

The Economies of Scales in Private and Public K-REITs

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Abstract

Although the REITs in Korea (hereafter:K-REITs) has over a decade long history, there has been a little academic research available due to many constraints including data availability. This research is the first attempt to examine total 74 REITs companies, using data from Korean REITs Association. In this study, we explore the scale-of-economics in both private and public REITs in Korea. Initially, we construct an equivalent baseline measure for growth prospects, profitability measure, and revenue and expense measure and compare private and public K-REITs. This study further explore by regressing return measure for private and public K-REITs against a range of firm-specific financial and physical variables. The results show that the size of K-REITs does matter for determining growth prospects in which profitability and expense are interrelated. Additionally, our finding indicates that the premium on the ownership structure between public and private K-REITs has embedded in return measure.

I. Introduction

Although the real estate industry has been known as regional industry where the international investment has been limited due to informational accessibility, over the last a few decades, the global Real Estate Investment Trusts (hereafter; REITs) industry has developed from a small sector of equity market to significant sector of global equity market¹. The shift of investment rebalancing on REITs attributes to the more information accessibility on REITs markets when making decision on transferring the capital from a local real estate into global real estate industry. As of end of 2012, total 855 companies operate across 40 countries with 2.6 trillion dollar in market size. Especially, the market size of REITs industry accounts for approximately 9% of composition in the Russell 2000 index.

The adoption of REITs in Korea attributes to resolve a financial distress for the firm by liquidating holding properties into securitization during Asian Financial Crisis in late 1990s. The REITs has been a bridge between two parties; investors requiring a stable return source and corporate property owners suffering from a financial distress. However, the market size of K-REITs is still relative small compared to Asian Countries such as Singapore, Japan and Australia with a similar length of REITs history². Comparing to active research agenda and focus on the advanced countries, a relatively small set of research is available for Real Estate Investment in Korea. While there are informational achievement in A-REITs, S-REITs HK-REITs, and J-REITs via academic research (Dimovski and Brooks 2006, Wong et al 2013, Newell et al 2010, Ooi et al), relatively little thing is known about K- REITs to global and institutional investors due to lack of data availability.

Thus, we attempt to provide necessary information for Korean REITs including the growth prospects, profitability measure, and revenue and expense measure. In that sense, this research first identifies the general characteristics of public and private REITs in Korea by exploring the growth

¹ As of end of 2012, the global REITs market size is approximately 855 Global Real Estate companies with a total amount of U.S. 66 billion dollar, according to European Public Real Estate Association(EPRA)

² The inception year, the legal name of REITs for Asian countries are as follows: Australia (LPTs, 1971), Japan (J-REITs, 2000), Singapore(S-REITs, 1999), Malaysia (M-REITs, 2005), and Hong Kong (HK-REITs, 2003), respectively. The market size of REITs for each country is as follow; Australia (U.S.\$64.7Bil.)

prospects, profitability measure, and revenue and expense measure. Second, we examine whether there is a positive effect of the scale of economies on public and private K-REITs. As previous studies identifies that there is an effect of the scale of economies (Bers and Springer 1997, Ambrose et al 2000, Ambrose et al 2005) in REITs industry. Thus, we expect that as the size of K-REITs companies grows, the efficiency associated with production, operation would improve, and this allows K-REITs becoming more cost efficient and profitable in its revenues. As part of this analysis, we test the effect of scale economies in K-REITs by utilizing the growth prospects, profitability measure, and revenues and expense measure³. Furthermore, we also identify the distinct characteristics between the formats of legal entity (i.e. publicly traded and privately traded REITs). Third, we attempt to provide a set of information on K-REITs for global investor to compare with other alternative assets. Therefore, we expect that both domestic and global investors can make their investment decision based on a set of information on K-REITs.

In previous studies, the economies of scale are known as the operational efficiency as the scale of company increases lower operational cost. In many industries, the notion of scale economies has been applied to many sub-function of corporate such as purchasing and managerial advantages for manufacturing firms and financial advantages through easy accessibility to a wide range of financial institutions. Many of prior research on REITs has also tested a debate on whether scale economies are available to REITs. The findings support that the economies of scale generally reduce the cost associated with REITs operation and efficiency gains has embedded in return measure. While many academic findings on Global REITs including capital structure and governance has cumulated (Chan et al 2013), limited information are available on K-REITs. Hence, we examine the effect of scale economies in K-REITs for both public and private REITs as a number of private REITs are now going to public REITs market.

Thus, utilizing accounting information, we collect all necessary information to prepare groundwork for analyzing the growth prospects, profitability measure, and revenue and expense measure in order to

³ See Ambrose and Linneman (2001) and Ambrose *et al*(2005)

test scale of economies. It would be worthy to note that if going public REITs or a relative size of REITs companies will be justified if the size and operation efficiency is positively interrelated. We focus on the total 74 of privately and publicly traded K-REITs. Our study includes total 296 quarterly K-REITs observation from Jan. 2011 to Dec.2013. Our analysis is based on the collected information from balance sheet⁴ and income statement containing such information as the growth prospects, growth prospects, profitability measure, and revenues and expense measure. Especially, we extend our analysis to a distinct format of legal entity of K-REITs in Korea both Ordinary K-REITs and Corporate Restructuring REITs (hereafter: K-CR REITs) under which REITs has been established to improve the financial distressed firms by liquidating its fixed asset including real estate assets. Thus, we analyze a set of hypothesis related to the growth of K-REITs and economies of size. At first, we focus on the economies of scale in that we test to find any operational efficiency exists as the firm size of REITs increases.

The results shows that the scale of economies exist in that the relative small-size K-REITs may expect the operational efficiency gains in growth perspectives measured by implied cap.rate, payout ratio. In addition, further analysis shows that large size K-REITs carries lower costs, and lower general and administrative expense while it expects a increasing profit measures including FFO yield, and ROE measures. We find that the notion of scale economies is related to the size of K-REITs and the size effect on K-REITs has a relationship with profitability of firm.

