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Leverage Strategies of Real Estate Investment Trusts and Real Estate Operating Companies

Carolyn W. Chang
Professor of Finance, Mihaylo College of Business and Economics, California State University, Fullerton, 800 N. State College Blvd., Fullerton, CA 92831, USA. Email: cchang@fullerton.edu.

Kian Guan Lim
Professor of (Quantitative) Finance, OUB Chair Professor, Lee Kong Chian School of Business, Singapore Management University, 50 Stamford Road, Singapore 178899. Email: kglim@smu.edu.sg.

Zhi Min Zhang*
Bay Area International Business School (BIBS), Beijing Normal University, No.18, Jinfeng Road, Zhuhai City, Guangdong Province, China. Email:zmzhang@bnu.edu.cn.

This paper employs empirical data in three major Asian real estate markets - Hong Kong, Japan, and Singapore, from 2001 to 2021, to study the leverage strategies of two related types of real estate companies – real estate investment trusts (REITs) and real estate operating companies (REOCs). The business model of the former must adhere to a real-estate-focused investment strategy while the latter undertakes a whole range of real estate development activities including land acquisition, financial feasibility analysis, construction, investment and asset management to redevelopment and disposal, and are not subject to the REIT rules with respect to tax transparency, earning distribution, real estate holding and leverage limit. We find that REOCs use 18.96% more debt than REITs after controlling for the agency and market risks, dividend yields, and property sector, country, and year fixed effects of firms; dividend payout has no effect on the leverage strategies; and high tax ratio increases the debt usage of REOCs relative to REITs. We also analyze the liquidation costs and business uniqueness effects. We find real estate value to total firm value ratio, as a proxy of liquidation cost, has negative effects on debt ratios for both real estate firms. Due to their uniqueness, REOCs with a high concentration of rental revenue stream are more vulnerable to

* Corresponding author

liquidation risks, and thus more likely to have lower debt ratio. REITs however tend to have higher debt usage as rental incomes enhance cash-flow liquidity.

Keywords

Capital Structure, Dividend Payout, Current Tax, Asset Liquidation Value, Uniqueness of Business Line, Real Estate Firms

1. Introduction

Shares of public real estate companies have been widely used as an indirect proxy for real estate investments by institutional investors for many years before the emergence of real estate investment trusts (REITs) in Asia. Asia introduced REITs only in 2001, but the Asian REIT markets have expanded exponentially in the short span of time. Asia is now the home to the second largest REIT market in the world after the U.S. Unlike the U.S., one unique feature of the Asian securitized real estate market is the coexistence of a relatively large number of real estate operating companies (REOCs) alongside with the REITs in the market. Therefore, Asian securitized real estate markets are an ideal laboratory to test the capital structure theory without having to worry about industry heterogeneity. Understanding the corporate financing strategies of the two seeming correlated firms could help to better explain the motivations behind the capital structure decisions of firms. This study makes two contributions to the capital structure literature.

First, we find significant evidence that REITs and REOCs adopt different leverage strategies, despite the fact that both operate in the same real estate industry. We find that tax shield benefits matter to REOCs in financing decisions, as we observe that tax-transparent[1] REITs use less debt than REOCs (Modigliani and Miller, 1963; Miller, 1977; DeAngelo and Masulis, 1980; MacKie-Mason, 1990). The second contribution is related to the hypotheses on how real estate asset values (asset liquidation) and the "uniqueness" of the revenue sources affect the debt ratios of REITs and REOCs. Unlike the industry-wide studies, our real estate industry data offer a clean identification on investment asset values and revenues from business activities[2] with little, if

[1] The tax transparency treatment for REITs refers to the exemption of tax on income that is distributed back to investors, subject to a distribution of at least 90.0% of the taxable income.

[2] Unlike the real estate industry, it is difficult if not impossible to accurately compare the asset values and incomes generated for firms across different industries. For example, firms in the service industry may have small fixed assets relative to manufacturing firms,

any, bias and distortions. Without accounting for the effect of the proportion of the asset value, but controlling for agency and market risks, dividend yields, and property sector, country, and year fixed effects of firms, REOCs use 15.7% more debt than REITs. Accounting for high asset values that imply higher liquidation costs, the expected debt ratios of REOCs decline significantly to the level of those of the REITs. Our results show that REOCs behave consistently with the leveraging strategies depicted by the hypothesis of the liquidation value in Shleifer and Vishny (1992), and somewhat with the "uniqueness" of the hypothesis of the business line in Titman and Wessels (1988).

The financing strategies of REITs, which are unambiguously structured as a tax-transparent vehicle, have been subject to extensive empirical tests. As REITs do not enjoy tax shield benefits, one should expect REITs to use less debt in the capital structure. However, contradictory to expectation, the empirical results from U.S. REIT studies show that REITs leverage up heavily with debt instead of raising more equity via secondary public offerings. Howe and Shilling (1988) find that stock prices react positively to announcements of debt offerings, but negatively to equity issuances. Ghosh et al. (2001) and Elayan et al. (2004) also observe signaling effects. However, Jaffe (1991) downplays the signaling story by arguing that many REITs in the form of partnerships are invariant to leverage structure because the taxpaying partners could claim tax credits for the interest expenses incurred. He shows that REITs are more highly levered than other industry firms, and also use more non-recourse debt.

The high distribution requirement imposed on REITs restricts the pecking order choice of REITs in terms of investment funding. Due to limited retained earnings, REITs seek external capital, such as new debt or equity to fund new investments (Brown and Riddiough, 2003; Ott et al., 2005). REITs use public debt to rebalance the capital structure and keep the target debt ratio. Brown and Riddiough (2003) show that REITs with high pre-offer levels of secured debt prefer to issue equity, whereas public debt is favored by REITs with high pre-offer levels of unsecured debt. The results are consistent with the trade-off hypothesis in the capital structure theory. Harrison et al. (2011) also find empirical support for the trade-off and market timing theories, but reject the pecking order theory. Ooi et al. (2010) show that REITs time public debt issuances to meet their long-term target debt ratio, and their findings support the market timing hypothesis.

Maris and Elayan (1990) and Feng et al. (2007) find that debt strategies are related to the growth opportunities and market valuation of REITs. High growth and large equity REITs use more debt than REITs that are facing uncertainty in future cash flows. Giambona et al. (2008) use lease maturity, foreclosure

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which may own some plants and machinery that may not have "marked-to-market" valuation.

recovery, physical flexibility and zoning to represent asset liquidation values, and show that REITs that specialize in liquid assets use more leverage. The results are consistent with the positive asset liquidation value and leverage relationship predicted by Shleifer and Vishny (1992). Erthugrul and Giambona (2011) show that relative operating performance, volatility, and leadership roles in the property segment of REITs explain the leverage ratio of REITs. For non-REIT firms, real estate offers "tangibility" for firms to support more debt relative to other tangible assets (machinery and equipment) (Giambona et al., 2013).

On a more general level, leverage strategy is a well-researched topic in corporate finance. Finance empiricists have found evidence of significant correlations between optimal leverage and other firm investment-related activities. They show that firms use more leverage if they hold more assets that are tangible (Rajan and Zingales, 1995) or report higher past profits (Titman and Wessels, 1988; Rajan and Zingales, 1995). Shleifer and Vishny (1992) show that the liquidation value of assets held by firms is positively correlated with their leverage ratio. Titman and Wessels (1988) predict that firms with a highly unique line of business use less debt. The regression tests we conduct also provide some results that concern the Modigliani-Miller (MM) debt irrelevance hypothesis. The MM theorem is founded on an ideal frictionless world, where firms are not subject to taxes, and bankruptcy and agency costs. The MM theorem cannot be verified when these assumptions are violated in the real-world environment. Many studies have found significant misalignment between the empirical data and optimal conditions in the MM world (Jensen and Meckling, 1976; Myers and Majluf, 1984; Baker and Wurgler, 2002, among others). Together with financing irrelevance, payout irrelevance is also a result of a perfectly competitive market. Firm value is simply an exercise of "pie-slicing" cash flows from investments. DeAngelo and DeAngelo (2006), however, argue that the pie-slicing exercise holds with a strict condition that requires firms to abide by the 100% payout rule.

REITs[3] enjoy significant tax-free status and issue close to full dividend payouts, and thus satisfy many of the key ideal conditions in the MM world. By accounting for some other risk factors such as agency risk represented by elements of self-management and self-advisory, beta[4] and interest rate risks that represent aspects of business and distress costs, the net expected debt ratios of REITs should contain only behavioral or "within industry variations" in

[3] REITs are exempted from paying tax for distributable income, if they comply with the stipulated income distribution rules in the Asian markets. However, some REITs that invest in cross-border real estate assets will be taxed for the income generated from sources outside the home countries before distribution. REITs that focus on the home market will also be subject to tax on retained income and also tradable gains from asset disposal, and other recognized taxable items.

[4] Delcoure and Dickens (2004) find that REIT and REOC betas are related to business risk, although the betas of REOCs are also positively related to agency costs.

leverage, which serves as a case of verifying MM irrelevance. By matching with REOCs in the regression models, the latter serve as controls, and the difference in the average debt ratios of the two types of real estate firms could be a gauge of how well the MM irrelevance hypothesis works empirically.

