

Macroeconomic Environments and Demand for Retail Space in Shopping Centres in Malaysia*

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Abstract

The performance of the retail industry in a country, which simultaneously reflects the demand for retail space, is significantly influenced by the macroeconomic environment of said country. However, in the case of Malaysia, studies regarding this issue are limited. Therefore, this paper aims to identify the macroeconomic determinants of the demand for retail space in shopping centers in Malaysia through the study of six variables: per capita income, private expenditure, inflation rate, interest rate, total population, and the number of tourists arrival. The nexus between these variables and the demand for retail space in shopping centers were examined by cointegration and causality tests, and regression analysis using quarterly data for the period 1993Q1 to 2016Q4. The results from bivariate cointegration tests indicate that inflation rate, interest rates, population size, and the number of tourists arrival have significant long-run relationships with the demand for retail space of Malaysian shopping centers. Meanwhile, the Granger causality tests show that only population size can cause the demand for shopping centers' retail space. Finally, the results from the regression analysis revealed that income per capita, private expenditure, interest rates, and population are the variables that significantly influence the demand for the retail space of the Malaysian shopping centers.

Keywords: Retail Space, Shopping Centre, Cointegration, Causality, Malaysia

JEL Classification Code: E00, E37, R33

1. Introduction

The wholesale and retail industry accounts for a significant share of a nation's economy. The performance of this industry is significantly related to the macroeconomic environment of the country. A robust economy, which increases consumers' disposable income, would allow

retailers to sell more goods. On the other hand, a sluggish economy that lowers consumer confidence could cause people to spend less, thus leading to a decline in sales. Meanwhile, retail property is a business that provides space for retailers to conduct business with customers. Theoretically, the demand for retail space is derived from the demand for retail goods and services. Thus, to study the demand for retail space, the focus should be given to the demand for retail goods and services as highlighted by Tsolacos (1995). Specifically, Tsolacos argued that the demand for retail space is determined by the demand for retail sales and in turn relates positively to economic trends.

As the demand for retail space is influenced by the general economic situation of the country, it is vital to understand the macro-determinants of the retail industry, and subsequently the demand for retail space. According to Nguyen, Bui & Thang (2019), the economy and national incomes improve, and the demand for real estate in the economy increases, which has a positive impact on the real estate market. However, most of the studies in this area concentrated on the consumer shopping behavior and their preference (Boykin & Ring, 1993) while others focused on other aspects such as the selection of the ideal retail tenant

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mix (Gerbich, 1998), the determinants of shopping center rents (Sirmans & Guidry, 1993), and the impact of anchor tenants, retail location and market competition (Konishi & Sandfort, 2003). For that matter, research that investigates the demand for retail space in relation to the macroeconomic of the country is very limited.

In Malaysia, the wholesale and retail industry continues to account for a significant share of its economy by contributing about 12.7% to the country's GDP. It also happen in Vietnam, where real estate market positively impacts Vietnam's economic growth (Nguyen et al., 2019). The shopping center industry in Malaysia has grown rapidly in the past two decades both in terms of number and total space. According to the Malaysia National Property Information Centre (NAPIC, n.d.), the total space of shopping centers in Malaysia increased to 14,638,030 square meters in 2016 from 2,62469 square meters in 1996. As of 2015Q2, there are 465 shopping centers in Malaysia, where out of these 59 are in Kuala Lumpur (NAPIC, n.d.). Furthermore, it was also reported that a total of 27 new malls are expected

to be ready in greater Kuala Lumpur by 2021. Many industry players argued that there is an oversupply of shopping centers in Malaysia, especially in greater Kuala Lumpur. Their concern is supported by the data on the occupancy rate of shopping centers reported by NAPIC.

The data in Figure 1 shows that the average occupancy rate of shopping centers in Malaysia for the period between 2010 and 2016 was 80.7%. Meanwhile, Figure 2 clearly shows that the gap between the total supply of shopping centers space in Malaysia and total space occupied enlarged over time starting from 1998.