The next section discusses the relevant literature. The section 3 describes the data used and method adopted. The section 4 analyzes the results and the final section presents our findings and discussion as well as limitation of paper.

⁴ The privately traded REITs in Korea are not under mandatory obligation to report a financial report to Korea Security Exchange Commission. The Korea REITs Association cumulates comprehensive accounting information on the privately traded REITs Company, information containing accounting report including income statement,

II. Literature Review

Although the relative size of REITs industry has been increased in recent years, the scale of economies has not been explored in the literature. Given the relative size of firm level K-REITs range of total asset from \$1,026 million to \$2.8 million, it is important to note that whether the REITs industry show a cost efficient operation and furthermore how these operational and managerial decision has been embedded in profitability in REITs. Therefore, it would be important implication for K-REITs to exploit the benefit from operational efficiency if theory of scale economies exists.

Scale Economies in REITs

Among many findings on economies of scale, Allen and Sirmans (1987) find evidence of economies of scale from early stage of U.S. REITs from 1977 to 1983. They find that the shareholder's wealth is positively related to the effect of REITs merge & acquisition and the improved management has been a primary source of efficiency gain, suggesting scale of economies.

In addition, McInto, Liang and Thomplins (1991) that the small size REITs firm shows a higher returns after controlling for market risk factor which contradicts to the prior research on scale economics. Furthermore McInto, Ott and Liang (1995) argues that REITs does not experience any significant and positive impact from sale transaction but only observed the positive impact from increased dividend payment.

Capozza and Lee (1995) examine the scale of economies by estimating net asset value. They find that the large size REIT will bring a significant premium compared to small sized REITs measured by net asset value. They categorize the relative size of REITs to find sources of difference in valuation. They refer the leverage, diversification, and overhead expenses of small size firm to the main cause of discount to net asset value. Later, Capozza and Seguin(1998) also explores the source of profits of different types

balance sheet, statement of cash flow and statement of equity holder.

of REITs industry, suggesting a lower management cost for focused REITs compared to diversified REITs industry.

Bers and Springer (1997) test whether REITs can benefit from an increase of size for the period 1992 – 1994. They hypothesize the operational management has a direct effect to the performance of REITs. They utilize the translog cost function to estimate economies of scale. They find that the economies of scale is time-dependent and sensitive to firm specific characteristics such as type of management, leverage level, as well as marginal impact of geographical and diversification effect.

Ambrose *et al* (2000) extend the studies of economies of scale into residential REITs market. They utilize net operating income (NOI) growth income rate for residential REITs when testing economies of scale with respect to firm size, branding strategy, and geographic concentration. The finding suggests that small REITs appear to be generating revenue and operating income, contradicting to the previous finding in other REITs types. Furthermore, branding strategy and geographic concentration do not generate higher NOI growth, indicating the scale of economies does not continue in year 1994 to 1997 in residential REITs sectors.

Conversely, Ambrose *et al* (2005) examine a comprehensive test on economies of scale in commercial real estate, a comprehensive test examining growth prospects, revenue and expense, profitability, and cost of capital measure. They extend the data scope into organizational structure, types of property focus. The finding suggests that large REITs can lower general costs including G&A expenses, and increase profit margins. In addition, they provide a large REITs can access a lower cost of capital. They conclude that there is no surprise that REITs will experience profitability measured by return on equity as their size increase, an evidence of scale economies. They also point out the variation of findings on scale economies in U.S. REITs attributes to the the time dependent market cycle. As pointed out in previous literature, if the economies of scale exists in the real estate industry, sizable public REITs will be preferred among real estate investors to exploit the operational efficiency and profitability.

This would be a ground for further discussion on governmental support to prepare improved legal surroundings for REITs industry.

Legal platform of REITs

Therefore, it is important to understand a possible motivation to select the legal entity of REITs and source of the return in REITs. Our study extends the type of legal platform of REITs; public and private REITs. Pagliari *et al* (2005) explore the REITs according to the type of legal platform; public versus private. They find that the legal entity of REITs did not provide a much difference in return characteristics and shows narrow difference in return measure in the period 1993 to 2001. However, the finding implies investors consider two legal entities differently and will examine two legal entries for liquidity, governance, transparency, control and executive compensation issues, a concern for portfolio investors.

Moreover, Ling and Petrova (2011) identifies the motivation for legal format of REITs entity between public and private. They also focus on the main reason for the REITs firm becomes a target of merger and acquisition, and the probability of subtle difference that bidder becomes a private and public firm. They find that there is higher possibility to become a acquisition targets if REITs are smaller and less liquidity with higher dividend yield. However, the existence of umbrella partnership (UPREITs) decrease the chance of being a target of privatization. Also they find that public buyers are more focused on highly levered REITs with greater institutional ownership efficiency of operation.

REITs formation is importation for investors to maximize long-term shareholder wealth. Especially, public REITs tend to show high correlation to the overall stock market which signals less diversification effect for portfolio investors (Clayton and MacKinnon 2003 and Gyorko and Keim 1992). Most of the previous literature mainly focuses on U.S. REITs and a few advanced REITs in Asian market, where advanced real estate financial markets are established. The Korean REITs market is relative small, new compared to other matured REITs markets, and thus limited research are available. In this sense, the

