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Empirical Analysis of the Effects of Macroeconomic Variables on the Equity Market Risk Premium in South Africa

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Abstract
The relationship between the Equity Market Risk Premium (MRP) and macroeconomic variables has been a subject of extensive debate in the finance literature. The MRP is a central component of the main asset pricing models which are used to estimate the cost of equity which is mainly used in investment appraisal, performance measurement and valuation of equity assets. Prior studies have identified a number of macroeconomic variables such as inflation rate, interest rate, foreign exchange rate and political risk as the key macroeconomic variables that determine the size of the MRP. Grounded on previous literatures, the test of the impact of these macroeconomic variables on the MRP is mainly based on data obtained from the developed countries and a few emerging countries, leaving a huge knowledge gap in African based literature. This necessitated the investigation of inflation rate, interest rate, foreign exchange rate and political risk on MRP within the South African context, as these fundamental variables vary across countries. Using secondary time series data for the period 2002 to 2017, a total of 192 observations per variable was used in the study. The model used were tested for possible misspecification errors that could arise from using a secondary time series data and the regression model was fitted using the Ordinary Least Square (OLS) estimator. The results show that inflation rate, interest rate and foreign exchange rate have a negative impact on the MRP whilst political risk has a positive impact on the MRP. Furthermore, the result shows that the inflation rate is the only variable amongst other variable tested that has a significant influence on the MRP for the study period. The study recommends that inflation rate should be monitored and kept within the inflation target to increase investors' confidence in the security market and also foster economic growth.
Keywords: All Share Index, Equity Market Risk Premium, Macroeconomic Variables, Risk-Free Security, South Africa.
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1. Introduction

The growth of stock markets in emerging economies has become one of the most important discourses in the area of financial markets and economic development (Saucedo & Gonzalez, 2021). As indicated by Adjasi (2009), stock markets provide a platform for the efficient acquisition of capital through sales of shares by publicly quoted companies which serves as an alternative to debt financing. The stock market, therefore, provides investors with a platform to invest their money. The providers of these funds expect a return as a compensation for investing their money in risky equity securities. As a result of the riskiness of equity, the investors would expect a premium over investing in risk-free securities (Damodaran, 2012).

According to the Capital Asset Pricing Model (CAPM) of Sharpe (1964) and Lintner (1965), this premium is made up of the riskiness of the individual security which is measured by beta, multiplied by the overall risk premium of investing in equities in general. The overall risk premium of investing in equities, in general, is called the Equity Market Risk Premium (MRP) (Goetzmann & Watanabe, 2009). Consistently, Siegel (2005) and Welch (2014) defined the MRP as the difference between the expected returns on market portfolio and risk-free assets.

There is a popular consensus among researchers such as Burger (2012), Choudhry (2001), Damodaran (2012), Doong, Yang and Wang (2005), Goetzmann and Watanabe (2009), Lettau, Ludvigson and Wachter (2008), Jun (2013), Maysami and Sim (2001), Moolman and Du Toit (2005), Nijam, Ismail and Musthafa (2015) and Westlund, Sheludchenko and Tahmidi (2011) that macroeconomic variables such as interest rate, inflation rate, oil price/barrel, exchange rate, price for risk, expected return, discount rate, risk appetite, consumption preference, political risk, money supply, gross domestic product (GDP), government external borrowing, catastrophic risk, available information, liquidity, government policies, dividend-price ratio, dividend yield, earnings-price ratio, stock variance, net equity expansion, term spread, treasury bill rate, default yield spread and default return spread are factors that affects the MRP in the developed and the emerging economies.

The objective of this paper is to investigate how the key and significant macroeconomic variables such as inflation rate, interest rate, foreign exchange rate and political risk affects the MRP within the South African context. This study, thus, informs the ongoing debate on whether macroeconomic variables have a significant impact on the MRP. Also, it contributed to the existing literature on the MRP puzzle and serve as a 'light shedding' study within the South African context. Finally, this study adds to the evidence of Bancel and Mittoo (2014), Damodaran (2012), Nijam et al. (2015) and Westlund et al. (2011) on the impact of macroeconomic variables on the MRP, both in the developed and the developing countries.

