Identifying Macroeconomic Factors that Affect the Share Prices of JSE-Listed Firms

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ABSTRACT

This research was undertaken to investigate the effect of macroeconomic indicators on the share prices of the top 40 JSE-listed firms. This study employed a mixed exploratory design and used secondary data. A mixed-method approach was followed by applying a systematic review and an empirical analysis. The findings of this paper demonstrated that strong, positive correlations exist between share prices and macroeconomic factors. CPI, exchange rates, GDP and money supply were strongly correlated with share prices. It was also found that identical correlations exist between share prices, CPI, GDP and money supply. This indicates that CPI, GDP and money supply reflect similar aspect of economic activity. The application of multiple regression analysis demonstrated that 97.1% of changes in share price of the sampled firms can be estimated through the modelling of CPI, exchange rates and repo rates. In conclusion, it is posited that macroeconomic factors affect the share price of the top 40 JSE-listed firms and that such an effect cannot be avoided by the firm.

Keywords: Macroeconomic Factors, Share Prices, JSE-Listed Firms, Money Supply, CPI, Exchange Rates, GDP
JEL Classification: E7, G1

1. INTRODUCTION

The share price of a firm can be affected by both internal and external factors. Internal factors are those within the control of a firm and would typically include elements such as corporate governance and policies, budgeting and recruitment processes. External factors refer to influences beyond the control of the firm (Jackson, 2024). Macroeconomic factors are among the prominent external factors that can affect the firm and its performance (Issah, 2017).

The relationship between macroeconomic variables and share prices has been studied extensively in countries such as India, Pakistan, Sri Lanka, Kenya and Taiwan. Sharma and Mahendru (2010) collected data between 2006 and 2009 and found a significant relationship between the exchange rate and share prices in India. Similarly, Oriwo (2010) investigated the association between share prices and macroeconomic factors in Kenya. The

lending rate was found to significantly influence the share prices of firms listed on the Kenyan stock exchange. Nijam et al. (2015) tested for the association between share prices and the gross domestic product (GDP), the consumer price index, interest rates, the balance of trade and the exchange rate in Sri Lanka. The study sampled data between 1980 and 2012 and found that there is an association between share prices, movements in GDP, the exchange rate and interest rates. Singh and Varsha (2011) performed similar research but sampled firms in Taiwan. Their study collected data relating to employment rates, exchange rates, GDP, inflation and money supply. Empirical results indicated that GDP and exchange rates are positively associated with share price movements, while inflation and money supply are negatively associated with the share price.

South African studies have also investigated the relationship between macroeconomic variables and share prices. Ndlovu et al.
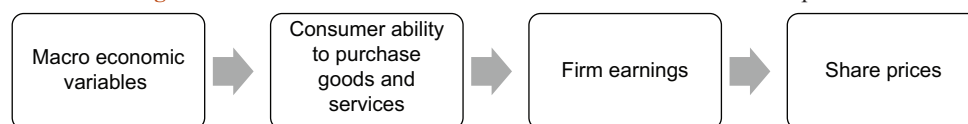
(2018) collected data relating to inflation, money supply, interest rates and exchange rates in order to determine whether these variables are associated with share prices. Data were collected between 1981 and 2016. A regression model was constructed and it was found that money supply was the most effective predictor of share price changes. Ho (2017) performed research relating to the South African banking sector between 1975 and 2015. It was found that inflation and interest rates prohibited growth in share prices. Findings were derived through sensitivity analysis and regression analyses. Cakan and Gupta (2017) tested the effects of unemployment, exchange rates and inflation on the stock prices of JSE-listed firms. Data were collected between 1994 and 2016 and a total of 5778 observations were analysed. The findings indicated that unemployment and inflation had a significant impact on the share prices of the sampled firms.

From a theoretical perspective, the association between macroeconomic variables and share prices can be reduced to the association between earnings and share prices. Figure 1 was constructed as an explanation.
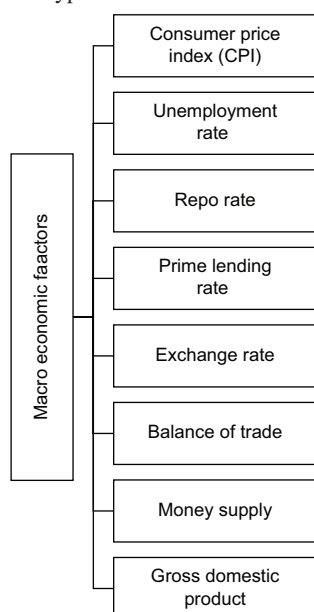
Figure 1 indicates that macroeconomic factors affect the potential for consumerism. During economic upturns, consumers can spend more, leading to positive effects on the profits of the firm. Investors view growth in profitability as a positive signal of the firm's future performance and potential. Consequently, demand for the shares increases, stimulating share prices and leading to increased shareholder wealth (Gharaibeh et al., 2022). The opposite is also true: during economic downturns, consumers have less funds to spend, leading to decreased profits for the firm. A decrease in profits signals to investors that the firm is on a downward trajectory and shares are disposed of, thereby increasing the supply. An increased supply of shares leads to a decrease in share value and a reduced ability to create shareholder wealth (Steyn, 2019).

Based on the preceding arguments, macroeconomic factors clearly affect share prices. Consequently, it can be posited that the behaviour of macroeconomic factors has a direct impact on the creation of shareholder wealth. Shareholder wealth refers to growth in the market value of shares. The creation of shareholder wealth is one of the primary objectives of financial management. The aim of this research paper is to determine whether the behaviour of macroeconomic factors is associated with changes in share prices of the top 40 JSE-listed firms in South Africa. Ultimately, this study aims to determine whether the creation of shareholder wealth is affected by the state of the South African economy. The findings of this study will provide insight into which external factors are associated with share prices and the creation of shareholder wealth.

2. LITERATURE REVIEW

In this section, the types of macroeconomic factors are described, the importance of macroeconomic indicators is investigated and the relationship between macroeconomic indicators and share prices is discussed. The section begins with an explanation of the types of economic indicators.

