The Effect of Macroeconomic Factors on Agricultural Sector Growth in Tanzania

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Abstract

The agricultural sector in Tanzania is a significant contributor to the country's economy, but its growth has been impeded by various macroeconomic factors, including inflation, interest rates, and exchange rates. Therefore, the study assessed the effect of macroeconomic factors on agricultural sector growth in Tanzania. The study used Purchasing Power Parity Theory, the Expectations Theory and Cost Push Inflation Theory. A correlational research design applied, data covering the period from the year 1993 to 2023 were used. Data were sourced from reputable institutions, including the NBS, World Bank, and BOT. The descriptive analysis and time-series analysis were applied. The ARDL was used to estimate the relationships between variables. Results indicate that the interest rates, exchange rates, and inflation have a statistically significant negative effect on agricultural sector growth at p-values of 0.0458, 0.042, and 0.014, respectively. The negative effect of these variables on agricultural sector growth means that, when these variables increase, agricultural sector growth decreases and vice versa, hence the study draws a conclusion that, the exchange rate, interest rate, and inflation rate have negative effect on agricultural sector growth.The study recommends that policymakers should prioritize stabilizing these economic indicators and consider targeted support measures to mitigate their adverse effects ensuring the sector to thrive amidst fluctuating macroeconomic conditions. To mitigate these negative impacts, the government can provide subsidies to farmers in order to offset increased costs of production, renegotiating trade agreements with other countries to reduce tariffs and non-tariff barriers so that farmers can export their products at competitive prices.

Keyword*: Macroeconomic Factors, and Agricultural Sector Growth, Tanzania*

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I. Introduction

The agricultural industry is a fundamental component of the worldwide economy, supplying food, raw materials, and jobs for billions. It represents 4% of the global GDP and employs about 25% of the global workforce in agriculture (World Bank, 2023). Therefore, the global economy is deeply interconnected with the agricultural sector, and its health and sustainability are critical to the overall economic system (Okwuchukwu, 2022). Ensuring the resilience and productivity of agriculture is a global priority, that is why it is often referred to as the cornerstone of the global economy (Steensland & Thompson, 2020).

In developed countries, agriculture often contributes a relatively small percentage to the national GDP, usually in a single digit. This is due to the reason that, their economies are more diversified and have a significant industrial and service sector. In developed countries such as the U.S, it contributes to around 5.4% of the U.S. GDP and provides 10.4% of U.S. employment (USDA, 2024). In Canada, it contributes around 2% of the country's GDP (Windfeld & Lhermie, 2022); in the United Kingdom, it accounts for around 0.6% of the country's GDP (National Statistics, 2022); in Germany, it contributes around 0.7% of the country's GDP (Kirschke et al., 2021), and in Japan, it accounts for around 1% of the country's GDP (Statista, 2024). In developing countries, agriculture has historically served as the foundation for numerous economies, where it not only serves as a primary source of food but also as a significant contributor to national income, employment, and foreign exchange earnings (Loizou et al., 2019).

The effect of agriculture on the GDPs of developing countries varies rely on the level of development of the country. In agriculture-based countries, the agriculture sector can contribute up to 50% of the overall GDP, while in more developed countries, this percentage can drop to less than 10% (Arias, 2016; Bruinsma, 2017). In Tanzania, as one of the developing countries, agriculture has been termed as the backbone of the economy whereby it contributing most to the livelihoods of the rural population.

In 2021, agriculture accounted for approximately 33.3 trillion Tanzanian shillings (TZS), equivalent to about 14.3 billion U.S. dollars, of Tanzania's Gross Domestic Product (GDP), and it played a role in generating 85% of the country's exports (Statistica, 2024). Tanzania's macroeconomic indicators demonstrated strong GDP growth prior to and during the initial phase of the Agricultural Sector Development Programme (ASDP-1), which began in 2006. Between 2006 and 2014, the GDP growth rate ranged from 6.0% to 8.1%. This GDP growth occurred during a time of growth in the agriculture sector, except for 2008, which experienced significantly lower growth. The agriculture sector had an average growth rate of 3.9% annually during the 2006–2014 period. Additionally, from 2006 to 2012, the agriculture sector's contribution to total GDP declined from 27.7% to 23.2% (URT, 2017).