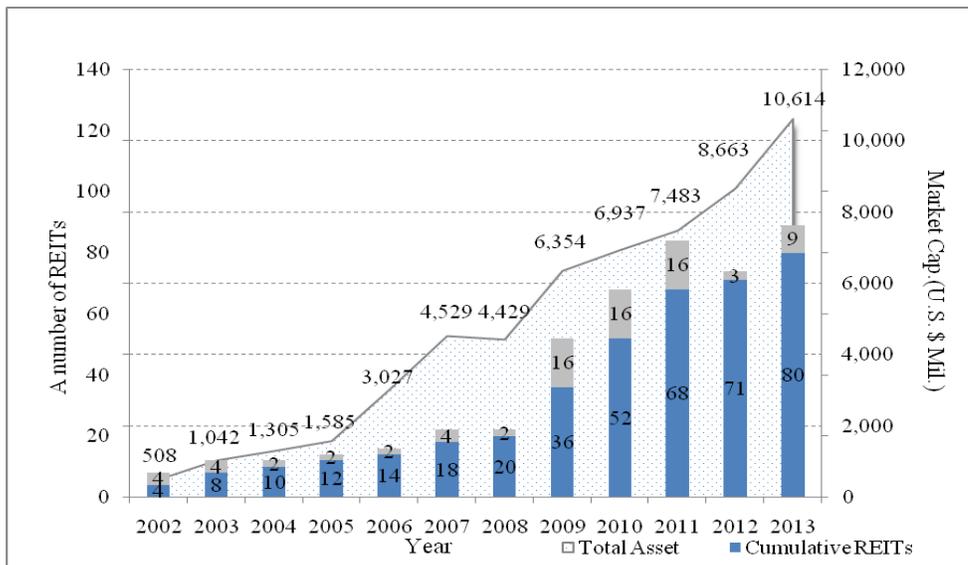
research of scale of economies would be groundwork for a potential growth in REITs industry and a possible merger & acquisition in the REITs industry in Korea. Therefore, we extend the academic boundary of scale economies by focusing on the REITs industry in Korea. Given the increased market size in REITs in Korea, we can contribute to response to the question whether REITs become cost efficient and profitable as the size increases.

III. Data & Method

While the history of U.S. REITs is approximately 50 years, the REITs industry in Korea has introduced in 2001 after Asian Financial Crisis. During this period, the K-REITs has rapidly developed with a market size of U.S.\$ 10,614 million as of end of 2013 as depicted in figure 1. We examine a total 75 REITs companies in Korea from March 2011 to December 2013. We identify the quarterly financial information for 75 REITs firms from KAREITs (Korean Association of Real Estate Investment Trusts). The proportion of

In sum, total 452 quarterly observations are examined for the research. For each observation, we collect the financial information from the balance sheet and income statement, and property information from the quarterly reports to shareholders.

Figure 1 ■ A Growth of Market Capitalization in REITs in Korea.

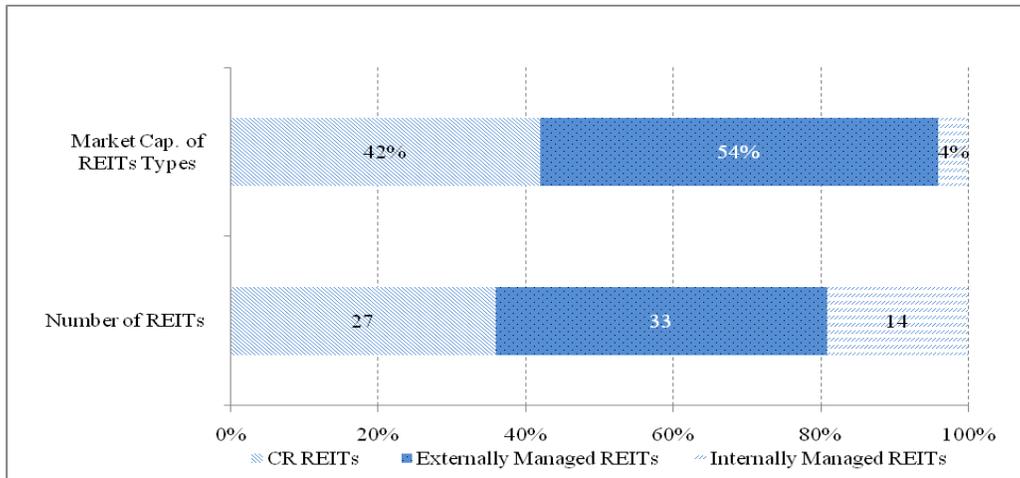


Source: KAREITs (Korea Association of Real Estate Investment Trusts)

In recent years, we observe increases in number of REITs in the year 2009 to 2011, and most of increases are especially from ordinary K-REITs. The governmental supports are main catalyst to promote an increase number of REITs in year 2009 where underlying asset are unsold residential properties. In addition, the total amount of market capitalization has sharply increased since 2006 where the Korea

National Pension Fund has extended its portfolio composition into alternative investment including Real Estate Investment Trusts since 2006.

Figure 2 ■ Organizational Structure in REITs in Korea



Source : KAREITs (Korea Association of Real Estate Investment Trusts)

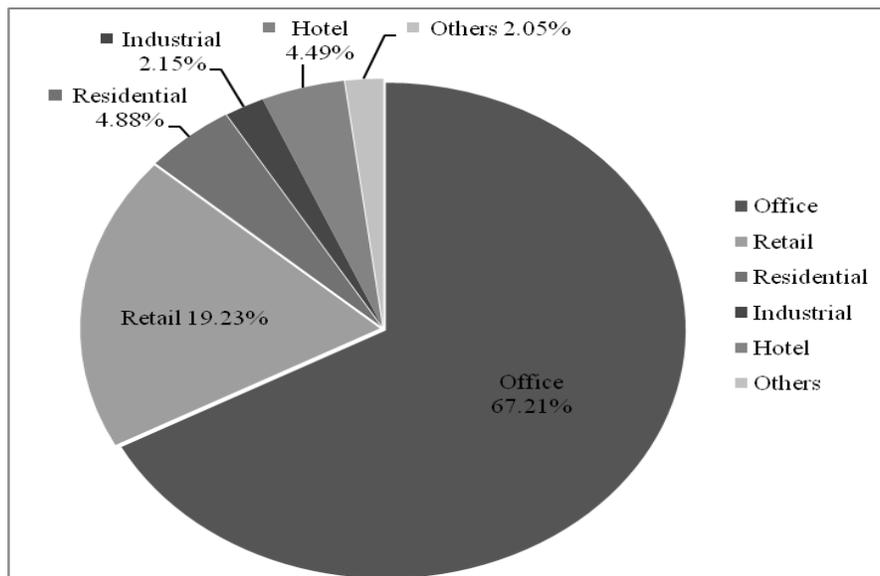
As shown in figure 2, REITs are structured into mainly two types; Corporate Restructuring(CR-REITs) and Ordinary REITs (K-REITs)⁵. The Corporate Restructuring REITs (CR-REITs) which was established to improve the distressed financial situation by liquidation through REITs and recently has extended its underlying asset into residential sectors to provide a liquidation to construction company to purchasing their sold properties due to recent residential market downturn. While CR-REITs normally adopting external management is driven to help individual firm's financial condition, the ordinary REITs, K-REITs can choose either internal management or external management. As of end of year 2013, the

