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THE IMPACT OF FOREIGN CAPITAL INFLOWS ON ECONOMIC GROWTH OF ETHIOPIA: NEW EMPIRICAL EVIDENCE FROM JOHANSSON COINTEGRATION TEST

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Abstract: An allocation of foreign capital inflows in productive way is necessary but not sufficient condition to achieve the sustainable economic growth. Therefore, the impact of FCIs on economic growth with has not yet investigated in Ethiopia. As a result, this paper explores the Impact of FCI inflow on economic growth by allowing the link between the two far variables to be human capital and labor force during the period 1981–2020 by applying the vector error correction model. Specifically, the study tries to answer the question of whether foreign capital inflow variables have any significant effect on the economic growth of the country. The empirical result reveals that, in the long run, a high level of foreign aid has a significant positive effect on economic growth. On the other hand, the stock of external debt stock has a negative and significant effect on economic growth and poses great challenges to the economy. While remittances have no significant effect on both the long and short run. Moreover, control variables like labour force have a significant positive impact, while human capital proxied by educational expenditure has a negative and significant effect on the economic growth of Ethiopia.

Keywords: Foreign aid, Foreign external debt sock, Remittance, Human Capital, Economic Growth

1. INTRODUCTION

Foreign aid, foreign direct investment (FDI), external debt, remittances, and portfolio investments remain important and stable sources of foreign capital

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inflows (FCI), as they bring in large amounts of foreign exchange that help developing countries maintain their balance of payments. For example, in 2013, remittances were three times higher than official development assistance and significantly higher than foreign direct investment in poor countries (World Bank, 2014).Developing countries are stuck in a vicious cycle of poverty. Alternative frameworks to foreign capital inflows were welcomed in least developed countries to bridge the gap between domestic savings and investment and accelerate development (Chenery & Strout, 1968).However, FCI is considered a key channel for technology transfer, management know-how, and production efficiency, linked to external markets and accessed by several developing countries (Ehigiamusoe & Lean, 2019).

All least developed countries need FCI for growth, but the amount and form of foreign economic assistance varies from country to country. Country size and national economic situation are the main determinants of the amount and shape of FCI (Chong *et al.*, 2009).The impact of foreign capital on domestic savings and economic growth is both a subject of theoretical debate and an empirical topic.

The issue of the economic impact of foreign aid on economic growth and development is controversial. Economic traditionalists refer to Easterly (2003); Riddell (1992); Stampen and Fenske (1988) argue that development aid has indeed promoted growth and structural change in many least developed countries. On the other hand, Adelman and Chenery (1966) and Chenery and Carter (1973) argue that aid does not promote faster growth, but rather slows growth by substituting rather than supplementing domestic savings and investment. Critics argue that this could worsen BOP a deficit as a result of the idea is to link debt repayment obligations and aid to the donor country's exports. Current research on the relationship between growth support and growth support shows mixed results.

For instance, some researchers argue that foreign aid stimulates economic growth by increasing private investment in host countries (see (Dash, 2021) as well as (T. Girma & Tilahun, 2022; Yohannes, 2011; Gounder, 2001; Murthy *et al.*, 1994; Adams & Klobodu, 2017), found a positive long-term impact. Dash (2021) argued that foreign aid does not crowd out private investment and that there is a positive correlation between foreign aid and economic growth in both the short-run and long-run. By taking the panel vector error-correction model Granger causality test (Mahembe and Odhiambo 2019), examined the causal relationship between foreign aid, poverty, and economic growth in

82 LDCs over the period 1981–2013. The study found that in the long run, foreign aid tends toward a long-run equilibrium path in response to changes in economic growth and poverty; and both economic growth and poverty together cause foreign aid. Similarly, Gounder (2001) applied the neoclassical production function and ARDL approach to Fiji for the period 1968 -1996. The results show that total aid and its various forms, have a significant impact on economic growth. On the other hand H. Girma (2015), Rehman and Ahmad (2016), Tadesse (2011) and Tefera and Odhiambo (2022), find that foreign aid has a negative economic growth in both short run and long run. Girma and Tilahun 2022), They investigated the predictability of foreign aid on Ethiopia's economic growth using the ARDL approach over the period 1985–2019.The empirical results show that there is a positive relationship between development aid and economic growth in the long run, but the effect is small in the short run.