Despite the importance of agriculture in economic growth, sector growth has been inconsistent and often affected by various macroeconomic variables (Oluwatoyese & Razak, 2016). The sensitivity of

agriculture to these factors can either propel the sector to significant grow or plunge it into stagnation (Chetthamrongchai et al., 2020).

High inflation increases the cost of farming inputs such as seeds, fertilizers, and equipment something which reducing farmers' purchasing power and potentially leading to lower agricultural output. Inflation leads to a general rise in prices, including farming inputs like seeds, fertilizers, and equipment (Osinowo & Sanusi, 2018). As the cost of these inputs increases, farmers have to spend more money to purchase them, this reduces their purchasing power and strains their budgets. With higher input costs, farmers struggle to maintain their profit margins (Osinowo & Sanusi, 2018).

The study by Nnoli et al. (2023), and Eje et al. (2023) showed that inflation had a positive effect on agriculture growth. The cost of borrowing money for investment in agricultural technologies and infrastructure is affected also by interest rates. Lower interest rates make borrowing money more attractive for farmers and agribusinesses (Balana & Oyeyemi, 2020). With lower borrowing costs, they are more likely to seek loans to invest in agricultural technologies and infrastructure. This increased borrowing can lead to more investments in modern equipment, advanced farming techniques, and improved infrastructure, ultimately boosting productivity and growth in the sector (Mishra, 2018).

The studies by Moh'd (2020) and Ölkers and Mußhoff (2023) indicated that the interest rate is significant and positively influences agriculture's export earnings and growth, while Aroriode and Ogunbadejo (2014) found that the interest rate revealed an insignificant effect on agricultural growth. Moreover, fluctuations in exchange rates impact the competitiveness of agricultural exports and the cost of imported goods, thereby affecting trade balances and farmers' incomes (Ngoma, 2015). When a nation's currency depreciates, its agricultural exports become cheaper for foreign buyers something which can increase demand and boost exports.

On the other hand, a stronger currency can increase the price of exports, making them less competitive in the international market (Roudari et al., 2020). Fluctuations in exchange rates can also affect the cost of imported goods, including inputs such as fertilizers, pesticides, and machinery. A weak currency makes imports more expensive which can lead to increase costs of production for farmers and ultimately reduces their profitability and income (Johnson et al., 2012). The study by Roudari et al. (2020) and Olaoye (2022) showed that the exchange rate has a negative effect on agricultural sector development.

1.2 Statement of the Problem

Most of available reviews about the impact of inflation, interest rates, and exchange rates are found around the world. In Tanzania, available studies (such as Stanslaus, 2017; Kihwele, 2022) focused on the impact of macroeconomic variables on economic growth and other sectors of the economy, such as the construction sector (such as Makoye et al., 2023), and banking sectors (such as Lyimo & Hussein, 2022; Nyabakora et al., 2020; and Miku et al., 2023). Limited researches have been conducted to comprehensively analyze macroeconomic effects on agricultural sector growth, particularly in the context of Tanzania. Hence, a comprehensive examination is needed to bridge the gap and provide policymakers with evidence-based insights for formulating effective agricultural and macroeconomic policies. Consequently, this research analyzed the impact of macroeconomic variables on the growth of the agricultural sector in Tanzania, utilizing time series data spanning from 1993 to 2023.

1.3 Research Objectives.

1.3.1 General Objective

The main objective of the study was to determine the effect of macroeconomic factors on agricultural sector growth in Tanzania.

1.3.2 Specific Objectives

Specific objectives of the study include;

i. To determine the effect of exchange rates on agricultural sector growth,
ii. To examine the effect of interest rates on agricultural sector growth,
iii. To determine the effect of inflation rate on agricultural sector growth.

