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The Dynamic Relationship Between Stock and Real Estate Prices in Kuwait

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Abstract

This paper examines empirically the dynamic relationship existing between the stock and real estate markets in the State of Kuwait for the period from January 2007 to December 2017. The main features of the real estate market in Kuwait are reviewed, and two indices are constructed to measure the activity of the residential real estate (land and houses) and multi-apartment buildings in the Kuwaiti real-estate market. The empirical analysis employs the main proper tests, such as the Johansen (1998) cointegration test and Vector Error Correction Model (VECM). These two tests confirm the long- and short-term association between Kuwaiti stock prices and multi-apartment building prices only, while no evidence of such a relationship is found for the residential real estate (land and houses) prices. This paper extends the literature available on the emerging stock markets, as the Kuwaiti Stock Market is one of the oldest stock markets in the member countries of the Gulf Cooperation Council (GCC). In addition, the results obtained in this paper have useful implications for academics and policy-makers in Kuwait.

Keywords: Kuwait stock market, cointegration, vector error correction model (vecm), real estate index, Kuwait

1. Introduction

Stock markets and real estate are well-known investment channels in all countries worldwide. The relationship between the stock and real estate markets has been studied by numerous researchers during the last few decades. This subject became more important during the post-global financial crisis of 2008. Two well-known mechanisms appeared in the literature to explain the relationship between real estate and stock prices. The first mechanism is the wealth-effect and the second is the credit-price effect. The wealth-effect mechanism states that, if the stock prices rise, then the wealth of the investors will increase also. Therefore, the investors may sell some of their stocks and buy real estate in order to diversify their portfolio. This mechanism assumes that real estate can be both an investment asset and a consumer commodity. As a result of this mechanism, the stock market will lead the real estate market. However, the credit-price effect mechanism argues that real estate provides good collateral against investor loans. Therefore, if the real estate price rises, the investors can borrow more money at a lower cost, which will encourage them to buy more stocks and bonds. In this case, the real estate will lead the stock market (Kapopoulos & Siokis, 2005). These two mechanisms are used in several researches as a framework that provides a basis for their methodology. This study aims to examine the long run and the short run relationship between stock prices and real estate prices (houses and multiple-apartment buildings). The remainder of this paper will review the related literature, review the real estate sector in Kuwait, the empirical work and discuss the results and the conclusion.

2. Literature Review

Early studies that investigated the relationship between the stock and real estate markets focused on the USA, UK, Korea and China (for example; Ibbotson & Siegel, 1984; Quan & Titman, 1999; Sim & Chang, 2006). More studies were done globally during the last decade, and these include quite a few countries around the world, such as most European countries, Asian countries such as Malaysia, Thailand, Japan, and Turkey, and other emerging countries. In the context of this study, the main studies regarding the relationship between the stock and real estate markets are reviewed, however, more attention is paid to studies that focused on the dynamic relationship, causality relationship, wealth effect and credit-price effect mechanisms. In fact, the dynamic relationship between the stock and property markets has been tackled by several recent studies in the literature. The results of these studies are mixed, as some of them detected a significant relationship between the stock and real estate markets, (i.e., long or short) while others did not. Some of these studies find that the stock market leads the real estate market, while others found the reverse result. In the following, we briefly outline the main literature related to this study. For example, Quan and Titman (1999) examine the relationship between stock returns and changes in property prices and commercial property rent levels for 17 countries over a period of 14 years. They conclude that there is a no significant relationship between stock returns and property values in 16 countries, while one does exist in Japan. They also find that real estate prices were affected significantly by growth in GDP. They used annual data changes which might be less accurate than monthly ones. However, Kakes and Den (2004) investigate the relationship between house prices and stock prices in the Netherlands and find that the latter leads the former. Kapopoulos and Siokis (2005) also find that higher stock prices in Greece had a positive impact on the house market. These higher stock prices lead households with a portfolio in the stock market to sell some of their stocks and buy houses. In China, Kapopoulos, Liu, and Su (2010) find a long-run nonlinear relationship between the stock and real estate market. Another study by Lean (2012) investigated the wealth-effect and credit-price effect for different geographic locations and different types of houses in Malaysia. Using 20 house indices, the lending interest rate and stock market index, he examines the dynamic linkages between those variables. The findings of this study are mixed; for example, a wealth-effect was found for all of the Malaysian indicators while, for cities such as Kuala Lumpur and Penang, a credit-price effect was found. However, for some types of houses, such as semi-detached houses, in Malaysia, as a whole there is evidence of a credit-price effect while a wealth-effect was reported for cities like Kuala Lumpur, Penang and Selangor. Only nine out of the 20 indices have a wealth-effect, while the remainder has a credit-price effect. The reasons for these mixed results were explained by the author by the fact that cities like Penang and Selangor are highly attractive to foreign investors. In fact, the stock market wealth-effect drives up the prices of these houses, leading to huge changes (Lean, 2012, p. 266). Moreover, another study, by Lean and Smyth (2014), investigated the dynamic interaction between stock prices and house prices in Malaysia. Using a similar methodology to Lean’s study (2012), they obtained almost identical results. They claimed that no long-run relationship existed between house and stock prices in most of the regions. Only in some regions, such as Kuala Lumpur, Penang and Selangor, was there evidence that stock prices lead house prices. Another study on a group of countries in the Far East, conducted by Lin and Fuerst (2014), investigated the long-term relationship between stock and real estate prices for nine Asian countries over the period 1980-2012. They find a linear relationship between the stock and real estate markets in Singapore, Taiwan and Hong Kong, but no evidence of such a relationship in China, Japan, Thailand, Malaysia, Indonesia or South Korea.

