



Explaining REIT returns in emerging economies: A Fama-French approach with foreign investment and political stability

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ABSTRACT

This study examines the applicability of the Fama-French 3-factor model to Real Estate Investment Trusts (REITs) in emerging economies using monthly data from January 2016 to December 2023 for 23 REITs across five emerging markets. A Generalized Method of Moments (GMM) (system) approach assesses the impact of 12 explanatory variables, including traditional factors like market, value, size, and momentum premiums, as well as emerging market-specific factors such as the Morgan Stanley Capital International (MSCI) Emerging Markets Currency Index and Bloomberg Commodity Ex-Agriculture Index. Control variables like political stability, foreign direct investment, and portfolio investment are also included. The results show that value premium, foreign direct investment, portfolio investment, and commodity prices positively influence REIT excess returns, while momentum premium and political instability negatively affect them. These findings highlight the combined importance of traditional and emerging market-specific factors, emphasizing the critical role of stable political conditions for REIT performance. This research contributes valuable insights for investors and policymakers in understanding REIT dynamics in emerging markets.

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1. Introduction

Real estate investment trusts (REITs) are income-generating instruments that offer diversification and liquidity, allowing investors to integrate the real estate sector into their portfolios at relatively lower costs than traditional real estate investments (Zhang and Hansz, 2022). Early studies on REITs linked these instruments to bonds due to their ability to generate stable income streams (Karolyi and Sanders, 1998). Until the 1990s, REIT returns exhibited a strong correlation with bond returns (Shen et al., 2021). However, following structural changes in the REIT market during the early 1990s, REITs began to resemble stocks more closely. As a result, their returns became more sensitive to factors affecting small-cap stocks and specific real estate drivers.

Following structural changes in the REIT market, ownership structures experienced significant transformations. After 1990, institutional ownership

in REITs substantially increased (Chen and Zhang, 1998). With growing participation in REITs and the evolving behavior of their returns relative to other financial assets, it is anticipated that investors will increasingly focus on determining whether factor-based investment strategies, which generate positive premiums in the stock market, can also be applied to achieve excess returns in the REIT market.

Despite REITs and certain stock segments exhibiting similar behavior following structural changes in the REIT market, significant differences between REITs and other equities persist (Zhang and Hansz, 2022). These differences often lead to REITs being excluded from most asset pricing studies, reinforcing their unique status as an asset class. One primary distinction is that while some stocks may not pay dividends, REITs are legally mandated to distribute a substantial portion of their income as dividends to shareholders.

Secondly, unlike common stocks subject to corporate or trust taxation, REITs benefit from tax exemptions, with taxes only applied to dividends based on the investors' personal tax rates (Gyourko and Keim, 1992). Thirdly, REITs distribute their profits directly to shareholders' tax returns, thus bypassing the potential advantages of debt financing. Given that REITs typically hold large, illiquid assets, accumulating debt provides no tax benefits and increases the risk of bankruptcy (Harrison et al.,

2011). Consequently, REITs tend to have lower debt levels than corporations (Zhang and Hansz, 2022). Additionally, REIT prices are generally more affected by interest rate changes compared to dividend stocks. Lastly, while general stocks are not usually seen as an effective hedge against inflation, REITs are often considered a good hedge. Due to these distinctive characteristics of REITs compared to general stocks, it is essential to test asset pricing models and factor-based investment strategies, specifically within the REIT market. Historically, empirical testing of these models and strategies has predominantly focused on general stocks, underscoring the importance of evaluating their applicability to the REIT market.

Fama and French (1993) identified value and size premiums in USA stocks, highlighting that value stocks generally outperform growth stocks and that small-cap stocks tend to have higher average returns than large-cap stocks. They labeled the excess returns of value stocks over growth stocks as HML (high minus low) and the excess returns of small-cap stocks over large-cap stocks as SMB (small minus big). Building on their work, Carhart (1997) introduced a fourth factor to the Fama–French three-factor model: Momentum. This momentum factor, known as WML (winners minus losers), is derived from historical returns and reflects the tendency for stocks that have performed well in the past to continue performing well, while those that have performed poorly are likely to continue underperforming.

While considering the critique by Titman et al. (2005) and Novy-Marx (2013), who argued that the Fama–French three-factor model is insufficient for fully explaining expected stock returns, Aldarmi et al. (2015) enhanced the model by adding two more factors: profitability and investment. The RMW (robust minus weak) factor differentiates average returns between stocks with high profitability and those with low profitability. Similarly, the CMA (conservative minus aggressive) factor distinguishes average returns between stocks with low (conservative) investments and those with high (aggressive) investments. These additions were designed to improve the model's ability to explain variations in stock returns.

Over the years, investors have consistently employed style-based investment strategies in the stock market to achieve higher returns or benefit from risk premia. Each risk factor—size, value, profitability, investment, and momentum—contributes to a specific risk premium. Investors capture these premiums by going long on assets with positive factor exposure and shorting assets with negative factor exposure (Idzorek and Kowara, 2013). Empirical evidence, primarily within the stock market, supports the effectiveness of factor-based strategies, especially concerning size, value, and momentum. However, the existence of these premiums and their associated risks have shown variation in results (Eun et al., 2022). This study investigates the presence, magnitude, and

significance of SMB, HML, and WML premiums within the REIT market of emerging economies. We also utilize emerging market-specific factors such as the Morgan Stanley Capital International (MSCI) Emerging Markets currency index and the Bloomberg Commodity ex-agriculture index. Furthermore, we include control variables like political stability, foreign direct investment, and portfolio investment to assess their impact on returns in the REITs market Bhargava and Weeks (2022).

Generally, REITs can be classified by the type of their capital structure into two main classes: equity REITs and mortgage REITs. Equity REITs are publicly traded company that, as their principal business, buys, manages, renovates, maintain, and occasionally sell real estate properties; on the other hand, mortgage REITs are REITs that make and hold loans and other debt instruments that are secured by real estate collateral (Block, 2011; Khan and Siddiqui, 2019). This distinction is essential when dealing with REITs, as those two different classes of REITs have different characteristics and exhibit different market behavior (Okoro and Ayaba, 2023).

