The Determinants of Malaysian Real Estate Investment Trusts' Systematic Risks

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Abstract: Research Question: The paper investigates the influence of firm performance, market performance, inflation, and economic growth on systematic risk within Malaysian Real Estate Investment Trusts (M-REITs). **Motivation:** The study aims to understand how firm performance, market performance, inflation, and economic growth collectively impact systematic risk within M-REITs. The novelty of this study lies in its focus on the Malaysian context and the specific examination of M-REITs, contributing to a limited body of research on systematic risk in emerging markets. Understanding these dynamics is crucial for investors, stakeholders, and policymakers to make informed decisions and enhance risk management strategies in the M-REIT sector. **Idea:** This paper analysed the impact of firm performance, market performance, inflation, and economic growth on systematic risk within M-REITs using panel data analysis. The central hypothesis is that factors such as Return on Asset (ROA), stock market indices, inflation, and economic growth significantly influence the systematic risk of M-REITs, with ROA playing a crucial role in shaping the overall risk profile of M-REITs. **Data:** This paper examined financial data from 17 REITs listed on the Bursa Malaysia exchange from 2017 Q1 to 2021 Q4. using quarterly reports from each company and macroeconomic data from the Department of Statistics Malaysia and S&P Global 500 for the same period. **Method/Tools:** The study utilised a panel data analysis approach, specifically Pooled Ordinary Least Square (OLS) regression. **Findings:** The key findings of the study reveal a significant and positive relationship between firm performance, stock market indices, inflation, and systematic risk within M-REITs. This aligns with the principles of the Capital Asset Pricing Model (CAPM). **Contributions:** This paper contributes to the literature by demonstrating the significant influence of firm performance, market performance, inflation, and economic growth on systematic risk within M-REITs, providing valuable insights for risk management strategies and decision-making in the M-REIT market.

Keywords: Systematic Risk, M-REITs, Firm Performance, Market Performance, Inflation, Economic Growth.
JEL classification: G00, G12, G14

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1 Introduction

The global market for Real Estate Investment Trusts (REITs) provides international investors with the opportunity to invest in a diverse range of real estate options. It offers investors various investment options, enabling them to diversify their portfolios (Zou et al., 2024). REITs have a history of being resilient during periods of inflation, making them a crucial component of any risk management strategies in emerging markets (Coşkuner et al., 2024). It is vital to understand and handle risks properly when dealing with the REITs market. REITs work in a similar way to mutual funds, providing investors with the opportunity to invest in real estate while enjoying benefits such as improved liquidity, diversification, high-income yields, tax transparency, mandatory distributions, and professional asset management (Wong, 2018). Although REITs have gained significant prominence in Malaysia's capital market, the rising market value of Malaysian REITs (M-REITs) has sparked concerns about potential systematic risk. Bursa Malaysia has reported a total market capitalisation of $335.07 billion for listed securities in September 2022, indicating that REITs have become a significant part of the market. According to the Malaysian REIT Managers Association (MRMA), the market capitalisation of M-REITs grew from $1.88 billion in 2010 to $7.95 billion by 2023.

M-REITs are a way for investors to invest in commercial real estate without directly buying properties. However, if these companies finance their expansion through borrowing and interest rates increase, the growing market capitalisation of M-REITs may increase systematic risk. Ting and Choi (2011) confirmed the significant and positive relationship between leverage and systematic risk in the M-REITs. Besides, according to Lee et al. (2008), the risk of REITs is having high correlation with its underlying real estate. When interest rate increase, it might cause the market demand for real estate decreases, lead to oversupply that might increase systematic risk. This situation is worsened by the low level of housing affordability in Malaysia especially the B40 group (Genesh et al., 2024). Therefore, even though M-REITs are less risky (Ting & Choi, 2011) and constitute less than 2.4% of total market capitalisation of Bursa Malaysia, the study of M-REITs systematic risk would provide insights to potential investors and increase their confidence on M-REITs market. Previous studies have mainly focused on the European and US markets, but there is a lack of research on emerging markets, such as Malaysia, and their role in systematic risk.

Systematic risk refers to the part of total risk that is affected by factors outside of a company's control, such as economic, political, and social issues (Céspedes et al., 2020; Diamond & Rajan, 2009; Hunjra et al., 2020; Park & Kim, 2016b; Rajan, 2006; Salas & Saurina, 2002). It is measured by how much a security's return changes in response to changes in the overall market return, systematic risk affects all market participants equally and cannot be reduced through diversification (Delcoure & Dickens, 2004; Mezei & Sarlin, 2014). The Capital Asset Pricing Model (CAPM) uses the β (beta) coefficient to calculate the sensitivity of a security's return to the general market, which represents the systematic risk (Fama & French, 2004). The key components of CAPM include expected investment return, risk-free rate, beta, and market return. A positive beta indicates that a stock moves in the same direction as the market. The beta coefficient can be estimated using an equation that considers the return on a particular portfolio and the market return (Castagna & Matolcsy, 1978).

