A Comparison of Characteristics of the Residential Real Estate Market Using Capitalization Rate: Focusing on Seoul and Hanoi City

Sang-hoon PARK, Jung-sun KIM and Hyeong-soon KIM, South of Korea

SUMMARY

The capitalization rate is one of the major factors when determining the value of real estate based on the expected value method. According to methods of estimating capitalization rate, market extraction method and debt coverage method derive results close to property's market value and loan to value ratio. Therefore, the comparison between the two can be used as indirect indicators to assess characteristics of values in real estate markets of interest.

This research aims to assess the characteristics of residential real estate market Hanoi, Vietnam, and Seoul, South Korea by estimating and comparing capitalization rates based on two methods above. After analysis, we could find out that first, Seoul's apartment market showed a lower capitalization rate compared to Hanoi's residential real estate market. This means that sentiments in the apartment market in Seoul are relatively directed towards capital gains for increased values at the end of each period, rather than operating profits. Second, apartments in Hanoi seems to be considered as a more secure investment than houses in Hanoi. Third, the difference between MECR and DCCR recorded as 0.99% for houses in Hanoi, indicating the highest risk. This result shows that sentiment towards houses in Hanoi retain less expectation in an increase of capital value as well as effective demand. Last, analysis of the rate of MECR and DCCR, houses in Hanoi and apartments in Seoul showed similar results. Regardless of the type of residential property, the two was considered as similar in terms of characteristics in investment.

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1. INTRODUCTION

Population and income are an integral factor in the size of national wealth, represented by Gross National Product and Gross Domestic Product; and real estate is a basis of both welfare of the population, and industry of income. Therefore, most states tend to manage the overheating or recession of real estate markets by making a direct or indirect intervention, regardless of their political system.

However, real estate markets require long-term and sophisticated planning to achieve the set management goals, due to stronger individuality of real estate property, unlike other goods. National management scheme on real estate markets begins with analyzing the significance of markets and their price level. Thus, comparing the real estate markets of different countries derives valuable insights.

Besides, globalized industrial and financial investments are swiftly tearing down the walls of individual nations. Such tendency acts one of the reasons why research on the comparison of national real estate market analysis should be conducted. Moreover, the most fundamental section in real estate market research is residential real estates, as researchers can make meaningful observations not only the welfare of the state through stabilizing residential supplies, but also increase in consumption and economic growth based on wealth effect through a price increase.

Based on these necessities, this research focused on residential real estate properties in metropolitan areas. After estimating capitalized interest by market extraction method and debt coverage method, we tried to ascertain the characteristics of the residential real estate market in metropolitan areas of Vietnam and South Korea. The reason that market extraction method and debt coverage method were selected for this research was that the acquisition of practical resources was possible and these methods required less subjective determination. Thus, we could verify the characteristics of the markets conveniently and clearly, using the difference in features of the two estimation methods.

We expect the results of this research would help to understand residential real estate markets of target nations and discover proper policy instruments based on their characteristics.

2. BACKGROUND AND PREVIOUS RESEARCH
1.1 Background

1.1.1 Definitions of the capitalization rate

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The capitalization rate of real estate property is also a ratio that transforms the income from the property to its value. It can be represented as the ratio of net operating income to the value of the property and comprised with the summation of the rate of return on capital and rate of capital recovery. Also, it can act as a bridge that connects real estate market and capital markets, beyond just the ratio of income and asset value.

$$\text{Capitalization Rate} = \text{rate of return on capital(discount rate)} + \text{rate of capital} \dots\, eq.\,1$$

The rate of return can be substituted to the discount rate as it was shown in <eq.1>. However, it is more rational to consider the rate of return as the discount rate of expected future income rather than the interest rate, if there is permanence in time. Therefore, the rate of return on capital fluctuates volatility risk of income; in turn, investors would require higher payoff for invested capital when the risk is higher.