Emerging markets have become important players in the global economy and have been recognized by investors as places for alternative opportunities and growth. Emerging and developing markets produce 59.38% of the world's GDP compared to 29.64% for G7 advanced economies based on purchasing power parity (PPP), which exhibits growth of 4.3% compared to 1.7% for (G7) and .04% for the Euro Area in 2023. Many studies have employed the three-stage Fama-French model to predict the excess return of REITs in different markets ranging from developed to emerging markets. However, earlier research primarily investigated the predictability of the Fama-French model using time series data, focusing on single-country REIT markets such as Singapore, the USA, and the Turkish market. Therefore, the current study aims to assess the capability of the Fama-French model to predict excess returns in emerging markets REITs as a specific economic area along with other control variables that could be more related to the emerging market's economic structure.

This study is significant in examining the suitability of the Fama-French model for emerging market REITs as a distinct economic group. It holds particular importance because investors often invest in diversified emerging market securities, including exchange-traded funds and REITs, rather than focusing on specific emerging market countries to enhance diversification. Traditionally, the Fama-French model has been extensively applied to equity markets in developed economies, with limited research addressing its relevance to REITs, especially in emerging markets. REITs exhibit unique characteristics, such as income stability, regulatory differences, and sensitivity to macroeconomic factors like interest rates and inflation, which may not be fully captured by the standard Fama-French factors (market, size, and value premiums). By

applying this model specifically to REITs, the study extends its utility to a different asset class, providing new insights into how traditional equity pricing models can be adapted to capture the dynamics of real estate markets in emerging economies.

Moreover, this research bridges a gap by augmenting the traditional Fama-French model with additional factors specific to emerging markets, such as commodity prices and currency fluctuations. While previous studies have focused on the applicability of the Fama-French model to REITs in developed markets, this study demonstrates that emerging markets require a modified approach that accounts for their unique economic and financial conditions. Doing so contributes to a more refined understanding of the factors driving REIT performance, offering a valuable extension of the Fama-French model in an underexplored context. In addition, this research fills a gap by incorporating non-traditional control variables like political stability, foreign direct investment (FDI), and portfolio investment, which are rarely considered in traditional REIT performance models. This approach offers a more holistic understanding of the drivers of REIT returns in emerging markets, where political and economic environments can vary significantly from developed markets. The study's findings on the negative impact of political instability and the positive influence of FDI and portfolio investment contribute to the literature by highlighting the importance of both macroeconomic and market-specific factors in shaping REIT performance in these rapidly evolving economies. Moreover, the research provides insights to portfolio managers to enhance their valuation process using the model and concentrate on the most crucial factors in the Fama-French model and other relevant factors associated with the emerging market. This could improve their effectiveness in securities selection and allocation.

The rest of the paper is organized as follows: Section 2 reviews related literature, discussing relevant studies and academic work. Section 3 describes the data sources and the model used for the research. Section 4 presents a detailed analysis of the estimated results. Lastly, Section 5 summarizes the key findings and provides policy insights.

2. Literature review

2.1. The size, value, and momentum premiums

Fama and French (1993) incorporated size and book-to-market factors into the traditional market factor of the Sharpe-Lintner Capital Asset Pricing Model (CAPM), demonstrating that these factors capture a substantial portion of average stock returns. They suggest these additional factors act as proxies for common risk factors in returns. They view small stocks as posing more risk than large stocks, and value stocks are riskier than growth stocks. Thus, the higher returns observed with small and valuable stocks merely compensate for the increased risk exposure. Chen and Zhang (1998)

further highlight that value stocks (i) are riskier because they often represent firms in financial distress, (ii) tend to have high leverage, and (iii) are associated with greater uncertainty regarding future earnings.

On the other hand, Lakonishok et al. (1994) found no evidence suggesting that value stocks pose a higher risk than growth stocks. Instead, they attribute the superior returns to investors' systematic mispricing of value and growth stocks. According to their findings, investors often display excessive optimism regarding the prospects of growth stocks and excessive pessimism regarding the prospects of value stocks. When these expectations are not realized, it leads to higher returns on value stocks and lower returns on growth stocks. This phenomenon is commonly known as extrapolation theory.

The persistence of these premiums might arise from transaction costs and arbitrage risk. Shleifer and Vishny (1997) suggested that value premiums are not easily arbitrated away due to idiosyncratic risk. While most previous studies on asset pricing have focused on the general stock market and excluded REITs because of their unique characteristics, Ooi et al. (2007) found evidence of value premiums in the REIT market. They also observed mixed results regarding the risk-adjusted performance of value REITs compared to growth REITs. Additionally, they identified a higher arbitrage risk associated with value REITs relative to growth REITs, making value REITs more susceptible to mispricing. Moreover, they did not find significant evidence indicating that investors are exposed to higher risk when investing in value REITs than growth REITs.

Moreover, Carhart (1997) identified that a momentum factor is significant in explaining expected asset returns when included alongside market beta, SMB, and HML within the Fama and French (1993) three-factor model. While there has been extensive research on assessing the predictive power of the WML factor on expected returns in general stocks, research on REITs remains limited. Chui et al. (2003) investigated the predictive power of Momentum, size, value, and turnover on REIT returns across two sub-samples, before and after 1990. They found that momentum, size, and value effects were significant before 1990, while only the momentum factor remained significant in defining expected REIT returns after 1990. Goebel et al. (2013) demonstrated the significance of the momentum factor in explaining the cross-section of REIT returns. They also concluded that the momentum factor is more prominent in the real estate market compared to the equity market.

In addition, the economic rationale behind the momentum factor remains unclear: Why should a company that has consistently delivered higher returns in the past be considered riskier and offer additional compensation for risk? Liu and Zhang (2017) proposed that expected growth risk rises with expected growth, suggesting that the

momentum factor in asset pricing reflects a form of systematic risk that investors may encounter. Conversely, [Jegadeesh and Titman \(1993\)](#) found no indication that the excess returns on a momentum-based strategy stem from systematic risk. Instead, they interpret the momentum premium as excess returns generated due to investor behavior and market under reaction to information.