2.1. Types of Macroeconomic Indicators

At the outset, it is important to understand the basic economic indicators relevant to this study. Within the existing literature, researchers identify at least eight different types of macroeconomic variables. Each of these variables is designed to measure a specific economic activity that affects society at large. Figure 2 presents the various macroeconomic factors under consideration.

From Figure 2, it can be observed that eight different macroeconomic factors are measured, namely consumer price index (CPI), unemployment rate, repo rate, prime lending rate, exchange rate, balance of trade, money supply and gross domestic product (Cattlin, 2024; Mpofu, 2015).

The consumer price index is an indicator of inflation. Inflation influences businesses not only in the form of depreciating the value of money but also leads to higher discount rates and reduces the present value of future cash flows. It also potentially depresses share prices. Firms with pricing power can offset inflationary pressure through higher prices, resulting in increased profits and share value (Nelson, 2024). The unemployment rate indicates the percentage of a population that is jobless but actively seeking employment. This rate is a good indicator of general economic health and activity. Unemployment rates inform policymakers on economic conditions, consumer confidence and general potential economic growth. It also assists in tracking job creation figures and monitoring the number of new jobs added within an economy (OECD, 2024).

Repo rates represent the rates at which central banks supply money to commercial banks. In effect, repo rates have an impact on interest rates within the financial systems. The central bank uses repo rates to implement and maintain its policies around currency distribution. A lower repo rate reduces the cost of borrowing and stimulates investment and consumer spending. This can positively affect share prices in a market. It should be noted that very low repo rates can lead to inflation spurs, which impact currency value and investor sentiment negatively. The cost of capital for a firm is impacted by the prime lending rate (Benjamin et al., 2010). Prime lending represents the lowest possible rate at which a consumer or investor can obtain funding from a commercial bank. When prime lending rates are high, borrowing activity in the market is constrained. This leads to an inability to obtain funding for investment and expansion (Kinyuru, 2011).

Figure 1: The association between macroeconomic factors and share prices

Source: Adapted from Gharaibeh et al. (2022)

Figure 2: Types of macroeconomic indicators

Source: Authors

Exchange rates represent the relationship between a local and foreign currency. The exchange rate mostly affects businesses that participate in imports and exports as a main function of their business (Caner, 2019). Fluctuations in the value of currencies can lead to gains or losses for businesses and impact their earnings significantly. When firms are exposed to fluctuations in foreign currency and adverse currency movements occur, the firm's share price declines. Firms can overcome and manage this risk by applying strategic hedging against volatile currency movements (Hamilton, 2018). The balance of trade represents the difference between a country's imports and exports within a specific period. Should a positive balance exist (i.e. a surplus), exports exceed imports. Should a negative balance exist (i.e. a shortage), imports exceed exports. The balance of trade can influence production, economic health and employment rates. It serves as a key indicator of a nation's ability to compete within the global market (Klein and Boudreaux, 2017).

Money supply refers to the availability of a currency within an economic system. There exists a relationship between money supply and asset value. Increases in money supply lead to a greater supply of capital, leading to inflation and higher asset prices. An increase in money supply gives way to greater demand and an influx of investment capital (Schwartz, 2019). The gross domestic product represents the value of all goods and services produced within an economy. GDP is used as a measure of economic activity and health. A positive association exists between GDP and stock market performances. GDP growth signals higher earnings, which drive share price increases. This relationship between GDP and share price behaviour is sensitive, as it is influenced by the cyclical nature of the business cycle (Statistics South Africa, 2013).

2.2. The Importance of Macroeconomic Indicators in the Business Environment

Understanding the broader macroeconomic environment is of great importance to any business. Macroeconomic indicators affect the operations and strategies of businesses, consumer behaviour, investment decisions and overall dynamics of the market. The consumer demand for products and services is impacted by the economic state, as consumers are more willing to spend during times of economic upturns (Mansouri, 2021). Conversely, spending declines in periods of economic hardship. This leads to negative impacts on sales, profits and the ability of the firm to collect debts from debtors. Businesses thus need to be responsive to the economic environment, while this environment is monitored through macroeconomic indicators. A solid understanding of macroeconomic indicators is vital, as it helps the business remain reactive to changes and maintain its market position (De Jager, 2017). From a retrospective point of view, the estimation and prediction of changes in macroeconomic indicators assist in planning and goal setting, ensuring that the business maintains a positive financial position in the market environment.

Firms also need to assess the economic climate before undertaking new investments, projects or expansions. A positive economic environment stimulates investment in new technology, facilities and workforce development. The opposite is also true for economic uncertainty (Du et al., 2022). Economic uncertainty leads to the deferral of investment in new projects. The ability of a firm to recruit new investors is also impacted by the economic environment. Investors are sceptical about investing during times of negative economic growth. It is also apparent that international investment potential is lost when macroeconomic indicators show regression in growth (Banerjee et al., 2015).

Monitoring operational costs is crucial, as firms need to maintain their competitive advantage in a market. Fluctuations in the economic environment can lead to changes in operational costs such as labour, materials and overheads. If these costs cannot be managed effectively, the profitability of a firm will be significantly reduced (Modi and Bhagat, 2021). For this reason, firms should monitor macroeconomic indicators to limit the impact of such changes on their operations. Incorporating awareness of changes in the economic environment forms an important part of strategic planning. Knowledge of the behaviour of macroeconomic indicators can assist the firm in aligning with current and future economic realities to ensure long-term sustainability. As the economic environment is complex, risk management strategies are also required. Potential risks need to be identified in order to develop contingency plans that enable the mitigation of risks. Those charged with stewardship need to act proactively to safeguard the operations and prosperity of the firm and to ensure stability during periods of economic uncertainty (Khatri, 2019).

From preceding arguments, it can also be posited that the creation of shareholder wealth is influenced by the ability of the firm to understand and predict macroeconomic variables and their behaviour. The ability of the consumer to continuously purchase the products and services of the firm is dependent on the economic environment in which the consumer operates. Where fluctuations in profitability occur, the share price is similarly affected. Investors opt to obtain shares that demonstrate consistent growth in profitability terms (such as net profits and EPS) over time. Where the firm fails to generate increasing profits in the long run, it can

be expected that share prices will decline and that shareholder wealth will be impacted negatively. Ultimately, macroeconomic factors affect not only profits, investments and operational costs but also the value of the firm as a whole.