Using the regression model and the Ordinary Least Square (OLS) as its estimator, the study found a mixed result. The results show that inflation rate, interest rate and foreign exchange rate have a negative impact on the MRP whilst political risk has a positive impact on the MRP in the South African context. The result is particularly prevalent for the sample periods 2002 to 2017. The rest of the paper discusses the review of relevant literature, describes the data and model specification, discusses the empirical results and provides the concluding comments.

2. Literature Review

2.1 Conceptual Review of MRP

Several leading authors including Ryan (2007), Reilly and Brown (2012), McGuigan, Kretlow and Moyer (2009) and Ross, Westerfield and Jaffe (2002) refer to MRP as the risk premium for investing in the market portfolio instead of the risk-free security. According to Fama and French (2002) and Zenner, Hill, Clark and Mago (2008), the MRP is defined as the difference between the return expected on the market portfolio as a whole and the risk-free rate. The MRP reflects the equilibrium price of equity market risk. It is the higher yield in relation to the risk-free yield that an investor expects to achieve from an investment whose return is uncertain (Damodaran, 2012). Thus, the MRP is an expression of the circumstance that equities are expected to yield higher returns than government bonds since otherwise; no investor would risk its capital (Zenner et al., 2008).

Sharpe (1964) and Lintner (1965) highlight the two components of the MRP in their CAPM model which is the return on market portfolio and the yield on risk-free asset which is mathematically expressed as "Rm – Rf", where Rm is the overall market return and Rf is the risk-free rate. Hence, if the risk-free yield is assumed to be known, represented by the government short-term treasury bill, it serves as a sufficient condition for being free of risk, thus, any changes in the market return of portfolio will consequentially affect the MRP (Fama & French, 2002).

Damodaran (2012) argued that the MRP is an important input into the asset pricing models which are used to estimate the cost of equity, which is a component of the firm's Weighted Average Cost of Capital (WACC). The firm's WACC is mainly used in business valuation, financial analysis, equity assets valuation, performance measurement and capital budgeting decisions (Bancel & Mittoo, 2014; Goetzmann & Ibbotson, 2005; Zenner et al., 2008). Furthermore, the cost of equity with the investors' required rate of return can also be used by investors to make investment decisions among a variety of investment assets such as equities, fixed income securities and other asset classes such as gold and real estate (Fernandez, Aguirreamalloa & Corres, 2011; Siegel, 2005). Zenner et al. (2008) asserted that if the MRP increases whilst the firm's equity beta remains unchanged, the firm's cost of equity and hence its WACC will increase as the cost of equity is affected by the MRP.

2.2 Estimation of MRP

Graham and Harvey (2010) argued that the MRP has been a major concern in the financial and economic sector for many decades as it has commanded the attention of both professional economist and investment practitioners due to lack of consensus on its estimation. Donaldson and Mehra (2008) identified two methods that can be used to estimate the MRP which is the historical risk premia method and estimate of current stock prices method. Using historical risk premia to estimate MRP assumes that what has happened in the past is representative of what might be expected in the future and using estimate of current stock prices assumes that it is possible to project the MRP from surveys of stock price movement or some other projection model. However, using historical risk premia or current stock price estimates require several assumptions that can make MRP estimation challenging (Bancel & Mitoo, 2014). The historical risk premia method requires assumptions about which risk-free security to use, length of the sample period and whether to use geometric average or arithmetic average of the historical stock returns. Generally, Siegel (2005) argues that the estimation of the MRP yields a maximum value if arithmetic mean of historical stock returns is used and a lesser value if the geometric mean of historical stock returns is used and this estimate also relies largely on the risk-free security used; a short-term government bond yields a higher value of MRP compared to a long-term government bond. Also, the estimate of current stock price method requires assumptions about future cash flows such as dividends and earnings and the projected growth rates that are inherent in current stock prices. The difference arising from these assumptions makes it difficult to arrive at a uniform method of calculating the MRP. Donaldson and Mehra (2008) identified various difficulties in quantifying MRP such as high market concentration, low liquidity, high volatility which often occur in emerging markets like South African market and the unreliability of historical data for computing the MRP. Nonetheless, this study adopted the historical approach of estimating the MRP as most MRP models use historical data and assume the past provides the best indication of what the future holds.