To understand what other causes have had an impact on the systematic risk in M-REITs, we referred to several past studies on different industries: In the restaurant industry, company financial information such as current ratio, leverage ratio, and firm size have proved to be the determinants of systematic risk (Park & Kim, 2016). In the hotel REITs industry, the growth rate has proved to be the determinant of systematic risk (Kim et al., 2002a). In the US tourism industry, the return on assets and cash flow to total asset ratio proved to have an impact on the systematic risk during the financial crisis (Angel et al., 2018). In the context of REITs' Malaysia, Ting and Choi (2011) found that diversification and leverage positively affect systematic risk (beta) while insider ownership, effective age less than 15 years, price to FFO ratio, variable/fixed debt ratio, and book to market ratio negatively affect systematic risk (beta). These studies proved that fundamental financial information could impact systematic risk other than macroeconomic changes. Ting and Choi (2011) confirmed the relationship between firm characteristics such as diversification, management type, ownership structure, age of REIT and systematic risk, this study added to current literature by focusing on M-REITs' growth rate and asset efficiency in affecting systematic risk, which is still limited. Analysing financial health, profitability, and operational efficiency can help investors gauge risk and adjust strategies accordingly. The current study also included market performance (i.e., gold price, crude palm oil price, KLCI and S&P 500) and macroeconomic factors (i.e., inflation and economic growth) to broaden the understanding of systematic risk and provide valuable insights for REIT managers in optimizing risk management strategies.

The paper fills a gap in the literature by specifically examining systematic risk in the context of an emerging market like Malaysia. While existing studies have primarily focused on developed markets, this research sheds light on how financial information and macroeconomic variables impact systematic risk in M-REITs within an emerging economy. The study offers practical implications for investors, stakeholders, and M-REIT administrators. By highlighting the significance of factors such as ROA, market performance, inflation, and economic growth in shaping systematic risk, the research provides actionable insights for enhancing risk management strategies and optimizing investment practices in the M-REIT.

2 Related Theory, Literature Review and Hypotheses Development

2.1 The CAPM Theory

Systematic risk refers to the risk that cannot be eliminated through diversification and is associated with the overall market conditions. When considering stocks, it is the risk connected to the market, where it can be defined as how much the general market influences a stock. This means it is a type of risk that affects the whole market, where it can be compared to a rise in inflation in the sense that it is felt by all economic actors (Vergara-Fernández et al., 2023a). Systematic risk is measured as the beta in the Capital Asset Pricing Model and one of the risk factors in the Fama-French setup. (CAPM) is a widely used financial theory that helps investors understand the relationship between risk and expected returns. While primarily applied to the stock market, CAPM's reliance on beta as a measure of systematic risk can be applied to REITs (Singh, 2023). By estimating the beta of a REIT, researchers and investors can evaluate its sensitivity to market movements and determine its expected returns in relation to the overall market.

2.2 Literature Review and Hypothesis Development

2.2.1 Hypothesis One (H1): Firms' Performance and Systematic Risk

The current ratio, which measures a firm's ability to cover its short-term liabilities with its short-term assets, serves as an indicator of liquidity. A higher current ratio suggests that a firm is in a stronger position to meet its financial obligations, which can enhance its overall financial stability. Firms with robust liquidity are often viewed as less risky by investors, as they are better prepared to handle economic fluctuations and unexpected financial challenges. As a result, a strong current ratio may contribute to reduced stock price volatility, thereby lowering the firm's exposure to systematic risk. This hypothesis is supported by existing literature, which indicates that firms with higher liquidity ratios typically experience lower levels of risk (Hidayat, 2024; Park & Kim, 2016). By exploring the relationship between the current ratio and systematic risk in the context of M-REITs, this study aims to highlight the significance of effective liquidity management in risk mitigation strategies.

Firm performance impacts systematic risk. One factor that influences a company's risk management strategies is its level of liquid assets (Hidayat, 2024). A high liquidity ratio reduces risk and promotes stability, while a low ratio forces firms to take higher risks and potentially earn better returns. Liquidity (LR) is measured through the current ratio (Bhatia & Kaur, 2024).

H1a: Current ratio has a negative relationship with systematic risk.

