The Cointegration of Macroeconomic Variables Towards Distribution Yield of Real Estate Investment Trusts (Reits) in Malaysia and Singapore: The Investor Perspectives

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Abstract
Purpose: The purpose of this study is to identify the cointegration of macroeconomic variables such as economic growth, income, interest rates, inflation, and money supply toward Real Estate Investment Trusts (REITs) distribution yield in Malaysia and Singapore.
Design/methodology/approach: The study used the Multiple Linear Regression and Cointegration Test to examine the influence of selected variables of this study. Ordinary Least Square method was used to determine the relationship between gross domestic product (GDP), real personal income (RPI), overnight policy rate (OPR), consumer price index (CPI) and money supply (M3) toward REITs distribution yield in Malaysia and Singapore.
Findings: The result of correlation analysis showed that all correlation coefficients for variables in Malaysia are significant whereas only CPI and M3 are significant in Singapore. Besides that, Multiple Linear Regression shows that GDP, OPR and M3 have a significant effect on a distribution yield of REITs in Malaysia but only GDP and CPI have a significant effect on a distribution yield of REITs in Singapore. Last but not least, there is unidirectional causality relationships between CPI and DY, GDP and OPR in Malaysia and unidirectional causality relationships basis between GDP towards DY and CPI, RPI and DY, M3 towards GDP and CPI, DY and CPI, and bidirectional basis between M3 and DY in Singapore.
Research limitations/implications: The research method will be able for other researchers to explore more variables that will be tested.

Practical implications: Investors and speculators should take these variables as an indicator for better estimation and forecast of distribution yield of REITs. This will help both investors and speculators to invest in the right timing to participate in real estate investment and to make better decision making since the finding of this study will give alert to market participants and investors of REITs about the changes and movement of REITs market. In addition, this study will help market participants in the diversification of an investment portfolio because the finding of this study proved that some variables are significant to the distribution yield of REITs in Malaysia and Singapore.
Originality/value: This study contributes to identify the cointegration of macroeconomic

variables such as economic growth, income, interest rates, inflation, and money supply toward Real Estate Investment Trusts (REITs) distribution yield in Malaysia and Singapore. The variables that market participants should give attention to the changes in these variables since low GDP and CPI will increase REITs DY in Singapore. Based on the finding of this study, the distribution yield of REITs in Malaysia and Singapore respond differently towards changes in macroeconomic variables. Thus, market participants of REITs should be aware of the changes in macroeconomic variables.

Keywords: Real Estate Investment Trusts (REITs), Conventional REITs, Islamic REITs, Malaysia, Singapore

Introduction

The growth of REITs in Asia countries started with the establishment of REITs in Japan which then followed by Singapore, Hong Kong, South Korea, Taiwan, and Malaysia. REITs are commonly regarded as a defensive and secure investment that offers continuing capital appreciation and stable dividend yield. In the past decade, REITs have become a growing mechanism in investment of Asia's real estate market. REITs have similarly become significant components of an investor's global portfolio. At the present time, the investors are well known with the performance and advantages of REITs such as high distribution yield in which it becomes attractive to the global investors. REITs can be defined as an investment vehicle that allows flow of funds from investors to the real estate in the sector of the economy (Lee, Ali, & Lee, 2016). The REITs in Malaysia are rather newly developed in Malaysia compared to Singapore REITs. The average of Malaysian REITs yield has been volatile irregularly since 2010 which the highest yield rates were 8.56 percent while the highest rate in 2018 is 6.24 percent (MREIT, 2018). Therefore, the researcher would like to investigate the causes and macroeconomic factors that have an impact on these irregular data. The researcher also established another problem regarding integration between macroeconomic variables and REITs distribution yield in Malaysia and Singapore since previous studies lacking in addressing the same macroeconomic variables given on different regional basis. Al-Ahad & Hossain (2018) further stated that Malaysia and Singapore likely to be more active in the real estate market. In contempt of REITs in Asian countries, there is a lack of studies looking into the comparative performance of REITs in different countries that offer Islamic REITs.