2.3 Empirical Review

Numerous studies attempted to identify the empirical relationships among various macroeconomic variables and the MRP. Some of these studies includes the study of Muchiri (2012) and Gikungu (2012) in Kenya, which concludes that the inflation rate had a positive but insignificant effect on MRP due to the positive effect of inflation on the returns of Nairobi stock exchanges (NSE), while interest rate had a negative but insignificant effect on the returns on NSE which in turn affects the MRP negatively. Brandt and Wang (2003) argue that changes occurring to inflation rate affect the decision about investment and consumption which influences the MRP. They conclude that the MRP tends to increase if inflation increases and decreases when inflation decreases because inflation rate and the MRP are positively related. Arnold (2008) reported that an increase in the inflation rate causes increase in the MRP which increases the cost of equity for firms and deters investment, spending and saving decisions of investors.

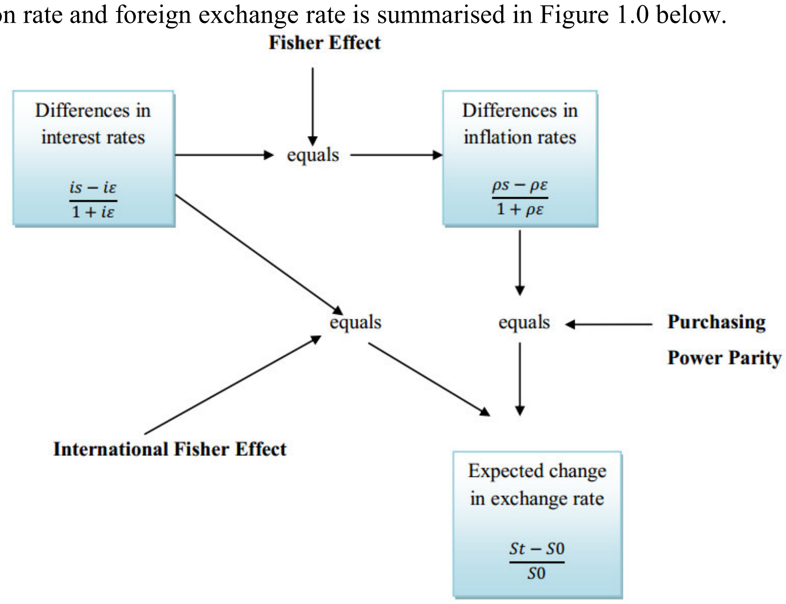
Ugur and Ramazan (2005) in their study investigating the effect of inflation on stock returns in Turkey from 1986 to 2000, concluded that there is a negative relationship between inflation and MRP owing to the negative impact of inflation on stock returns. Also, Mohammad (2011) uses multiple regression models to test the impact of changes in selected microeconomic and macroeconomic variables on the MRP in Bangladesh. He examines monthly data for all the variables under study covering the period from July 2002 to December 2009. The study finds a negative relationship between the MRP and the inflation and exchange rate. Other studies such as those of Basil and Copeland (1982) and Connolly and Dubofsky (2015) also argue that MRP decreases during periods of high inflation and vice versa.

Harris and Marston (2015) obtained a concluding result in their study of the shareholders risk premia using the Standard and Poor (S&P) 500 as a proxy for the market portfolio and the yield on the US Government long-term bonds, they found a negative relationship between interest rates and MRP based on the data from 1982 to 1991. Goetzmann and Watanabe (2009) assert that equity market consistently relies on the opinion and forecasts of public and private sector about the direction of economy. Their analysis of the historical data for over 50 years shows that stock returns have positive relationship with forecasted growth of GDP and a negative relationship with external debt to a percentage of GDP. Westlund et al. (2011), based their research on the findings of Goetzmann and Watanabe (2009) and tested GDP growth rate on the MRP in Canada, Germany and Sweden and found that growth in GDP has a significant positive relationship with the MRP in the three countries.

2.4 Theoretical Motivation

This study is grounded on three relevant theories that explains the relationship between inflation rate, interest rate and foreign exchange rate and therefore, attempt to link these macroeconomic variables to the MRP. The theories are the Fisher Effect Theory (FET), International Fisher Effect Theory (IFET) and the Purchasing Power Parity Theory (PPPT).

The IFET and the PPPT try to explain changes in exchange rates using changes in nominal interest and inflation rates differentials between two countries. These two theories stem from the basic FET which links the nominal interest rate to both the real interest rate and the inflation rate. Thus, the triangular relationship between interest rate, inflation rate and foreign exchange rate is summarised in Figure 1.0 below.



Source: Buckley (2004) Figure 1. Relationship between the interest rate, inflation rate and the exchange rate.

