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Research Article

Effect of Industrialization on Per Capita GDP Growth in Ethiopia: An ARDL Approach

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Abstract

Despite Ethiopia's significant GDP growth averaging 7.2% between 2010 and 2024, increased income inequalities have been lingering, reflecting a pattern of uneven development. This study investigates the effect of industrialization on real per capita GDP in Ethiopia using annual data from 1980 to 2023. The Autoregressive Distributed Lag (ARDL) approach to co-integration and error correction model are applied in order to investigate the long-run and short-run relationship between the dependent variable real per capita GDP and its determinants. The findings of the Bounds test show that there is a stable long-run relationship between real per capita GDP, industrialization, population growth, bank lending, government expenditure, and inflation. Additionally, our findings demonstrate that while population increase and inflation have a strong and negative long-term association with real per capita GDP, industrialization has a considerable positive long-term effect on it. In contrast, government has a negative short-term relationship with real GDP per capita, whereas bank lending and population have a positive short-term effect. Based on our empirical findings, we recommend that the government should try to control fertility by providing education, creating employment opportunities, and giving family planning services at low cost for women. We also recommend that digitalization, allowed through Homegrown Reform 2.0 and mobile finance channels such as Telebirr or M-Pesa, provide a modern transmission mechanism to protect household possessions from inflationary pressure. Furthermore, the government should set a legal national minimum wage to protect low-income earners from the high cost of living.

1 Introduction

The economic welfare of Ethiopia, from the 'economic miracle' to modern headwinds (1995–2025), reveals a country that has undergone a profound socioeconomic transformation over the last three decades (Mulugeta and Tadesse, 2021; Zikargie and Cochrane, 2024). In the mid-1990s, limited per capita earnings afflicted approximately 45.5% of the population; however, the country achieved noticeable progress in average incomes by

2016, primarily propelled by continued agricultural growth and drastic income-enhancing public expenditure (Hill and Genoni, 2019; World Bank, 2020). The foundation, as well as the success and limits of agricultural-led growth, remain central to the Ethiopian narrative, as studied by Hill and Tsehaye (2018) indicates that the Agriculture Development Led Industrialization (ADLI) approach achieved a 0.9% gain in per-capita output for every 1% increase in agricultural productivity between 1996 and 2011. Nevertheless, as population growth rises and land becomes scarce, the elasticity of agriculture is reducing. In this context, the growth laws of Kaldor (1967) suggest that the role of manufacturing acts as the growth engine, indicating that development of the industrial base inspires productivity across the broader economy.

This shift suggests that Ethiopia follows a path similar to countries like China, shifting from low productivity output levels to achieving high economic growth by successfully building industries and advancing their technology (Findlay, 1978). Specifically, between 2004 and 2014, the period of fast economic achievement was very effective, propelling a significant rise in per-person output value amongst the population (Yimer and Geda, 2024). According to George and Ijeoma (2023) , sustainable industrialization directly contributes to economic development by using GDP and per capita growth, which continues to be the most effective instrument for raising living standards. A recent study conducted by Melesse and Tefera (2025) suggested that industrial value addition acts as a vital engine for escalating the per capita income base for Sub-Saharan African economies.

However, recent evidence validates that macroeconomic uncertainties, including high inflationary accelerations, civil war, and climate change, have slowed the pace of per capita income growth (Alemayehu Geda and Mekonnen Bekele, 2023). Ethiopia's per capita income and the living standards profile in 2025 reflect a complex macroeconomic landscape where nominal GDP per capita has improved to roughly USD 1,120, though Purchasing Power Parity (PPP) stands at USD 4,740, reflecting severe cost-of-living pressures as of January 2026 (International Monetary Fund, 2026). Despite this nominal growth, the low-income headcount at the USD 3.00 per day PPP threshold is anticipated to increase to 43.3% in 2025, a shift that threatens to undo years of socioeconomic progress (World Bank, 2024). This reversal is largely credited to a perfect storm of factors, including inflation that peaked between 20% and 30%, ongoing internal conflicts, and the strategic removal of fuel grants under the 2024–2025 macroeconomic changes. Consequently, ensuring the population's share of this increased GDP is vital for preventing income deterioration on two levels: first, at the headcount level, where subsistence-level income can rise by 1.94 percentage points for every 1% increase in household income (World Bank, 2024); and second, at the national level, where rising per capita income widens domestic resource mobilization. This fiscal expansion is essential to allow the government to increase resilience-focused spending on critical safety nets, such as the Urban Productive Safety Net and Jobs Project (UPSNJP).

