International Journal of Business and Management; Vol. 10, No. 8; 2015
ISSN 1833-3850 E-ISSN 1833-8119
Published by Canadian Center of Science and Education

Development of Empirical Correlations between Wilshire US REIT Index and Dow Jones Industrial Average Index and Different Interest Rate Swaps

Subhashis Nandy[1]

[1] School of Advanced Studies, University of Phoenix, Phoenix, Arizona, USA

Correspondence: Subhashis Nandy, School of Advanced Studies, University of Phoenix, Phoenix, Arizona, USA. E-mail: subasnandy@email.phoenix.edu

Received: June 8, 2015 Accepted: June 23, 2015 Online Published: July 22, 2015

doi:10.5539/ijbm.v10n8p39 URL: http://dx.doi.org/10.5539/ijbm.v10n8p39

Abstract

REITs (Real Estate Investment Trusts) have gained significant popularity among the financial investors in the recent years. The investors do not have access to any model that correlates Wilshire US REIT Index with Dow Jones Industrial Average and different interest rate swaps. The researcher has developed empirical correlations between Wilshire US REIT Index and Dow Jones Average and swap rates of different durations. The null hypothesis that no correlation exists between natural logarithms of Wilshire US REIT Index and natural logarithms of Dow Jones Industrial Average Index has been tested. The researcher has also tested the null hypotheses that no correlation exists between natural logarithms of Wilshire US REIT Index and interest rate swaps of different durations. The period used in this study is from March 10, 2005, to March 10, 2015. The findings from this study indicate that the null hypothesis that no correlation exists between natural logarithm of US REIT Index and Dow Jones Industrial Average Index can be rejected. Further, the null hypotheses that no correlation exists between natural logarithms of US REIT Index and 1-year, 2-year, 3-year and 30-year interest rate swaps can also be rejected.

Keywords: Wilshire US REIT index, dow jones industrial average, interest rate swaps, correlation

1. Introduction

1.1 Introduce the Problem

Investments in REITs (Real Estate Investment Trusts) have increased significantly in the last few years as interest rates have remained low (Goebl, Harrison, Mercer, & Whitby, 2013). According to Louargand (2007), US REITs grew from $9 billion equity capitalization in 1991 to more than $400 billion in 2006. Goodchild (2008) discussed the gain in popularity of REITs among investors in USA since the early 1990s.

Financial investors considered REITs as safe havens for investment during the financial crisis between 2007 and 2009 (Raudszus, Olliges, & Mueller, 2012). After the financial crisis of 2007-2009, the prices of REITs have increased significantly, as interest rates have remained quite low (Blau & Whitby, 2014). The problem that the REIT investors face today is that even though investors borrow money to invest in REITs, they do not have access to the empirical relationships that exist between US REIT prices and different interest rates. Further, the investors also do not have access to research information on the empirical relationship that exist between US stock market prices and US REIT prices over the last decade.

1.2 Explore the Importance of the Problem

Allen, Madura and Springer (2000) documented that REIT returns are sensitive to long and short-term interest rates. Swanson, Theis, and Casey (2002) determined that interest rates do impact REIT returns. Glasscock, Lu, and So (2002) wrote about the existence of a negative relationship between REIT returns and interest rates. Chaney and Hosley (2010) documented that the interest rate sensitivity of Swiss office real estate stood at 31.1 percent with a standard deviation of 7.8 percent. The empirical relationship between REIT prices and interest rates is important because financial REIT management teams procure funding via loans at prevalent market rates. The direct empirical relationship between US REIT prices and interest rate swaps had not been studied by other researchers.

In the past, a number of researchers published information about the correlations between returns on REITS and stock market returns (Ross & Zisler, 1991; Ennis & Buril, 1991; Gyouroke & Keim, 1992). Kapopoulos and Siokis (2005) documented that investors who register gains in stock markets usually feel the "wealth effect" and invest in real estate market. Thus, an increase in stock prices might lead to increase in the real estate prices. This could suggest a direct relationship between stock market prices and real estate prices. Chung, Fung and Schilling (2011) stated that REIT prices were dependent on fluctuations in prices of stocks from 1997 through 2006. However, the empirical relationship between US REIT prices and stock prices had not been examined by other researchers.