Literature Review

According to Newell & Osmadi (2009), Malaysia is the first country in Asia that introduced the concept of property trust or real estate to stock exchange in 1989 and few years after the introduction, in 2005 REITs was known in the form of listed property trust (LPT). However due to some regulations and local structural in Malaysia such as unattractive properties and lack of tax incentives, LPT failed to take-off in Malaysia (Newell, 2012). Stimulated by the strong growth and developing of REITs market in other Asian countries such as Japan, Hong Kong and Singapore, the Securities Commission of Malaysia (SC) established new guidelines on REITs. The first REITs in Singapore which is CapitaLand Mall Trust was listed in 2002 on the main board of SGX-ST succeeding the inauguration of the sector's regulatory regime in 1999 (Newell and Pham, 2015). Since the first announcement of REITs in Singapore, listed property-related investment trusts have become a significant and popular class of asset in Singapore which increased the number of listed REITs to 20 REITs within 7 years and their portfolio covers retail, industrial, commercial and residential.

According to Tsolacos (2012), analysis in real estate field used economic indicators as independent variables and predict the possibility of different phases of capital values in times

of declining and increasing capital values. He also mentioned that the outcome was found to be satisfactory. Similarly, (Agarwal & Hu, 2014; Chang, Chen & Leung, 2013; Fei, Ding & Deng, 2008) used macroeconomic variables as factors to identify the changes in REITs performance and they found a significant relationship between those variables. Despite the understanding that distribution yield of REITs can be affected by economic factors, it can be alleged that every articles had particular differences and various in stating the economic indicators for the reason that REITs has distinctive features which is high dividend yield and low risks. Consequently, Limaye, Chavez, & Elkassabgi (2016) believed that income plays an important role in determining the resources availability for investors to invest in real estate industry even though the investors donot necessary acquire to own a real estate property.

It seems that investors prefer income and consumption factors when considering to invest or not to invest on REITs since they have to choose between consuming the income for other purposes or to invest in financial market. When it comes to investment, investors will carefully consider all the consequences since they might have to bear the loss cost and other risk. Kenney (2013) then verified in her study that REITs distribution yield do hedge inflation in both good times and bad times of economic. This statement proposed that REITs offer investors a chance to diversify their portfolios. In other words, the researchers having considered theoretically how real estate can be thought as a hedge against inflation by analysing the inflation sensitivity of real estate investment. The most evident that can be seen on the effect of interest rates on distribution yield of real estate investment is on either capitalization rates or derivation of discount (Loyford & Moronge, 2014).

Based on the result findings, Golob, Bastic, & Psunder (2012) further stated that there is correlation coefficient between interest rates and REITs distribution yield that those variables are related to each other and changes in interest rates will affect the investment decision. Basically, interest rates can be identified as an important role on REITs performance since it affects the rate of distribution yield which can be seen through a declining interest rates as it influences the activities on real estate investment. According to Bredin, O'Reilly, & Stevenson, (2007), changes in monetary policy will have an impact towards general economic activity which affected through demand in the underlying real estate market. This will directly affect dividend payments of the firm to REIT investors since monetary policy changes will influence the rents obtainable by REITs from underlying portfolio of property and therefore this effect indicates that REITs are far more strongly tense to their underlying asset. They believed that changes in monetary policy rates and REITs distribution yield showed a strong response and highly correlated.

Method

This study used data of average REITs distribution yield in Malaysia and Singapore in order to measure the dependent variable. As for the macroeconomic independent variables, data of GDP, RPI, CPI, OPR and M3 were taken for this study. As highlighted by Chan et al. (2013), it would be best to apply the same sample period across countries to facilitate unbiased comparisons. Therefore, the data collection is from 1st January 2010 until the end of December 2018 on a monthly basis which obtained from WorldBank Data and DataStream. The research instruments involved unit root test, Johansen cointegration test, Engle-Granger test, VECM and VAR. The authors use the same operating measures as used by Loo et. al (2016) in their study of REITs which consists of the same dependent variables. However, the authors further add another variable which is RPI. Besides that, most of the previous academic investigations such as (Ong et al., 2011, Olanrele et al., 2015 and Jalil and Ali, 2014) have been focused on determinants of REITs performance by using net asset value (NAV) as the indicator, however, this study used distribution yield since there is a lack of study using this indicator ever since

many researchers overlooked distribution yield as the indicator to measure the performance of REITs.