Today's environment requires a transition from agricultural dependence toward labor absorption in high-value sectors to shield low-income households from the recent waves of market uncertainty (Rodrik, 2016). In the Ethiopian situation, this association is challenged by frictional structural change, where labor transitioned to the informal services low-productivity sector rather than high-value manufacturing (Rodrik, 2016). This aligns with the broader observation by Rodrik, 2016 that Sub-Saharan Africa has been challenged by "premature deindustrialization," since manufacturing declines before the middle-income status of the economy.

The growth-welfare paradox and the mismatch between macro-growth and micro-earnings in Ethiopia, an emerging economy, stem from its pursuit of an industrial-led economy along with its industrial policy amendments for decades. Therefore, what is critical here is to understand the precise chronological connection between industrialization and citizens' well-being. In spite of Ethiopia's continuing GDP growth, occupying the status of the third-largest economy in Sub-Saharan Africa by nominal GDP, it continues to stand

at the bottom globally in GDP per capita, presently ranked about 165th out of 190 nations (International Monetary Fund, 2024; World Bank, 2025). The Human Development Index (HDI) status of Ethiopia highlights this difference, as it consistently ranks among the low-income countries, commonly categorized in the bottom 20% of African countries (United Nations Development Programme, 2024). Because the current literature has overlooked the dynamic relations between these variables, there is a necessity for a rigorous econometric methodology, such as the Auto Regressive Distributed Lag (ARDL) modeling approach, to capture short-term shocks and long-term equilibrium (Pesaran et al., 2001).

1.1 Statement of the Problem

The main problem of this study centers on the growth-productivity paradox in the condition of Ethiopia's failure of robust macroeconomic growth to translate into proportionate rises in per capita income for the majority of the populace. Although the theory recommended by Lewis (1954) suggests taking industrialization as the engine of structural transformation, data revealed recently indicate that Ethiopia's industrial base has not effectively absorbed surplus labor into high-value-added industrial sectors, leading to a stagnant productivity framework (Worku and Bekele, 2024).

Huluka (2024) stated that notwithstanding expansions in human capital, individual economic output in Ethiopia shows a declining trend due to productive inadequacies. Attempts at per capita output only benefit the well-to-do privileged groups disproportionately, indicating a declining trend of individual output shares concerning the lower-income group (Ali and Asfaw, 2023).

There is a critical knowledge gap concerning how industrial value-added growth intermingles with per capita GDP under conditions of high inflation and structural inelasticity. Without the application of a precise econometric study using the ARDL modeling approach, the sequential link between industrial policy and individual income remains unpredictable. Furthermore, in spite of Ethiopia's execution of an industry-led economy, a critical empirical gap remains concerning the transmission of industrial value additions to individual income status. In addition, there is also an existing structural income productivity gap where small scale industrial subsectors weaken to elevate the earnings of the majority labor force (Birru, 2026). According to Ayal et al. (2024), this challenge is intensified by the purchasing power erosion caused by exchange rate depreciation. Furthermore, Yadete et al. (2025) validate that an insistent disconnect between industrial innovation and labor productivity prevents sectoral growth from rendering into higher individual earnings. This study fills this gap by quantifying the dynamic relationship between industrialization and income per capita GDP amidst these macroeconomic headwinds.

1.2 Objectives of the Study

The general objective of this research is to examine the effects of industrialization on per capita GDP growth in Ethiopia from 1980–2023 using an Autoregressive Distributed Lag modeling approach. Based on this broad objective, the research has the following specific objectives:

1. Assess the long-run relationship between the dependent variable (real per capita GDP) and its determinants: industrialization, population growth, bank lending, government expenditure, and consumer price index.

2. Examine the short-run relationship between the dependent variable (real per capita GDP) and its determinants: industrialization, population growth, bank lending, government expenditure, and consumer price index.

2 Materials and methods

2.1 Data Description and Sources

The time-series data were employed for the study period between the years 1980 and 2023.

Data were collected on 15 March 2024 from the World Bank's WDI online database because of their reliability, international comparability, and trustworthy analysis of Ethiopia's macroeconomic indicators. The variables, Per Capita GDP (PCGDP), the industry's value addition, population, and consumer price index, were collected from the World Bank dataset. Whereas, government expenditure data was collected from the African Development Bank (AfDB) source. The statistical overview of Table 1 below, showing the variables included in the model, their units of measurement and sources, is explained as follows. Per Capita GDP (PCGDP) is measured in constant 2015 US dollars per person and obtained from the World Bank, WDI data portal. Industry Value Added percent of GDP is measured as a percentage share of GDP obtained from the World Bank, WDI data portal. Population Growth is measured as the annual percentage change in total population obtained from the World Bank, WDI data portal. Government Expenditure is measured in constant 2015 US dollars (millions) and is sourced from the AfDB database. Consumer Price Index (CPI) is measured as an index (2015 = 100) (World Bank, WDI).