2. Literature Review

2.1 Review of Theories

2.1.1 The Purchasing Power Parity Theory (PPP)

Gustav Cassel, a Swedish economist, is credited with developing the theory of PPP, which he first presented in the early 20th century (Kadochnikov, 2013). The PPP theory is an economic concept proposing that, over time, the exchange rates between two nations ought to align so that the cost of a collection of goods and services is consistent in both countries. Essentially, this theory posits that exchange rates should adjust to ensure that a single unit of currency maintains equivalent purchasing power across different nations (Rabe

& Waddle, 2020). The PPP theory is relevant to this study because fluctuations in exchange rates can significantly impact the agriculture sector by altering the cost of imported inputs like machinery, fertilizers, and pesticides, which in turn affects farmers' purchasing power, production costs, and ultimately, the sector's overall growth (Johnson et al., 2012). The PPP theory also indicates that, a country's currency value relative to other countries can impact its export competitiveness in the agricultural sector (Ogunjobi et al., 2022). When a country's currency is overpriced, its exported goods become less appealing to international buyers due to the higher value. On the other hand, an underpriced currency can boost a country's exports, as its products become more affordable and competitive globally, potentially driving up demand for agricultural products and promoting sector growth (Ruhil et al., 2023).

2.1.2 The Expectations Theory

The author of the Expectations Theory is often credited to Irving Fisher, an American economist who first proposed the theory in the early 20th century (Dimand, 2019). The Expectations Theory posits that long-term interest rates are shaped by the market's predictions of future short-term interest rates. This theory asserts that investors decide to purchase or sell bonds based on their expectations regarding future interest rates (França & Gaspar, 2023). In simpler terms, investors expect to be compensated for the risk of lending money over a longer period. If they think short-term interest rates will rise, they want a higher interest rate on long-term bonds to offset that risk. Conversely, if they think short-term rates will drop, they'll accept a lower interest rate on long-term bonds (Cieslak, 2018). The theory is relevant to the study as it shows that, when interest rates are high, borrowing costs increase for farmers and agribusinesses leading to reduced investment in machinery, technology, and infrastructure (Kharaishvili et al., 2015). This can hinder productivity growth and limit the overall growth potential for the agricultural sector. Conversely, lower interest rates can stimulate investment and fuel expansion in the agricultural sector, leading to increase productivity and output (Adams, 2021).

2.1.3 Cost Push Inflation Theory

The author of the cost-push inflation theory is A. W. Phillips (Lawler & Pavlenko, 2020). Cost-push inflation theory, also known as supply-side inflation. It suggests that, increases in the cost of production results high prices for goods. This can occur due to variety of factors such as rising wages, increasing raw material costs, high import prices, or government regulations that raise production costs (Egle, 1961). When companies face

higher expenses, they frequently compensate by increasing prices, leading to a rise in the general price level of goods and services, and subsequently driving inflation (Greenwood & Hanke, 2021). In the context of the agricultural sector, cost-push inflation can have a profound effect on production and profitability (Jain et al., 2022).

When production costs rise, farmers may be forced to increase prices of their products in order to maintain profitability. This can lead to decrease consumer demand for agricultural products, which in turn can hinder the growth of the agricultural sector (Assouto et al., 2020). Cost-push inflation can also have indirect effects on agricultural sector through its effect on other macroeconomic factors (Desta, 2016). If inflation increases, it may result in higher interest rates, which can make it more costly for farmers to borrow money for investments. This could further impede the growth and development of the agricultural sector (Snell, 2022). Moreover, cost-push inflation can also affect the competitiveness of the agricultural sector in the global market (Abeles & Panigo, 2015). If production costs increase significantly in a particular country, its agricultural products may become less competitive compared to those from other countries with lower production costs (Janger & Schmidt-Dengler, 2010).

2.2 Empirical Review

The effect of exchange rates on agricultural sector growth has been a focal point of several studies across different countries. Ogunjobi et al. (2022) focused on Nigeria, found a significant long-term positive relationship between exchange rates and agricultural exports, while Eliakim (2020), who studied Tanzania, observed a negative correlation between exchange rates and agricultural exports, suggesting a need for further research using time series analysis. In Nigeria, Awolaja and Okedina (2020) revealed that an appreciation of real exchange rates positively impacts agricultural output, while depreciation has negative effects, underscoring the complexities of exchange rate relationships with agricultural growth.