1.3 Describe the Relevant Scholarship

Chan, Hendershott and Sanders (1990) observed that unexpected inflation, changes in the risk and term structures of interest rates and the percentage change in the discount on closed-end stock funds consistently drove equity REIT returns in USA. Ross and Zisler (1991) stated that real estate risk lies midway between that of stocks and bonds in the 9 to 13 percent range. Ennis and Burik (1991) demonstrated that during the last half of the 1980s, the correlation coefficient of US stocks and REITs was 0.79. Gyourko and Keim (1992) stated that the stock market appeared to reflect accurately information about the risks and the returns faced by different types of real estate firms.

Allen, Madura and Spring (2000) estimated the sensitivity of REIT returns to stock market and interest rate changes in the USA. They developed a model to test whether differences in asset structure, financial leverage, management strategy and degree of specialization in REIT portfolios were related to their sensitivity to interest rate and market risk. Swanson, Theis and Casey (2002) studied several aspects of the relationship between daily REIT stock premiums and various interest rates in the USA. They observed that interest rates impact REIT prices unevenly depending on the time frame. Glasscock, Lu, and So (2002) stated that the observed negative relationship between REIT returns and interest rates is a manifestation of the effects of the changes in monetary policy. Liow, Ooi, and Wan (2003) studied the relationship between interest rate risks and returns of traded property stocks in Singapore. They concluded that the pricing of interest rate risk was sensitive to prevailing market conditions.

Chaney and Hoesli (2010) found that the interest rate sensitivity of Swiss office real estate stood at 31.1 percent with a standard deviation of 7.8 percent. Su, Huang, and Pai (2010) utilized information on daily US REIT and US interest rates and Japanese REIT and Japanese interest rates from April 2, 2003 to October, 1, 2007, and determined from the data that there was insignificant evidence of the effect of the expected interest rate on US REITs. These authors concluded that the influence of interest rate changes would raise the investors' expectation in terms of US REIT market. However, these authors also found that the expected factor of the interest rate would affect Japanese REIT returns negatively. They found that returns of Japanese REITs would go down if investors expected long-term rates to increase. Chung, Fung, and Silling (2011) determined that REIT prices were dependent on fluctuations in prices of stocks from 1997 through 2006. These authors also found that synchronicity of industrial and regional mall REIT prices with other stock prices to be the highest, while the synchronicity of apartment, health care, and mixed care REIT prices to be the lowest. Lean and Smyth (2012) based on their study of REITs in Malaysia from 2006 to 2009, stated that investors with unanticipated gains in share prices would invest in real estate, thus suggesting the existence of wealth effect.

Raudszus et al. (2012) examined whether REITs behave more like equities than like direct real estate during a crisis such as, bank failures during 2007-2009. They showed that equity REITs experience positive abnormal returns relative to common equities in times of an external shock, such as bank failures. They concluded that market participants consider equity REITs more like direct real estate, which might act as "safe havens" during turbulent times. Goebl, Harrison, Mercer, and Whitby (2013) examined the influence of changes in interest rate cycles on REIT returns. These authors found that the characteristic REIT return relationships are heavily influenced by interest rates, and that REIT return relationships are related to Federal Reserve policy rate environment faced by these firms.

Ito (2013) analyzed the impact of Tokyo Stock Price Index and 2-year and 5-year swap rates on Tokyo Stock Exchange REIT index prices. This author found positive impact of Tokyo Stock Price Index on Tokyo Stock Exchange REIT Index prices from 2003 to 2013. Ito (2013) attributed this to the "wealth effect" felt by the investors when stock market prices would increase, and who would then invest in real estate market. Ito (2013) also showed the existence of relatively small negative impact of 2-year and 5-year interest rate swaps on Tokyo Stock Exchange REIT index prices from 2003 to 2013 (compared to the positive impact of Tokyo Stock Price Index on Tokyo Stock Exchange REIT index prices). Ito (2013) explained the small negative impact of interest

rate swaps by suggesting that during the period of financial stress, REIT companies find it difficult to procure funding in Japan.

Blau and Whitby (2014) focused on speculative trading in REITs during the recent boom and bust cycles in real estate. They found a strong relation between speculative trading in REITs and the economic cycle. However, they concluded that the speculative trading in REITs was not related to future returns. Their results suggested that although speculative trading in REITs was present in boom years, it did not affect the quality of the markets at large.