2.2. Relationship between stock market returns and REITs' returns

Investigating factor premiums in REITs involves considering how fluctuations in the stock market may impact these premiums. For instance, [Karolyi and Sanders \(1998\)](#) explored that fluctuations in both stock and bond returns significantly influence explaining REIT returns. In contrast, [Bouri et al. \(2021\)](#) investigated the correlation between the equity market and REITs across 19 countries during various crises, including the dot-com crisis, the 2007/08 financial crisis, the European sovereign debt crisis, and the Brexit period in the UK. They observed a significant impact of equity markets on REITs, both in developed and emerging REIT markets. These relationships were especially strong during the global financial crisis and the sovereign debt crisis.

[Allen et al. \(2000\)](#) analyzed a sample of publicly traded REITs. They suggested that the REITs' returns are affected by changes in the stock market, with this sensitivity being particularly significant for REITs with high financial leverage. [Clayton and MacKinnon \(2003\)](#) demonstrated the shift in factors influencing REITs, from primarily economic factors impacting large-cap stocks in the 1970s and 1980s to a stronger influence from small-cap stocks and real estate-specific factors in the 1990s. Given this evolving dynamic, including the stock market index as an explanatory variable provides insights for investors building mixed-asset portfolios, especially those with factor-based REIT investments. Such investors would benefit from evaluating how stock market movements affect factor premiums within the REIT market, both during economic downturns and periods of growth ([Zhang et al., 2023](#)).

Moreover, [Coşkun et al. \(2017\)](#) applied the Fama-French model to the Turkish REIT market, incorporating variables such as exchange rate (reflecting currency risk), election period (as a measure of political risk), and financial crisis period (representing high volatility periods). They suggest that investors should consider information from the Fama-French model due to its ability to explain variations in REIT returns. Their findings indicate that the size premium is more effective than the value premium in explaining return variations. They also highlighted that property management strategies may impact the size premium, pointing to the significance of property focus. However, their study suggests a lack of sensitivity to the election period, and the market showed an inverse relationship with the USD dollar.

Similarly, to assess the performance of REITs in both emerging and developed markets, [Khan and Siddiqui \(2019\)](#) considered a set of external (such as stock index, interest rates, and inflation) and internal factors (such as net income, dividend yield, and size) and concluded that all internal variables significantly affect the REITs performance. The key external factors influencing REITs were the stock index, inflation, and interest rate.

On the other hand, [Jackson \(2020\)](#) analyzed the returns of 33 USA publicly traded lodging REITs over a 20-year period and supports the applicability of the Fama-French three-factor model to lodging REITs, demonstrating the relevance of market, size, and book-to-value factors in this sector. Similarly, [Chaudhry et al. \(2022\)](#) employed factors such as default risk and unanticipated inflation, GDP, and Federal fund rate along with Fama-French model factors. Their findings suggest that the default risk premium plays a crucial role in the periods surrounding the global financial crisis. Additionally, they observed that the GDP has a positive and statistically significant impact on REIT returns. In addition, their research identifies the positive and statistically significant impact of size premium and value premium during the global financial crisis. In contrast, the momentum effect negatively and statistically significantly impacts REIT returns.

In addition, [Ijasaan et al. \(2021\)](#) explored the relationships between South African REITs (SA REITs) and ten of the world's leading REIT markets across Europe, Asia, North America, and Oceania. By employing the wavelet coherence method to assess co-movement patterns in the time-frequency domain, the study uncovered distinct and varied linkage patterns rather than uniform correlations between markets. The findings showed that while the USA market generally leads South Africa—likely due to the larger share of the global REIT index—South Africa leads both Australia and New Zealand, indicating that market size plays a less significant role compared to the relative size differences. Moreover, there were periods of moderate to high coherence across lower frequencies, which diminished in the intermediate and short-term periods, suggesting opportunities for diversification. Despite South Africa's smaller REIT market size, the analysis suggests that SA REITs are not isolated from global REIT trends. However, the study found no evidence of contagion following Brexit, as there were no sustained periods of high-frequency coherence after June 2016. This research offers valuable insights into the global interactions of REIT markets and provides a foundation for further investigation into REIT performance in emerging economies like Saudi Arabia, where market-specific dynamics could similarly influence cross-market linkages. Similarly, [Salisu et al. \(2024\)](#) investigated the predictability of REIT returns in relation to gold market volatility, examining 11 sectors across five regions. Their study reveals that REITs experience higher returns during periods of increased gold market volatility, though the results differ between tranquil and turbulent

periods. Before the Global Financial Crisis (GFC), REIT investors exhibited sector-specific behaviors, but this pattern did not persist in the post-GFC and COVID-19 periods. The research also highlights the role of REITs as a haven for gold investors, although this hedging capability is shown to be sector-dependent. To test the robustness of their findings, the authors conducted a sensitivity analysis by replacing gold market volatility with stock market volatility. The results provided counterfactual evidence, reinforcing the influence of market volatility on REIT performance. This study sheds light on the nuanced interaction between REITs and gold as alternative investments and the varying effectiveness of REITs as a hedge across different sectors and periods.

This research is unique in its comprehensive approach, incorporating three types of variables to analyze REIT returns. The first set includes the traditional Fama-French factors: value, size, and momentum premiums, as well as the REITs market premium, which are foundational to understanding asset pricing. The second set comprises emerging market-specific factors, such as the MSCI Emerging Markets Currency Index, the Bloomberg Commodity Ex-Agriculture Index, the Bloomberg Emerging Markets Hard Currency Aggregate Debt Index, and the Bloomberg Commodity Ex-Agriculture and Livestock Capped Total Return Index. These factors provide a comprehensive view of the factors unique to emerging markets. Finally, the study incorporates control variables, including political stability, foreign direct investment, and portfolio investment. These controls are crucial for understanding the broader economic and political context impacting REIT performance. This multifaceted approach allows for a more holistic and detailed analysis of the factors influencing REIT returns, particularly in the context of emerging markets.