A similar analysis of the impact of foreign aid on economic growth in Africa is conducted by Tefera and Odhiambo 2022.They used a panel data set from 25 low-income countries (LICs) in Africa from 2000 to 2017. In a dynamic panel growth model within the system GMM framework, they consider three main proxies of bilateral aid as independent variables, including gross aid, traditional donor aid, and non-traditional donor aid.The main conclusions suggest that the impact of foreign aid on economic growth is large and appears to be detrimental to TA and TDA agencies. Research on the relationship between remittances and growth is controversial. Dilshad (2013), Kausar *et al.*(2019), Zafar *et al.*(2016) and Jawaid and Saleem (2017) studied in Pakistan and found a positive effect on economic growth. Aduguna Chomen *et al.*(2023), Meyer and Shera (2017), Asaminew *et al.* (2010) and Beyen in Ethiopia (2012). Rehman and Ahmad (2016) also found a positive impact of remittances on economic growth in LDCs.

Meanwhile, a study by Lacheheb and Ismail (2020) investigated the long-term negative effects this has on the economies of developing countries. The researchers found that remittance inflows had a negative impact and affected economic growth throughout the sample period.

Surprisingly, Adams and Klobodu (2017) found that the effect of remittances on economic growth is insignificant in all regressions.

Studies on the relationship between external debt and economic growth (Mohd Dauda *et al.*, 2013; Mohd Daud & Podivinsky, 2012 and Toktaş *et al.*, 2019) found that external debt has a positive impact on economic growth. For

more information, Mohd Dauda *et al.* (2013) studied the Malaysian economy and found that external debt accumulation has a positive impact on economic growth up to an optimal level. Jawaid and Saleem (2017) investigated the impact of capital inflows on Pakistan's economy and found that external debt has a significant and positive impact. Other authors Rehman and Ahmad (2016) considered this to be negative. According to Guei (2019), external debt has a negative and significant short-run relationship with economic growth in the studied period for 13 emerging economies. This result shows that debt does not have a significant impact on economic growth in the long run. Adams and Klobodu (2016) used ARDL to analyze the differential impact of capital movements on economic growth in Ghana over the period 1970-2014. They recognized that external debt was negative and had a significant impact on Ghana's economic growth. They attribute this negative development to a lack of capital, moderate debt, and the use of debt for mere consumption purposes rather than to support productive investment projects that generate returns to foster economic growth. Adams and Klobodu (2017) investigated the relationship between capital flows and economic growth in five SSA countries. Among the variables, they found that external debt had a negative and significant impact on growth in all countries studied. Finally, they suggested that policymakers in SSA should focus on attracting capital inflows to support structural change and implement the initiatives and economic capacity necessary to sustain it.

Contribution of this paper is firstly, Number of previous studies such as (Fayissa and Nsiah 2010; Assaminew *et al.* 2010; Yohannes 2011; H. Girma, 2015; Zafar *et al.* 2016; Tadesse, 2011; Meyer and Shera 2017; Adugna Chomen *et al.* 2023; Beyene 2012; Jawaid and Saleem 2017; T. Girma and Tilahun 2022),focus on single proxy variable for private capital inflows. This study incorporated three indicators as proxies for capital inflows to fill the gap in the empirical literature. The inclusion of more variables helps to give a complete and clear picture of foreign capital inflows in the Ethiopian economy. Secondly, several studies are cross-country in nature. Studies by (for example Rehman and Ahmad 2016; Siddiqui 2014; Yemane Michael 2019; Guei 2019; Tefera and Odhiambo 2022) their studies provide critical insights into this study. While noting that the cross-country growth literature has yielded mixed results, indeed, the effectiveness may be heterogeneous across countries in that the context of each country should be taken into consideration. This is the compelling reason for this study and also for filling in the gaps that were not captured by embracing the three largest foreign capital inflows to Ethiopia.

2. EMPIRICAL LITERATURE REVIEWS

A number of studies have dealt with the impact of foreign capital on economic growth over the last three decades. Most of the empirical studies showed that there were mixed effects exists. The studies show that foreign capital inflow has both a negative and positive impact on the economic growth of developing countries.

