

Research Article

Impact of Foreign Currency Reserve on Economic Growth in Ethiopia: An Economic Policy Analysis

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Abstract

Background: Ethiopia's foreign currency dynamics have significantly influenced its economic growth, particularly in recent years. The nation's chronic shortage of foreign exchange has been a persistent challenge, affecting various sectors of the economy. Such shortage hinders the importation of essential goods and services, disrupt business operations, and impede economic growth. Moreover, foreign exchange controls have made it difficult for investors to repatriate profits, potentially deterring foreign investment. **Methods:** This study analyzed the impact of foreign currency reserve on Economic growth in Ethiopia using 30 years of data spanning from 1991–2021. The study employed the Autoregressive Distributed Lag model to analyze the time series data, utilizing advanced econometric techniques to ensure the robustness of the results. This methodology provided a rigorous foundation for analyzing the impact of foreign currency on Ethiopia's economic growth, leveraging both modern econometric techniques and robust testing procedures. **Results:** The ARDL model result indicated that foreign currency reserve, Broad money supply, Exports and Trade openness index has a positive and significant effect on Ethiopian GDP growth in the long run and Government final consumption expenditure, Gross fixed capital formation has a negative and significant effect on Ethiopian GDP growth in the long run. The real effective exchange rate has positive sign and is statistically significant in explaining the economic growth in the long run. The government of Ethiopia may increase economic growth by 0.0850961% if it can increase its expenditure by 10%. The long-run result indicated that import had a negative relationship with manufacturing sector performance and statistical significance (P-value=0.0031) at 5% level. The long-run coefficient -0.074675 implies a unit increase in inflation will diminish the manufacturing sector by 0.074675. The country's economic growth over the past decade was fueled by massive borrowing that has created a debt burden of more than US\$26 billion, or with a public debt to-GDP ratio of 61.8%. **Conclusion:** By emphasizing homegrown innovation, the government should also endeavor to reduce the reliance of the manufacturing sector on imported equipment and supplies. The policymaker ought to take into account devaluing the birr currency price to its actual exchange rate value. Foreign currency reserves play a crucial role in fostering economic growth in Ethiopia by stabilizing the macroeconomic environment and by enhancing and adopting a strategic approach to reserve allocation and investment. Strengthening institutional frameworks and improving transparency will further optimize the impact of reserves on economic growth.

Keywords

Impact Assessment, Foreign Currency Reserve, ARDL Model, ECM, Economic Growth, Ethiopia

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1. Introduction

Most countries use USD as their reserve due to its acceptance overall the world [5]. Currency crises are mainly linked with the inconsistencies between domestic macroeconomic policies, such as an exchange rate commitment and a persistent government budget deficit that eventually must be monetized [18]. A reserve currency is a large quantity of currency maintained by central banks and other major financial institutions to prepare for investments, transactions and international debt obligations, or to influence their domestic exchange rate [8]. [24] also described reserve currencies being held in significant quantities by numerous governments and central banks as part of their foreign exchange reserves.

Social cost of foreign exchange would be likely to be higher than its private cost. That means investment in the priority projects through directed domestic credit is squeezing the availability of credit and foreign exchange for the rest of the economy. The poor performance of exports in past years and the growing demands for imports in Ethiopia makes foreign exchange availability continue to be a challenge for business and the economy at large. Export has been on down-ward sides since the early 2010's. Exports of goods and services as a ratio of GDP declined from its peak 16.7% in 2011 to 8.9% in 2018 [10].

In terms of the Ethiopian economic outlook, the African Development Bank [2] mentioned that gross official reserves remained low at 2.5 months of imports in 2016-2017 and 2.1 months in 2017-2018. The IMF identified inadequate reserves as a downside risk to economic growth for 2017-2018, which was forecast at 8.5%. Despite high economic growth, Ethiopia is heavily dependent upon imports. According to the IMF [19], Ethiopia's export revenues in the previous year was largely unchanged, despite some volume growth, as global agricultural commodity prices remained low and exports from manufacturing remained unbalanced.

Ethiopia is the biggest coffee exporter in Africa, yet its total export revenue has been hitting short of the targets set for the past few years owing to weaker commodity prices. Conversely, the Ethiopia's foreign currency crisis was cracked down on black market exchanges. With the exception of the agricultural food processing industry, most Ethiopian enterprises regularly import trained labor and raw materials. In the third quarter of 2019, the nation's imports climbed to 3746.40 USD million from 3428.60 USD million in the second quarter. From this total, food, clothing, machinery, and gasoline make up the majority of imports. The industrial sector was vulnerable to fluctuations in foreign exchange rates and shortages in currency availability due to its reliance on external sources for raw materials and the country foreign currency crisis was cracked down on black market exchanges [11].

The study was attempted to investigate the effects of foreign currency reserve and exchange based on the aforementioned rationale of the foreign currency crisis was cracked down on exchanges in Ethiopia.

Ethiopia's foreign currency supply, which is accessible to both travelers and investors, is progressively facing severe shortages. The importance of foreign currency shortages is so great that opening a Letter of Credit (LoC) can take up to a year or longer, and even then, there is no guarantee that the requested amount of foreign currency was available [1]. However, poor nations are unable to return to the state of takeoff due to inadequate assistance. When given and accepted, foreign aid aids developing nations in closing the gap between their levels of sovereignty and low saving [14]. Foreign direct investment, gross domestic product, and variables are all causally related in two ways [23].

In accordance with Steiner [6] an increase in foreign exchange reserves boosts the national currency supply, which impacts national exchange rate fluctuations through supply changes. However, in developing nations that import fewer luxury goods and services, imports are based mostly on relatively inexpensive luxury goods (oil products, pesticides, fertilizers, medicines, machinery, and food products, among other things). Reductions in foreign exchange reserves lead to declines in agricultural production of raw materials and oil products, as well as increased levels of food and higher levels of inflation.

The reserve currency's weakness, shown by its drop or depreciation in terms of the foreign exchange rate, is currently one of Ethiopia's primary growth issues. Although there are many reasons for the nation's poor economic performance, this currency change could be harmful to it. The policy failures to establish effective financial institutions, widespread unseen corruption in the privatization of the public sector, and currency devaluation are cited as the main causes of the country's perceived financial crises over the past 27 years as well as issues with the country's reserve currency [27].

The effect of exchange rates on the performance of the manufacturing sector has been the subject of numerous studies. The results of the investigations, however, are inconsistent. The other study that [9] looked at found a weak, negative correlation between the factors. Additionally, it has been revealed that there is a negative and significant association between the manufacturing performance and the exchange rate [16]. While most studies have revealed exchange rate exerts a positive and insignificance influence on the different sector's performance [27].

The mixed results show that the relationship between the exchange rate and different sector remains unclear. Besides, all the reviewed studies ignored the effect of foreign currency reserve on the manufacturing sector's performance.

To the researcher's best knowledge, the studies conducted in the area of foreign currency influence are few in number and their scope. [28] studied on an assessment of foreign currency shortage and its implication on the Ethiopian economy. [37] studied the impact of the real exchange rate changes on export performance in Tanzania and Ethiopia. [24]

studied the impact of real effective exchange rate on the economic growth of Ethiopia.

All the above and other researchers mainly focused on foreign currency influence on the national economy and importers performance. But the direct influence of foreign currency reserve and exchange rate on the performance of the manufacturing sector in Ethiopia has not been given an emphasis. Thus, the current state of Ethiopia's foreign reserve currency crisis, its perceived causes, its detrimental effects on the country's economy, and the policy directions that ought to be followed in order to recover from the ongoing reserve currency crisis have, however, received less attention in these studies. Thus, an attempt is made to fill in these information gaps in the current study.

The general objective of this study is to examine impacts of foreign currency reserve on economic growth in Ethiopia for the periods from 1991–2021 G.C.