The facts presented in Figure 1 and Figure 2 indicate that despite the impressive development of the shopping centers industry in Malaysia, the industry is facing severe challenges. The shopping centers industry in Malaysia is becoming an increasingly competitive market, which can be observed through the trend in the demand and supply for retail space in the country. However, very little research has been conducted to identify the macroeconomic determinants that influence the long-run demand for retail

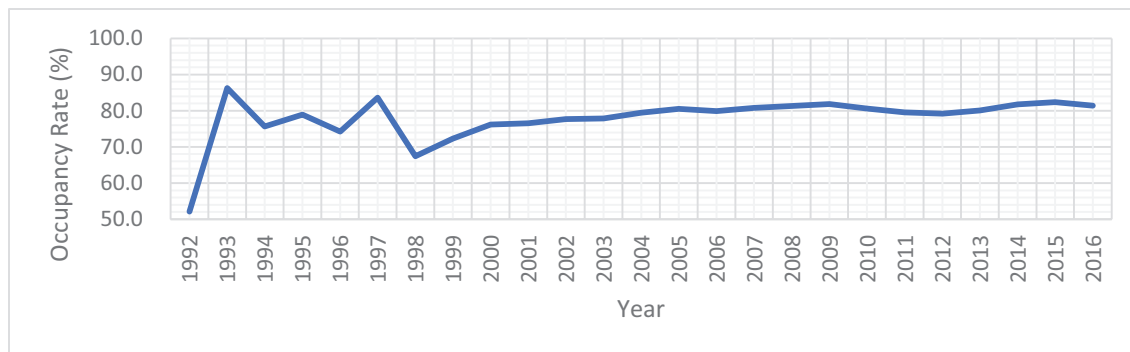


Figure 1: Malaysia Shopping Centres Occupancy Rate (1992–2016)

Source: Malaysia, NAPIC.

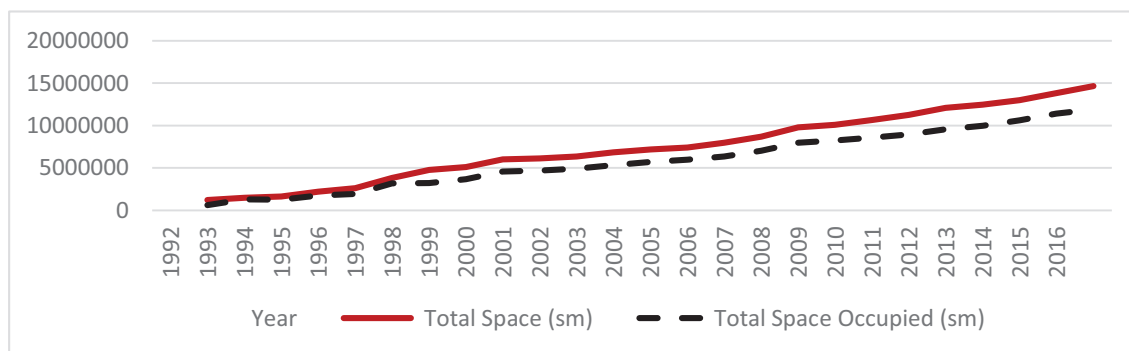


Figure 2: Malaysia Shopping Centres (1992–2016) – Total Space and Total Occupied Space (Square Meter)

Source: Malaysia, NAPIC

space in Malaysia. Therefore, the objective of this paper is to investigate the macroeconomic determinants for the demand for retail space of shopping centers in Malaysia. Using cointegration and the Granger causality approach, this paper will also investigate the existence of long-run and causal relationships between macroeconomic variables, demographics, and demand for retail space in Malaysian shopping malls. The macroeconomic variables involved in this study are per capita income, private expenditure, inflation, and interest rates. Meanwhile, the demographic factors taken into consideration for this study are the total population and the number of tourists arriving.

