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Assessing the extent of exchange rate risk pricing in equity markets: emerging versus developed economies

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Abstract

Purpose – This paper contributes to the literature on exchange rate exposure by assessing the extent to which exchange rate risk is priced in both African emerging and developed equity markets. It examines whether this risk leads to a premium or discount in market returns. The study uses the United States and South Africa as representatives for developed and emerging economies, respectively.

Design/methodology/approach – The paper employs two-factor and three-factor conditional CAPM approaches with a two-stage estimation process. In the first stage, time-varying risk exposures are derived using the ICAPM model estimated through rolling regression. In the second stage, the impact of these risk exposures, particularly exchange rate risk exposure, is assessed on stock market returns using Generalized Linear Model (GLM) regression.

Findings – Unlike previous studies that suggest exchange rate risk is not necessarily priced in the equity market due to hedging, this paper finds that exchange rate risk is indeed priced in both African and developed equity markets, albeit to different extents. The African equity market demands a higher premium compared to the developed equity market.

Practical implications – The findings of this paper have significant implications for policymakers, asset managers, and investors. They provide insights for making more informed decisions, implementing effective risk management strategies, and fostering a more stable and appealing investment environment.

Originality/value – To the best of our knowledge, this is the first study to evaluate the degree of exchange rate exposure in environments characterized by high currency volatility versus those with low volatility, all within the context of the conditional ICAPM model.

Keywords Exchange-rate exposure, Pricing, Premia, Arbitrage pricing theory, Rolling window, Emerging and developed economies

Paper type Research paper

1. Introduction

With the increasing interconnectedness of global economies, facilitated by advancements in technology and trade liberalization, the exposure to exchange rate risk—also known as currency risk—has become an inescapable reality for investors and businesses. This risk arises primarily from fluctuations in exchange rates and can significantly impact the returns on investments, not only for businesses operating in international markets but also for domestic businesses affected by the global integration of markets.

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Currency risk becomes particularly relevant in the context of equity markets, where it can substantially affect the valuation of international investments and the profitability of multinational corporations. In today's globalized economy, where companies often source materials from abroad and sell products in multiple countries, changes in exchange rates can quickly translate into variations in cost structures and revenue, thereby impacting overall profitability (Priestley and Ødegaard, 2004; Mahapatra and Bhaduri, 2019).

A number of studies have sought to assess how movements in currency rates influence stock prices and to what extent the risk associated with changes in exchange rates is reflected or priced into the stock market (Pierdzioch and Kizys, 2010; Jacque, 2013; Van Cauwenberge *et al.*, 2021; Fuchs, 2022) have contributed to a deeper understanding of these dynamics. A study by He *et al.* (2021) examines the foreign exchange rate exposure and its determinants on the Chinese stock market. It is found that international operations play a negligible part in explaining exposures, because larger firms or firms with lower leverage ratios tend to have smaller exposures. Bailey and Bhaopichitr (2004) highlight the relevance of currency structures and exchange rate regimes in noting the presence of exchange risk premia within equity markets. Jiménez-Martín and Cinca (2010) show that changes in private agents' opinion of risk and macroeconomic uncertainty produce exchange rate risk pricing within the Eurozone for a sample period of 1986–1998, concluding that currency risk premia exists in European markets in this regard.

According to classical portfolio theory, exchange rate risk is assumed unsystematic in well-developed capital markets. Thus, it can be hedged against. This reality explains why exchange rate risk would not be priced within these markets (Stålstedt, 2006; Korsgaard, 2009; Mahapatra and Bhaduri, 2019; He *et al.*, 2021). Empirical findings in the seminal work of Jorion (1990) agree with this notion as the author concludes that although a relationship between the value of domestic (US) currency and stock returns can be established, currency risk does not appear to be significantly priced with the US stock market over the given period of his study. Further still, Kodongo and Ojah (2011) extend to the African case and equally find insufficient evidence to conclude that unconditional pricing is present among the biggest markets on the continent. However, drawing from the Arbitrage Pricing theory presented by Ross (1976), currency risk can instead be described as one of several factors that contribute to overall market risk, constituting a systematic element that investors would willingly pay a premium to avoid particularly when taking internationally diversified portfolios into account (Al-Shboul and Anwar, 2014; Mahapatra and Bhaduri, 2019). As such, contrary to classical portfolio theory, this implies that currency risk should indeed be priced by the market as a "*reward*" for accepting this type of risk (Mahapatra and Bhaduri, 2019).