To address this general objective, the study aims to achieve the following specific objectives:

- 1) To assess the past trend of FCR and RGDP on economic growth in Ethiopia throughout the period 1991–2021 G.C.
- 2) To investigate the relationship between foreign currency reserve and economic growth of Ethiopia over period 1991–2021 G.C.
- 3) To analyze the short run and long run impact of foreign Currency reserve on economic growth in Ethiopia throughout the period 1991–2021 G.C.

2. Foreign Exchange Rate and Economy Development

Foreign exchange reserves are also partly channeled to service external debt around 8% of total foreign-exchange earnings in 2018. It is defined also as the country's currency expressed in terms of another country's currency [21]. The exchange rate, as a key macroeconomic indicator, plays a vital role in international trade by enabling the comparison of the value of goods and services produced in different countries. It reflects the relative value of one country's currency to another and influences trade flows, investment decisions, and economic stability. Countries adopt different exchange rate policies depending on their economic conditions, development goals, and interactions with the global economy. These policies may range from fixed and pegged systems to floating exchange rate regimes, each with distinct implications for monetary policy, inflation control, and trade competitiveness. In any case, one of the major contributing elements towards understanding the monetary development as set in the Development and Transformation Plan is sufficient foreign exchange reserves holding of the country. This is on the grounds that accessibility of foreign currency capacitates the economy to satisfy the need for investment henceforth economic growth over the long run and empowers the Financial

Position to make stable macroeconomic execution in the short run, in expansive sense [16].

3. Foreign Exchange Reserve and Developing Countries

In a country affected with foreign change problems, reserve accumulation by the Central Bank comes from export earnings, remittance, loan and aids and foreign revenue is modelled in a log-linear frame as follows.

$$\text{Log FERT} = \text{FERT}_{t-1} + \text{Debt} + \text{Aid}_t + \text{Ext} - \text{Im}$$

Where:

FERT, debt, aid, Ext, and Im are ratios of reserves to GDP, debt to GDP, aid to GDP, exports to GDP and imports to GDP respectively.

Reserves at the end of the current period are a function of reserves at the end of the last period, returns on last year's foreign bonds, this year's aid inflows and export earnings less import payments during this period.

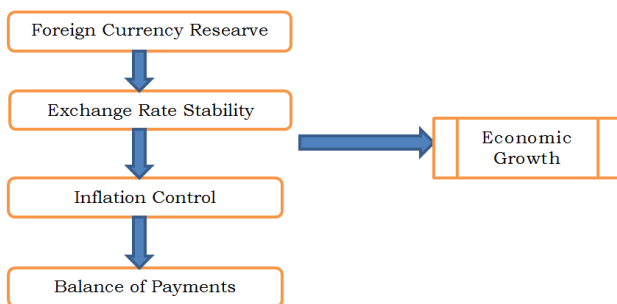
Similar to the goods market, the foreign exchange market is driven by the forces of supply and demand. The supply of foreign exchange comes from exports (including merchandise and service exports), foreign aid, and private transfers, along with net capital inflows. These sources together balance the demand for foreign exchange, which primarily comes from imports.

This balance between supply and demand is adjusted through the real exchange rate. When the real exchange rate depreciates, it makes exports cheaper and more competitive internationally, thereby increasing export volumes. At the same time, it makes imports more expensive, leading to a reduction in import demand. Conversely, if the exchange rate appreciates, exports become more expensive and less competitive, while imports become cheaper and more attractive. In the case of many Less Developed Countries (LDCs), persistent foreign exchange shortages arise. These are often due to structural trade deficits, weak export capacity, and high dependency on imports. Such shortages can significantly constrain economic performance and development [12].

On the other hand, the imports of Less Developed Countries (LDCs) mainly consist of raw materials, semi-finished goods, fuel, capital goods, and consumer goods with capital goods accounting for the largest share. By comparison, the slow response of exports and the substantial increase in imports caused by escalating demand for consumer goods and capital goods imports to rehabilitate the economy led to an ever widening trade deficit. Additionally, the recent global financial crisis that entailed a fall in inflows of foreign exchange into low-income countries from export revenues, remittances and other sources, led to foreign exchange rationing. This, in turn resulted into significantly reduced production or complete suspension of production by import-input intensive firms in some countries [3].

4. Conceptual Framework

The conceptual framework serves as a blueprint to understand the relationship between foreign currency reserves and economic growth in Ethiopia. It outlines key variables, their interactions, and potential outcomes. Based on the framework, the study hypothesized that there is a positive relationship between foreign currency reserves and economic growth in Ethiopia. Moreover, Exchange rate stability mediates the relationship between foreign currency reserves and economic growth. Also, adequate foreign currency reserves reduce inflation, contributing to economic growth. Based on the reviewed literature above, Foreign exchange reserve is treated as independent variable and Real Economic Growth (RGDP) is treated as dependent variable.



Source: Authors Design from the Empirical Review of different literature, 2024.

Figure 1. Conceptual Framework.

5. Methods and Materials

$$1. D(\text{Debt}_{j,t} / \text{GNI}_{j,t}) = a_1 [D(\text{FOR}_{j,t} / \text{GNI}_{j,t})] + a_2 (\log \text{GNI}_{j,t}) + a_3 (\text{Controls}_{j,t})$$

$$2. \text{Maturity}_{j,t} = b_1 (\text{Foreign Reserve}_{j,t} / \text{GNI}_{j,t}) + b_2 (\log \text{GNI}_{j,t}) + b_3 (\text{Controls}_{j,t})$$

The Impacts on Macroeconomic Variables:

$$1. \text{CON}_{j,t} / \text{GDP}_{j,t} = c_1 (\text{FOR} / \text{GNI}_{j,t}) + c_2 (\log \text{GNI}_{j,t}) + c_3 (\text{Controls}_{j,t})$$

$$2. \text{EXP}_{j,t} / \text{GNI}_{j,t} = d_1 (\text{FOR} / \text{GNI}_{j,t}) + d_2 (\log \text{GNI}_{j,t}) + d_3 (\text{Controls}_{j,t})$$

$$3. \text{INV}_{j,t} / \text{GDP}_{j,t} = e_1 (\text{FOR}_{j,t} / \text{GNI}_{j,t}) + e_2 (\log \text{GNI}_{j,t}) + e_3 (\text{Controls}_{j,t})$$

$$4. \text{DGDP}_{j,t} / \text{GDP}_{j,t} = f_1 (\text{FOR}_{j,t} / \text{GNI}_{j,t}) + f_2 (\log \text{GNI}_{j,t}) + f_3 (\text{Controls}_{j,t})$$

Where;

- 1) Debt = total external debt outstanding;
- 2) Maturity = average maturity of new commitments (years);
- 3) GNI = gross national income; and
- 4) Foreign Reserve = the amount of foreign exchange reserves.

The primary goal of this research was to determine the relationship between Ethiopia's foreign exchange reserve and country economic growth from 1991– 2021 G.C. To achieve the objective of the study descriptive and explanatory research designs were used. With the aid of mean, standard deviations, and time series graphs, the descriptive design was aims to evaluate the trend of foreign exchange reserve and economic growth. The explanatory research designs were employ statistical and econometric techniques to investigate the relationship between foreign exchange reserves and economic growth. In order to do this, the ARDL model and related procedures were used in this work.

Owing to the nature of the research, secondary data sources based on macroeconomic statistics at the national level was the sole sources of data used in this study. The Ministry of Finance and Development and the National Bank of Ethiopia will provided the annual time series data for the years 1991– 2021 G.C. on the following topics: Real Gross Domestic Product, Real Effective Exchange Rate, Government Consumption Expenditure, and Gross Fixed Capital Formation, Broad Money Supply, Export and trade openness. The availability of data was essentially determines the time of choosing.

6. The Empirical Model

The theoretical framework applied in this empirical setup was that of [17], who created a straightforward open-ended economy model in which foreign exchange reserves increased as liquidity risk costs decreased. The models are expressed as follows:

The Effects on External Debt and it's Maturity:

5) Subscript j denotes country j,

6) While subscript t denotes year.