2.3. The Association between Macroeconomic Factors and Stock Markets

Stock markets serve as reflections of economic health. They are a barometer of investor sentiment and expectations regarding the future conditions of a market. A stock market that reflects growth in share prices signals investor confidence in the prospect of future growth. Conversely, stock markets with declining share prices signal concerns about future economic stability. Stock market performance and macroeconomic conditions are often linked, as rising stock prices lead to more wealth. This can stimulate consumer spending and encourage economic growth (Wang, 2023). A prosperous economic environment can kindle increases in a firm's share price. When the economic environment leads to increased revenue and profits, the firm can report higher earnings. Such earnings information may pique the interest of investors and lead to more investment in the firm.

The value and importance of stock markets has been recognised by various emerging countries as they improve the quality and efficiency of domestic financial systems. The exposure of local markets to the global community leads to a flexible exchange rate system. Certain macroeconomic factors may have different effects in different markets and time periods. The stock market and its relationship to economic considerations will undoubtedly change in response to any changes that impact the overall state of the economy (Kanetsi, 2014). Any investor should understand the dynamic relationship between the stock market and macroeconomic variables in order to manage their investments more effectively, given the significant influence that macroeconomic variables have on the stock market and the significant role that the stock market plays in the economy by influencing its major factors, which in turn affect investment decisions (Osamwonyi and Evbayiro-Osagie, 2012). Stock market prices should be used as a leading indicator of future economic activity because they represent the state of the economy (Pal and Mittal, 2011). Numerous studies have revealed that shifts in the economy's fundamentals have a significant impact on stock market indexes. Empirical research and economic theories regard stock prices and thus, the market index, as the most reliable measures of shifts in economic activity. An investor must prioritise these areas if they wish to increase the return on their investments (Ahmed, 2008).

From the perspective of the firm, it is also important to understand the impact of macroeconomic activity on its profits and value. Companies are required to consider the impact of macroeconomic factors on their financial performance in order to plan appropriately. Unfortunately, the effects of economic downturns cannot be managed or overcome. For this reason, the firm needs to incorporate the impacts of economic decline into its budgeting projections, recruitment of new staff, layoffs and capital investments.

3. RESEARCH DESIGN AND METHODOLOGY

This study comprised the collection of secondary data and analyses based on a longitudinal approach. A mixed exploratory research design was applied. The mixed exploratory design commenced with qualitative analysis, followed by quantitative analysis. The qualitative findings and quantitative results were integrated to reach a conclusion. In the following paragraphs, each method is explained.

3.1. Qualitative Research Method

The qualitative analysis was executed in the form of a systematic review. The purpose of the systematic review is to identify macroeconomic factors that can be included for testing in the empirical analysis. The term systematic review is defined by Boland et al. (2017) as a review that aims to uncover and synthesise existing research evidence so that study findings can be compared for integrated understanding. According to Cooper (2017), social scientists utilise a technique called research synthesis to compile and combine the results of several investigations on a single study subject or topic. A systematic review's research synthesis is an essential component (Cooper, 2017). In Table 1, it can be observed that a total of 11 academic research articles were analysed for the purpose of the systematic review. These research articles were selected through the application of the following criteria:

- The aim/goal/objective/hypothesis of the sampled study should be to estimate/seek macroeconomic factors that are associated with share prices. This criterion allowed for research synthesis;
- Sampled articles should be selected from peer-reviewed academic journals. This criterion maintained the quality aspect of the qualitative research process;
- The publication date of sampled journal articles should not be older than seven years. This criterion served as a control measure to ensure relevance of the qualitative research findings and
- The article should be written in English.

Furthermore, it should be noted that the sampled articles were obtained through searches on Google Scholar, EBSCOhost, Sabinet, Scopus, ProQuest, JSTOR and Emerald Insight Journals. The sampled academic articles were analysed by means of a tabular approach to identify patterns. Such patterns were identified through frequency counting of concepts.

3.2. Quantitative Research Method

The purpose of the quantitative analysis was to determine whether an association exists between the share prices of sampled firms and the macroeconomic factors, which were identified by means of qualitative analysis. The population of the empirical study comprised the top 40 Johannesburg Stock Exchange (JSE) listed firms in South Africa. These firms are deemed an appropriate population. JSE-listed firms represent 80% of the market capital represented by the JSE. Thus, it can be posited that the top 40 JSE-listed firms are a fair reflection of the conditions of the South African market (Courtney Capital, 2024).