Findings

Unit Root Test

Table 1: Augmented Dickey Fuller (ADF) Test of REITs distribution yield towards macroeconomic variables

	Level		1st difference	
	No trend	Trend	No trend	Trend
MALAYSIA				
GDP	0.00***	0.00***	0.00***	0.00***
RPI	0.92	0.00***	0.00***	0.00***
CPI	0.89	0.06*	0.00***	0.00***
OPR	0.02**	0.13	0.00***	0.00***
M3	0.89	0.85	0.00***	0.00***
DY	0.14	0.63	0.00***	0.00***
SINGAPORE				
GDP	0.00***	0.00***	0.00***	0.00***
RPI	0.84	0.69	0.00***	0.00***
CPI	0.00***	0.31	0.23	0.00***
OPR	0.99	0.99	0.00***	0.00***
M3	0.00***	0.00***	0.00***	0.00***
DY	0.08*	0.24	0.00***	0.00***

Note: ***1% level of significant, ** 5% level of significant, * 10% level of significant

Table 1 shows data for GDP, RPI, CPI, OPR, M3 and DY of REITs in Malaysia. The data for GDP are stationary at 1% level of significance in level with and without trend while RPI is stationary at 1% level of significance in level with trend. Meanwhile, the data for OPR are stationary at 5% level of significance in level without trend. However, data for CPI, M3 and DY fail to reject null hypothesis at level and proceed to ADF test at 1st difference. Therefore, it can be concluded that the data are stationary.

Table 1 also shows data for GDP, RPI, CPI, OPR, M3 and DY of REITs in Singapore. The data for GDP and M3 are stationary at 1% level of significance in level with and without trend. Meanwhile, the data for CPI and DY are stationary in level without trend at 1% and 10% level of significance respectively. Nevertheless, data for RPI and OPR fail to reject null hypothesis at level and proceed to ADF test at 1st difference. Therefore, it can be concluded that the data are stationary.

Table 2: Phillips-Perron (PP) Test of REITs distribution yield towards macroeconomic variables

	Level		1st difference	
	No trend	Trend	No trend	Trend
MALAYSIA				
GDP	0.00***	0.01***	0.01**	0.03**
RPI	0.5	0.00***	0.00***	0.00***
CPI	0.9	0.14	0.00***	0.00***
OPR	0.02**	0.14	0.00***	0.00***
M3	0.89	0.85	0.00***	0.00***
DY	0.14	0.71	0.00***	0.00***
SINGAPORE				
GDP	0.00***	0.01***	0.00***	0.01**
RPI	0.07*	0.00***	0.00***	0.00***
CPI	0.00***	0.48	0.00***	0.00***
OPR	0.83	0.01	0.00***	0.00***
M3	0.00***	0.00***	0.00***	0.00***
DY	0.07*	0.21	0.00***	0.00***

Note: ***1% level of significant, ** 5% level of significant, * 10% level of significant

Table 2 indicates data for GDP, RPI, CPI, OPR, M3 and DY of REITs in Malaysia. The data for GDP is stationary at 1% level of significance in level with and without trend. Meanwhile, data for RPI and OPR are stationary in level with trend at 1% level of significance and in level without trend at 5% level of significance. Nevertheless, data for CPI, M3 and DY fail to reject null hypothesis and proceed to PP test at 1st difference. Based on PP test result at 1st difference, it can be concluded data for RPI, CPI, OPR, M3 and DY reject null hypothesis and are stationary at 1% level of significance while GDP is stationary at 5% level of significance.