7. Model Specification

In this analysis, annual data for the years 1991– 2021 G.C. was utilized to assess the effect of Ethiopia's foreign exchange

reserve on economic growth. The study's independent variables include the money supply growth rate (M2), real exchange rate (RER), gross capital formation (GCF), foreign exchange reserve (FER), export (Exp), and import (IM). The dependent variable is the real GDP.

Most studies have taken Ethiopia's fiscal and monetary policy variables into account when calculating the influence of foreign exchange reserves on the country's economic growth. Andrias (2011) embraced the model specification that is listed here.

$$\ln Y_t = \beta_0 + \beta_1 \ln REER + \beta_2 \ln M2_t + \beta_3 \ln GFCE_t + \beta_4 \ln EXP_t + \beta_5 \ln GFCF_t + \beta_6 \ln TO_t + \varepsilon \quad (1)$$

$$\text{Real GDP} = f(\text{foreign currency reserves, broad money supply, government final consumption expenditure, export, gross fixed capital formation, trade openness index}) \quad (2)$$

8. Measurement and Expected Signs

Table 1. Expected Sign of the independent Variables.

Variables	Symbol	Expected signs
Real growth domestic	RGDP	NA
Foreign currency reserve	RER	+
Government final consumption expenditure	GFCE	-
Gross fixed capital formation	GFCF	+
Broad money supply (liquid liability)	M2	+
Export	EXP	+
Trade openness	TO	+

Source: Authors computation from literature (2024)

The natural logarithm is used to express each variable contained in the higher than model square. The natural logarithm of the variables is used because it allows information that is inclined to be corrected into a normal distribution, which may be a critical assumption in econometric estimation [31].

9. Results and Discussions

Ethiopia's government has been working for the past twenty years to reduce deep-rooted poverty through rapid economic growth and macroeconomic stability. The EPRDF government's economic policies are characterized by a free market economy, which is demonstrated by encouraging the private sector at home, welcoming foreign investment, liberalizing the financial sector (for local owners only), and creating and enacting aggressive fiscal and monetary policies. Data from MoFED, 2020 shows that the average growth rates of GDP, GDP capita, and population between 1991 and 2021 are 6.7%, 3.4%, and 6.1%, respectively [7].

The expansion of the service and agricultural sectors has accounted for the majority of Ethiopia's economic growth over the past ten years, with the manufacturing sector performing relatively poorly. The country is among the world's

fastest growing economies thanks to sound macroeconomic policies that encourage the nation to make the most use of all of its resources. The general inflation rate for the final year of GTP I was estimated to be 20.2% [26].

Ethiopia's population is estimated by the World Bank to be 114.9 million, growing at a rate of 2.9% annually. The country's life expectancy is reported as 64 years in 2020, indicating a significant change from 67.8 years in 2020. The per capita income is estimated to be \$690 in 2020 [33]. The primary driver of growth and development in Ethiopia is agriculture, with an average growth of 6.6% in agricultural value added during the first Growth and Transformation Plan (GTP I) period.

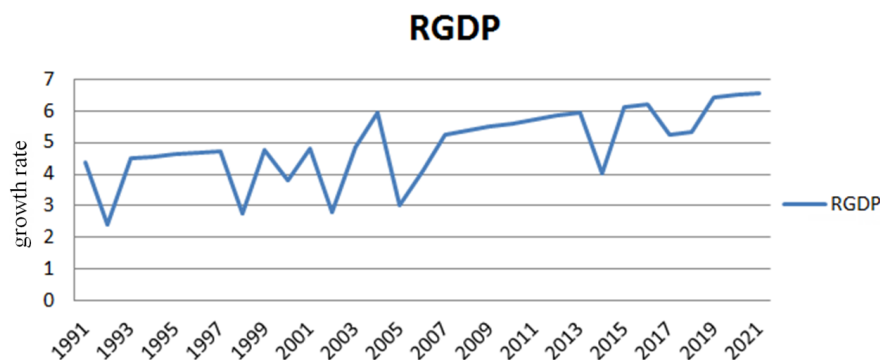
Consequently, the establishments of micro and small-scale businesses as well as the advancement of current ones to medium-sized businesses have received the majority of attention. This has led to the creation of jobs for almost 7 million persons [37].

9.1. Growth Rate of Real GDP in Ethiopia (1991–2021)

Throughout the research period, Ethiopia's economy performed inconsistently, particularly between 1991–2021. The severe drought that existed at the time is what caused the

lowest RGDP growth rates, which are shown in Figure 2 below, to be recorded the highest growth rate was recorded in

1995–1998 (5.5%), which was followed by 6% in 2004–05 and 6.5% in 2021.



Source: Computed based on data from National Bank of Ethiopia (NBE, 2024).

Figure 2. RGDP growth rate in Ethiopia (1991 – 2021).

During the Derg period, the average yearly growth rate was only 2.21%. However, the economy performed better as a result of the early 1990s reform initiatives, with the RGDP growing by approximately 4.5% on average between 1992–1993 and 2000–2001.

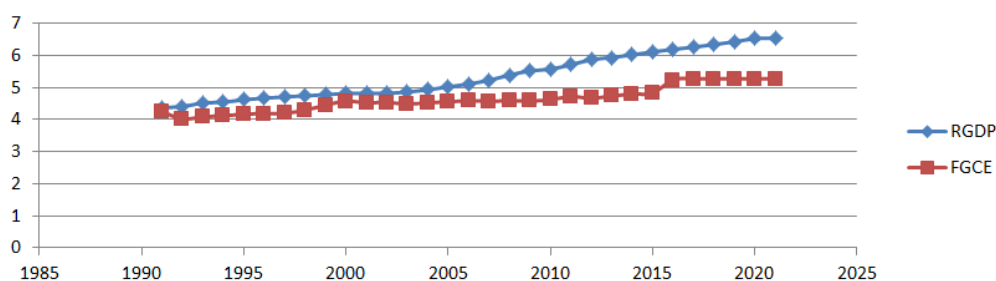
Since agriculture is the primary source of the nation's GDP, a decrease in agricultural output during the year resulted in a recorded growth rate of 1.3% in 1998. As seen in Figure 2 above, 2001's EPRDF economic performance was also negative, coming in at -2.5%. This is also a consequence of the year's drought.

Following the year 2001/02, there was a notable shift in both the sign and amount, with the former going from 3% to 6% in 2014 and 2005, respectively. The successful implementation of the sustainable development and poverty reduction program (SDPRP) (2002/03 – 2004/05), the plan for accelerated and sustained development to end poverty (PASDEP) (2005/06 – 2009/10), and the first growth and transformation plan (GTP I, 2010/11 – 2015) and (GTPII 2015–2020) has

played an irreversible role for the good performance of the economy, which has averaged 4.5% in the last 30 years after the Derg regime of the study period. This result is the result of the country's commitment to achieving the MDGs and the external assistance (particularly from IFB and WB) for achieving the MDGs [34].

9.2. Trend of Government Final Consumption Expenditure and GDP in Ethiopia

As seen in Figure 3 below, both GDP and total government spending over the study period (1991–2021) demonstrated a rising tendency, meaning that neither ever fell from one year to the next. GDP and total expenditure increased as a result of the government's intention to provide all social services and infrastructure in response to the need for overall economic control brought on by the Derg regime's command economic system. At the same time, the government engaged in the production and distribution of necessities.



Source: Computed based on data obtained from NBE, 2024.

Figure 3. Trend of Trend of Government final consumption expenditure and GDP in Ethiopia in millions of birr.