The capitalization rate is estimated with information about properties during a short period and used as indicators in various aspects. First, we can comprehend the trends in the real estate market. Consistent estimation of capitalization rate may allow predictions of the market. Second, capitalization rates may be provided as a part of resources for investors to determine their intention to invest. Especially pertinent information on capitalization rate can be an important reference point in asset management. Third, the information can be used as an instrument to determine the accuracy of property values, to verify the appraised value assessed through the cost approach or comparison approach.

1.1.2 Methods of estimating the capitalization rate

Estimation of capitalization rate can be classified by resources used and methods. Notable examples are market extraction method, built-up method, a band of investment method, Ellwood method, and debt coverage methods.

First, Market extraction method is an approach to estimate capitalization rate directly using similar sales cases. It is particularly useful when there is a lot of recent sales activity. The most traditional method to estimate the rate is presented in <eq. 2>. When market extraction method is used, selected cases should be similar in location, status, and age of structures.

$$\text{Capitalization Rate}(R_0) = \frac{\text{Net Operating Income(NOI)}}{\text{Price of selected properties(V)}} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\, eq.\,2$$

Second, debt coverage method is suggested by Ronald E. Gettle (1975) pointing out that Ellwood method is excessively focused on equity investors. Debt coverage method utilizes debt coverage ratio, which the proportion of net operating income covering the debt on the property. Stability is considered to emphasize the position of mortgage holders and estimated as <eq. 3>. DCR represents the debt coverage ratio, the portion of net operating income to the amount of the debt, and M represents the mortgage rate.

$$\text{Capitalization Rate}(R_0) = DCR(\frac{NOI}{Ddet\ Service}) \times M \times MC \dots\dots\dots\dots\dots\dots\dots\dots eq.3$$

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Third, the built-up method estimates by isolating risk factors of property and appreciate them. Capitalization rate consists of covered interest rate, uncovered interest rate, and fluctuation of property value, as represented in <eq. 4>. Though theoretically valid, the built-up method has a limitation in objectivity because there is no set standard in measuring the risk for each component.

$$\text{Capitalization Rate}(R_0) = \text{covered interest rate} + \text{uncovered interest rate}$$
$$+ \text{fluctuation in property value(nominal growth rate)} \dots \text{eq. 4}$$

Fourth, the band of investment method is an approach in deriving the capitalization rate. If invested capital is divided into land and building, the approach is called a physical band of investment method. If it is divided into mortgage capital and equity capital, the approach is called a financial band of investment method. The critique towards the physical band of investment method is that property cannot be separated into land and building. Financial approach separates capital contributing to the income into mortgage and equity and estimates the capitalization rate as <eq. 5>.

$$\text{Capitalization Rate}(R_0) = L/V \times R_M \times E/V \times R_E \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \text{eq. 5}$$

Last, there is Ellwood method. This approach consolidates individual financial factors to estimate the capitalization rate. Including various factors and fluctuation in values during the period of occupancy, the rate is estimated by <eq. 6>. Represents equity yield rate, which is internal rate of return that matches the present value of pre-tax cash balance expected by investors with equity investment. Represents the sinking fund factor of % interest rate by year period. Represents repaid mortgage rate at the end of the period, and means the rate of fluctuation in property value.

$$\text{Capitalization Rate}(R_0) = y - (L/V) \times \left(y + p \times SFF_{y\%,t} - MC \right) - \Delta \times SFF_{y\%,t} \dots \dots \text{eq. 6}$$

1.2 Literature review

Research history for capitalization rate is lengthy. Boykin and Hoesli(1984) found out after the research comparing capitalization rate based on debt coverage method and market extraction method, that the rate based on debt coverage method is estimated 1.3% to 2.2% higher than the rate based on market extraction method, which means that debt coverage method tend to undervalue the market value of property in interest. Philips(1998) confirmed that the capitalization rate of residential real estate properties differs in different metropolitan areas in the United States. Moreover, He argued that capitalization rate reflects numerous factors such as inflation rate, cost of capital, tax, and lease regulations that differ by region.