Table 2 also indicates data for GDP, RPI, CPI, OPR, M3 and DY of REITs in Singapore. Both data for GDP and M3 are stationary at 1% level of significance in level with and without trend. Meanwhile data for RPI and CPI are stationary at 1% level of significance in level with and without trend respectively. The data for DY is stationary at 10% level of significance in level without trend. Nevertheless, data for OPR fail to reject null hypothesis and proceed to PP test at 1st difference. Based on PP test result at 1st difference, it can be concluded data for RPI, CPI, OPR, M3, DY and GDP reject null hypothesis and are stationary at 1% level of significance and at 5% level of significance respectively.

Multiple Regression Model

Table 3: Correlation coefficient between macroeconomic variables and REITs distribution yield for period from January 2010 until December 2018

	DY	GDP	RPI	CPI	OPR	M3
MALAYSIA						
DY	1.0	0.00***	0.00***	0.00***	0.00***	0.00***
GDP		1.00	0.04**	0.00***	0.00***	0.00***
RPI			1.00	0.00***	0.00***	0.00***
CPI				1.00	0.00***	0.00***
OPR					1.00	0.00***
M3						1.00
SINGAPORE						
DY	1.00	0.15	0.11	0.00***	0.30	0.1*
GDP		1.00	0.00***	0.00***	0.00***	0.01***
RPI			1.00	0.00***	0.00***	0.01***
CPI				1.00	0.00***	0.00***
OPR					1.00	0.00***
M3						1.00

Note: ***1% level of significant, ** 5% level of significant, * 10% level of significant

The first objective of this paper is to measure the association between macroeconomic variables with REITs DY in Malaysia and Singapore. The questions regarding this objective are answered by doing a correlation analysis between selected variables. Table 3 reveals that there is a moderate positive correlation between GDP and DY, moderate negative correlation between RPI and DY and between OPR and DY while both M3 and CPI have a strong negative correlation with DY in Malaysia. Besides that, the findings show that there is a weak negative correlation between CPI and REITs DY and between M3 and REITs DY in Singapore.

Table 4: Estimated model: Multiple linear regression (Malaysia)

Coefficient	Coefficient Value
F-Statistic	0.00***
β_0	0.00***
$\beta_{gdp,dy}$	0.00***
$\beta_{rpi,dy}$	0.66
$\beta_{cpi,dy}$	0.23
$\beta_{opr,dy}$	0.03**
$\beta_{m3,dy}$	0.00***
R^2	0.72

Note: ***1% level of significant, ** 5% level of significant, * 10% level of significant

The second objective of this paper is to investigate whether REITs DY in Malaysia and Singapore respond differently towards changes in macroeconomic variables. The Multiple Linear Regression has been tested for answering questions of this objective. Therefore, the results as follow:

The null hypothesis has been rejected because the F-statistic is significant at 1%. Table 4 display

$$r_{dy,t} = 9.17 + 0.14_{gdp} + 0.01_{rpi} + 0.43_{cpi} + 0.30_{opr} + (-0.70_{m3})$$

that at least one of the independent variables used in this study has significant effect to the REITs DY in Malaysia. The R^2 value indicates that 72% of variation in REITs DY is

explained by the variation of dependent variables.

Table 5: Estimated model: Multiple linear regression (Singapore)

Coefficient	Coefficient Value
F-Statistic	0.00***
β_0	0.00***
$\beta_{gdp,dy}$	0.03**
$\beta_{rpi,dy}$	0.43
$\beta_{cpi,dy}$	0.00***
$\beta_{opr,dy}$	0.38
$\beta_{m3,dy}$	0.71
R^2	0.15

Note: ***1% level of significant, ** 5% level of significant, * 10% level of significant

Therefore, the results as follow:

$$r_{dy,t} = 6.20 + (-0.05_{gdp}) + 0.06_{rpi} + (-01.01_{cpi}) + (-0.01_{opr}) + (-0.01_{m3})$$

The null hypothesis has been rejected because the F-statistic is significant at 1%. Table 5 show that at least one of the independent variables used in this study has significant effect to the REITs DY in Singapore. The R^2 value indicates that 15% of variation in REITs DY is explained by the

variation of dependent variables.