3. Data and methodology

To accurately assess the risks associated with REITs, it is important to focus on a specific category, such as equity REITs, due to the significant heterogeneity among different REIT types, including mortgage REITs and hybrid REITs. By concentrating on a single category, researchers can gain a more precise understanding of the risk profile, as each REIT type operates under distinct financial structures, market conditions, and investment approaches. This targeted focus allows for a clearer evaluation of the unique risks inherent to equity REITs, as opposed to the broader REIT sector. Moreover, mortgage REITs usually have more debt-related factors than equity REITs, which could impact model estimates and findings. Including REIT companies from various emerging markets, each with unique country-specific characteristics, further highlights the importance of this selection criterion. By choosing REITs from a specific index representing a particular security market, market segment, or asset class, we ensure that all REITs adhere to the

same qualification criteria for inclusion, maintaining consistency in their eligibility (McMillan et al., 2011). This study utilizes the Morningstar Global REIT indices (indexes.morningstar.com) due to the availability of security data and the stringent eligibility criteria. To be included in the Morningstar Global REIT Index, a company must be designated as a REIT, have at least 75% of its assets in real property, and generate 75% of its revenue from real estate. Additionally, REITs must distribute 90% of their taxable income as dividends. It's important to note that the index excludes mortgage REITs.

Additionally, by using the Morningstar Global REIT Index to measure the market performance or the market premium, this research differentiates itself from earlier studies, such as Jackson (2020) and Coşkun et al. (2017), who used an equity index to measure the market performance. We argue that the Morningstar Global REIT Index is better suited for capturing the market risk (systematic risk) of REITs and provides a close approximation to the performance of the market portfolio. For the emerging market REITs, the sample is drawn from the Morningstar Emerging Markets REIT Index, a sub-index of the Morningstar Global REIT Index, which constitutes 2.05% of the overall index. To measure the market performance, current research employs the monthly data for 23 companies from a sample of five emerging economies, spanning the period from January 2016 to December 2023.

3.1. Model specification

To assess the Fama – French three-factor model for REITs in emerging markets, we specify the model as follows:

$$R_{it} - R_f = \alpha_i + \beta_1(R_m - R_f) + \beta_2(SMB)_{i,t} + \beta_3(HML)_{i,t} + \beta_4(WML)_{i,t} + \beta_5(MXE)_{i,t} + \beta_6(BBU)_{i,t} + \beta_7(EMS)_{i,t} + \beta_8(MXW)_{i,t} + \beta_9(PS)_{i,t} + \beta_{10}(FDI) + \beta_{11}(PI) + \beta_{12}(PE) + \beta_{13}(COV) + \beta_{14}(R_{it} - R_f)_{t-1} + \varepsilon_i \quad (1)$$

where, R_{it} is the monthly realized return of the REITs, and it is computed as:

$$R_{it} = \left(\frac{P_{i,t}}{P_{i,t-1}} - 1 \right) \quad (2)$$

where, $P_{i,t}$ is the closing price at the current month, whereas $P_{i,t-1}$ the closing price of the previous month, R_f is U.S. one-month T-bill, R_m is the monthly market returns of the market index, $R_{it} - R_f$ are the monthly excess returns, $R_m - R_f$ is the market premium, (*SMB*). It is small minus big, and it is the average return on the nine small stock portfolios minus the average return on the nine big stocks. *HML* is high minus low and represents the average return on the two value portfolios minus the average return on the two growth portfolios, *WML* is the equal-weight average of the returns for the two winner portfolios for emerging markets minus the average of the returns for the two loser portfolios,

MXE is the MSCI emerging markets currency index. The MSCI Emerging Markets Currency Index (EMCI) can significantly influence REITs (Real Estate Investment Trusts) in emerging markets through currency risk, foreign investment, and borrowing costs. Fluctuations in the EMCI reflect changes in currency values, affecting REIT valuations and investor returns, particularly for international investors who face exchange rate risk. A stronger local currency can attract foreign capital into REITs by offering higher returns when repatriating profits, while currency depreciation may deter investment and increase the cost of foreign-denominated debt, impacting profitability. Additionally, currency movements influence real estate demand; a weaker currency may boost foreign demand for local properties, benefiting REITs, whereas a stronger currency might reduce this demand. Consequently, the EMCI plays a crucial role in shaping REIT performance in emerging markets. *BBU* is the Bloomberg commodity ex-agriculture and livestock capped total return index, as the movements in this index reflect changes in commodity prices, such as those for energy and metals, which can influence the broader economic environment and inflation expectations. For REITs, higher commodity prices can lead to increased operational costs, particularly for energy and materials used in property management and development, potentially squeezing profit margins. Conversely, rising commodity prices may signal economic growth and increased demand for real estate, benefiting REITs through higher rental income and property values. Additionally, changes in commodity prices can affect investor sentiment and asset allocation, as shifts in commodity markets might lead investors to re-evaluate their investments in REITs. Thus, the Bloomberg Commodity ex-Agriculture and Livestock Index serves as an important indicator of economic conditions that can influence REIT performance. *EMS* represents the Bloomberg emerging markets hard currency aggregate, including USD-denominated debt from sovereign, quasi-sovereign, and corporate EM issuers index, and it measures the performance of hard currency-denominated debt issued by emerging market entities, can significantly impact REITs (Real Estate Investment Trusts) through several channels. Fluctuations in this index reflect changes in the credit conditions and interest rates for emerging markets, influencing investor sentiment and capital flows. When the index performs well, it often indicates a favorable credit environment and lower risk premiums, potentially attracting more investment into emerging market assets, including REITs. Conversely, a decline in the index can signal increased risk and higher borrowing costs, which may adversely affect REITs by raising their financing costs and reducing their profitability. Additionally, changes in the index can affect overall investor risk appetite and asset allocation, impacting the attractiveness of REITs relative to other investments. Therefore, the performance of the Bloomberg Emerging Markets Hard Currency