Business success is influenced by the growth rate, which impacts revenue and risk. Rapid growth can increase revenue but also exposes companies to competition and risk (Liu et al., 2024). On the other hand, slow growth allows for capital reinvestment and access to low-interest loans. It is important to avoid risky behaviours, such as cryptocurrency mining, and implement risk management strategies to achieve goals and retain customers. Fast growth increases systematic risk (Kim et al., 2002), requiring more external funding and capital. In the case of REITs, this implies that they often need significant funding to acquire assets and generate revenue. Consequently, the positive relationship between firm growth rate and systematic risk suggests that REITs face higher systematic risk as they seek additional funds to expand their operations.

H1b: Firm's growth rate has a positive relationship with systematic risk.

Banks evaluate their performance based on return on assets (ROA), which considers both profitability and asset turnover. ROA is calculated by dividing net income by total assets, and a healthy ROA indicates financial well-being (Thacker et al., 2020). Additionally, lower systematic risk is associated with good performance. Several studies support the idea that higher profitability can reduce systematic risk, and there is a negative correlation between ROA and systematic risk (Adam, 2014; Delcoure & Dickens, 2004; Ichsan et al., 2021; Lee & Jang, 2012; Lehar, 2005). However, Lee & Jang (2012) argued that high profitability can lead to a greater risk, as firms may take on more credit to achieve their goals, especially in the finance industry. This argument can also be applied to Real Estate Investment Trusts (REITs), as they often require financing for property acquisitions, which may increase their exposure to systematic risk. Therefore, it is reasonable to hypothesise a positive relationship between ROA and systematic risk in the REIT market.

H1c: Return on asset has a positive relationship with systematic risk.

The asset turnover ratio measures a company's efficiency in generating revenue by selling assets. While its value is controversial due to intangible assets, economic conditions, and measurement methods, a high ratio indicates efficient management. Studies show that diversified firms have higher ratios, and a negative relationship exists between the asset turnover ratio and systematic risk. (Comment & Jarrell, 1995; Hasanaj & Kuqi, 2019; Hua et al., 2016; Joshi, 2022; Kabaciński et al., 2020; Vinţe & Ausloos, 2022).

H1d: Asset turnover ratio has a negative relationship with systematic risk.

A company's financial stability is influenced by its cash flow, which affects the debt-to-equity ratio and total asset ratios. Positive cash flow reduces debt and total asset ratios, leading to a low cash flow to total assets ratio (CFTA). Maintaining a healthy balance between assets and liabilities is crucial for financial stability and growth as financial stability and growth depend on maintaining a healthy balance between assets and liabilities. Angel et al. (2018) found a negative correlation between systematic risk and the cash flow to total assets ratio (CFTA). Good financial management ensures positive cash flow and a healthy CFTA ratio (Denis & McKeon, 2021a; Dirman, 2020a; Muien et al., 2022a; Rosly & Bakar, 2003a).
H1e: Cash flow to total asset ratio has a negative relationship with systematic risk.

2.2.2 Hypothesis Two (H2): Market Performance and Systematic Risk

Gold has been widely acknowledged as a valuable investment for many years. Despite the COVID-19 pandemic, gold prices have significantly outperformed major stock indices worldwide, including the S&P 500 and Dow Jones (Hasan et al., 2023a; Sumer & Ozorhon, 2021a). Furthermore, while gold prices tend to rise during turbulent economic times, returns on real estate investments are influenced by macroeconomic conditions and their correlation with stock markets, leading to more cyclical fluctuations. Gold as a substitute investment portfolio for M-REITs, will have a negative relationship with M-REITs. Thus, we hypothesised that when GOLD is performing well, M-REITs systematic risk will increase.
H2a: Gold price has a positive relationship with systematic risk.

Crude Palm Oil (CPO) significantly influence the Malaysian stock market index. The importance of the palm oil industry has been observed through its impact on exports and the creation of derivative instruments based on palm oil. Previous studies have proven a positive and significant relationship between the CPO price and the Malaysian stock market (Nordin & Ismail, 2014a). This correlation is believed to be due to Malaysia's status as a major palm oil exporter (Hassan et al., 2023a). When the CPO price rises, it is expected that the stock market in Malaysia will also rise, CPO market can influence investor confidence and contribute to market instability (Go & Lau, 2017). When CPO price increases, it will usually lead to inflation and lower investor confidence and a potential sell-off of REITs holdings. This may result in fewer investors in the REITs market and increase systematic risk. Thus, we hypothesised that when CPO is increasing, M-REITs systematic risk will increase.
H2b: Crude Palm Oil price has a positive relationship with systematic risk.