2.1. The Remittance– Growth Nexus

Empirical evidence shows that remittances contribute to economic growth by positively influencing consumption, savings and investment. Several empirical studies provide evidence of the growth-promoting effects of international remittances. In this regard, various types of literature reports that evidence of the positive impact of remittances on accelerating economic growth (see Tung, 2018; Beyene, 2014, Lartey, 2013, Eggoh *et al.* 2019; Adugna Chomen *et al.* 2023; Meyer and Shera, 2017; Zafar *et al.* 2016).In detail, Eggoh *et al.* (2019), Investigated the impact of international remittances on economic growth in 49 LDCs from 2001 to 2013. By applying PSTR, difference, and GMM models. They found remittances have a positive and significant impact on economic growth, while aid and FDI have an insignificant impact. Lartey (2013), examined the relationship between remittances, investment, and economic growth in SSA. The result shows that nexus between remittances and growth is positive, and the interaction effect between remittances and financial deepening on growth is also positive, and indirectly, remittances contribute towards a stable macroeconomic environment by smoothing consumption. Also Beyene (2014), investigated the effects of international remittances on poverty and inequality in Ethiopia. He found a significant effect of remittances on poverty reduction. Adugna Chomen *et al.* (2023), investigated the short and long term effects of foreign aid and remittances on economic growth of 31 African countries over the period 1980 to 2019, by employing the ARDL PMG estimation technique. They founded remittances have a positive and significant impact on economic growth through long run. Zafar *et al.* (2016), conducted research on the impact of workers' remittances on economic development in Pakistan during the period 1980–2010. The quantitative evidence demonstrates that workers` remittances have all the earmarks of being a critical wellspring of economic development. The studies recommended that Pakistan's policy of empowering and increasing the stream of workers' remittances be better used for economic development and growth.

Some empirical studies have also reported that the impact of international remittances on economic growth could be negative (for instance, Tung, 2018; Tolcha and Rao 2016; Ayenew 2022a). Specifically, Tung (2018) analyzed the impact of remittance inflows on trade balances in 17 countries of the Asia-Pacific region from the period 1980–2015. By internalizing OLS, 2-SLS, and PGMM models. They found that remittance inflows hurt the trade balances of the countries in the sample. Tolcha and Rao (2016), analyzed the impact of remittances on economic growth in Ethiopia. This study assessed the impact of remittances on Ethiopian economic growth over the period 1981–2012. The ARDL model is used for time-series estimation. The study found that there is a significant short-run impact of remittances on economic growth, while it affect the economy negatively in the long run. Ayenew (2022a), investigated the impact of remittance inflows on the economic growth of sub-Saharan African countries. The study includes 26 sub-Saharan African countries over the period 2010–2019. By employing the two-step GMM system, the finding shows remittance alone hurts economic growth. When remittances interact with financial sector development, institutional quality, and economic growth, the coefficient of the interaction term is positive.

2.2. Foreign aid and Economic Growth Nexus

Over the past three decades, foreign aid has received significant attention from an economic growth perspective. The empirical literature on the impact of foreign aid on economic growth has generated different schools of thought. Several empirical studies provide evidence of the growth-promoting effects of development assistance (Feeny, 2003; Appiah-Otoo *et al.*, 2022; Burnside & Dollar, 2000; Dash, 2021; Gounder, 2001; Murthy et al, 1994) ; T.Girma & Tilahun, 2022; Setargie Ejigu, 2015).More specifically, Appiah-Otoo *et al.*(2022), who studied 37 African countries for the period 2002–2018 using an instrumental variable GMM model of foreign aid to stimulate economic growth through sound financial development. Applying a panel FMOLS model to eight South Asian countries from 1996 to 2018 (Dash, 2021), we find a positive relationship between foreign aid and short- and long-term economic growth.

Similarly Gounder (2001) Fiji, Murthy *et al.*Tadesse (2011) in Cameroon and Setargie Ejigu (2015) in Ethiopia also found that the relationship between foreign aid and economic growth was positive and statistically

significant.T Girma and Tilahun (2022) used the ARDL approach to analyze the predictability of Ethiopia's foreign aid and economic growth from 1985 to 2019.This empirical result shows that foreign aid plays a positive role in economic growth in the long run, but is not important in the short run, and that the predictability of foreign aid plays a positive role in economic growth in both the short and long run.

Several empirical literatures provide evidence that foreign aid has a negative impact on host country economic growth (e.g. Burnside & Dollar, 2000; Tefera and Odhiambo, 2022; Anetor *et al.*2020; Abate, 2022 ; Adugna Chomen *et al.*2023).and H. Girma, 2015). For further details, Tefera and Odhiambo (2022) study the impact of foreign aid on economic growth by applying dynamic PGM within a system GMM framework for 25 LICs in Africa over the period 2000–20. they found that the impact is negative and appears to be important for economic growth. Anetor *et al.* (2020) a sample of 29 SSAs from 1990 to 2017 using the FGLS methodology,found that in inadequate channeling of foreign aid had a negative impact on poverty reduction in the studied countries. Similarly, Abate (2022) finds that the impact of foreign aid on the economic growth of 44 least developed countries between 2002 and 2019 is negative after applying the GMM system and dynamic panel threshold regression. The findings suggest that foreign aid was not being channeled appropriately.In the vibe , Adugna Chomen *et al.* (2023) investigated the short- and long-term effects of foreign aid and remittances on the economic growth of 31 African countries from 1980 to 2019 using the ARDL-PMG estimation methodology. They reasoned that short-term foreign aid would have a negative impact. They suggested that African governments should take strong measures to maximize the returns and effectiveness of foreign capital and stimulate economic growth.