On the other hand, several studies have documented the long-term relationship between the stock and real estate prices of different locations and types, including macro-economic variables; for example, Liow (2006) suggests that there exists a long-term relationship between the stock price, residential price index and office index in Singapore. Residential property has stronger effects on the stock market in the short-term. In fact, using different indices which reflect the geographic location while investigating the relationship between stock prices and real-estate prices produces more accurate results. It may be argued that using different indices representing the locations will be more important for big countries, with extensive land and several cities. The logic behind this is: if the stock price rises, the investors become wealthier, which leads them either to spend more on consumer products or to buy an expensive house located in a prime location or high-demand area as an investment. Therefore, using indices representing each city is helpful when conducting research on the wealth-effect and credit-price effect. Another study by Bahadur and Neupane (2006), using real GDP and other variables, reported a long-run integration between real and nominal GDP, market capitalisation and stock prices in Nepal. They find that the causality evidence is only between real GDP and other variables. The findings from this paper show that the growth in GDP and the stock market have a long-run association. Sim and Chang (2006) examine the relationship between real estate prices in different regions with three types of real estate (residential, commercial and industrial land) and stock prices in the Korean market. Their study is based on the “Wealth effect” and “credit price effect” mechanisms, mentioned earlier. They use vector autoregression (VAR) and include the GDP and three-year corporate bond yield as the control variables. They concluded that the house and land prices lead the stock prices in most of the various real estate areas. Their Variance Decomposition results indicate that commercial, industrial and residential land shocks the stock price returns in Korea. Moreover, they found that commercial and industrial lands have a larger variation in stock price than do residential lands (Sim & Chang, 2006). Ibrahim, Padli, and Baharom (2009) also investigated the dynamic interactions and long-run relationships between stock prices, real estate prices and macroeconomic factors in Thailand. They conclude that there is a positive long-run relationship between house prices, real output stock prices and consumer prices.

The first study focused on Saudi Arabia that examined the relationship between stock market and house prices was an empirical study done by Batayneh and Al-Maliki (2015), in which they also examine the role of real GDP.

Following the framework of the "wealth-effect" and the "credit-price effect", this study used Unrestricted Vector Autoregression (UVAR), cointegration tests, a VAR causality test, Impulse Response Functions and variance decompositions. Evidence from this study shows: no-long-run relationship between house prices, stock prices and GDP; that the stock prices affect house prices and that the relationship between the two is negative; that GDP growth affects house price changes and that the relationship between the two is negative; and that house prices do not affect stock prices or real GDP. To our knowledge, this study is the first set in GCC countries that deal with such a subject. Another useful study on Turkey by Yuksel (2016) examines the dynamic relationship between real estate, stock prices and the one-month deposit rate (as a control variable) in Turkey, taking into consideration the impact of the global financial crisis in 2007 on Turkey's economy. This study also based on the theories of the "wealth-effect" and "credit price effect". Yuksel (2016) runs his tests and analysis over two periods: pre the global financial crises (14-11-2005-14-10-2007) and the post-crisis period (15-10-2007-11-09-2009). Yuksel uses the threshold cointegration approach and momentum-threshold autoregressive (M-TAR) and finds that the long-run relationship between real estate and stock prices changed during the two investigated periods. During the pre-crisis period, credit-price effects and wealth-effects were reported but, during the crisis period, only the credit-prices effects were reported. The author argues that the disappearance of the wealth-effect during the crisis period is due to the changed conjecture after the global crisis (Yuksel, 2016). A recent study by Ali and Zaman (2017) investigated the relationship between stock and house prices based on panel data for 22 European countries. The evidence found in this study shows a negative relationship between house and stock prices in five countries: Austria, Germany, Spain, Belgium, and Luxembourg, but a positive relationship exists between house prices and stock prices in 15 countries; Lithuania, Bulgaria, Cyprus, Poland, Croatia, Estonia, Denmark, Sweden, Malta, Greece, Latvia, Slovakia, Slovenia, Hungry and the UK. Moreover, no significant relationship was found for Italy or France. The same study found that house prices cause stock prices in the long-run only, while stock prices cause house prices in both the long and short runs. Moreover, in a very recent study, Gounopoulos, Kousenidis, Kosmidou, and Patsiak (2018) conducted empirical work to examine the dynamic relationship between the real estate and stock prices in Greece, focusing on the wealth-effect and price-credit effect. The main findings of this study show that the relationship between the stock and real estate prices in both the long and both runs is a one-way causal effect, from the stock to the real estate market, and is a wealth-effect only.

From the previous review of the literature, we can sum up the most important factors which this study should monitor as follows: using different indices which represent different types of real estate, such as house, multiple-apartments building, etc.; wealth-effects and credit-price mechanisms are good frameworks to explain such relationships between the stock and real estate markets, and a long and short-term casualty analysis is important to tackle.

3. Review of the Real Estate Sector in Kuwait

Kuwait is an oil exporting country. The oil sector dominates the Kuwaiti economy, accounting at the end of 2017 for about 60% of GDP at current prices, 92% of total exports, and 90% of the total government revenues. The government is heavily dependent on oil receipts to finance its budgetary operations. Government expenditure plays a crucial role in the economy and provides a leading source of liquidity in the local economy. Three main sources determine the liquidity position in Kuwait: oil revenues, government expenditure and the credit provided by the banks and financial institutions. A significant portion of individual investors' liquidity surplus is channelled both locally, either to the stock market or real estate sector, and internationally, to other countries' stock or real estate markets. Therefore, the stock and real estate markets in Kuwait play a major role in the Kuwaiti economy. This role can be observed through many indicators, above all the stock and real estate markets' role within the domestic economic activity. The real estate, renting and business services and the financial intermediation (stock market) value added to the GDP at current prices represent 10% and 9.8% of the total, respectively. The total value of traded shares in Kuwait Stock Exchange (KSE, henceforth) and traded on the real estate market in Kuwait during 2017 represents 5.5% and 7% of the GDP at current prices, respectively. Among other investment portfolios, real estate, especially houses and multi-apartment buildings, tend to be preferred, due to their negligible overhead cost. Moreover, they are easily and softly managed. Individual investors, in particular, find real estate more attractive, lucrative, and familiar due to the historical fine handling supported by the acquirement of developed trading skills which, combined, enable them to generate significant profits. Different assets in the real estate market, whether in the form of nonresidential land or multi-apartment buildings, are widely accepted by the banks as collateral for granting credit to the clients. However, in February 2008, the Kuwaiti government issued two laws (number 8 and 9 of 2008), which prohibited any company from owning or trading in residential land and houses. The same laws imposed on residential land above 5000 meters square an annual 10 KD fee per square meter. As a result, the local banks stop accepting residential land and houses as collateral for granting loans to clients. However, real estate, as a tangible asset, is considered the best way to store money compared to other investment tools in Kuwait. Kuwaiti people believe that "property gets sick but never dies". In addition to its important role in economic activity, real estate acquires a special, crucial significance due to its vital role in the area of investment portfolios. The main segments of real estate in Kuwait are residential (houses and land), multi-apartment buildings and land, commercial (property and land) used for business and shops, warehouse (stores, etc.), and industrial property. It is worth mentioning here that the commercial, warehouse and industrial sectors are less active and their turnover in the market is tiny compared with the first two sectors. The most active markets are houses and multi-apartment buildings. The main reason for the high demand for the residential sector is the fact that the government owns about 95% of the total land in Kuwait, and only 5% of it is available for private and individual investors (Kaganova, Al-Sultan, & Speakman, 2005).