Aggregate Index plays a crucial role in shaping the financial conditions and investor perceptions that influence REIT performance in emerging markets. *MXW* is the MSCI free-float weighted equity index and includes both emerging and developed world markets. This index can impact REITs (Real Estate Investment Trusts) through its influence on global equity market trends and investor sentiment. As a broad benchmark that includes a diverse range of stocks across different regions, the index reflects the overall health and performance of global equity markets. Positive movements in the MSCI index often signal strong equity market performance, which can enhance investor confidence and lead to increased capital inflows into REITs. This can result in higher valuations and improved performance for REITs, as they are perceived as attractive investment opportunities in a buoyant market. Conversely, declines in the MSCI index may indicate weaker market conditions, potentially leading to reduced investor confidence and capital flows into REITs. Additionally, the free-float weighting of the MSCI index ensures that the influence of individual large-cap stocks on the index is appropriately reflected, which can affect sector-specific performance and impact REITs differently based on their market focus and geographic exposure. Thus, the MSCI Free-Float Weighted Equity Index serves as a significant barometer of global equity trends that can affect the performance and attractiveness of REITs.

PS is political stability and the absence of violence/terrorism scores, and it can significantly influence REITs (Real Estate Investment Trusts) through their impact on investor confidence and market conditions. High scores in political stability and security are typically associated with a favorable investment climate, reducing risk premiums and attracting both domestic and international capital into REITs. Stable political environments are conducive to predictable economic policies, which can enhance property values, rental income, and overall performance of REITs. *FDI* is foreign direct investment and refers to direct investment equity flows in the reporting economy. It can significantly impact REITs (real estate investment trusts) through various economic and financial channels. High levels of *FDI* often signal a favorable investment climate and confidence in a country's economic stability, which can lead to increased demand for real estate assets. For REITs, this can translate into higher property values, increased rental income, and greater opportunities for expansion and development. *FDI* can also bring in additional capital for REITs, enhancing their financial flexibility and enabling them to undertake new projects or acquire more properties.

PI is the portfolio investment covering transactions in equity securities and debt, and it plays a crucial role in influencing the performance of REITs (Real Estate Investment Trusts). Investments in equity securities, such as stocks, can affect REITs through changes in investor sentiment and market conditions. Increased portfolio investment in

equities often signals investor confidence and a bullish market outlook, which can lead to higher valuations and enhanced performance for REITs as they attract more capital and enjoy improved financial conditions. On the other hand, portfolio investment in debt instruments, including bonds and other fixed-income securities, can influence REITs by affecting interest rates and borrowing costs. High levels of investment in debt can signal lower risk premiums and reduced borrowing costs, benefiting REITs by lowering their financing expenses and

potentially boosting their profitability. Conversely, shifts in portfolio investment away from these assets can lead to increased costs and financial pressures on REITs. Therefore, the dynamics of portfolio investment in equity and debt markets are critical in shaping the investment landscape and performance of REITs. PE is the portfolio equity, and it constitutes net inflows from equity securities other than those recorded as direct investment. COV is the COVID-19 dummy used to evaluate the impact of the pandemic REITs market (Table 1).

Table 1: Variables description

Variable	Description	Frequency of data	Units of measurement	Data source
$R_{it} - R_f$ Excess return	Difference between realized return and risk-free rate	Monthly	Percentage	Computed
$R_m - R_f$ Market premium	Difference between market return and risk free rate	Monthly	Percentage	Computed
SMB	Small Minus Big is the average return on the nine small stock portfolios minus the average return on the nine big stock portfolios	Monthly	Percentage	Kenneth-French data website
HML	High Minus Low is the average return on the two value portfolios minus the average return on the two growth portfolios	Monthly	Percentage	Kenneth-French data website
WML	Winners minus losers is the equal-weight average of the returns for the two winner portfolios for emerging markets minus the average of the returns for the two loser portfolios	Monthly	Percentage	Kenneth-French data website
MXE	The MSCI EM Currency Index sets the weights of each currency equal to the relevant country weight in the MSCI EM Index.	Monthly	Points	Bloomberg Terminal LP
BBU	The Bloomberg ex- Agriculture and Livestock index intends to be UCITS compliant and maintain continuity and proportion to BCOM component weights. Only one component can reach a maximum weight of 30% and those remaining cannot exceed 20%	Monthly	Points	Bloomberg Terminal LP
EMS	The Bloomberg Emerging Markets Hard Currency Aggregate Index is a flagship hard currency Emerging Markets debt benchmark that includes USD-denominated debt from sovereign, quasi-sovereign, and corporate EM issuers	Monthly	Points	Bloomberg Terminal LP
MXW	The MSCI ACWI Index is a free-float weighted equity index. MXWD includes both emerging and developed world markets	Monthly	Points	Bloomberg Terminal LP
PS	Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5	Annually	Score	World bank
FDI	Foreign direct investment refers to direct investment equity flows in the reporting economy. It is the sum of equity capital, reinvestment of earnings, and other capita	Annually	Dollars	World bank
PI	Portfolio investment covers transactions in equity securities and debt securities	Annually	Dollars	World bank
PE	Portfolio equity includes net inflows from equity securities other than those recorded as direct investment and including shares, stocks, depository receipts (American or global), and direct purchases of shares in local stock markets by foreign investors	Annually	Dollars	World bank
COV	COVID Period 2020/5-2021/5 =0 all other period before and after =1	Monthly	Binary dummy variable	computed

4. Results and analysis

We start our empirical analysis by explaining the basic statistical properties, such as means, ranges, and standard deviations of the selected variables (Table 2). It shows that the average excess return of the REITs remained -10%, which implies that over the sample period, REITs underperformed compared to risk-free returns. This underperformance

highlights the risks associated with REIT investments, as they could potentially result in long-term losses. This risk is further corroborated by the high standard deviation of 16.2% for excess returns, indicating significant volatility, and by the negative skewness, which suggests a tendency toward more extreme negative returns.

