EJED 2023 5(2):1–13
Ethiopian Journal of Environment and Development
http://journal.du.edu.et/index.php/ejed

External debt servicing, foreign exchange constraint and import demand: evidence from Ethiopian economy

Garedew Aweke Gizaw* **and Demisse Jarsa**

Department of Economics, Dilla University, Ethiopia;
**Corresponding author; Email: garedewa@du.edu.et / awekegar8@gmail.com;*

Received: 20 August 2023 *Accepted: 14 December 2023* *Published: 30 December 2023*

DOI: **10.20372/ejed.v05i2.01**

Abstract

This study examines whether the country's foreign exchange availability influences import demand and provides empirical evidence about the impact of servicing external debt on the foreign exchange reserve. A yearly basis data starting from 1982 up to 2021 is employed. The World Bank's World Development Indicator (WDI) database is the primary source of the necessary data. The auto regressive (ARDL) method of econometric estimate is employed in the data analysis. The long-run result shows that repayment of foreign borrowing is insignificant in affecting the foreign exchange reserve of the nation. However, foreign aid, foreign borrowing and export growth are significant in increasing the foreign exchange reserve of the country. A sufficient supply of foreign currency in an economy is important to deal against instability and uncertainty of foreign capital flows. So, the government of Ethiopia can enhance the foreign exchange reserve through capital inflows and export growth. The findings from the import demand function of Ethiopia show that the foreign currency reserve is significant in driving import demand of the country. It is known that import enables unfettered access to capital goods from abroad and for improving the domestic welfare. So, the government should have stable and sufficient foreign exchange reserves to finance import of goods and services from abroad.

Keywords/Phrases: Ethiopian economy, External debt servicing, Foreign exchange reserve, Import demand

1 Introduction

Different economic development theories highly emphasize that developing countries, in general, are trapped by a vicious circle of poverty, which accounts for the existence of low levels of income, which results in low saving and investment activity in the nation. This implies that there are only little prospects of future growth in per capita income and development of the industrial sector which arises from lower level of investment. Therefore, existence of this situation does not stop at one period since it involves a vicious circle in which poverty and low development lead to more poverty and underdevelopment (Todaro and Smith, 2012).

External debt financing is viewed as a mechanism to escape from the poverty trap and relieve bottlenecks in the development process for many developing countries. In practice, there are sound theoretical reasons why it may be entirely rational for developing countries to borrow from abroad (Ghatak, 2005). To some extent, the accumulation of external borrowing for developing countries arises from their interest in stabilizing the domestic financial market through foreign currency reserves. In this regard, external borrowing contributes to increasing the foreign exchange reserve of developing countries. However, the effect of foreign borrowing in developing countries might not be reflected directly rather first, it boosts the foreign exchange accumulation of countries and could lead to economic growth and more import demand since import of goods and services requires the availability of foreign exchange reserve in

the economy. But, this borrowing, in turn, results in repayment, including the interest, which is difficult for most developing countries because developing countries are characterized by foreign exchange constraints combined with the high import of capital goods and heavy types of machinery (Obsfeld *et al*. 2008).

Ethiopia is among those developing countries that borrow from the rest of the world such as the Western World and China, to finance the saving-investment gap, export-import gap, and tax-government spending gap. This borrowing result in repayment of the debt, including interest for the lender country, and Ethiopia has been paying a substantial amount of foreign currency over the last few decades. For instance, the country is paying a total of external debt to different lender countries and institutions, which amounts to 30.4 Million USD in 1990 with a foreign exchange reserve of 202 Million USD; paid 138.6 Million USD in 2000 with a foreign exchange reserve of 490 Million USD; paid 88.3 Million USD in 2005 with foreign exchange reserve of 1.04 Billion USD, paid 1.8 Billion USD in 2010 with foreign exchange reserve of 2.2 billion USD, paid 1.4 USD in 2015 with foreign exchange reserve of 3.8 Billion USD, paid 2.1 Billion USD in 2018 with foreign exchange reserve of 3.9 Billion USD (World Bank, 2021). Hence, the main debate here is "Has external debt servicing eroded foreign exchange accumulation of Ethiopia?" and "Does the country's limited foreign exchange accumulation affect its import demand?" Hence, the need of this study is to answer the above two main questions and draw harmonized policy implications regarding the issues.

The empirical findings by Obstfeld *et al*. (2008) for 134 countries and Aizenman *et al*. (2016) for 100 countries from advanced, emerging, and developing economies concluded that the increase in foreign exchange reserve is a response to domestic financial protection (exchange rate stability) and to get relaxed from policy trilemma . A study by Ayunku and Markjackson (2020) found that external debt servicing is insignificant in affecting the foreign exchange reserve of the Nigerian economy. On the other hand, various research works are done to show how the growth performance of nations is affected by the availability of foreign exchange reserves. In this regard, Lensik (1995), Tariq *et al*. (2013), Cheng (2013), and Krušković & Maričić (2015) tried to answer the question "Why do countries accumulate foreign exchange reserve?" Those studies confirm the positive impact of the supply of foreign currency on growth. However, all the above studies neglected the impact of the supply of foreign currency on import demand. Specifically, in Ethiopia, no one is devoted to the impact of foreign currency supply on import demand. Moreover, although empirical investigations are done to assess the effect of external borrowing on foreign currency supply, some of research cannot devote to figuring out the effects of repayment of external borrowing on the supply of foreign currency in Ethiopia.