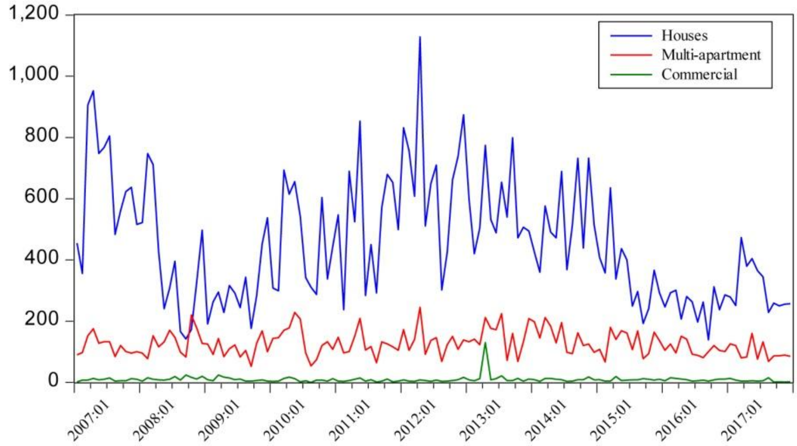

Figure 1. Kuwait real estate market, number of monthly transactions

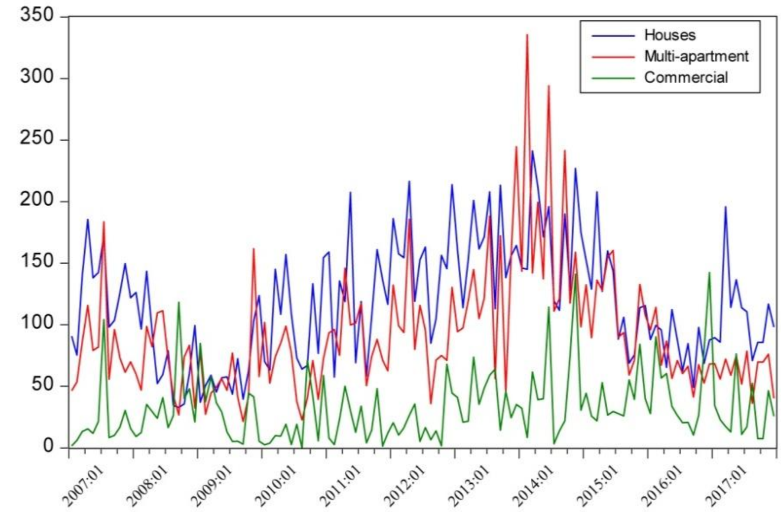

Figure 2. Monthly trading activity of Kuwait real estate market im M.KD

In fact, the houses and land are managed by a government institution called the Public Authority for Housing Welfare, which distributes houses and residential land to Kuwaiti citizens according to certain terms, such as they must be a Kuwaiti family and should not own a house (Almutairi & Al-Sakka, 2016). There were 93,341 existing house applications at the end of 2017. An applicant must wait at least 14 years to reach his turn. Therefore, due to the limited available residential lands in the market, houses price fluctuating according to supply and demand. Figure 1 indicates that the houses (houses and residential lands) have the highest number of transactions in the Kuwaiti real estate market, followed by the multi-apartment buildings and lands, while the commercial sector has the lowest value and number of transactions. In fact, the available residential land (supply side) is always lower than the demand side, and the prices of these units (houses or lands) are constantly increasing. Moreover, small investors in Kuwait tend to invest in houses, either buying and waiting until the prices increase then selling at a higher price or buying them to rent out, obtaining approximately 7-8% returns annually. Figure 2 shows that the house sector has the highest value regarding market transactions during the investigated period (2007-2017). However, the same figure also shows a high demand for buying multi-apartment buildings, due to the structure of the population in Kuwait, whereby non-Kuwaitis represent 70% of the total population. At the end of 2017, the total population of Kuwait was 4.2 million. Since non-Kuwaitis, by law, cannot buy apartments or houses, all non-Kuwaitis rent apartments in multi-apartment buildings. The owners of these multi-apartment buildings can get a return of 8-10%, which is higher than a bank deposit (2.75% in 2008).

4. The Empirical Work and Results

4.1 Data

The data used in this study were taken from the Kuwait Stock Exchange and Central Bank of Kuwait websites. Unlike the Kuwait Stock Exchange Market, the real estate market has no official index. The purpose and benefits of such an index are to aid the economic policy-makers, individual investors, and the banking and financial sector. The only available data are the value of traded real estate and the number of transactions, together with some details relating to the size and location of the property. The main segments of the real estate sector are houses (houses and residential land), multi-apartment buildings and lands in the same zone, commercial real estate (shops, offices and land in the same zone), and industrial real estate. As a result of the unviable indices for the real estate market in Kuwait, two indices were constructed in this study. In fact, the real estate indices came in several forms and the differences between them relate to the methodology used. Real estate is a heterogeneous market, which means that each property or piece of land differs, in terms of location, size or condition. Assil (2012), pointed out that the main method used internationally to construct a real estate price index is econometrics, such as a hedonic, repeat sales method or simple method. In this study, the simple method was used to construct an index based on the average value over a number of transactions. For the purpose of this study, two simple indices have been constructed. The main source of this data is the Ministry of Justice, Documentations Department. These indices are related to the most active sectors; houses and residential lands (HP, henceforth) and multi-apartment buildings (MAB, henceforth). These indices can be constructed as follows:

$$A_t = (\frac{V_t}{T_t}) \tag{1}$$

$$\text{Index} = (\frac{A_t}{A_0}) \text{ X } 1000 \tag{2}$$

Where A_t is the average value of traded real estate, V_t the value of traded real estate at time t, T_t the number of transactions at time t, and A_0 the average value of traded estates on the base date, which is January 2002. By applying this method, we get the two indices: HP and MAB. The credit facilities to real estate variable is the total loans to real estate and the instalment loans, which are usually used for the purpose of building houses or buying land. The KSE Index is the premier market index. Since we get the time series of instalment loans from January 2007 to December 2017, this study will cover monthly data from January 2007 to December 2017.