The explanatory variables of this study were selected guided by both theoretical and empirical issues. Per Capita GDP was chosen as the dependent variable to signify individual income levels as a proxy that may have consistency with earlier empirical studies, particularly conducted on the growth–income nexus (George and Ijeoma, 2023; Jetin, 2020). Industrial value added was encompassed to catch the usage of structural transformation, while population growth indicates demographic pressures on per capita incomes. Government expenditure was encompassed to measure the effect of fiscal policy on income development, dependent on welfare-oriented spending agendas emphasized in the Ethiopian Growth and Transformation Plans (Alemayehu Geda and Mekonnen Bekele, 2023; World Bank, 2020). CPI was selected to account for inflationary dynamics that reduce household purchasing power.

Table 1: Variable descriptions and sources

Variables	Definition	Source
PCGDP	gross domestic product per capita current USD	World Bank, WDI
IVA	industry value added percent of GDP	World Bank, WDI
POP	Population Growth	World Bank, WDI
BLEND	Bank's Lending Net Financial Flows (NFL) current USD	World Bank, WDI
GOVEXP	Government Expenditure percent of GDP	AfDB
CPI	consumer price index	World Bank, WDI

2.2 Model specification

The study employed the Autoregressive Distributed Lag modeling approach because of its advantages, depicted as follows. Compared to previous cointegration techniques, the ARDL methodology offers a number of benefits. First, it can be applied regardless of whether the variables have a combination of various integration orders, are integrated of order 0 (I(0)), or are all integrated of order 1 (I(1)). According to conventional methods, every series must have the same sequence of integration. Conversely, if I(2) or higher-order series are present, the ARDL method will not work. This technique is quite easy to apply and allows for the estimate of a cointegration relationship using the ordinary least squares (OLS) method, which sets it apart from previous multivariate cointegration methods (Engle and Granger, 1987; Johansen and Juselius, 1990). Third, it is somewhat more effective and dependable in small samples with 30 to 80 observations (Pesaran et al., 2001).

Furthermore, even when the regressors are endogenous, the ARDL technique consistently yields correct t-statistics and unbiased estimates of the long-run model, whereas classic cointegration techniques may also encounter endogeneity problems (Narayan and Smyth, 2005; Pesaran et al., 2001). Furthermore, because an ARDL model is based on a single-equation framework, it is still appropriate to use it. ARDL cointegration provides objective and effective estimates of both short- and long-term relationships instantly (Pesaran and Shin, 1998). A straightforward linear transformation can also be used to build an error correction model (ECM) from an ARDL model (Pesaran and Shin, 1998). According to Pesaran and Shin (1998), ECM holds long-term evidence while combining short-term modifications with long-term equilibrium. The ARDL method's advantages over other conventional cointegration techniques confirm its applicability in this investigation.

Thus, as the model has intrinsic flexibility, this characteristic is basic in examining the growth-welfare paradox of Ethiopia, where macroeconomic shocks such as inflation, population pressures, and financial volatilities disrupt the path to stability. Ali and Asfaw (2023) and Huluka (2024) elucidated that researchers who conducted empirical studies recently in low-income countries have applied ARDL to capture the industrialization-income nexus, accentuating its capability to separate short-term shocks from long-run drivers of per capita growth. Furthermore, the model's capacity to include lagged effects makes it well-suited to situations where policy interventions, such as productive-support spending or industrial reforms, apply delayed effects on per capita GDP and family income levels. Therefore, the ARDL framework delivers a rigorous econometric instrument to investigate whether industrialization can serve as a transmission mechanism linking Ethiopia's macroeconomic growth to personal income results, while accounting for both short-term variations and long-term equilibrium adjustments.