Amvrose and Nourse(1993) analyzed factors that affect capitalization rate in perspective of a band of investment method. The research claimed that the capitalization rate has a negative correlation with EPR(earning price ration) and positive correlation with interest rates and inflation.

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Sivitanidou and Sivitanides(1996) found out that capitalization rate tends to change by market forces affect the income and the risk, but slowly, after analyzing the correlation between capitalization rate and market forces in office space markets.

Chen et al. (2004) verified the feasibility of real estate prices using Spratt's regression models. After the analysis, they found out that the capitalization rate has a positive correlation with the growth of rent, inflation, the growth of GDP, and PIP Change (Price of property ÷ change in GDP), and has a negative correlation with any other factors. On the other hand, Doina C. et, al. (2007) argued that the increase in residential demands, supply contracts, liquidity crisis and interactions of these forces have a significant effect in capitalization rate. Geltner et al.(2007) claimed that the capitalization rate is determined by three factors, the opportunity cost of assets, expectations of increasing price, and the risk. Meanwhile, Tian(2013) suggested that the capitalization rate of residential properties is changed by interest rates and expected price, but there is little effect on individual property with empirical analysis results.

Moreira et al. (2016) analyzed the relationship between lease income and a capitalization rate in Lisbon and Porto region. Using the Capital Asset Pricing Model(CAPM), they measured the risks with the date from 2006 to 2009.

Seo-jin Ha, et al.(2018) analyzed the determinant factor of capitalization rate using transaction data in Seoul (around 28,000 cases). The result showed that past tendencies of realizing capital gains by selling the properties changing to leasing out for monthly rents to recuperate the investment then confirmed the importance of operating income.

Literature review cited above mostly focused on direct research on capitalization rate itself. Our research has distinctive advantage of attempting to understand the characteristics of the real estate market itself. Also, the approach retains distinctive advantage that such characteristics can be shown clearly and expediently.

3. METHOD AND DATA
1.1 Analysis Methods

This research used the aforementioned capitalized interest rate to analyze the characteristics of the residential real estate market in Hanoi, Vietnam, and Seoul, the Republic of Korea. However, among many methods of calculating capitalized interest rate, we employed market extraction method and debt coverage method that empirical approach may be taken. A market extraction method is an approach that estimates capitalization rate of real estate properties after collecting data on sales and lease transactions, which are evidence that contains intentions, customs, and characteristics of market participants. Though it has been a standing controversy on the concept of market value in real estate studies, market values can be viewed as "the value that has the highest probability of realization in the market," consolidating recent opinions (The Dictionary of Real Estate Appraisal, 6th ed. (2015)). Thus, we can find out the closest value to true market value if this approach is employed.

Meanwhile, a debt coverage method is an approach structured to find out the property value that mortgage can be recovered most stably at the perspective of a creditor. The loan paid out by a creditor tends to be determined at a certain rate to the value of the property. Therefore, to collect such loan stably, the property value may be lowered to determine the amount of the

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loan rather than the true market value. Due to such characteristics, the value of the asset would be conceptually minimized if the capitalized interested rate is estimated by the debt coverage method.

   To extrapolate further, we would get meaningful results pertaining to characteristics of real estate market value based on region and the type of property by comparing Market Extraction Capitalization rates(MECR) and Debt Coverage Capitalization rates(DCCR). First, in the case of MECR, it is assumed that the rental fee is stationary at every period. Hence, by assuming the rational participants of the market, it is a valid deduction to interpret the market value to contain the risk to volatility. If people pay for the same amount even if the expectation of rent income is low, it would mean the property conveys the sign of the potential of the increase in asset value, as a rational investor selects their investment to achieve the required rate of return on the same amount of capital. Therefore, we can confirm the expectation of capital recovery and the degree that it was reflected in the value of residential real estate properties by comparing different MECRs. Second, we can compare MECR and DCCR to ascertain the degree of risk each property bears, and they can also be broken down and compared by region and by type of property. The ratio between MECR and DCCR means the level of asset value that can be recognized as the minimum value in a certain range of market values. If each ratio is compared to another by region and by type of property, the characteristics each section of the market retain can be observed.