1.4 State the Hypotheses

The objective of the current research work is to establish relationships between Wilshire US REIT Index values and Dow Jones Industrial Average and different interest rate swaps from March 10, 2005, through March 10, 2015.

The sets of hypotheses to be tested in this study are:

H_o (Null): There is no correlation between natural logarithm of Wilshire REIT Index (independent variable) and natural logarithm of Dow Jones Industrial Average Index (dependent variable 1) and natural logarithms of interest rate swaps (dependent variable 2).

H_1 (Alternative): There is correlation between natural logarithm of Wilshire REIT Index (independent variable) and natural logarithm of Dow Jones Industrial Average Index (dependent variable 1) and natural logarithms of interest rate swaps (dependent variable 2).

The 1-year, 2-year, 3-year, 4-year, 5-year, 10-year, and 30-year interest rate swaps are considered as interest rates for this study. According to Anoruo and Nwala (2014), interest rate swap is a contract between two counterparties who agree to future interest payments based on the value of one asset in exchange for a payment based on the value of another asset. Daily data for the different interest rate swaps were obtained from the website of St Louis Federal Reserve Bank. Daily data for Dow Jones Industrial Average and Wilshire US REIT Index were also obtained from the website of St Louis Federal Reserve Bank.

2. Method

A linear regression (OLS–Ordinary Least Squares) model is used to determine correlation between natural logarithm of Wilshire US REIT Index (independent variable) and natural logarithm of Dow Jones Industrial Average Index (dependent variable 1) and the natural logarithm of different interest rate swaps as follows:

$$ln\ (REIT)_t = \alpha + \beta_1\ ln\ (DJIA)_t + \beta_2\ ln\ (Interest\ Rate)_t + \varepsilon_t$$

Where REIT = Wilshire US REIT Index

DJIA= Dow Jones Industrial Average Price Index

Interest Rate= 1-year, 2-year, 3-year, 4-year, 5-year, 10-year, or 30-year interest rate swaps, ε_t = error term.

The serial correlations and heteroscedasticity of ε_t are adjusted by using the method of Newey &West (1987), as utilized in the work of Ito (2013).

2.1 Sample Selection

For our research, we have utilized daily closing prices of Wilshire US REIT Index, and Dow Jones Industrial Average from March 10, 2005, to March 10, 2015 (excluding holidays and the days on which the markets were closed). These data have been retrieved from the web site of Federal Reserve Bank of St. Louis. The researcher has used a sample size of n=2494 data points for each category. The daily closing data of 1-year, 2-year, 3-year, 4-year, 5-year, 10-year and 20-year interest rate swaps have also been obtained from March 10, 2005, to March 10, 2015 (excluding holidays and the days on which the markets were closed). These data have been retrieved from the web site of Federal Reserve Bank of St. Louis. The researcher has also used the same sample size of n=2494 data points for each of the swap rate categories. The researcher has made sure that the data have been available for all of the categories on each trading day for this study.

3. Results

The descriptive statistics of the data are shown in Table 1.

Table 1. Descriptive statistics of data

Variable	Mean	Median	Standard Deviation	Minimum	Maximum	Skew
Wilshire US REIT Index	5320.11	5239.06	1458.95	1687.06	9331.50	0.046
Dow Jones Industrial Average	12388.45	12198.99	2411.91	6547.05	18288.63	0.422
1-year interest rate swap	1.97	0.61	1.99	0.25	5.76	0.750
2-year interest rate swap	2.15	1.15	1.87	0.34	5.73	0.681
3-year interest rate swap	2.39	1.71	1.75	0.42	5.72	0.572
4-year interest rate swap	2.64	2.13	1.64	0.56	5.74	0.469
5-year interest rate swap	2.86	2.44	1.54	0.73	5.76	0.392
10-year interest rate swap	3.57	3.42	1.22	1.54	5.85	0.176
30-year interest rate swap	4.09	4.08	1.01	2.17	6.02	0.016

The results of the analysis are shown in Table 2. The values of the intercepts α, the slope β_1 (for natural logarithm of DJIA) and the slope β_2 (for natural logarithm of the interest rate swaps) are listed for the different interest rates. The corresponding t-statistic values and the p-values (probability values) are shown for each independent variable.