The purpose of this study is to scrutinize the impact of industrialization on per capita GDP. To achieve this objective, the following empirical model is specified:

$$\text{lnPCGDP} = f(\text{lnIVA},\ \text{lnPOP},\ \text{lnBLEND},\ \text{lnGOVEXP},\ \text{lnCPI}) \tag{1}$$

Where lnPCGDP is natural logarithm of per capita GDP in current USD, lnIVA is natural logarithm of industry value added percent of GDP, lnPOP is natural logarithm of number of total population, lnBLEND is natural logarithm of commercial banks' lending USD, lnGOVEXP Public spending relative to GDP and lnCPI natural logarithm of consumer price index. The ARDL model's level equation of order $(p, q_1, q_2, q_3, q_4, q_5)$, denoted by ARDL$(p, q_1, q_2, q_3, q_4, q_5)$ can be expressed as follows:

$$\begin{aligned}\ln PCGDP_t = \beta_0 &+ \sum_{i=1}^{p} \alpha_i \ln PCGDP_{t-i} + \sum_{i=0}^{q_2} \beta_{2i} \ln POP_{t-i} \\ &+ \sum_{i=0}^{q_3} \beta_{3i} \ln BLEND_{t-i} + \sum_{i=0}^{q_4} \beta_{4i} \ln GOVEXP_{t-i} \\ &+ \sum_{i=0}^{q_5} \beta_{4i} \ln CPI_{t-i} + u_t\end{aligned} \tag{1}$$

We can re-parameterize the above equation in the following Error-correction form:

$$\begin{aligned}\Delta \ln PCGDP_t = \alpha_0 &+ \sum_{i=1}^{p-1} \theta_i \Delta \ln PCGDP_{t-i} + \sum_{i=0}^{q_1-1} \varphi_{1i} \Delta \ln IVA_{t-i} \\ &+ \sum_{i=0}^{q_2-1} \varphi_{2i} \Delta \ln POP_{t-i} + \sum_{i=0}^{q_3-1} \varphi_{3i} \Delta \ln BLEND_{t-i} \\ &+ \sum_{i=0}^{q_4-1} \varphi_{4i} \Delta \ln GOVEXP_{t-i} + \sum_{i=0}^{q_5-1} \varphi_{5i} \Delta \ln CPI_{t-i} \\ &+ \psi ECT_{t-1} + \varepsilon_t\end{aligned} \tag{2}$$

Where

$$ECT_{t-1} = \ln PCGDP_{t-1} - \theta_1 \ln IVA_{t-1} - \theta_2 \ln POP_{t-1} - \theta_3 \ln BLEND_{t-1} - \theta_4 \ln GOVEXP_{t-1} - \theta_5 \ln CPI_{t-1} \tag{3}$$

It distinguishes between the adjustment coefficient for long-run equilibrium deviations, the long-run coefficients, and the short-run coefficients.

3 Results and discussions

This subtopic presents and discusses post-estimation outputs, model estimation findings, and pre-estimation testing.

3.1 Descriptive statistics and trend analysis of variables

The study uses an annual time series data covering the period from 1980-2023. Data were gained from the World Bank's World Development Indicator online data portal and the of the African Development Bank (AfDB) statistical entry. These sources were chosen because of their reliability, international comparability, and dependable analysis of Ethiopia's macroeconomic indicators.

Table 2 provides descriptive statistics and Figure 1 shows the trend over time for the variables included in the model. The dependent variable natural logarithm of real per capita GDP has a mean of 5.634 USD with minimum of 4.704USD and maximum of 7.165USD.

Natural logarithm of industrialization has a mean of 1.774 percent varying between a minimum value of 1.682 percent and a maximum value of 1.910 percent. Moreover, ln of population growth has a mean of 2.942 and a maximum value of 3.677. Natural logarithm of bank lending indicates a mean of 1.062 with a minimum value of -0.616. The natural logarithm of the share of government expenditure to GDP has a mean value of -0.980 percent. Natural logarithm of consumer price index (CPI) has a mean of 4.061 with a maximum value of 6.491.

Table 2: Model variable descriptive statistics from 1980 to 2023

Variables	Mean	Std. Dev.	Min	Max
ln GDP per capita (constant 2015 US$)	5.634	0.698	4.704	7.165
ln industry value added as percent of GDP	1.774	0.072	1.682	1.910
ln population growth	2.942	0.498	1.989	3.677
ln bank lending	1.062	0.291	−0.616	1.458
ln government expenditure as percent of GDP	−0.980	1.103	−3.174	1.172
ln consumer price index (CPI)	4.061	1.163	2.559	6.491

Source: Author's compilation based on stata output (2026).