1.2 Data

   The purpose of this research is to estimate capitalization rate of residential real estate properties in Hanoi and Seoul based on market extraction method and debt coverage method then to interpret them by comparison.

   The data used to estimate capitalization rate by market extraction method are described as follows. We obtained the data on price and rents of real estate properties through internet websites batdongsan.com.vn (Hanoi) and Daum.net (Seoul). Though real prices in which transaction was conducted can be obtained at property market in Seoul, we used listed asking prices on the internet to compare to price data in Hanoi. First, Royal City in Hanoi and Apgujeong Hyundai Apartment in Seoul were selected as data collection region because two regions had similar characteristics in respective markets, such as the income bracket of residents and square footage. Second, single house market in Hanoi and apartment market in Seoul were compared to each other. The reason for such selection is because the prevailing housing option in Vietnam is of single houses, unlike South Korea, most housing transactions involve apartments. As houses in Hanoi are widely spread across every district of the city showing drastic variance, we used the case of 'Nam Tu Liem District' where construction of new house and transaction of housing units are relatively active.

   Resources we used for debt coverage method includes mortgage rate, debt coverage ratio, and loan interest rate. Mortgage rate was set to be the maximum rate applicable in respective countries. In the case of Hanoi, mortgage rate was set to 70%, based on the most influence VietinBank resources. In case of housing markets in Seoul, we applied generally accepted loan to value ratio for apartments, 70%, to improve comparative analysis, despite the regulations in risk management standard for mortgages, prescribed in 'Banking business supervisory regulations.' For payment terms, the longest period was applied to test data.

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Finally, the average interest rate was taken to be the standard for test data. Therefore, data in Hanoi was applied with VietinBank's 25-year mortgage and 8.62% APR, and data in Seoul was applied with KB Kookmin bank's 30-year mortgage and 3.43% APR. The used resources described above were summarized in <Table1>.

<Table 1> Resources for estimating capitalization rate

method	factors	data
The market extraction method	rent price	internet website
	market valume	(batdongsan Daum)
The debt coverage method	mortgage rate, loan to value	70% (Hanoi, Seoul)
	payment term	25 yrs (Hanoi), 30 yrs (Seoul)
	loan interest rate	8.62% (Hanoi), 3.43% (Seoul)

Data collection period was one year, from January 1st to December 31st, 2018. Whereas collecting real transaction cases are most accurate in case of using market extraction method, we used listing price data for both countries' data to ensure appropriate comparison because it was difficult to collect real transaction cases in Vietnam effectively. Observations were 124 apartments and 98 houses in Hanoi, and 157 apartments in Seoul. Average space of properties was measured at a similar level in both cities, with 129.49 ㎡ in Hanoi and 146.03 ㎡ in Seoul.

While Seoul′s average price per unit area(㎡) reached 9.7 fold to that of Hanoi′s it was measured that annual rent price in Seoul reached only 2.66 times to that of Hanoi. Meanwhile, it was measured that the price of Seoul apartments was 2.12 times higher in sales price and 1.34 times in rent price to a single house in Hanoi.