Kuala Lumpur Composite Index (KLCI), which is the broadest index in the Malaysian equity capital markets and comprises the 30 largest public firms in Malaysia (Abd Sukor et al., 2020). Murthy et al. (2017) find that factors such as interest rate, exchange rate, money supply, and oil price can affect the KLCI. Hamzah et al. (2010) claimed a negative relationship between Malaysia REITs' systematic risk and KLCI and KLPI during the 1998 crisis. Stock market as the main substitute for REIT market will reduce the holding of REITs by investors when stock market is performing well. This is because the return from stock market is higher than REITs market. Thus, we hypothesised that when KLCI is booming, the systematic risk for M-REITs increases due to less interest from the investors.
H2c: KLCI has a positive relationship with systematic risk.

The S&P500 is a widely watched stock market index in the US, constructed based on the common stock of 500 publicly traded companies that represent different sectors of the American economy (Rodríguez et al., 2017). A study on the international shipping industry found higher levels of beta during economic downturns due to factors such as high freight rate volatility and credit spreads (Drobetz et al., 2016). Another paper demonstrated a higher level of systematic risk during financial crises, such as the COVID-19 pandemic's impact on S&P 500 returns (Umut & Uyar, 2022). Same as KLCI, we hypothesised that when S&P 500 is booming, the systematic risk for M-REITs increases due to less interest from the investors.
H2d: The S&P500 Index has a positive relationship with systematic risk.

2.2.3 Hypothesis Three (H3): Inflation and Systematic Risk

The Consumer Price Index (CPI) is a measure of the average change in prices paid by consumers (Barkan et al., 2023; Joshi, 2022). Inflation, on the other hand, is measured by the percentage change in the purchasing power of a currency, resulting in an increase in prices and a decrease in purchasing power. Angel et al. (2018) found that as inflation occurs, the European stock index increases, reflecting positive economic expectations for the economy. However, Naili and Lahrichi (2022) argued that inflation has a positive relationship with bank credit's risk as inflation limits one's capacity to pay back debts under inflationary condition. Thus, the following hypothesis was developed because inflation might limit M-REITs companies to pay their loan instalment and lead to a higher systematic risk.
H3: CPI Index has a positive relationship with systematic risk.

2.2.4 Hypothesis Four (H4): Economic Growth and Systematic Risk

Gross domestic product (GDP) is a measure of a country's total output of goods and services during a period. It is calculated by summing all income earned from production and subtracting expenditures on equipment replacement and maintenance (Svobodova et al., 2020). A negative relationship between GDP growth rate and banks' credit risk was found (Naili & Lahrichi, 2022), indicating that a good economic environment makes households and creditors more likely to service their debts. A food industry study by Boz et al. (2015) stated a negative relationship between GDP growth rate and systematic risk. Thus, the following hypothesis was developed.

H4: GDP Growth Rate has a negative relationship with systematic risk.

Figure 1 illustrates the research framework.