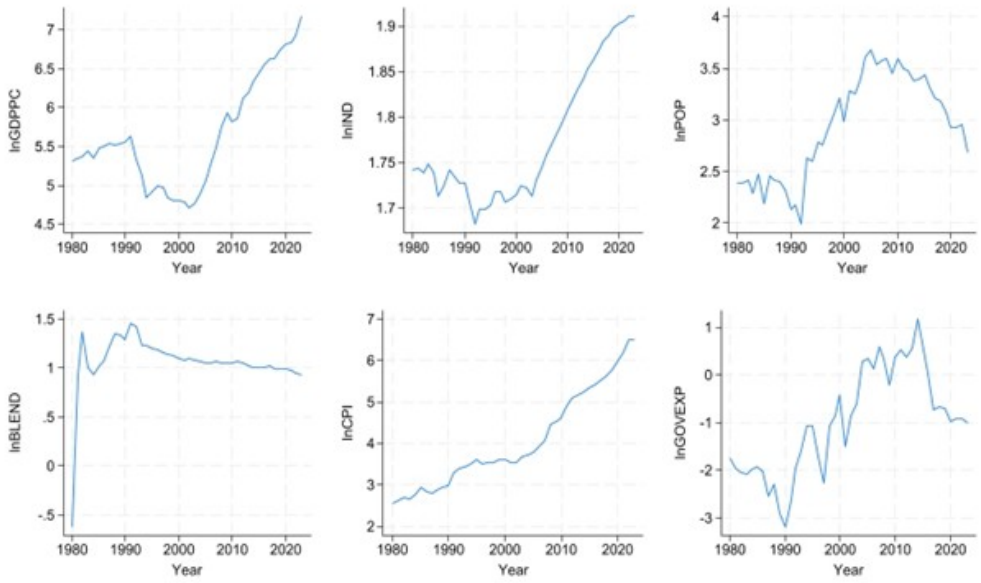

Figure 1: The trend of model variables in natural logarithm over (1980-2023).
[Source: Author's compilation based on stata output (2026).]

3.2 Econometric model results and discussions

3.2.1 Results of the unit root analysis

Table 3 shows the Augmented Dickey-Fuller (ADF) test results, which serve to validate the stationarity of the variables and prevent spurious regression outcomes. The interpretation reveals that all variables, ln of real per capita GDP (lnIVA), ln of population growth (lnPOP), ln of bank lending (lnBLEND), ln of government expenditure (lnGOVEXP), ln of consumer price index (lnCPI) are non-stationary at their levels but become stationary at the 1% significance level after the first difference. This approval that the variables are

integrated of order one, I (1), delivers the necessary econometric justification for employing the ARDL modeling approach. Consequently, the model is statistically valid for ascertaining the long-run cointegrating relationship between industrialization and per capita GDP.

Table 3: ADF unit-root test results

	Levels		First difference		Conclusion
Variables	Constant	Constant and Trend	Constant	Constant and Trend	
lnPCGDP	0.014	-0.03	-0.50***	-0.65	I(1)
lnIVA	0.016	-0.07	-0.80***	-1.09	I(1)
lnPOP	-0.05	0.019	-0.95***	-1.05	I(1)
lnBLEND	-0.29	-0.42	-1.15***	-1.17	I(1)
lnGOVEXP	-1.34	-2.10	-5.42***	-5.40	I(1)
lnCPI	1.56	-0.95	-3.83***	-4.51	I(1)

*** significant at 1%, ** significant at 5%, * significant at 10%
Source: Author's compilation based on stata output (2026)

3.2.2 Optimal lag length selection

The Autoregressive Distributed Lag (ARDL) model needs the identification of an optimal lag structure to confirm that the residuals are white noise and the model is not over-parameterized. In contrast to the VAR model, the ARDL model approach permits flexible lag lengths per regressor (Pesaran et al., 2001). The optimal lag structure determination is facilitated by measuring multiple model configurations using the Akaike Information Criterion (AIC). Following the commendation of Pesaran and Shin (1998), the ARDL approach permits an asymmetric lag specification to better capture the reaction time of the dependent variable to several shocks. As indicated below in Table 4, the ARDL (1, 0, 0, 1, 1, 2) specification was selected as it minimizes the information criteria while maximizing the Adjusted R-squared (0.6679), confirming the model is parsimonious and devoid of serial correlation.

Table 4: Optimum Lag Selection Determination

Model (lnGDPPC, lnIVA, lnPOP, lnBLEND, lnGOVEXP, lnCPI)	**LL**	**AIC**	**HQIC**	**SBIC**	**Adj R-squared**
ARDL(1, 0, 0, 1, 1, 2)	54.9007	−2.1903*	−2.0354*	−1.7724*	0.6679
ARDL(1, 1, 1, 1, 1, 1)	52.4112	−2.1045	−1.9496	−1.6866	0.6432
ARDL(2, 1, 1, 1, 1, 1)	51.3201	−2.0551	−1.8802	−1.5954	0.6215
ARDL(1, 0, 0, 0, 0, 1)	47.1124	−1.9872	−1.8710	−1.6946	0.5988
ARDL(2, 2, 2, 2, 2, 2)	43.5562	−1.8214	−1.6256	−1.3195	0.5521

*indicates the optimal lag length selected by the criteria.
Source: Author's compilation based on stata output (2026)

3.2.3 Co-integration test

The result of the bounds test for cointegration is shown in Table 5. The F-statistic of the test was compared with the critical value provided by Kripfganz and Schneider (2020). The calculated F-statistic (8.963) is greater than the upper bound (6.095) for 1% level of significance. Therefore, the null hypothesis of no long-run relationship is strongly rejected at 1% level of significance.