Hence, this study aims to assess how the accumulation of foreign currency is affected by the external debt repayment practice of Ethiopia and, in turn, how this foreign exchange reserve affects the country's import demand by using ARDL technique of estimation This might help to draw alternative policies and import strategies with the prevailing foreign exchange constraint in the country.

2 Materials and Methods

2.1 Data Source and Type

A supplementary form of macroeconomic data covering the years 1982–2021 is gathered primarily from the World Bank's World Development Indicator (WDI) database in order to meet the study's goals.

2.2 Model specification and method of data analysis

A new model, initially created by Pasaran, Shin, and Smith (2001), can offer a number of benefits over conventional time series estimate methods for studying time series research. This newly developed model is known as an autoregressive distributive lag model and can give a valid, unbiased, and reliable output because of the following advantages. This method can be applied to a mixture of first-difference and level-stationary variables. Second, it is more suitable for small sample size data in time series regression (Pesaran *et al*. 1998; Narayan, 2005). Third, it deals with even some of the endogenous independent variables. (Pesaran *et al*. 1998). Fourth, this

technique uses only a single reduced form equation, which is impossible in other co-integration estimation techniques.

According to Green (2003), the simple generalized ARDL (p, q) equation can be shown as:

$$\begin{aligned} Y_t = {} & C + \gamma T + \alpha_1 Y_{t-1} + \ldots + \alpha_p Y_{t-p} + \\ & \beta_0 X_t + \beta_1 X_{t-1} + \ldots + \beta_q X_{t-q} + \\ & \theta D + U_t \end{aligned} \quad (1)$$

Based on the above generalized equation, the two equations of this study which are going to be estimated are specifies as follows.

Equation one: A composition of traditional and financial stability models used by Obstfeld, *et al.* (2008) is applied to show how the foreign exchange reserve is affected by external debt servicing. Moreover, according to Gosselin and Parent (2005), foreign reserve function can be affected also by economic size which can be real GDP growth rate, export volume, external borrowing. Hence, the foreign exchange reserve function can be expressed as:

$$FER = f(GDPgr, EB, AID, Ex) \quad (2)$$

Where, EB is external borrowing has its counterpart of repaying. As a result, external debt servicing (EDS) should be included in the model. AID is foreign official aid; Ex is export, which is a proxy for structure of the economy.

Then the final foreign exchange reserve equation can be expressed as:

$$FER = f(GDPgr, EB, EDS, AID, Ex) \quad (3)$$

Then, the auto regressive form of equation three which is going to be estimated can be expressed as:

$$\begin{aligned} \Delta FER_t = {} & \beta_0 + \theta_1 GDPgr_{t-1} + \theta_2 EB_{t-1} + \\ & \theta_3 EDS_{t-1} + \theta_4 AID_{t-1} + \theta_5 Ex_{t-1} + \\ & \sum_{j=1}^{n} \beta_{1j} \Delta GDPgr_{t-1} + \sum_{j=1}^{n} \beta_{2j} \Delta EB_{t-1} + \\ & \sum_{j=1}^{n} \beta_{3j} \Delta EDS_{t-1} + \sum_{j=1}^{n} \beta_{4j} \Delta AID_{t-1} + \\ & \sum_{j=1}^{n} \beta_{5j} \Delta Ex_{t-1} + U_t \end{aligned} \quad (4)$$

Table 1. Measurement and source of dependent and independent variables for equation one

Variable	Code	Measurement	Expected Sign	Data source
Foreign exchange reserve	FER	Foreign exchange reserve in USD at time t		World Development Indicator
Real GDP	GDPgr	Growth rate of real GDP at time t	+	World Development Indicator
External debt	EB	External borrowing in USD at time t	+	World Development Indicator
External debt servicing	EDS	External debt servicing in USD at time t	-	World Development Indicator
Aid received	AID	Net official aid received in USD at time t	+	World Development Indicator
Total Export	EX	Total export in USD at time t	+	World Development Indicator

U_t is the error term of the function;
n, is the lag length of the auto regressive process of the equation;
Δ stands for the first difference operator;

θ_1, θ_2, θ_3, θ_4, θ_5 are long run parameters the function; and
β_{1j}, β_{2j}, β_{3j}, β_{4j}, β_{5j} are short run parameters of the function.

Equation two: To show whether the country's foreign exchange constraint is affecting import demand or not, a simple open economy model is used, and the import demand function, which is presented based on the theory of balance of payment and national income identity equation as follows.