⁵ The legal characteristics of K-REITs are as follows; Two types of K-REITs coexists; CR- REITs and Ordinary K-REITs. The motivation of two types of REITs in Korea is essential distinct point. The CR-REITs facilitates financial distressed firm liquidating fixed assets to retain earnings to improve financial condition. The ordinary K-REITs is mainly driven by ordinary securitization process similar to U.S REITs. The management of REITs is structured into external management and internal management. The CR-REITs mandatorily adopts an external-management while the Ordinary K-REITs can select either external management or internal management. The ordinary K-REITs will pass the ownership test if less than 30% of REITs stock is held by individual while no limitation for ownership test applies to CR-REITs. The ordinary K-REITs and CR-REITs satisfy the asset test if at least 70% of assets are related to real estate. Distribution test requires 90% of a REITs' net income must be distributed to shareholders as dividends. Income test rules at least 80% of total income should from the real estate and real estate related securities for both CR-REITs and Ordinary K-REITs. While CR-REITs has a benefit of corporate tax exemption, the ordinary K-REITs only with external management can pursue a corporate tax exemption.

Korea REITs industry is consisting of total 80 firms where corporate REITs, externally managed REITs and internally managed REITs accounts for 29, 38 and 13 among total number of 80 REITs firms, respectively.

The 90 percent of total REITs operates in private market because the more rigorous legal constrains are applied into public REITs since a few fraud events occurred in year 2009. Due to legal constraints, the privately held REITs formation has been preferred among investors. However, there is strong consensus on the development of REITs market toward markets that are more public and more toward external management.

Figure 3 ■ Property-type allocations for the K-REIT as of end of 2013



Source : KAREITs (Korea Association of Real Estate Investment Trusts)

Figure 2, based on data collected from KAREITs, represents a glimpse of the sector composition in K-REITs. As shown in Figure 2, the office sector REITs accounts for approximately 67.21 % and has been the largest REITs sector in Korea. The retail sector represents about 19.23% followed by hotel and residential sector, 4.49% and 4.48% respectively. The industrial REITs sector accounts for 2.15 % followed by 2.05% of other type of REITs including development REITs. With the set of data collected, we carefully examine K-REITs in aspects of growth prospects, revenue and expense, profitability. We

then attempt to test theory of the scale of economies in K-REITs. The descriptive statistics for our main variables are presented in Table 1. Our analysis relies on the quarterly income statement, which based on the quarterly cash in-and-out flow in that we exclude the REITs focused on the development project since the profitability of REITs focused on development project is mainly from the capital gain at the sales. Thus, we include total 452 quarterly observations for our analysis after excluding the 115 quarterly observations of REITs focusing on development project and 29 omitted observations. In table 1, the capitalization is denoted as book value since it is impossible to estimate the market value for private REITs. Among 57 REITs companies, the largest REITs estimated is the KR REITs, a Corporate Restructuring REITs and the amount of 1 Billion U.S. dollar while the smallest size of REITs company, 8 million U.S. dollar.

Table 1 Descriptive Statistics of K-REITs (2009 Q1 - 2013 Q4)

Variables	Mean	Std.Dev.	Min.	Max.
Total Cap. (\$ mil.)	1.82E+11	1.87E+11	8.91E+09	1.13E+12
Implied Cap.Rate(%)	0.017	0.015	0.000	0.256
NOI/Sales (%)	0.663	1.645	0.078	4.768
Revenue/Sales(%)	0.784	0.173	0.074	1.007
G&A Expense/Sales	0.354	0.259	0.080	1.040
ROE (%)	0.018	0.039	0.000	0.129
FFO Yield (%)	0.024	0.062	0.000	0.130
ROC (%)	0.008	0.006	0.000	0.103
Total Deb/Total Asset	0.523	0.192	0.037	1.001
ST Debt/LT Debt	0.394	1.592	0.000	13.945

Note: This study includes total XXX quarterly observations between 2009 and 2013. We include total number of 507 observation. The descriptive statistics of the observation analyzed are explained as follows; The first row represents the name of variable, observation number, and first and second moments; mean and standard deviation. Total Cap. is the sum of the book value of common equity outstanding plus the value of preferred shares plus the book value of debt. The value is denoted as millions of dollars for concise manner of presentation. We denote Log (Total Cap.) as the natural log of the Total Cap variable in dollar terms. ICR is the implied capitalization rate representing net operating income as a percentage of real estate valueCapital represents the equity and debt subtracting cash amount. NOI/Sales is denoted as a net operating income (NOI) as a percentage of sales. Rental Revenue/Sales is revenue as a percentage of sales. . FFO Yield is defined as the funds from operations as a total amount of equity. ROE is defined as net income as a percentage of equity amounts. ROC is also estimated as a proxy for REITs profitability that is return on the total capital invested. Asset Growth measures the annual growth of book value in total assets over the year, and FFO Growth is the annual growth in FFO. Total Debt/Total Asset measures the book value of total debt denoted as a percentage of the total asset of the REIT in dollar terms. ST Debt/LT Debt is the ratio of the book value of short-term debt to the book value of long-term debt expressed as a percentage.