Table 5: The bound-test to cointegration

Null hypothesis: No long-run relationship exists		
Test statistic	Value	
F-statistic	8.963	
k	6	
Critical value bounds		
Significance level	Lower bound I(0)	Upper bound I(1)
10%	2.467	3.762
5%	2.977	4.444
1%	4.197	6.059

Source: Author's compilation based on stata output (2026)

3.2.4 Result of long-run model

Table 6 presents the outcomes of the long-run model. Out of five independent variables analyzed, three of them (industry value-added, population, and consumer price index) were found to have a significant long-run effect.

The long-term coefficient of industrialization is 12.980 and it is significant at 1% significance level. This suggests that a 1% increase in the proportion of industry to GDP will result in about 12.98% increase in per capita GDP. As the industry sector grow within an economy, new employment is produced, which raises the per capita income of citizens. By shifting labor from low-productivity agriculture to high-productivity industrial sectors, the economy realizes the "dual dividend" of higher average income and structural change. The long-run significant effect of industrialization on per capita income revealed in this study is consistent with the engine of growth hypothesis often witnessed in the African emerging economies. Yimer and Geda (2024) confirm that even though Ethiopia has been encountering structural bottlenecks, industrial and gross capital formation indicators persist as the key drivers of long-run equilibrium in per capita income growth in Ethiopia. Also, Befikadu (2024) found a modest, although significant, relation between industrialization and income progress.

The long-run coefficient of population growth is -0.339 and it is statistically significant at 5% level of significance. This implies that, in the long run, a 1 percent increase in population growth leads to a decrease of about 0.34% in per capita income, keeping other variables constant. This can be due to the fact that when population grows rapidly, the existing capital gets spread out across more labor to provide the same basic services creating capital widening. This in return creates decrease in productivity of labor by reducing capital-to-labor ratio. Furthermore, increase in population can decrease the quality of labor if more education infrastructures are not built to cope with the increase in the country's school-age population.

Consumer price index is statistically significant at 1% level and has a long-term coefficient of -0.269. It implies that, in the long run, a 1 percent increase in inflation leads to a decrease of about 0.27% in per capita GDP. Because low-income households are most vulnerable to inflationary pressures leading to a reduction in their real purchasing power, this negative relationship underscores that price stability is a precondition for sustainable welfare progress. Likewise, the negative effect of inflation complements the finding of Melaku (2022) , who discusses that an acute increase in inflation will result in the reduction of economic growth and exacerbate income inequality by making

consumers incompetent of maintaining purchasing power, performing as a significant long-term restraint to sustainable per capita growth.

Table 6: Results of long run model

Selected model: ARDL(1,0,0,1,1,2) Dependent Variable: lnPCGDP			
Variable	**Coefficient**	**Standard error**	**Probability**
lnIVA	12.980***	1.290	0.000
lnPOP	−0.339**	0.144	0.025
lnBLEND	0.272	0.339	0.429
lnGOVEXP	0.077	0.067	0.261
lnCPI	−0.269***	0.089	0.005

*** Significant at 1%; ** significant at 5%; * significant at 10%
Source: Author's compilation based on stata output (2026).

3.2.5 Result of Short-Run Model

The crucial insights into the short-term impact of industrialization on the Per Capita GDP growth of Ethiopia have been provided by the short-run dynamics captured through the Error Correction Term (ECT) and the differenced variables. As depicted in Table 7, bank lending has a short-run coefficient of 0.426 and was found significant at the 5% level. This shows that, in the short term, a 1% increase in bank lending results in about 0.43% improvement in per capital income. Even though, growth theories indicate that increase in productivity is the main driver of long-run economic growth, bank-lending can increase per capita income in the short-run through an increase in consumption of goods and services by households and allowing small and medium-sized business have access to working capital which allows them to create jobs. Similarly, the government expenditure short-run effect on per capita income is negative (-0.058) and is significant at the 10% level. This can occur if government spending is financed by borrowing. This decreases the amount of credit available for private sectors, driving up interest rate and decreasing private investment. Furthermore, increase in government spending can trigger a spike in the price of goods and services eroding real per capita income.