A number of studies provide empirical evidence in this regard and find that currency risk is priced within various international markets from both developed and emerging economies (Al-Shboul and Anwar, 2014; Mahapatra and Bhaduri, 2019). Mahapatra and Bhaduri (2019), for instance, note growing currency risk premium expectations among Indian investors particularly in the post-crisis interval of their sample (2012–2016). In principal, although there exists strong evidence in support of exchange rate risk pricing in both developed and emerging market economies, much of the literature on the subject is mixed and urges continuing research in the area in order to gain greater insight on the presence as well as variation of exchange rate risk premia across different economies.

Many studies predominantly focus on the US market and other developed and emerging nations. However, there is a noticeable gap in research specifically addressing African emerging markets, particularly in terms of comparing the extent exchange rate risk exposure of African and developed equity markets. This paper aims to address this gap by enhancing the existing literature on exchange rate exposure. Thus, the contribution of this paper is twofold. Firstly, it compares the extent of currency risk pricing in African equity markets to that in developed equity markets, using the United States and South Africa as proxies for

developed and African equity markets, respectively. Secondly, this paper employs the conditional two-factor and three-factor International Capital Asset Pricing Model (ICAPM) to empirically measure how exchange rate risk is priced in these equity markets. Specifically, the methodology involves a two-stage procedure. In the first stage, time-varying parameters related to different risk premiums are estimated using a rolling window regression technique. In the second stage, the effects of these risk premiums on equity returns are analysed based on generalised linear model (GLM). It is within this framework that the paper assesses the impact of exposure to various currency risks on equity returns, providing new insights into the dynamics of exchange rate risk in different market contexts.

The volatility inherent in the South African currency, the Rand (ZAR), is well-documented. In the past, the Rand has experienced significant fluctuations due to many factors: economic fundamentals, global influences, commodity price shifts, monetary policies, political uncertainty, and capital flow dynamics (see Kappler *et al.*, 2013; Kulikova and Taylor, 2013). It is therefore vital to compare the extent of exchange rate exposure in such a volatile environment with that in an environment featuring a stable currency. South Africa is regarded as a prime case study for examining the stock market dynamics of African countries, primarily because it hosts the most robust stock market on the continent. Ranked as number one in Africa, the Johannesburg Stock Exchange (JSE) showcases a mature financial market environment that is not commonly found elsewhere in the region. This prominence is due to its sophisticated infrastructure, a wide variety of listed companies, and its capacity to attract both local and international investors.

The reminder of this paper is therefore organized as follows; Section 2 presents the literature review, section 3 provides the methodology, section 4 puts forth the data, estimation, results and discussion of findings and section 5 concludes the paper.

2. Literature review

Numerous studies have been conducted to evaluate the impact of exchange rate fluctuations on stock market returns. These studies aim to understand both the general effects of changes in exchange rates on overall stock market performance and the specific effects of exchange rate risk exposure on individual stock returns.

On the issue of the change in exchange rate on stock market returns, Bhargava and Konku (2023) explore the relationship between fluctuations in major currencies and US stock market returns, represented by the S&P 500. Employing VAR/VECM analysis and various GARCH models, the authors detect volatility spillovers from currency markets to the S&P 500 volatility, indicating significant cross-market influences. Salisu *et al.* (2021) develop a predictive model linking exchange rate movements to stock return differentials between domestic and foreign (US) markets, based on the uncovered equity parity (UEP). Their findings show a positive correlation between stock return differentials and exchange rate returns for Brazil, India, and South Africa, supporting the UEP hypothesis. However, they report contrasting results for China and Russia. They also suggest that incorporating asymmetry in their models could enhance forecast accuracy for stock return differentials related to exchange rates. El-Masry and Badr (2021) examine the causal relationships between stock market performance and the foreign exchange market in Egypt from 2009 to 2016. Their study identifies a significant causal relationship between these markets and market capitalization before the January 25th Egyptian revolution. Post-revolution, these causal links appear to dissipate. Okere *et al.* (2021) assess the linear and nonlinear impacts of Nigeria's oil prices and exchange rates on stock market performance from January 1995 to December 2019 using the nonlinear autoregressive distributed lag (NARDL) model. Their linear analysis shows a long-term positive correlation between the Nigerian stock market and crude oil prices, with a significant positive relationship in the short term for exchange rates.

