EFFECT OF FOREIGN EXCHANGE RATE ON FINANCIAL PERFORMANCE OF LISTED MANUFACTURING COMPANIES IN KENYA

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Abstract:

The government of Kenya's broad target for enhancing manufacturing is to increase the manufacturing share of gross domestic product from 8.4% to 15% to create more jobs but the target remains a mirage owing to the poor performance of the manufacturing sector over the years where for instance, sector performance declined to 3.5% in 2019 compared to 4.4% in 2018. Studies globally, regionally and locally have been conducted to establish how macroeconomic variables affect the profitability of companies. However, mixed results have been reported pointing to positive, negative, significant and insignificant effects making it unknown how economic growth, inflation and exchange rates influence the performance of manufacturing firms. The purpose of this study was to establish the influence of Interest rates on the financial performance of listed manufacturing companies in Kenya. The study was guided by; the efficient market hypothesis and arbitrage pricing theory. This study adopted a descriptive correlational research design grounded on panel data spanning 6 years from 2015 to 2020 with a target of 8 listed manufacturing firms. The exchange rate showed a negative influence on performance with coefficients 0.358, 2.764 and -1.532 respectively such that a 1% increase in economic growth and inflation increased performance by 0.358% and 2.764% respectively while a 1% increase in exchange rate decreased performance by 1.532%. The study recommends the formulation of prudent macroeconomic policies including bailouts during pandemics

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geared towards enhancing the performance of manufacturing firms as envisaged under the Big four agenda and Vision 2030 blueprint.

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1. Introduction

1.1 Background of the Study

A firm exists as a body that optimizes available scarce resources to produce goods and services to be sold to customers at a profit. Increased or decreased profits indicate the improved or declining financial performance of the firm (Haider, Anjum, Sufyan, Khan and Khan, 2018). Measurement of financial performance as noted by Haider *et al.* (2018) is by profits, size, market share, worker and client satisfaction, a societal and conservational performance where diverse ratios such as return on asset (ROA), liquidity and turnover ratios among others are commonly used to measure the financial status of firms. Challenges of competition in the globalization period have influenced several firms to realize the significance of financial performance that aid the sustainability of businesses. Undoubtedly, the firms' performance is informed by both inside factors and outside factors considered to be macro (Dewi, Soei and Surjoko, 2019).

Internal and macroeconomic dynamics affect the performance of firms either positively or negatively, inside factors occur within the business that management can control such as; production capacity, reduced costs, structural culture, governance, production quality, demand and production factors while macro factors are exogenous such as; economic conditions, political, social, environmental, competition, government regulations and policies making it impossible for the management to control (Egbunike and Okerekeoti, 2018). It is therefore vital that firms understand these factors for the sake of controlling their effect on future financial performance (Issah & Antwi, 2017). According to KIPPRA (2020), gross domestic product (GDP) growth rate, overall inflation, population size, poverty level, labour productivity growth, exchange rate and the unemployment rate were the key Kenya's macroeconomic and inclusive growth indicators in the year 2020.

Studies investigating the effect of macroeconomic variables have been conducted globally, regionally and locally focusing on different sectors of the economy. For instance, Issah and Antwi (2017), Dewi *et al.* (2019), Cyril and Okechukwu (2014) established positive effects in the United Kingdom (UK), Indonesia, Nigeria and Kenya respectively while Haider *et al.* (2018), Nurlaily, Suhadak, Kusdi, Wen, His & Lydia (2011), Kipkirui & Abednego (2019) established negative effect in Pakistan, Indonesia and Kenya respectively. This mixed result is an indication that it remains uncertain as to what effect macroeconomic variables have on the profitability of manufacturing companies. Therefore, it is necessary to undertake a study to establish the influence of selected

macroeconomic indicators on the financial performance of manufacturing firms listed at Nairobi Securities Exchange (NSE).