The FET, IFET and the PPPT show how inflation rate, interest rate and foreign exchange rate are related. On one hand, the FET suggests that the rate of inflation and real rate of interest rate are represented in the nominal interest rates. On the other hand, the IFE and the PPP theory expand on the FET; suggest that currency changes are proportionate to the difference between the two countries' interest rate and the inflation rate respectively (Utami & Inanga, 2009). Therefore, based on the FET, IFET and PPPT, inflation rate, interest rate and exchange rate are interrelated and thus, impact one another. This implies that the changes in inflation rate affects interest rate and the changes in interest rate and inflation rate differentials of two countries also affect their exchange rates (Fama & French, 2002; Buckley, 2004).

According to Amtiran et al. (2017) and Connolly and Dubofsky (2015), an increase in inflation rate, interest rate and exchange rate causes a decrease to the actual market returns because the market prices are negatively affected. The decrease in market return, thus, causes the MRP to reduce. This, therefore, explains the indirect relationship that exists between the FET, IFET, PPPT and the MRP.

3. Data and Model Specification

The study covers the periods from 2002 to 2017 and employs time series data that consisted of 192 monthly observations. Data relevant to this study were obtained from such secondary sources as the South African Reserve Bank (SARB) database, World Bank database, Johannesburg Stock Exchange (JSE) database, Stats-South Africa and CEIC database. The data on inflation rate (consumer price index) was obtained from the World Bank database. The data on interest rate (prime lending rate), exchange rate (ZAR/USD), treasury bills rates were obtained from the SARB database. The JSE-ALSI data was obtained from the JSE database whilst the political risk which was measured by the ratio of government external debt to GDP were obtained from the Stats SA and CEIC database. Multiple regression models were primarily employed for investigating the relationship between the variables under study. Ordinary Least Square (OLS) method was used to estimate the parameters of the regression model. Data analysis was performed with the aid of Excel and STATA 15 statistical software.

The general relationship between the MRP which is the difference between the JSE-ALSI (Rm) and the treasury bills (Rf), the dependent variable and such macroeconomic variables, the independent variables as inflation rate (*INFR*), interest rate (*INTR),* exchange rate (*FXER)* and the political risk (EXDB) was represented by the regression model (1) shown below.

$$Rm - Rf = \beta 0 + \beta 1 INFR + \beta 2 INTR + \beta 3 FXER + \beta 4 EXDB + \varepsilon t \quad (1)$$

Where R_m denotes the market rate of return; R_f denotes the risk-free rate of return; β_0 represents the intercept; β_1- β_4 represents the coefficient of the variables; INFR denotes the inflation rate; INTR represent the interest rate; FXER denotes the foreign exchange rate; EXDB represents the ratio of external debt to GDP and ε_t represents the error term (See Annexure A for a comprehensive definition of variables).

According to Gujrati and Porter (2009), Nijam et al. (2015) and Talla (2013), choosing the best regression model that fits a time series data, it is necessary to reclassify the linear-linear regression model represented in equation (1) above into Linear–Log, Log–Log and Log-Linear models which will be regressed and compared based on model selection statistics criteria.

$$Rm - Rf = \beta 0 + \beta 1 \, Log\, INFR + \beta 2 \, Log\, INTR + \beta 3 \, Log\, FXER + \beta 4 \, Log\, EXDB + \varepsilon t \quad (2)$$

$$Log\, Rm - Log\, Rf = \beta 0 + \beta 1 \, Log\, INFR + \beta 2 \, Log\, INTR + \beta 3 \, Log\, FXER + \beta 4 \, Log\, EXDB + \varepsilon t \quad (3)$$

$$Log\, Rm - Log\, Rf = \beta 0 + \beta 1 INFR + \beta 2 INTR + \beta 3 FXER + \beta 4 EXDB + \varepsilon t \quad (4)$$

The best model was selected based on model selection statistics criteria namely Adjusted (R^2), estimated F statistics (F), Variance Inflation Factor (VIF) and Durbin-Watson statistic (DW). These model selection criteria cover for the misspecifications that could arise from multicollinearity, autocorrelation and non-stationarity of time series data (Obadire, Moyo & Munzhelele, 2022; Nijam et al., 2015). Table 1 summarise such key statistics of each model regressed

Table 1. Key statistics of regression model selection

Table 1 presents the results of model selection criteria which are based on Adjusted R^2, VIF, DW, estimated F value and the p-value. The selection criteria in the Table considers the regression equation with the highest Adjusted R^2, highest F-value with significance of $P<0.05$ as the most appropriate model to fit the time series data for the current study (Obadire, 2018; Nijam et al., 2015). This Table shows each regression model equation on one column and the corresponding selection values for each equation on the other columns. The markings *** indicate significance at 99% level. The models were fitted using theOLS estimator.