The nonlinear analysis further reveals that positive shocks in crude oil prices significantly boost stock market performance, while negative shocks also tend to increase market performance.

Focusing on the impact of exchange rate risk on stock market returns, Qureshi *et al.* (2022) examine the relationship between exchange rate risk and sectoral stock returns in Pakistan from 1992 to 2017, utilizing high-frequency data and the Wavelet-multi-resolution-extended dynamic conditional correlation GARCH (MRA-EDCC GARCH) model. Their findings indicate that the transmission of exchange rate risk to sectoral stock returns is scale-dependent, with the prevalence of mean and volatility spillovers varying across different scales. Notably, these risk transmissions are more pronounced in the short term. The study also highlights greater evidence of exchange rate volatility impacting sectoral returns, though there are only a few instances where sectoral returns influence exchange rates. Karolyi and Wu (2022) delve into the economic mechanisms by which exchange rate fluctuations influence international stock returns. Their analysis centres on two specific currency risk factors: a dollar-risk factor and a carry-trade-risk factor. Using a dataset encompassing 47,000 stocks from 46 countries over four decades, they discover that currency risk is more frequently priced in firms that produce tradeable goods, particularly during periods of increased exchange rate volatility. Their conclusions remain robust across various benchmarks for firm internationalization, chosen factor models, and the sub-periods analysed. This research underscores the nuanced ways that exchange rate dynamics can affect global stock markets, especially in trade-related sectors during volatile times.

Studies on the pricing of currency risk in African stock markets is relatively scarce, potentially due to the underdeveloped nature of these markets. Korley and Giouvris (2021) utilise a Markov-switching Vector Auto Regressive (VAR) model to explore the relationship between foreign exchange and frontier stock markets under two different volatility regimes: low and high. The authors discover that frontier stock markets yield positive returns in high-volatility regimes and note that these regimes are less persistent than low-volatility ones. Their findings suggest that a stock-oriented model predominates in Sub-Saharan African (SSA) countries. However, they also note that, regardless of the regime, there is no relationship between the stock and FX markets in Côte d'Ivoire. Kodongo and Ojah (2011) simultaneously investigate the occurrence of unconditional currency risk pricing and equity market segmentation in Africa's major stock markets using multi-factor asset pricing theory. Their research uncovers strong evidence of partial market segmentation but does not find sufficient evidence to reject the hypothesis that foreign exchange risk is unconditionally priced in these markets.

Our paper aims to bridge the existing literature gap by comparing the extent of currency risk pricing in US and African stock markets, with a specific focus on the South African stock market. We employ a two-stage conditional ICAPM model. In the first stage, we derive the exchange rate risk exposure using the ICAPM model estimated through rolling regression. In the second stage, we assess the impact of this exposure on stock market returns using Generalised Linear Model (GLM) regression. This approach provides a nuanced understanding of how currency risk is priced in contrasting economic environments, enhancing our comprehension of risk dynamics in African and developed equity markets alike.

3. Methodology

This paper applies the conditional ICAPM approach to assess whether or not exchange rate risk pricing exists within the US and South African equity markets. Conditional ICAPM extends the traditional ICAPM by allowing the parameters (risk premiums) to vary over time

based on available information and changes in the economic environment. It is in that context that in the first stage of our estimation, the following two- and three-factor ICAPM are employed, respectively:

$$R_t = \alpha_{0t} + \alpha_{1t}R_{GMt} + \alpha_{3t}R_{EXt} + \epsilon_t \quad (1)$$

$$R_t = \alpha_{0t} + \alpha_{1t}R_{GMt} + \alpha_{2t}R_{VIXt} + \alpha_{3t}R_{EXt} + \epsilon_t \quad (2)$$