Measurement of Growth Prospects

We first measure the total capitalization as total book value of stock and preferred stock, and the book value of debt. We measure the implied capitalization rate to measure the K-REITs growth prospects. The implied capitalization rate derived from a percentage of rental net operating income on the value of real property held in specific K-REITs. This implied capitalization rate would be a proxy for a initial rate of return for investors. In detail, a higher implied cap. rate signals the markets discounts the value of REITs asset while the lower implied cap. rate shows a market premium on the value of asset in REITs.

Total cap. = book value of common stock + book value of debt.

Implied cap. rate(ICR) = net operating income(NOI) / value of real estate

K-REITs Revenue and Expenses

We examine K-REITs revenue measure from net operating income as a percentage of total sales and rental revenue as a percentage of sales. We further examine the K-REITs revenue from the rental revenue as a percentage of sales. As K-REITs expense measure, we use the general and administrative expense as a percentage of sales. The revenue and expense measures are critical to test the existence of economies of scale because for large size firm, we expect the revenue measures will increase as the cost decreases.

The implicit capitalization estimated is about 1.7% on average and the net operating income per sales is about 66.3% on average, implying 78% of net operating income from total sales is available after subtracting operating costs. The total rental revenue accounts for 79% in total sales and the operating cost explain 36.2% of total sales respectively.

NOI to sales ratio=NOI/sales

Rental revenue to sales ratio= rental revenue / sales

Expense ratio = G&A expense/sales

K-REITs Profitability

We examine profitability of K-REITs using FFO Yield⁶ as funds from operation (FFO)⁷ as a percentage of the K-REITs's total equity amount. . We also use the return on equity (ROE) as a K-REITs profitability measure defined as net income as a percentage of equity amounts. ROC is also estimated as a proxy for K-REITs profitability. This measure extends invested equity to invested capital by including debt amount. The ROC is return on the total capital invested on K-REITs. The average quarterly return on equity is 1.8% and 7.48 % in annual percentage. The quarterly FFO yield is 2.4% in quarterly basis and 9.95% in annual yield, which is higher than return on equity because it includes the depreciation amount in FFO measure.

$$\text{FFO Yield} = \text{FFO} / \text{Equity} = (\text{EBITDA} - \text{Int}) / \text{Equity}$$

$$\text{ROE} = \text{Net income} / \text{Equity}$$

$$\text{ROC} = \text{Return on Capital} = \text{Net Income} / (\text{Equity} + \text{Debt} - \text{Cash})$$

⁶We estimate FFO yield as FFO as a percentage of the equity amount which is book value which is different from previous study that is generally defined as funds from operations as percentage of the REITs' market price per share of common equity. Since 90% of REITs in Korea is not traded in public market, it is impossible to estimate the market price of REITs share.

⁷Fund From Operation is defined as GAAP Net Income + Real Estate Depreciation. Also the alternative method to calculate is from EBITDA less interest. The FFO measure is also referred as supplemental earnings since it counts only realized expense excluding depreciation as expense only marked in account.

IV Analysis

Table 2 contains descriptive statistics for growth prospects, revenue and expense, and profitability classified by different types of REITs companies; office, retail, residential, industrial, hotel and others.

Type in K-REITs

Table 2 Growth Prospects, Revenue and Expense, and Profitability measure by Property Type in K-REITs

	Office	Retail	Residential	Industrial	Hotel	Others
Growth Prospects Measures						
Implied Cap.Rate	0.015	0.022	0.010	0.016	0.012	0.042
Revenue and Expense Measures						
NOI/Sales	0.655	0.864	0.078	0.729	0.785	0.318
Rental Rev/Sales	0.712	0.952	0.218	0.996	0.963	0.671
G&A Exp/Sales	0.381	0.274	0.922	0.342	0.229	0.802
REIT Profitability Measures						
Net Income/Equity	0.017	0.035	0.002	0.017	0.012	0.020
FFO Yield	0.024	0.050	0.002	0.030	0.015	0.022

Note: The sample includes total XXX REIT quarterly observations year 2009 1Q to 2013 4Q. We classify the sample to REITs property type: Office, Retail, Residential, Industrial, Hotel, Others. The components include the following measures; Implied Cap. Rate and Payout Ratio for Growth Prospects measures, NOI/Sales and Rental Revenue/Sales, G&A expenses/Sales for REITs Revenue and Expenses, and Net Income/Equity and FFO Yield for Profitability Measures.

The quarterly implied cap. rate for Hotel and Office REITs represent 1.3% (5.3% per annual basis) and 1.5%(6.14% per annual basis), indicating a possible premium on property valuation, while Industrial and Retail REITs represent 1.6% (6.56% per annum) and 2.2% (9.09% per annum) respectively, implying a possible discount in property valuation. The net operating income to sales ranges varies from 86.6% for retail to 31.8% for others. The rental revenue to sales ranges from 99.6% for industrial REITs to 21.8% for residential REITs. While the primary income resource for industrial REITs mainly comes from the rental revenue, the primary income resource of residential REITs is not from the rental revenues but from

the capital gain at the sale. While expense to sales ranges from 27% for retail to 38 % for office, residential and others type REITs have higher level of expense ratio due to the structure of income sources relying on capital gain at sale. The retail REITs have highest ROE of 3.5% (11.5% per annum) followed by the ROE of office and industrial REITs, 1.7% (6.98% per annum) respectively. The FFO yield ranges from 5%(21.55% per annum) for retail to 3.0%(12.55% per annum) for office REITs.

The information in Table 3 reveals a descriptive statistics for growth prospects, revenue and expense, and profitability classified by vintage year of REITs companies from 2005 to 2013. The vintage year represent. The notion of vintage year is defined as the year in which the REITs companied formed. In real industry, the vintage year is important because the peak or bottom of real estate cycle also affects a possible return of REITs through the overvaluation and undervaluation reflecting cyclical behavior in real estate industry.