1.2 Statement of the Problem

In the medium term, the republic of Kenya plans to realize all-encompassing progress by warranting a growing industrial sector to generate employment (KIPPRA, 2020). The broader target for enhancing manufacturing within the five-year plan from 2018 to 2022 is to grow the manufacturing share of GDP from 8.4 % to 15 % (Government of Kenya, 2020). The target remains a mirage owing to the poor performance of the manufacturing sector over the years where for instance, according to KIPPRA (2020) report, progress in the industrial division declined to 3.5% in 2019 in relation to 4.4% in 2018. This decline is attributed to a slump in the production of consumption goods and the global recession among other macroeconomic challenges that have made 42% of manufacturing firms operate at less than half their production capacity (KPMG & KAM, 2020) which has led to poor financial performance. KNBS reported that from the year 2017 to 2018 there was a massive job loss from 910,000 to 841,000 employees which had a negative effect on the financial performance. Reduced financial performance has led to many companies shutting down such as; Webuye pan paper, East African Portland cement, Raymond's and even some operating at half capacity such as Mumias sugar company.

To ensure the sustainability of the manufacturing sector it is imperative to identify the main macroeconomic aspects that affect financial performance. Several studies; globally, regionally and locally have been conducted to establish how macroeconomic factors affect the financial performance of firms. However, mixed results have been reported pointing to the positive, negative, significant and insignificant influence of economic growth, inflation and exchange rate on financial performance, more importantly, studies conducted in Kenya rarely focused on manufacturing firms listed at the NSE, this makes it unknown as to how; economic growth, inflation and exchange rates affect the performance of manufacturing companies. To bridge the knowledge gap, it was necessary to conduct a study on the influence of selected macroeconomic indicators on the financial performance of listed manufacturing companies in Kenya.

2. Literature Review

2.1 Arbitrage Pricing Theory (APT)

Stephen Ross in 1976 advanced this hypothesis by postulating that an asset's yields can be projected using a direct association of an asset's probable yields and the macroeconomic indicators that affect the asset's risk. APT provides policymakers and investors with a multi-factor pricing function for securities, built on the connection between a financial asset's expected return and risks. The APT purposes to identify the market price of a security that may be erroneously priced. APT assumes that trading action is not always perfectly efficient, and hence sometimes results in assets being overvalued or undervalued. Saeed and Akhter, (2012) suggested that the projected yield

of an asset depends on regular risks that include macroeconomic issues, which are not diversifiable practice measures.

Sadiye (2014) further argued that the theory uses numerous indicators hence a multiple-variable model. The sensitivity of undertakings in each variable is presented with a beta coefficient that designates the unique sensitivity of each particular variable (Ouma & Muriu, 2014). The model also links the expected return of an asset to multiple risk factors where Ouma and Muriu (2014) outlined numerous security risks that included variations in interest rates, inflation and growth.

APT, offer traders a function to evaluate the hypothetical value of an asset where after obtaining the value, traders identify slight deviations from the fair market price, and trade accordingly. The study was geared towards determining various macroeconomic variables in the stock market in relation to the financial performance of firms.

2.2 Theory of Purchasing Power Parity

Cassel (1918) came up with the hypothesis which postulates that the exchange rate of currencies ought to be equal to the ratio of total price levels between two countries, such that one unit of currency of one country will have an equal purchasing power in a foreign country. Coakley, John & O'Reilly (2005) suggested that the theory could also be stated as an inflationary theory of exchange rates as it shows variations in cost levels as the key element of exchange rate developments. PPP can either be absolute or relative where absolute defines the situation where local currency retains the same purchasing power when exchanged for international currency.

Coakley *et al.* (2005) argued that local currency needs to have the ability to buy an equal quantity of commodities across the world. Relative PPP on the other hand, notes that variation in national costs mirrors changes between countries. PPP is a collective device used by merchants to evaluate the over or undervaluation of an asset. It is ordinarily used to analyze forex stock pairs. Merchants can use the discrepancy between the PPP rate and exchange rate to evaluate a currency's long-standing projection and valuation.

Purchasing power parity is relevant to the study because it is a commonly used metric for measuring the gross domestic product (GDP) and by comparing the GDP values in different time periods we can tell the level of growth for a country which impacts the financial performance of firms either positively or negatively.