The national income equation states that national income is expressed as:

$$Y = f(C, I, G, X, M) \quad (5)$$

Where, Y- national income, C- consumption, I- investment, G- government spending, X- export value and M- import. By rearranging equation five above, import demand is expressed as:

$$M = f(Y, I, G, X) \quad (6)$$

Export is one source of income for import and it can be explained by the availability of foreign exchange reserves. Then, by expanding the above function and including other variables according the country's context and economic literature, the following import demand equation can be specified.

$$M = f(PCI, RP, FER, REER) \quad (7)$$

Where M is import as a share of GDP, PCI is per capita income (a proxy for national income), RP is the relative price, which is a share of domestic price to the world price, FER is foreign exchange reserve, and $REER$ is the real effective exchange rate.

Then, the auto regressive form of equation seven to be estimated is expressed as:

$$\begin{aligned}\Delta M = {} & \beta_0 + \theta_1 PCI_{t-1} + \theta_2 RP_{t-1} + \theta_3 FER_{t-1} + \\ & \theta_4 REER_{t-1} + \sum_{j=1}^{n} \beta_{1j} \Delta PCI_{t-1} + \\ & \sum_{j=1}^{n} \beta_{2j} \Delta RP_{t-1} + \sum_{j=1}^{n} \beta_{3j} \Delta FER_{t-1} + \\ & \sum_{j=1}^{n} \beta_{4j} \Delta REER_{t-1} + U_t\end{aligned} \quad (8)$$

Table 2. Measurement and source of dependent and independent variables for equation two

Variable	Code	Measurement	Expected Sign	Data source
Import Demand	M	Total import as a share of GDP at time t		World Development Indicator
Per Capital Income	PCI	Per capital income in USD at time t	+/-	World Development Indicator
Relative price	RP	A share of domestic price to world price at time t	+	World Development Indicator
Foreign exchange reserve	FER	Foreign exchange reserve in USD at time t,	+	World Development Indicator
Real effective exchange rate	REER	Real effective exchange rate at time t,	-	World Development Indicator

U_t is the error term of the function;

n, is the lag length of the auto regressive process of the equation;

Δ stands for the first difference operator;

θ_1, θ_2, θ_3, θ_4, θ_5 are long run parameters the function; and
β_{1j}, β_{2j}, β_{3j}, β_{4j}, β_{5j} are short run parameters of the function.

For both equations, to test whether there is co-integration between the dependent and independent variables, a bound testing approach is used, which is proposed by Pesaran, Shin, and Smith (2001). The hypotheses of the test can be presented as:

H_0: $\theta_1 = \theta_2 = \theta_3 = \theta_4 = \theta_5 = 0$, implies no co-integration among the variables.

H_1: $\theta_1 \neq \theta_2 \neq \theta_3 \neq \theta_4 \neq \theta_5 \neq 0$, shows co-integration among the variables

3 Results and Discussion

Discussion of Findings

Foreign exchange reserve and import demand equations are specified for the Ethiopian economy, and the results of both equations are discussed intensively. In doing this, pre-estimation and diagnostic tests are employed before the findings.

3.1 Foreign Exchange Reserve Equation of Ethiopia

3.1.1 Unit Root Testing

This model requires unit root testing to make sure that none of the variables stay stagnant at the second difference or higher. By doing this, the foreign exchange reserve equation's unit root test result is shown as follows. It makes use of both the Philips-Perron (PP) and Augmented Dicky-Fuller (ADF) tests.

According to the results, the external borrowing and real GDP growth rate are stationary at level, while the other variables are stationary at first difference. This outcome provides compelling evidence in favor of using the autoregressive regression approach for the foreign exchange reserve function.

Table 3. Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) test results

Variables	Augmented Dickey Fuller (ADF) and Phillps Perron (PP) Test		Decision
	ADF	PP	
	T-statistics	T-statistics	
FER	-6.587295***	-7.716360***	I (1)
GDPgr	-3.683762**	-4.397673***	I (0)
EB	-3.877499**	-3.326784**	I (0)
EDS	-5.047035***	-4.137477***	I (1)
AID	-6.835964***	-6.828706***	I (1)
Ex	-5.007812***	-4.960542***	I (1)

Note: *** and ** indicates significance at 1% and 5% level of significance.

Source: Own computation using EViews 9.0

3.1.2 Bound testing approach of co-integration for foreign exchange reserve function

To test whether there is a co-integration between the foreign exchange reserve and its explanatory variables; a bound testing approach is used. The result for checking this long-run co-integration between the foreign currency supply and its explanatory variables is presented in the table 4 below.

At a significance level of 5%, the F-statistic value (9.71) is higher than the upper bound critical values. This suggests that the foreign exchange reserve and other independent variables in the function have a long-term relationship. This is an example of Ethiopia's co-integrated foreign exchange reserve function.

Table 4. Bound testing result for equation 1

Bounds Testing Result		
Null Hypothesis: No long-run relationships exist		
Test Statistic	**Value**	**K**
F-statistic	9.709534	5
Critical Value Bounds		
Significance	**Lower Bound**	**Upper Bound**
5%	2.62	3.79
1%	3.41	4.68

Source: output from E-views 9 econometric software.