<Table 2> Basic data

Type		N	mean	stanard deviation	max	min
Area (㎡)	Hanoi House	98	43.0	13.479	81.4	31.0
	Hanoi Apartment	124	129.49	26.091	184.0	88.0
	Seoul Apartment	157	146.03	55.377	286.0	63.0
Price per ㎡ (KRW)	Hanoi House	98	9,452,848	1,471,545	12,362,500	6,603,194
	Hanoi Apartment	124	2,067,450	214,939	2,592,913	1,755,725
	Seoul Apartment	157	20,064,886	2,641,337	27,916,667	15,575,758
Annual rent per ㎡ (KRW)	Hanoi House	98	177,067	73,345	367,347	70,313
	Hanoi Apartment	124	89,271	13,106	123,967	65,455
	Seoul Apartment	157	237,864	28,146	307,313	192,500

※ In case of an apartment, prices were based on the exclusive area for apartments, and land area for single houses; prices and rents were presented by KRW. VND was converted via exchange rate between two currencies (estimation method is the same in following tables)

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4. ESTIMATION OF THE CAPITALIZATION RATE
1.1 Estimation of the capitalization rate

  This research selected market extraction method and debt coverage method to estimate the capitalization rate and already discussed the rationale of method selection.

  First, the capitalization rate by market extraction method is estimated based on market value and rent prices data from the same apartment complex were collected to achieve the similarity in age of buildings, location, or conditions. In case of houses, cases for relatively newer structure situated the same region.

  The capitalization rate by market extraction method is the ratio between the market value and annual rent price, per unit area (m^2). Average of each case was employed. The result is presented in <Table 3>, which says that capitalization of Hanoi single house reached 0.0187, Apartments in Hanoi recorded 0.0432, and Apartments in Seoul reached 0.0115.

<Table 3>Market Extraction Capitalization rates(MECR)

Type	Hanoi Houses	Hanoi Apartments	Seoul Apartments
NOI mean per ㎡(KRW)	159,360	80,344	214,078
Market value per ㎡(KRW)	9,452,848	2,067,450	20,623,365
market extraction capitalization rate	0.0169	0.0389	0.0104

※ NOI mean per : Rent price per × operating expenses(10%)

  Second, the components comprise capitalization rate by debt coverage method are DCR(debt coverage ratio), LTV(loan to value ratio), MC(mortgage constant).

  DCR represents the ration between NOI(net operating income) earned from the property and debt service. The average value for each case was applied. Also, when estimating NOI, operating expenses that amount to 10% of comprehensive rent income was applied. Debt service is a value per unit area (m^2) calculated by applying LTV and MC to market value of properties of interest. Estimation results are presented in <Table 4>. Apartments in Hanoi show the largest value, followed by Apartments in Seoul and houses in Hanoi. It is notable that only 38.67% debt service is covered by NOI earned from the houses in Hanoi.

<Table 4>Debt Coverage Ratio

Type	Hanoi Houses	Hanoi Apartments	Seoul Apartments
NOI mean per ㎡(KRW)	159,360	80,344	214,078
Debt service mean per ㎡ (KRW)	412,139	126,951	444,603
MC(Mortgage Constant)	0.0987	0.0987	0.0539
LTV(Loan To Value)	0.7	0.7	0.7
DCR(debt coverage rate)	0.3867	0.6329	0.4815

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Estimation results for the capitalization rate with DCRs in <Table 4> are presented in <Table 5>. It can be observed that the capitalization rate is generally higher compared to the capitalization rate based on market extraction method in <Table 3>. These were expected results according to estimation methods and resources used in the estimation process. Debt coverage method is an approach to measure property value on the side of a creditor. Since creditor operators their funds considering recuperation of lent money, this method would produce a value most stable in a certain condition.

The capitalization rate by debt coverage method was measured to be 0.0437 for apartments in Hanoi, 0.0267 for houses in Hanoi, and 0.0182 for apartments in Seoul.