Table 1: Qualitative analysis

Journal title	Author (s)	Publication year	Location	Research summary	Research finding	Macroeconomic factors identified
Academic Journal of Business and Management	Ling	2023	UK	The study explored the impact of exchange rate, consumer price index, export value, interest rate, money supply, producer price index, total reserves and economic policy uncertainty index on stock market prices.	Through ordinary least squares modelling, it was established that exchange rate and money supply have significant effects on the stock market.	Exchange rate; money supply
Global Journal of Arts Humanity and Social Sciences	Oladosu and Akeerebari	2022	Nigeria	In this study, money supply, exchange rate, consumer price index and prime lending rate were applied as proxies for macroeconomic factors. The market capitalisation of Nigerian listed firms was collected to represent a dependent variable. Ordinary least square regression modelling was applied to compile a regression model.	The research concluded that money supply and exchange rate had a positive and significant effect on market capitalisation, while the prime lending rate had a significant negative effect on market capitalisation.	Money supply, exchange rate, prime lending rate.
International Journal of Social and Humanities Sciences	Zreik	2022	Lebanon	In this Lebanese study, regression analysis was applied in order to predict stock returns (dependent variable) by means of inflation, interest rate and money supply (independent variables). The researcher collected ten years of data for quantitative analysis.	The research indicated that 95,9% (R2=0.959) of changes in Lebanese stock returns could be predicted by modelling the inflation, interest rate and money supply as independent variables.	Interest rate; money supply.
Bank and bank systems	Alzoubi	2022	Jordan	The researchers collected data from the Amman Stock Exchange between 1991 and 2020. Correlation analysis and regression modelling were applied for statistical analysis.	It was concluded that CPI and repo rates affected 83,3% of stock prices in the long run.	CPI, repo rate
Accounting	Luwihono et al.	2021	Indonesia	The quantitative study aimed to measure the relationship between interest rate, exchange rate, inflation rate and stock prices. Data were collected for the period 2010 to 2017. Data were collected for banking firms listed on the Indonesian Stock Exchange.	It was found that a significant statistical relationship exists between the exchange rate and share prices.	Exchange rate
Eurasian Journal of Business and Economics	Ali	2020	Bangladesh	The research was undertaken to determine whether macroeconomic factors such as economic growth rate, inflation rates, interest rates and exchange rates affect the market capitalisation of listed firms in Bangladesh. The study applied a Vector Error Correlation Model to test for correlations in the short run and in the long term.	The study found that economic growth is a significant factor in the prediction of the market capitalisation of firms listed on the Bangladesh stock exchange.	GDP
Journal of Security and Sustainability Issues	Dinh et al.	2020	Vietnam	The researchers collected data between 2014 and 2019 to test for relationships between macroeconomic variables and the share prices of Sacombank. Regression analysis was applied to seven different independent variables: economic growth rate, inflation, lending rate, risk-free rate, USA dollar-to-Vietnamese Dong rate, SP500 index and the Vietnam Ho Chi Minh Stock Index.	The findings of the study pointed out that the economic growth rate, consumer price index, lending rate and risk-free rate had the most significant impact on share prices.	GDP; CPI; prime lending rate; risk-free rate.
South Asian Journal of Business Studies	Chang et al.	2019	Pakistan	The research investigated the effects of industrial production, foreign direct investment, trade balance, exchange rate, interest rate and consumer price index on stock prices of companies listed on the Karachi Stock Exchange (KSE-100). The authors applied a decomposition analysis to determine the significance of the selected variables.	The study concluded that the interest rate affected the share price negatively, while the consumer price index affected share prices positively.	Interest rate; CPI
Journal of Sustainability and Socio-Economic Growth	Mawardi et al.	2019	Indonesia	The researchers collected data relating to 350 Islamic firms for the period 2011 to 2017. A linear regression approach was applied to determine whether macroeconomic activity have an impact on share prices.	The findings indicated the share prices of sampled firms were significantly impacted by the inflation rate, government interest rate and production index.	Inflation, repo rate, production index.

Table 1: (Continued)

Journal title	Author (s)	Publication year	Location	Research summary	Research finding	Macroeconomic factors identified
Journal of Economics and Sustainable Development	Khan and Khan	2018	Pakistan	The paper was compiled to establish how different macroeconomic variables impact the stock prices of Pakistani listed firms. Data were collected for the period May 2001 to August 2016. A total of 184 monthly observations were collected for analysis.	The findings of the study indicated that a significant relationship exists between money supply, exchange rate, interest rate and share prices in the long run. The conclusion was reached through the application of regression modelling.	Interest rate, exchange rate, money supply.
International Journal of Mathematics and Mathematical Sciences	Kwofie and Ansah	2018	Ghana	The research set out to test the relationship between exchange rate, inflation and share prices on the Ghana Stock Exchange by applying ARDL bounds testing. Data were collected for the period 2000 to 2013.	The research showed that a significant positive relationship exists between share prices, inflation and exchange rates in the long run.	Inflation rate; exchange rate.

Source: Researchers as listed

Judgment sampling was applied to the sample. Judgement sampling is a type of non-probability sampling which requires the researcher to apply his or her own judgment as it pertains to the sampling process (Bell, 2015). The major disadvantage of this sampling type is that it may give rise to biases held on the part of the researcher. To mitigate such bias, clear sampling criteria were established. Each firm sampled had to comply with the selection criteria. The criteria were as follows:

- The entity should be listed on the JSE for all years under review
- The entity should have share prices available for all years under review and
- The entity's share prices should demonstrate a correlation with at least one of the macroeconomic factors identified in the qualitative analysis.

It should be noted that other researchers such as Marx and Mohammadali-Haji (2014), Saunders (2016); Smit et al. (2022) and Mothapo et al. (2024) all successfully sampled the top 40 JSE-listed firms in their research. The sample for this research is illustrated in Table 2.

Data were collected for the period 2014-2023. Variables collected for statistical analysis included share prices of sampled firms, money supply, exchange rate, prime lending rate, repo rate, consumer price index (CPI) and gross domestic product (GDP). Share price data were collected from IRESS, while data relating to macroeconomic factors were collected from Statistics South Africa. Statistical analysis was performed by means of the Statistical Package for the Social Sciences (SPSS), version 27 and involved the application of correlation analysis and multiple regression modelling. As the data collected were limited in observations (i.e. $n < 30$), a Spearman rank correlation coefficient was calculated. To further enhance statistical findings, multiple regression analysis was applied to estimate a predictive share price model. Share price was selected as proxy for the dependent variable, while macroeconomic factors represented independent variables. To determine the optimal predictive model, a stepwise multiple regression analysis was conducted using SPSS. This method systematically evaluates all potential combinations of independent variables, ultimately selecting the subset that most effectively predicts the dependent variable, while concurrently mitigating the influence of multicollinearity. Findings related to the empirical analysis can be observed later in this paper.

4. QUALITATIVE ANALYSIS

In this section, the qualitative findings of the research are presented. The analysis of sampled research articles was conducted by means of tabling. Each article was analysed based on journal title, author(s), year of publication, geographical focus, research summary, key findings and macroeconomic factors identified. Articles were arranged chronologically, from the most recent to the oldest. The most frequently identified factors were selected for testing in the empirical phase of the study. The qualitative findings are summarised in Table 1.

To ease the interpretation of qualitative data displayed in Table 1, the frequencies associated with each macroeconomic factor identified were counted. Table 3 summarises these frequencies.

From Table 3, it can be observed that all macroeconomic factors identified from the systematic review, apart from the risk-free rate and production index, were accounted for at least twice. Consequently, all macroeconomic factors listed in the table were included for quantitative testing, except the risk-free rate.