In comparison to the last ten years of the Dreg government, there was an overall decrease in the amount of government

spending as a percentage of GDP. But since 1997, the share has been gradually increasing; on average, 22.93% increased

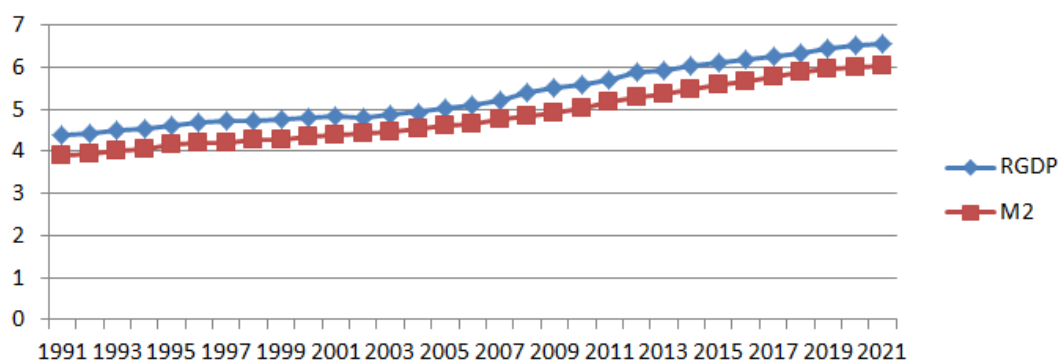
from 1997 to 2001–2002.

9.3. Trend of Broad Money Supply and GDP in Ethiopia

Broad money supply refers to all of the currency and other liquid assets in an economy. GDP stands for gross domestic product, which is the total value of all finished goods and services produced within a nation's borders over a given period of time. Although GDP is not a perfect indicator of

economic productivity and health, a higher GDP level is generally preferred to a lower one. GDP gives information about the size of an economy, and the GDP growth rate is one of the best measures of economic growth over time. The GDP per capita measurement is also closely associated with the trend in living standards over time.

In general, the value of money in circulation rises when economic productivity grows as indicated by the GDP growth rate. This is so that more valuable goods and services can be obtained by exchanging each unit of cash.



Source: Computed based on data obtained from NBE data, 2024.

Figure 4. Trend of broad money supply and GDP in Ethiopia in millions of birr.

According to above [Figure 4](#), after 2002/3, the wide money supply and GDP increased during the study period of 1985 to 2020. Coins and notes are included in broad money, but savings accounts and deposits made into a counter savings account also count. The term "domestic disequilibrium" refers to the imbalance in resources that arises from factors like budget deficits and gaps between savings and investments. The National Income Account's revenue-expenditure section further discloses that, including grants, the yearly resource gap (budget deficit) during the 1921–2021 period averaged 8492.971 and 14493.69 million Birr, respectively [36].

The corresponding numbers for 2017 were 66643.18 and 84557.13 million Birr. The way the government finances a deficit is one of the main causes of inflationary pressure. A government can theoretically finance a deficit in three different ways: it can print money by borrowing from the central bank; it can borrow from the public by issuing bonds to the public; or it can deplete its foreign exchange reserves. These options for funding the deficit in Ethiopia have changed between regimes.

According to the MoFEC data set, 8492.971 million Birr was the average yearly finance demand for the years 1991–2021. According to the World Development Indicator (WDI), the average annual domestic demand for net savings and investment for the 1990–2013 data-available periods was 4.37

billion Birr and 8 billion Birr, respectively. This indicated 3.63 billion Birr in saving investment disequilibrium. Over the same time period, net borrowing averaged 13.7 billion Birr annually. Between 1991 and 2017, the average rate of broad money growth was 18.60% and the average rate of inflation was 10.76 percent. These numbers unequivocally show that there are internal imbalances in Ethiopia and that these imbalances are linked to inflationary pressures [13].

9.4. Descriptive Analysis

Before processed to inferential statistics we must do descriptive analysis. In [Table 2](#) the descriptive analysis of mean, median, maximum-minimum, standard deviation, skewness, and sum square deviation presented to test the normality of variable used in the model.

[Table 2](#) presents the summary statistics of the variables used to define real GDP growth in this study. It shows the number of observations, means, standard deviations, minimum and maximum values of each variable. All the variables have 30 observations except lagged real GDP and active labour force growth. The average values of all variables are positive. Almost all variables have minimal standard deviations. The maximum and the minimum values show that the range is small and almost similar over all variables.

Table 2. Summary of Descriptive Statistics.

Statistics	RGDP	EXPORT	FGCE	GFC	M2	RFR	TO
Mean	5.281398	3.888265	4.616549	4.962977	4.795928	2.237781	4.612176
Median	5.068980	3.789690	4.578620	4.879935	4.635329	2.109566	4.549041
Maximum	6.430756	4.866726	5.655347	5.819369	5.947802	5.277523	6.541860
Minimum	4.376821	2.253822	4.025026	4.224130	3.901033	1.958086	3.257894
Std. Dev.	0.658549	0.748378	0.398805	0.452667	0.643827	0.589313	0.815131
Skewness	0.345613	-0.311373	0.801067	0.541929	0.397234	4.789747	0.275317
Kurtosis	1.657302	2.276887	3.211056	2.363216	1.813877	25.26402	2.303706
Jarque-Bera	2.850791	1.138380	3.264225	1.975301	2.547582	734.3167	0.985028
Probability	0.240413	0.565984	0.195516	0.372451	0.279769	0.000000	0.611088
Sum	158.4419	116.6479	138.4965	148.8893	143.8779	67.13343	138.3653
Sum Sq. Dev.	12.57691	16.24200	4.612317	5.942315	12.02087	10.07142	19.26871
Observations	30	30	30	30	30	30	30

Source: Authors compilation from data collected, 2024.

9.5. Diagnostic Tests

The previous chapter discussed the research design employed to achieve the objectives of the study and to test the research hypothesis. In this chapter, the study analyzes the collected data using statistical software (version-14) and presents the result and discussions accordingly.

9.5.1. Unit Root Test

The bounds test approach to cointegration does not need pre-testing for stationarity of the variables included in the model, however it is important to carry out stationarity tests of all the series.

This is because the ARDL bounds test to cointegration is

not applicable if the order of integration is above $I(1)$. It is, therefore, necessary to test for stationarity of the variables before regression analysis is done. It is prominent that stationarity properties of time series are investigated by testing for unit roots and there are several methods for testing for stationarity. Thus, this study used the commonly used Augmented Dickey Fuller [38] and Phillips-Perron test for unit root tests and the unit root test results are presented in Table 3 below.

To interpret the ADF test results, compare the p-value to a chosen significance level, typically 0.05. If the p-value is less than 0.05, reject the null hypothesis that a unit root is present, indicating the series is stationary.

Table 3. Unit root Test Result (ADF Test).

Null Hypothesis: RGDP has a unit root		
Exogenous: Constant, Linear Trend		
Lag Length: 3 (Automatic - based on SIC, maxlag=7)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.479920	0.8105
Test critical values:		
1% level	-4.356068	
5% level	-3.595026	
10% level	-3.233456	

Null Hypothesis: RGDP has a unit root**Exogenous: Constant, Linear Trend****Lag Length: 3 (Automatic - based on SIC, maxlag=7)**

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D (RGDP)

Method: Least Squares

Date: 05/24/24 Time: 00:37

Sample (adjusted): 1995 2021

Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RGDP (-1)	-0.077282	0.052221	-1.479920	0.1545
D (RGDP (-1))	0.521972	0.187124	2.789452	0.0113
D (RGDP (-2))	-0.053743	0.021871	-2.457314	0.0233
D (RGDP (-3))	0.024252	0.023670	1.024607	0.3178
C	0.319758	0.205031	1.559563	0.1345
@TREND ("1991")	0.007231	0.004228	1.710365	0.1027
R-squared	0.516321	Mean dependent var		0.074283
Adjusted R-squared	0.395401	S.D. dependent var		0.043244
S.E. of regression	0.033625	Akaike info criterion		-3.747936
Sum squared resid	0.022612	Schwarz criterion		-3.457606
Log likelihood	54.72317	Hannan-Quinn criter.		-3.664331
F-statistic	4.269949	Durbin-Watson stat		1.996770
Prob (F-statistic)	0.008353			

Source: Authors Model output, 2024.