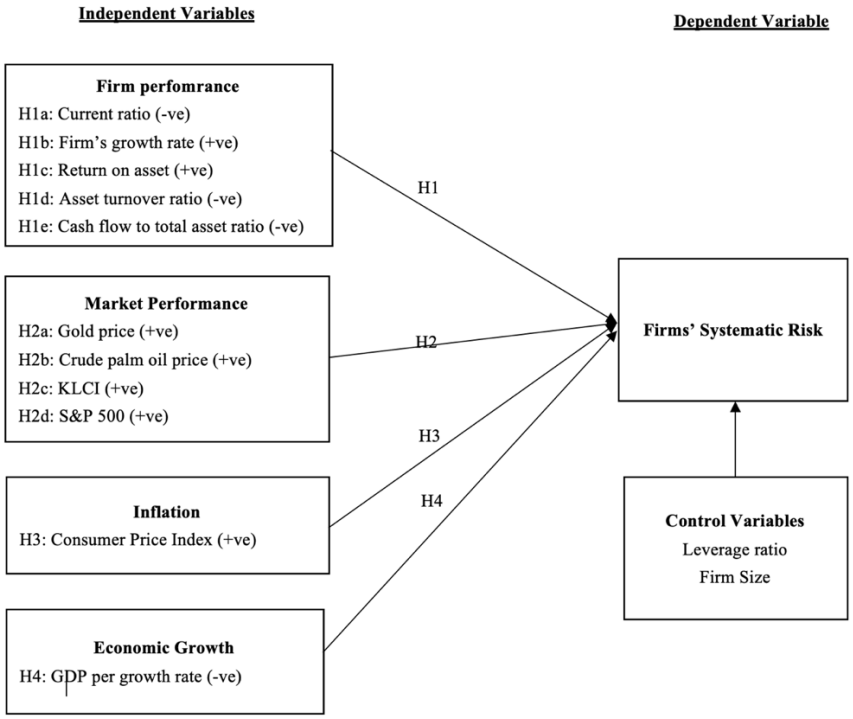

Figure 1 Research Framework

3 Research Design

3.1 Sample Selection

The study selected a sample of 17 REITs listed on the Bursa Malaysia exchange during the period from 2017 to 2021. The selection criteria for the sample likely included factors such as availability of financial data, listing on the specific exchange, and a sufficient track record for analysis. We collected data from two main sources: company financial data and macroeconomic indices. The financial data was drawn from quarterly reports of 17 selected REITs listed on Bursa Malaysia. These REITs were chosen based on the criterion that their listing period must exceed 5 years or cover the period from 2017 to 2021. Of the 20 REITs listed on Bursa Malaysia, AME REIT, IGB Commerce REIT, and KIP Real Estate A were excluded due to their shorter listing periods. Financial data was gathered for the quarters ending in March, June, September, and December. Macroeconomic data was sourced from the Department of Statistics Malaysia (DOSM) and S&P Global, covering the same 5-year period from 2017 to 2021. This macroeconomic data was aggregated into quarterly periods to match the financial data. Specifically, data from January to March was averaged to form Quarter 1 (Q1), April to June will become Quarter 2 (Q2), July to September will be Quarter 3 (Q3), and October to December will be Quarter 4 (Q4). The sample selection process may have aimed to ensure a diverse representation of M-REITs in terms of size, performance, and market presence to capture a comprehensive view of systematic risk determinants within the M-REIT market. By including a range of REITs in the sample, the study likely sought to enhance the robustness and generalizability of its findings regarding the impact of firm performance, market performance, inflation, and economic growth on

systematic risk in M-REITs

3.2 Regression Model

We employed static panel data analysis to examine the hypothesised relationships. We performed natural logarithms for firm size so that the coefficients can be understood as elasticities of a Cobb-Douglas function. Equation (1) shows the panel regression model.

$$\beta_{it} = \alpha_0 + \alpha_1 CR_{i,t} + \alpha_2 lnGRW_{i,t} + \alpha_3 ROA_{i,t} + \alpha_4 AST_{i,t} + \alpha_5 CFTA_{i,t} + \alpha_6 GOLD_{i,t} + \alpha_7 CPO_{i,t} + \alpha_8 KLCI_{i,t} + \alpha_9 SP500_{i,t}$$
$$+ \alpha_{10} CPI_{i,t} + \alpha_{11} GDPGR_{i,t} + \alpha_{12} LEV_{i,t} + \alpha_{13} lnSZ_{i,t} + \mu_{it} + \lambda_{it} + \varepsilon_{it} - - - - - - - - - - (1)$$

Where: β_{it} is the systematic risk by firm i at time t and acts as the dependent variable in this study. α represents the regression coefficient for each variable. μ_{it} is firm-specific effect, λ_{it} . The error for time-specific error and ε_{it} is the well behave error-term.

3.3 Measurement for Variables

Table 1 provides an overview of the variables, proxies, and data sources used in this study.

Table 1: Measurement of Variables

Abbreviation	Variable	Formula	Data Sources	Units	Adopted Source
BETA	Beta Coefficient	$\beta_{it} = \frac{cov(R_{it}; R_{mt})}{var(R_{mt})}$	Bursa Malaysia	Ratio	Vergara-Fernández et al. (2023)
CR	Current Ratio	(Current Asset / Current Liabilities)	Bursa Malaysia	Ratio	Park and Kim (2016)
GRW	Firm's growth rate	Logarithm of (Total Asset$_t$ − Total Asset$_{t-1}$	Bursa Malaysia	Log	Hua *et al.* (2016)
ROA	Return on asset	(Current Income / Total Assets)	Bursa Malaysia	Ratio	Angel et al. (2018)
AST	Asset turnover ratio	(Revenue / Total Asset)	Bursa Malaysia	Ratio	Park and Kim (2016)
CFTA	Cash flow to total asset ratio	(Net Cash / Total Asset)	Bursa Malaysia	Ratio	Angel et al. (2018)
GOLD	Gold price	$(\frac{Gold_t - Gold_{t-1}}{Gold_{t-1}})$	Goldprice.org	Ratio	Sumer and Ozorhon (2021)
CPO	Crude palm oil price	$(\frac{CPO_t - CPO_{t-1}}{CPI_{t-1}})$	Bursa Malaysia	Change in decimal	Robert Engle et al. (2015)
KLCI	Kuala Lumpur Composite Index	$(\frac{KLCI_t - KLCI_{t-1}}{KLCI_{t-1}})$	Bursa Malaysia	Change in decimal	Ahmad Husni Hamzah et al. (2010)
S&P 500	Standard and Poor's 500 Index	$(\frac{SP500_t - SP500_{t-1}}{SP500_{t-1}})$	S&P Dow Jones Indices	Change in decimal	Uyar and Kangalli (2022)
CPI	Consumer Price Index	$(\frac{CPI_t - CPI_{t-1}}{CPI_{t-1}})$	Department of Statistics Malaysia	Change in decimal	Robert Engle et al. (2015)
GDPGR	Real GDP growth rate	$(\frac{GDP_t - GDP_{t-1}}{GDP_{t-1}})$	World Bank Data	Change in decimal	Naili and Lahrichi (2022)
LEV	Leverage Ratio	(Total debts / Total assets)	Bursa Malaysia	Ratio	Park and Kim (2016)
lnSZ	Firm Size	Logarithm of Total Assets	Bursa Malaysia	Log	Park and Kim (2016)