3.1.3 Other pre-estimation tests for foreign exchange reserve function of Ethiopia

In addition to the functional form test confirming that the model is fully described and that there is no issue with omitted variable bias, table 5 above suggests that there is no serial correlation problem in the function at a 5% level of significance. The results of the normality test show that the foreign exchange reserve function does not have a heteroscedasticity issue and that the errors are normally distributed.

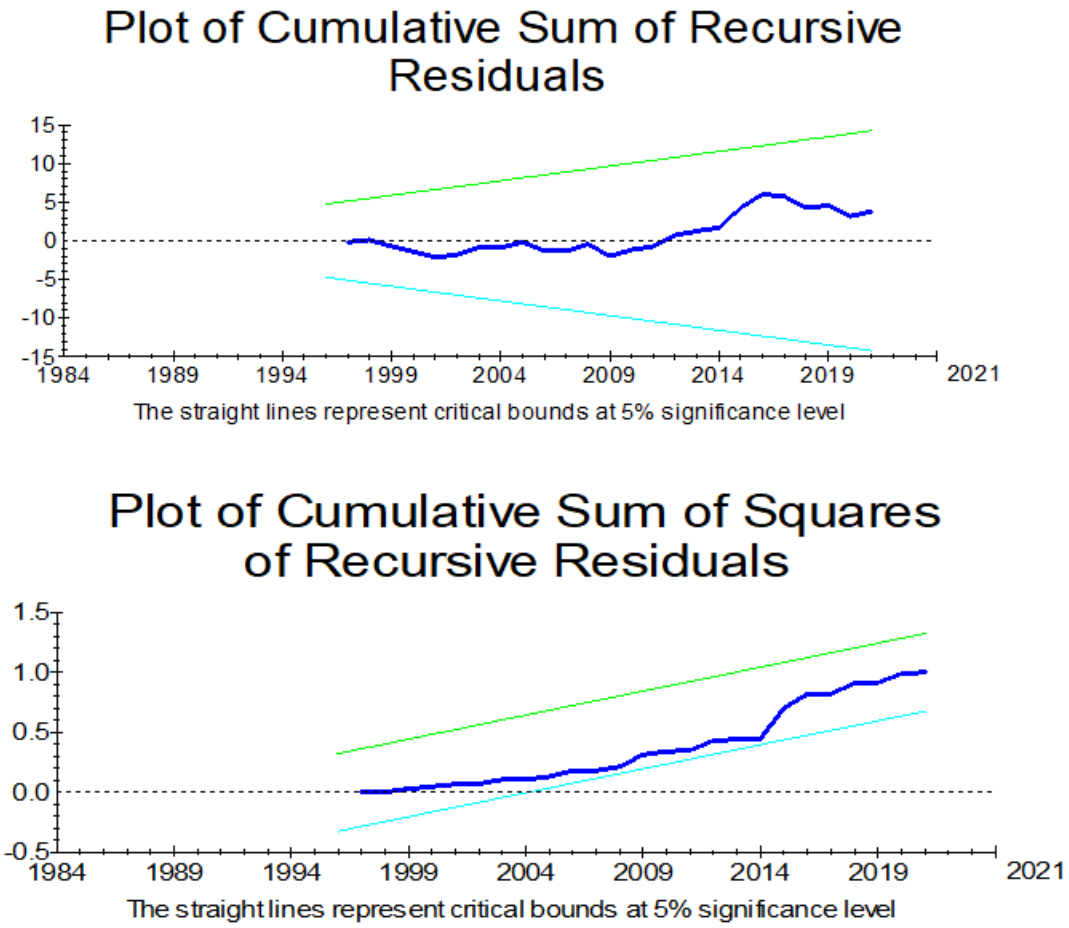
The CUSUM and CUSUM square tests recommended by Pesearon and Shin (1997) are used to verify the model's stability. By graphing the test statistics of these stability tests, we may determine whether a structural break issue exists.

Table 5. Pre-estimation diagnostic tests result for the foreign exchange reserve function

Test statistics	LM version	*F* version
Serial Correlation	CHSQ (1) = 2.5521[.110] **	*F* (1, 25) = 1.7999[.192] **
Functional Form	CHSQ (1) = .24652[.620] **	*F* (1, 25) = .15859[.694] **
Normality	CHSQ (2) = .40651[.816] **	Not applicable
Heteroscedasticity	CHSQ (1) = 2.6427[.104] **	*F* (1, 36) = 2.6907[.110] **

Source: Output from Microfit 4.1 ARDL (0, 0, 1, 1, 2, 2).

Note: 5% level of significance is used.



The two graph plots above demonstrate how, at the 5% level of significance, the recursive residual static curves for the foreign exchange reserve equation fluctuate between the critical boundaries. This suggests that there are no structural break issues with the model, which displays both short- and long-term associations.

3.1.4 Long run and short run estimates of foreign exchange reserve equation of Ethiopia

After making sure that there is long-run co-integration between foreign currency supply and its explanatory variables, it is possible to estimate the function. In doing this, the following table summarizes the long-run estimation result for the foreign exchange reserve function of Ethiopia.