Table 2. Results of analysis

Regression Model	Interest Rate	α (Intercept)	β_1 (Slope for ln DJIA)	β_2 (slope for ln Swap rate)	R^2 (Coefficient of Determination)	Standard Error
1	1-year swap	-5.759	1.520	0.019	0.907	0.092
		t_{stat} =-59.637	t_{stat}=148.12	t_{stat}=10.487		
		p = 0	p= 0	p=0		
2	2-year swap	-5.610	1.504	0.013	0.904	0.093
		t_{stat}= -57.008	t_{stat} =144.137	t_{stat} = 6.116		
		p = 0	p = 0	p= 0		
3	3-year swap	-5.459	1.488	0.0056	0.903	0.094
		t_{stat}= -55.336	t_{stat} =142.537	t_{stat} = 2.204		
		p = 0	p = 0	p = 0.027		
4	4-year swap	-5.395	1.481	0.0015	0.903	0.094
		t_{stat} =-54.595	t_{stat} =142.185	t_{stat} = 0.499		
		p = 0	p = 0	p= 0.617		
5	5-year swap	-5.362	1.478	0.0035	0.903	0.095
		t_{stat}= -54.311	t_{stat} =142.418	t_{stat} = -0.400		
		p = 0	p =0	p= 0.690		
6	10-year swap	-5.376	1.479	-0.0001	0.903	0.095
		t_{stat} =-54.077	t_{stat} = 143.54	t_{stat} = -0.0217		
		p = 0	p = 0	p = 0.982		
7	30-year swap	-5.444	1.484	0.014	0.903	0.094
		t_{stat}= -55.453	t_{stat} = 147.26	t_{stat} = 1.874		
		p = 0	p= 0	p= 0.061		

Table 3 shows the comparisons of the decisions about the null hypotheses that no correlation exists between dependent variable (natural logarithms of REIT Index) and independent variables (natural logarithms of Dow Jones Industrial Average and natural logarithms of interest rate swaps).

Table 3. Comparison of the decisions about the null hypothesis of no correlation between dependent and independent variables

Regression Model Number	Dependent Variable	Independent Variables	p-value	Decision about H_o (no correlation exists between dependent variable and independent variables)
1	ln (REIT index)	ln (DJIA)	0	Reject Ho
1	ln (REIT index)	ln (1-year swap rate)	0	Reject Ho
2	ln (REIT index)	ln (DJIA)	0	Reject Ho
2	ln (REIT index)	ln (2-year rate swaps)	0	Reject Ho
3	ln (REIT index)	ln (DJIA)	0	Reject Ho
3	ln (REIT index)	ln (3-year rate swaps)	0.027	Reject Ho (at 5% and 10% levels of significance)
4	ln (REIT index)	ln (DJIA)	0	Reject Ho
4	ln (REIT index)	ln (4-year rate swaps)	0.617	Do not reject Ho
5	ln (REIT index)	ln (DJIA)	0	Reject Ho
5	ln (REIT index)	ln (5-year rate swaps)	0.690	Do not reject Ho
6	ln (REIT index)	ln (DJIA)	0	Reject Ho
6	ln (REIT index)	ln (10-year rate swaps)	0.982	Do not reject Ho
7	ln (REIT index)	ln (DJIA)	0	Reject Ho
7	ln (REIT index)	ln (30-year rate swaps)	0.061	Reject Ho (at 10% level of significance)

4. Discussion

The results from table 1 indicate that all categories of data are positively skewed (the mean values are greater than the median values). It is observed from the results in table 2 that the values of the slope β_1 (for natural logarithm of DJIA) are all positive and significant (p-values are equal to zero). Further, it is noted that the values of the slope β_2 are positive and significant (p-value = 0) for 1-year and 2-year interest rate swaps. However, these slope (β_2) values are very small compared to the slope values (β_1) for Dow Jones Industrial Average. The value of the slope β_2 is positive and p-value is equal to 0.027 for 3-year swap rate. On the other hand, the values of the slope β_2 for 4-year, 5-year and 10-year interest rate swaps are not significant at 5% and 10% levels of significance. For 30-year interest rate swaps, the value of the slope β_2 is positive and p-value is equal to 0.061 (slope is significant only at 10% level of significance).