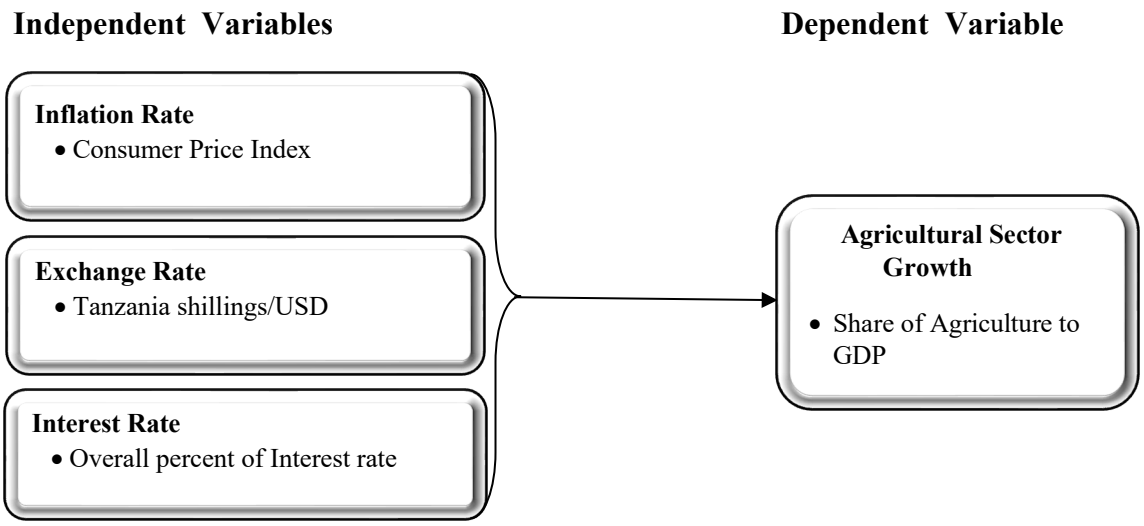
rates also play a crucial role in agricultural sector performance, as explored by various researchers. Onyishi et al. (2015) found that changing interest rates significantly affected credit availability for agriculture in Nigeria, emphasizing the need for policymakers to be mindful of interest rate levels. Similarly, Murungi et al. (2023) demonstrated that the introduction of an interest cap in Kenya led to increased agricultural lending. Other studies, like those by Ogwal (2023) and Kadir and Tunggal (2015), corroborated the negative impact of high interest rates on agricultural loans in Uganda and productivity in Malaysia, respectively, stressing that interest rate fluctuations remain an important aspect needing further investigation.

Inflation rates have also been addressed as significant factors influencing agricultural growth. Eslami and Baghestany (2020) linked inflation uncertainty to agricultural growth through a Bivariate GARCH model, while Mekonen (2020) reported a negative long-term relationship between inflation and agricultural

sector growth in Ethiopia. Moh'd (2020) found that while inflation positively affected agricultural export earnings in Tanzania, exchange rates showed no significant impact. In a broader context, Soliman et al. (2023) highlighted the negative effects of rising inflation on agricultural output in the UK. Across all these studies, a common theme persists: there is a pressing need for further research to examine the compounded effects of various macroeconomic factors, including inflation, exchange rates, and interest rates, on agricultural sector growth.

2.3 Conceptual Framework

The Figure 1 demonstrates how three key macroeconomic variables – inflation rate, exchange rate, and interest rate - influence agricultural sector growth. The graph reveals that, changes in these variables can lead to variations in the agricultural sector's contribution to GDP.



Source: Researcher (2024)

Figure 1: Conceptual Framework

2.4 Hypothesis

Based on the variables, the following hypothesis are formulated for the study;

i. Exchange Rates and Agricultural Sector Growth

H_0: Exchange rates have no effect on agricultural sector growth.
H_1: Exchange rates have an effect on agricultural sector growth.

ii. Interest Rates and Agricultural Sector Growth

H_0: Interest rates have no effect on agricultural sector growth.
H_1: Interest rates have an effect on agricultural sector growth.

iii. Inflation Rates and Agricultural Sector Growth

H_0: Inflation rates have no effect on agricultural sector growth.
H_1: Inflation rates have an effect on agricultural sector growth.