The "duality" structure of the real estate markets in Asia that comprise both REITs and REOCs which operate in the same industry serves to identify effective channels that influence the leveraging strategies of real estate firms. The duality structure is unique to the real estate market where the assets of real estate firms are priced[5] competitively and almost concurrently in the private and public markets. On the one hand, REOCs and REITs generate cash flows by investing and trading real estate assets in the private (primary) markets. On the other hand, these cash flows are priced into their stock prices by investors in stock markets. Significant price discovery processes occur between the two real estate markets.[6] By using REITs and REOCs, we can control for industry-specific idiosyncrasies that may influence the returns of public firms.

This paper is organized into 6 sections. The next section provides an overview of the three major Asian real estate markets of Japan, Singapore, and Hong Kong that are studied in this paper. Important features of the dual real estate market structures in Asia are described. Section 3 describes the data sources and descriptive statistics. Section 4 discusses the panel regression with fixed effects methodologies used in the empirical tests. Section 5 analyzes the empirical results including those of the robustness tests. Section 6 contains the conclusions.

2. Background

Prior to 2001, REOCs (or more commonly referred to as real estate developers in Asia) were the only securitized real estate vehicles in the market. These firms undertook a whole range of real estate development activities that ranged from land acquisition, financial feasibility analysis, construction, investment and asset management to redevelopment and disposal. They adopted different strategies for different types of real estate. For residential real estate, the "build-to-sell" model was commonly adopted, where Asian developers sold residential units "off-the-plan" even before completion. However, they adopt the "build-

[5] A high degree of integration between the primary and securitized real estate markets is evidenced (Agarwal and Hu, 2014; Mei and Hu, 2000; among others), which may imply that REOCs and REITs are responsive to common shocks in real estate markets.

[6] Studies have found significant evidence that real estate markets are integrated with financial asset markets in the US (see Ling and Naranjo, 1999), the UK (Lizieri and Satchell, 1997), Australia (Wilson et al., 1996), Hong Kong (Fu and Ng, 2001) and Singapore (Ong, 1994).

to-hold" strategy for commercial real estate by keeping prime-grade buildings in their books to generate stable long-term rental income.

The real estate market landscape underwent a significant structural change after REITs made their debut in Asia in 2001. The Nippon Building Fund was the first Asian REIT that was listed on the Tokyo Stock Exchange in September 2001. REITs opened up a new avenue for developers (REOCs) to unlock undervalued assets in their books. Developers set up publicly listed REITs and transferred commercial real estate from their books via arms-length open market sales into REITs. REITs appeal to institutional and retail investors as alternative securitized real estate investments. The Asian REIT markets have since grown by leaps and bounds into a sizeable market with a total of 120 REITs and a total market capitalization of US$150 billion as of the end of December 2013.[7] The three largest Asian REIT markets are Japan, Singapore and Hong Kong which are ranked in descending order through market capitalization.[8] Hong Kong was a late starter with the first REIT that was set up by the Hong Kong Housing Authority via the securitization of a portfolio of state owned retail real estate and carparks in November 2005.[9]

The REIT model is unambiguous, although there are variations in the rules that govern REITs across the Asian REIT markets (see Appendix 1). REITs in Asia are subject to the minimum 90% distribution rule. REITs must adhere to a real estate focused investment strategy. Japanese and Singaporean REITs must invest at least 75% and 70% of their total assets in real estate, respectively, whereas Hong Kong REITs must hold 100% real estate in their portfolios. In Japan, REITs do not have restrictions in the use of debt to finance investment activities. However, Singaporean REITs are subject to a 35% or 60% cap, if a good rating is obtained from the credit agencies. For Hong Kong REITs, the gearings are capped at 45%. REITs listed on the three Asian bourses enjoy tax transparency at source.

REOCs are not subject to the REIT rules with respect to earning distribution, real estate holding and leverage limit. They are also not granted tax transparency as is the case with REITs. The business activities of REOCs cover a full real estate development lifecycle which ranges from land acquisition, construction, to the selling of real estate upon completion. Properties under

[7] The statistics are calculated by the authors based on the data obtained from Datastream. The data are obtained for the 7 Asian markets that have REIT listings, which include Hong Kong, Japan, Malaysia, Singapore, South Korea, Taiwan and Thailand.

[8] The Japanese REIT market has 35 listed REITs with a total market capitalization of US$45.63 billion which constitute 48 percent of the total market capitalization. Singapore and Hong Kong are the second and third largest markets in Asia with approximately US$29.3 billion (24 listed REITs) and US$12.2 billion (8 listed REITs), respectively.

[9] The first Hong Kong REIT, known as Link REIT, was dubbed as the largest initial public offering (IPO) of a REIT in the world, and the largest privatization project in Hong Kong when they were concurrently launched in Hong Kong and globally in 2005.

construction are risky, and revenues from these activities are lumpy. Hong Kong REITs are prohibited from undertaking any development activities, which are deemed to be speculative. In Singapore and Hong Kong[10], the exposure of REITs to real estate development activities is limited to 10% of the total asset value. The Japanese jurisdictions are more lenient and allow REITs to allocate up to 50% of their total asset value to development properties. The restrictions on development activities set REIT portfolios, which consist mainly of operating properties that generate steady rental income, apart from the properties in the portfolios of REOCs. The development intensive business models that REOCs focus on are more homogeneous and substitutable. Their revenue sources that come mainly from "property trading" are speculative, but relatively less "unique".

Differences in the nature of asset holdings and revenue sources of the two firms offer a unique setup to test the effects of asset liquidation value (Shleifer and Vishny, 1992) and unique line of business (Titman and Wessels, 1988) on leverage ratios in the real estate markets in Asia.

3. Data and Descriptive Statistics

The SNL Financial database is the main source of data used in this study. Based on the number of firms as of 2013, our final sample includes a total of 159 real estate firms that consist of 73 REITs and 86 REOCs in three Asian markets[11], namely Japan (REITs: 37 and REOCs: 11), Singapore (REITs: 28 and REOCs: 20) and Hong Kong (REITs: 8 and REOCs: 55). REITs have outnumbered REOCs to become the most popular securitized real estate investments in Singapore and Japan, whereas REOCs continue to dominate in Hong Kong. Annual data on the firm and financial variables are collected for the sample period of 2001 to 2013. After removing samples with missing data, a panel of 3440 firm-year observations is constructed.

A type dummy variable is used to sort the sample firms into a group that consists of REOCs (type =1) and a group that consists of REITs (type = 0). REITs make

[10] The Securities and Futures Commission of Hong Kong has relaxed the rules to allow REITs to invest as much as 10 percent of their gross asset value in property development or redevelopment effective 22 July 2014. Previously, Hong Kong REITs were barred from undertaking development and redevelopment activities (Source: Bloomberg, "New Hong Kong REIT Rule May Free $4.4 Billion for Development," 24 July 2014.).

[11] We include only three Asian countries which are Japan, Hong Kong and Singapore in the empirical analyses, because of practical considerations. The SNL database does not cover firms in Thailand, Taiwan and South Korea. The real estate market of Malaysia is dropped because the SNL coverage of Malaysian real estate firms is incomplete and contains only a few large real estate developers and one REIT (KLCC Property Holdings Berhad), which undertook a corporate restructuring exercise to convert from REOC status to a REIT in 2013) in the database.

up 37.5% of the firm-year samples. REITs are tax-exempted for their distributable earnings, make high dividend payouts of 90% or more, and derive a high fraction of their revenue from the rental income of operating investment real estate. REOCs have a different business model, which focuses on real estate development and trading activities. Their revenue sources are more diversified.

Based on the number of listed real estate firms (as of 2013), the compositions of REOCs and REITs by country are shown in Figure 1. Japanese REITs constitute slightly more than half (50.68%) of the Asian REIT markets, whereas Hong Kong REOCs constitute about 63.22% of the REOC markets in Asia. Considering the property types[12] (or sectors) in the portfolio holdings of the real estate firms, REOCs are more diversified across sectors than REITs: 82.52% of the REOC samples hold diversified portfolios, whereas only 44.34% of REITs hold diversified portfolios across more than one sector.

The sample firms are sorted by organization structure into self-managed (selfmgd) and self-advised (self-adv). The self-managed firms use direct employees for property management activities including lease management, routine and preventive maintenance of properties, and are identified by the dummy selfmgd =1. Firms that employ direct asset managers to undertake acquisition, asset enhancement and capital management strategies for their portfolios are identified by the dummy selfadv=1. In Asia, REITs are mostly externally managed (selfmgd=0) and externally-advised (selfadv=0). They outsource their property and asset management activities to third-party property managers and professional asset managers, respectively. Only 15% of the REITs adopt the US-style internally managed (self-managed) and internally advised (self-advised) models. For developers, outsourcing is less preferred, and they usually set up an in-house property management team (73%), and hire professional asset managers directly (96.1%) to grow their investment portfolios.

3.1 Debt Ratios

The leverage strategy of the real estate companies is proxied by the amount of debt they utilize in their liability funding. The dependent variable in our regression analyses is the debt ratio (debtratio), which is the total debt to enterprise value ratio obtained from the SNL database. We also obtain the data on the total debt, and the breakdown of the total debt by types of interest rates, which include mostly variable rate debts and senior secured debts. For each firm and each year, in addition to the total debt, the proportion of the total debt in the form of a variable rate debt and senior secured debt is also calculated for the regressions.