As shown in Table 3, the values of the slopes of the linear relationship between natural logarithms of Wilshire US REIT Index prices and Down Jones Industrial Average Index prices are positive and significant. This suggests that with the increase in Dow Jones Industrial Average, the US Wilshire REIT Index increases at constant interest rate swaps. From the data in Table 3 (p-values are 0), we reject the null hypotheses that there is no correlation between natural logarithm of REIT index and natural logarithm of Dow Jones Industrial Average. Kapopoulos and Siokis (2005) suggested that investors who register gains in stock markets possibly feel the "wealth effect", and invest in real estate market. Thus, increases in stock prices would lead to increases in real estate prices. In the past, Chung, Fung, and Silling (2011) determined that REIT prices were dependent on fluctuations in prices of stocks from 1997 through 2006. Ito (2013) observed a positive linear relationship between Tokyo Stock Price Index and Tokyo Stock Exchange REIT Index. It can be concluded from the current work that US Wilshire REIT Index prices have strong positive linear relationship with Dow Jones Industrial Average Prices. The financial investors can utilize these results in making judicious decisions in investing in US REIT markets.

From the data in table 3, it is observed that the values of the slopes of the linear relationships between natural

logarithms of Wilshire US REIT Index prices and 1-year, 2-year, and 3-year interest rate swaps are positive and significant (p-values are zero or close to zero). It is also noted that the slope values of these shorter-duration swap rates (such as, 1-year, 2-year and 3-year interest rate swaps) are much small, compared to the values of the slopes between natural logarithms of Wilshire US REIT Index prices and Dow Jones Industrial Average Index. This suggests that with increase in these interest rate swaps, the prices of Wilshire US REIT index increase only by small amounts at constant values of Dow Jones Industrial Average. As the shorter-duration interest rate swaps increase, investors borrow more money to invest in REIT markets, which leads to small increases in Wilshire US REIT Index prices. Su, Huang & Pai (2010) determined that there was insignificant evidence of the effect of the expected interest rate on US REITs. It can be concluded from the current work that REIT prices are influenced somewhat by interest rate swaps. These findings will be of importance to the financial investors, when those investors borrow money with shorter duration interest rate swaps to invest in US REIT markets.

From the data in table 2 and table 3, it is noted that the values of the slopes of the linear relationships between natural logarithms of Wilshire US REIT Index prices and 30-year interest rate swaps is positive and significant (p value is zero). The value of this slope is close to the values of the slopes of the linear relationships between natural logarithms of Wilshire US REIT Index prices and 1-year and 2-year interest rate swaps. This suggests that with increase in the 30-year interest rate swaps, the prices of Wilshire US REIT index increase by a small amount at constant values of Dow Jones Industrial Average. As the 30-year interest rate swaps increase, investors borrow money to invest in REIT markets, which leads to small increases in Wilshire US REIT Index prices. The financial investors can utilize the findings from this analysis when they borrow money with very long duration interest rate swaps to invest in US REIT markets.

In this article, the researcher has developed multiple linear regression model between natural logarithms of Wilshire US REIT Index (independent variable) and natural logarithm of Dow Jones Industrial Average (dependent variable 1) and various interest rate swaps (dependent variables 2). The researcher has tested the following hypotheses: the existence of correlations between natural logarithm of Wilshire US REIT Index (independent variable) and natural logarithm of Dow Jones Industrial Average prices (dependent variable 1) and natural logarithms of interest rate swaps of different durations (dependent variable 2). The results of these hypotheses tests indicate that the null hypotheses that no correlation exist between the natural logarithm of Wilshire US REIT Index and Dow Jones Industrial average, and 1-year, 2-year, 3-year and 30-year interest rate swaps can be rejected. Some of the limitations of this study could be: (1) the researcher has utilized data from Wilshire US REIT Index, Dow Jones Industrial Average, and interest rate swaps from March 10, 2005, to March 15, 2015; results may differ when data will be analyzed for longer time periods; (2) the researcher has developed correlations between natural logarithm of Wilshire US REIT Index and Dow Jones Industrial average, and 1-year, 2-year, 3-year and 30-year swap rates; results may differ if the correlations between natural logarithm of Wilshire US REIT Index and Dow Jones Industrial average, and 30 year treasury bond rates and 30-year mortgage rates are examined.