2. Literature Review

Previous studies have identified several macroeconomic factors that could affect the demand for retail space. Most of the studies on this issue, however, focus on the relationship between retail rents and macroeconomic variables. Benjamin et al. (1998) found that rental rates, retail sales, population growth, and aggregate disposable income of the local population influence the demand for retail space. Jones (1995) concluded that rental growth is linked to the profitability of business and inflation. Liow (2000) found there is a close relationship between retail rental charges and economic fluctuations. He argued that a reduction in consumer spending during an economic downturn leads to lower demand for retail goods and services, hence retailers become less inclined to invest in additional space and cause the demand for retail space to drop.

Tsolacos (1995) stated that retail rents are sensitive to broad economic forces in both regional and national contexts. He further suggested that the demand for retail space is derived from the demand for retail products. Meanwhile, some other studies argued that the determination of retail space rental is subjected to the joint forces of both demand and supply. In addition, Nguyen, Tsai, Nguyen, Nguyen & Vu (2020) argued that both buyers and sellers of real estate, the price-setting mechanism rests on the forces of demand and supply. Tsolacos (1995) and Chaplin (2000), for instance, have included both demand-side and supply-side factors in their models. Some researchers, however, argued that supply-side factors are insignificant for retail rent determination (Hetherington, 1988) due to the inelastic supply of retail space in the short run. Since the supply of property tends to be inelastic, retail space rental is primarily demand-determined.

Besides economic and demographic variables, some researchers have also investigated the impact of technology on retail sales. For example, Borsuk (1997) dealt with the implications of information technology (IT) on retail real estate and claimed that IT requires developers and investors to examine any property – owned or considered for purchase – for its adaptive use potential. Laws, regulations, and other

government policies can also positively or negatively affect the retail industry. Jeon (2018) found that the Korean real estate market is more sensitive to policy changes than other countries in connection with the Korean government's policy. Government assistance such as government-backed loans and subsidies can help fledgling retailers grow. On the other hand, government policies can also hinder businesses by imposing regulations that increase costs, such as requiring the development and integration of new systems or establishing a minimum wage that small retailers may not be able to afford. The retail industry also relies heavily on the government-supported road, rail, and water transport infrastructure to move goods and bring customers to retail locations.

3. Data and Methods

In this study, the quarterly data from 1993Q1 to 2016Q4 (92 observations) was used in the estimation. The main sources of data are from the Department of Statistics Malaysia, Bank Negara Malaysia (Central bank of Malaysia), National Properties Information Centre (NAPIC) Malaysia, Tourism Malaysia, and World Bank Development Indicators database. There are four macroeconomic variables; per capita income (GDP), private expenditure (PC), inflation rates (INF), and interest rates (Based Lending Rates, BLR), and two demographic variables; total population (POP), and the number of tourists arriving (TA) involved in this study. Since the quarterly data for GDP, PC, POP, and TA are not available, the linear spline interpolation method has been applied to convert the annual data to the quarterly data. Although this approach may not accurately generate the quarterly data, this is the best option to be used to deal with this situation. This interpolation method has been widely used in empirical studies using time series data. The interpolation process has been carried out using EViews 11.

The econometric tests applied in the analysis include unit root tests, a co-integration test, and Granger causality tests. For unit root tests, in the Augmented Dickey-Fuller (ADF) tests, the null hypothesis is the series that contains a unit root, therefore non-stationary. The null hypothesis of a unit root is rejected if the computed coefficient's *t*-statistic is greater than the critical values, favoring stationarity. For this test, the optimal lag length is chosen using the Akaike Information Criteria (AIC). In addition to the ADF tests, this paper also uses the unit root test suggested by Phillips and Perron (1988).