Moreover, PS and the MSCI Emerging Markets Currency Index (MXE) exhibit negative skewness,

underscoring the impact of exchange risk and geopolitical risk on the excess returns of REITs in emerging markets. Also, the average political stability score remained at -0.0559, indicating the lower political stability observed in emerging market countries over the sample period. The portfolio equity net inflow was negative, whereas portfolio investment showed a positive average. This suggests that larger flows into the emerging market portfolio

may occur because investors are more inclined to invest in the debt securities of emerging market countries, which typically offer higher interest rates than other countries. This phenomenon, often associated with "hot money" or opportunistic investments, can partially explain why excess returns are negative for these countries, as REITs are considered equity investments.

Table 2: Descriptive statistics

Variable	Observation	Mean	Standard deviation	Min	Max	Skewness
Market premium	2208	-.115	.142	-.505	.089	-0.92246
SMB	2208	-.001	.015	-.034	.035	-0.01371
HML	2208	.007	.024	-.069	.061	-0.17112
WML	2208	.009	.026	-.091	.07	-0.80117
PS	2208	-.551	.518	-2.007	.248	-0.52589
Excess return	2208	-.107	.167	-.851	1.042	-0.13517
FDI	2208	-7.803e+09	1.313e+10	-4.056e+10	2.354e+10	-0.64762
PI	2208	3.206e+09	1.747e+10	-2.660e+10	5.468e+10	0.921627
PE	2208	-1.345e+09	6.488e+09	-2.743e+10	1.032e+10	-1.85815
MXE	2208	1639.262	71.678	1437.13	1754.75	-0.58724
BBU	2208	247.532	47.47	166.633	379.187	0.863492
EMS	2208	1121.627	90.595	921.949	1295.025	0.284424
MXW	2208	558.184	103.383	371.66	754.83	0.190436
COVID19	2208	.865	.342	0	1	-2.13102

Fig. 1 presents the pairwise correlations between the selected variables and indicates a strong and positive correlation between excess returns and market premium, whereas Bloomberg commodity ex-agriculture and livestock capped total return index and COVID have a strong negative correlation with excess returns in the REITs market. This indicates that when the BBU index goes up, excess returns in the REITs market tend to decrease, and vice versa. Similarly, the COVID-19 pandemic has

had a significant negative impact on REIT excess returns. The pandemic brought about economic uncertainty, reduced consumer spending, and disrupted various sectors, including real estate. As a result, the performance of REITs suffered, leading to negative excess returns. The strong negative correlation indicates that as the impact of COVID-19 worsened, the excess returns of REITs declined correspondingly.

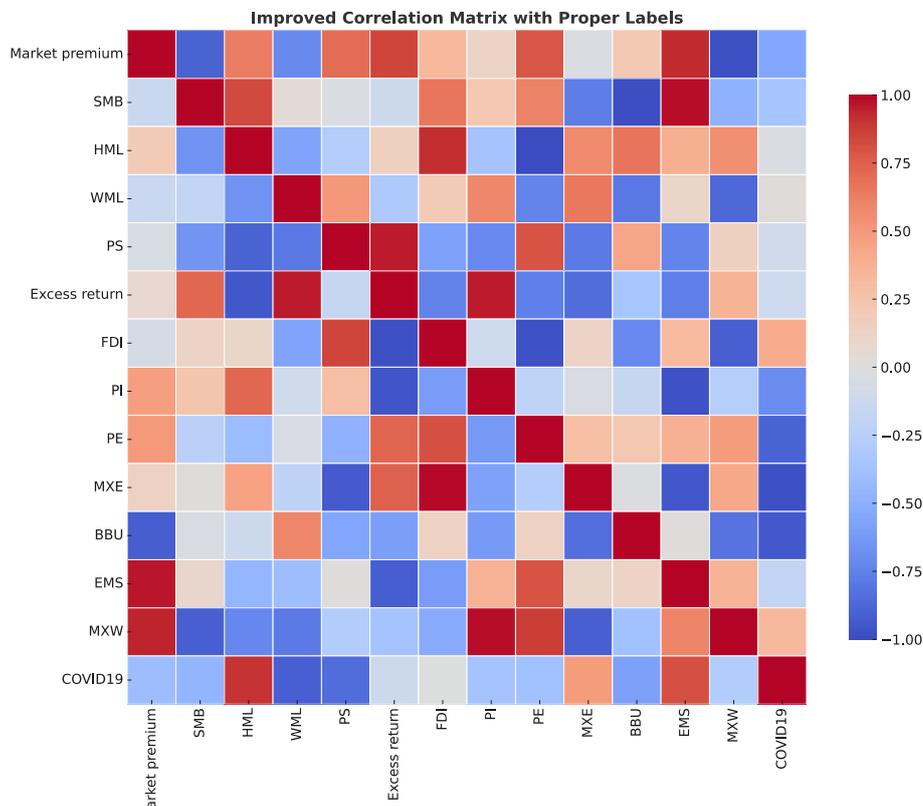


Fig. 1: Pairwise correlation (Pearson above, Spearman below diagonal)

4.1. Model estimation and analysis

To examine the role of selected factors in influencing excess returns in the REITs market, this research employs the system Generalized Method of Moments (GMM) methodology suggested by [Blundell and Bond \(1998\)](#). This approach specifies the dynamic model as follows:

$$z_{it} = \delta z_{it-1} + X'_{it}\beta + \vartheta_i + \varepsilon_{it} \quad \varepsilon_{it} \sim N(0, \sigma_\varepsilon^2) \quad (3)$$

where, z_{it} is the excess returns in the REITs market, and X is a set of independent variables, ϑ_i is the fixed effect, and ε_{it} is the random error. [Blundell and Bond \(1998\)](#) suggested that in the dynamic panel data, the system GMM estimator is more efficient than the first-difference GMM estimator.