5. EMPIRICAL ANALYSIS

The empirical analysis was executed through correlation analysis and multiple regression analysis. The execution of each of these statistical approaches can be observed in the sections hereafter.

5.1. Correlation Analysis

For the purpose of correlation testing, a Spearman rho correlation (r) was measured. The interpretation of this measure ranges as follows:

- 0 to 0.3 is considered a poor correlation
- 0.31 to 0.5 is considered a medium correlation
- 0.51 to 1 is considered a strong correlation.

Table 2: Sample to the research

Name of the firm	JSE sector
Anglo American Platinum Ltd	Basic materials
AngloGold Ashanti Ltd	Basic materials
Aspen Pharmacare Ltd	Healthcare
Capitec Bank Ltd	Financials
Clicks Ltd	Consumer services
Compagnie Fin Richemont	Consumer goods
Exxaro Ltd	Basic materials
FirstRand Ltd	Financials
Gold Fields Ltd	Basic materials
Harmony Gold Mining Company Ltd	Basic materials
Impala Platinum Ltd	Basic materials
Investec PLC	Financials
Kumba Iron Ore Ltd	Basic materials
Nedbank Ltd	Financials
Northan Platinum Ltd	Basic materials
Reinet Investment SCA	Financials
Remgro Ltd	Financials
Sasol Ltd	Basic materials
Shoprite Ltd	Consumer goods
Standard Bank Ltd	Financials
Vodacom Group Ltd	Telecommunication

Source: Authors

Table 3: Frequencies

Macroeconomic factor identified	Frequency
CPI	4
Interest rate/prime lending rate	6
Exchange rate	5
Risk-free rate	1
Money supply	4
GDP	2
Repo rate	2
Production index	1

Source: Authors

Where the correlation coefficient is negative, the same interpretation was applied, as explained in the latter bulleted list. This interpretation of the Spearman rho measure is in line with recommendations made by Pallant (2013) and Field (2009).

Correlation findings were tabled and displayed per JSE sector. A summary of correlation findings relating to each company within the JSE sector was provided. Correlation findings are displayed in Tables 4-10.

From Table 4, it can be observed that Anglo Platinum Ltd resulted in $r = 0.818$, $n = 10$, $P < 0.05$, as it relates to the CPI and share price association. It can be posited that there is a strong association between CPI and share price and that 67% ($R^2 = 0.669$) of changes in share price can be attributed to changes in CPI. Similarly, correlations among GDP and share price and money supply and share price also resulted in $r = 0.818$, $n = 10$, $P < 0.05$. These findings point out that CPI, GDP and money supply are also well-associated. For share price and exchange rate, $r = 0.503$, $n = 10$, $P < 0.05$. This indicates that 25% ($R^2 = 0.253$) of changes in the share price of Anglo Platinum Ltd can be attributed to changes in the exchange rate. The prime lending rate and the repo rate were well-associated with each other, but they were not associated with the share price.

For AngloGold Ashanti Ltd, the association between the exchange rate and share price could be expressed as $r = 0.745$, $n = 10$, $P < 0.05$. This demonstrates a strong association and that 56% ($R^2 = 0.555$) of changes in the share price can be attributed to the exchange rate as it relates to CPI and share price, GDP and share price and money supply and share price, $r = 0.952$, $n = 10$, $P < 0.05$. It can be posited that there is a strong association between CPI, GDP and money supply, while all these economic factors are strongly associated with the share price of AngloGold Ashanti Ltd. The share price association with the prime lending rate and repo rate was insignificant.

Exxaro Ltd resulted in high share price correlations with CPI, GDP and money supply, where $r = 0.850$, $n = 10$, $P < 0.05$ and $R^2 = 0.187$. The share price correlation with the exchange rate indicated a medium association, where $r = 0.433$, $n = 10$, $P < 0.05$ and $R^2 = 0.187$. Again, a strong association is observed between CPI, GDP and money supply. No correlations existed between share price and the repo rate, and share price and prime lending rate.

Goldfields Ltd demonstrated high share price correlations with CPI, GDP and money supply, where $r = 0.891$, $n = 10$, $P < 0.05$ and $R^2 = 0.794$. As it relates to the share price correlation with the exchange rate, a strong association was obtained where $r = 0.661$, $n = 10$, $P < 0.05$ and $R^2 = 0.437$. The associations between the share price of Goldfields Ltd and the repo rate and the prime lending rate were insignificant.

High share price correlations with the CPI, GDP and money supply were shown by Harmony Gold Mining Company Ltd. ($r = 0.721$, $n = 10$, $P < 0.05$ and $R^2 = 0.519$). Regarding the relationship between the exchange rate and share price, a substantial correlation was found at $r = 0.515$, $n = 10$, $P < 0.05$ and $R^2 = 0.265$. The

Table 4: Basic materials

Association measure	Share price				
	Anglo American Platinum Ltd	AngloGold Ashanti Ltd	Exxaro Ltd	Gold Fields Ltd	Harmony Gold Mining Company Ltd
n	10	10	10	10	10
CPI	0.818	0.952	0.850	0.891	0.721
Exchange rate	0.503	0.745	0.433	0.661	0.515
GDP	0.818	0.952	0.850	0.891	0.721
Money supply	0.818	0.952	0.850	0.891	0.721
Prime lending rate	−0.128	0.189	0.000	0.091	0.067
Repo rate	−0.128	0.189	0.000	0.091	0.067

Source: Authors

Table 5: Basic materials (continued)

Association measure	Share price			
	Impala Platinum Ltd	Kumba Iron Ore Ltd	Northan Platinum Ltd	Sasol Ltd
n	10	10	10	10
CPI	0.648	0.915	0.745	−0.721
Exchange rate	0.636	0.600	0.600	−0.467
GDP	0.648	0.915	0.745	−0.721
Money supply	0.648	0.915	0.745	−0.721
Prime lending rate	−0.183	0.085	−0.152	0.195
Repo rate	−0.183	0.085	−0.152	0.195