4 Discussion of Results

4.1 Descriptive Analysis and Diagnostics Tests

Descriptive analyses, following Angel et al. (2018), revealed features and characteristics, outliers were identified through descriptive analyses, where observations significantly deviating from the overall data distribution were flagged. Specifically, among the initial 340 observations, 21 outliers were detected and subsequently excluded to enhance the robustness of the analysis, resulting in a final dataset of 319 observations. Notably, the asset turnover ratio exhibited high standard deviation, possibly due to diverse REIT business strategies (Chacon, 2023). The descriptive analysis results are presented in Table 2, the variables are presented in their raw form rather than in logarithmic transformation. This allows for a direct interpretation of the values and their relationships without the influence of logarithmic scaling.

Regarding the value of M-REIT beta in this sample, the study indicates that the average beta for the M-REITs is approximately 0.0762. This value suggests a relatively low level of systematic risk compared to the broader market, as a beta of 1 indicates market-level risk, while values below 1 indicate lower risk. However, the beta value in this study is higher than past study by Ting and Choi (2011), which is 0.46 indicating that the systematic risk for M-REITs is increasing.

Table 2: Descriptive Analysis Results

Variable	Obs	Mean	Std. Dev.	Min	Max	VIF
BETA	319	0.0762	0.2585	-0.5409	1.1303	
CR	319	1.4004	1.1515	0.0293	8.8773	1.11
GRW	319	0.0066	0.0314	-0.1075	0.3003	1.17
ROA	319	0.0080	0.0087	-0.0356	0.0521	1.24
AST	319	41.4495	40.6587	4.0482	245.6584	1.68
CFTA	319	0.0250	0.0184	0.0004	0.1153	1.76
CPI	319	0.0024	0.0098	-0.0303	0.0186	2.31
GDPGR	319	0.0075	0.0557	-0.161	0.173	1.62
S&P500	319	0.0375	0.0465	-0.0757	0.1189	2.17
KLCI	319	-0.0033	0.0401	-0.0799	0.1001	2.34
CPO	319	0.0363	0.1010	-0.1251	0.2759	1.50
GOLD	319	0.0207	0.0528	-0.0652	0.1129	1.03
LEV	319	0.3719	0.1183	0.04	0.63	1.10
lnSZ	319	21.5022	1.0058	19.402	23.6253	1.18

Table 3 presents correlation analysis results, indicating no correlation issues (below 0.7 threshold). Pooled Ordinary Least Square (POLS) analysis was initially conducted to examine econometric models. Variance Inflation Factors (VIFs) analysis, shown in Table 2, confirmed no multicollinearity issues (all variables are below the threshold value of 10). Diagnostic tests for heteroskedasticity and serial correlation were performed using Modified Wald and Wooldridge Test with a 0.5 threshold. The regressions were run with time-specific effect.

Table 3: Correlation Analysis Results

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) BETA	1.000													
(2) CR	-0.028	1.000												
(3) GRW	-0.027	-0.049	1.000											
(4) ROA	0.197	0.108	0.192	1.000										
(5) AST	-0.022	-0.173	-0.114	-0.203	1.000									
(6) CFTA	-0.033	0.173	0.211	0.096	-0.602	1.000								
(7) CPI	-0.423	-0.024	0.025	-0.198	-0.006	0.037	1.000							
(8) GDPGR	0.050	0.048	-0.006	0.122	-0.024	0.016	-0.209	1.000						
(9) S&P500	-0.314	0.003	-0.025	-0.118	-0.024	0.029	0.462	0.289	1.000					
(10) KLCI	-0.192	-0.016	-0.027	-0.155	0.004	0.021	0.667	-0.445	0.248	1.000				
(11) CPO	0.051	-0.083	0.053	-0.082	-0.024	0.029	-0.095	0.258	0.417	-0.225	1.000			
(12) GOLD	0.079	0.021	-0.056	0.082	0.033	0.016	-0.008	-0.004	-0.016	-0.012	-0.012	1.000		
(13) LEV	-0.067	-0.110	0.035	-0.195	0.023	-0.091	0.059	0.005	0.092	0.002	0.077	0.048	1.000	
(14) lnSZ	0.072	-0.072	-0.093	0.065	-0.243	0.283	0.008	0.004	0.020	-0.012	0.037	0.017	-0.148	1.000