[Table 3](#) presents three different specifications of Eq. 3 and shows that the value premium (HML) has a positive and statistically significant impact on excess returns across all the specifications. This finding suggests that value portfolios have positively contributed to the portfolio's excess returns. The value premium represents the additional return investors earn from holding growth REIT companies compared to value REIT companies. Growth REIT companies are generally perceived as riskier but offer higher potential future returns than value REIT companies, which can explain why investors are willing to pay a premium to hold these growth REITs.

Moreover, the estimates in [Table 3](#) show a positive and statistically significant impact of PI on the excess returns in REITs markets. This suggests that higher investment inflows into portfolios containing REITs contribute positively to their performance, likely by driving up demand and prices for these real estate assets, thereby enhancing their returns relative to the risk-free rate. Similarly, the findings given in [Table 3](#) present a negative and statistically significant impact of portfolio equity investment on the excess returns in the REITs market. PE constitutes investment transactions in equity, excluding direct investments recorded by FDI. The negative relationship between PE and the excess return of REITs indicates that higher portfolio equity net inflows are associated with lower excess returns for REITs. This might be because other classes of equity investments are seen as competitors to REITs, leading to a reallocation of investments from REITs to other equity classes. This is consistent with the regression results for the MSCI World (MXW) index, which measures equity performance and negatively affects REIT excess returns. Additionally, the positive PI coefficient and the negative PE coefficient suggest that the increase in PI may stem from debt securities inflows, as PI includes both debt and equity securities.

Also, the dynamic panel data estimation findings given in [Table 3](#) indicate that the BBU has a positive and statistically significant impact on the excess returns in the REITs market of emerging economies. This relationship can be attributed to many

emerging market countries being major commodity exporters. For example, Mexico is one of the largest oil exporters, and South Africa is a leading exporter of precious metals like gold. When commodity prices rise, these countries benefit from increased export revenues, which can boost their economic growth. Higher commodity prices often signal stronger global economic growth, supporting economic expansion in emerging markets. This economic growth can enhance the performance of REITs in these regions, leading to higher excess returns.

The estimates in [Table 3](#) also reveal a negative and statistically significant non-linear relationship between the market premium and excess returns across all the specifications. This indicates that as the market premium increases, the excess returns initially rise but eventually decline after reaching a certain point. This non-linear relationship suggests that the benefit of higher market premiums diminishes at higher levels, potentially due to increased risk or other market dynamics.

Moreover, current research finds a negative and statistically significant impact of the momentum premium (WML) on the excess returns of REITs. This indicates that REITs with high past returns tend to underperform in the future compared to those with low past returns. This negative impact suggests that momentum strategies, which typically favor assets with strong past performance, may not be effective for REIT investments and could lead to lower excess returns. These findings are consistent with [He and Neo \(2021\)](#). However, their study suggests a statistically insignificant relationship between the REITs market's momentum premium (WML) and excess returns.

In contrast, the current study finds a negative and statistically significant impact of the MSCI ACWI Index (MXW) on the excess returns in the REITs market. This indicates that when the global equity market, as measured by the MSCI All Country World Index (ACWI), performs well, REITs tend to experience higher excess returns. The MSCI ACWI Index tracks the performance of both emerging and developed market equities. Equities can be viewed as competing investments to REITs, which may explain the negative relationship between REITs' excess returns and the equity market. When the equity market rises, it attracts more investors, prompting a reallocation of funds from REITs to equities. This shift in investment can lead to a decrease in REIT prices, thereby causing REIT returns to be negatively correlated with equity market performance.

Furthermore, this study finds a positive and statistically significant impact of the Bloomberg emerging markets hard currency aggregate debt index (EMS) on the excess returns in the REITs market of emerging economies, indicating the favorable impact of leverage or credit availability on REIT performance. Real estate is one of the most leveraged alternative asset classes, often relying heavily on borrowing. Higher debt or credit availability enables more investments in real estate,

thereby increasing demand for REITs. This increased demand can drive up the prices and excess returns of REITs. In essence, when credit is more accessible, investors can finance more real estate acquisitions and developments, which boosts the overall performance and returns of REITs.

Similarly, our findings suggest a positive and statistically significant impact of foreign direct investment on the excess returns in the REITs market of emerging economies. This implies that FDI may inject capital to boost overall growth and potentially increase demand for real estate, which benefits REITs. Finally, the estimates in Table 3 suggest a positive and statistically significant impact of lagged excess returns (one month) on the current value of excess returns, indicating a strong momentum effect, where strong historical performance in REITs (positive excess returns) might lead to continued positive excess returns soon. This could be due to investor sentiment or short-term trends. Investors who witnessed past success might be more likely to invest in REITs again, pushing prices and potentially higher returns.

Moreover, our estimates reveal a negative relationship between political stability and excess returns in the REITs market of emerging economies. This indicates that higher political stability is associated with lower excess returns for REITs in emerging markets. The negative relationship suggests that political stability might lead to lower perceived risk in the market, which could reduce the potential returns investors expect from REIT investments. Additionally, political stability may attract investments to other sectors or asset classes perceived as less risky, reducing demand for REITs and, consequently, lowering excess returns.

To ensure the robustness of our estimates, we also employed the Generalized Least Squares (GLS) approach, which is recognized for its efficiency in producing reliable parameter estimates, especially in the presence of heteroscedasticity or correlated errors. By applying GLS, we aimed to verify the stability and reliability of our results. The key findings from the GLS analysis remained consistent with our original results from the GMM (System) approach, confirming that our estimates are robust and not sensitive to the choice of estimation method (Table 4). This consistency across different methodologies enhances the credibility of our conclusions.

5. Conclusion

This study investigates the relevance of the Fama–French 3-factor model for a sample of 23 REIT companies from five selected emerging economies, using monthly data spanning from January 2016 to December 2023. Current research employs 12 explanatory variables: market premium, value premium, size premium, momentum premium, MSCI emerging markets currency index, Bloomberg commodity ex-agriculture, EM USD aggregate, and MSCI ACWI Index.