3. Research Methodology

3.1 Research Design and Data Sources

The correlational research design was used. Tanzania was selected because of the country's significant reliance on agriculture to the extent that it termed as a back bone to the country's economy. The study relied on quantitative data from existing sources, covering the period from the year 1993 to 2023.

The data was sourced from reliable and reputable institutions, including the National Bureau of Statistics, World Bank and the Bank of Tanzania, and the. Information about the inflation rate, interest rate, and exchange rate was obtained from BOT and information about the share of agriculture in GDP was obtained from NBS and WB. The study analysed data using descriptive statistics, and timeseries data analysis.

3.2 Variables and Measurement

Table 1 indicates independent and dependent variables along with their measurements.

Table 1: Measurement of Variables

Variables	**Measurement of Variables**
Independent Variables	
Inflation rate	CPI
Exchange rate	Tanzania shillings per USD
Interest rate	Interest rate in percentage
Dependent variables	
Agricultural sector growth	Share of agriculture to GDP in percentage

Source: Researcher's work (2024)

3.2 Specification of the Model

The research used Autoregressive Distributed Lag (ARDL) model. One of the key advantages of the ARDL model is its ability to accommodate both stationary and non-stationary time series data. Also, The ARDL model offers flexibility in selecting lag lengths for the variables. Researchers can include different lag structures for the dependent and independent variables, allowing for a more nuanced representation of the dynamics at play compared to more rigid structures in other time series models (Kripfganz & Schneider, 2023).

A regression equation form of ARDL written as;

$(ASG)_t = \beta_0 + \beta_{1(1-\rho)} INFL + \beta_{2(1-\rho)} EXR + \beta_3(_{1-\rho)} INT + \Sigma\Delta ASG_{t-1} + \Sigma\Delta INFL_{t-1} + \Sigma\Delta EXRt\text{-}1 + \Sigma\Delta INTt\text{-}1 + \varepsilon t$

Where:
ASG = Agricultural Sector Growth.
INFL = inflation rate.
EXR = exchange rate.
INT = interest rate.
β_0 is the intercept term.
β_1, β_2, and β_3 are the coefficients for the respective independent variables.
ρ is the error correction term.
$\Sigma\Delta GDP_{t-1}$, $\Sigma\Delta INFL_{t-1}$, $\Sigma\Delta EXR_{t-1}$, and $\Sigma\Delta INT_{t-1}$ are the lagged differences of the dependent and independent variables.
εt is the error term.

4. Findings and Discussions

4.1 Findings

4.1.1 Summary Descriptive Statistics

The research applied standard deviations, means, minimum and maximum values of the variables. Results are presented in Table 2.

Table 2: Descriptive Statistics

Variables	Exchange Rate	Interest Rate	Inflation Rate	Agricultural Sector Growth
Mean	1400.775	16.01129	9.607419	26.71387
Max	2519.47	37	34.08	30.87
Min	479.87	2.46	3.3	23.25
Std. dev	651.4404	9.152792	7.835239	1.971395

Source: Data (1993-2023)

Findings in Table 4.1 shows that, the mean exchange rate is 1400.775 shillings per USD, indicating that, on average, the local currency is worth approximately 1.40 shillings per US dollar. The maximum exchange rate is 2519.47 shillings per USD, which suggests that the value of the local currency has fluctuated

significantly over time. Conversely, the minimum exchange rate is 479.87 shillings per USD, implying that the value of the local currency has also been relatively low in some instances.

The standard deviation of 651.4404 suggests that, there is a significant amount of variation in the exchange rate. The mean interest rate is 16.01129%, approximately 16% indicating that interest rates have been relatively high on average. The maximum interest rate is 37%, which proposes that, there have been instances where interest rates have been extremely high, potentially affecting borrowing costs and agricultural sector growth. On the other hand, the minimum interest rate is 2.46%, implying that interest rates have also been relatively low at times, which stimulated agricultural sector growth. The standard deviation of 9.152792 suggests that, there is a moderate amount of variation in interest rates.