2.3. The Effect of Foreign External Debt on Economic Growth

Studies on external debt and economic growth have shown mixed results. Some empirical studies have reported that external debt has a positive impact on foreign economic growth (e.g.Toktaş *et al.*, 2019 and Mohanty, 2017), and external debt is particularly They claim that it has a positive impact on growth. Toktas *et al.*(2019) applied asymmetric causality analysis to his time series data from Q1 2003 to Q1 2017 in Turkey and found a causal relationship between external debt and economic growth. Similarly, Mohanty (2017) investigated his time series data from 1981 to his 2014 using a vector error correction

model. He found that there is a long-term relationship between Ethiopia's external debt and economic growth, with external debt having a statistically significant positive impact on Ethiopia's economic growth during the study period.Furthermore, there is empirical literature on the nexus between foreign external debt stock and economic growth. For example, Dreher (2006), Hameed *et al.* (2008), Ehigiamusoe and Lean (2019), Ayenew (2022b) and Fosu (1999) found that foreign external debt stock hurts and negatively affects economic growth. Ehigiamusoe and Lean (2019), who examined the impact of FCIs on the economic growth of Nigeria through the period 1980–2015 employing the ARDL-bounds test, found the impact of foreign loans is negative. In the way Ayenew (2022b) argued in SSA, external debt affects economic growth negatively.

3. METHODOLOGY OF THE STUDY

3.1. Model Specification

Various studies have been conducted to understand the impact of foreign capital inflows (FCI) on the economic growth of developing countries, and different variables and methodologies have been used for data analysis. According to the theoretical propositions reviewed in the literature, the impacts of foreign capital inflows on economic growth were to be examined by specifying the following equations: Growth Equation. The growth model, used in this study, is based on the Lucas-Roomer endogenous growth model, which extends the old neo-classical model by emphasizing the role of endogenous factors (i.e., human capital stock and R&D activities) as the main drivers of economic growth. While early neo-classical models assumed total factor productivity growth as exogenously given, the newer endogenous growth models attribute this component of growth to the 'learning by doing' effect occurring between 38 physical and human capital, which results in increasing returns to scale in production technology (Lucas, 1988). Therefore, the production function under endogenous growth theory can be written as:

$$Y_t = f(K_t, L_t, HC_t) \tag{3.1}$$

In addition to the aforementioned variables, according to Acemoglu and Robinson (2008), human capital can play a major role in economic growth and cross-country income differences. Human capital theory, developed primarily by Becker (2009) and Mincer (1974) is about the role of human capital in the

production process and about the incentives to invest in skills, including pre labor market investments in the form of schooling and on-the-job investments in the form of training. Hence, with the expected signs indicated below the variables, growth function is given by:

$$REALGDP = f(AID, REMIT, EXDEBT, LF, HK) \quad (3.2)$$

Where,

RGDP = real gross domestic product

AID = foreign aid as a percentage of GDP

REMIT = Remittance as a percentage of GDP

LF = Labor Force

HK = human capital proxy by education expenditure

EXDEBT = External debt as a percentage of GDP

$$LREALGDP = \beta_0 + \beta_1 AID + \beta_2 REMIT + \beta_3 EXDEBT + \beta_4 LLF + \beta_5 HK \quad (3.3)$$

Where L represents the natural logarithm of the respective variable and U_t is the error term.

3.2. Data Type, Source and Description

It is important to discuss the source and nature of the data, as the success of the econometric analysis ultimately depends on the availability and accuracy of the data. Regarding the type of data, the study was conducted based on secondary data covering the period from 1981 to 2020. The main data source for the problem under study is the World Development Index. This study analyzes the relationship between foreign capital inflows and economic growth of the Ethiopian economy over the period 1981 to 2020. For this reason, real GDP an indicator of economic growth was used as the dependent variable. Following various empirical model specifications of economic growth and theories of economic growth determination, control variables such as Labour force and human capital are used in this study. Regarding foreign private capital inflows, our variables of foreign aid, Personnel remittances received, and external debt stock as percentage of GDP are used. Concerning the human capital variable, expenditure on education and Labour force (total labour force) were used.