Where R_{it} represents the excess return [1] on local stock market (South Africa and US stock markets, respectively), R_{GMt} represents the excess return on a portfolio representing the global equity market, R_{EXt} is the return on the change in exchange rate (in this case the nominal exchange rate for each respective country), R_{VIXt} represents the change in the global volatility index (VIX), and ϵ_t is the two-factor model error term. All the coefficients, representing the different risk premiums, are time varying. α_{1t} represents the trend of Beta or systematic risk, α_{2t} represents the risk related to VIX and α_{3t} denotes exchange rate exposure or risk. It can be inferred through the ICAPM equation that the expected return is exactly equal to the risk free rate captured by a constant α_{0t} in the absence of risks (Jorion, 1991; Korajczyk, 1999; Korsgaard, 2009; Mangram, 2013).

The rolling regression approach is applied on both Equations (1) and (2) to obtain the parameters representing the different risk premiums. In the second stage, the problem of risk pricing is addressed using the results from equations (1) and (2). This analysis is conducted through equations (3) and (4), as detailed below.

$$\alpha_{0t} = \delta_0 + \delta_1\alpha_{1t} + \delta_3\alpha_{3t} + \xi_t \quad (3)$$

$$\alpha_{0t} = \delta_0 + \delta_1\alpha_{1t} + \delta_2\alpha_{2t} + \delta_3\alpha_{3t} + \varsigma_t \quad (4)$$

In Equation (4), as previously mentioned, α_{0t} is the output of the rolling window for the constants from Equation (2), representing the expected return when all risk factors are absent. α_{1t} is the rolling coefficient that indicates exposure to the global market, while α_{2t} denotes the coefficient for exposure to global volatility. α_{3t} quantifies the exposure to exchange rate risk. ξ_t is the error term in the equation.

It should be noted that the variables employed in Equations (3) and (4) consist of estimated parameters derived from an OLS rolling window regression of Equations (2) and (3), respectively. In this context, Equations (3) and (4) are considered the conditional versions of the International CAPM (ICAPM), incorporating various time-varying risk factors as regressors. These equations are estimated using the generalised linear model (GLM) approach, which is employed to address potential non-normality in the dataset (see. Fealy and Sweeney, 2007; Fox, 2003).

4. Estimation and results

4.1 Data

The paper utilizes monthly stock price data from the South African stock market (JSE) and the US stock market (S&P 500), which are sourced from Yahoo! Finance. The nominal exchange rate data for the South African rand/US dollar is obtained from the Reserve Bank of South Africa's official ResBank database, while the US exchange rate data (US dollar index) is sourced from the Federal Reserve Bank of St. Louis (FRED) database. Additionally, global equity market data (MSCI World) and the global volatility index (VIX) are acquired from Reuters DataStream. The sample period encompasses monthly data from November 2004 to February 2024, a range determined by the availability of the data.

The stock price data is converted into returns using the following calculation before any estimations are carried out.

$$R_t = \left[\ln\left(\frac{p_t}{p_{t-1}}\right)\right] \times 100$$

R_t represents the return at time t, p_t the price at time t and p_{t-1} the previous price at time.

Table 1 presents the descriptive statistics along with the results of the unit root tests conducted using the Augmented Dickey-Fuller method. As shown in Table 1, the average return of the South African equity market (R_{sat}) exceeds that of the US stock market (R_{USt}). However, the standard deviation (SD) of the JSE is also higher than that of the S&P 500. These findings support the well-known trend that emerging markets, like South Africa, tend to offer higher returns than developed markets, but at the cost of increased risk. Additionally, the Jarque-Bera (JB) test rejects the null hypothesis of normality for many returns, indicating the skewness in the data. Furthermore, both the return and volatility of the rand/dollar exchange rate (R_{ExcSAt}) surpass those of the US dollar index (R_{ExcUSt}), underscoring the heightened returns and risks associated with emerging market assets.

4.2 Estimation

As previously mentioned, we estimate Equations (1) and (2) using a one-step rolling window OLS regression with a fixed window size of 57. This rolling window approach yields dynamic estimates, allowing us to plot them over time. For example, Figure 1 illustrates the trend of the estimated α_{3t}, the exchange rate risk exposure, for both South Africa and the US.