4.2 Methodology

The main objective of this study is to examine the dynamic long-run and short-run relationship between the main stock price index of the Kuwaiti Stock Market (the base date is 29 December 1993 =1000, KSEI henceforth), house and residential land prices (HP, henceforth), multiple-apartment building and land (in the same zone) prices (MAP, henceforth) and bank credit facilities to the real estate sector (RC, henceforth). The bank credit facilities loans (RC) for real estate are a decisive factor in the real estate market. As mentioned earlier, the credit-price mechanism states that real estate is good collateral against investors' loans, and so is worth including as a variable in order to investigate its relationship with the stock market. This variable can also be used as a proxy for real estate market activity. If the loans for real estate rise, the stock price may rise also. This study aims to investigate the dynamic relationship between the stock and real estate markets in the State of Kuwait for the period from January 2007 to December 2017. Figure 3 shows the monthly data for the four variables for this period. Figure 3 also shows that the four variables display similar trends. If the stochastic trends are driving them together, we may argue that these variables cointegrate with each other, which may be interpreted as an equilibrium relationship in the long-run. However, if the KSEI, RC, HP and MAP move together, then the $I(1)$ of these variables may be cointegrated and have an equilibrium relationship in the long-run. All data were transformed into a natural logarithm. To investigate this relationship, the Augmented Dickey-Fuller unit roots test is applied to all of the variables at their level. If the results of the Augmented Dickey-Fuller Test Equation for unit roots confirm that all variables are non-stationary at their level, and become stationary when we take first deference, the cointegration test of Johansen (1998) will be applied. If the results of the cointegration show that the variables are cointegrated, the Var Error Correction Model (VECM) will be used. However, if the results show no cointegration, the Unrestricted Vector (UVAR) will be applied. The EViews program has been used for empirical work.

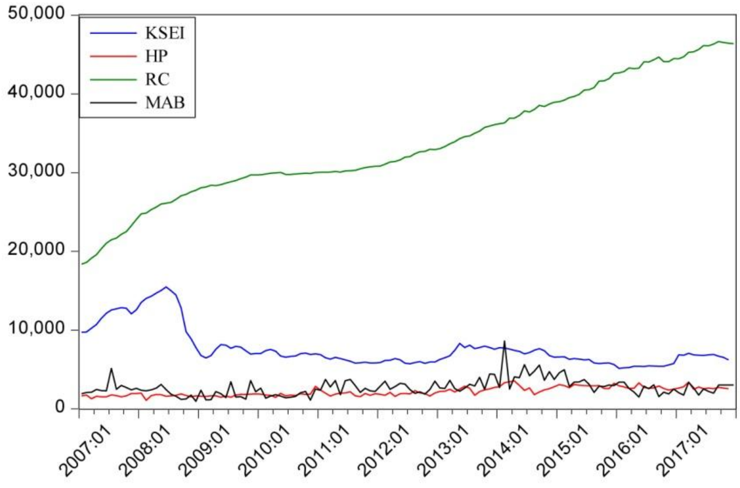

Figure 3. Vriables on their level

4.3 Descriptive Statistics

Table 1 shows the descriptive statistics for the four variables. It indicates that the skewness test is used to measure the extent to which the probability distribution has a positive or negative tail concerning its departure from symmetry. Table 1 shows that RC and HP are positively moderately skewed to the right, while MAP and KSEI are positively more skewed to the right. The kurtosis statistic measures the extent to which the distribution tends to have a relatively larger proportion of observations around the center. For a normal distribution, the kurtosis coefficient equals 3. Values of the coefficient > 3 indicate a distribution with tails thicker than normal, while values of < 3 indicate a distribution with tails thinner than normal. Two variables have kurtosis less than 3: RC and HP, so they are platykurtic, and their distribution is a thinner tail. The other two variables, KSEI and MAP, are leptokurtic and have a distribution with tails thicker than normal.

Table 1. Descriptive statistics

	KSEI	RC	HP	MAP
Mean	7651.610	33600.65	2175.684	2694.527
Median	6832.220	31947.90	1988.437	2527.203
Maximum	15456.20	46654.90	3524.341	8581.789
Minimum	5114.520	18360.20	1056.550	945.9434
Std. Dev.	2486.890	7295.192	546.3687	1078.501
Skewness	1.728212	0.103547	0.435647	1.680743
Kurtosis	4.985244	2.193592	2.155241	8.943352
Observations	131	131	131	131

Source: Prepared by the author.

4.4 Unit Root Test

To ensure that our time series is stationary or not at their level, the Augmented Dickey-Fuller (ADF), the unit root test, was applied at all levels of the variables. The tests are as follows:

1) Null hypothesis: Variable has a unit root. (not stationary);

2) Alternative hypothesis: Variable does not have a unit root (stationary).

If the p-values < .05, that means that the data are stationary, and the null hypothesis is rejected. Moreover, if the t-statistic > critical values, the null hypothesis is also rejected. Tables 2-5 show that all of the variables at their level are nonstationary, while first deference makes all of the variables stationary.

Table 2. Augmented Dickey-Fuller unit test results for KSEI

Variables	Level	$\Delta\ Level$
Prob.*	0.2578	0.0000
t-Statistic**	(-2.0685)	(-6.2103)
Test critical values;		
1%	-3.480818	-3.480818
5%	-2.883579	-2.883579
10%	-2.578601	-2.578601

Source: Prepared by the author.

*MacKinnon (1996) one-sided p-values, denotes stationary less than 0.05; ** Significant, t-Statistics must be > critical values.

Table 3. Augmented Dickey-Fuller unit test results for RC

Variables	Level	$\Delta\ Level$
Prob.*	0.9935	0.0126
t-Statistic**	(0.787221)	(-3.4065)
Test critical values;		
1%	-3.486064	-3.486064
5%	-2.885863	-2.885863
10%	-2.579818	-2.57818

Source: Prepared by the author.

*MacKinnon (1996) one-sided p-values, denotes stationary less than 0.05; ** Significant, t-Statistics must be > critical values.

Table 4. Augmented Dickey-Fuller unit test results for HP

Variables	Level	$\Delta\ Level$
Prob.*	0.6972	0.000*
t-Statistic**	(-1.14338)	(-7.6545)
Test critical values;		
1%	-3.480818	-3.480818
5%	-2.883579	-2.883579
10%	-2.578601	-2.578601

Source: Prepared by the author.

*MacKinnon (1996) one-sided p-values, denotes stationary less than 0.05; ** Significant, t-Statistics must be > critical values.

Table 5. Augmented Dickey-Fuller unit test results for MAP

Variables	Level	$\Delta\ Level$
Prob.*	0.1284	0.0000
t-Statistic**	(-2.457357)	(-8.8216)
Test critical values;		
1%	-3.480425	-3.480425
5%	-2.883408	-2.883408
10%	-2.578510	-2.578510

Source: Prepared by the author.