Analysis on Vintage Year in K-REITs

Table 3 Growth Prospects, Revenue and Expense, and REITs Profitability by Vintage Year

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Growth Prospects Meausres									
Implied Cap.Rate	0.027	0.016	0.016	0.015	0.014	0.014	0.015	0.011	0.007
Revenue and Expense Measures									
NOI/Sales	0.777	0.613	0.627	0.563	0.852	0.677	0.709	0.728	0.671
Rental Rev/Sales	0.993	0.708	0.694	0.598	0.931	0.678	0.820	0.820	0.859
G&A Exp/Sales	0.235	0.408	0.386	0.450	0.233	0.432	0.395	0.282	0.354
REIT Profitability Measures									
Net Income/Equity	0.023	0.019	0.019	0.016	0.026	0.014	0.033	0.010	0.007
FFO Yield	0.031	0.028	0.029	0.022	0.032	0.019	0.050	0.006	0.012

Note: The sample includes total 452 REIT quarterly observations year 2009 1Q to 2013 4Q. For Vintage year analysis, we examine the quarterly REITs observation classified by the initial launching year. The number of REITs observations are denoted in the paranthesis; 2005(20), 2006(54), 2007(60), 2008(29), 2009(108), 2010(68), 2011(85), 2012(29), and 2013(19). We classify the sample to REITs by calendar year 2009 to 2013. The components include the following measures; Implied Cap. Rate and Payout Ratio for Growth Prospects measures, NOI/Sales and Rental Revenue/Sales, G&A expenses/Sales for REITs Revenue and Expenses, and Net Income/Equity and FFO Yield for Profitability Measures.

The quarterly implied cap. rate for early years 2005, 2006 and 2007 ranges in 2.7% (11.25% per annum), 1.6% (6.14%), and 1.6% (6.56% per annum) while 1.5% (6.14% per annual basis) and 1.5% (6.14 per annum), indicating a decreasing pattern of cap.rate. in recent years.

The net operating income to sales ranges differ from 56.3% for year 2008 to 85.2% for 2009. The rental revenue to sales ranges from 99.3% for 2005 to 59.8% for 2008. The primary income source for the REITs vintage year in 2005 mainly comes from the rental revenue while REITs vintage year in 2008 indicates only 59.8% of revenues from rental income. The expense to sales ranges from 23.5% for 2005 to 40 % and 43% for 2006 and 2010. The vintage year in 2005, 2009 and 2012 show a lower level of expense ratio. For profitability measure, the REITs vintage year in 2009 and 2011 have higher ROE of 3.5% (13.87% per annum) followed by the ROE of Vintage year 2011, 3.5% (13.87% per annum) respectively. In sum, regarding profitability ROE ranges from 8-12% per annum among the vintages years considered. Similarly, the FFO yield ranges from 9% to 21.55% per annum.

Table 4 presents a descriptive statistics for growth prospects, revenue and expense, and profitability classified management type of REITs; Internal Management and External Management. The Corporate Restructuring REITs is analyzed in separate section. Since the CR-REITs must adopt the external-management while the Ordinary K-REITs can select either external management or internal management. The ordinary K-REITs and CR-REITs satisfy the asset test if at least 70% of assets are related to real estate. Distribution test requires 90% of a REITs' net income must be distributed to shareholders as dividends. Income test rules at least 80% of total income should from the real estate and real estate related securities for both CR-REITs and Ordinary K-REITs. While CR-REITs have a benefit

of corporate tax exemption, the ordinary K-REITs only with external management can pursue a corporate tax exemption.

Analysis on Vintage Year in Management Type

Table 4 Growth Prospects, Revenue and Expense, and REITs Profitability by Management Type

	Ordinary K-REITs		CR-REITs
	Internal Management	External Management	External Management
Growth Prospects Measures			
Implied Cap.Rate	0.038	0.013	0.017
Revenue and Expense Measures			
NOI/Sales	0.288	0.631	0.696
Rental Rev/Sales	0.817	0.702	0.845
G&A Exp/Sales	0.615	0.383	0.321
REIT Profitability Measures			
Net Income/Equity	0.018	0.012	0.012
FFO Yield	0.019	0.018	0.028

Note: The sample includes total XXX REIT quarterly observations year 2009 1Q to 2013 4Q. We classify the sample to REITs by management type from 2009 to 2013. We separately present the CR-REITs since CR-REITs are supposed to be externally managed. We include 282 Ordinary K-REITs with internal management and 182 Ordinary K-REITs with external management. Also 8 CR REITs are included in the analysis. The components include the following measures; Implied Cap. Rate and Payout Ratio for Growth Prospects measures, NOI/Sales and Rental Revenue/Sales, G&A expenses/Sales for REITs Revenue and Expenses, and Net Income/Equity and FFO Yield for Profitability Measures.

The quarterly implied cap. rate for external and internal management ranges from 3.8% (16.09% per annum) and 1.3%(5.30 % per annum), implying a possible premium on property valuation for the case of external management in ordinary K-REITs and CR-REITs. The net operating income to sales ranges varies from 28.8% for internal management to 63.1 % for ordinary K-REITs and 69.6% for CR-REITs. The rental revenue to sales ranges from 81.7% for internal management to 70.2% for ordinary K- REITs, and 84.5% for external management. . While expense to sales ranges from 38.3% for external management of ordinary K-REITs to 32.1 % for CR-REITs, the internal management of ordinary K-REITs have higher level of expense ratio of 61.5% . For profitability measure, the internal management

shows higher ROE of 1.9% (7.6% per annum) and 1.8% (7.20% per annum) for ordinary K-REITs and 2.8% (11.09% per annum) of CR REITs respectively. The FFO yield ranges from 1.9%(7.82% per annum) for internal management to 1.8%(7.40% per annum) and 2.8%(11.09%) for external management of CR-REITs.