Johansen's Cointegration Test

Table 6: Result on Johansen cointegration for Trace test (Malaysia)

Hypothesized No. of CE(s)	Trace Statistic	Critical Values (5%)
r = 0	112.4	95.75
R ≤ 1	69.64	69.82
R ≤ 2	36.48	47.86
R ≤ 3	19.4	29.8
R ≤ 4	9.09	15.49
R ≤ 5	0.03	3.84

Note: **Significant level at 5%   ** p-values of MacKinnon-Haug-Michelis (1999)

Table 6 showed non-existence of cointegration between variables. Therefore, fail to reject nullhypothesis at 5% level of significant for lag 1.

Table 7: VEC Granger Causality Test

Independent Variables							
Dep. Variables	X2 – statistic of lagged 1st differenced term (p-value)						ECTt-1 Coeff (t-ratio)
	DY	GDP	RPI	CPI	OPR	M3	
DY	-	0.42	0.81	0.02**	0.22	0.10	0.03
GDP	0.55	-	0.09	0.52	0.30	0.21	0.35
RPI	0.14	0.27	-	0.97	0.41	0.08	0.42
CPI	0.87	0.67	0.91	-	0.74	0.78	0.99
OPR	0.39	0.00***	0.61	0.98	-	0.81	0.07
M3	0.27	0.59	0.33	0.83	0.65	-	0.79

Note: ***1% level of significant, **5% level of significant

The third objective of this paper is to investigate the cointegration between macroeconomic variables and distribution yield of REITs in Malaysia and Singapore. Table 7 signifies the unidirectional causality relationship between CPI and DY in Malaysia in a short term horizon. It means that CPI maintains its resilient dynamic outcome towards DY. The results also indicate a unidirectional causality relationship between GDP and OPR. Overall, this

proposes a lack of diversification benefits that exist in these variables in the short term holding period, thus giving insight to the investors to be well prepared on the investment decision.

Table 8: Result on Johansen cointegration for Trace test (Singapore)

Hypothesized No. of CE(s)	Trace Statistic	Critical Values (5%)
r = 0	173.32	95.75
R ≤ 1	117.39	69.82
R ≤ 2	63.46	47.86
R ≤ 3	32.78	29.8
R ≤ 4	14.54	15.49
R ≤ 5	03.71	3.84

Notes: **Significant level at 5% **MacKinnon-Haug-Michelis (1999) p-values

Table 8 showed non-existence of cointegration between variables. Therefore, fail to reject null hypothesis at 5% level of significant for lag 1.

Table 9: VEC Granger Causality Test

Independent Variables							
Dep. Variables	X^2 – statistic of lagged 1st differenced term (p-value)						ECTt-1 Coeff. (t-ratio)
	DY	GDP	RPI	CPI	OPR	M3	
DY	-	0.00***	0.05**	0.58	0.23	0.00***	0.00
GDP	0.55	-	0.38	0.32	0.99	0.02**	0.09
RPI	0.06	0.11	-	0.12	0.15	0.21	0.00
CPI	0.01***	0.02**	0.18	-	0.74	0.00***	0.00
OPR	0.92	0.24	0.91	0.74	-	0.36	0.83
M3	0.04**	0.83	0.14	0.16	0.85	-	0.25

Note: *** Significant at 1% level, ** Significant at 5% level

Table 9 specify bidirectional causality relationship among DY in Singapore and M3 in the short term horizon. It shows that there are significant effects from both variables to interact with each other in the short term period. Empirically, the results also indicate the unidirectional relationship among GDP towards DY and CPI, M3 to GDP and CPI, DY to CPI and RPI to DY respectively. Generally, the independent variables maintain its resilient dynamic effect towards the dependent variable on a unidirectional basis.