Table 3: Dynamic panel data model – GMM (system) estimation

	(1)	(2)	(3)
	ER	ER	ER
ER(-1)	.065*** (.015)	.066*** (.014)	.065*** (.014)
SMB	.04 (.142)	.041 (.141)	
HML	.351*** (.09)	.351*** (.09)	.356*** (.089)
FDI	0.02*** (0)	0.03*** (0)	0.041*** (0)
PI	0.01*** (0)	0.014*** (0)	0.032*** (0)
PE	-0.01* (0)	-0.02* (0)	-0.04* (0)
BBU	0.02*** (0)	0.03*** (0)	0.05*** (0)
EMS	0.3** (0)	0.4** (0)	0.51** (0)
COVID19	0 (.008)		
Market premium	.771*** (.058)	.772*** (.058)	.772*** (.057)
Market premium SQR	-1.434*** (.365)	-1.434*** (.364)	-1.445*** (.362)
Market premium CUB	-2.562*** (.557)	-2.562*** (.557)	-2.59*** (.555)
WML	-.267*** (.077)	-.267*** (.076)	-.264*** (.075)
PS	-.016*** (.005)	-.017*** (.005)	-.016*** (.005)
MXE	0.01 (0)	0.002* (0.001)	0.001 (0.01)
MXW	-0.02*** (0)	-0.03*** (0)	-0.05*** (0)
_cons	.026 (.099)	.026 (.099)	.034 (.098)
Observations	2185	2185	2185
Adj R ²	0.789	0.782	0.778

Standard errors are in parentheses; ***, P<.01; **, P<.05; *, P<.1; SQR: Square; CUB: Cube; _cons: Constant term

Table 4: GLS estimation

	(1)	(2)	(3)
	ER	ER	ER
SMB	.082 (.15)		
HML	.339*** (.099)	.35*** (.097)	.348*** (.097)
WML	-.253*** (.084)	-.245*** (.083)	-.245*** (.083)
PS	-.017*** (.005)	-.018*** (.005)	-.017*** (.005)
FDI	0.01*** (0)	0.02*** (0)	0.03*** (0)
PI	0.02*** (0)	0.02*** (0)	0.03*** (0)
PE	-0.01* (0)	-0.02* (0)	-0.03* (0)
MXE	0** (0)	0** (0)	0** (0)
BBU	0*** (0)	0*** (0)	0*** (0)
EMS	0*** (0)	0*** (0)	0*** (0)
MXW	0** (0)	0** (0)	0** (0)
COVID19	-.008 (.008)	-.008 (.008)	
Market premium	.808*** (.062)	.814*** (.061)	.815*** (.061)
Market premium SQR	-1.296*** (.383)	-1.272*** (.38)	-1.259*** (.38)
Market premium CUB	-2.222*** (.594)	-2.202*** (.593)	-2.183*** (.592)
_cons	.04 (.094)	.034 (.094)	.032 (.094)
Observations	2208	2208	2208
Pseudo R ²	0.788	0.781	0.77

Standard errors are in parentheses; ***, P<.01; **, P<.05; *, P<.1; SQR: Square; CUB: Cube; _cons: Constant term

In addition, current research employs control variables such as political stability index and foreign direct investment, portfolio investment, and portfolio equity investment. While using the GMM (system) approach, this research finds the positive and statistically significant impacts of the historical excess returns, value premium, foreign direct investment, portfolio investment, Bloomberg ex-Agriculture and Livestock index (BBU), and Bloomberg emerging markets hard currency aggregate debt index (EMS) on the excess returns of REITs market in the emerging economies. Conversely, our estimates reveal a negative and statistically significant impact of momentum premium (WML) and political stability on the excess returns in the REITs market of emerging economies.

These findings yield some important policy insights for the REITs market in emerging economies. This research shows that the significant positive influence of the value premium (HML) on excess returns suggests that value-oriented REIT investments are particularly beneficial. Policies promoting value investing, such as tax incentives, should be considered as these measures can contribute to a more stable and profitable REIT market, since value investments typically offer lower volatility and more consistent returns.

Foreign Direct Investment (FDI) is crucial in boosting the REITs market, evidenced by its positive impact on excess returns. Governments should focus on creating an attractive environment for FDI by simplifying regulatory processes and offering incentives to foreign investors. Such initiatives can increase foreign capital inflow, enhance market liquidity, and stimulate growth in the real estate sector, which in turn can positively impact the REITs market. Similarly, portfolio investment inflows positively influence excess returns in the REITs market. Policymakers should facilitate and incentivize portfolio investments through favorable regulations and investment schemes.

The positive relationship between the BBU and REITs excess returns suggests that higher commodity prices benefit the real estate market. Emerging economies, many of which are major commodity exporters, should leverage this relationship by integrating commodity and real estate investment strategies. Policies that connect commodity revenues with real estate investments can optimize returns and drive economic growth. Credit availability, as indicated by the positive impact of the Bloomberg emerging markets hard currency aggregate debt index (EMS), is another critical factor. Financial regulators should ensure robust credit availability for real estate investments by maintaining healthy credit markets and supporting real estate financing. Enhanced access to credit can stimulate REIT investments, driving market growth and stability and ensuring the sector remains attractive to investors.

Conversely, the negative impact of the momentum premium (WML) suggests that momentum investing strategies may not be

beneficial for REIT returns in emerging markets. Investors and policymakers should exercise caution when investing in momentum and implement measures to manage associated risks. Promoting awareness and risk management strategies can protect investors from potential losses and contribute to a more stable investment environment. Lastly, the negative relationship between political stability and excess returns indicates a nuanced impact of political conditions on the REITs market. While political stability reduces investment risk, it may also lower potential returns. Therefore, governments should aim to enhance political stability to create a predictable and secure investment environment while balancing this stability with policies that encourage higher returns. Such a balanced approach can attract investment and foster a dynamic and resilient REITs market. By implementing these policy insights, emerging economies can create a more favorable environment for REIT investments, potentially leading to enhanced market performance and broader economic growth.

Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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