[12] The property types are sorted into 7 groups, which are coded in the following orders: 1: Diversified, 2: Health care, 3: Hotel, 4: Industry, 5: Multi-family, 6: Office, and 7: Retail, Regional Mall and Shopping Center.

Figure 1 Compositions of Sample Firms sorted by: (a) Country, and (b) Property Sector (based on 2013 sample)

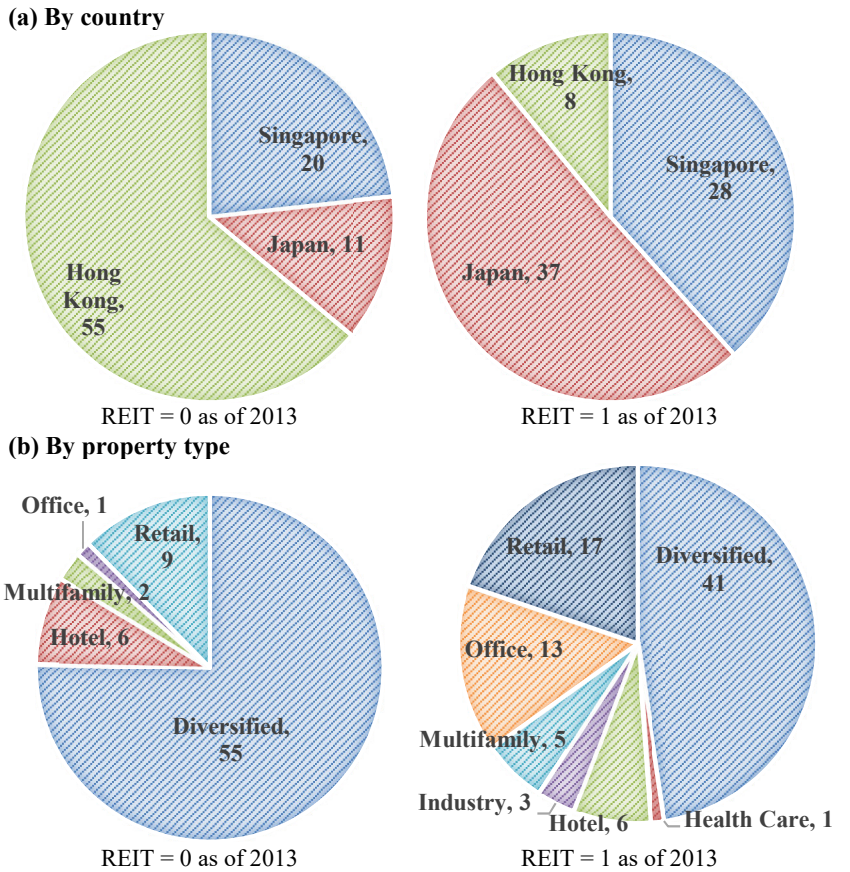
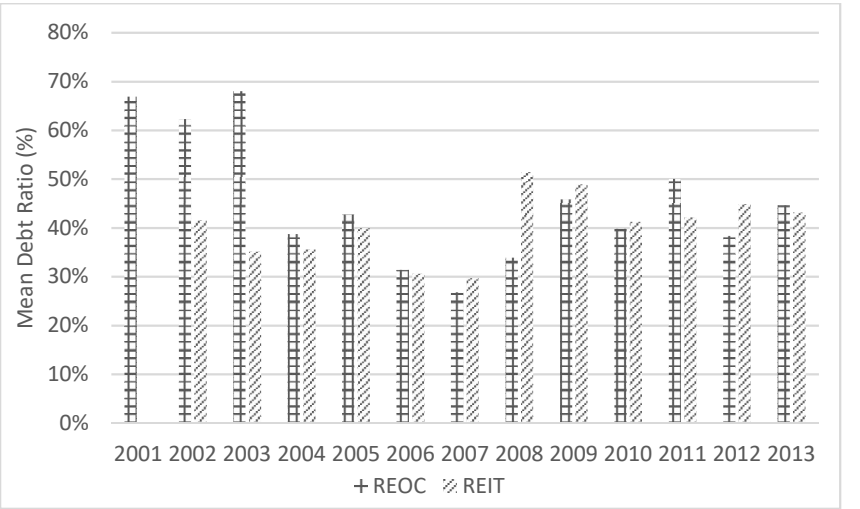


Figure 2 shows the historical time trend of the debt ratio (vertical bars) for both REOCs and REITs in the sample period of 2001 to 2013. The number of firms included in our sample (represented by the two overlaying lines) increases steadily over the sample periods. The average debt ratio was estimated at 42.90%, and the ratio is lower for REITs at 40.34% compared to 45.33% for REOCs averaged across the sample periods. With type of debt, REOCs used more variable debt, which constitutes 63.5% of the total debt, compared to 29.2% of the variable rate debt used by REITs. REOCs and REITs used relatively small amounts of convertible debt, which was estimated at 5.9% and 1.3%, respectively. More than 99% of the debts of REOCs and REITs are of the senior secured type. Subordination debt is not popular among Asian real estate firms.

Figure 2 Distributions of Mean Debt Ratio of REITs and REOCs of Hong Kong, Singapore and Japan 2001-2013



REOCs had been gradually deleveraging over the years, where the debt ratio hit the lowest level in 2007. With an increase in the number of new REITs listed in the markets, the debt ratio for REITs has also declined, but at a slower rate, thus reflecting the increasing use of equity financing. However, real estate firms took up more debt after the global financial crisis in 2008, which caused the debt ratios to creep up steadily in the post-2008 periods. This was due to the low debt interest rate accompanied by a non-significant increase in credit risk in Asia from 2009 to 2021, unlike the recessions in Europe and the U.S.

3.2 Firm Characteristics

We download the financial data directly from the SNL database, which include market capitalization (US$ million), dividend yield and growth, net income and total equity. We calculate the log-market capitalization and use it as the proxy of firm size (size). The average size of the securitized real estate in Asia has a market capitalization of US$1.336 billion (0.290 in logarithm term). REOCs (US$1.697 billion) are larger by market capitalization than REITs (US$0.899 billion). Real estate firms in Hong Kong have the largest average market capitalization of (US$1.737 billion), whereas Singaporean real estate firms are relatively smaller with an average market capitalization of US$0.917 billion.

The average dividend yield of real estate firms in Asia was estimated at 3.7% per annum, and the average dividend growth rate was 19.2%. REITs generate a higher average dividend yield of 6.2% with an average growth rate of 24.6%

per annum relative to REOCs. The average dividend yield of REOCs was estimated at 2.2% with an annual average dividend growth rate of 16.4%. By country, Singaporean real estate firms offer the most attractive dividend yield of 4.6% on average, whereas the real estate firms of Hong Kong have the highest dividend growth rate of 22.7%.

We collected weekly total stock return data for individual sample firms in our list from a second data source, Datastream. The stock market index returns and interest rate data are also downloaded from this database. They are used together with the individual stock return data to calculate the market and interest rate betas for individual firms by using the two factor capital asset pricing models (CAPMs). These two systematic risk variables are used to control for the macro and market risks in our empirical models.

We regress the log stock return, which is calculated as the first difference of the log total return index of an individual stock, on the log stock market return (rmj,t) and the interest rate spread (Δij,t), where subscript i denotes a sample firm, j denotes the country in which the firm is listed, and t denotes the time (by week):

$$r_{ijt} = \alpha_{ij} + \beta_{1ij} r_{jt}^{m} + \beta_{2ij} \Delta i_{jt} + \varepsilon_{ijt} \quad (1)$$

The log-stock market returns for Singapore, Hong Kong and Japan are represented by the Straits Time Index, Hang Seng Index and Tokyo Stock Price Index (TOPIX), respectively. The credit spread variables are calculated as the difference between prime lending rates and interbank 3-month rates for the respective markets. We run the regressions by using weekly data for each of the sample firms, and recover the two betas, β1i,j and β2i,j, for each year in the sample period.[13] The two betas are used to control for capital market risks in the empirical leverage models.

The mean statistics for the market beta, β1i,j, and the interest rate beta, β2i,j, are estimated at 0.900 and -0.051 as in Table 1, respectively. REITs have a lower market beta of 0.622 relative to the market beta of 1.107 for REOCs. The interest risk betas for REITs and REOCs are estimated at -0.083 and -0.006, respectively. The results are consistent with the general perception that REITs are defensive stocks. REITs are also less sensitive to interest rate risks compared with REOCs. These summary statistics are reported in Table 1 as follows.

[13] We estimate the betas only if we have at least 11 months of weekly data in each year. We truncate those years where shorter weekly time-series data are available, for example, if a firm was listed in June of year "X", and the stock price data are only available for 6 months in year "X", the beta for year "X" for the firm will not be calculated, and instead we start from 1 January of year "X+1", and calculate the betas by using weekly data of the full year for year "X+1".