Therefore, the p-value is 0.8105. Since the p-value obtained is greater than the significance level of 0.05, and the ADF statistic is higher than any of the critical values. Clearly, there

is no reason to reject the null hypothesis. So, the time series is, in fact, non-stationary.

Table 4. Unit Root Test Hypotheses and Decision Rule.

Hypothesis	Description	Decision Rule
H_0 : Unit root exists	Variable is non-stationary	Reject H_0 if p-value < 0.05
H_1 : No unit root	Variable is stationary	Do not reject H_0 if p-value $\geq$ 0.05

9.5.2. Test for Heteroskedasticity

To evaluate the estimated long run model, some diagnostic test is undertaken. Before doing any analysis, we require to check the standard property of the model. In this study we carried out a number of model stability and diagnostic checking which includes heteroskedasticity and serial correlation tests. The presence of heteroskedasticity has been checked for the efficiency of the estimates to ensure that the standard errors are not wrong, and any inferences made could not be misleading. It is assumed that the errors are homoscedastic, or their variance is constant.

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of RGDP

chi2 (1) = 0.00

Prob > chi2 = 0.9679

The null hypothesis is the error terms are homoscedastic. The [15] test for heteroskedasticity has been used to ensure that this assumption is no longer violated. To reject the null hypothesis that the error terms are homoscedastic, the p-value

of the F-Statistic, Observation *R-squared and Scaled explained SS should be less than 5%, but our result indicated that the P-value for F Statistic, Observation *R-squared and Scaled explained SS are more than 0.05, thus, the errors are not heteroskedastic so, we are going to accept the null hypothesis that the error terms are homoscedastic.

9.5.3. Test for Autocorrelation

To check the regressed variables autocorrelation we perform Breusch- Godfrey serial correlation LM test. The result in the table shows a probability value is 0.1694 for the model.

One of the methods to test for serial correlation is DW test with the following rule of thumb.

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of RGDP

chi2 (1) = 0.00

Prob > chi2 = 0.9679

estat bgodfrey

Number of gaps in sample: 1

Table 5. Breusch-Godfrey LM test for autocorrelation.

Lags (p)	chi2	df	Prob > chi2
1	4.195	1	0.0406

H0: no serial correlation

H0: $\rho=0$, i.e. no serial correlation

H1: $\rho>0$, i.e. presence of positive serial correlation or

H1: $\rho<0$, i.e. presence of negative serial correlation the rule of thumb is that $DW \approx 2$, i.e. there is no serial correlation $DW < 2$, implies a positive serial correlation and $DW > 2$ implies presence of a negative serial correlation. But the DW test is not applicable when there is lagged dependent variable in the

right-hand side of the regression equation, due to this fact correlogram Q-statistics test is used for this study with following statistical result. The test clearly shows there is no serial correlation if the P-value exceeds the 5% critical value as indicated in Table 5 there is no serial correlation.

The result indicates the p-value is insignificant and the null hypothesis rejected. There is no autocorrelation problem between variables on the model.

Table 6. Durbin's alternative test for autocorrelation.

Lags (p)	chi2	df	Prob > chi2
1	1.743	1	0.1868

H0: no serial correlation

Number of gaps in sample: 1

Durbin-Watson d-statistic (7, 30) = 1.269088

9.5.4. Lag Length Selection

It is necessary to determine the lag length in estimation of the ARDL model. There are different criteria's we can use to

choose for the optimal lag length like, sequential modified Log-Likelihood (LL), Likelihood Ratio test statistic (LR), Final prediction error (FPE), Akaike information criterion (AIC), Schwarz Bayesian information criterion (SBIC), and Hannan-Quinn information criterion (HQIC). Setting appropriate lag length is necessary because of there are variables that only affect the short run dynamics of the research model

and if they are omitted, they may lead the model to residual misspecification problem being part of the error term [24]. The Table 7 below shows that according criteria's listed

above; lag order of one (1) is selected as the optimal lag of the model.

Table 7. Lag length selection.

lag	LL	LR	FPE	AIC	HQIC	SBIC
0	157	.136	2.8e-15	-13.6488	-13.567	-13.3016
1	335	.008	355.74	2.9e-20	-24.7101	-22.5871
2	473	.387	276.76	5.6e-23*	-33.4898	-28.2825
3	455	2.58	158.2	-399.863	-398.064	-392.226
4	471	1.39	317.79*	-414.308*	-412.509*	-406.671*

Endogenous: RGDP M2 GFC EXPORT RFR FGCE TO

Exogenous: _cons

Source: Authors Model output, 2024.

Table 7 above confirms that almost all criteria LR, FPE, AIC, SC and HQ are selected a lag length of 1 at 5% level of significance. Consequently, using the information criteria

approach, the Johansen co-integration test was conducted using 1 lag for the VAR.

9.6. Key Regression Statistics: R^2

Table 8. Summary for key regression Model result.

Source	SS	df	MS	Number of obs = 30
Model	5.06336953	1	5.06336953	F (1, 28) = 18.87 Prob > F = 0.0002
Residual	7.51354308	28	.268340824	R-squared = 0.4026 Adj R-squared = 0.3813
Total	12.5769126	29	.433686642	Root MSE = .51802
RGDP	Coef.	Std. Err.	t P>t	[95% Conf. Interval]
lag	.0474646	.0109268	4.34 0.000	.0250821.0698472
_cons	4.545696	.193983	23.43 0.000	4.14834 4.943052

Source: Authors Model output, 2024.

It measures goodness of fit statistics of the model. It is desirable to have some measure of how well the regression model actually fits the data. In fact, a scaled version of the residual sum of squares is usually employed. The most common goodness of fit statistic is known as R^2 .

One way to define R^2 is to say that it is the square of the correlation coefficient between the actual values of the dependent variable and the corresponding fitted values from the model, provided a constant is included in the regressions. A

correlation coefficient must lie between -1 and +1 by definition. Since R^2 defined in this way is the square of a correlation coefficient, it must lie between 0 and 1. If this correlation is high, the model fits the data well, if the correlation is low (close to zero), the model is not providing a good fit to the data, while the correlation is high (close to one) the model providing a good fit to the data. Here below are some of the key statistical results of the stata-14 result.

9.7. Bound Test for Long Run Co-Integration

After confirming diagnostic tests, the next step of any time series econometric analysis is to check the long run relationship of variables under study. So to do this ARDL bound test is applied. The first step of the ARDL bounds analysis is to investigate presence of long-run relation among the variables included in model. The model was estimated by ARDL and the optimal lag was selected by VAR Lag Order Selection Criteria, as displayed in the [Table 7](#).

By using the VAR lag selection Criteria, all information criteria's showed lag length of six which is indicated by * in [Table 7](#) and as highlighted in blue color with the exception of the SIC which has chosen two as the optimal lag length. Thus, the model used lag length of six to conduct the short run and long run estimation.

9.7.1. Long Run Coefficients

The test of the result in [Table 9](#) suggests the effect of foreign currency reserve is positive and significant at a 5% significance level (t-statistic=2.872424 and $\alpha=2.129398$). The other main variable exchange rate effect on manufacturing sector performance is negative but insignificant (t-statistics=-0.150895 and $\alpha=-0.005701$).

Table 9. Long run VECM (Vector Error Correction Model) results.

Vector Autoregression Estimates	
Date: 05/24/24 Time: 01:27	
Sample (adjusted): 1993 2021	
Included observations: 28 after adjustments	
Standard errors in () & t-statistics in []	
	RGDP
RGDP (-1)	1.155757 (0.18944) [6.10085]
RGDP (-2)	-0.316680 (0.18590) [-1.70349]
C	0.850005

Vector Autoregression Estimates

	(0.54294)
	[1.56556]
R-squared	0.761717
Adj. R-squared	0.742654
Sum sq. resids	2.515071
S.E. equation	0.317179
F-statistic	39.95856
Log likelihood	-5.991628
Akaike AIC	0.642259
Schwarz SC	0.784995
Mean dependent	5.213355
S.D. dependent	0.625239

Source: Authors Model output, 2024.