4.2 Econometrics Results and Discussions

Table 4 shows the panel regression results Three models were run to test the hypotheses and robustness of this study. Model (1) examined the relationship between the independent variables (firm characteristics: current ratio, firm's growth rate, return on assets, assets turnover ratio, and cash flow to total assets ratio), systematic risk and control variables. Model (2) examined the relationship between the independent variables (macroeconomic variables: gold price, crude and palm oil price, Kuala Lumpur composite index, Standard and Poor's 500 index, consumer price index, and real GDP growth rate), systematic risk and control variables. Model (3) examined the relationship between all independent variables, systematic risk, and control variables.

The relationship between the firm characteristics with systematic risk (beta) for model 1 and model 3, can be analysed through the coefficients provided in the models, along with their levels of significance. Our findings show that Return on Asset (ROA) is the only firm characteristic that positively and significantly affects systematic risk ($p<0.01$), thus, H1c is supported. When ROA increases by one unit, the systematic risk will increase by 4.0122 units. The finding is consistent with Lee and Jang (2012) where higher profitability could lead to a greater risk as firms may take on more credit to achieve their goals. The result indicates that when ROA for M-REITs companies increase, the companies might take on more debt financing to maximise their return, leading to a higher systematic risk. The Current Ratio (CR) does not significantly affect systematic risk ($p>0.05$). However, the negative correlation between the CR and systematic risk is aligned with past studies (Hidayat, 2024; Park & Kim, 2016) indicating that high liquidity could reduce systematic risk. Contrary to Liu et al. (2024), Growth Rate (GR) in M-REITs does not affect systematic risk positively. Our finding shows a negative relationship but insignificant. We also found an insignificant relationship between Asset Turnover Ratio (AST), Cash Flow to Total Asset Ratio (CFTAR) and systematic risk, respectively. Nevertheless, the negative relationship between them is consistent with past studies (Comment & Jarrell, 1995; Denis & McKeon, 2021; Dirman, 2020; Hasanaj & Kuqi, 2019; Hua et al., 2016; Joshi, 2022; Kabaciński et al., 2020; Muien et al., 2022; Rosly & Bakar, 2003). The finding of AST and CFTAR implying that while efficient asset utilisation is generally favourable, it may not significantly affect systematic risk. Based on the results, H1a, H1b, H1d and H1e are not supported.

In terms of macroeconomic factors, Consumer Price Index (CPI)($p<0.05$), Standard & Poor's 500 Index (S&P 500)($p<0.10$) and Kuala Lumpur Composite Index (KLCI)($p<0.05$) positively and significantly affect systematic risk. When CPI, S&P 500 and KLCI increase by one-unit, systematic risk will be changed by 59.6320 units, 25.1598 units and 16.7201 units, respectively. Our result for inflation is consistent with theoretical assumption and past study (Naili & Lahrichi, 2022), where inflation increases systematic risk due to lower investing power by REITs investors. Stock market index (KLCI and S&P 500) positively affect systematic risk because when the stock market is performing well, investors might move their portfolio from M-REITs (lower return portfolio) to stock market (higher return portfolio). These findings are supported by Hamzah et al. (2010) indicating that M-REITs systematic risk is having negative relationship with KLCI during crisis, where investors switched their portfolio from stock market to M-REITs during economic uncertainty, leading to a reduction in M-REITs systematic risk. The findings suggest that H2c, H2d and H3 are supported.

GDP growth rate (GDPGR) and Crude Palm Oil (CPO) negatively and significantly affect M-REITs systematic risk. Thus, H4 is supported and consistent with Boz et al. (2015) and Naili and Lahrichi (2022), indicating that when Malaysia GDP is increasing and the market is performing well, the systematic risk for M-REITs decreases. This makes sense because when the market is good, investors usually have extra money to allocate for their investment portfolio. The result for CPO is not consistent with previous studies (Hassan et al., 2023; Nordin & Ismail, 2014), our finding indicates a negative relationship between CPO price and M-REITs systematic risk. Therefore, H2b are not supported. This situation could be explained because the stock market and M-REITs are substitutes. Since KLCI and CPO are having a positive relationship, thus, when CPO increases, stock market will increase, and this leads to potential sell-off of REITs holding and an increase in M-REITs systematic risk.