References

Allen, M., Madura, J., & Springer, T. (2000). REIT Characteristics and the Sensitivity of REIT Returns. *The Journal of Real Estate Finance and Economics, 21*(2), 141-152. http://dx.doi.org/10.1023/a:1007839809578

Anoruo, E., & Nwala, K. (2014). Unit Root Properties: Interest Rate Swaps. *SCMS Journal of Indian Management, 11*(1), 21-30.

Blau, B. M., & Whitby, R. J. (2014). Speculative Trading in REITs. *The Journal of Financial Research, 37*(1), 55-74. http://dx.doi.org/10.1111/jfir.12028

Chan, K., Hendershott, P., & Sanders, A. (1990). Risk and Return on Real Estate: Evidence from Equity REITs. *Real Estate Economics, 18*, 431-452. http://dx.doi.org/10.1111/1540-6229.00531

Chaney, A., & Hoesli, M. (2010). The Interest Rate Sensitivity of Real Estate. *Journal of Property Research, 27*, 61-85. http://dx.doi.org/10.1080/09599916.2010.500815

Chung, R., Fung, S., & Silling, J. D. (2010). What Determines Stock Price Synchronicity in REITs. *Journal of Real Estate Finance and Economics, 43*, 73-98. http://dx.doi.org/10.1007/s11146-010-9254-3

Ennis, R., & Burik, P. (1991). Pension Fund Real Estate Investment Under a Simple Equilibrium Pricing Model. *Financial Analyst Journal, 47*, 20-30. http://dx.doi.org/10.2469/faj.v47.n3.20

Glasscock, J. L., Lu, C., & So, R. W. (2002). REIT Returns and Inflation: Perverse or Reverse Casualty Effects? *Journal of Real Estate Finance and Economics, 24*(3), 301-317.

http://dx.doi.org/10.1023/a:1015221515787

Goebl, P. R., Harrison, D. M., Mercer, J. M., & Whitby, R. J. (2013). REIT Momentum and Characteristic-Related REIT Returns. *Journal of Real Estate Finance and Economics, 47*(3), 564-581. http://dx.doi.org/10.1007/s11146-012-9371-2

Goodchild, R. (2008). REITs–A Global Phenomenon. *Journal of Property Investment and Finance, 26*(3), 1. http://dx.doi.org/10.1108/jpif.2008.1126.caa.001

Gyourko, J., & Keim, D. B. (1992). What Does the Stock Market Tell Us About Real Estate Returns? *Journal of the American Real Estate and Urban Economics Association, 20*, 457-485. http://dx.doi.org/10.1111/1540-6229.00591

Ito, T. (2013). The Impact of Stock Price and Interest Rate on the REIT Market in Japan. *International Journal of Business, 18*(4), 359-369.

Kapopoulos, P., & Siokis, F. (2005). Stock and Real Estate Prices in Greece: Wealth versus Credit Price Effect. *Applied Economics Letters*, *12*, 125-128. http://dx.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.

Liow, K. H., Ooi, J. T. I., & Wan, L. K. (2003). Interest Rate Sensitivity and Risk Premium of Property Stocks. *Journal of Property Research, 20*, 117-132. http://dx.doi.org/10.1080/0959991032000109508

Louargand, M. (2007). The Global REIT Revolution. *Real Estate Issues, 32*(1), 1-5.

Newey, W. K., & West, K. D. (1987). A Simple, Positive Semi-Definite, Heteroskedasticity and Autocorrelation Covariance Matrix. *Econometrica, 55*, 703-708. http://dx.doi.org/10.2307/1913610

Raudszus, M., Olliges, J. W., & Mueller, J. W. (2012). Bank Failures and REIT Returns. *Journal of Real Estate Portfolio Management, 18*(1), 1-22.

Ross, S., & Zisler, R. (1991). Risk and Return in Real Estate. *Journal of Real Estate Finance and Economics, 4*, 175-190. http://dx.doi.org/10.1007/bf00173123

Su, H. M., Huang, C. M., & Pai, T. Y. (2010). The Hybrid Characteristic of REIT Returns: Evidence from Japanese and US Markets. *Journal of Real Estate Literature, 18*(1), 77-98.

Swanson, Z., Theis, J., & Casey, K. M. (2002). REIT Risk Premium Sensitivity and Interest Rates. *Journal of Real Estate Finance and Economics*, *24*(3), 319-330. http://dx.doi.org/10.1023/a:1015273532625