3.2.1. Variables and Expectations

Table 3.1: The proxy and expected sign of independent variables

Variables	*Proxy*	*Expected sign*
Economic growth	Real GDP (constant $2005)	
Foreign aid	Official development assistance(ODA) as percent share of GDP	Positive
Remittance	Personal Remittance received as percent share of GDP	Positive
External debt stock	External debt as the percentage share of GDP	Positive
Labor force	Labor force	Positive/negative
Human capital	Education expenditure as a percentage share of GDP	Positive/negative

3.3. Model Selection

The study uses the Vector Error Correction Model (VECM) approach to co-integration proposed by Johansen and Juselius (1995) to empirically analyze the long- and short-run effects of foreign capital inflows on economic growth in Ethiopia. The advantage of vector error correction (VECM) is that if the time series is not stationary, then the VAR framework needs to be modified to allow consistent estimation of the relationships among the series. The vector error correction (VEC) model is just a special case of the VAR for variables that are stationary in their differences, i.e., I (1). The VECM can also take into account any co-integrating relationships among the variables. The vector error correction model is chosen because (1) the time series are not stationary in their levels but are stationary in their differences, and (2) the variables are co-integrated.

4. EMPIRICAL RESULTS

The study conducted stationary tests in order to determine the level of integration of the variables in the model using both Augmented Dickey Fuller (ADF) and unit root tests. The results presented in Table 1 indicate that real GDP, remittances, foreign aid, External debt, human capital, and Labour force are non-stationary at level but, after making the first difference, become stationary integrated at an order of one, i.e., I(1) at a 5% significant level. Thus, all the time-series variables are stationary and integrated in the same order, that is, I (1). Six of our variables (LREALGDP, AID, REMIT, EXDEBT, LLF, and HK) were integrated into order 1. In short, all the variables have unit roots at their level but became stationary in the first differences. From Table 4.1, we can

conclude that none of the variables are integrated of order zero, I (0), which is a precondition for applying the VECM. In other words, all the tests revealed that the model has variables that are integrated of order I (1); none of the variables are found to be integrated of I(0) and I(2). Therefore, this condition makes the VECM appropriate to conduct long-run relationship analysis among variables under investigation.

Table 4.1: Augmented Dickey Fuller Unit Root Test

Variables	*Augmented Dickey Fuller*				
	t statistics at level		*t statistics at first difference*		
	t- statistics	*p-value*	*t-statistics*	*p-value*	*Status*
LREALGDP	-2.242	1.0000	-4.323*	0.0000***	I(1)
AID	-1.763	0.3987	-6.375*	0.0000***	I(1)
REMIT	-2.670	0.0794	-6.491 *	0.0000***	I(1)
EXDEBT	-1.341	0.6102	-5.200*	0.0000***	I(1)
LLF	1.786	0.9983	-4.776*	0.0001***	I(1)
HK	-1.254	0.6500	-6.292*	0.0000***	I(1)
Critical values	Level		First difference		
1%	-3.655		-3.655		
5%	-2.961		-2.961		
10%	-2.613		-2.613		

Note: Accepting or rejecting the null hypothesis depends on critical values and P-values. In the case of the P-Value, when the P-Value is smaller than the standard significance levels of 1%, 5%, and 10%, we reject the null hypothesis (See Table 4.1). ***, **, and * indicate the rejection of a null hypothesis of non-stationary at the 1%, 5%, and 10% levels of significance, respectively. LREALGDP = real GDP, AID= foreign aid, REMIT=remittances, EXDEBT=external debt, LLF=labour force, HK=human capital

Estimating the Optimal Lag Order

Before the cointegration test, one must select the appropriate lag length of the time-series data. Determining the optimal lags in the model is necessary to test before the cointegration test. The determination of the optimal number of lags depends on the criteria of the Akaike Information Criterion (AIC), Final Prediction Error (FPE), Schwarz Information Criterion (SC), and Hannan-Quinn Criterion (HQ) with the smallest value, as well as LR with the highest value (Bhat *et al.*, 2021); (Niedźwiecki *et al.*, 2017). It is clear from Table 4.2 that of the five criteria, two selected lag order 3, and the rest selected lag order

1. Thus, we hypothesize one as the optimum lag length. A lag of 1 year seems appropriate to analyze the relationship between foreign capital inflows and economic growth in Ethiopia.