The mean inflation rate is 9.607419%, approximately 9.6% indicating that, inflation has been relatively high on average. The maximum inflation rate is 34.08%, which suggests that, there have been instances where inflation has surged significantly, potentially affecting the purchasing power of consumers, and agricultural sector growth. Conversely, the minimum inflation rate is 3.3%, implying that inflation has also been relatively low at times. The standard deviation of 7.84 suggests that there is a moderate amount of variation in inflation rates. This standard deviation suggests that, inflation has not been consistently high or low. The mean agricultural sector growth rate is 26.71%, indicating that the agricultural sector has experienced significant growth on average. The maximum growth rate is 30.87%, which may suggest that, the sector has experienced rapid growth in some instances. Conversely, the minimum growth rate is 23.25%, implying that growth has also been relatively slow at times. The standard deviation of 1.971395, approximately 2.0% suggests that, there is a relatively small amount of variation in agricultural sector growth rates.

4.1.2 Unit Root Test

To assess whether the time series data was stationary, this study employed the Augmented Dickey-Fuller Test (ADF). The test involved two hypotheses: the null hypothesis, which assumed the data was non-stationary (having a unit root), and the alternative hypothesis, which proposed that the data was stationary. The results of the ADF test, presented in Table 4.2, provide insight into the stationarity of the time series data.

Table 3: Augmented Dickey-Fuller Test for Unit Root

At Level (Zero Difference)		
Variable	**MacKinnon approximate p-value for Z(t)**	**Conclusion**
Exchange rate	0.9811	Non-Stationary

Interest rate	0.4800	
Inflation rate	0.2562	
Agricultural sector growth	0.0574	
1st Difference		
Exchange rate	0.000	Stationary
Interest rate	0.000	
Inflation rate	0.000	
Agricultural sector growth	0.000	

Source: Data (1993-2023)

Table 3 displays the findings of the ADF test for unit roots across four key variables: the exchange rate, the interest rate, the inflation rate, and agricultural sector growth. The test examines whether each variable is stationary or non-stationary at their levels (i.e., without taking differences). The column labeled "MacKinnon approximate p-value for Z(t)" presents the p-value for the test statistic Z(t), indicating the likelihood of obtaining the test statistic assuming the null hypothesis of non-stationarity for the series. The findings indicate that all variables are non-stationary at their original levels, as the p-values for each of the four variables exceed 0.05. This suggests that all four variables are non-stationary, meaning that they exhibit a unit root and are likely to follow a random walk process. However, when taking the first differences of each variable (i.e., examining changes in each variable over time), all four variables become stationary, as indicated by the p-values of 0.0000 for each variable. This indicates that all four variables become stable and follow a stationary process after taking their first differences.

4.1.3 ARDL Model Summary Results

The findings presented in Table 4 reveal that the F-statistic stands at 8.15, suggesting that the overall model holds statistical significance. The likelihood of this result occurring by chance is very low (Prob > F = 0.0001), reinforcing the model's significance. Furthermore, the R-squared value of 0.7216 indicates that the model accounts for roughly 72% of the variation in the dependent variable, while the remaining 28% is attributed to other factors.

The adjusted R-squared value of 0.6331, which considers the number of predictors in the model, offers a more cautious assessment of the model's fit, indicating that it explains about 63% of the variability in the dependent variable. The Root Mean Squared Error (RMSE) of 1.1177 reflects the average deviation between observed and predicted values; a lower RMSE signifies a stronger model fit. Additionally, the log

likelihood value of -41.255054 serves as an indicator of model fit quality, with lower values suggesting a better fit. Overall, the model is statistically significant and exhibits a good fit to the data.

Table 4: Model Summary Results

Category	Value
F(7, 22)	8.15
Prob > F	0.0001
R - squared	0.7216
Adj-R- squared	0.6331
Root-MSE	1.1177
Log-likelihood	-41.255054

Source: Secondary Data (1993-2023)

4.1.4 ARDL Coefficient Results

Table 5 displays the ARDL findings related to the impact of the exchange rate, inflation rate, and interest rate on agricultural sector growth at a lag of one (1).