A vector error correction model is a restricted VAR model that has cointegration restrictions built in to the specification. It is designed for use with non-stationary series that are known to be cointegrated. The vector error correction specification restricts the long-run behaviour of the endogenous variables to converge to their cointegrating relationships while allowing a wide range of short-run dynamics. The cointegrating term [the error correction term] corrects the deviation from long-run equilibrium gradually through a series of partial short run adjustments.

a) Long-Run Relationships (VECM)

The cointegration rank test in the previous section suggests three cointegrating equations that define real GDP, real effective exchange rate and government expenditure as dependent variables. This study considers only the first cointegrating equation that relate real GDP to other variables as the focus is to examine the impact of other variables [and real effective exchange rate in particular] on real GDP growth. The other cointegrating equations are not considered in this study. After imposing this normalization restriction by the Johansen method, the cointegrating equation for real GDP growth is estimated. The result of the estimation is given by [Table 10](#).

Table 10. Cointegrating Coefficients (Identification: beta is exactly identified by Johansen normalization restriction imposed).

Beta	Coef. Std. Err. z P>z	[95% Conf. Interval]	
RGDP	1...	.	.

Beta	Coef. Std. Err. z P>z	[95% Conf. Interval]	
M2	-.138938.059903 -2.32 0.020	-.2563456	-.0215304
GEC	-.0850961.1314379 -0.65 0.517	-.3427097	.1725176
EXPORT	-.6130398.0670512 -9.14 0.000	-.7444578	-.4816219
RFR	-1.16879.0810345 -14.42 0.000	-1.327615	-1.009966
FGCE	-.4332057.1117601 -3.88 0.000	-.6522515	-.2141598
TO	.1260173.0439552 2.87 0.004	.0398667	.2121678
_cons	2.06187...	.	.

*** denotes significance at 1%.

Source: Authors Model output, 2024.

RGDP - .138938 M2 - .0850961 GEC - .6130398 EXPORT - 1.16879 RFR - .4332057 FGCE - .1260173 TO - 2.06187

Table 11. Real GDP Model Results.

Date: 05/24/24 Time: 01:38

Sample (adjusted): 1993-2021

Included observations: 28 after adjustments

Trend assumption: No deterministic trend

Series: RGDP EXPORT FGCE GFC M2 RFR TO

Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized	Trace	0.05		
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.970507	252.2299	111.7805	0.0000
At most 1 *	0.866392	153.5689	83.93712	0.0000
At most 2 *	0.795215	97.20932	60.06141	0.0000
At most 3 *	0.649659	52.80707	40.17493	0.0017
At most 4	0.420212	23.43932	24.27596	0.0635
At most 5	0.248828	8.176741	12.32090	0.2233
At most 6	0.005888	0.165345	4.129906	0.7366

Trace test indicates 4 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized	Max-Eigen	0.05		
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.970507	98.66103	42.77219	0.0000
At most 1 *	0.866392	56.35960	36.63019	0.0001
At most 2 *	0.795215	44.40225	30.43961	0.0005
At most 3 *	0.649659	29.36775	24.15921	0.0090

Date: 05/24/24 Time: 01:38

At most 4	0.420212	15.26258	17.79730	0.1156
At most 5	0.248828	8.011396	11.22480	0.1737
At most 6	0.005888	0.165345	4.129906	0.7366

Max-eigenvalue test indicates 4 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Source: Authors Model output, 2024.

All the variables which are expected to explain real GDP [RGDP] growth are significant except Government Consumption Expenditure [GEC].

The real effective exchange rate has positive sign and is statistically significant in explaining the economic growth in the long run. Increase/appreciation of broad money supply (M2) by 1% increases economic growth by 0.138938%. The finding of this study shows that decrease in broad money supply does not promote economic growth in the long run. Depreciation may encourage exports and increase the foreign earnings of the country for the time being, but it hurt the economy in the long-run as the cost of imported raw materials increase continuously. The positive sign of real effective exchange rate shows that the impact works through the aggregate supply channel in the long-run. This is in line with modern view discussed in the literature review.

Government Consumption Expenditure (GCE) is equally

statistically significant to real effective exchange rate. It is positively related to and statistically significant in explaining economic growth in the long run. Governments play major roles in the investment sector of LDCs. Public spending may be helpful in complementing private investment if it is productive. The government of Ethiopia may increase economic growth by 0.0850961% if it can increase its expenditure by 10%.

9.7.2. Estimated Short-Run Coefficient

The test result of VECM in Table 12 revealed that the coefficient of error correction term (ECT) is -.0724734 result is >-1 (oscillatory). This implies there is a possibility of a high long-term adjustment. The speed of adjustment is 72.4% percent per unit time in the long term.

b) Short-Run Relationships

Table 12. Short-run Coefficient.

Sample: 1991 – 2021 G.C			No. of obs = 30		
Log likelihood = 541.6045			AIC = -52.51161		
Det (Sigma_ml) = -1.73e-35			HQIC = -52.04099		
			SBIC = -49.09852		
Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_RGDP	9	.040871	0.9162	98.39556	0.0000
D_M2	9	.02281	0.9687	278.2788	0.0000
D_GEC	9	.077263	0.6694	18.22164	0.0327
D_EXPORT	9	.078701	0.7134	22.39823	0.0077
D_RFR	9	.041877	0.7141	22.48399	0.0075
D_FGCE	9	.079078	0.7186	22.98289	0.0062
D_TO	9	.055922	0.8347	45.45386	0.0000

Source: Authors Model output, 2024.

The adjusted R-square shows that 0.9162% of the variation in real GDP growth is explained by the combined effects of all the determinants of real GDP in the short-run. Changes in real GDP growth can be motivated by activating two period lagged foreign currency reserve (FCR) and Gross Fixed Capital Formation (GFCF).

10. Empirical Results and Discussion

The previous section of the chapter presented steps of analysis and overall results of the study. Hence, this section presents the discussion and detailed interpretation of the result. Besides, the discussion evaluates the statistical findings of the study to the given hypothesis.

10.1. Foreign Currency Reserve

The long-run result of foreign currency at a 5% significance level ($\chi^2=98.39556$ and $p=0.000$) was positive and significant. The result was under the expected alternative hypothesis $H1$: There is a significance relationship between foreign currency reserve and manufacturing sector performance in Ethiopia.

These results suggest that a unit increase in foreign currency reserve has 2.12 unit increases in manufacturing sector performance. The result interpreted as follows, as stated in the literature Ethiopian manufacturing sector is highly dependent on imported raw materials and capital goods. Based on this information, as the country's foreign currency reserve is enhanced the industry can easily get the foreign currency to import the required raw materials for their manufacturing process and industry expansion.

To illustrate more, based on NBE reports, before 2019 the highest priority from imported goods was given to vehicle oil importers. The manufacturing of raw materials was given third priority. That means when the volume of foreign currency reserve goes down, the foreign currency amount that was allowed to the manufacturing sector may decrease. In this situation, the sector may be forced to reduce imports that are essential for their process. This reduction of the essential goods can affect their performance and contribution to the national GDP. On the other side, when the reserve level is enhanced the industry may get the required foreign currency and can improve its performance.

The short-run coefficient of foreign currency reserve is insignificance but positive. Besides, its effect at one year lag is negative and significant. It means one unit increase in the previous year's foreign currency diminishes manufacturing sector performance by 0.7186 units in the short run.

10.2. Exchange Rate

The long-run result of the exchange rate was (t -statistics= -9.14 and $p=0.000$) was negative and insignificance. The result was inconsistent with $H2$: There is significance a rela-

tionship between exchange rate and manufacturing sector performance in Ethiopia. The insignificance result shows that the exchange rate is not the main concern for the manufacturing sector compared with the scarcity of foreign currency nationwide. This result is consistent with Chinyere et al (2018), which found the growth increasing the quantity of naira exchanged for the dollar caused a fall in the manufacturing output in Nigeria. However, it contradicts with studies by [27] and [23] which have a positive and insignificance impact on the manufacturing sector.