Table 1 Descriptive Statistics

		All	Up to 2008	After 2008	REOC	REIT
Firm-year observations		3440	1376	2064	2240	1220
Organization structure and financial variables						
Property type	proptype	2.452	2.240	2.568	1.557	3.944
		(2.140)	(2.070)	(2.169)	(1.382)	(2.338)
Self managed	selfmgd	0.462	0.564	0.406	0.730	0.015
		(0.499)	(0.496)	(0.491)	(0.444)	(0.122)
Self advised	selfadv	0.606	0.712	0.549	0.961	0.015
		(0.489)	(0.453)	(0.498)	(0.193)	(0.122)
REOC dummy	type	0.625	0.737	0.564	1.000	0.000
		(0.484)	(0.441)	(0.496)	(0.000)	(0.000)
Log market size/1000	size	0.290	0.211	0.332	0.529	-0.109
		(1.375)	(1.425)	(1.347)	(1.546)	(0.898)
Dividend yield	divyield	0.037	0.023	0.045	0.022	0.062
		(0.036)	(0.017)	(0.041)	(0.021)	(0.043)
Market beta	betamkt	0.900	0.930	0.885	1.107	0.622
		(0.504)	(0.606)	(0.441)	(0.480)	(0.390)
Interest rate beta	betaint	-0.051	0.005	-0.084	-0.083	-0.006
		(0.403)	(0.028)	(0.504)	(0.515)	(0.094)

(Continued⋯)

(Table 1 Continued)

		All	Up to 2008	After 2008	REOC	REIT
Debt structure						
Debt ratio	debtratio	0.439	0.378	0.472	0.436	0.443
		(0.220)	(0.211)	(0.217)	(0.243)	(0.174)
Variable debt ratio	vardrat	0.482	0.501	0.473	0.635	0.292
		(0.338)	(0.345)	(0.334)	(0.314)	(0.261)
Senior secured debt ratio	secdrat	0.452	0.480	0.437	0.473	0.419
		(0.404)	(0.403)	(0.404)	(0.377)	(0.440)
Leverage channel						
Dividend payout	divpayout	0.526	0.565	0.507	0.355	0.841
		(0.526)	(0.690)	(0.425)	(0.509)	(0.394)
Current tax ratio	rcurtax	0.254	0.270	0.246	0.377	0.031
		(1.071)	(0.934)	(1.137)	(1.306)	(0.249)
Real estate asset value / revenue source						
Real estate value to enterprise value ratio	rrevalue	0.751	0.864	0.682	0.633	0.896
		(0.471)	(0.632)	(0.321)	(0.560)	(0.268)
Property rental revenue ratio	rrentrev	0.675	0.573	0.725	0.292	0.991
		(0.430)	(0.452)	(0.410)	(0.370)	(0.050)

Notes: The second column shows the various variable names used in the regressions. Statistics in the column "Up to 2008" refer to numbers calculated for 2001 up to and including 2008. Statistics in the column "After 2008" refer to numbers calculated for years after 2008 up to 2021. Numbers that correspond to each variable denote the means, while the corresponding numbers in brackets denote the standard errors.

3.3 Leverage Channels

Table 1 also reports the statistics for three other important explanatory variables. The first two variables termed "leverage channels" are related to tax effects on corporate debt policies. When dividends are taxed as income, and capital gains face lower taxes or no tax, then the MM dividend irrelevance rule does not hold, and one would expect higher discretionary dividend payout to be more costly to the shareholders. This would be counter-balanced only by an increase in the tax shield with higher debt. However, in the three Asian countries, Japan imposes both dividend and capital gains taxes, and the differential is small so that there may not be any direct effect of the dividend policy on debt issues. For Singapore, tax on dividends for small investors are based on the marginal income tax, which is one of the lowest in Asia, so the dividend impact may be small. For Hong Kong, both dividends and capital gains are close to being tax-free, so again there is no direct dividend effect on the debt issue. Nevertheless, dividend payout is considered a leverage channel that may impact leverage. The average dividend payout ratio (didpayout) of Asian real estate firms is estimated at 52.6%. REITs pay out as much as 84.1% of the earnings as dividend, whereas the dividend payout of REOCs is lower at 35.5% on average. Earning management strategies adopted by some REITs, such as deferred payments, income supports, operating losses carried forward, and share-buy-back, among others, can possibly explain for the short-falls in the payouts relative to the mandatory level of 90%. The non-distributable cash flows by REITs are subject to corporate taxes at the standard rates. Real estate firms in Hong Kong that consist mainly of REOCs have the lowest dividend payout, while the highest dividend payout of 78.8% in Japan could be related to the large number of REITs in the country. Japanese REITs constitute more than half of the Asian REIT market share by number.

More directly, current tax ratio is used as a leverage channel to see if it is able to explain leverage. The data on dividend payout ratio and current tax ratio are obtained directly from the SNL database, and their descriptive statistics are shown in Table 1. The current tax ratio is calculated as the current tax to the total net income ratio, (rcurtax = curtax/netincome). The average current tax ratio for real estate firms in Asia is estimated at 25.4%. REITs being a tax-transparent vehicle pay on average 3.1% of their net income as the current tax, whereas REOCs have an average current tax ratio of 37.7%. Real estate firms in Hong Kong have the highest current tax ratio of 32.7%, whereas real estate firms in Singapore are the most tax efficient with the lowest current tax ratio of 19.1% on average.

3.4 Asset Liquidation and Business Line

Other than the two public market channels, we extend our tests to examine how business and investment activities in the private markets could influence the leveraging strategies of real estate firms. In the finance literature, property,

plant and machinery (PPE) are commonly used to proxy the fixed asset investments of firms, but the proxy may be subject to measurement errors because of difficulty in controlling for firm [14] and industry-specific heterogeneities. As we use firms in the same real estate industry, the value of real estate assets held by real estate firms and their revenue sources could be measured more accurately and uniformly.

Based on the data on real estate value obtained from the SNL database, we calculate the real estate assets to the firm value ratio, (rrevalue = revalue/entvalue), where the firm (enterprise) value is the sum of the total equity and debt of a sample firm (entvalue = totequity + debt). rrevalue is inversely related to the liquidation value of firms, such that firms with high real estate holdings have low liquidation value. Table 1 shows that real estate firms own a relatively high proportion of illiquid assets with an average real estate asset ratio of 75.08%. On average, REITs hold 89.55% real estate assets whereas REOCs hold 63.32% real estate assets.

The business activities of REOCs and REITs are different, although both firms operate in the same real estate industry. REITs are mandatorily required to invest at least 70% of the assets in investment properties to generate long-term rental income streams, whereas construction and property developments are the main line of business activities of real estate developers. Real estate developers in Asia widely adopt the build-to-sale trading model that sells residential properties off-the-plan, also known as pre-completion sales. Properties under construction and development have a shorter project life-cycle of 3 to 5 years depending on the project scale. REITs are, however, prohibited from undertaking "property trading" activities, which are highly speculative and prone to cyclical risks.[15]

Table 1 shows that the average rental revenue (rrentrev) ratios are estimated at 67.5% for the full sample firms. We also observe clear distinctions in the business lines of the two firms. REITs generate 99.1% of their revenue from property rental income, and only a small 0.9% from development activities. For REOCs, however, rental income and development business account for 29.2% and 70.8%, on average, of their total property revenue, respectively. As in Titman and Wessels (1988), the uniqueness of business is likely linked to

[14] Firm-specific heterogeneity is for example, service firms that may not have significant investment in "hard" assets relative to manufacturing firms, and as such, the fixed asset variable may not be a fair measure for the investment of service firms, on the one hand, and will over-weigh investment of manufacturing firms, on the other hand. It is also uncommon to control for firm fixed effects in the panel in the finance literature because of the large number of sample firms involved.

[15] REITs, however, are allowed to undertake limited real estate development activities, where in Singapore, the development investments should not exceed 25% of the total asset, effecitive July 2015. REITs are also required to hold development properties for investment purposes upon completion.

liquidation (bankruptcy) costs, and firms with a high concentration in the revenue source are likely to be closely associated with businesses that are unique.

4. Emprical Strategy

There are two objectives of our empirical analyses. The first objective is to find out if the two types of securitized real estate firms use the same leveraging strategies (debtratio) after controlling for heterogeneity in financial characteristics, organization features, and capital market risks. We then test the key leverage channels that influence the debt levels of REOCs and REITs. The debt ratio model is estimated by using a panel regression with a fixed effects framework:

$$\begin{aligned} debtratio_{i,j,t} = {} & \alpha + \beta' \mathbf{X_{ijt}} + \phi \times type + \delta \times channel_{ijt} \\ & + \vartheta\,(type \times channel_{ijt}) + \sum_{a} \lambda_a\, I_{ijt} \\ & + \sum_{b} \gamma_b J_{ijt} + \sum_{c} \tau_c K_{ijt} + \varepsilon_{ijt} \end{aligned} \tag{2}$$

where i is the firm, j is the country, and t is the year. Xi,j,t is a vector of variables included to control for country j, structural and financial attributes of firm i in year t, such as size, self-managed (selfmgd), self-advised (selfadv), and dividend yield (divyield), and two market risk factors which are systematic market beta (betamkt) and interest rate beta (betaint). Whether firm i of country j at t is a particular type or belongs to a particular property sector is represented by a dummy variable I_{ijt} that takes the value of 1 if the firm i is in the sector a; and 0 otherwise. Whether firm i at t in country j belongs to a particular country is represented by a dummy variable J_{ijt} that takes the value of 1 if firm i is in country b; and 0 otherwise. Whether the variable of firm i at t in country j is at time t represented by dummy variable K_{ijt} that takes the value of 1 if the variable occurs at year c; and 0 otherwise. These dummy variables capture the fixed sector, country, and year effects in the model when they are used. The variable channel denotes one for dividend payout (divpayout), current tax ratio (rcurtax), asset value ratio (rrevalue), and rental revenue ratio (rrentrev). α, β', ϕ, δ, ϑ, $\{\lambda_a\}$, $\{\gamma_b\}$, and $\{\tau_c\}$ are the regression parameters, and εijt is the error term. The error term is assumed to be independent and identically distributed (i.i.d.) and can be further modelled to consider cluster effects or heteroscedasticity in the variances and covariances.