<Table 5>Debt Coverage Capitalization rates(DCCR)

Type	Hanoi Houses	Hanoi Apartments	Seoul Apartments
DCR(debt coverage rate)	0.3867	0.6329	0.4815
LTV(Loan To Value)	0.7	0.7	0.7
MC(Mortgage Constant)	0.0987	0.0987	0.0539
debt coverage capitalization rate	0.0267	0.0437	0.0182

Comparing the capitalization rates estimated by two different methods, the discrepancy was the lowest for Hanoi Apartments with 0.49% difference. On the other hand, Hanoi houses showed the highest difference between the two values with a 0.99% difference. The ratio of two capitalization rates that is a rate of MECR to DCCR reached 89% for Hanoi Apartments, 63% for Hanoi houses, and 57% for Seoul apartments.

<Table 6>compare MECR and DCCR

Type	Hanoi Houses	Hanoi Apartments	Seoul Apartments
market extraction capitalization rate (1)	0.0169	0.0389	0.0104
debt coverage capitalization rate (2)	0.0267	0.0437	0.0182
gap (2-1)	0.0099	0.0049	0.0078
rate (1÷2)	0.63	0.89	0.57

From the process described above, we have estimated the capitalization rate of market extraction method and debt covering method. Analysis of estimated values may be interpreted as the following.

First, estimating MCCR showed that the capitalization rate of Seoul apartments was the lowest, just as shown in <Table 3>. Lower capitalization rate means that market value is being paid, despite lower expected rental income. Since rational market participant chooses an asset that achieves a certain level of return on investment, Such tendency signifies the

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prevailing sentiment of expectation in an increase of market value that compensates lower rent price. Therefore, we can interpret the results that the rate of capital recovery for Seoul apartments evaluated by <eq. 1> would be much higher than that of Hanoi apartments. The lower capitalization rate of Hanoi houses can be interpreted as the same. In case of Seoul apartments and Hanoi houses, it can be deduced that the rate of capital recovery due to increase in market value would be much more substantial than monthly income from operating the capital from the perspective of an investor.

Second, comparing apartments and houses in Hanoi, the analysis shows that apartments retain a higher rate of return at every period and low-risk factors. Hanoi is currently experiencing a shift of prominent type of housing from single houses to apartments. A new stream of supply of large scale apartment complexes is increasing based on demands of younger generations, due to more accessible convenience and transportation facilities as well as the more convenient arrangement of living spaces. Also, the value of Vietnamese real estate properties are generally higher compared to the level of income, so there are only limited effective demands that can practically participate in the market. Though single houses have an advantage of the lower price per unit area, since practical transactions require larger sum of money, effective demand for the sector is limited to a certain group of demographics. In the creditors' perspective, limitation in effective demand translates into a risk factor, because it acts as a constraint in a steady recovery of lent money. The rate presented in <Table 6> reflects such circumstances, as apartments reach 89%, but houses only reach 63%.

Third, it can be said that higher discrepancy between MECR and DCCR means higher inherent risk for the investment property. Examining the differences in <Table 6> shows that single houses in Hanoi show the highest difference with 0.99%. Apartments in Seoul are also shown to retain high inherent risk compared to apartments in Hanoi. DCCR, estimated at creditors' point of view, represents the lowest value in order for stable recuperation of invested money. Less difference between MECR and DCCR that Seoul apartments are showing despite a lower rate of return compared to Hanoi houses may be because of higher expectation in the increase of principal asset value, and relatively sufficient effective demands.

Fourth, comparing the capitalization rate by two methods, it was found out that Hanoi houses retain a level of risk similar to Seoul apartments compared to Hanoi apartments. If the rate between MECR and DCCR from Table 6 is examined, Hanoi houses and Seoul apartments show values of 0.63, and 0.57, respectively. Considering the characteristics of different types of capitalization rates, MECR is close to the normal value in the market, whereas DCCR is close to the minimum value in the market. The rate between MECR and DCCR means the height of minimum value, compared to the normal market value. That is, Hanoi apartments' minimum market value reaches 89% of normal market value, whereas the minimum market value for Hanoi houses and Seoul apartments reach 57%~63% of normal market value. Conversely, this result represents higher inherent risk considered for Hanoi houses and Seoul apartments compared to Hanoi apartments, which means that the level of risk evaluated as an investment asset is similar for Hanoi houses and Seoul apartments despite their difference in the type of residential property.