However, in the short run, the exchange rate result gets absorbed by a long-run equation. We didn't have a result for the exchange rate in the short run. The result tells us technically the exchange rate has a zero lag and doesn't have a short-run effect on manufacturing sector performance. So, we should reject the alternative hypothesis $H2$: There is significance a relationship between exchange rate and manufacturing sector performance in Ethiopia and ascertains exchange rate and manufacturing sector performance does not have a relationship in the short run.

10.3. Foreign Direct Investment

The result of the long-run coefficient indicated that foreign currency reserve has a positive relationship with manufacturing sector performance was statistical significance (p -value= 0.0062). The result implies one unit increase can lead to a 1.21 unit increase in performance. The possible reason could be in the long run, the investment made by foreign investors enhances the overall output (performance of the sector).

In the short run, a coefficient of -0.281494 indicates that all factors remain constant 1 unit increase in FDI will lead to a decreased manufacturing sector performance by 0.281494 unit but statistically insignificant at a 5% significance level.

10.4. Total Import

Likewise, the long-run result indicated that import had a negative relationship with manufacturing sector performance and statistical significance (P -value= 0.0031) at 5% level. The long-run coefficient of -0.54845 indicates that all factors remain constant 1 unit increase in total import will diminish manufacturing sector performance by 0.54845. This result showed that an increase in total imports has a negative impact on the manufacturing sector's performance.

The possible reason could be since most of the imported materials in Ethiopia were finished industrial products. These imported industrial products could minimize the market share of domestic industries. The results were consistent with studies results by Abdul-Mumuni [1] and [23]. The short-run coefficient of import (-0.074055) was still negative but statistically insignificance (P -value= 0.3821) at 5% level.

Long-run coefficient reveals that inflation had a negative relationship with manufacturing sector performance and sta-

tistical significance (p -value= 0.0039) at a 5% significance level. The long-run coefficient -0.074675 implies a unit increase in inflation will diminish the manufacturing sector by 0.074675. The possible reason is that inflation may affect the manufacturing sector's purchasing ability of raw materials. This may lead to a reduction in the output of manufacturing industries. The results were consistent with studies results by Abdul-Mumuni [1] and [6]. The short-run coefficient of inflation (-0.021327) was negative and statistically significant (P -value=0.0019) at a 5% level.

In order to attain the major objective of the research, this chapter presented the empirical findings of the study. As it is discussed earlier, stationary test is done first before estimating the coefficients. Following the test for stationary, the co-integration test is discussed for the existence of long run association of the research variables. And the Vector error Correction model is presented in order to analyze the short run dynamics of the variable. Finally all the necessary residual tests conducted were presented and discussed.

It has been further dwindled to cover respectively only 3.6, 2.3 and 2.2 months of imports as of June 2005, 2006, and 2007, which is almost equivalent to the minimum required level of the International Monetary Fund (IMF). The reserve position has declined and reached to 8 weeks of import as of 2007/08. Recent year figures also indicated similar fluctuations which reflect the fact that it is one of the challenges that could entangle the country to meet its development goals [35].

The current level of reserve position, which is closer to the minimum required level of the IMF would merely cover strategic goods like petroleum, and hamper the ongoing private investment that set as a pillar for market oriented economy and an engine for growth [30].

According to [23], Ethiopia has recorded average annual economic growth of about 10% for the past decade, the fastest rate throughout the African continent. However, foreign investors and local businesses have complained that the severity of hard currency shortages have stifled the private sector.

The reformist leader of Ethiopia, Abiy Ahmed, talked of the seriousness of the currency crisis in the country's parliament, stating that: The crisis with hard currency in Ethiopia today is a serious challenge for the development of the country. It will not be solved in a short period of time, nor in the next 15 or 20 years. There is an urgent need for more cooperation with the private sector to find a solution [23].

The International Monetary Fund (IMF) [19] stated that Ethiopia's foreign reserves at the end of the 2016-2017 fiscal year stood at US\$3.2 billion, less than what it spends on imports in just 2 months.

In terms of the Ethiopian economic outlook, the African Development Bank [2] mentioned that gross official reserves remained low at 2.5 months of imports in 2016-2017 and 2.1 months in 2017-2018. The IMF identified inadequate reserves as a downside risk to economic growth for 2017-2018, which was forecast at 8.5%. Despite high economic growth, Ethiopia is heavily dependent upon imports.

According to the IMF [19], Ethiopia's export revenues in the previous year were largely unchanged, despite some volume growth, as global agricultural commodity prices remained low and exports from manufacturing remained unbalanced.

Ethiopia is the biggest coffee exporter in Africa, yet its total export revenue has been hitting short of the targets set for the past few years owing to weaker commodity prices.

It is in line with this that the National Bank of Ethiopia announced a devaluation of the country's currency, the Ethiopian Birr, against the US Dollar of 15% effective from October 11, 2017, and an interest rate on deposit increase from 5% to 7% in order to stimulate savings as well as to counter inflation. The measure was seen by the global economic players (e.g., The World Bank and the IMF) as helping to boost the growth of the country's export sector which had experienced a sluggish outlook. It was also expected to reduce Foreign Exchange shortages and to ease the debt burden [4].

However, the Debt Sustainability Assessment conducted by the IMF [19] shows that Ethiopia remains at high risk of debt distress owing to its small export base. Public and publicly-guaranteed external debt breaches the thresholds for the current value of debt-to-exports and debt service-to-exports in the baseline. This implies that Ethiopia might lose the opportunity to borrow from international financial institutions such as the IMF to advance new infrastructural growth projects.

The repayment period of loans is determined based on the cash flow of each project and the economic life of the major investment components. However, it cannot exceed 20 years including a maximum grace period of 5 years. A grace period is a time period within the life of a project when a borrower may not be required to make a principal loan repayment.

Hence, the country's economic growth over the past decade was fueled by massive borrowing that has created a debt burden of more than US\$26 billion, or with a public debt to-GDP ratio of 61.8% as of the end of June 2018. Ethiopia remains at high risk of debt distress, according to a 2018 debt sustainability analysis by the African Development Bank [2]. Accordingly, Ethiopia is critically facing a shortage of funds.

The shortage of hard currency and the pressure from the lenders such as China, has forced the government of Ethiopia to launch privatization process of the mega-state enterprises, such as Ethio-telecom, Ethiopian Airlines, and its Power Company and shipping lines, among others [11].

In addition, the government of Ethiopia has indicated that its external debt has exceeded US\$26 billion, moving the country into the highly indebted category. According to the Government of Ethiopia, it plans to pay off up to 22.5 billion birr (about US\$800 million) during the 2019-2020 fiscal year, with 9.6 billion birr (about US\$340 million) having already been paid as of December 2019 [19]. Currently, according to the IMF (International Monetary Fund, 2018), Ethiopia's total debt represents 44% of its GDP, with the average debt-to-GDP being 33.55% from 1991 until 2017 [11].

Table 13. Outstanding Public Borrowing by Source (in Ethiopian birr).

	2016-2017	2017-2018		Percentage change	
	Q2	Q1	Q2		
	A	B	C	C/B	C/A
Domestic borrowing	33,091.6	35,365.3	37,888.6	7.1	14.5
Foreign borrowing	4,816.9	5,096.4	5,226.4	2.6	8.5
Total	37,908.5	40,461.7	43,115.0	6.6	13.7

Source: Authors Computation output, 2024. Data Source: NBE Second Quarter 2017/18 Fiscal Year Series.

As shown in Table 13 the total outstanding borrowing of the banking system in Ethiopia stood at 43.1 billion birr as of Q2 2018, showing a 13.7% annual increase. Of the total borrowing, 37.9 billion birr (87.9%) was domestically sourced, with 5.23 billion birr (12.1%) from external sources. This situation has led the country to a high level of debt crisis, which has fueled the foreign currency reserve crisis. This reserve foreign currency crisis presents a significant challenge to Ethiopia becoming one of the middle-income countries which it has poised to become by 2025 [39].