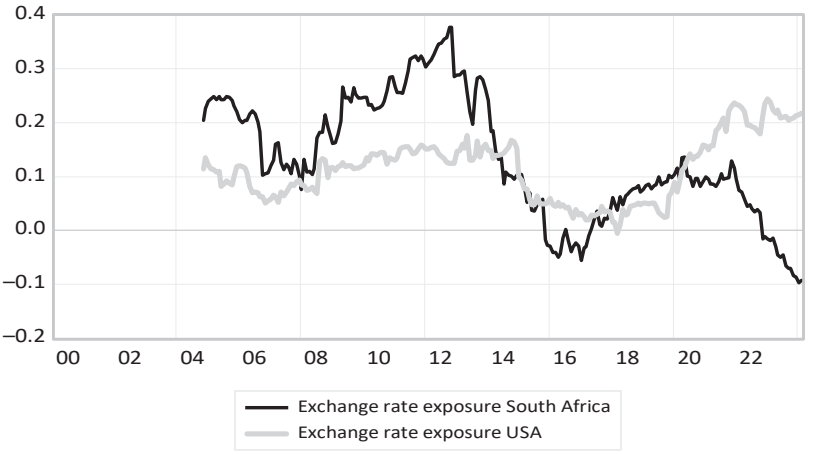
Figure 1 illustrates that, until the year 2020, the South African stock market (JSE) demonstrated a higher exposure to local currency risk compared to that of the US stock market. However, this trend reversed with the onset of the COVID-19 pandemic, which, as highlighted in studies by Sharif *et al.* (2020), Shaik *et al.* (2023), and Ha (2024), intensified geopolitical risks affecting currency markets. Additionally, the current geopolitical environment, characterized by conflicts such as the Ukraine war and the Israel-Palestine conflict, has increased global risk, thereby elevating the exchange rate risk exposure of the US stock market.

The US stock market appears to be more vulnerable to these risks compared to South Africa, likely due to its more prominent role and integration in the global market. However, there has been a noticeable downtrend in the exposure of the South African stock market to currency risk. This trend might reflect a 'decoupling' phenomenon observed in many emerging markets, as discussed by Omoshoro-Jones and Bonga-Bonga (2020). This decoupling suggests that these markets are becoming less synchronized with global risks, potentially due to shifts in local economic policies or changes in global market dynamics. Such a shift could represent a strategic divergence in how emerging markets like South Africa are responding to global economic stresses, positioning themselves to better manage the direct impacts from international financial volatilities.

Variables	Mean	S.D.	ADF	JB
R_{sat}	0.75	4.75	17.57***	5.184*
R_{USt}	0.45	4.48	16.44***	35.25***
R_{GMt}	0.37	4.57	15.69***	62.35***
R_{ExcSAt}	0.39	4.7	17.54***	130.72***
R_{ExcUSt}	0.0086	2.32	16.74***	9.04**
R_{VIXt}	0.53	3.43	17.89***	127.73***

Note(s): ***, *** and * denote rejection of the null hypothesis at 1%, 5% and 10% levels, respectively of the null hypothesis of unit root for ADF test and normality for Jarque-Bera (JB) test
Source(s): Authors own creation

Table 1. Descriptive statistics and unit root tests

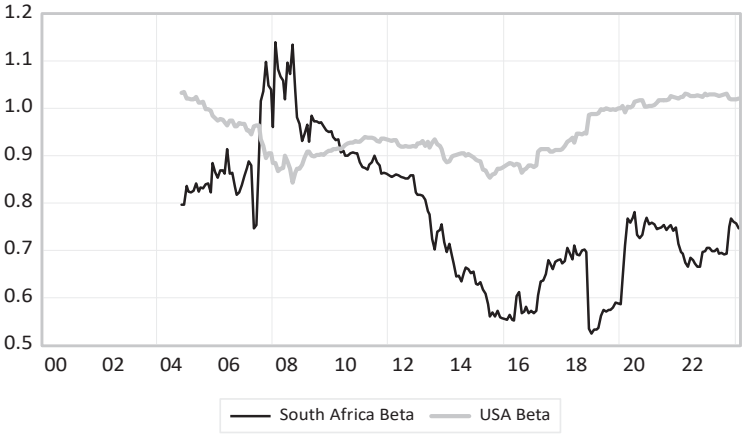


Source(s): Authors' own creation

Figure 1.
Exchange rate risk exposures of South Africa and the US

Figure 2 displays the trend of the estimated α_{1t} in Equation (2), which represents the market beta, or the systematic risk exposure, of both the South African and US stock markets to the global stock market.