Table 6. Long-run and short-run estimates of foreign exchange reserve equation

Method: ARDL				
Model selected: ARDL (0, 0, 1, 1, 2, 2)				
Variables	**Coefficients**	**Standard error**	***t*-statistics**	***p*-values**
Long-run coefficients				
GDPgr	-17502.6	8225028	-0.0021280	0.998
EB	0.064788	0.020606	3.1441	0.004***
EDS	-0.29866	0.28472	-1.0489	0.304
AID	0.45467	0.073786	6.1620	0.000***
Ex	9.35E+07	1.92E+07	4.8796	0.000***
C	-1.18E+09	2.03E+08	-5.8140	0.000
Short-run coefficients				
D(GDPgr)	-17502.6	8225028	-0.0021280	0.998
D(EB)	0.15199	0.033061	4.5974	0.000***
D(EDS)	1.6047	0.48382	3.3166	0.002***
D(AID)	-0.16780	0.16400	-1.0232	0.315
D(Ex)	5.44E+07	3.27E+07	1.6661	0.106
D(C)	-1.18E+09	2.03E+08	-5.8140	0.000***
ECM-1	-0.78726	0.16434	-4.79043	0.000***

Note: *** and ** indicates the rejection of a null hypothesis of statistical insignificance of the coefficients at 1%, and 5% levels of significance.

Source: Output from Microfit 4.1

The long-run estimates show that foreign borrowing, official foreign aid, and the export sector are strongly significant in affecting the foreign exchange reserve of Ethiopia. This result is consistent with a theory of capital flows. That is, a rise in foreign borrowing is one of the mechanisms to finance funds from abroad and directly increases the foreign currency availability. Another reason is foreign borrowing is likely to lead to greater investment activity in domestic and abroad, which, in turn, might affect the volume of trade. This confirms the finding by Andriyani *et al*., (2020). This result is also consistent with the short-run result. However, borrowing cannot be a persistent way to increase foreign exchange reserves since it can cause serious difficulties. External borrowing beyond the threshold level might cause a debt trap, economic instability, limited fiscal space, vulnerability to external shocks, and low opportunities for private sector growth. Managing borrowing levels and ensuring debt sustainability are crucial for developing countries to ensure long-term economic stability. So, borrowing to increase the foreign exchange reserve of a country should be managed carefully. If the central bank wants to increase the foreign currency reserve, especially during a crisis period, it should seek to identify and utilize other sources of foreign exchange reserve enhancement mechanisms.

Export and foreign aid are strongly significant and favorably influence the foreign currency supply of the country. This is because the export of goods and services is a way to fund sources from abroad in the form of foreign currency. So, countries with abundant natural resources should increase their export in terms of volume and diversification to accumulate a sufficient amount of foreign currency. This finding is also parallel with the findings by Rahmawati and Setyowati (2018) and Andriyani *et al*., (2020). This is one of the reasons why Ethiopia and other sub-Saharan African countries have accumulated substantial foreign currency supply in recent years, mostly from the export sector as well as foreign aid flows although it is not at a satisfactory level. But both

export and foreign aid are found to be insignificant in the short run.

The speed of adjustment of any disequilibrium towards long-run equilibrium, which can be shown by the error correction coefficient, is significant. This estimated error correction coefficient for the foreign exchange reserve equation in Ethiopia implies a high speed of adjustment to equilibrium after a shock. Approximately 78.72% of the disequilibrium from the previous year's shock converges back to the long-run equilibrium in the current year.

In the long run, GDP growth rate and external debt servicing are insignificant in affecting the foreign currency reserve of a country. The insignificant effect of external debt servicing on the foreign currency supply of the country might be because of the huge amount of concessional loans over recent decades. But, in the short run, external debt servicing is significant in affecting the foreign exchange reserve of the country. The GDP growth rate is also insignificant in affecting foreign currency accumulation of the country both in the short run and the long run, which is inconsistent with the findings of Kashif & Thiyagarajan (2017). This result implies that Ethiopia is unable to build up foreign currency reserves from a pro-growth approach.

3.2 Import demand equation of Ethiopia

The second function to be estimated in this study is the import demand equation. Before presenting the long-run estimates of all parameters, the necessary pre-and post-estimation tests are checked as follows.

3.2.1 Unit root testing

The unit root test result for the import demand function is presented on the table seven below.

The result shows that relative price (RP) is stationary at level and other variables are stationary at first difference. Like that of the former foreign exchange reserve function, the unit root test result of the import demand function implies a strong justification for employing the autoregressive (ARDL) regression technique.

Table 7. Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) test results

Variables	Augmented Dickey Fuller (ADF) and Phillps Perron (PP) Test		Decision
	ADF	PP	
	T-statistics	T-statistics	
M	-5.275265***	-5.266011***	I (1)
PCI	-3.265249**	-3.229117**	I (1)
RP	-5.262737***	-5.267288***	I (0)
FER	-6.587295***	-7.716360***	I (1)
REER	-5.580210***	-5.635874***	I (1)

Note: *** and ** indicates significance at 1% and 5% level of significance.
Source: Own computation using EViews 9.0

3.2.2 Bound testing approach of co-integration for import demand equation of Ethiopia

The import demand function of Ethiopia is tested for the existence of co-integration between the import demand and its explanatory variables by using a bound testing approach. The result for checking this long-run co-integration between the import demand and its explanatory variables is presented in the table below.