*MacKinnon (1996) one-sided p-values, denotes stationary less than 0.05.; ** Significant, t-Statistics must be > critical values.

Tables 2-5 show the p-values and t-Statistic for all of the variables, indicating that they are non-stationary in their level and may be integrated in some order. It is clear that the p-values and t statistics indicate that the four variables became stationary after first deference has been applied. In the next step, the Johansen cointegration test is applied to the level of all variables.

4.5 Johansen Cointegration Test

The Johansen (1998) Cointegration Test was applied in the study. To conduct the cointegration test, the variables must be non-stationary in their level. The results of the Augmented Dickey-Fuller unit show that all of the variables are non-stationary and, after converting them by the first difference, they all became stationary. However, before the Johansen Cointegration Test was applied, the VAR lag order selection criteria were tested for the times series and, according to the sequential modified LR test statistic (LR), Final prediction error (FPE), Akaike information criterion (AIC) and Hannan-Quinn information criterion (HQ), the optimal lag for HP is 2, while it is 4 for the MAP. For the purpose of this study, the Johansen cointegration will be performed with lag 2 for the HP equation and 4 lags for the MAP equation. Our target variable is LKSEI:

Equation 1. (HP Equation): The relationship between the logarithm of KSEI and logarithm of CR and logarithm of HP (LHP, henceforth).

Equation 2. (MAP Equation): The relationship between the logarithm of KSEI (LKSEI, henceforth) and the logarithm of CR (LCR, henceforth) and the logarithm of MAP (LMAP, henceforth).

The following hypothesis is tested to investigate the cointegration of the above two equations, assuming the intercept (no trend) in CE and test VAR for our target variable LKSEI and other variables, as discussed earlier:

1) Null hypothesis: there is no cointegration in this model. (MAP and HP equations)

2) Alternative hypothesis: there is cointegration in this model. (MAP and HP equations)

Table 6. Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue		Trace Statistic		0.05 critical value	Prob.*	
	LMAP	LHP	LMAP	LHP	for both	LMAP	LHP
Non	0.165846	0.208122	30.58910	51.88345	29.79707	0.0405	0.0000
At most 1	0.043269	0.125604	7.740681	22.01494	15.49471	0.4935	0.0045
At most 2	0.017054	0.037066	2.167386	4.834597	3.841466	0.1410	0.0279

Source: Prepared by the author.

* Denotes rejection of the null hypothesis at the 0.05 level if Prob. < 0.05; **MacKinnon-Haug-Michelis (1999) p-values.

Table 7. Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue		Max-Eigen statistic		0.05	Prob.**	
	MAP	HP	MAP	HP	critical value	MAP	HP
Non	0.165846	0.20812	22.84842	29.86851	21.13162	0.0284	0.0023
At most 1	0.043269	0.125604	5.573295	17.18034	14.26460	0.6684	0.0168
At most 2	0.017054	0.037066	2.167386	4.834597	3.841466	0.1410	0.0279

Source: Prepared by the author.

** denotes rejection of the null hypothesis at the 0.05 level if Prob. < 0.05. **MacKinnon-Haug-Michelis (1999) p-values.

Tables 6 and 7 show the results of the Johansen Cointegration Test for both the trace and maximum eigenvalue tests. Since the value of the p-Statistic denotes the rejection of the null hypothesis at the 0.05 level, overall, we reject no cointegration in this equation at the 5% level. The results show that there are three cointegration equations/error terms for the HP and one cointegration equations/error for MAP. In a similar study of the Saudi Arabian market by Batayneh and Al-Maliki (2015), no cointegration was found among the variables used in their study. However, the cointegration results obtained in this study are in line with those of previous studies; for example, Lean (2012) on Malaysia; Yukesl (2016) found no cointegration during the pre-crises period (November 14, 2005, to October 14, 2007) in Turkey but did find cointegration during the crisis period (October 15, 2007, to September 11, 2009); and Ibrahim, Padli, and Bahrom (2009) find cointegration between housing and stock prices in Thailand.

The Vector Error Correction Model (VECM), may provide the best option for testing the long- and dynamic short-run relationship between the KSEI and Credit to the Real estate (CR), House price Index (HP) and multi-apartment buildings Index (MAP), and all variables are endogenous. This will be achieved by applying two equations with (p-1) lags. The first will test the relationship between LKSEI and LCR and LHP, while the second will examine that between LKSEI and LCR and LMAP. According to Engle, Robert and Granger (1987), the conventional ECM for a cointegration series can be written as follows:

$$\text{VECM}; \Delta y_t = \sigma + \sum_{i=1}^{k-1} \beta_i \Delta y_{t-i} + \sum_{j=1}^{k-1} \delta_j \Delta x_{t-j} + \sum_{m=1}^{k-1} \theta_m \Delta ß_{t-m} + Ꝏ\, ECT_{t-1} + \mu_t \tag{3}$$

Where β_i, δ_j, θ_m = short-run dynamic coefficients and μ_t is residuals (stochastic error term).

Z is the ECT and OLS residuals from the long-run cointegration regression:

$$Y_t = \sigma + \delta_j x_t + \theta_m ß_t + u_t \tag{4}$$

Where error-correction term ECT_{t-1} can be defined as a cointegrating equation for the long-run relationship:

$$z_{t-1} = ECT_{t-1} = (y_{t-1} - \delta_1 x_{t-1} - \theta_1 ß_{t-1}) \quad (5)$$

The OLS residual from the long-run cointegration regression is the ECT (Z). The coefficient of ETC (Ꝍ) measures the speed at which KSEI returns to equilibrium following a change in the independent variables. Based on equations 3 and 5, the following equations were examined;

HP equation:

$$\text{VECM; } \Delta\ KSEI_t = \sigma + \sum_{i=1}^{k-1} \beta_i\, \Delta KSEI_{t-i} + \sum_{j=1}^{k-1} \delta_j\, \Delta CR_{t-j} + \sum_{m=1}^{k-1} \theta_m\, \Delta HP_{t-m} + Ꝍ\, z_{t-1} + \mu_t \quad (6)$$

MAP equation:

$$\text{VECM; } \Delta\ KSEI_t = \sigma + \sum_{i=1}^{k-1} \beta_i\, \Delta KSEI_{t-i} + \sum_{j=1}^{k-1} \delta_j\, \Delta CR_{t-j} + \sum_{m=1}^{k-1} \theta_m\, \Delta MAP_{t-m} + Ꝍ\, z_{t-1} + \mu_t \quad (7)$$

where z_{t-1} equals to ECT_{t-1} which can be defined as a cointegrating equation for the long-run relationship:

For HP; $$z_{t-1} = ECT_{t-1} = LKSEI_{t-1} - \delta_1 LCR_{t-1} - \theta_1 LHP_{t-1} \quad (8)$$

For MAP: $$z_{t-1} = ECT_{t-1} = LKSEI_{t-1} - \delta_1 LCR_{t-1} - \theta_1 LMAP_{t-1} \quad (9)$$

Based on equation 6, the VECM for the Kuwait Stock Market Index (KSEI), as a target variable, with CR and HP as independent variables, were estimated and the following results were obtained:

$$\Delta lKSEI_t = -0.004120\, KSEI_{t-1} - 6.857317\, lCR_{t-1} + 5.615335\, lHP_{t-1} + 19.4286 + 0.459387\, \Delta lKSEI_{t-1}$$
$$+0.668425\, \Delta lRC_{t-1} - 0.018143\, \Delta lHP_{t-1} - 0.006843 \quad (10)$$

Based on equation 8, the following results for the long-run relationships were obtained:

$$est_{t-1} = 1.000 lKSEI_{t-1} - 6.857317 lCR_{t-1} + 5.615335\, lHP_{t-1} + 19.42986 \quad (11)$$

The coefficient of ECT_{t-1} (C1), which is the speed of adjustment to the long-run equilibrium, must be negative and significant. Table 8 shows that the coefficient of ECT_{t-1} (C1), for the HP equation has a p-value more than 0.05 and a negative sign, which does not satisfy one of the conditions of the long-run association (P. >.05). This coefficient suggests the lack of a long-term association between stock market prices (KSEI) and house prices (HP) in Kuwait during the investigated period. The same table also shows the lack of a short-run relationship between the variables. It may be argued that these results may be due to certain factors, such as laws 8 and 9 of 2008, as noted earlier. In fact, by prohibiting companies and Islamic banks to own and trade in residentials land and houses, the demand for housing became restricted to individuals who are capable to buy from their savings. These two laws prohibited banks from accepting houses as collateral for loans. Therefore, householders cannot borrow more than 100,000 KD to purchase a house. This loan called an instalment loan and, banks offer them against salary under certain terms, such as the monthly instalment must not exceed 40% of the salary. However, the average house price is 300,000KD, and so it is challenging for small-scale investors to raise this amount. As a result, we cannot expect house prices to affect stock prices. Moreover, these results are in line with a few previous studies, such as Quan and Titman (1999) and Lean and Smyth (2014).

Table 8. Coefficients of the least squares (Gauss-Newton/Marquardt steps) of the HP equation

	Coefficient	Std. Error	t-Statistic	Prob.
C(1) $KSEI_{t-1}$	-0.004120	0.004975	-0.828142	0.4092**
C(2)$\Delta KSEI_{t-1}$	0.459387	0.079523	5.776746	0.0000
C(3) ΔRC_{t-1}	0.668425	0.599765	1.114479	0.2672
C(4) ΔHP_{t-1}	-0.018143	0.029641	-0.612088	0.5416
C(5) intercept	-0.006843	0.005985	-1.143520	0.2550

*Prepared by the author; **Sign is negative and insignificant.

Based on equation 7, the VECM for the Kuwait Stock Market Index (KSEI), as a target variable, with CR and MAP as independent variables, was estimated with 3 lags (p-1) and the following results were obtained:

$$\Delta lKSEI_t = -0.052976 lKSEI_{t-1} - 0.020997 lCR_{t-1} + 0.427213 lMAB_{t-1} - 12.022 + 0.425436 \Delta lKSEI_{t-1}$$
$$+0.081221\, \Delta lKSEI_{t-2} - 0.019139 \Delta lKSEI_{t-3} + 0.882905 \Delta lRC_{t-1} + 0.606741 \Delta lRC_{t-2}$$
$$+0.271156 \Delta lRC_{t-3} + 0.037737 \Delta lMAB_{t-1} + 0.036779 \Delta lMAB_{t-2} + 0.034240\, \Delta lMAB_{t-3} - 0.015389 \quad (12)$$

Based on equation 9, the following results for the long-run relationships were obtained:

$$est_{t-1} = lKSEI_{t-1} - 0.020997\, lCR_{t-1} + 0.427213 lMAB_{t-1} - 12.02287 \quad (13)$$

Table 9 shows that the coefficient of ECT_{t-1} (C1), which is the speed of adjustment to the long-run equilibrium, has a p-value less than 0.05 and a negative sign, which satisfies both conditions. This coefficient supports a long-term association so, if the Kuwaiti stock market index rises, other variables will be pulled back by 5.2% to reach equilibrium in the long-run. This can be explained also by the fact that the estimated coefficient indicates that about 5.2% of this disequilibrium is corrected between one month. There is evidence to suggest a long-run causality for the one independent variable, only MAP which has ***t*** statistic of 2.29269, while CR insignificant (***t***= -0.06766). Therefore, MAP have an influence on the dependent variable (KSEI) in the long-run. Credit facilities has no a direct effect on stock prices, while multi-apartment buildings have a positive and strong effect on stock prices and it is a bidirectional relationship (Table 9). This can be explained by the credit-price effect mechanism. As mentioned earlier, multi-apartment buildings are widely accepted by the banks as collateral for granting extended credit to their clients. It may be argued that, in the long-run associated relationship, if the stock price rises, the multi-apartment buildings' price will increase. As mentioned earlier, the stock and real estate markets are the only two investment channels for local investors. Therefore, it is logical to see such positive relationship between these two variables, as the bidirectional positive relationship between KSEI and MAP informs us that investors transfer their investment from the real estate market (multi-apartments) to stock market. The findings of this study are in line with those of: Kakes and Den (2004) on the Netherlands; Siokis (2006) on Greece; Kapopoulos, Liu, and Su (2010), who find a long-run but nonlinear relationship between the stock and real estate markets in China; and Fuerst (2014), who finds a linear, long-run relationship between stock and real estate prices for several south eastern countries, including China, Singapore, Thailand, Malaysia, Indonesia and South Korea. However, to investigate the short-run relationship, the Wald test has been applied to investigate whether the coefficients reported in Table 9 (C(5), C(6), and C(7); C(8), C(9), and C(10)) are equal to zero or not. These coefficients belong to the ΔRC and ΔMAP with their 3 lags.