Regression Analysis

The information in Table 5 presents the regression analysis for the impact of on growth prospects, revenue and expense, and profitability of K-REITs controlling for size of REITs firm denoted as total capitalization of REITs firm, management types; corporate restructuring, and external management, and public dummy denoted if the REITs is listed. In general, we find a evidence of economies of scale in our analysis. For implied capitalization rare, we find a positive and significant coefficient for size of REITs firm, implying REITs total capitalization increases in Implied Cap. Rate. This finding implies that the higher REITs firm form a higher asset prices. Other factors as corporate restructuring and external management has a negative and significant impact on implied cap.rate which means there is a market premium on CR REITs and external management REITs with higher asset prices in the market.

In our research, our primary focus is on the scales of economies where we expect larger REITs will gain the operational efficiency through low expense ratio and increase in revenues. We provide the evidence of scale of economies that the NOI to sale is positive and significant to the size of REITs measured by total capitalization. Also debt ratio has a positive and significant ratio to the NOI to Sales meaning that high NOI ratio firm utilize the use of debt to lower the cost of capital or have an easy accessibility to use of debt compared to other firms. Also the corporate restructuring factor and external management factor determines the increase in NOI to sales ratio, indicating external management and corporate restructuring REITs generate higher profitability. However, we find that larger REITs have less relied on rental revenue but relies on other income such as parking and etc from the detailed analysis of income statement. This implies larger REITs firm also generate alternative source of cash flow in addition to rental revenue.

Also publicly listed REITs firm has a low rental revenue to sales ratio, implying the proportion of rental income is lower in private REITs company.

As we hypothesize, we strongly support that REITs becomes larger the G&A expense ratio has been lowered and statistically significant. We strongly support that larger REITs have lower the G&A expense ratio to total sales. We can infer this finding as the larger REITs firm can reduce the expense when manage the property and operational efficiency, indicating a possible economies of scale. The CR-REITs and external management shows significant and negative coefficient, suggesting external management and CR-REITs can increase the value of property through lowering expenses ratio. The overall evidence support that larger REITs have higher NOI to sales ratio while lowering expense ratio allowing a scale of economies as we expect it in the measure of profitability.

We also examine the profitability measure by ROE (Net Income to Total Equity) and FFO Yield (Fund From Operation to Equity amount). In both measures, we can conclude that larger firms achieve higher profitability measure. The total size of REITs has a positive and significant impact on ROE and FFO Yield as well as total debt to capitalization.

Regression Analysis Controlling for Type of REITs

Table 5 represents the regression analysis for the growth prospects, revenue and expense, and profitability of K-REITs controlling for the type of REITs firm. The type of K-REITs is classified as office, retail, industrial, residential, and hotel. The office sector REITs accounts for approximately 67.21 % a largest REITs sector in Korea. The retail sector represents about 19.23% and hotel and residential sector present, 4.49% and 4.48% respectively. The industrial REITs sector accounts for 2.15 % followed by 2.05% of other type of REITs such as development REITs.

For implied capitalization rate, we could not find the size of REITs firm, after controlling for type of REITs firm, implying the most of large REITs is classified as office REITs. Also it is worthy to note that the total debt to total capitalization rate also have a positive and significant impact on implied cap.rate. which means there is a market premium on REITs with high debt ratio

Our critical variable to test the effect of scales of economies is the operational efficiency via low expense ratio and increase in revenues. After controlling for the type of REITs firm, we still find the evidence of scale of economies that the NOI to sale is positive and significant to the size of REITs measured by total capitalization. Also debt ratio shows a positive and significant ratio to the NOI to Sales, implying the high NOI ratio firm take an advantage of the use of debt. Type of firm shows a positive and significant coefficient for NOI/Sales ratio except for the residential type.

We find that high debt to capitalization firm shows high revenue per sales ratio similar to the result from table 5. Also retail, industrial, and hotel REITs high rental revenue to sales ratio, implying the proportion of rental income is higher compare to other types of REITs but residential REITs shows a negative and significant coefficient for the rental revenue ratio.

For our primary research factor in our hypothesize, after controlling for the type of REITs, we strongly argue that REITs becomes larger the G&A expense ratio has been lowered and statistically significant. This evidence supports that as a size of REITs firm increase, its G&A expense ratio to total sales decreases. We still find that as the larger REITs firm increases the operational efficiency has been enhanced indicating the possible economies of scale. This negative and significant coefficient has been detected in most of type of REITs firms except for the residential REITs.

After controlling for the type of REITs firms, the overall evidence supports that larger REITs have higher NOI to sales ratio while lowering expense ratio.

However, we could not find the relation between the size and profitability in our profitability measure by ROE (Net Income to Total Equity) and FFO Yield (Fund from Operation to Equity amount). In both measures, we find a both coefficient are insignificant, implying larger firms does not necessarily relate to the increased profitability. Furthermore, the use of debt also enhances the profitability of firm's ROE and FFO Yield.