The short-run coefficient of $\Delta(lnCPIt)$ and $\Delta(lnCPIt^{-1})$ is 0.345 and 0.660, respectively. This imply that a 1% increase in inflation in the current year increases per capita income by about 0.35% in the same year and by about 0.67 % in the next year. In the short-run, this positive relationship can occur due to money illusion workers might increase their labor supply which increases total output. The positive coefficient of the consumer price index shown above in this study matched with theoretical and empirical justifications conducted recently. According to Simeneh (2025), moderate inflation can inspire economic activity by helping firms to increase production in reaction to increasing nominal demand and easing adjustments in relative prices and cheering short-term investment through demand-pull effects. This describes why the immediate effect of inflation has a positive effect in this study, notwithstanding its long-term detrimental effect on purchasing power.

The coefficient of the error correction term (-0.486) was negative and statistically significant at 1% level of significance. This result implies that there is a reasonable adjustment towards the long run steady state. Specifically, around 48.6% of divergence from the long run relation in the current period will be converging back to the long-run equilibrium in the next period.

Table 7: Short run model result

Variable	Coefficient	Standard error	Probability
Δ(lnBLEND)	0.426**	0.167	0.016
Δ(lnGOVEXP)	-0.058*	0.032	0.080
Δ(lnCPI)	0.345**	0.132	0.014
$\Delta(\ln CPI_{-1})$	0.660***	0.163	0.000
Constant	-7.604***	1.687	0.000
ECM(-1)	-0.486***	0.101	0.000

*** Significant at 1%; ** significant at 5%; * significant at 10%
Source: Author's compilation based on Stata output (2026).

3.2.6 Model diagnostic test result

Table 8 shows the different diagnostic tests conducted on the estimated econometric model. The Breusch-Godfrey Lagrange Multiplier test was used to test for autocorrelation in the model. The result shows that we failed to reject the null hypothesis of no serial correlation. The Breusch-Pagan test for heteroscedascity shows that the error term is homoscedastic. The Ramsey RESET test designates that the model is correctly specified

Figure 2 shows the result of CUSUM test based on OLS residuals. Because it falls within the critical boundaries at the 5% significance level and does not cross the lower and upper critical limits, it shows that we are unable to reject the null hypothesis of parameter stability. This indicates that during the course of the calculated model's sample period, the estimated coefficients display parameter stability.

Table 8: Model diagnostics test

Test	Statistic Value	Probability
Breusch-Godfrey LM test for autocorrelation	0.115	0.734
Breusch-Pagan test for heteroscedasticity	2.13	0.144
Ramsey RESET Test	0.76	0.526

Source: Author's compilation based on Stata output (2026).

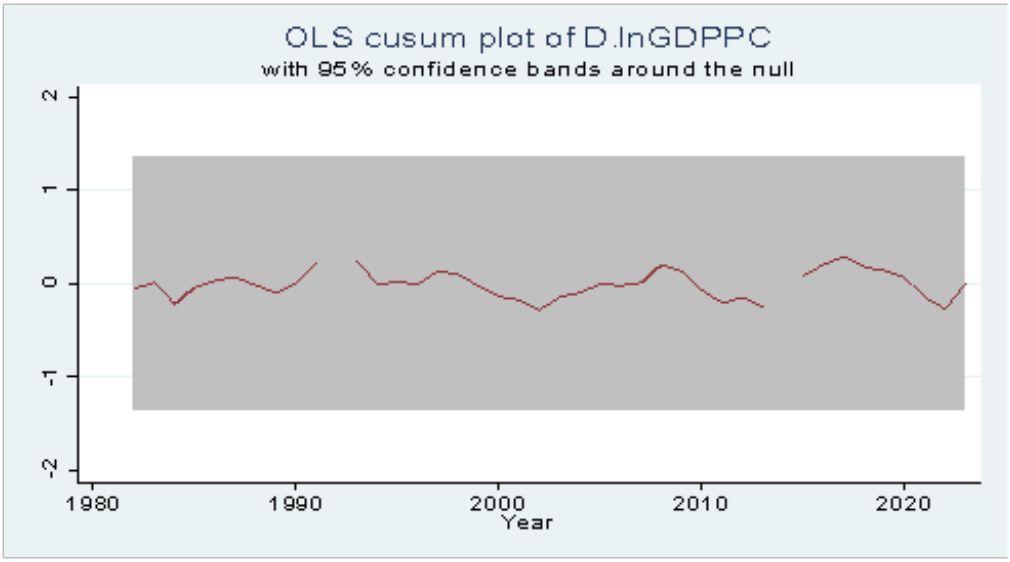

Figure 2: CUSUM plot

Author's compilation based on Stata output (2026).