Table 5: Coefficient Results

Agricultural Sector Growth	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Exchange rate						
--	.0044868	.0026171	1.71	0.101	-.0009406	.0099143
L1	-.0019855	.0026297	-0.76	0.0458	-.0074392	.0034681
Interest rate						
--	.0078341	.0537586	0.15	0.885	-.1036545	.1193227
L1	-.1175473	.0543054	-2.16	0.042	-.0049247	.2301698
Inflation rate						
--	.0283682	.0609062	0.47	0.646	.1546798	.0979435
L1	-.1777834	.0664492	-2.68	0.014	-.0399763	.3155905
_cons	16.9491	3.357043	5.05	0.000	9.987018	23.91118

Source: Data (1993-2023)

Exchange Rate and Agricultural Sector Growth: The results presented in Table 5 indicate a p-value of 0.0458, which is below the significance threshold of 0.05. This suggests that the exchange rate has a statistically significant negative impact on the growth of the agricultural sector, with a coefficient of -0.0019855 and a standard error of 0.0026297. This implies that a one-unit change in the exchange rate results in a -0.0019855 change in agricultural sector growth, all else being equal. The negative coefficient signifies that an appreciation of the exchange rate (meaning an increase in the value of the domestic currency) correlates with a reduction in the agricultural sector's contribution to GDP, expressed as a percentage.

This result implies that, a stronger currency can make exports more expensive and imports cheaper, leading to increased competition for domestic producers and potentially reducing their competitiveness in both domestic and international markets. This can result in decreased production and employment opportunities in the agricultural sector, ultimately contributing little or slow to the growth.

Interest Rate and Agricultural Sector Growth: The findings presented in Table 5 indicate a p-value of 0.042, which is below the significance threshold of 0.05. This implies that the interest rate has a statistically significant negative impact on the growth of the agricultural sector, with a coefficient of -0.1175473 and a standard error of 0.0543054. Essentially, a 1-unit increase in the interest rate is associated with a decrease of approximately 0.1175473 in agricultural sector growth, holding all other factors constant. Therefore, if interest rates were to rise by 1 unit, one could expect agricultural sector growth to decline by about 0.1175473, again holding everything else constant. This negative correlation suggests that higher interest rates adversely affect the agricultural sector. As interest rates go up, borrowing costs for farmers increase, making it more challenging for them to secure funds for investments, which in turn results in lower growth rates.

Inflation Rate and Agricultural Sector Growth: The results presented in Table 5 reveals a p-value of 0.014, which is below the significance threshold of 0.05. This indicates that the inflation rate significantly hampers the growth of the agricultural sector, with a coefficient of -0.1777834 and a standard error of 0.0664492. Specifically, it implies that a 1-unit increase in the inflation rate results in a decrease in agricultural sector growth of approximately 0.1777834, holding all other factors constant. Therefore, as the inflation rate rises, agricultural sector growth tends to decline by about 0.1777834 units, all else being equal. This finding aligns with the "cost-push" theory of inflation, which suggests that rising prices diminish consumer purchasing power and reduce demand for agricultural goods, consequently hindering growth in the agricultural sector.

4.2 Discussion

Findings show that the exchange rate has a statistically significant negative effect on agricultural sector growth. The study's findings contrast with previous research, such as Obiageli (2020), who showed that there is a negative effect of exchange rate on agriculture sector. Other studies, like Ogunjobi et al. (2022), suggested a positive long-term relationship between exchange rates and agricultural exports, emphasizing that favorable exchange rates enhance export competitiveness. Additionally, the study aligns with Eliakim (2020) who noted a negative correlation between exchange rates and agricultural exports, indicating that a weaker currency can increase costs for imported inputs, ultimately hindering exports due to inflation and decreased foreign buyer purchasing power. The findings also differ from Mushi and Sila (2021), who

emphasized that a depreciated currency boosts competitiveness for domestic producers, facilitating higher export volumes. Awolaja and Okedina (2020) noted that real exchange rate appreciation positively affected agricultural output more than depreciation negatively affected it.