Table 9. Coefficients of the least squares (Gauss-Newton/Marquardt steps) MAP equation

	Coefficient	Std. Error	t-Statistic	Prob.
C(1) $KSEI_{t-1}$	-0.052976*	0.019589	-2.704352	0.0079*
C(2) $\Delta KSEI_{t-1}$	0.425436	0.088205	4.823245	0.0000
C(3) $\Delta KSEI_{t-2}$	0.081221	0.096744	0.839549	0.4029
C(4) $\Delta KSEI_{t-3}$	-0.019139	0.090809	-0.210763	0.8334
C(5) ΔRC_{t-1}	0.882905	0.635951	1.388322	0.1677
C(6) ΔRC_{t-2}	0.606741	0.639803	0.948324	0.3449
C(7) ΔRC_{t-3}	0.271156	0.635065	0.426974	0.6702
C(8) ΔMAP_{t-1}	0.037737	0.016213	2.671660	0.0086**
C(9) ΔMAP_{t-2}	0.036779	0.013398	2.268450	0.0252**
C(10) ΔMAP_{t-3}	0.034240	0.013398	2.555706	0.0119**
C(11) Intercept	-0.015389	0.007335	-2.098138	0.0381

Source: prepared by the author.

*Negative and below the 5% level; ** Significant at 5%.

Tables 8 and 9 report the results of the Wald test for the triple coefficients for each variable, in order to investigate whether the variables in their lags 1, 2 and 3 are equal to zero or not. If so, this shows evidence that no short-run causality exists between these variables and stock prices. Tables 8 and 9 show that the null hypothesis for each of the coefficients of C(5)=C(6)=C(7)=0 cannot be rejected, while the coefficients of C(8)=C(9)=C(10)=0 can be rejected, since all of them < .05. As a result, the variables' coefficients, such as credit facilities from the banks to the real estate sector (RC), cannot be rejected while the multi-apartment buildings' prices (MAP) can. Therefore, MAP influences the stock prices in the short-run. In other words, there is no short-run causality from (CR) to stock prices, while there is a short-run relationship between KESI and MAP.

Table 10. Test the Null Hypothesis that loans for real estate (RC)do not cause stock prices in the short-run

Test Statistics	Value	df	Probability*
F-statistic	1.569728	(3, 116)	0.2005
Chi-square	4.709183	3	0.1944

Source: Prepared by the author.

*p-value < 5% level.

Table 11. Test the Null Hypothesis that houses prices (MAP) do not cause stock prices in the short-run

Test Statistics	Value	df	Probability*
F-statistic	3.602561	(3, 116)	0.0156
Chi-square	10.80768	3	0.0128

Source: Prepared by the author.

*p-value < 5% level.

Our result of the KSEI and MAP is in line with other studies that find a short-run relationship; such as Liow (2006) for the Singapore markets; Ali and Zaman (2017) for 22 European countries; and Gounopoulos et al. (2018) for Greece.

The result of a lack of a short- and long-run relationship obtained in this study for KSEI and HP may reflect the real estate market features of the residential sector (houses and land) in Kuwait, which is not organized well. As mentioned earlier, laws 8 and 9 of 2008 have affected the residential housing market in Kuwait negatively. Moreover, the government owns about 95% of the residential land in Kuwait. As a result of these factors, land has become scarce and limited to a few areas of Kuwait, and is unavailable for institutional investors. These restrictions have made residential land and houses very expensive for most middle-income people. However, the process of buying a house in Kuwait involves several steps. The first involves placing an order either to buy or sell through a broker, after which it takes a long time for the transaction to be settled between the buyer and seller, which must be finalized by the Ministry of Justice. This paper procedures that comply with the regulations requires several documents of approval steps. This paperwork takes a long time. This can be enhanced by creating either a real estate exchange market or an efficient, organized system that reduces the paperwork and facilitates the market system. This will enhance the supply/demand mechanism and smooth the transaction mobility between buyer and seller. The market data and all related information should be more accurate and disclosed publicly to meet the investors and regulatory authority’s needs.

4.6 Serial Correlation

We proceed next with the Breusch-Godfrey serial correlation LM test. The hypothesis can be written as follows:

1) Null hypothesis: there is no serial correlation between the variables.

2) Alternative hypothesis: there is a serial correlation between the variables.

Table 12. Breusch-Godfrey serial correlation LM test

		Test	Prop
F-statistic	2.726123	Prob. F(2,114)	0.0697
Obs*R-squared	2.657171	Prob. Chi-Square(2)	0.0601

Source: Prepared by the author.

*Significant >0.05.

Table 12 indicates that there is no serial correlation in the model. Due to the significant results of the p-value, which is > 0.05, we cannot reject the null hypothesis. There is no evidence of a serial correlation in this model. As the next step, we test the heteroskedasticity in our model.

4.7 Heteroskedasticity Test

1) Null hypothesis: there is no heteroskedasticity in the model.

2) Alternative hypothesis: there is a heteroskedasticity in the model.

Table 13. Heteroskedasticity test: Breusch-Pagan-Godfrey

		Test	Prop
F-Statistic	1.773680	Prob. F(12,114)	0.0608
Obs*R-squared	19.98082	Prob. Chi-Square(12)	0.0674

Source: Prepared by the author.

*significant >0.05.

Table 13 clearly shows that there is no heteroskedasticity in the model. All of the statistical test results, such as the p-value, are significant at level 1 and > 0.05, so the null hypothesis cannot be rejected. However, to ensure the dynamic stability of the model, the stability diagnostics were tested by the Cumulative sum (CUSUM) chart. Figure 4 shows that the CUSUM line (blue) lies within the 5% significance level, which provides evidence that the model is dynamically stable in the long-run.