The global financial crisis has significantly dampened real estate value in the post-crisis periods. As robustness tests, we add a time dummy, aft2008 to the model, which has a value of 1 to indicate the post-global financial crisis periods that cover 2008 and after; and 0 otherwise to indicate the pre-crisis periods. We

include an interactive term to simulate the "difference-in-differences" (diff-in-diff) effects, where the crisis is expected to induce external shocks to the leveraging channel effects, if the channels are found to be significant in the regression model. The accompanying regression model is shown below:

$$\begin{aligned} debtratio_{i,j,t} = \; & \alpha + \beta' \mathbf{X_{ijt}} + \phi \times type + \delta \times channel_{ijt} \\ & + \vartheta_1 \, (type \times channel_{ijt}) + \vartheta_2 \, (type \times aft2008) \\ & + \vartheta_3 \, (type \times aft2008 \times channel_{ijt}) \\ & + \sum_a \lambda_a \, I_{ijt} + \sum_b \gamma_b J_{ijt} + \sum_c \tau_c \, K_{ijt} + \varepsilon_{ijt} \end{aligned} \tag{3}$$

For further robustness testing of the effects on leverage, we create a dummy t75roe, which sorts the sample firms into a group with an ROE above the 75th percentile – where a value of 1 is assigned to the latter higher performers, and 0 otherwise. We then add a triple diff-in-diff term ("channel × type× t75roe") into Equation (3) to test if the leveraging strategies of REITs and REOCs are also dependent on the stock performance of the firms.

For further robustness tests, we use deal level data on the debt and equity issuances of firms from the SNL database to test if the quantum of debt and equity raised varies between REITs and REOCs, and if different channel effects are significant in explaining the leveraging strategies. We repeat the estimation of the models as in Equation (3), but replace the dependent variables with the gross amount of debt and equity raised by firms during the sample periods.

Figures 3(a) and 3(b) show the number of debt and equity issuances by the sample real estate firms over the period of 2001 to 2013. The figures show uptrends in the number of capital raising exercises after 2008 for both REOCs and REITs. REOCs used more debt than equity in funding their business activities throughout the sample period whereas REITs used more equity issuance in raising new capital. The number of new equity issuance by REITs peaked in 2013 with a total of 66 equity issuance.

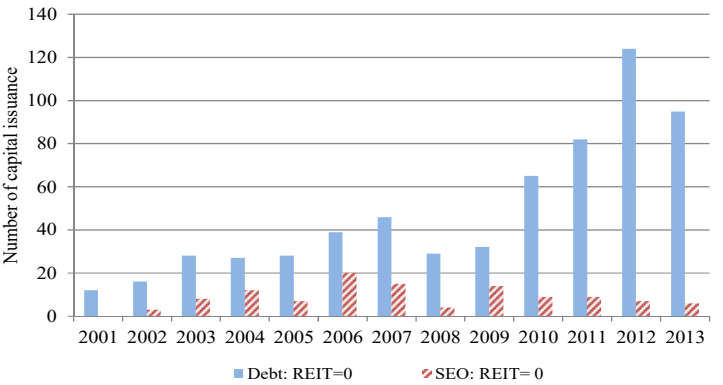
5. Empirical Results

5.1 Leveraging Strategies

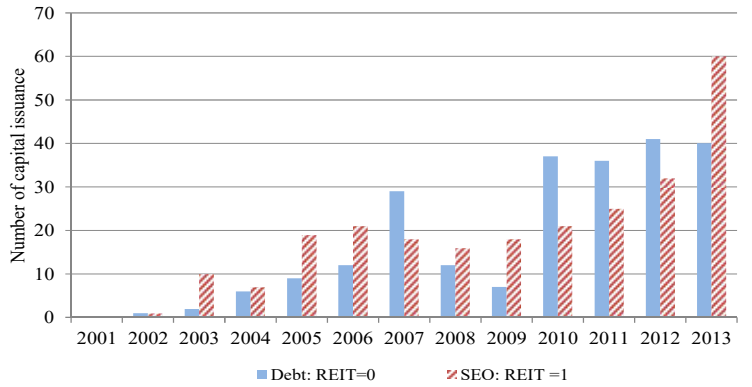
Using the regression model in Equation (2) but first by restricting δ, ϑ, and some of the fixed effect dummies to zero, we empirically test if REOCs use more debt than REITs via the type dummy variable. The regression results are reported in Table 2.

Figure 3 **New Debt Issuance (Shaded Bars) and SEOs (Dashed Bars) by: (a) REOCs, and (b) REITs (SNL Financial Database, 2001-2013)**

(a)



(b)



As seen in Table 2, the regression results are consistent across Models (1) to (4). The models are all controlled for property sector, country and year fixed effects in different permutations. We find that large firms use less debt. This could be due to the ability of large firms to raise financing more cheaply via equity offers. Firms that adopt a self-managed structure also use less debt. The self-advised structure coefficients, which are used mainly by REITs, are significant and negative only in Models (3) and (4). Self-management and self-advisory imply more internal economy, but also provide for less transparency as there is lack of external review. Thus, it may be more expensive to raise more debt, especially for REOCs relative to firms with external management and advisories.

Table 2 Leverage Strategies of REITs versus Real Estate Operating Companies

VARIABLE	(1) debtratio	(2) debtratio	(3) debtratio	(4) debtratio
Type	0.13180***	0.19359***	0.14404***	0.18964***
	(0.00498)	(0.00490)	(0.00453)	(0.00398)
divyield	0.85495***	1.05437***	0.18820***	0.56480***
	(0.03333)	(0.03242)	(0.03050)	(0.02672)
size	-0.08529***	-0.08116***	-0.08375***	-0.08879***
	(0.00082)	(0.00079)	(0.00079)	(0.00068)
betamkt	0.06940***	0.04869***	0.12164***	0.07458***
	(0.00269)	(0.00264)	(0.00254)	(0.00223)
betaint	-0.03251***	-0.04772***	0.00699***	-0.01220***
	(0.00207)	(0.00204)	(0.00197)	(0.00167)
selfmgd	-0.02297***	-0.04706***	-0.00788***	-0.04436***
	(0.00278)	(0.00277)	(0.00251)	(0.00222)
selfadv	-0.06079***	0.08203***	-0.03669***	0.00612
	(0.00492)	(0.00477)	(0.00422)	(0.00401)
Constant	0.41321***	0.18720***	0.48486***	0.32304***
	(0.00416)	(0.00379)	(0.01056)	(0.00972)
Observations	23,905	23,905	23,905	23,905
R-squared	0.43220	0.46225	0.54723	0.67948
Property FE	YES	NO	NO	YES
Year FE	NO	NO	YES	YES
Country FE	NO	YES	NO	YES

Notes: The dependent variable is total debt ratio (debtratio). The table reports the panel regression results with different combinations of property sector, country and year fixed effects. Type is a dummy variable that sorts the sample firms into REITs (type = 0) and REOCs (type = 1). Control variables include firm size measured by log-market capitalization (US$ million) (size), dividend yield (divyield), two dummy variables that represent the organizational structure of sample firms: self-advised (self-adv) and self-managed (self-mgd), and two capital risk measures: market beta (betamkt) and interest rate beta (betaint) that are estimated in Equation (1) by using weekly data from Datastream. Standard errors are shown in parentheses. *** indicates significance at the 1% level; ** indicates significance at the 5% level; and * indicates significance at the 10% level.

The systematic market beta has a significantly positive association with debt ratio. The result is consistent with the explanation in Tuzel (2010) that real estate holdings contribute to increased systematic risks for publicly listed firms. Moreover, higher debt is typically related to higher leveraged beta. The interest rate beta, namely credit risk, is significant and negative in explaining the debt ratio in all of the models, except for Models (3) and (4). Dividend yield has a positive relationship with debt ratio. The two types of securitized real estate firms adopt different leveraging strategies in sourcing for external funds.
The results in Table 2 show that the estimated coefficient on the key identifier, type, is highly significant and positive in all of the models. For the first three models; i.e., Models (1) to (3), the estimated coefficient values range from 0.1318 to 0.1935, when only a single fixed effect, either property sector, country or year, is included in the model. The coefficients remain significant and positive when three (Model 4) of the fixed effects are jointly controlled for in the model. In Model (4), where the three fixed effects are included, the coefficient on type is estimated at 0.1896, while the coefficients for all of the other control variables are stable and consistent. The results imply that REOCs use on average 18.96% more debt than REITs, ceteris paribus.