Table 4.3: VAR Lag Order Selection Criteria

Lag	*LL*	*LR*	*Df*	*P*	*FPE*	*AIC*	*HQIC*	*SBIC*
0	-293.467				.676981	16.6371	16.7292	16.901
1	-77.0433	432.85	36	0.000	.000031*	6.61352	7.25832*	8.46096*
2	-45.8282	62.43	36	0.004	.000048	6.87935	8.07684	10.3103
3	-4.65522	82.346	36	0.000	.00006	6.59196	8.34214	11.6064
4	48.41816	106.27*	36	0.000	.000079	5.63991*	7.94279	12.2379

Notes: * indicates the lag order selected by the criterion. LR: sequential modified LR test statistic (each test at the 5% level). FPE: Final prediction error AIC: Akaike Information Criteria SBC: Schwarz Bayesian information criterion HQ: Hannan-Quinn information criterion

Cointegration Test (Johansen Cointegration Test)

Since all the variables are cointegrated in their first order, I (1), we can go for the Johansen multivariate cointegration test. We applied the cointegration test to find the cointegration vector (denoted by r) among the time-series variables in the case of Ethiopia. It uses two likelihood estimators, namely the trace test and the maximum eigenvalue test.

The hypothesis of the cointegration test is: The null hypothesis (H0) states there is no cointegration among equations (variables), and the alternative hypothesis (H1) states there is cointegration among equations (variables). Table 4.3 presents the summary results of Johansen's Maximum Likelihood co-integration test. When the cointegration rank was detected based on the

Table 4.3: Johansen Cointegration Test

Maximum rank	*Parms*	*LL*	*Eigenvalue*	*Trace statistics*	*Critical value*
0	6	-129.34968	.	94.5523	94.15
1	17	-112.54467	0.57760	60.9423*	68.52
2	26	-98.839024	0.50483	33.5310	47.21
3	33	-90.157649	0.35930	16.1682	29.68
4	38	-85.192505	0.22479	6.2379	15.41
5	41	-82.142871	0.14478	0.1386	3.76
6	42	-82.073546	0.00355		

Note: Trace test indicates 2 cointegrating eqn(s) at the 0.05 level. * Denotes rejection of the hypothesis at the 0.05 level. ** MacKinnon *et al.* (1999) p-values.

Maximum likelihood approach by Johansen's (1988) Johansen Trace test, it showed the existence of two cointegrating equations at the 5 percent significance level, implying that there are common trends in the process. It shows that the trace statistic is greater than the critical value, with a significance level of 5%. This means the alternative is accepted while that the null hypothesis states that no cointegration can be rejected. This means that LREALGDP, AID, REMIT, EXDEBT, LLF, and HK have cointegration at a significance level of 5%, and it is concluded that these variables have a long-run equilibrium.

Vector-Error Correction Model Results and Analysis

After understanding that the variables are co-integrated and a set of variables is found to have one or more co-integrating vectors, a suitable estimation technique is a Vector Error Correction Model (VECM), which adjusts to both short-run changes in variables and deviations from equilibrium (Maria, 2014). Therefore, in the following section, VECM shall be estimated; hence, both the short- and long-run elasticities can be captured simultaneously.

The long run and short run model dynamics

Table 4.4: Results of Vector Error Correction Model Showing the Long Run Effects

	Long run results			*Short run results*			
Variables	*Coefficients*	*t–statistics*	*p-value*	*Variables*	*Coefficients*	*t-statistics*	*p-value*
AID	-.1060(.01914)	-5.54	0.000***	Δ(AID)	-.088(0.420)	0.21	0.833
REMIT	-.0682(.08722)	-0.78	0.434	Δ (REMIT)	-.109(.126)	-0.86	0.387
EXDEBT	.01642(.0021)	6.52	0.000***	Δ (EXDEBT)	4.14(3.06)	1.35	0.178
LLF	-4.572(.442)	-10.32	0.000***	Δ (LLF)	-.003(0.002)	-1.34	0.182
HK	1.1883(.152)	7.81	0.000***	Δ (HK)	.357(.078)	4.565	0.000
Cons	50.54455			ECM_1	-.0257(.012)	-2.02	0.044

Notes: ***, **, and * indicate statistical significance at 1%, 5%, and 10% levels, respectively. Figures in parenthesis are the standard errors of the coefficients, while Real GDP (dependent variable), HK = human capital, REMIT = remittance as percentage of GDP, LLF = log of labour force, AID = foreign aid as percentage share of GDP, and EXDEBT = foreign eternal deb stocks as percentage share of GDP.

Once we confirmed the long-run relationship for the equation in the model, the presence of a cointegration vector in the model suggests a long-run relationship among the variables under investigation in the Ethiopian

economy. The cointegration vector represents the dynamic and adjustment of the variables in long-run equilibrium. The long-run relationship between economic growth and foreign capital inflows in Ethiopia over the period from 1981 to 2020 is presented as follows: Table 4.4. The results ascertained in Table 4.4 show that the variable remittance has no long-run or short-run impact on economic growth, reflecting that changes in personnel remittance received cannot explain variations in economic growth in Ethiopia.