Table 8 below shows that the value of the F-statistic (6.84) is greater than the upper bound critical values at a significance level of 5%. This implies that there is the existence of a long-run relationship between import demand and other independent variables in the function. This represents a co-integrated import demand function in Ethiopia.

Table 8. Bound testing result for import demand function in Ethiopia

Bounds Testing Result		
Null Hypothesis: there is no long-run relationship between the variables		
Test Statistic	**Value**	**K**
F-statistic	6.846409	4
Critical Value Bounds		
Significance	**Lower Bound**	**Upper Bound**
5%	2.62	3.79
1%	3.41	4.68

Source: output from E-views 9 econometric software.

3.2.3 Diagnostic testing for import demand equation of Ethiopia

The following diagnostic tests are presented for import demand function of Ethiopia.

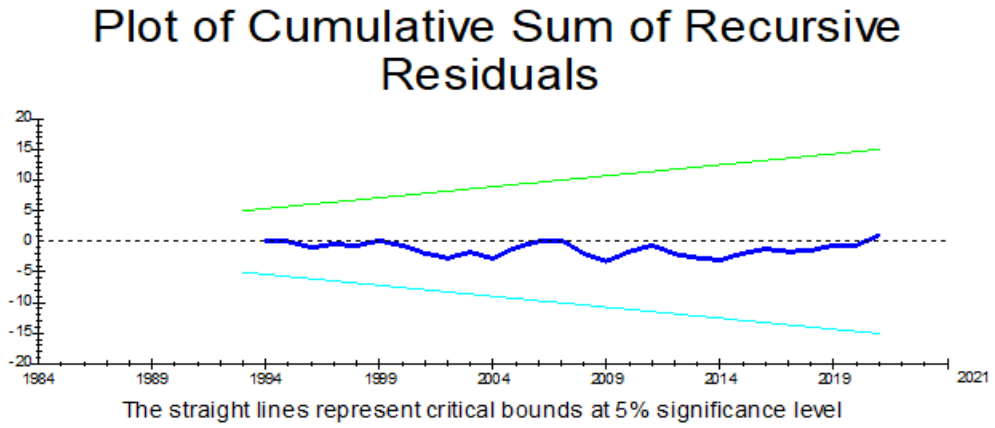
The result in Table 9 implies that there is no serial correlation problem in the function at a 5% level of significance, and the functional form test also confirmed that the model is well specified and there is no problem of omitted variable bias. The normality test reveals that the errors are normally distributed, and there is no heteroscedasticity problem in the import demand function of Ethiopia.

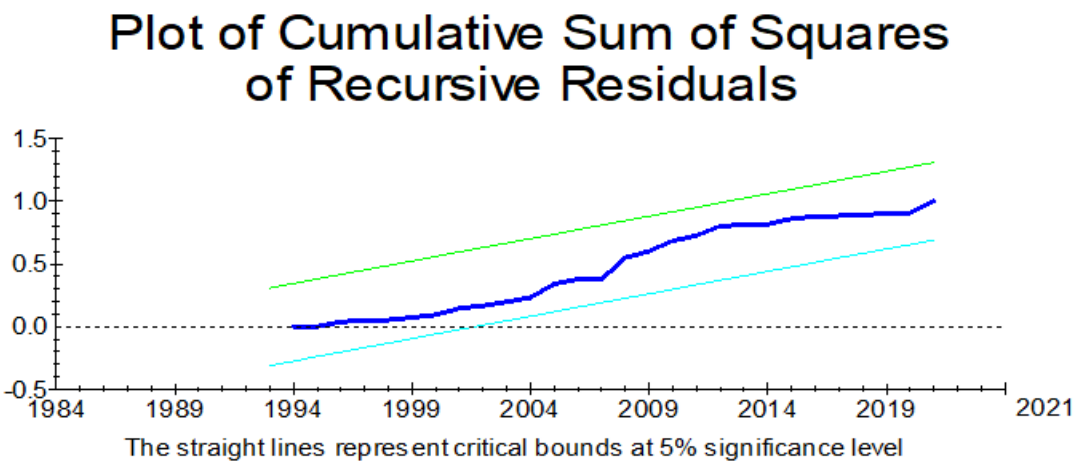
Table 9. Pre-estimation diagnostic tests result for import demand function of Ethiopia

Test statistics	**LM version**	***F* version**
Serial Correlation	CHSQ (1) = 1.2504[.263] **	*F* (1, 28) = .95269[.337] **
Functional Form	CHSQ (1) = .013297[.908] **	*F* (1, 28) = .0098011[.922] **
Normality	CHSQ (2) = .67625[.713] **	Not applicable
Heteroscedasticity	CHSQ (1) = .330624[.861] **	*F* (1, 36) = .028948[.866] **

Source: Output from Microfit 4.1 ARDL (2, 0, 0, 1, 1) .5% level of significance is used

The following plot of graphs is showing the stability and structural problem test for the import demand function in Ethiopia.