Figure 2 indicates that the systemic risk in the US stock market hovers around unity, confirming a strong correlation with the global stock market. Conversely, the systematic risk of the South African stock market surged above unity during the 2008 global financial crisis, suggesting a heightened risk premium for emerging markets during such periods. Studies, including those by Köksal and Orhan (2013) and Ameur *et al.* (2013), suggest that during times of global financial instability, investors perceive emerging markets as riskier. This perception is often due to their reliance on external capital flows, commodity exports, and currency fluctuations. As a result, risk aversion increases, prompting capital to flow out of these markets and subsequently amplifying their systematic risk (Gajurel and Dungey, 2023; Junior and Alagidede, 2020).



Source(s): Authors' own creation

Figure 2.
Systematic risks (Beta) for the South African and US stock markets

Next, after deriving the various time-varying risk parameters, Equations (3) and (4) are estimated using the conditional ICAPM. This analysis primarily focuses on assessing how exchange rate risk exposures impact stock returns in South Africa and the US. The GLM estimation is chosen to deal with possible non-normality in the data [2]. Tables 2 and 3 present the results for the two- and three-factors ICAPM, respectively.

Before discussing the results presented in Tables 2 and 3, it is crucial to assess whether the three-factor estimated equation encompasses the two-factor one. To this end, we apply the Wald test to examine whether the coefficient of the change in VIX, δ_2, is zero in Equation (4). The results of the test show that the null hypothesis of $\delta_2 = 0$ is rejected for the three-factor estimation in both South Africa and the US. This finding is corroborated by the likelihood ratio (LR) statistic, which rejects the null hypothesis of a simpler model. Therefore, our discussion will primarily focus on the results presented in Table 3.

Focusing on coefficient δ_3, which illustrates how stock market returns respond to changes in exchange rate risk exposure, the results in Table 3 indicate that the South African stock market demands a higher risk premium for exchange rate exposure compared to the US stock market. Overall, the data presented in the tables indicate that exchange rate risk pricing is evident in both the US and South African markets. This finding aligns with the conclusions of various other studies on developed and emerging economies, particularly when considering the time-varying nature of pricing [3]. However, these results contradict those of Kodongo and Ojah (2011), who found insufficient evidence to support the presence of unconditional pricing of exchange rate risk exposure among the major stock markets in Africa. The discrepancy between the findings of Kodongo and Ojah (2011) and our study may stem from differences in methodology. While Kodongo and Ojah employed an unconditional ICAPM, our research utilizes a conditional ICAPM model. The conditional ICAPM model has the advantage of a two-step estimation process: initially, the exchange rate risk exposure is derived, and subsequently, the model is estimated incorporating this exposure. This approach more accurately reflects how the inherent risks associated with exchange rate fluctuations impact stock market returns.

Several factors may explain why the South African stock market requires a higher premium from exchange rate risk exposure compared to the US stock market. Firstly, South Africa's exchange rate tends to be more volatile than that of the US, influenced by factors such as political instability, economic diversification that is relatively lower, and a heavy

	δ_0	δ_1	δ_3	LR statistic
South Africa	−0.697***	1.14***	1.002***	87.12***
USA	−0.787***	1.41***	0.324***	84.60***

Table 2. Two-factor model GLM estimation

Note(s): **** denotes the rejection of the null hypothesis at 1% level. The likelihood ratio (LR) statistic rejects the null hypothesis of a simple model in favour of this model, as in Equation (3)
Source(s): Authors own creation

	δ_0	δ_1	δ_2	δ_3	LR statistic
South Africa	−0.509***	1.034***	0.35***	1.460***	93.74***
USA	−0.779***	1.675***	0.736***	0.848***	122.22***