Lastly, our findings show an insignificant relationship between Gold, Firm Leverage (LEV), firm size (lnSZ) and M-REITs systematic risk ($p>0.05$). The result for Gold is consistent with past studies (Hasan et al., 2023; Sumer & Ozorhon, 2021) as the most suitable investment alternative for M-REITs during economic uncertainty. Our finding noticed a positive relationship between GOLD and M-REITs systematic risk but not significant. The result for LEV is not consistent with Ting and Choi (2011), where our finding indicates a negative relationship between LEV and systematic risk. This could be because M-REITs have been performing well during our period of study. Firm size indicates a positive relationship with M-REITs systematic risk, indicating that larger firms might have a larger market capitalisation, which could increase systematic risk as supported by Ting and Choi (2011).

Table 4: Panel Regression Results

Variables	Model 1	Model 2	Model 3
Current Ratio	-.0072		-.0099
	(.0085)		(.0086)
Growth Rate	-.3715		-.3390
	(.4286)		(.4267)
Return on Asset	4.2553***		4.0122**
	(1.6527)		(1.6544)
Asset Turnover Rate	-.0002		-.0002
	(.0003)		(.0003)
Cash Flow to Total Asset Ratio	-.8741		-.8852
	(.8852)		(.8812)
Consumer Price Index,		52.9652*	59.6320**
		(30.1507)	(30.3232)
GDP Growth Rate,		-7.9624*	-8.6206*
		(4.4425)	(4.4663)
Standard & Poor's 500 Index		22.4157*	25.1598*
		(12.9254)	(12.9968)
Kuala Lumpur Composite Index		15.3693*	16.7201**
		(8.1883)	(8.2261)
Crude Palm Oil Price,		-1.0941*	-1.2961*
		(.7455)	(.7497)
Gold Price		.42321*	.3733
		(.2305)	(.2318)
Firm Leverage	-.0684	-0.0877	-.0932
	(.1101)	(.1079)	(.1096)
Firm size	.0150	.0179	.0150
	(.0132)	(.0123)	(.0131)
Observation	319	319	319
Wald X^2_{10}/ F value	0.4538***	0.7257***	0.5591***
Adjusted R-Square	0.2998	0.3012	0.3110
Breusch-Pagan LM	1.0000	1.0000	1.0000
Poolability F-Test	0.4538	0.77	0.98
Hausman Test	0.1067	1.0000	0.9997
Heteroskedasticity (Wald Test)	0.2115	0.3605	0.5921
Serial Correlation (Wooldridge Test)	0.1057	0.6543	0.9055
Adopted Model	POLS	POLS	POLS

Note: *, **, *** indicates the statistically significance level at 90%, 95% and 99%, respectively. The standard errors of the coefficients are stated in the brackets The p-value of the Breusch-Pagan LM Test, Poolability F-Test, Wald Test, Wooldrige Test, and Hausman Test results are reported. The panel results were run with time specific effect.

5 Conclusions

We investigate factors influencing systematic risk in Malaysian REITs to enhance business management efficiency by estimating their capital cost. The findings, aligned with CAPM theory, emphasise the significance of market performance, inflation, and economic growth as determinants. The study highlights the importance of considering stock market indices and market dynamics in assessing and managing systematic risk. It emphasises the role of macroeconomic factors in shaping systematic risk, providing valuable insights for REITs companies, investors, researchers, and policymakers to enhance risk management strategies.

First, our findings show a significant and positive relationship between ROA and M-REITs systematic risk. This provides insights to M-REITs companies that while increasing their assets to maximise returns, firms need to ensure good leverage ratio and their capability to pay back the debt. This is because a higher ROA could indicate higher leverage and systematic risk.

Second, macroeconomic factors play a vital role in affecting M-REITs systematic risk. The findings show that stock market performance, inflation and economic growth are having close relationship with the systematic risk. Therefore, REITs companies, investors and policy makers should consider all these factors in making their investment decision related to REITs.

The most significant limitation of this research is the small sample size and limited study period, which may restrict the generalisability of the findings to other REITs contexts. Future studies should focus on increasing the number of REITs included in the sample and extending the study period to obtain more representative results that can be empirically extrapolated to other contexts.

Despite these limitations, we contribute to the empirical research on REITs as a starting point for future research that aims to consolidate the list of systematic risk determinants. Future studies could explore: (i) The use

of other econometric models to estimate betas and evaluate whether the results improve by adding more samples; (ii) The application of the current model to measure the risk of REITs in different ways than the CAPM model; (iii) The analysis of other REIT markets to compare the results and observe the particular characteristics of the sector in each economy; (iv) The consideration of other subsectors of the REIT industry to identify potential variations in systematic risk determinants across different subsectors.

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