The recursive residual static curves for the import demand equation imply that the residual curves move between the critical bounds at a 5% level of significance. This implies that the model, which shows short-run and long-run relationships, is stable, and there is no structural break problem in the model.

3.2.4 Long run and short run estimates of import demand function of Ethiopia

After making sure that there is an existence of cointegration between import demand and its explanatory variables, it is possible to estimate the function. In doing this, the following table summarizes the long-run and short-run estimation results for the import demand function in Ethiopia.

Table 10. Long-run and short-run Estimates of the import demand equation

Method: ARDL

Model selected: ARDL (2, 0, 0, 1, 1)

Variables	**Coefficients**	**Standard error**	***t*-statistics**	***p*-values**
Long-run coefficients				
PCI	-0.13204	0.049339	-2.6762	0.012**
RP	1.0468	1.0454	1.0013	0.325
FER	0.2027E-7	0.6834E-8	2.9665	0.006***
REER	-0.019265	0.051816	-0.37180	0.713
C	40.8159	7.5747	5.3885	0.000***
Short-run coefficients				
D(PCI)	-0.45161	0.13724	-3.2907	0.002***
D(RP)	-0.021853	.0037493	-5.8285	0.000***
D(FER)	0.17323	0.17575	0.98569	0.332
D(REER)	-0.024949	0.0099976	-2.4955	0.018**
D(C)	6.7549	2.1256	3.1779	0.003***
ECM-1	-0.68041	0.14305	-4.75644	0.000***

Note: *** and ** indicates the rejection of a null hypothesis of statistical insignificance of the coefficients at 1%, and 5% levels of significance.

Source: Output from Microfit 4.1

The result from estimates of the import demand function for Ethiopia presented in Table 10 shows that in the long run, foreign currency reserve is significant in increasing the aggregate import demand of the country. Keeping other things constant, a 1 unit increase in foreign currency reserve at the national bank results in a 0.2 unit rise in import demand of the country. This suggests that a significant portion of foreign exchange reserves are used to finance imports. This is due to the fact that a rise in foreign exchange reserves boosts the nation's purchasing power and ensures uninterrupted international transactions. This result contradicts the study conducted by Vacu & Odhiambo (2019) and is in line with a study conducted by Vacu (2021) & Farayibi (2016). This call for a sufficient amount of foreign currency reserve is important to increase imports, which in turn enables countries with constrained production capacity, to unfettered access to capital goods from abroad and to improve domestic welfare. But in the short run, it is found to be insignificant in affecting the import demand in Ethiopia.

Per capita income has a major negative impact on Ethiopia's import demand over the long and short terms. When all else is held constant, a one unit increase in the nation's per capita income causes the demand for imports to decline by 0.13 units. According to the standard demand imperfect substitution theory, the consumer's goal is to maximize utility while staying within their means.

In other words, the import demand function is primarily determined by the income of the importing country and the relative price of goods. This finding might be because as per capital income is improved, domestic investment can be expanded, and infant domestic industries become strong and competitive at the international level, which can substitute imported items from abroad by enabling them to be produced in domestic. Moreover, an increase in per capital income can increase domestic production, domestic saving and investment, shift in consumer preferences, and those in turn can reduce aggregate import demand of the country. This result is consistent with Narayan & Smyth (2005) and inconsistent with a study by Vacu & Odhiambo (2020).

As indicated by the error correction coefficient, the rate at which any disequilibrium adjusts to long-term equilibrium is noteworthy. A high rate of equilibrium adjustment following a shock is implied by this calculated error correction coefficient for Ethiopia's import demand function. About 68.04% of the shock-related disequilibrium from the prior year converges to the long-term equilibrium this year. Although the relative price of goods and services and the real effective exchange rate are found to be significant in negatively affecting the aggregate import demand, in the long run, both are insignificant in affecting the import demand function of Ethiopia. This might be because of price inelastic nature of Ethiopia's imported items from the rest of the world.

4 Conclusion and Implications

According to the findings, a nation's foreign exchange reserves can be considerably raised over time via export expansion, overseas borrowing, and international aid. The capital flow theory is to blame for this. The outcome can be used to support the theory that foreign commerce and capital inflows may be the cause of a sizable foreign exchange reserve. However, over time, Ethiopia's foreign exchange reserve is not significantly impacted by GDP growth rate or external debt servicing.This might be because of the huge amount of concessional loans over the last decades and the inability to build up foreign currency reserves from a pro-growth approach in Ethiopia. It is known that reserving a sufficient amount of foreign currency in an economy is essential to deal with the instability and uncertainty of external capital flows. The implication of this result is the government of Ethiopia can enhance the foreign exchange reserve through capital inflow, such as borrowing and working on export growth. The government policy should be designed by focusing on increasing exports in terms of volume and diversification.