Next, we explain why the leveraging strategies are different between REOCs and REITs, and identify the channels that could explain this difference. We add two finance variables of dividend payout and current tax ratio, and their respective interactive terms (type × channel), as shown in Equation (2). We also use the real estate asset value ratio, (rrevalue), and the property operating revenue (rrentrev), and their respective interactive variables to model the differential effects of asset liquidation and uniqueness of business line. The main results are reported in Table 3.

Firm size, market beta and dividend yield variables remain significant and the signs are also consistent with those reported in the earlier models. The self-managed dummy variable is only significant in Models (1) to (3), and the self-advised dummy coefficients are not significant in all of the models, although the estimated coefficient signs remain the same as in the earlier regressions. The three fixed effects of property sector, country and year are incorporated in all of the models.

The addition of the channel variable and the interactive terms (Models 1, 2, and 4) do not explain away the variations captured by the type variable. The type dummy variables are significant and positive in all 3 models. In Model (1), we find that the dividend payout variable and the interactive term are statistically insignificant. In Model (2), the current tax ratio variable, rcurtax, and the interactive term, type × rcurtax, however, are significant. The results imply that the leveraging strategies of REOCs and REITs are not correlated with dividend policy, and the REIT effects in leveraging decisions cannot be explained by the dividend payout channel. There appears to be no evidence that dividend payout is of any influence whether in REITs or REOCs. Since some REITs do not pay

out 100% dividends, and REOCs are certainly discretionary in their dividends issue, the 100% payout condition as required by DeAngelo and DeAngelo (2006) does not in this case appear to deter the irrelevance of dividend policy as far as debt policy is concerned, and the firm value also may not be affected if it is related directly to leverage.

The negative current tax coefficient suggests that real estate firms with a high current tax ratio use less debt. However, the results show that REOCs are more likely to exploit the tax-shield advantages in the leveraging strategies. The net positive coefficient of 0.024 on the interactive term implies that REOCs with a higher current tax to income ratio will exploit the tax-shield benefits by using more debt financing. For every 1% increase in the current tax to net income ratio, the debt ratio of REOCs increases by 12.3% relative to REITs, ceteris paribus.

Aside from the finance factors, we further test the effects of differences in business activities in the private market on the leveraging strategies of real estate firms. The results are reported in Models (3) and (4) of Table 3. The results show that the type dummy coefficients are significant and positive in Model (4). The exogenous channel of rental income ratio enables REITs to raise more debt with a higher rental ratio, although it does not appear to do the same for the REOCs. The results are therefore mixed in terms of the finding in Titman and Wessels (1988) in that the higher uniqueness of business, such as in real estate firms with high rental incomes, should result in less debt. This is supported by the results on REOCs, but the exception for REITs could be because rental incomes are their major source of revenue.

For Model (3), the coefficient on the exogenous channel of real estate asset value, which is a proxy of asset illiquidity when asset value becomes a large portion of the total firm value, is estimated to be significantly negative for both REITs and REOCs, although more so for REITs. The results support the hypothesis of Shleifer and Vishny (1992) that real estate firms that hold a high fraction of real estate assets (more illiquid assets) use less debt. When the real estate asset value factor is considered, the conditional difference between the average of the REIT and REOC debt ratios becomes insignificantly different from zero at -0.004. This provides support of the MM debt irrelevance hypothesis.

Table 3 Leveraging Strategies and Channels: Regressions that use Fixed Property Sector, Country, and Year Effects

Channel	(1) Dividend payout	(2) Current tax ratio	(3) Real estate asset value ratio	(4) Property rental revenue ratio
Firm size	-0.100***	-0.083***	-0.067***	-0.088***
(size)	(0.005)	(0.004)	(0.004)	(0.005)
Market beta	0.112***	0.096***	0.073***	0.027*
(betamkt)	(0.014)	(0.012)	(0.012)	(0.015)
Interest rate beta	-0.018	-0.024*	0.014	-0.029*
(betaint)	(0.012)	(0.013)	(0.018)	(0.016)
Self-managed dummy	-0.046***	-0.064***	-0.082***	-0.018
(selfmgd)	(0.015)	(0.015)	(0.014)	(0.020)
Self-advised dummy	-0.057	-0.026	-0.032	-0.023
(selfadv)	(0.037)	(0.034)	(0.029)	(0.047)
Dividend yield	1.079***	0.847***	0.594***	1.075***
(divyield)	(0.268)	(0.171)	(0.165)	(0.184)
REOC dummy	0.166***	0.145***	-0.004	0.885***
(type)	(0.045)	(0.037)	(0.043)	(0.169)
Exogenous channel	-0.032	-0.099***	-0.257***	0.659***
(channel)	(0.023)	(0.031)	(0.030)	(0.163)
Interactive type × channel	0.036	0.123***	0.145***	-0.898***
(type × channel)	(0.029)	(0.032)	(0.030)	(0.165)
Constant	0.220**	0.346***	0.578***	-0.439**
(Constant)	(0.107)	(0.060)	(0.057)	(0.192)
R-squared	0.600	0.528	0.639	0.620

Notes: The dependent variable is total debt ratio (debtratio). The table reports the panel regression results with property sector, country and year fixed effects. type is a dummy variable that sorts sample firms into real estate investment trust (REITs) (type = 0) and real estate operating companies (REOCs) (type = 1). Exogenous channels in the models include the dividend payout ratio (divpayout), current tax ratio (rcurtax), real estate asset value ratio (rrevalue), and property rental to revenue ratio (rrentrev). Each regression that involves a channel variable is represented by (1), (2), (3), and (4) in the last 4 columns. Control variables include firm size measured by log-market capitalization (US$ million) (size), dividend yield (divyield), two dummy variables that represent the organizational structure of sample firms: self-advised (self-adv) and self-managed (self-mgd), and two capital risk measures: market beta (betamkt) and interest rate beta (betaint) that are estimated in Equation (1) by using weekly data from Datastream. The standard errors are shown in parentheses. *** indicates significance at the 1% level; ** indicates significance at the 5% level; and * indicates significance at the 10% level.

5.2 Impact of Global Financial Crisis

The US subprime crisis caused serious disruptions to the operations of many real estate firms in Asia. New City Residence Investment Corporation, a residential REIT in Japan, had failed to raise external capital to pay back a 4.5 billion yen (49.8 million USD) syndicated loan and to purchase previously agreed property worth 2.7 billion yen (29.9 million USD). In September 2008, New City Residence Investment Corporation filed for bankruptcy under the Civil Rehabilitation Act (2000).[16] In May 2009, Joint Corporation Co. Ltd., a Japanese apartment developer, filed for bankruptcy protection after it was saddled with liabilities of 168 billion yen (US$1.7 billion).[17]

The subprime crisis is an exogenous shock that we use to test the "second difference" effects on the leveraging decisions of REITs and REOCs. We add an interactive term (type × aft2008) and a triple diff-in-diff (interactive) term (type × channel × aft2008) as in Equation (3), where aft2008 is a post-crisis period dummy that has a value of 1 if the year is 2008 and after, and 0 otherwise. The results in Table 4 show that the coefficients on the type dummy, channel, and interactive and control variables are largely consistent, and have the same signs as those reported in the previous models.

We observe that the interactive variable, type × aft2008, is significantly positive in all of the models. The results indicate that REOCs use on average between 5.1% and 9.1% more debt than REITs in the post-crisis periods after conditioning on all the control variables. While the dividend and current tax channels effects are significantly positive for REOCs, these effects disappeared after the crisis as the triple interactive terms are not significant. The effects of liquidation and unique line of business on the leveraging of REOC become weaker after the crisis. The results show the significant impact of the subprime crisis on the leveraging strategies of real estate firms in Asia. REOCs generally behave more like REITs in their leveraging strategies after the subprime crisis in terms of their overall debt ratios which drew closer post crisis. This could be due to the low interest cost of debt post crisis in Asia as well as stable rental incomes which encouraged REITs to use relatively more debt than REOCs during that period of time. Figures 2, 3a, and 3b provide a consistent picture about what happened post the 2008 crisis.

[16] Bloomberg News, Taku Kato and Mari Murayama, "New City REIT Files Bankruptcy with $1.1 Billion Debt", October 9, 2008.
[17] Bloomberg News, Gregory Turk and Yasuke Miyazawa, "Join, Japanese Developer, Files for Bankruptcy", May 29, 2009.