2.3 Conceptual Framework

This study was guided by a conceptual framework in Figure 2.1. The independent variables were economic growth measured by nominal Gross Domestic Product, inflation rate measured by producer price index (PPI) rate and exchange rate measured by US dollar rate. Financial performance, the dependent variable was measured by return on asset.
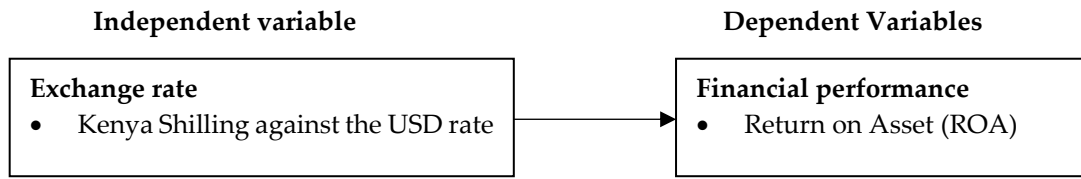
Independent variable	Dependent Variables
Exchange rate • Kenya Shilling against the USD rate	**Financial performance** • Return on Asset (ROA)

Figure 2.1: Conceptual Framework

2.4 Empirical Literature

To evaluate the effect of macroeconomic indicators on the liquidity of banks in Kenya, Soy and Kalui (2021) studied 37 commercial banks using a census study and multiple regression analysis. Results indicated that the exchange rate and inflation effect on liquidity were not statistically significant but Simiyu (2015) by investigating commercial banks trading at the NSE established that the exchange rate had a positive significant effect on ROA.

Ahmad et al. (2020) in examining 300 Nigerian companies using enterprise value ratio to measure firm value and GDP growth and Inflation as macroeconomic variables. Results based on panel analysis indicated that GDP had a negative significant influence on company value while there was a significant positive influence by exchange rate. Egbunike and Okerekeoti (2018), similarly exploring the financial performance of Nigerian firms indicated that the exchange rate had no significant effect on financial performance.

Examining the impact of macroeconomic indicators on banks' performance in Nepal, Bhattarai (2018) using regression revealed that macroeconomic variables; economic growth and exchange rate had no significant impact on performance. Alibabaee and Mohammad (2016) in their study in Iran focusing on automotive, pharmaceutical companies and oil products from 2009 to 2014, established that exchange rates positively influenced the performance of pharmaceutical and oil products industries but negatively for the automotive industry. Inflation had an insignificant influence on the performance of the pharmaceutical and oil products industries but positively influenced the performance of the automotive industry.

Dewi, Soei and Surjoko (2019) in determining the influence of macroeconomic indicators on the profitability of fast-moving consumer goods companies in Indonesia using regression established that Gross Domestic Product (GDP) positively and significantly influenced profitability while inflation and exchange did not. Conversely, Nurlaily *et al.* (2011) investigating the influence of macroeconomic variables on the performance of Indonesian food and beverage companies from 2004 to 2010 depending on OLS established that inflation and exchange rates had a significant negative influence on financial performance.

In an attempt to understand how macroeconomic indicators, affect the performance of Nigerian conglomerates, Cyril and Okechukwu (2014), used panel data from 2011 to 2014 involving three companies using; monetary policy rate, exchange rate and inflation rate as macroeconomic variables it was noted that there was a positive

significant influence of exchange rate and insignificant negative influence of inflation on performance.

3. Methodology

3.1 Research Design
A descriptive correlational design based on a quantitative research paradigm was employed where Mugenda (2010) pointed out that descriptive survey research provided data that objectively showed whether a significant relationship among variables existed. The design is therefore suitable as it established the influence of selected macroeconomic indicators on the financial performance of listed manufacturing companies in Kenya.

3.2 Target Population
As noted by Bartlett *et al.* (2001) and Creswell (2003), the target population is a complete set of items from which information is collected from (Bartlett *et al.,* 2001; Creswell, 2003). The population for this study consisted of eight trading manufacturing companies at the NSE by 2020.

3.3 Data Collection Procedure
According to Burns and Grove (2003), data collection is a detailed and logical process for the gathering of facts important to the research objective. The study employed quarterly panel data spanning six years from 2015 to 2020 on economic growth, inflation, exchange and return on assets (ROA) as this provided sufficient information and covered the scope period of the study as most firms had published their financial reports. Data on economic growth: GDP growth rate, inflation, and the exchange rate was obtained from published financial statistics reports of CBK and KNBS websites while ROA information was obtained from published financial records of the NSE trading manufacturing companies.