Equation	Models	P<0.05	F-value	Adj R^2	VIF	DW
Linear-Linear	$R_m - R_f = \beta_0 + \beta_1 INFR + \beta_2 INTR + \beta_3 FXER + \beta_4 EXDB + \varepsilon_t$	0.000***	32.85	40.01%	2.33- 9.40	0.23
Linear-Log	$R_m - R_f = \beta_0 + \beta_1 \text{ Log } INFR + \beta_2 \text{ Log } INTR + \beta_3 \text{ Log } FXER + \beta_4 \text{ Log } EXDB + \varepsilon_t$	0.000***	27.73	35.89%	2.33- 998.75	0.24
Log- Log	$\text{Log } R_m - \text{Log } R_f = \beta_0 + \beta_1 \text{ Log } INFR + \beta_2 \text{ Log } INTR + \beta_3 \text{ Log } FXER + \beta_4 \text{ Log } EXDB + \varepsilon_t$	0.000***	14.45	21.98%	2.33- 998.75	0.91
Log-Linear	$\text{Log } R_m - \text{Log } R_f = \beta_0 + \beta_1 INFR + \beta_2 INTR + \beta_3 FXER + \beta_4 EXDB + \varepsilon_t$	0.000***	13.50	20.75%	2.33- 9.40	0.89

According to the key statistics of regression model selection results, the linear-linear regression model was found to be the most appropriate model amongst other models based on the model statistics selection criteria presented in Table 1 above. The Linear-Linear model is the model with the highest F-value of 32.85 significant at $p<0.05$ with the highest adjusted R^2 value of 40.01% and a mean VIF lesser than 10. Hence, the linear-linear regression model was adopted for the study and the other regression models namely linear-log, log-log and log-linear presented in Table 1 above were eliminated as they were not appropriate for the current study based on the selection criteria adopted.

4. Empirical Results and Discussion of Findings

The linear-linear regression model was estimated using the OLS estimator. The study had a data point of 192 observations which is a monthly data for the period 2002 to 2017. The OLS estimator was used in fitting the selected model because it is suitable for estimating data points with uncorrelated predictors with its linearity in estimating unknown parameters (Williams et al., 2013).

The time series data were pretested to avoid spurious regression and was differenced at 1st level order in order to make the variables stationary. The original linear-linear regression model shown in equation 1 was transformed and differenced to its 1st order level to control for non-stationarity and the presence of unit roots. The transformed regression model is shown below.

$$\mathbf{D1}Rm - Rf = \beta 0 + \beta 1\mathbf{D1}INFR + \beta 2\mathbf{D1}INTR + \beta 3\mathbf{D1}FXER + \beta 4\mathbf{D1}EXDB + \varepsilon t \text{ ------------------ (6)}$$

The summary results of the ordinary least square regression models are presented in Table 2

Table 2. Model Regression Results

Table 2 shows the model regression results for all the variables in its 1st order level differencing. The regression model was fitted using the OLS estimator. The markings *** indicate significance at 99% level. The variables in the Table are defined as follows: *INFR* denotes inflation rate which is measured by consumer price index, *INTR* denotes interest rate which is measured by prime lending rate, *FXER* denotes foreign exchange rate which is measured by *ZAR/USD* and *EXDB* denotes political risk which is measured by ratio of government external debt to GDP.