4 Conclusion and policy implication

4.1 Conclusion

This study tries to examine the effect of industrialization on real per capita GDP growth in Ethiopia, both in the short-run and long-run. Using the ARDL modeling approach from 1980 to 2023, we find a stable long-run relationship between real per capita GDP, industrialization, population growth, bank lending, government expenditure, and inflation. Moreover, the study show that industrialization has a significant positive long-run effect on real per capita GDP whereas population growth and inflation have a significant and negative long-run relationship with real per capita GDP. On the other hand, bank lending and population are found to have positive short-run effect on real per capita GDP while government has a negative short-run relationship with real GDP per capita.

Throughout this research period, 1980–2023, the manufacturing sector fell behind in adding value within the country's industry. The empirical result from this research confirms that industrialization remains the strongest mechanism for improving per capita income and socio-economic wellbeing in Ethiopia; however, its current structure remains sub optimal.Without the development of manufacturing, it is substantially difficult to promote economic growth and, in particular, per capita GDP. This structural inequity illustrates a decoupling between aggregate industrial growth and income distribution, where high macroeconomic growth fails to manifest as sufficient Per Capita GDP (PCGDP) gains to meaningfully improve the standard of living. This indicates that while the economy expands, the benefits do not reach the individual level at a rate fast enough to significantly raise average household incomes.

4.2 Policy Implications

1. Ministry of Industry (MoI) and Ministry of Planning and Development (MoPD)

The government must vigorously commit to the realization of the Homegrown Economic Reform 2.0 (HGER 2.0) by strengthening industries with high labor elasticity. Policy makers should motivate incentives for the agro-processing sectors to ensure the creation of the maximum number of formal jobs. By focusing on labor-intensive manufacturing rather than the construction sector, the government can ensure that industrial growth directly addresses the economic condition of the individual household rather than just aggregate GDP.

2. Ministry of Urban Development and Infrastructure and Municipal Administrations

The government should leverage the Corridor Development initiatives in main cities as a basic channel for income enhancement by founding designated, reasonable zones for Small and Medium Enterprises (SMEs). To protect against "Premature Deindustrialization" and its casualties on the urban youth, policymakers must accentuate the integration of small-scale production into modern industrial linkages. This approach confirms that modernization may not displace low-income earners but instead gives them a formal path into global value chains.

3. The National Bank of Ethiopia (NBE) and the Ministry of Labor and Skills (MoLS)

To shield socioeconomic groups' strata from macroeconomic shocks and the deterioration of currency value, the government needs to harmonize industrial goals with extended social safety nets like the Urban Productive Safety Net and Jobs Project (UPSNJP).

The government must set a legal national minimum wage that is strictly pegged to the Consumer Price Index (CPI) to confirm these industrial gains translate into real purchasing power. By 2026, the minimum wage must be calibrated to exceed the current cost of living to prevent the erosion of real income and ensure the people's share of revenue is sufficient to shield households from income uncertainty.

3. Ministry of Innovation and Technology and Commercial Banks

The government must give attention to embracing Digital Ethiopia 2025/2030 and mobile finance programs like Telebirr and M-Pesa as force multipliers for industrialization and financial inclusion. As a modern transmission mechanism to deliver government-to-person payments directly to workers, the state can bypass predatory informal lenders and shield family assets from inflationary pressure by utilizing digitalization.

4. Regional State Administrations and Ministry of Agriculture

To shield the expansion of islands of prosperity, the government should validate regional industrial decoupling by focusing on small-scale manufacturing stimuli for emerging regional states. This geographical redistribution of industry must be coupled with "Green" strategies that link industrial pay to Climate-Smart insurance products, allowing urban workers to safeguard the economic assets of their rural families against climate shocks.

5. Ministry of Health and Ministry of Planning and Development

As the study's results suggest that Ethiopia could not endure the gains from economic growth without addressing the issue of rapid population growth. Therefore, policymakers must prioritize population management to lower the youth dependency ratio. With-

out such regulation, it is entirely impossible to maximize the efficiency of industrial development or achieve the comprehensive, sustainable improvements in living standards required for Ethiopia to escape the low-income trap.

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Data Availability

Data can be made available on the behavior of the request

Declaration of interests' statement

The author declare no competing interests.

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