(b)' Dep. Var.= DER	
	Fixed Effect Model		Fixed Effect Model	
Endogenous Variable				
LongDebt	-2.111	(-0.410)	-2.111	(-0.410)
Instruments Variables				
ROA	-0.774 ***	(-5.450)	-0.774 ***	(-5.450)
FirmSize	0.747 ***	(3.440)	0.747 ***	(3.440)
MBR	1.119 ***	(3.970)	1.119 ***	(3.970)
Dum04	-0.004	(-0.050)	-0.004	(-0.050)
Dum05	-0.019	(-0.370)	-0.019	(-0.370)
Dum06	0.041	(0.610)	0.041	(0.610)
Dum07	0.029	(0.790)	0.029	(0.790)
Const	0.176	(0.490)	0.176	(0.490)
F Statistic	5.420 ***		5.420 ***	
Hausman Specification Test	39.210 ***		39.210 ***	
Observations	119		119	
Firms	38		38	

Note 1: ***, ** and * indicate significant at the 1 percent, 5 percent and 10 percent level, respectively
Note 2: Dum01-Dum07 are year dummy variables.

Appendix 2: OLS Pooling Results of Short-term Debt and Ownership Concentration

	(b) United States		(e) Singapore	
	OLS Pooling Model		OLS Pooling Model	
Endogenous Variable				
DER	0.097 ***	(3.220)	0.419 ***	(5.150)
MBR	-0.094	(-0.710)	-0.552	(-1.140)
Instruments Variables				
Ownership	-6.967 ***	(-4.350)	-1.261 ***	(2.410)
Ownership*MBR	0.061	(0.410)	-0.223	(-0.410)
Ownership^2	10.121	(0.910)	-0.921 **	(-2.200)
MBR^2	0.009	(1.410)	0.009	(0.150)
Dum01	1.100 *	(1.810)	-0.210	(-0.140)
Dum02	-1.011 *	(-1.800)	-0.187	(-0.950)
Dum03	-1.170	(-1.440)	-0.514	(-0.880)
Dum04	-1.040	(-1.390)	-0.185	(-0.470)
Dum05	-0.740	(-1.170)	-0.114	(-0.140)
Dum06	-0.690	(-0.170)	-0.212	(-0.140)
Dum07	-0.100	(-0.410)	-0.151	(-0.850)
Const	7.140 *	(1.910)	3.327 **	(2.120)
F Statistic	2.262 ***		3.755 ***	
R-squared	0.041		0.074	
Observations	923		42	

	(b)' United States		(e)' Singapore	
	OLS Pooling Model		OLS Pooling Model	
Endogenous Variable				
ShortDebt	-0.085	(-0.420)	1.622	(0.610)
Instruments Variables				
ROA	-0.127 ***	(-3.220)	0.092	(0.590)
FirmSize	-0.072	(-0.140)	0.921	(0.990)
MBR	-0.355	(-0.410)	-0.298	(-1.440)
Dum01	1.222 ***	(4.110)	-0.170	(-0.510)
Dum02	-0.415	(-0.840)	-0.015	(-0.390)
Dum03	-0.384	(-0.760)	-0.240	(-0.210)
Dum04	-0.377	(-0.840)	-0.079	(-0.410)
Dum05	-0.314	(-0.580)	-0.041	(-0.310)
Dum06	-0.225	(-0.410)	0.019	(0.200)
Dum07	-0.110	(-0.170)	0.088	(0.760)
Const	2.112 ***	(3.420)	0.851	(1.310)
F Statistic	3.620 ***		2.260 ***	
R-squared	0.032		0.024	
Observations	923		42	

Appendix 3: Descriptive Statistics of Empirical Data

(A) J-REIT

	(A) Liability Structure			(B) Proxies of Asset Liquidation Value				
				(a) Concentration		(b) Area		(c) Use
	DER	LongDebt	ShortDebt	Concentration	Tokyo23	MetroArea	LocalCity	Residence
mean	1.089	0.575	0.239	0.474	0.523	0.064	0.215	0.316
s.d	1.477	0.246	0.192	0.233	0.282	0.140	0.239	0.474
max	13.608	0.992	0.955	1.000	1.000	1.000	0.976	1.000
min	0.039	0.000	0.000	0.130	0.000	0.000	0.000	0.000

	(c) Use			(C) Ownership Structure		(D) Other Independent Variables			
	Office	Hotel	Commerce	Real Estate Firms	Financial Institutions	Foreigners	ROA	MBR	FirmSize
mean	0.079	0.011	0.545	0.268	0.222	0.198	0.029	1.117	11.709
s.d	0.233	0.042	0.612	0.239	0.201	0.213	0.009	0.257	0.746
max	1.000	0.235	0.892	1.000	0.799	0.875	0.053	2.077	13.495
min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.449	9.676

(B) REITs in major international markets

		ShortDebt	MBR	ROA	FirmSize	Ownership
(a) Japan (N=41)	mean	0.239	1.117	0.029	11.709	0.474
	s.d.	0.192	0.257	0.009	0.746	0.223
	max	0.955	2.077	0.053	13.495	1.000
	min	0.000	0.000	0.000	9.676	0.000
(b) United States (N=149)	mean	0.340	2.152	0.011	6.683	0.319
	s.d.	0.298	11.603	0.690	2.005	0.254
	max	0.981	293.541	5.159	10.961	1.000
	min	0.000	0.000	-20.494	-5.065	0.000
(c) Canada (N=18)	mean	0.085	1.122	0.000	6.143	0.443
	s.d.	0.112	0.547	0.117	2.025	0.349
	max	0.841	4.194	0.190	10.139	1.000
	min	0.000	0.000	-1.416	-1.752	0.000
(d) Australia (N=34)	mean	0.145	1.029	0.026	6.228	0.412
	s.d.	0.312	0.386	0.144	2.091	0.315
	max	0.968	4.901	0.359	10.928	1.000
	min	0.000	0.028	-1.907	-0.227	0.000
(e) Singapore (N=16)	mean	0.165	0.921	0.056	6.791	0.684
	s.d.	0.218	0.429	0.114	1.320	0.273
	max	0.971	4.358	0.848	9.510	0.988
	min	0.000	0.217	-0.444	1.630	0.000

DER: Total Liability divided by Market Value of Capital, *LongDebt:* Long-term Debt divided by Total Liability, *ShortDebt*: Short-term Debt divided by Total Liability, *Concentration*: Top Five Investment Asset Concentration divided by Total Investment Assets, *Tokyo23*: Real Estate Assets Invested in Tokyo 23 wards divided by Total Investment Assets, *MetroArea*: Real Estate Assets Invested in Tokyo excl. 23 wards plus neighboring prefectures divided by Total Investment Assets, *LocalCity:* Real Estate Assets Invested in Local Cities other than Tokyo23 and MetroArea divided by Total Investment Assets, *Residence*: Real Estate Assets Invested in Retail Residence divided by Total Investment Assets, *Office:* Real Estate Assets Invested in Office Building divided by Total Investment Assets, *Hotel*: Real Estate Assets Invested in Hotel divided by Total Investment Assets, *Commerce*: Real Estate Assets Invested in Commercial Facilities divided by Total Investment Assets, *Real Estate Firms*: Ownership ratio of a Top Real Estate Firm, *Financial Institutions*: Ownership ratio of a Top Financial Institution, *Foreigners*: Ownership ratio of a Top Foreigner, *ROA:* Return on Total Assets, *MBR*: Total Liability plus Market Value of Capital divided by Book Value of Total Assets, *FirmSize:* Natural Logarithm of Total Assets.