3.4 Data Processing and Analysis
Panel data denotes samples of similar cross-sectional units observed at multiple points at regular intervals where the study adopted panel data analysis based on fixed and random effect model using STATA. The Hausman test was conducted to select a random or fixed effect model based on the null hypothesis that the random model is appropriate. A panel regression model 3.1 was relied upon to get the influence of economic growth, inflation and exchange rate on the financial performance of trading manufacturing companies. T-Test was used to test the hypothesis on individual parameters.

$$ROA_{it} = \alpha + \beta EXR_{it} + \varepsilon_{it} \quad \text{...(3.1)}$$

Where;
$ROA =$ Return on assets, a measure of financial performance;
$EXR =$ Exchange rate, measured by quarterly USD dollar exchange rate;

$\varepsilon =$ Error term capturing other factors;

$t =$ Time period, from Quarter 1 2015 to Quarter 4 2020;

$i =$ Eight manufacturing firms;

$\beta_i =$ Panel regression coefficient;

$\alpha =$ Constant.

4. Research Findings and Discussion

4.1 Descriptive Statistics
Mean, standard deviation, minimum and maximum were run to understand the distribution of the variables used that included the return of assets (ROA) and exchange rate.

Table 1: Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
ROA	42	6.5	10.82452	-34.3	36.7
EXR	42	102.1629	2.490892	98.25583	106.4592

Results in Table 1 for the study period 2015 to 2020, we had 42 observations arising from the multiplication between 6 years' study and 7 firms producing a panel of 42 observations where the average return on assets (ROA) for the manufacturing sector and exchange rate (EXR) and economic growth (ECG) were 6.5, 6.0% and Ksh.102.20 respectively. The standard deviation of 10.82 for ROA which was greater than the mean showed that during the study period there was a wider variability in the performance of the various manufacturing firms as it can be noted that the minimum ROA was at -34.3 which was reported for Eveready in 2020 while the maximum return on assets was 36.7 for Orchard in 2015. The exchange rate had standard deviation values less than the mean $2.3 < 4.6$, an indication that the variability in the variables over time was small. The lowest exchange rate was 98.30 and a maximum of 106.50 for the years 2015 and 2020 while the smallest economic growth rate of -0.3% and maximum economic growth of 6.3 % were recorded in 2020 and 2018 respectively.

4.2 Variables Normality Distribution
The study conducted a normality test for the variables to ascertain their distribution over time. Shapiro-Wilk W test was employed with the null hypothesis that the variable is normally distributed at a 5% level of significance.

Table 2: Shapiro-Wilk W Test for Normal Data

Variable	Obs.	W	Z	Prob.
ROA	42	0.99370	-0.509	0.81030
EXR	42	0.95571	1.048	0.52027

Note: P-values > 0.05 indicate normal distribution.

Normality test for variables guides us on whether to apply parametric or non-parametric tests if the variables are normality or not normally distributed. Shapiro-Wilk W test results in Table 2 depicted all W-values being approximately 1, probability values greater than 0.05 and z-values less than the z-critical value of 1.96. This implied the acceptance of the null hypothesis that variables of financial performance (ROA) and exchange rate (EXR) were normally distributed at a 5% level of significance.

4.3 Stationarity Test

To ensure the reliability and validity of results when conducting panel data analysis, it is prudent to establish that the variables are stationary. The study employed Levin-Lin-Chu stationarity test based on the null hypothesis that the variable is not stationary and the alternative hypothesis that the variable is stationary.

Table 3: Levin-Lin-Chu Stationarity Test Results

Variable	Panels	Periods	Test Statistic	P-value
ROA	7	6	-22.7608	0.0000
EXR	7	6	-2.1534	0.0156

Note: P-values indicate statistically significant given p-value < 0.05.

The critical value for the test static is -1.9470. Test results in Table 3 showed probability values less than 0.05 while all the test statistic values for the variables were less than the critical value of -1.9470. This implied the rejection of the null hypothesis that the variables were not stationary at a 5% level of significance an indication that financial performance (ROA) and exchange rate (EXR) were stationary hence their usage for analysis would yield valid and reliable results.

4.4 Correlation Analysis

Correlation analysis was conducted to establish the association between the variables of ROA and EXR.