Variable	Coefficient	T-Statistic	P-value
β_0	-0.0074	-0.01	0.989
INFR	-2.6108	-2.71	0.007***
INTR	-0.2940	-0.21	0.830
FXER	-1.5737	-1.03	0.305
EXDB	0.2557	0.76	0.447
R-squared	0.0534		
Adjusted R^2	0.0330		
F-statistic	2.62 (0.0363)		
MSE	7.4129		
No of obs.	191		

The selected model's regression results shown in Table 2 show that inflation rate, interest rate and foreign exchange rate has a negative impact on MRP, whilst political risk factor has a positive impact on the MRP for the study period covering 2002 to 2017. This is represented in the equation below:

$_{D1}R_m - R_f$ = -0.0074 -2.6108 (INFR) -0.2940 (INTR) -1.5737 (FXER) + 0.2557 (EXDB) + 7.4129 --------- (7)

Firstly, the results indicate that inflation rate is negatively and significantly correlated with MRP, which means that there is an inverse relationship between inflation rate and the MRP, where an increase in inflation causes a decrease in MRP and a decrease in inflation causes an increase in MRP. The general argument from past studies such as those of Brandt and Wand (2003) documented that MRP tends to increase if perceived inflation increases than anticipated and vice versa. The results of the current study, however, contradict previous studies as previous studies considered perceived inflation while the current study considered the effect of actual inflation on MRP. The results of this study are consistent and similar with the findings of Basil and Copeland (1982) who argued that MRP may narrow or decrease during periods of high inflation. Similarly, Connolly and Dubofsky (2015) argue that MRP decreases as US treasury bond rates increases, and moved inversely with inflation; that is, higher inflation leads to a lower MRP. Further analysis of past studies such as those of Amtiran et al. (2017), Geske and Roll (1983), Nijam et al. (2015) and Tandiontong et al. (2015) support the notion that, in recent years of increased inflation, the MRP declines. The results of this study show that MRP decreases as inflation increases and vice versa because increase in inflation causes an increase in the relative riskiness of investors' return on equity which explains a large part of market return decline. Sustained increase in inflation results in a higher interest rate which adversely affects the market prices and thus, reduces the actual market returns. As a result of this, the study, therefore, argues that MRP decreases as the inflation rate causes the actual market returns to decrease beyond government bond yields.

Secondly, the results indicate that interest rate is negatively correlated with MRP, which implies that there is an inverse relationship between interest rate and the MRP, where an increase in interest causes a decrease in MRP and vice versa. The findings from past studies such as those of Fama and French (2002) and Tandiontong et al. (2015) shows that, a reduced interest rate which is used to correct inflation causes a push (an increase) to the MRP. According to Peng and Zervou (2015), an increase interest rate is used in controlling inflation (an increase in price caused by too much money chasing too few goods) through monetary policies. In regard to this, the increased interest rate shrinks the supply of money available for purchasing or investing either by individuals or by companies. Conversely, when interest rate is reduced, more money is available for investors or individuals for purchases or investment in either risky equity securities or government bonds. The results of this study are consistent and similar with the findings of Harris and Marston (2015) who argued that interest rate affects MRP negatively based on their study of the shareholders risk premia for the period 1982 to 1991 in the US. Similarly, the study of Bowman and Shay (1999) on MRP and interest rates in New Zealand showed that the MRP varies negatively over time with changes in interest rate. Other previous studies such as those of Uddin and Alam (2007) and Gikungu (2012), concludes that a reduction in interest rate causes the MRP to increase and vice versa. The results of this study show that MRP moves in an inverse direction as interest rate, which implies that MRP has a negative relationship with interest rate; this follows the finance and economics rule of thumb. This result is attributed to the fact that an increase in interest rate affects the company's estimated amount of future cash flow, which lowers the price of the company stock. Hence, when company experiences decline in their stock price, the whole market or the key indexes goes down. With the lowered expectation in the growth and future cash flow of the company, investors will get lesser returns from investing in risky equity securities, making stock ownership less desirable. Furthermore, investing in equities can be viewed as too risky compared to other investments. However, the increasing effect of interest rate on government bonds such as treasury bills usually allow a corresponding increase in the rate of return on treasury bills and bonds, making these investments more desirable. Thus, the increase in interest rate causes a drastic decline on market returns and a corresponding increase in the risk-free securities such as the treasury bill yield, which consequentially leads to a decrease in the MRP. This means that, the premium available for compensating the investors for investing in risky equity securities declines due to higher interest rates (Uddin & Alam, 2007; Harris & Marston, 2015).