However, borrowing cannot be a persistent way to increase foreign exchange reserves since it can cause severe difficulties, especially during a crisis when it becomes almost impossible to refinance. Borrowing above the threshold level can lead to a debt trap, economic instability, limited fiscal space, vulnerability to external shocks, dependence on foreign lenders, and reduced opportunities for private sector growth. Managing borrowing levels and ensuring debt sustainability are crucial for developing countries to ensure long-term economic stability and growth. So,

foreign borrowing should be managed carefully, and most of the time it is not recommended as a persistent way of gaining foreign exchange reserves from abroad.

The results of Ethiopia's import demand function demonstrate that, over time, per capita income has a negative impact on the nation's overall import demand equation. This is due to the fact that rising per capita income can lead to changes in consumer choices, domestic production, saving, and investment, all of which can lower the nation's overall import demand. However, foreign exchange reserves are strongly significant in positively affecting the import demand of the country because an increase in foreign exchange reserves increases the purchasing power and provides stability in international transactions without disruptions. So, the government should have a stable foreign exchange reserve to finance the import of goods and services from abroad since import enables unfettered access to capital goods from abroad and to improve the domestic welfare and human development.

Acknowledgments

The authors are grateful to Dilla University's Office of Research, Publication, Ethics, and Dissemination for providing support for this study.

Conflicts of Interest

The authors of this research state that they have no conflicts of interest with regard to its publication.

References

Aizenman, J., Chinn, M.D., & Ito, H. (2016). Monetary policy spillovers and the trilemma in the new normal: Periphery country sensitivity to core country conditions. *Journal of International Money and Finance*, 68, 298-330.

Andriyani, K., Marwa, T.,Adnan, N., & Muizzuddin, M. (2020). The Determinants of Foreign Exchange Reserves: Evidence from Indonesia. *The Journal of Asian Finance, Economics, and Business*, 7(11), 629-636.

Ayodotun, A. & Farayibi, A. (2016). Modelling the determinants of import demand in Sub-Sahara Africa. MPRA Working paper, Available at SSRN 2828351.

Ayunku, P.E. & Markjackson, D. (2020). Impact of External Debt on Nigeria's Foreign Reserve Portfolios. *Asian Journal of Economics and Empirical Research*, 7(1), 1-7.

Cheng, G. (2013). A growth perspective on foreign reserve accumulation. Macroeconomics Dynamics, Cambridge University press, USA.

Ghatak, S. (2005). Introduction to Development Economics. 3^{rd} ed. Taylor & Francis.

Gosselin, M.A. & Parent, N. (2005). *An empirical analysis of foreign exchange reserves in emerging Asia*. (No. 2005-38). Bank of Canada.

Green, W.H. (2003). Econometric Analysis, Person Education. *Inc., Upper Saddle River, New Jersey*.

Kashif, M., Sridharan, P., & Thiyagarajan, S. (2017). Impact of economic growth on international reserve holdings in Brazil. *Brazilian Journal of Political Economy*, 37, 605-614.

Krušković, B.D. & Maričić, T. (2015). Empirical Analysis of the impact of foreign exchange reserves to economic growth in emerging economics. *Applied Economics and Finance*, 2(1), 102-109.

Lensink, R. (1995). Foreign exchange constraints and developing countries. *Economic Modelling*, 12(2), 179-191.

Narayan, P.K. (2005). The saving and investment nexus for China: evidence from cointegration tests. *Applied economics*, 37(17), 1979-1990.

Narayan, P.K. & Smyth, R. (2005). The determinants of aggregate import demand in Brunei Darussalam: an empirical assessment using a cointegration and error correction approach. *The Singapore Economic Review*, 50(02), 197-210.

Obstfeld, M., Shambaugh, J.C., & Taylor, A.M. (2008). Financial stability, the trilemma, and international reserves (No. w14217).

Pesaran, M.H. & Shin, Y. (1998). An autoregressive distributed-lag modelling approach to cointegration analysis. *Econometric Society Monographs*, 31, 371-413.

Pesaran, M.H., Shin, Y., & Smith, R.J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics*, 16(3), 289-326.

Rahmawati, H.F. & Setyowati, E. (2018). The Effect of Exports, Imports, Money Supply and Inflation on Indonesia's Foreign Exchange Reserves for the April 2012-June 2017 Period. In: *The National Conferences Management and Business*, 6(6), p.17.

Smith, S.C. & Todaro, M.P. (2012). Economic Development. 11^{th} edition. The Pearson Series in Economics, 2012.

Tariq, M., Haq, Z., Jan, S., Jehangir, M., & Aamir, M. (2014). Real exchange rate and foreign exchange reserves: A mercantilist view. *Life Science Journal*, 11(3), 13-25.

Vacu, N.P. & Odhiambo, N. (2019). The determinants of aggregate and dis-aggregated import demand in Ghana. *African Journal of Economic and Management Studies*, 10(3), 356-367.

Vacu, N. & Odhiambo, N.M. (2020). The determinants of import demand: a review of international literature. *Acta Universitatis Danubius. Œconomica*, 16(5).

Vacu, N.P. (2021). Examining the determinants of import demand in Tanzania: an ARDL approach. Working Papers 28945, University of South Africa, Department of Economics.

World Bank (2022). World development indicator data base. Washington DC, U.S.A.