Table 4: Pearson Correlation Coefficients without COVID 19

Variable	ROA
ROA	1.0000
	(0.0485)
EXR	-0.3158*
	(0.0416)

Note: Values in parenthesis ( ) are p-values and * indicates statistically significant given p-value < 0.05.

Test results in Table 4 depicted correlation coefficients of r = -0.3158 for financial performance (ROA) and exchange rate (EXR) with a p-value of 0.0416 < 0.05.

4.5 Fixed and Random Effect Panel Regression Analysis

After conducting Pearson correlation analysis, fixed and random effect panel regressions were conducted to predict the changes in ROA due to the changes in EXR.

Table 5: Fixed Effect Results

ROA	Coef.	Std. Error.	t	$p > |t|$
EXR	-1.21233	0.18971	-6.39	0.000
Constant	149.26718	117.1429	1.27	0.882

Table 6: Random Effect Results

ROA	Coef.	Std. Error.	t	$p > |t|$
EXR	-1.53183	0.09867	-15.52	0.001
Constant	147.9827	114.0604	1.30	0.204

Table 7: Hausman Test Results

ROA	(b)	(B)	S.E.	$p > |Chi^2|$
	fe	re		
EXR	-1.21233	-1.53183	1.83	
$b =$ consistent under null hypothesis; random effect appropriate				
$B =$ inconsistent under alternative hypothesis; fixed effect appropriate				

Before the interpretation of fixed and random effect results, Hausman test was run to identify the appropriate model between fixed effect and random effect. The Hausman test was based on the null hypothesis that the random effect model is appropriate while the alternative hypothesis was that the fixed effect model was appropriate. Results in Table 7 capture the variables where ROA as the dependent variable and EXR as the independent. Columns b (fe) and B (re) captured the fixed and random effect models coefficients with S.E. denoting the standard errors. Given the chi-square p-value ($p > |Chi^2|$) of 1.000 which is greater than 0.05 implied the null hypothesis that the random effect model is appropriate was accepted at 5% level of significance.

From the Hausman test results, Table 7 results on random effect were used to extract a regression model (4.1) that establishes the influence of selected macroeconomic indicators of EXR on the financial performance of manufacturing companies (ROA) trading at NSE.

$$ROA_{it} = 147.98 - 1.532\,EXC_{it} \quad \text{……………………………………………... (4.1)}$$

The regression coefficient of -1.532 with a p-value 0.001< 0.05 and t-statistic -15.52 smaller than t-critical -2.02 implied exchange rate (EXR) had a significant negative influence on financial performance (ROA) at 5% level of significance. The exchange rate (EXR) therefore had a significant negative influence on financial performance (ROA) such that a percentage increase in the exchange rate (EXR) led to a 1.532% decrease in financial performance (ROA) of the manufacturing firms.

The findings though contradicting Soy and Kalui (2021); Simiyu (2015) who established insignificant and negative influence for commercial banks in Kenya, are

similar to the results of Nurlaily *et al.* (2011) who assessed the influence of exchange rate on the financial performance of Indonesian food and beverage companies.

5. Summary, Conclusion and Recommendation

5.1 Summary
Correlation coefficients of r = -0.3158 with a p-value 0.0416 < 0.05 indicated a significant negative association between financial performance (ROA) and exchange rate (EXR). The random effect results having regression coefficient of coefficients -1.532 with a p-value 0.001< 0.05 and -1.582 with a p-value of 0.004< 0.05 implied a significant negative influence of exchange rate (EXR) on financial performance (ROA) such that a percentage increase in the exchange rate (EXR) led to 1.532% and 1.582% decrease in financial performance (ROA).

5.2 Conclusions
The study findings established that the null hypothesis for the objective was rejected at 5% level of significance. That is, an exchange rate (EXR) had a significant influence on ROA. Therefore, it was concluded that the exchange rate influenced negatively the financial performance of listed manufacturing companies in Kenya which might be associated with the weakening of the Kenyan shilling during the period making imports too expensive since the majority of the companies buy some raw materials from other countries.

5.3 Recommendations
Firms to establish empowered research departments and teams that can predict the volatility in exchange rates which may direct firms as to when to stock more of the imported raw materials to reap from a stronger Kenyan shilling and cut on cost when the shilling weakens against the US dollar.

Conflict of Interest Statement
The authors declare no conflicts of interest.

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