Thirdly, the results indicate that foreign exchange rate is negatively correlated with MRP, which implies that there is an inverse relationship between foreign exchange rate and the MRP. This means that currency depreciation, that is, an increase in foreign exchange rate causes a decrease in MRP and vice versa. The results in Table 2 show that MRP decreases as foreign exchange rate increases. This is because the ZAR depreciated against the US dollars as a result of the persistent increase in inflation and a sharp rise in the interest rates during the period under study. The results imply that, as a result of the currency depreciation, that is, increase in foreign exchange rate, the government increases its interest rate to protect its currency from further depreciation which causes bond price to fall and bond yield to rise. However, with the increase in interest rate, the stock price movement is affected, and the actual market returns on stocks declines. This study, therefore, argues that with a depreciating currency, the actual market returns decreases while the bond yields increase which consequentially causes the MRP to decrease (Kyung-Chun, 2008; Tandiontong et al., 2015). This result is similar with the early evidences of Doong et al. (2005) and recent evidences of Kyung-Chun (2008), Mohammad (2011), Burger (2012), Tandiontong et al. (2015) and Amtiran et al. (2017), whose studies found a negative relationship between exchange rate and the MRP.

Fourthly, the results in Table 2 show that political risk has a positive relationship with the MRP in South Africa. These results are similar to the findings of Goetzmann and Watanabe (2009) and Westlund et al. (2011). The results show that the ratio of government external debt to GDP coefficient is positive, which means that an increased political risk causes an increase to MRP and vice versa. In regard to this, investors (local and foreign) that are attracted to invest in the country's capital market will demand a higher return on their investment to compensate them of the high political risk in the country. As a result of this, market return increases above government bond yields and thus, causes MRP to increase. Nielsen and Risager (2001) suggest that political risk emerges from uncertainty in government policies, persistent increase in inflation rate, interest rate and depreciating currency. Nielsen and Risager (2001) further argued that an increase in these variables (interest, inflation and foreign exchange rate), thus, impact the political risk negatively which in turn causes decline in market prices, actual market returns and consequentially causes a decline to the MRP and vice versa. These uncertainties influence the multinational corporations and results in more uncertain investment outcomes as a result of the monetary and fiscal policy in place.

Furthermore, the results in Table 2 shows that inflation rate amongst other macroeconomic variables tested in the study have the highest impact on MRP compared to other macroeconomic variables in the context of South Africa for the study period. This is because inflation rate is the only variable that has a significant impact on MRP for the study period with $p<0.05$ and a T-statistic value of -2.71. This study, therefore, argues that inflation rate has the greatest impact on the MRP in South Africa. Lastly, the results, show that the independent variables (inflation rate, interest rate, exchange rate and political risk) jointly explain the variance of the dependent variable (MRP) which implies that the selected macroeconomic variables jointly have an impact on the MRP within the South African context.

5. Conclusion

The aim of this paper was to investigate how the key and significant macroeconomic variables such as inflation rate, interest rate, foreign exchange rate and political risk affects the MRP within the South African context. The study found that inflation rate, interest rate and foreign exchange rate has a negative impact on MRP, whilst political risk factor has a positive impact on the MRP. It was also evident from the results that the inflation rate is the only macroeconomic variable with a significant impact on the MRP for the study period within the South African context. This study is, however, limited to only four macroeconomic variables and the MRP data available from 2002 to 2017. The study could not obtain JSE-ALSI data prior 2002 due to the unavailability of data from the JSE database which is a major parameter in estimating the MRP. As a result of this, other variables were limited to 2002 in order to have uniformity in the variables' data point for the study period.

Future research may consider other macroeconomic variables or other firm specific risks and thus expand the regression model to accommodate other factors that could affect MRP in South Africa over a longer period. Finally, further studies on persistence of news and changes on market risk premium and macroeconomic variables will be useful to investors in understanding how these changes affect their lives and influence them in making rational and better investment decisions and aid the regulators in effective policy formulation.

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ANNEXURE A: Variable Definitions

The variables used in this study are defined as follows:

Name of Variable	**Denoted as**	**Definition of variable**
Return on Market	R_m	Average returns on JSE-ALSI on an annual basis.
Return on Risk-free Security	R_f	Average returns on the government 91-days treasury bill.
Market risk premium	$R_m - R_f$	The difference between the market returns and the yields on risk-free securities.
Inflation rate	INFR	Average consumer price index measured on an annual basis.
Interest rate	INTR	Average prime lending rate measured on an annual basis.
Foreign exchange rate	FXER	Average ZAR/USD measured on an annual basis.
Political risk factor	EXDB	The ratio of government external debt to GDP measured on an annual basis.
Logarithm	Log	The logarithm of the variables (R_m, R_f, INFR, INTR, FXER and EXDB).