Source: Authors

Table 6: Financials

Association measure	Share price			
	Capitec Ltd	FirstRand Ltd	Investec Ltd	Nedbank Ltd
n	10	10	10	10
CPI	0.976	0.636	−0.297	−0.491
Exchange rate	0.758	0.576	−0.042	−0.661
GDP	0.976	0.636	−0.279	−0.491
Money supply	0.976	0.636	−0.279	−0.491
Prime lending rate	0.238	0.482	0.671	0.372
Repo rate	0.238	0.482	0.671	0.372

Source: Authors

Table 7: Financials

Association measure	Share price		
	Reinet Investments SCA	Remgro Ltd	Standard bank Ltd
n	10	10	10
CPI	0.988	−0.830	0.382
Exchange rate	0.806	−0.588	0.055
GDP	0.988	−0.830	0.382
Money supply	0.988	−0.830	0.382
Prime lending rate	0.293	0.274	0.781
Repo rate	0.293	0.274	0.781

Consumer goods

Association measure	Share price	
	Compagnie Fin Richemont	Shoprite Ltd
n	10	10
CPI	0.612	0.273
Exchange rate	0.648	0.188
GDP	0.612	0.273
Money supply	0.612	0.273
Prime lending rate	0.439	0.835
Repo rate	0.439	0.835

Table 8: Consumer services

Association measure	Share price
	Clicks Ltd
n	10
CPI	0.964
Exchange rate	0.758
GDP	0.964
Money supply	0.964
Prime lending rate	0.152
Repo rate	0.152

Source: Authors

Table 9: Health care

Association measure	Share price
	Aspen Pharmacare Ltd
n	10
CPI	−0.758
Exchange rate	−0.382
GDP	−0.758
Money supply	−0.758
Prime lending rate	0.067
Repo rate	0.067

Source: Authors

Table 10: Telecommunications

Association measure	Share price
	Vodacom Ltd
n	10
CPI	0.976
Exchange rate	0.758
GDP	0.976
Money supply	0.976
Prime lending rate	0.238
Repo rate	0.238

correlations between Harmony Gold Mining Company Ltds share price and the prime lending rate and the repo rate were negligible.

The relationship between the share price and exchange rate for Impala Platinum Ltd. can be expressed as follows: r = 0.636, n = 10, P < 0.05. This shows a high correlation, with the exchange rate accounting for 40% ($R^2 = 0.404$) of share price movements. Relationships between the money supply and share price, GDP and share price and CPI and share price are as follows: r = 0.648, n = 10, P < 0.05, $R^2 = 0.419$. It is possible to argue that the money supply, GDP and CPI all have a strong correlation with one another and that this correlation also exists with the share price of Impala

Platinum Ltd. There was little correlation between the share price and the repo and prime lending rates.

In relation to the CPI and the share price, Kumba Iron Ore Ltd produced a result of $r = 0.915$, $n = 10$, $P < 0.05$, as shown in the table. A significant correlation between CPI and share price is hypothesised, with 84% ($R^2 = 0.837$) of share price movements attributable to changes in CPI. Similar results were obtained for the correlations between the money supply and share price and the GDP and share price ($r = 0.915$, $n = 10$, $P < 0.05$). These data point out that CPI, GDP and money supply are likewise well-associated with one another. In terms of exchange rate and share price, $P < 0.05$, $r = 0.636$, $n = 10$. This suggests that fluctuations in the exchange rate account for 40% ($R^2 = 0.404$) of variations in Kumba Iron Ore Ltds share price. While there was an association between the prime lending rate and the repo rate, there was no significant association between these macroeconomic factors and the share price of Kumba Iron Ore Ltd.

Northam Platinum Ltd showed strong share price associations with the GDP, CPI and money supply ($r = 0.745$, $n = 10$, $P < 0.05$ and $R^2 = 0.555$). A significant association between the share price and the exchange rate was discovered at $r = 0.600$, $n = 10$, $P < 0.05$ and $R^2 = 0.360$. There was little relationship between the share price of Northam Platinum Ltd and the prime lending rate and repo rate.

In terms of CPI, GDP and money supply, Sasol Ltd showed strong negative share price correlations ($r = -0.721$, $n = 10$, $P < 0.05$ and $R^2 = 0.519$). It may be argued that the money supply, GDP, CPI and share price of Sasol Ltd move in opposite directions. A medium negative correlation between the share price and exchange rate was found, with $r = -0.467$, $n = 10$, $P < 0.05$ and $R^2 = 0.218$. Little correlation was found between the prime lending rate, the repo rate, and the share price of Sasol Ltd.

As per the table, the association between the Capitec Ltd share price and the exchange rate can be described as follows: $r = 0.758$, $n = 10$, $P < 0.05$. This demonstrates a strong link, with 58% ($R^2 = 0.575$) of share price fluctuations being explained by the exchange rate. The following are the relationships between the share price and the money supply, GDP and share price, and CPI and share price: $r = 0.976$, $n = 10$, $P < 0.05$, $R^2 = 0.953$. This suggests a substantial correlation between the money supply, GDP, and CPI and that this correlation extends to the share price of Capitec Ltds shares. The share price and the prime lending rate and repo loans did not significantly correlate.

FirstRand Ltd has shown strong share price correlations with the GDP, CPI, and money supply ($r = 0.636$, $n = 10$, $P < 0.05$ and $R^2 = 0.404$). At $r = 0.576$, $n = 10$, $p < 0.05$ and $R^2 = 0.332$, a significant correlation was found between the exchange rate and share price. With $r = 0.482$, $n = 10$, $P < 0.05$ and $R^2 = 0.232$, the share price of FirstRand Ltd and the prime lending rate and repo rate showed moderate correlations.

The negative relationship between the share price and exchange rate for Investec Ltd can be expressed as follows: $r = -0.042$, $n = 10$, $P < 0.05$. This demonstrates a very small correlation.

Relationships between the money supply and share price, GDP and share price, and CPI and share price are as follows: $r = -0.297$, $n = 10$, $P < 0.05$, $R^2 = 0.088$. There was a strong, positive association between the share price and the repo and prime lending rates, where $r = 0.671$, $n = 10$, $P < 0.05$.