Table 3. Three-factor model GLM estimation

Note(s): **** denotes the rejection of the null hypothesis at 1% level. The likelihood ratio (LR) statistic rejects the null hypothesis of a simple model in favour of this model, as in Equation (4)
Source(s): Authors own creation

reliance on commodity exports. This heightened volatility increases the perceived risk for investors, who then require a higher premium to compensate for potential losses. Secondly, South Africa has encountered more frequent political and economic disruptions compared to the US. Issues like political uncertainty, corruption, and economic mismanagement contribute to increased exchange rate risks, prompting investors to seek higher premiums as compensation. Thirdly, inflation rates in South Africa are often higher than in the US. Elevated inflation can diminish the real value of the currency and lead to further exchange rate instability, thus increasing investment risk. Lastly, developing markets such as South Africa sometimes impose more restrictions on capital flows compared to developed markets like the US. These restrictions can limit investors' ability to effectively hedge against currency risk, leading them to demand higher risk premiums to offset these additional risks.

The finding that the South African stock market requires a higher premium for exchange rate risk exposure compared to the US market can significantly aid investors, policymakers, and asset managers in making more informed decisions, implementing effective risk management strategies, and fostering a more stable and appealing investment environment. For investors, this insight allows for a more accurate assessment of the risks associated with investing in South African equities. Understanding the need for a higher risk premium can inform strategies on asset allocation and diversification, helping investors manage their portfolios more effectively. Furthermore, awareness of higher exchange rate risk may encourage investors to adopt more comprehensive hedging strategies to safeguard against currency fluctuations. This could include the use of financial derivatives such as forward contracts, options, and swaps.

Policymakers can leverage this information to enact measures aimed at reducing exchange rate volatility and bolstering economic stability. Potential actions might involve efforts to enhance political stability, diversify the economy further, and manage inflation more effectively. Such measures can contribute to a more predictable investment climate, thereby attracting more foreign investment. For asset managers, understanding the dynamics of exchange rate risks associated with South African markets can help in optimizing portfolio construction by balancing risk and return more adeptly. They might adjust their exposure to South African assets based on the evaluated risk premiums and potential returns, enhancing overall portfolio performance. This strategic approach can lead to better risk-adjusted returns for investors seeking opportunities in emerging markets like South Africa.

5. Conclusion

This paper examines the differential effects of exchange rate risk exposure on stock markets in Africa and developed regions, with South Africa representing the African market and the US representing the developed market. The investigation employs a conditional CAPM methodology conducted in two stages. Initially, we derive various time-varying risk exposures using the ICAPM model estimated through rolling regression. Subsequently, we assess the impact of these risk exposures, particularly exchange rate risk exposure, on stock market returns using Generalized Linear Model (GLM) regression.

The empirical analysis reveals distinct dynamics in exchange rate risk exposures between the South African and US equity markets, with differences becoming more pronounced during crisis periods. Furthermore, the results from the GLM regression in the second stage indicate that the South African stock market demands a higher risk premium for exchange rate exposure compared to the US stock market. Overall, the findings confirm that exchange rate risk pricing is present in both markets. This aligns with other studies on developed and emerging economies, suggesting that even with hedging strategies, the potential for pricing exchange rate risk in equity markets remains, including in developed markets where various hedging instruments are available.

Several reasons are proposed for why the South African stock market requires a higher premium for exchange rate risk exposure compared to the US stock market. These include the higher volatility of the South African Rand and ongoing political and economic instability in the country, which influence the currency's value.

These insights are invaluable for investors, policymakers, and asset managers. They help in making more informed decisions, implementing effective risk management strategies, and creating a more stable and attractive investment environment by providing a deeper understanding of how exchange rate risks impact stock market valuations across different global contexts.

Notes

1. Excess of the risk-free rate as shown in the classical CAPM equation (1).
2. Table 1 show that the null hypothesis of normality is rejected for the majority of the variables.
3. See, Brown and Otsuki (1993), Dumas and Solnik (1995), Tai (2000), Carrieri and Majerbi (2006), Bae *et al.* (2008), Al-Shboul and Anwar (2014), Mahapatra and Bhaduri (2019).

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