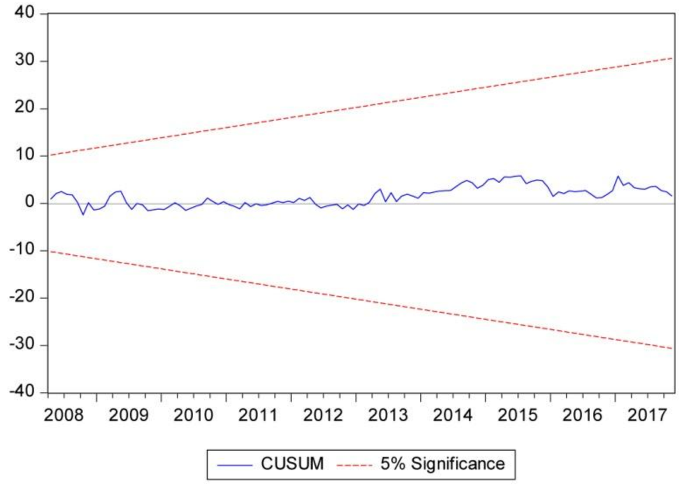

Figure 4. CUSUM chart

5. Conclusion and Recommendations

This study examined the dynamic relationship between stock and the real estate prices in Kuwait for the period from January 2007 to December 2017. Our empirical analysis includes house and residential land prices, multi-apartment building prices and total credit facilities from the banks to the real estate sector. The relationship between these variables was examined using two models. The HP model examines the relationship between the Kuwaiti stock market Index and credit facilities with the real estate sector and house and residential lands index (HP), while the MAP model examines the relationship between the Kuwaiti stock market index and credit facilities with the real estate sector and multi-apartment buildings and land in the same zone index (MAP). The Johansen Cointegration Test result shows that there a cointegration equation/three error terms in the HP model while, in the MAP model, only one error term exists. However, the Vector Error Correction Model (VECM) confirmed the positive long-term association between stock and the multi-apartment building prices (with land in the same zone). Multi-apartments have a strong positive effect on stock prices and it is a bidirectional relationship. This finding shows that investors in these markets (the stock and real estate markets) are diversifying their portfolios by shifting their money between the two. If the multi-apartments witnesses growth, the owners of real-estate tend to use it as collateral to borrow from the banks and buy shares. A short-term relationship between the stock and real estate prices was found in this study only between the Kuwaiti Stock market and the multi-apartment buildings market. Moreover, this study documents no heteroscedasticity and no serial correlation, and the results of the Breusch-Godfrey serial correlation LM test and the (CUSUM) chart confirmed that the model is dynamically stable in the long-run. This study recommends the urgent construction of an index for the real estate market and the more efficient organization of the market. The purpose and benefit of such an index will be in aiding the economic policy-makers, individual investors and the banking and financial sector.

References

Ali, G., & Zaman, K. (2017). Do house prices influence stock prices? Empirical investigation from the panel of selected European Union Countries. *Economic Research-EKONOMSKA, 30*(1), 1840-1849. https://doi.org/10.1080/1331677X.2017.1392882

Almutairi, H., & El-Saka, M. I. T. (2016). Determinants of Housing Prices in an Oil based Economy. *Asian Economic and Financial Review, 6*(5), 247-260. Retrieved from https://ideas.repec.org/a/asi/aeafrj/2016p247-260.html

Assil, E. (2012). Constructing a real Estate Price Index; The Moroccan Experience. *Working paper, Bank Al-Maghrib*. Retrieved from http://www.bkam.ma/

Bahadur, S. G. C., & Neupane, S. (2006). Stock Market and Economic Development: A causality test. *Journal of*

Nepalese Business Studies, 3(1), 35-44. https://doi.org/10.3126/jnbs.v3i1.481

Batayneh, K., & Al-Malki, A. M. (2015). The Relationship between House Prices and Stock Prices in Saudi Arabia: An Empirical Analysis. *International Journal of Economics and Finance, 7*(2), 156-167. https://doi.org/10.5539/ijef.v7n2p156

Engle, R. F., & Granger, C. W. J. (1987). Co-Integration and Error Correction: Representation, Estimation, and Testing. *Econometrica*, *55*(2), 251-276. https://doi.org/10.2307/1913236

Gounopoulos, D., Kousenidis, K. K., & Patsiak, V. (2018). The Investigation of the Dynamic Linkages between Real Estate Market and Stock Market in Greece. *The European of Finance*, 1-24. https://doi.org/10.1080/1351847X.2018.1532443

Ibbotson, R., & Siegel, L. (1984). Real Estate Returns: A comparison with Other Investment. *AREUA Journal, 12,* 219-241. https://doi.org/10.1111/1540-6229.00320

Ibrahim, M., Padli, J., & Baharom, A. H. (2009). Long-Run Relationships and dynamic Interactions Between Housing and Stock Prices in Thailand. *Asian Academy Management Journal of Accounting and Finance, 5*(1), 93-105. Retrieved from https://EconPapers.repec.org/RePEc:usm:journl:aamjaf00501_93-105

Johansen, S. (1988). Statistical analysis of co-integration vector. *Journal of Economic Dynamics and Control, 12*, 231-254. https://doi.org/10.10165-1889(88)90041-3

Kaganova, O., Al-Sultan, F., & Speakman, J. (2005). Overview of Real Estate Market in Kuwait. *Journal of Real Estate Literature, 13*(3), 289-302. Retrieved from https://www.questia.com/.../overview-of-real-estate-markets-in-kuwait

Kakes, J., & Van Den End, J. W. (2004). Do stock prices affect house prices? Evidence for the Netherlands. *Applied Economics Letters, 11*(12), 741-744. https://doi.org/10.1080/1350485042000254863.

Kapoppouls, P., & Siokis, F. (2005). Stock and Real Estate Prices in Greece: Wealth Versus ‘Credit price’ Effect. *Applied Economics Letters*, *12*, 125-128. https://doi.org/10.1080/1350485042000307107

Lean, H. H., & Smyth, R. (2012). REITs, interest rates and stock prices in Malaysia. *International Journal of Business and Society, 13*(1), 49-62. Retrieved from https://www.researchgate.net/publication/241761693_REITs_interest

Lean, H. H., & Smyth, R. (2014). Dynamic International between House Prices and Stock Prices in Malaysia. *International Journal of Strategic Property Management, 18*(2), 163-177. https://doi.org/10.3846/1648715X.2014.925006

Lin, P., & Fuerst, F. (2014). The Integration of direct Real Estate and Stock Markets in Asia. *Applied Economics, 46*(12), 1323-1334. https://dx.doi.org/10.2139/ssrn.2186877

Liow, K. H. (2006). Dynamic relationship between stock and property markets. *Applied Financial Economics, 16*(5), 371-376. https://doi.org/10.1080/09603100500390885

Liu, Y. S., & Su, C. W. (2010). The relationship between the real estate and stock markets of China: Evidence from a nonlinear model. *Applied Financial Economics, 20*(22), 1741-1749.

Quan, D. C., & Titman, S. (1999). Do Real Estate Prices and Stock Prices Move Together? An International Analysis. *Real Estate Economics, 27*(2), 183-207. https://doi.org/10.1111/1540-6229.00771

Sim, S, H., & Chang, B. K. (2006). Stock and Real Estate markets in Korea: Wealth or credit-price effect. *Journal of Economic Research, 11*, 99-122. https://doi.org/10.1016/S2212-5671(12)00030-5

Yuksel, A. (2016). The relationship between stock and real estate prices in Turkey: Evidence around the global financial crisis. *Central Bank Review, 16*(1), 33-40. https://doi.org/10.1016/j.cbrev.2016.03.006