Table 4 Leveraging Strategies and Impact of Global Financial Crisis: Regressions that use Fixed Property Sector, Country, and Year Effects

Channel	(1) Dividend payout	(2) Current tax ratio	(3) Real estate asset value ratio	(4) Property rental revenue ratio
Firm size	-0.100***	-0.084***	-0.067***	-0.088***
(size)	(0.005)	(0.004)	(0.004)	(0.005)
Market beta	0.117***	0.102***	0.079***	0.033**
(betamkt)	(0.014)	(0.013)	(0.012)	(0.015)
Interest rate beta	-0.015	-0.020	0.017	-0.025
(betaint)	(0.012)	(0.013)	(0.018)	(0.016)
Self-managed dummy	-0.043***	-0.062***	-0.084***	-0.019
(selfmgd)	(0.015)	(0.015)	(0.014)	(0.020)
Self-advised dummy	-0.056	-0.024	-0.031	-0.027
(selfadv)	(0.037)	(0.034)	(0.029)	(0.047)
Dividend yield	1.262***	0.937***	0.605***	1.118***
(divyield)	(0.274)	(0.175)	(0.166)	(0.186)
REOC dummy	0.104**	0.094**	-0.054	0.846***
(type)	(0.049)	(0.042)	(0.052)	(0.171)
Exogenous channel	-0.035	-0.096***	-0.276***	0.651***
(channel)	(0.023)	(0.031)	(0.031)	(0.163)
Interactive type x channel	0.055*	0.135***	0.181***	-0.859***
(type × channel)	(0.033)	(0.037)	(0.034)	(0.168)
Interactive type and crisis	0.091***	0.069***	0.064**	0.051*
(type × aft2008)	(0.028)	(0.025)	(0.029)	(0.029)
Triple interactive	-0.046	-0.018	-0.058*	-0.054
(type × channel × aft2008)	(0.040)	(0.022)	(0.033)	(0.055)
Constant	0.250**	0.390***	0.610***	-0.427**
	(0.109)	(0.062)	(0.062)	(0.194)
R-squared	0.606	0.532	0.641	0.622

Notes: The dependent variable is total debt ratio (debtratio). The table reports the panel regression results with property sector, country and year fixed effects. Type is a dummy variable that sorts sample firms into REITs (type = 0) and REOCs (type = 1). Exogenous channels in the models include the dividend payout ratio (divpayout), current tax ratio (rcurtax), real estate asset value ratio (rrevalue), and property rental to revenue ratio (rrentrev). Each regression that involves a channel variable is represented by (1), (2), (3), and (4) in the last 4 columns. Control variables include firm size measured by log-market capitalization (US$ million) (size), dividend yield (divyield), two dummy variables that represent the organizational structure of sample firms: self-advised (self-adv) and self-managed (self-mgd), and two capital risk measures: market beta (betamkt) and

interest rate beta (betaint) that are estimated in Equation (1) by using weekly data from Datastream. Dummy variable aft2008, which takes a value of 1 if the year is after 2008 and 0 otherwise, is also introduced in the above regressions. The standard errors are shown in parentheses. *** indicates significance at the 1% level; and ** indicates significance at the 5% level; and * indicates significance at the 10% level.

5.3 Debt Types

We next test if the leveraging channel effects are differentiated by the choice of the type of debt. As the variable interest rate debt (vardrat) (0.482) and the senior secured debt (secdrat) (0.404) constitute more than 88.6% of the total debt of the real estate firms, we replace the debt ratio with these two types of debt as the dependent variables in Equation (2). The results for vardrat and secdrat are summarized in Tables 5 and 6, respectively.

Table 5 shows that the variations in the variable interest rate debt ratios are not correlated with firm size and market risks (market and interest rate betas), but the organization structure of the firms has strong effects on the variable debt choices. We find that the coefficients on the two self-managed and self-advised dummies are significant and negative in all of the models, which imply that real estate firms that are managed and advised internally use less debt with a variable interest rate. We also find that the type dummy is positively significant in all except for Model 4. The results show that REOCs use 6.11% to 6.47% more variable interest rate debt than REITs. Real estate firms with a higher current tax ratio also use more variable debt, but the results reverse for REOCs with a high current tax ratio. REOCs with high current tax ratio use less debt with a variable interest rate than comparable REITs with high current tax ratio. Real estate firms that have a high concentration of rental revenue (unique business line) use less debt with a variable interest rate. This appears to be the opposite for total debt ratio.

We next examine the use of senior secured debt and different channel effects in leveraging strategies for REOCs and REITs. Table 6 shows that large real estate firms use less senior secured debt. We also find strong negative relationships between the self-managed and self-advised structures of real estate firms and the senior secured debt ratio in Models (2) and (3). However, the differential effects in the use of senior secured debt between REOCs and REITs show up only in Model (2), where the type dummy is significantly positive. Under Model (3), when the real estate asset value channel is used, the conditional difference between the average REIT and REOC debt ratios is not significantly different from zero, which is similar to the results in Table 3. We also find that real estate firms with a high dividend payout ratio and high asset liquidation ratio (high real estate value) use less senior secured debt. The latter result is reversed with REOCs. REOCs that face high liquidation costs in asset use more senior secured debt. This could be due to their diversified real estate portfolio.

Table 5 Leverage by Variable Debt: Regressions that use Fixed Property Sector, Country, and Year Effects

Channel	(1) Dividend payout	(2) Current tax ratio	(3) Real estate asset value ratio	(4) Property rental revenue ratio
Firm size	-0.015	-0.000	-0.014	-0.017
(size)	(0.011)	(0.010)	(0.012)	(0.012)
Market beta	0.000	-0.028	-0.024	-0.030
(betamkt)	(0.031)	(0.027)	(0.031)	(0.032)
Interest rate beta	0.001	-0.005	0.055	0.024
(betaint)	(0.026)	(0.026)	(0.040)	(0.035)
Self-managed dummy	-0.133***	-0.156***	-0.077**	-0.194***
(selfmgd)	(0.037)	(0.034)	(0.038)	(0.043)
Self-advised dummy	-0.323***	-0.325***	-0.399***	-0.313***
(selfadv)	(0.116)	(0.095)	(0.092)	(0.087)
Dividend yield	0.397	0.249	-0.152	0.085
(divyield)	(0.567)	(0.357)	(0.398)	(0.355)
REOC dummy	0.612***	0.647***	0.611***	-0.439
(type)	(0.117)	(0.094)	(0.110)	(0.309)
Exogenous channel	0.071	0.157***	-0.027	-1.255***
(channel)	(0.048)	(0.057)	(0.071)	(0.298)
Interactive type × channel	-0.009	-0.190***	0.002	0.996***
(type × channel)	(0.065)	(0.059)	(0.076)	(0.303)
Constant	0.389	0.370**	0.512***	1.836***
	(0.288)	(0.172)	(0.182)	(0.394)
R-squared	0.404	0.357	0.352	0.468

Notes: The dependent variable is variable debt ratio (vardrat). The table reports the panel regression results with property sector, country and year fixed effects. Type is a dummy variable that sorts sample firms into REITs (type = 0) and REOCs (type = 1). Exogenous channels in the models include the dividend payout ratio (divpayout), current tax ratio (rcurtax), real estate asset value ratio (rrevalue), and property rental to revenue ratio (rrentrev). Each regression that involves a channel variable is represented by (1), (2), (3), and (4) in the last 4 columns. Control variables include firm size measured by log-market capitalization (US$ million) (size), dividend yield (divyield), two dummy variables that represent the organizational structure of sample firms: self-advised (self-adv) and self-managed (self-mgd), and two capital risk measures: market beta (betamkt) and interest rate beta (betaint) that are estimated in Equation (1) by using weekly data from Datastream. The standard errors are shown in parentheses. *** indicates significance at the 1% level; and ** indicates significance at the 5% level; and * indicates significance at the 10% level.

Table 6 Leverage by Senior Secured Debt: Regressions that use Fixed Property Sector, Country, and Year Effects

Channel	(1) Dividend payout	(2) Current tax ratio	(3) Real estate asset value ratio	(4) Property rental revenue ratio
Firm size	-0.119***	-0.118***	-0.120***	-0.153***
(size)	(0.012)	(0.010)	(0.012)	(0.014)
Market beta	-0.044	-0.025	-0.043	-0.094**
(betamkt)	(0.033)	(0.027)	(0.031)	(0.038)
Interest rate beta	0.008	0.004	0.176***	0.007
(betaint)	(0.031)	(0.030)	(0.055)	(0.041)
Self-managed dummy	-0.124***	-0.169***	-0.152***	-0.081
(selfmgd)	(0.038)	(0.033)	(0.039)	(0.053)
Self-advised dummy	-0.133	-0.154**	-0.160**	0.132
(selfadv)	(0.087)	(0.074)	(0.074)	(0.113)
Dividend yield	-0.491	0.351	0.020	0.065
(divyield)	(0.614)	(0.364)	(0.419)	(0.450)
REOC dummy	0.117	0.243***	-0.005	-0.396
(type)	(0.104)	(0.080)	(0.111)	(0.407)
Exogenous channel	-0.200***	-0.009	-0.253***	-0.294
(channel)	(0.054)	(0.064)	(0.076)	(0.392)
Interactive type × channel	0.129*	0.042	0.294***	0.265
(type × channel)	(0.071)	(0.067)	(0.077)	(0.398)
Constant	0.865***	0.728***	0.958***	1.288***
(Constant)	(0.244)	(0.134)	(0.152)	(0.462)
R-squared	0.367	0.383	0.419	0.442

Notes: The dependent variable is senior secured debt ratio (secdrat). The table reports the panel regression results with property sector, country and year fixed effects. Type is a dummy variable that sorts sample firms into REITs (type = 0) and REOCs (type = 1). Exogenous channels in the models include the dividend payout ratio (divpayout), current tax ratio (rcurtax), real estate asset value ratio (rrevalue), and property rental to revenue ratio (rrentrev). Each regression that involves a channel variable is represented by (1), (2), (3), and (4) in the last 4 columns. Control variables include firm size measured by log-market capitalization (US$ million) (size), dividend yield (divyield), two dummy variables that represent the organizational structure of sample firms: self-advised (self-adv) and self-managed (self-mgd), and two capital risk measures: market beta (betamkt) and interest rate beta (betaint) that are estimated in Equation (1) by using weekly data from Datastream. The standard errors are shown in parentheses. *** indicates significance at the 1% level; and ** indicates significance at the 5% level; and * indicates significance at the 10% level.