In terms of CPI, GDP, and money supply, Nedbank Ltd showed a medium negative share price correlation ($r = -0.491$, $n = 10$, $P < 0.05$ and $R^2 = 0.241$). It may be argued that the money supply, GDP, CPI and share price of Nedbank Ltd move in opposite directions. A strong negative correlation between the share price and exchange rate was found, with $r = -0.661$, $n = 10$, $P < 0.05$ and $R^2 = 0.437$. There was a medium, positive correlation found between the prime lending rate and the repo rate and the share price of Nedbank Ltd, where $r = 0.372$, $n = 10$, $P < 0.05$ and $R^2 = 0.138$.

For Reinet Investments SCA, the CPI, GDP and money supply showed strong share price correlations ($r = 0.988$, $n = 10$, $P < 0.05$ and $R^2 = 0.976$). A strong correlation between the share price and exchange rate was found, with $r = 0.806$, $n = 10$, $P < 0.05$ and $R^2 = 0.649$. There was a small, positive correlation found between the prime lending rate and the repo rate and the share price of Reinet Investments SCA, where $r = 0.293$, $n = 10$, $P < 0.05$ and $R^2 = 0.085$.

Remgro Ltd showed strong negative correlations between the share price and the money supply, GDP and CPI ($r = -0.830$, $n = 10$, $P < 0.05$ and $R^2 = 0.689$). The exchange rate and share price correlation showed a medium-sized negative relationship ($r = 0.588$, $n = 10$, $P < 0.05$ and $R^2 = 0.346$). There were minor, positive relationships between the prime lending rate and share price and the repo rate ($r = 0.274$, $n = 10$, $P < 0.05$ and $R^2 = 0.07$).

The positive, strong relationship between the share price and exchange rate for Compagnie Fin Richemont can be expressed as follows: $r = 0.648$, $n = 10$, $P < 0.05$, $R^2 = 0.419$. Strong relationships between the money supply and share price, GDP and share price and CPI and share price are as follows: $r = 0.612$, $n = 10$, $P < 0.05$, $R^2 = 0.375$. There was a medium, positive association between the share price and the repo and prime lending rates, where $r = 0.439$, $n = 10$, $P < 0.05$, $R^2 = 0.193$.

The following is an expression of the relationship between Shoprite Ltds share price and exchange rate: $n = 10$, $P < 0.05$, $r = 0.188$. This demonstrates a weak association, with the exchange rate explaining 3.5% ($R^2 = 0.035$) of changes in share prices. The following are the relationships between GDP and share price, CPI and share price and money supply and share price: $n = 10$, $r = 0.273$, $P < 0.05$, $R^2 = 0.075$. It is evident that there is not much of a correlation. With $r = 0.835$, $n = 10$, $P < 0.05$ and $R^2 = 0.697$, there was a significant, positive association between the share price and the repo and prime lending rates.

Clicks Ltd demonstrated significant positive connections between the share price and the GDP, the CPI and the money supply ($r = 0.964$, $n = 10$, $P < 0.05$ and $R^2 = 0.929$). The exchange rate and share price were shown to have a high, positive association ($r = 0.758$, $n = 10$, $P < 0.05$ and $R^2 = 0.574$). The prime lending

rate, the repo rate and the price of Clicks Ltds shares did not significantly correlate.

High, negative share price correlations with the CPI, GDP and money supply were shown by Aspen Pharmacare Ltd ($r = -0.758$, $n = 10$, $P < 0.05$ and $R^2 = 0.574$). Regarding the relationship between the exchange rate and share price, a negative medium correlation was found at $r = -0.382$, $n = 10$, $P < 0.05$ and $R^2 = 0.146$. The correlations between Aspen Pharmacare Ltds share price and the prime lending rate and the repo rate were negligible.

Vodacom Ltd resulted in high share price correlations with CPI, GDP and money supply, where $r = 0.976$, $n = 10$, $P < 0.05$ and $R^2 = 0.953$. The share price correlation with the exchange rate indicated a strong association, where $r = 0.758$, $n = 10$, $P < 0.05$ and $R^2 = 0.575$. Small correlations existed between the share price and the repo rate and share price and prime lending rate, where $r = 0.238$, $n = 10$, $P < 0.05$ and $R^2 = 0.06$.

5.2. Multiple Regression Modelling

In this section, findings related to the multiple regression model are reported. Multiple regression modelling was applied to estimate share price by means of independent, macroeconomic variables. The findings presented in Table 11 were constructed through the application of stepwise regression testing.

Table 11 indicates that the proposed model can predict 97.1% ($R2 = 0.971$; $SE = 1913.667$) of changes in the dependent variable (share price). In Table 11, the F ratio, together with its significance value (Sig.), indicates that the regression model is an overall good fit for the data, with $F(3;6) = 66.158$, $P < 0.005$. This demonstrates that the model can reliably predict share price, as $P = 0.001$, which is smaller than 0.05. Furthermore, it can be observed that the t-values fall within the negative range of $-4.835 \leq t \leq -2.775$ and within the positive range of $2.004 \leq t \leq 8.716$. This aligns with the accepted threshold, where t-values should exceed 2 or be <-2 to be considered statistically significant.

5.3. Discussion of Empirical Findings

Table 12 and Figure 3 summarise the overall findings presented in this section. In Table 12, a summary of the findings is presented. The findings are displayed by means of sector, correlations identified, type of correlation and other comments.

Table 11: Multiple regression modelling for share price

R2	0.971		
Standard error (SE)	1913.667		
F ratio	66.158		
Significance value (sig)	0.001		
Degrees of freedom (df)	3;6		
Independent variable	**Unstandardised beta**	**t-value**	**P-value**
Constant	−24304.596	−4.835	0.003
CPI	729.371	−2.775	0.001
Exchange rate	−419.289	2.004	0.001
Repo rate	−446.548	8.716	0.001

Source: Authors

From Table 12, it is evident that analysis was performed based on the different JSE sectors. The table indicates that, in general, the share prices of sampled firms correlated with CPI, exchange rate, GDP and money supply. In the majority of cases, these correlations were strong and positive in nature. The healthcare sector emerged as an outlier, where the correlations among share prices and CPI, exchange rates, GDP and money supply showed strong, negative associations. Under consumer goods, results related to Shoprite Ltd deviated from the general conclusion. Shoprite Ltd resulted in poor correlations among share prices and CPI, exchange rates, GDP and money supply but generated strong and positive correlations between share prices and the prime lending rate and repo rate.