Conclusion

Based on the outcome of this study, investors and market participants should look forward to the effect of GDP, RPI, CPI, OPR and M3 on the distribution yield of REITs in Malaysia and Singapore. Nevertheless, market participants should focus on changes of OPR and GDP in Malaysia since these variables have a positive relationship with RETs DY which high GDP and OPR will increase REITs DY. Unlike Malaysia, GDP and CPI have a negative relationship with REITs DY in Singapore. This suggests that market participants should give attention to the changes in these variables since low GDP and CPI will increase REITs DY in Singapore. Based on the finding of this study, the distribution yield of REITs in Malaysia and Singapore respond differently towards changes in macroeconomic variables. Thus, market participants of REITs should be aware of the changes in macroeconomic variables. Investors and speculators should take these variables as an indicator for better estimation and forecast of distribution yield of REITs. This will help both investors and speculators to invest in the right timing to participate in real estate investment and to make better decision making since the finding of this study will give alert to market participants and investors of REITs about the changes and movement of REITs market. In addition, this study will help market

participants in the diversification of an investment portfolio because the finding of this study proved that some variables are significant to the distribution yield of REITs in Malaysia and Singapore.

References
Agarwal, S., & Hu, M. (2014) Liquidity Dynamics between REIT and Property. *27th AustralasianFinance and Banking Conference 2014 Paper* (pp. 1-58)

Bredin, D., O'Reilly, G., & Stevenson, S. (2007). Monetary Shocks and REIT Returns. 1-26. Chang, K. L., Chen, N. K., & Leung, C. Y. (2013). In the Shadow of the United States: The

International Transmission Effect of Asset Returns. *Pacific Economic Review*, 18(1), 1- 40.

Fei, P., Ding, L., & Deng, Y. (2008). Correlation and Volatility Dynamics in REIT Returns: Performance and Portfolio Considerations. *Institute of Real Estate Studies*, National University of Singapore, Working Paper.

Golob, K., Bastic, M., & Psunder, I. (2012). Analysis of Impact Factors on the Real Estate Market:Case Slovenia. *Engineering Economics*, 23(4), 357-367.

Jalil, R. A., & Ali, H. M. (2015). Performance Determinants of Malaysian Real Estate InvestmentTrusts. *Jurnal Teknologi*, 151-159.

Kenney, A. (2013). *REITs' Inflation-Hedging Benefits*. Retrieved from May 6, 2018, from https://www.reit.com

Lee, J. Y., Ali, H. M., & Lee, C. L. (2016). The New Real Estate Investment Trusts in Malaysia: Lessons from Listed Property Trusts. *Centre for real estate Research and Dept of Property Management*, 1-17.

Limaye, A. R., Chavez, A. E., & Elkassabgi, A. (2016). Impact of Disposable Income and REITs Return. 1-29.

Loo, W. K., Anuar, M. A., & Ramakrishnan, S. (2016). Integration between the Asian REIT Markets and Macroeconomic Variables. *Journal of Property Investment and Finance*, 34(1), 68-82.

Newell, G. (2012). The Investment Characteristics and Benefits of Asian REITs for Retail Investors: Asia Pacific Real Estate Association Limited (APREA) Publication.

Newell, G., & Osmadi, A. (2009). The Development of Preliminary Performance Analysis ofIslamic REITs in Malaysia. *Journal of Property Research*, 26(4), 329-347.

Olanrele, O. O., Said, R., & Daud, M. N. (2015). Setting a Benchmark for REIT Performance inMalaysia. *International Journal of Property Sciences*, 5(1), 31-43.

Ong, T. S., Chong, M. P., & Teh, B. H. (2011). A Study on Performance of Malaysian Real Estate Investment Trusts from 2005-2010 by Using Net Asset Value Approach. *Department of Accounting and Finance*, 1-15.

Tsolacos, S. (2012). The Role of Sentiment Indicators for Real Estate Market Forecasting. *Journal of European Real Estate Research*, 5(2), 109-12.

Victor, E. S & Razali, M. N. (2019). Identification of Macroeconomic Factors on Excessive Returns: A Literature Review. *Journal of the Malaysian Institute of Planners*, 17(1), 186-195.

Xiao, P. (2015). An Empirical Analysis of Factors Influencing China's Real Estate Prices - Based on the VAR Model. *Lignan Journal of Banking, Finance and Economics*, 1-12.