5.4 Deal Analysis on Equity Issuance

We conduct more robustness tests by using the deal level data on the issuance of equity by the sample firms over the sample period of 2001-2021. This is to provide comparable results with those that involve debts that we have examined so far. For equity issuance, many of the REOCs were listed before the sample cut-off date of 2001, and the initial public offering (IPO) data are thus truncated and biased. Therefore, we only use secondary equity offering (SEO) to represent the incremental effects of the equity channel by real estate firms in the sample periods. We obtain the data on gross proceeds (in US$) raised by the sample firms from the SNL database and sort them by the issuance type (common debt versus SEOs). We transform the figures into logarithm term (lgrossamt) and use them as the dependent variable as in Equation (2). We run the log-gross capital proceeds model on the same set of control variables including the channels and the type dummy.

The results are reported in Table 7, which shows that large firms use more SEO issuance to raise new capital. This is consistent with the results in Table 3, which indicates that large firms therefore use less debt in external financing. The type dummy is not significant in all of the models except the model that has property rental revenue as a channel. Conditional on the rental revenue channel, REOCs use fewer issued SEOs than REITs to fund their investments. This along with the results in Table 3 imply that REOCs use more internal financing. We also find that the high uniqueness in the business line (high rental revenue) can also increase the use of SEOs to raise capital. REOCs with high uniqueness in their business line use more SEOs than REITs in their capital structure. Again, this is consistent with the results that concern debts. Other channels (dividend payout, current tax and real estate value) are not significant in explaining the variations in the issuing of SEOs.

6. Conclusions

The co-existence of REITs and REOCs in Asia offers a unique laboratory to test how managers of the two types of real estate firms choose their leveraging strategies in financing real estate activities. We use the financial data of REITs and REOCs listed on the exchanges of Hong Kong, Japan and Singapore for the periods of 2001 to 2021 in our tests. Our results show that REOCs on average use 15.7% more debt than REITs which is a tax-exempted and high dividend payout securitized real estate vehicle, ceteris paribus.

What are the channels that explain for the variations in the leveraging decisions of REOCs vis-à-vis REITs? We test whether 100% dividend payout and no tax assumptions that are closely mimicked in REITs are important channels that drive the differences in leveraging strategies between REITs and REOCs.

Table 7 Deal Level Leveraging Strategies: Secondary Equity Offerings and Channel Effects

Channel	(1) Dividend payout	(2) Current tax ratio	(3) Real estate asset value ratio	(4) Property rental revenue ratio
Firm size	0.471***	0.699***	0.615***	0.820***
(size)	(0.144)	(0.100)	(0.129)	(0.130)
Market beta	0.200	-0.101	0.165	0.223
(betamkt)	(0.316)	(0.218)	(0.279)	(0.272)
Interest rate beta	-0.070	-0.025	-0.872	-0.459
(betaint)	(0.393)	(0.378)	(1.483)	(0.511)
Self-managed dummy	-0.099	-0.172	-0.273	-0.388
(selfmgd)	(0.470)	(0.354)	(0.428)	(0.482)
Self-advised dummy	0.894	1.139**	0.972	-0.601
(selfadv)	(0.771)	(0.518)	(0.654)	(1.416)
Dividend yield	0.593	3.079	1.373	5.570**
(divyield)	(9.540)	(2.417)	(2.630)	(2.705)
REOC dummy	-0.143	-0.444	-0.505	-3.439***
(type)	(0.744)	(0.423)	(0.701)	(1.255)
Exogenous channel	0.813	0.523	0.210	-4.046**
(channel)	(0.577)	(0.973)	(0.692)	(1.800)
Interactive type × channel	-0.788	-0.506	-0.120	4.760***
(type × channel)	(1.137)	(0.976)	(0.719)	(1.525)
Constant	10.548***	11.179***	11.864***	16.037***
	(1.347)	(0.878)	(1.297)	(2.085)
R-squared	0.290	0.370	0.363	0.410

Notes: The dependent variable is log-gross amount of equity offerings (SEO). The table reports the panel regression results with property sector, country and year fixed effects. Type is a dummy variable that sorts sample firms into REITs (type = 0) and REOCs (type = 1). Exogenous channels in the models include the dividend payout ratio (divpayout), current tax ratio (rcurtax), real estate asset value ratio (rrevalue), and property rental to revenue ratio (rrentrev). Each regression that involves a channel variable is represented by (1), (2), (3), and (4) in the last 4 columns. Control variables include firm size measured by log-market capitalization (US$ million) (size), dividend yield (divyield), two dummy variables that represent the organizational structure of sample firms: self-advised (self-adv) and self-managed (self-mgd), and two capital risk measures: market beta (betamkt) and interest rate beta (betaint) that are estimated in Equation (1) by using weekly data from Datastream. The standard errors are shown in parentheses. *** indicates significance at the 1% level; and ** indicates significance at the 5% level; and * indicates significance at the 10% level.

Dividend payout for the most part appears to have no effect on debt strategies while higher tax induces more leverage usage by REOCs due to the valuable tax shield. However, we find that that the conditional leverage difference between REITs and REOCs, which is represented by a type dummy in the model, cannot be explained away by the use of dividend payout and current tax channels.

When we explore the private real estate market channel with the two proxies that represent liquidation costs (Shleifer and Vishny, 1992), and uniqueness in business line (Titman and Wessels, 1988), we find significant changes to the conditional leverage difference between REITs and REOCs. When the liquidation channel, which is inversely related to real estate asset value, is included in the leveraging model, we find that the conditional leverage difference between REITs and REOCs as represented by the type dummy disappears. The liquidation channel and interactive term provide incremental explanatory effects to the leveraging strategies of the two real estate firms. Similar to the expositions by Shleifer and Vishny (1992), real estate firms with high liquidation costs (high asset to total firm value) use less debt in terms of debt to total firm value ratio and in terms of actual dollar debt amounts. The conditional leverage difference between REITs and REOCs under the liquidation channel, however, is negative when dollar debt amounts are used as the dependent variable.

The uniqueness in the business line channel also affects the conditional leverage difference between REITs and REOCs proxied by the type dummy, and we see differences in leveraging strategies increase significantly between REOCs and REITs from an average of 15.7% to nearly 88.5%, when the rental revenue variable and the interactive term are included. REITS with high uniqueness in their business line (in fact nearly exclusively as this is the business model of REITs) as shown by the high concentration of rental revenue would use more debt to finance their operations. On the other hand, REOCs would use less debt when the rental income concentration is high. The latter results are consistent with the exposition in Titman and Wessels (1988).

There are two useful lessons from the above empirical results. First, the results imply that the divergence in the leveraging strategies between REITs and REOCs cannot be fully explained by dividend payout and current tax channels. The current tax channel does provide incremental explanatory effects to the leveraging strategies of real estate firms. The tax channel is more relevant for the REOCs. Second, the results also seem to suggest that liquidation value and uniqueness in business line are more pertinent when explaining the leverage strategies and their differences across the two major types of real estate firms.

We have conducted other robustness tests by using the subprime crisis as the exogenous shocks, and find that the regression effects of the channels are not rejected. We find some significant time variations in the conditional leverage difference between REITs and REOCs before and after the crisis that are

consistent with market development post crisis, as seen in Figures 2, 3a and 3b. We also use deal-level equity issuance by REOCs and REITs in our tests, and find consistent results with those in the debt regressions. After controlling for risk factors that involve the control variables as well as channel factors, there are key cases, such as the ability of the asset value ratio to explain for the conditional differences in the leverages of the REITs and REOCs that appear to support the empirical implications of the MM irrelevance hypothesis.

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Appendix : Summary of Key Requirements for REITs

	Japan	Singapore	Hong Kong
Structure	Trust or corporate (listed REITs are all corporations)	Collective investment scheme (unit trust) or corporate	Unit trust
Management structure	External	External	External/Internal
Investment in real estate	For listed J-REITs, at least 75% of assets must be invested in real estate	At least 70% of deposited property should be invested in real estate or real estate-related assets	Only invest in real estate
Property development	Restricted-at least 50% of total assets are income producing and unlikely to be sold within one year	Property development and investments in uncompleted projects shall not exceed 10%	Investment in property development or redevelopment shall not exceed 10% of the gross asset value
Leverage	No restrictions	Over 35% of total assets permitted with disclosed credit rating (capped at 60%)	Capped at 45% of gross asset value
Dividend payout	At least 90% to qualify for tax deduction	At least 90%	At least 90% of annual net income after tax

Notes: Prior to 22 July 2014, Hong Kong REITs (H-REITs) were prohibited from undertaking real estate development activities, but H-REITs could acquire uncompleted units that comprised less than 10% of the net asset values (NAVs).

Source: http://www.sfc.hk/edistributionWeb/gateway/EN/consultation/conclusion?refNo=14CP2