Table 5 Growth Prospects, Revenue and Expense, and REITs Profitability : Regression Analysis Controlling for Management Type

	Growth Prospects				Revenue and Expense				REITs Profitability			
	Implied Cap Rate		NOI/Sales		Rental Rev/Sales		G&A Exp/Sales		Net Income/Equity		FFO Yield	
	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Log of Total Cap.	0.002**	1.331	0.022***	3.290	-0.015**	-1.750	-0.001**	-2.220	0.001**	2.340	0.001**	2.100
Total Debt /Total Cap.	0.003	0.822	0.077**	2.210	0.147***	3.200	-0.071**	-0.090	0.012***	3.870	0.025***	6.720
Public Dummy	0.000	0.091	-0.021	-0.890	-0.123***	-4.240	-0.015	-0.150	-0.001	-0.850	-0.002	-0.970
Corporate Restructuring	-0.022***	-4.851	0.355***	7.780	0.192***	3.310	-0.442***	-4.850	-0.003	-0.780	-0.001	-0.110
External Management	-0.027***	-5.931	0.301***	6.730	0.088	1.510	-0.389***	-3.850	-0.010**	-2.330	-0.007	-1.600
Intercept	0.026	0.792	0.3011*	-1.61	0.752***	4.301	1.113***	6.15	-0.020	-1.29	0.001	-1.301
Adj. R ²	0.092		0.221		0.234		0.262		0.152		0.220	
F Statistics	9.091		26.090		27.450***		31.480***		15.89***		26.520**	

Note: The sample includes total 452 REIT quarterly observations year 2009 1Q to 2013 4Q. We classify the sample group whether it is on the public market, formation of REITs; Corporate Restructuring, External Management. The components include the following measures; Implied Cap. Rate and Payout Ratio for Growth Prospects measures, NOI/Sales and Rental Revenue/Sales, G&A expenses/Sales for REITs Revenue and Expenses, and Net Income/Equity and FFO Yield for Profitability Measures.

Table 6 Growth Prospects, Revenue and Expense, and REITs Profitability : Regression Analysis Controlling for Type of REITs

	Growth Prospects				Revenue and Expense				REITs Profitability			
	Implied Cap Rate		NOI/Sales		Rental Rev/Sales		G&A Exp/Sales		Net Income/Equity		FFO Yield	
	Coeff.	<i>t</i> -stat.	Coeff.	<i>t</i> -stat.	Coeff.	<i>t</i> -stat.	Coeff.	<i>t</i> -stat.	Coeff.	<i>t</i> -stat.	Coeff.	<i>t</i> -stat.
Log of (Total Cap.)	0.001	0.780	0.032***	4.600	-0.004	-0.550	-0.035***	-4.710	0.001	1.490	0.001	1.390
Total Debt /Total Cap.	0.007**	2.100	0.113***	3.780	0.170**	5.080	-0.103***	-3.370	0.018***	6.140	0.031***	9.250
Office	-0.031***	-6.000	0.258***	5.840	0.009	0.180	-0.360***	-8.010	-0.008**	-1.980	-0.006	-1.260
Retail	-0.027***	-5.400	0.341***	7.440	0.226**	4.400	-0.447***	-9.580	-0.007*	-1.550	-0.006	-1.090
Industrial	-0.028***	-4.560	0.345***	6.190	0.266**	4.250	-0.447***	-7.900	-0.009*	-1.670	-0.002	-0.320
Residential	-0.031***	-2.360	-0.192*	-1.620	-0.463**	-3.470	0.071	0.590	-0.016	-1.410	-0.018	-1.360
Hotel	-0.032***	-6.020	0.431***	9.000	0.252**	4.710	-0.536***	-11.040	-0.013**	-2.740	-0.015**	-2.730
Intercept	0.025	1.280	-0.501**	-2.800	0.730**	3.640	1.649***	9.070	-0.010	-0.560	-0.014	-0.680
Adj. R ²	0.087		0.325		0.484		0.365		0.110		0.027	
F Statistics	6.600***		30.64***		59.560***		36.41***		7.690***		16.43***	

Note: The sample includes total 452 REIT quarterly observations year 2009 1Q to 2013 4Q. We classify the sample to REITs by calendar year 2009 to 2013. For calendar year analysis, we examine the quarterly REITs observation classified by the calendar year 2009 to 2013. The components include the following measures; Implied Cap. Rate and Payout Ratio for Growth Prospects measures, NOI/Sales and Rental Revenue/Sales, G&A expenses/Sales for REITs Revenue and Expenses, and Net Income/Equity and FFO Yield for Profitability Measures.

IV Conclusion

In recent decade, the REITs industry has rapidly expanded in the financial market and many academic analyses have been cumulated for Asian countries. However, there has been limited academic research available in the REITs industry in South Korea. To response this movement, we first attempt to examine a comprehensive analysis on profitability of K-REITs. Furthermore, we test a economies of scale in K-REITs as suggested in previous literature. The economies of scale in previous literature suggest that the size of REITs firm increases, the operational efficiency and lowering cost lead profitability of firm. We examine the economies of scale in K-REITs in the aspect of growth prospects, revenue and expense measure, profitability measure. We obtain the financial information from the Association of Korea Real Estate Investment Trusts and explore the different aspects of REITs classified by property type of REITs, vintage year, legal platform between public and private REITs. After constructing all accounting information, we run regression analysis to test the relation between the size of REITs firm and growth perspective, and profitability. In the study, we have a limitation on data availability since a majority of REITs firm discontinues and contains missing information such as cash flow due to structural difference such as REITs focusing on development project. In our results, we suggest that larger REITs have operational efficiency that lower the G&A expenses, and improve profitability after controlling for legal structure, and management type. Furthermore, we find the operational efficiency in larger K-REITs firm through a low expense ratio even after controlling for property type of K-REITs. However, this operational efficiency does not link to the profitability when we control for the property type of REITs. We argue that there is certainly scale of economies exist in K-REITs through the negative coefficient of size of firm and expense ratio as well as positive coefficient of firm size and profitability measure. In overall, it is important to note that the size of REITs market has rapidly grown and continue so. Thus, the results can also reflect a rapid shift in the REITs industry in Korea. In addition, the real estate market in Korea has also experienced a global financial crisis in the late 2000s in which the results reflect market fluctuation in Korea. Although we support our findings that the larger size REITs firm exploits the

economies of scale, we can mislead the worth of small REITs because the small can be property specific driven factor or just large REITs without management strategy can generate inefficiency.

To sum, we can conclude that there has been an evidence of economies of scale in K-REITs by lowering operational expense. Thus, the general expectation on REITs market should focus on careful examination on a possible merger and acquisition as well as regulation determining the size of REITs.

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