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5. CONCLUSIONS AND SUMMARY

This research aimed to review the properties of Korean and Vietnamese residential real estate using capitalization rates. To achieve our goal, we have selected market extraction method and debt coverage method as methods for our analysis process. Market extraction method represents the maximum value in the market, while debt coverage method produces a loan value, that is close to the minimum value in the range of market values. Examination results of various characteristics we have found for each region and type of residential property using estimated capitalization rates can be summarized as the following.

First, the analysis shows that Seoul apartments and Hanoi houses have a higher portion of the rate of capital recovery among the real estate asset value. On the other hand, Hanoi apartments showed the highest DCCR of 0.0437, which means that they have a higher rate of return on capital compared to other properties.

Second, the rate between MECR and DCCR for Hanoi apartments and houses were evaluated to be 89% and 63%, respectively supporting our arguments, that is, if an apartment and a house have the same value, the apartment is recognized to be more secure property.

Third, based on estimation methods and characteristics of resources used, higher discrepancies between MECR and DCCR, as presented in <Table 6>, would mean more risk for the particular investment asset. The result showed Hanoi houses retained the highest risk, with a discrepancy of 0.99%.

Fourth, the rate of MECR and DCCR is the proportion of recognizable minimum value to the par market value. As a result, Hanoi houses and Seoul apartments are showing similar values. That is, two types of properties, Hanoi houses, and Seoul apartments are viewed as similar in terms of investment, despite the difference in the type of property.

The characteristics of Vietnamese and Korean residential market may be used as resources in making investment decisions. However, this research has the following inherent limitations.

First, listed asking prices were collected not, the transactions actually happened. Though record for actual transactions can be attained in South Korea, it was not in Vietnam, so the accuracy had to be compromised for comparative analysis of both countries. Second, data collected to estimate capitalization rate were restricted to a certain area, which cannot represent residential markets in either Hanoi or Seoul completely. Every industrial investment is now without borders. It is same with real estate investment, evolving hastily to be a global arena of competition. There was much difficulty for our research to keep up with such trends due to limitations in data collection, etc. However, we hope that our research could be used as a meaningful resource to respond to the shifting landscape of the investing environment.

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BIOGRAPHICAL NOTES

Sang-hoon, Park
Seoul National University, MBA
Dankook University Urban planning & Real Estate Ph. D. Candidate

Jung-sun, Kim
Master in Public Administration, Yonsei University
Ph.D in Urban Planning, Dankook University

Hyeong-soon, Kim
Master in Public Administration, Hanyang University
Ph.D in Real Estate Studies, Dankook University

CONTACTS

Title Given name and family name: Sang-hoon, PARK
Institution: Dankook University of Korea
Address: 3F, Shinan Bldg., 512, Teheran-ro, Gangnam-gu, Seoul, 06179, Korea
City: Seoul
COUNTRY: South of Korea
Tel. +82 2 3467 0102
Email: pinfly1@gmail.com
Web site: www.seoulprice.net

Title Given name and family name: Jung-sun, KIM
Institution: Seoul Appraisal.co., Ltd. / Hanoi National University
Address: 707, 63, Seochojungang-ro, Seocho-gu, Seoul, 06651, Korea
City: Seoul
COUNTRY: South of Korea
Tel. +82 2 6338 8901
Email: kimsun2018@gmail.com
Web site: www.seoulprice.net

Title Given name and family name: Hyeong-soon, KIM
Institution: Seoul Appraisal.co., Ltd.
Address: 707, 63, Seochojungang-ro, Seocho-gu, Seoul, 06651, Korea
City: Seoul
COUNTRY: South of Korea
Tel. +82 2 6338 8901
Email: hanskim21@hanmail.net
Web site: www.seoulprice.net

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