Also, findings indicate that the interest rate has a statistically significant negative effect on agricultural sector growth. This result is consistent with previous research, including that by Onyishi et al. (2015) and Ogwal (2023), which indicates that high interest rates make borrowing costly, leading to loan defaults and reduced credit access for small-scale farmers. The findings also align with Kadir and Tunggal (2015) and Ayeomoni et al. (2016), revealing that high interest rates correlate negatively with agricultural productivity and output due to increased borrowing costs, hindering investments in technology and operations. Egilsson (2020) further notes that high rates can depreciate currency and increase input costs, exacerbating output declines, especially in developing countries where agriculture is vital to the economy.

Moreover, findings indicate that the inflation rate has a statistically significant negative effect on agricultural sector growth. The study's findings align with Mekonen (2020), revealing a negative long-term relationship between inflation and agricultural sector growth, indicating that rising inflation hampers growth. As inflation increases, the costs for farmers rise, tightening their profit margins and prompting decreased production and investment. This contraction in the agricultural sector can impede overall growth. In contrast, Moh'd (2020) found that moderate inflation can positively influence agricultural export earnings. Low inflation may strengthen the currency, reducing competitiveness, while moderate inflation can foster demand for goods and services, encouraging farmers to increase production and generate higher export revenues. Aye and Odhiambo (2021) support the notion that moderate inflation can stimulate agricultural investment, leading to higher productivity and efficiency, as farmers are incentivized to adopt new technologies that enhance output. Similarly, Soliman et al. (2023) highlighted that rising energy inflation and the Consumer Price Index (CPI) negatively affect agricultural output by elevating production costs, which can deter farmers from producing due to decreased affordability. Conversely, lower energy inflation and CPI enhance agricultural output by reducing production costs and increasing consumer demand due to lower living expenses. The negative impact of inflation on agricultural sector growth is further explained by the cost-push inflation theory, as noted by Lawler and Pavlenko (2020). Rising input costs force farmers to raise prices or curb production, thereby leading to lower yields and stunted growth in the agricultural sector.

5. Conclussion and Recomendations

5.1 Conclussion

The study aimed to determine the effect of exchange rate on agricultural sector growth. The study finds that the exchange rate negatively impacts the growth of the agricultural sector in a statistically significant way. This suggests that when the currency depreciates, there is an uptick in the import of agricultural inputs like seeds, fertilizers, and pesticides, which can harm local agricultural production. This is due to the reason that, a weaker currency makes imported goods cheaper, reducing the incentive for domestic farmers to invest in local production. As a result, agricultural sector growth is hindered due to the increased reliance on imports and decreased domestic production.

The study aimed to determine the effect of interest rate on agricultural sector growth. The study sought to investigate the impact of interest rates on agricultural sector growth. Key findings indicate that increasing interest rates have a statistically significant negative effect on the sector's growth. This negative correlation arises from high interest rates increasing the cost of borrowing for farmers and agricultural businesses. As a result, they are less able to invest in necessary tools, technology, and labor that drive productivity and efficiency improvements. Furthermore, high interest rates also lead to reduced consumer demand for agricultural products due to decreased household income and reduced consumer purchasing power resulting from higher borrowing costs.

Additionally, the research sought to assess how inflation rates influence the growth of the agricultural sector. The findings indicate that inflation levels have a statistically significant adverse effect on this sector's growth. Specifically, as inflation rises, the growth rate of agriculture significantly declines. This indicates that elevated inflation diminishes farmers' purchasing power, hampering their ability to invest in their enterprises, acquire necessary inputs like seeds, fertilizers, and equipment, and sustain their livelihoods. Consequently, this decline in agricultural production and productivity negatively affects the overall growth of the sector.

5.2 Recommendations

Since the exchange rate has a negative effect on agricultural sector growth, the government should provide enough subsidies to farmers to compensate for the increased production costs resulting from the depreciated currency. In terms of interest rates, since the interest rate has a negative effect on agricultural sector

growth, the government needs to improve access to credit for farmers and agricultural businesses through subsidies, low-interest loans, or credit guarantees. Moreover, since the inflation rate has a negative effect on agricultural sector growth, the governments can introduce targeted subsidies and financial assistance to farmers so that it can help them to absorb the increased costs of production. The government can also focus on developing value-added products and processing facilities to increase the value of agricultural output in order to make it more resilient to inflationary pressures.

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