Next, the existence of a long-run relationship between the variables is determined using a Johansen cointegration test. The method suggested by Johansen (1988) could determine the number of cointegration relations that exist between the variables. Specifically, in the Johansen trace test, the null hypothesis that there are less than or equal to *h* cointegrating

relations ($r < h$) is tested against the alternative hypothesis that there are more than h cointegrating relations ($r > h$). In the final analysis, the Granger (1969) causality test will be performed. In this method, the variable y_1 is said to cause y_2 in the Granger sense if the forecast for y_2 improves when lagged variables y_1 are considered in the equation. Four findings are possible in a Granger causality test: (i) neither variable Granger causes each other; (ii) unidirectional causality from y_2 to y_1 ; (iii), unidirectional causality from y_1 to y_2 ; and (iv), bidirectional causality between two variables, which means y_1 and y_2 Granger cause each other. All tests in this paper were conducted using statistical software EViews 11.

Previous studies that investigated the interaction between macroeconomic variables and the demand for retail space normally use the traditional demand function with an additional variable measuring for demographic variables. Therefore, in this paper, in addition to cointegration and causality tests, a multiple regression analysis will also be used to examine the relationship between the demand for shopping centers' retail space and the variables studied. The multiple regression model in this study can be expressed in the following functional form.

$$RS_t = f(GDP_t, PC_t, INF_t, BLR_t, POP_t, TA_t) \quad (1)$$

where the dependent variable RS_t is a total occupied retail space in shopping centers at time t (used to measure the demand for retail space), GDP_t is per capita income at time t , PC_t is a private expenditure at time t , INF_t is inflation rates at time t , BLR_t is interest rates at time t , POP_t is the total population at time t , and TA_t is the number of tourist arrival at time t .

4. Empirical Results

Results from ADF and PP tests are presented in Table 1. The unit root tests were conducted at the level as well as at the first difference of the series. The ADF test results at level show all series are not stationary at level. All series, however, were found stationary at first difference except BLR. Unlike ADF, the results from PP tests at the level found four out of seven series are stationary at level. The series which not stationary at the level are PC, BLR, and TA. The results of PP tests on the first difference are consistent with the results from ADF. However, unlike in the ADF, the PP tests found that BLR is stationary at first difference. Based on the unit root tests, this study concluded that all series are stationary at the first difference, hence $I(1)$.

Next, the Johansen cointegration test was conducted to investigate the existence of a long-run relationship between the demand for shopping centers space in Malaysia and the variables studied. The cointegration test was run on a bivariate VAR model that included the total occupied space

(RS) of shopping centers and each of the macroeconomic and demographic variables independently. The results from the test are presented in Table 2. The trace statistics in Table 2 show that four out of six variables studied are cointegrated with the demand for retail space in the shopping centers. Out of this, three variables (INF, BLR, and TA) have at least two cointegration equations with RS, while POP only has one cointegration equation with RS. The finding suggests the existence of a long-run relationship between the demand for retail space (RS) in Malaysian shopping centers and two macroeconomic variables: inflation rate (INF), and interest rate (BLR). This paper also found the long-run relationship between RS and two demographic variables studied: population (POP) and the number of tourists arriving (TA). The macroeconomic variables that have no cointegration relationship with RS are GDP and PC.

The next analysis investigates the causal relationship between the demand for retail space and all variables studied. Like cointegration analysis, the Granger causality test was performed on the bivariate VAR model that consists of RS and each variable studied individually. The results from the test are presented in Table 3. The results show that out of six variables studied, five do not have a causality relationship with RS. The variables are GDP, PC, INF, BLR, and TA. Only in the case of POP, the unidirectional causality relationship running from POP to RS was found.

In the final analysis, multiple regression with RS_t as the dependent variable and all macroeconomic and demographic variables studied as independent variables have been estimated. The purpose of this analysis is to identify the variable that significantly affects the demand for retail space in shopping centers in Malaysia. In addition, from the estimation, the magnitude of the impact of variables studied on the demand for retail space in shopping centers can be