In addition, the findings of this research pointed to a pattern within the correlation results. The results indicated that correlations between CPI, exchange rates, GDP and money supply were identical. This is an indication that these variables measure the same type of activity within the South African economy and the researcher could essentially rely on only one of these macroeconomic variables when measuring results. Similarly, the prime lending rate and repo rate also resulted in identical correlations with share prices. Again, this is an indication that the prime lending rate and repo rate measure similar activities within the economy and only one of these variables require testing by the researcher in order to obtain an understanding of the relationship between the selected macroeconomic variable and share prices.

Based on the qualitative analysis, this research yielded similar conclusions to those presented by other researchers. In the study, GDP was found to be a significant correlator to share prices, a finding which is in line with Ali (2020) and Dinh et al. (2020). Furthermore, this research also identified CPI as a macroeconomic variable that is related to share price behaviour. This finding is similar to the studies performed by Chang et al. (2019) and Dinh et al. (2020). Other macroeconomic variables that were well associated with share price included exchange rates and money supply. These findings are in line with the conclusions drawn by Ling (2023), Khan and Khan (2018), Kwofie and Ansah (2018), Luwihono et al. (2021), Oladosu and Akeerebari (2022) and Zreik (2022). Findings related to the multiple regression model were displayed in Figure 3.

In Figure 3, Y represents the share price, X1 the CPI, X2 the exchange rate and X3 represents the repo rate. When comparing the outcomes of the multiple regression analysis with the correlational insights presented in Table 12, a divergence is apparent. The correlation analysis highlighted a strong association between share prices and several key macroeconomic indicators, namely the CPI, the exchange rate, GDP and the money supply. These variables demonstrated notable correlational relationships, suggesting their potential predictive power regarding share price fluctuations. The subsequent application of a multiple regression model revealed a different set of influential factors. In the regression model, the CPI and the exchange rate, consistent with their correlational prominence, were retained as independent variables. Intriguingly, the repo rate, which did not exhibit a strong correlational relationship in the initial analysis outlined in Table 12, emerged as a statistically significant predictor within the multiple regression

Table 12: Summary of correlation findings

Sector	Correlation identified	Type of correlation	Other comment
Basic materials	Correlations existed between the share price and CPI, exchange rate, GDP and money supply.	Positive correlation	
Financials	Correlations existed between the share price and CPI, exchange rate, GDP and money supply.	Positive correlation	
Consumer goods	Correlations existed between the share price and CPI, exchange rate, GDP and money supply. Correlations also existed between the share price, prime lending rate and repo rate.	Positive correlation	Shoprite Ltd proved to be an anomaly and it resulted in high correlations between share price, prime lending rate and repo rate. This had not been the case for other observations. It can be speculated that findings for Shoprite Ltd resulted in an anomaly, due to the essential nature of the goods that this firm sells. Investors may consider investing in essential goods as a more stable investment that does not fluctuate when macroeconomic variables shift.
Consumer services	Correlations existed between the share price and CPI, exchange rate, GDP and money supply.	Positive correlation	
Health care	Correlations existed between the share price and CPI, exchange rate, GDP and money supply.	Inverse correlation	The healthcare sector delivered inverse correlations, indicating that there was an inverse relationship between share prices and CPI, exchange rates, GDP and money supply. This is an anomaly, as all other observations resulted in positive associations. It may be the case that the health care sector represents essential goods and services and thus remain stable or even adverse to changes in macroeconomic variables.
Telecommunication	Correlations existed between the share price and CPI, exchange rate, GDP and money supply.	Positive correlation	

Source: Authors

Figure 3: Multiple regression model

$$Y = 729.371(X1) - 419.289(X2) - 446.548(X3) - 24304.596$$

Source: Authors

framework. This inclusion suggests that the repo rate, while not strongly correlated in isolation, provides unique and valuable information to the model's estimation of share prices when considered in conjunction with other variables.

6. CONCLUSION

As indicated in the introduction, firms strive to create shareholder wealth for investors. The purpose of this research was to determine whether macroeconomic factors affect the ability of the top 40 JSE-listed firms to create shareholder wealth. This was achieved through a two-step process. First, a systematic review was performed in order to identify specific macroeconomic factors for analysis. Secondly, the identified macroeconomic factors were empirically examined to determine the association between share prices and such macroeconomic factors. Judgement sampling was applied to select the sampling frame. Testing was done within the different JSE sectors.

The findings of this research indicate that the share prices of sampled firms generally correlated with the behaviour of CPI, GDP, the exchange rate and the money supply. It was also found that CPI, GDP and money supply exhibited identical correlation

coefficients, indicating that these macroeconomic factors, in essence, measure the same economic activity. When multiple regression modelling was applied, it was found that the share price of sampled firms can be predicted by means of modelling CPI, exchange rate and the repo rate, resulting in $R^2 = 0.71$. Thus, the combination of these independent variables can predict 97.1% of changes that occur in the share prices of listed firms.

From these findings, it may be posited that macroeconomic indicators affect the share prices of sampled firms to a significant extent. Since these indicators are external in nature, they cannot be influenced by the firm. Instead, the firm needs to plan around the behaviour of macroeconomic factors, taking into account that this may affect its share price value.

The limitations of this research included the fact that the population was restricted to the top 40 JSE-listed firms. In addition, the study relied on only one type of empirical analysis: correlation analysis. Lastly, the result of this research is restricted to the performance of a single stock exchange, namely the JSE. As it relates to further research, the methods applied in this study can be mimicked and applied to other smaller stock exchanges such as AltX (i.e. the JSEs alternative stock exchange). The type of empirical analysis can also be expanded on through the additional application of linear regression modelling.

Finally, it can be posited that listed, sampled firms' share prices were influenced by macroeconomic factors in the South African economic environment. It may, therefore, be posited that downturns in the economic cycle affect the ability of firms to create shareholder wealth.

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