Nonetheless, foreign external debt has a negative effect on economic growth in the long run, but its effect is positive and insignificant in the short run. This implies that reducing foreign external debt is beneficial to growth in the long run. Foreign aid has a positive and significant effect on economic growth in the long run, but its effect is positive and insignificant in the short run. This implies that an increase in foreign aid is advantageous to the long-term economic growth of Ethiopia.

Regarding the control variables included in the model, the results show that labour force has a positive and significant impact on economic growth. This is in line with theories and some empirical literature (See Geredew A. 2017 and Fentaye 2015), who discovered a long-term positive relationship between labour force and economic growth in Ethiopia. However, human capital, as measured by educational expenditure, has a negative impact on economic growth in Ethiopia. This is not surprising considering the government's policy is to focus only on enrollment rather than quality of education expenditure in most developing countries, including Ethiopia.

Diagnostic tests

The study conducted some diagnostic tests such as serial correlation, heteroskedasticity, multicollinearity, and normality tests.

Table 4.5: Diagnostic Test of Autocorrelation and Heteroskedasticity

Residual	*Measurement*	*Chi-square*	*DF*	*Probability*
Serial LM test	LM-stat	40.5092	36	0.27806
Heteroskedasticity	Breusch-pagan	19.92061	15	0.2762

Table 4.5: Diagnostic test of Multicollinearity and Normality

Residual	*Measurement*	*Value*	*Probability*
Normality	Jarque-bera	0.344	0.841
Multicollinearity	VIF	7.35	

For serial correlation, the LM test was employed, and the result reported in Table 4.5 confirms that there is no problem with serial correlations among variables in the model. Similarly, the result of the Breusch-Pagan-Godfrey Heteroskedasticity test in Table 4.5 also indicates no problem of Homoscedasticity in the model. To test the normality distributions of the variables, we employed the Jarque-Bera test, which confirms that the model is normal (see Table 4.6). The study also used the variance inflation factor (VIF) to check for the presence of multicollinearity among the explanatory variables in the model, and the report on Table 4.6 shows that the VIF is 7.35. This suggests there is no problem with multicollinearity among the variables. Gujarati and Porter (2009, p. 340) posited that, as a rule of thumb, a variable is said to be highly collinear if the VIF of that variable is greater than 10.

RESULTS AND DISCUSSION

The estimated long-run coefficients resulting from the selected vector error correction model and the short-run coefficients resulting from its error correction representation are reported in Tables 4.4, respectively. The results provide the long-run relationships and the short-run dynamics of the economic growth and foreign capital inflow variables.

Discussion on the Long Run and Short Run Dynamics

The findings on the nexus between foreign aid and economic growth in this study show that the foreign aid received by Ethiopia over the years has had a positive and significant impact on the growth of the economy. It implies that a one-unit increase in AID leads to a 10.60% increase in long-run economic growth, which is statistically significant. The study's findings are in line with other studies, such as (e.g., Simon Fenny (2005), Appiah-Otoo *et al.*, 2022; Burnside and Dollar 2000; Gounder,2001; Murthy *et al.*, 1994; T. Girma and Tilahun, 2022; Yohannes, 2011 and Setargie Ejigu, 2015). But contradicts with Tefera and Odhiambo 2022; Anetor *et al.* (2020), Abate (2022); Adugna Chomen *et al.* 2023; H. Girma 2015 and Tadesse 2011).

The regression result shows negative impact of foreign external debt stock on economic growth. The coefficients of External debt indicate that an increase in external debt by 1 unit decreases economic growth by 1.6 percent in the long run and is statistically significant. Our study is consistent with some previous studies (See Dreher (2006); Hameed *et al.* (2008); Toktaş *et al.*, 2019 and Mohanty 2017), that reported adverse effects of external debt on

economic growth. Dreher (2006), reported that foreign loans (such as IMF loans) have no robust, significant positive impact on economic growth; rather, the overall impact of IMF programs on economic growth is negative. Hence, foreign loans are erroneously marketed to developing countries as a solution to their underdevelopment, even though the loans do not have any positive impact on economic growth.

The findings on the relationship between remittances and economic growth in this study show that the personnel received by Ethiopia over the years have had no significant impact on the growth of the economy. This is consistent with the study of (Ayenew 2022a).