Table 1: Results from Unit Root Tests

Series	ADF		PP	
	Level	1 st Diff	Level	1 st Diff
RS	-2.7450 [5]	-2.8758 [4]	-5.1584*	-5.4076*
GDP	-0.4985 [5]	-5.1146 [4]*	-6.2534*	-47.3286*
PC	0.1773 [5]	-5.0450 [3]*	-0.6928	-4.0453*
INF	-2.6515 [4]	-6.3311 [3]*	-3.0241*	-5.9988*
BLR	-0.8529 [5]	-2.8437 [4]	-0.7718	-3.6900*
POP	-2.2742 [1]	-4.7065 [0]*	-5.9271*	-5.4207*
TA	-0.9551 [5]	-3.1307 [4]*	-1.0924	-3.9885*

*Significant at 5% level. All data are in the form of a logarithm. For ADF, the optimum lag length is determined by AIC with maximum lag = 5. Figure in [] indicates the lag length used in the estimation. Intercept is included in the test equation.

Table 2: Cointegration Rank Test (Trace) between RS and the Variables Studied

Variables	Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	Critical Value (5%)	Conclusion
GDP	None At most 1	0.1081 0.0366	13.6613 3.3566	15.4947 3.8414	No cointegrating equations
PC	None At most 1	0.0965 0.0098	10.0275 0.8915	15.4947 3.8414	No cointegrating equations
INF	None* At most 1*	0.1770 0.0716	24.2220 6.6895	15.4947 3.9414	2 cointegrating equations
BLR	None At most 1*	0.076 0.075	14.494 7.025	15.494 3.841	2 cointegrating equations
POP	None* At most 1	0.1493 0.0356	17.8260 3.2660	15.4947 3.8414	1 cointegrating equations
TA	None* At most 1*	0.1184 0.0693	17.8177 6.4731	15.4947 3.8414	2 cointegrating equations

*Denotes rejection of the hypothesis at 0.05 level. Data are in the first Diff and log. Intercept (no trend) in CE and test VAR.

Table 3: Results of Pairwise Granger Causality Tests between RS and Variables Studied

Null Hypothesis	F-statistic	Probability	Conclusion
GDP does not Granger cause RS RS does not Granger cause GDP	1.6475 1.7696	0.1706 0.1432	No causality relationship
PC does not Granger cause RS RS does not Granger cause PC	0.9657 0.3481	0.4311 0.8446	No causality relationship
INF does not Granger cause RS RS does not Granger cause INF	0.2200 0.0652	0.9265 0.9920	No causality relationship
BLR does not Granger cause RS RS does not Granger cause BLR	0.2475 0.1958	0.9104 0.9400	No causality relationship
POP does not Granger cause RS RS does not Granger cause POP	3.3798 0.3250	0.0132* 0.8604	Unidirectional causality running from POP to RS
TA does not Granger cause RS RS does not Granger cause TA	0.2939 0.1696	0.8811 0.9532	No causality relationship

*Significant at 5 percent level. Data are in first diff and log. Max lag = 4.

measured. Since the estimated regression equation is in the form of log-linear, the coefficient will give us the elasticity, which measures the percentage change of the demand for retail space in shopping centers as a result of a 1% change in the respective independent variable. The results from the regression analysis are presented in Table 4.

Based on the results from regression analysis in Table 4, the overall fit of the estimation is good with an adjusted *R*-squared of 0.9955. This adjusted *R*-squared value suggests that about 99.55% of changes in RS can be explained by the independent variables used in the regression. The estimation results also found that four out of six independent variables studied are statistically significant at 5% levels.

The variables that are significant are GDP, PC, BLR, and POP, with the magnitude of the coefficients 0.1724, 1.4066, -0.1934, and 10.7107, respectively. This magnitude of the coefficient suggesting that if GDP per capita increases by 1%, the demand for retail space in shopping centers will increase by 0.17%. An increase of 1% in PC would increase the demand for retail space in shopping centers by 1.41%. For BLR, an increase of 1% in interest rates could decrease the demand for retail space in shopping centers by 0.19%. Finally, if the population size increase by 1%, the demand for retail space is expected to increase by 10.71%. The results from regression analysis also show that INF and TA are not significant at 5% significant levels.