Ethiopia's economy experienced a strong, broad-based economic growth that averaged 10.3% annually from 2006-2007 to 2016-2017, compared to a regional average of just 5.4%, but Ethiopia's real GDP growth decelerated to 7.7% in 2017-2018 [39]. However, this developmental phase is reaching its limits by exacerbating external imbalances and the public debt burden. Severe foreign exchange shortages, barriers to domestic and foreign private investment in key sectors, and low tax revenue from private activities and other institutional inefficiencies increasingly pose obstacles to the further development of the private sector and to the overall economy of the country.

The World Bank also holds similar views about the development challenges faced by Ethiopia, with "limited competitiveness, underdeveloped private sector, political disruption associated with social unrest could negatively impact growth through lower FDI [foreign direct investment], tourism and exports [39]. According to the IMF's recently released projections, Ethiopia is expected to achieve a 6.1% real gross domestic product (GDP) growth rate by the end of 2023, with a 6.2% growth rate predicted for 2024. The IMF also reported a 6.4% growth rate for Ethiopia in 2022.

11. Summary and Conclusions

The study examines impact of foreign currency reserve on economic growth in Ethiopia by using annual time series data sourced from world development indicators of the World Bank and the National Bank of Ethiopia (NBE). To check

variables stationary unit root test was conducted by using Phillips- person unit root test method. After checking the stationary of the variables bound test of the co-integration test was conducted and the result showed evidence of long-term relationship among manufacturing sector value-added, exchange rate, foreign currency reserve, total import, foreign direct investment, and inflation. This result revealed all variable has signed to move on the same direction to the long – run.

Findings of the study suggest that foreign currency reserve impact on the manufacturing sector is positive and significant in the long run but positive and insignificance in the short run. On contrary, the impact of the exchange rate is negative and insignificance in the long run but it doesn't affect the short-run model.

Foreign direct investment was found to have a positive significant effect on manufacturing sector performance in the long run. The sign changed to negative but not significant in the short-run model.

Total import has a negative and significant effect on manufacturing sector performance in the long run but negative and insignificance. Finally, the finding on inflation shows consistency in both the short and long-run models. In both scenarios, the impact of inflation on manufacturing sector performance was negative and significant.

This study examines the impact of foreign currency reserves on Ethiopia's growth domestic product through the use of annual time series data sourced from the World Bank's and the National Bank of Ethiopia's (NBE) world development indicators.

The PP unit root test method and ADF unit root test were used to check various state variables. The results of the cointegration test, which represents the foreign currency reserve, government final consumption expenditure, gross fixed capital formation, broad money supply, exports, and trade openness index, demonstrated a long-term relationship between GDP and the variables that were checked.

The study's findings indicate that the foreign currency reserve (RFR) has a positive sign and is statistically significant

in explaining Ethiopia's long-term economic growth. This confirms the acceptance of the null hypothesis, which states that exchange rates have a long-term effect on the country's economic growth. An increase of 1% in the RFR increases economic growth by 0.27 or 27%. The study's findings indicate that an increase in the RFR promotes economic growth in the long run.

In the long run, export has been favorably and statistically important in explaining economic growth. A 1% increase in exports or their appreciation boosts economic growth by 71.34%. The study's conclusion demonstrates that, over time, higher exports do really contribute to economic growth. The findings of [29, 26, 25, 32] and [20] are all in line with this outcome.

The government final consumption expenditure (GFCE) has a negative and significant effect on economic growth of Ethiopia implying that, large size of government expenditure goes to recurrent expenditure. Thus, recurrent expenditure may have impeded growth by reducing the resources available for capital expenditure. Defense expenditure, poverty targeted expenditure, inflation targeted expenditure, and voting campaign expenditure and expenditure on interest payment constitute the most important components of current expenditure.

As a result, long run responsiveness of real GDP to the change in government final consumption expenditure is 0.6694. It means that a one percent increase in government final consumption expenditure will decrease real GDP by 0.6994 percent over time. This is explained by the fact that government spending of money for the purchase of consumption goods and services leads to the increase the aggregate demand for goods and services. The same result with this study was seen in [13].

The broad money supply (M2) had a positive and significant long run effect on economic growth. A 1% increase in broad money supply leads to an increases economic growth by 0.9687 which was contrary to the expected sign. The result was highly significant at 5 percent level of significance. Therefore, the results show that increase in money supply improves economic growth. The National Bank of Ethiopia manages the supply of money through channels like the management of the reserve requirements and the management of the interest rate with the commercial banks. Thus, the expansionary policy may be implemented in Ethiopia since it is significant in the long run. The same result with this study was seen in [22].

Finally, the trade openness index (LnTO) had a positively effect on economic growth of Ethiopia it is found statistically significant effect in the long run. The result was highly significant at 5 percent level of significance. Therefore, the results show that increase in trade openness improves economic growth.

12. Recommendations and Policy Implication

Based on the findings of the study, the researcher suggests the following recommendations that may help the decisions of policymakers.

The manufacturing sector's performance is positively and significantly impacted by foreign currency reserves, according to the study's findings. Therefore, increasing currency reserves through product manufacture, finished goods exports, and the management of illicit remittances should be a top priority for the government. By emphasizing homegrown innovation, the relevant body should also endeavor to reduce the reliance of the manufacturing sector on imported equipment and supplies.

The performance of the industrial sector is affected by the insignificance of currency rates. Therefore, the policymaker ought to take into account devaluing the birr currency price to its actual exchange rate value. Devaluation can lessen the negative impact of imports on industrial performance and deter the import of domestically produced substitute items.

Excessive inflation can impact the purchase power of raw materials in the industrial sector, even though its effects are felt nationwide. Therefore, the government needs to try to keep inflation to single digits through possible protection and support infant local industries and promoting production and productivity of producers.

The analysis's findings indicate that foreign direct investment inflows have the potential to improve sector performance over time. We can infer from the outcome that the industry benefited from an influx of both human and financial skills. Thus, in order to draw investors from all over the world, the government needs enhance infrastructure and sound governance strengthening international relations.

Ultimately, it is discovered that export has a substantial and detrimental influence. This suggests that the government should utilize potential export diversification strategies in order to affect the issue of export instability.

Abbreviations

ARDL	Autoregressive Distributed Lag
BOP	Balance of Payment
ECA	United Nations Economic Commission for Africa
FER	Foreign Exchange Reserve
FX reserves	Forex Reserves
GDP	Gross Domestic Product
IMF	International Monetary Fund
LDC	Least Developing Country
LoC	Letter of Credit
NBE	National Bank of Ethiopia
OLS	Ordinary Least Square
PPP	Purchasing Power Party
RGDP	Real Growth Domstic Product

VECM	Vector Error Correction Modeling
VIF	Variance Inflation Factors
VAR	Vector Autoregressive
WDI	World Development Indicator

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Author Contributions

Tadele Melaku Chala is the sole author. The author read and approved the final manuscript.

Ethical Approval and Informed Consent to Voluntarily Participate

Ethical approval and consent to voluntarily participate and Ethical clearance was obtained from the Institutional Research Ethics Review Committee (IRERC) of Ambo University with the ethical approval letter. The Director of Research and Community Services also provided the permission. Moreover, supporting letter was taken from the Ambo University and given to potential concerned offices for possible data sources. All participants, Data sources and experts were assured of confidentiality.

The entire fully informed competent person expressed their voluntary agreement to participate in the research process. They understood that their participation is voluntary and they are free to withdraw at any time, without giving a reason and without cost. Moreover, they are confirmed that they will be given a copy of this consent form. They voluntarily agreed to take part in the study.

Consent for Publication

The author obtained permission from all participants in the Ambo University to publish the work.

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Data are available upon request from the corresponding author.

Conflicts of Interest

The author declares no conflicts of interest.

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