Concerning control variables, human capital has a negative and statistically significant effect on Ethiopian economic growth over the period under investigation. In the long run, variable human capital, as proxied by education expenditure as a percentage of GDP, has a negative and statistically significant impact on Ethiopian economic growth (see table 4.4). According to Roomer (1996), human capital accumulation, which is the ability of individuals to solve problems and to think critically, is believed to promote higher growth. However, in this study, this theory does not hold true, and the results clearly show that a unit increase in human capital (as measured by education expenditure as a percentage of GDP) leads to an 11.883% decrease in Ethiopia's Real GDP. It means that more expenditure on education will cause a low level of Real GDP (economic growth in the long run). Other findings, such as those of Geredew A.(2016), support the study's findings but contradict (Mohanty 2017). This may be due to the fact that the quality of education is declining; the government of Ethiopia is showing a strong commitment to expanding the number and coverage of educational institutions in the country rather than paying attention to their quality. As well, there may be a mismatch between the skills taught by the educational system and the skills needed by the labour market, so highly educated workers may end up doing low-productivity jobs (Son, 2012).

The long-run labour force coefficient has a positive and significant effect on economic growth. Indicating that an increase in the labour force by 1% has a positive impact on economic growth by 4.5728% and is statistically significant, keeping other variables constant. We should note that this result supports the theory that labour force expansion and utilisation are important in production. This finding is in line with or consistent with the other past studies by (Geredew A., 2016), who found a positive and significant impact of

the labour force on economic growth in Ethiopia. The findings also corroborate the findings of (Tadesse 2011 & Setargie Ejigu, 2015), who discovered a long-term positive relationship between the labour force and economic growth in Ethiopia.

When we come to short-run dynamics, the coefficients of the error correction for the equation are negative and statistically significant (see Table 4.4). It implied that there is a quick adjustment towards a long-run steady state. It can be represented as:

$$\Delta LREALGDP = \sum_{i=0}^{k} \Delta AID + \sum_{i=0}^{k} \Delta REMIT + \sum_{i=0}^{k} \Delta EXDEBT + \sum_{i=0}^{k} \Delta LLF + \sum_{i=0}^{k} \Delta HK - ECM_{T\_1}$$

The short-run relationship between real gross domestic product and other explanatory variables has shown a negative relationship except for external debt and human capital, which indicate a positive relationship. In the short run, the relationship between human capital and economic growth reveals a positive and significant effect, which implies that human capital in the short run positively and significantly affects Ethiopia's economic growth. The short-run coefficient of human capital, proxied by education expenditure as a percent share of GDP (ΔHK), has a significant positive impact on economic growth. Holding other things constant, a 1 unit increase in human capital leads to a 35.67% increment in the real GDP of the country. The speed of adjustment from disequilibrium towards equilibrium (The error correction coefficient), estimated at (-0.0257), is highly significant and has the correct sign. It implies a high rate of adjustment to equilibrium after a shock. Approximately 2.57 percent of the disequilibrium from the previous year's shock converges back to the long-run equilibrium in the current year, and such a highly significant error correction term is another proof of the existence of a stable long-run equilibrium relationship among the variables

5. CONCLUSION AND RECOMMENDATIONS

This paper examined the impact of foreign capital inflows on the economic growth of Ethiopia over the period from 1981 to 2020. The study employed external debt, remittance inflows, and foreign aid as proxies for foreign capital inflows. This study employed the vector error correction model to examine the relationship between variables. The finding reveals that there is a long-run relationship between foreign capital inflow variables and economic growth in Ethiopia.

The empirical result shows that proxies of foreign capital inflows are mixed. Foreign external debt and foreign aid are statistically significant. The study found that foreign aid has a positive impact on economic growth, while the impact of foreign external debt on economic growth is negative. Besides, there is no evidence to support any significant effect of personnel remittances on economic growth. However, there is evidence of long-run causal relations between the dependent and independent variables. The findings of this study are robust to alternative proxies of foreign capital inflows and various diagnostic tests.

According to the estimation result, foreign aid has a positive coefficient, which shows an increase in foreign aid spurs economic growth. The external debt coefficient is negative, which retards the economic growth of Ethiopia. This could be due to poor public debt management and the poor effectiveness of domestic policies. The control variables, human capital and labour force, are statistically significant. The results imply human capital proxies on educational expenditure impede economic growth, but labour force increases productivity and boosts economic growth in Ethiopia.

The study suggests that policymakers should work on the way that remittance inflow promotes investment and Strategies should be made in such a way to sustain the already good inflow of worker's remittances and make them effective in the economic growth of Ethiopia. In addition, the government of Ethiopia and policymakers should improve the existing policies on external debt management, such as investing in productive activities and sectors and implementing structural change, and try to minimize the dependence on external borrowing through diversifying the economy so as to generate more domestic revenue. The findings of this study show that foreign aid has a positive effect on economic growth. Thus, policymakers should design policies that manage and work on positive spillover channels.

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