Table 4: Result of Regression Analysis

Independent Variables	Coefficient	Std. Error	t-statistic	Prob.
Intercept	−152.5782*	4.2050	−36.2842	0.0000
GDP _t	0.1724*	0.0199	8.6529	0.0000
PC _t	1.4066*	0.0680	20.6833	0.0000
INF _t	−0.0127	0.0143	−0.8851	0.3785
BLR _t	−0.1934*	0.0619	−3.1210	0.0025
POP _t	10.7107*	0.3023	35.4196	0.0000
TA _t	0.0372	0.0389	0.9569	0.3413
R-squared	0.9958			
Adjusted R-squared	0.9955			
Prob. (F-statistic)	0.0000			

*Significant at 5% levels.

5. Discussion and Conclusion

The demand for retail space in shopping centers is significantly determined by the macroeconomic and demographic variables of the country. However, there are not many studies that focus on this issue in the case of Malaysia. The lack of knowledge on this issue may affect the future growth and development of Malaysia's shopping centers industry and ultimately impact the retail sector as well, which is one of the main contributors to the Malaysian economy. Therefore, the objective of this paper is to identify the macroeconomic and demographic variables that influence the demand for retail space in shopping centers in Malaysia. This paper also investigates the existence of a long-run relationship between the demand for retail space in shopping centers in Malaysia and selected macroeconomic and demographic variables. In addition, this paper examines the direction of causality relationship that may exist between the demand for retail space in shopping centers and variables studied.

There are six variables involved in this study; per capita income, private expenditure, inflation rate, interest rate, total population, and the number of tourists arriving. The existence of a long-run relationship was tested using Johansen cointegration tests, while the Granger causality test was used to examine the direction of the causality relationship. Both tests were conducted in the form of a bivariate VAR model consisting of the demand for retail space in shopping centers and variables studied, separately. Meanwhile, a regression analysis was estimated to identify the significant variables that influence the demand for retail space in shopping centers and their effect on demand.

The result from cointegration tests found that the inflation rate, interest rate, the total population, and the number of tourists arriving have long-run relationships with the demand

for retail space in shopping centers in Malaysia. Therefore, policymakers should consider all these variables in their long-term planning of the development of the shopping center industry in Malaysia. However, the test on the short-run relationship found that only population size could cause the movements of the demand for retail space in Malaysian shopping centers. The causality tests found no support on the causality relationship between the demands of retail space and the macroeconomic variables per capita income, private consumption, inflation rate, and interest rate. The demographic variable - the number of tourists arriving - was similarly found to have no causal relationship with the demand for retail space in Malaysian shopping centers.

The results from regression analysis revealed that income per capita, private expenditure, and interest rates are the macroeconomic variables that significantly influence the demand for the retail space of the Malaysian shopping centers. Out of these three macroeconomic variables, private expenditure is expected to have the highest impact on the demand for retail space, while per capita income is the lowest. In line with the earlier expectation, the estimation results showed that both per capita income and private expenditure influence the demand for retail space in Malaysia's shopping centers positively. Theoretically, higher per capita income indicates higher consumer purchasing power, hence the demand for goods and subsequently the demand for retail space by retailers. Meanwhile, for interest rates, as expected, this variable will influence the demand for retail space in the shopping centers negatively. Finally, for demographic variables, this study found that only population size significantly and positively influences the demand for retail space in Malaysian shopping centers. Out of all variables studied, the population is also the variable that has the highest impact on the demand for retail space in shopping centers in Malaysia.

In conclusion, macroeconomic variables inflation rate and interest rates, as well as demographic factors population size, and the number of tourists arriving have an influence on the long-run demand for retail space in the shopping centers in Malaysia. Interestingly, this paper failed to find support on the existence of a long-run relationship between the demand for retail space in shopping centers and per capita income as well as private expenditure. Meanwhile, in the short run, only population size could cause the movements of the demand for retail space. However, the results from regression analysis found that income per capita, private expenditure, and population are the variables that positively and significantly influence the demand for retail space of shopping centers in Malaysia. Meanwhile, interest rates will affect the demand negatively.

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