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Sectoral Labour Productivity Convergence in Cameroon: Evidence and Policy Implications

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Abstract

Purpose: The Cameroonian economy has experienced multiple crises since the 1970s, resulting in slow labour productivity growth and persistent income and opportunity disparities. This study investigates productivity movements across the three formal sectors; agriculture, industry, and service, as well as the aggregate economy, between 1970 and 2023. Specifically, it examines the presence of labour productivity convergence or divergence, identifies their sources and evaluates how productivity growth is influenced by key determinants, with the goal of informing policies to reduce poverty and improve living standards particularly for low-income populations.

Methodology: A parametric approach employing ordinary least squares techniques are used to test for the presence of labour productivity convergence or divergence, using the Beta and Sigma-convergence tests. A quantile regression approach is conducted to properly reveal the labour productivity dynamics within the various sectors. A Labour productivity decomposition technique is conducted to identify sources of convergences or divergence in productivity in the economy.

Findings: The study finds evidence of sigma-convergence between sectors and the aggregate economy, driven mainly by industry and service. No significant Beta-convergence is observed within sectors or at the aggregate level. Industry and services contribute most to labour productivity growth, with an annual convergence speed of 12.2%, reflecting the combined effects of worker reallocation and productivity gains. Estimated times to halve productivity gaps are 8 years for industry, 20 years for services and 42 years for agriculture, highlighting persistent structural imbalances.

Unique Contribution to Theory, Policy and Practice: The study emphasizes the need for balanced sectoral development through coordinated policies, improved institutional quality, and substantial investment in human capital. Targeted interventions across agriculture, industry and services are essential to accelerate structural transformation, reduce income disparities, and achieve sustainable economic growth in Cameroon.

Keywords: *Sectoral Labour Productivity, Economy Growth and Development, Technology, Employment*

1.0 INTRODUCTION

Productivity growth is widely recognized as the most important long-term determinant of economic development and rising income levels across countries. Differences in labour productivity account for much of the gap between developed and developing economies and strongly influence the pace of structural transformation. Classical and neoclassical growth models identify capital accumulation, technological progress, and labour reallocation as the fundamental drivers of productivity improvements (Solow, 1956; Barro & Sali-i-Martin, 2004). In developing countries, wide productivity differentials often exist across sectors, particularly between low-productivity agriculture and higher-productivity industry and service. The movement of labour from traditional to modern sectors therefore represents a central mechanism for accelerating growth and structural change.

The convergence hypothesis provides a framework for assessing whether less productive economies or sectors are catching up with more productive ones. Convergence theory predicts that economies with lower initial productivity levels should grow faster due to diminishing returns to capital and the diffusion of technology (Baumol, 1986; Barro & Sala-i-Martin, 2004). Empirical studies distinguish between sigma convergence, which reflects a reduction in the dispersion of productivity levels over time, and beta convergence, which tests whether low-productivity sectors grow faster than high productivity sectors (Bernard & Jones, 1996). While strong evidence of convergence has been found among developed economies, findings for African countries are mixed, often indicating slow or conditional convergence due to structural constraints and institutional weaknesses (McMillan et al., 2014).

Cameroon presents a particularly relevant context for examining sectoral labour productivity convergence because of its pronounced structural dualism. Agriculture absorbs a large share of the labour force but contributes relatively little to GDP, whereas industry and services generate higher value added with fewer workers. These imbalances raise concerns about inefficient labour allocation and the sustainability of aggregate growth. Despite the importance of sectoral dynamics, existing studies on Cameroon have largely focused on aggregate productivity growth, leaving sector-specific convergence patterns underexplored. Given Cameroon`s high economic openness and export concentration, the economy is vulnerable to both external and internal shocks including climate effects, multilateral trade agreements, internal unrest, and weak policy coordination.

These structural challenges raise critical questions about the country`s ability to sustain high output growth over time and about the policies required to improve sectoral performance and strengthen aggregate productivity. This study advances the literature in three key ways. First, unlike earlier research that focused primarily on beta convergence (Tabi, 2005), it incorporates both beta and sigma convergence tests to provide a comprehensive assessment of unconditional convergence. Second it investigates the sources of convergence in labour productivity to better understand the mechanisms behind productivity changes. Third, it estimates the speed of

convergence, offering insight into how quickly effective policy coordination could narrow productivity gaps and support long-term structural transformation in Cameroon.

2.0 LITERATURE REVIEW

2.1 Theoretical Review

The theory of productivity convergence is rooted in the neoclassical growth model, which states that economies or sectors with lower initial productivity levels tend to grow faster than more advanced ones due to diminishing returns to capital and the diffusion of technology (Solow, 1956). In this framework, long-run growth is driven by capital accumulation, labour expansion, and technological progress. As capital deepens in lagging sectors, marginal returns rise relative to advanced sectors, encouraging catch-up. Extending this view, Barro and Sala-i-Martin (2004) introduced the concept of conditional convergence, arguing that convergence occurs only when economies share similar structural characteristics, including human capital levels, institutional quality, and savings behavior.

Empirical research distinguishes between sigma and beta convergence in assessing productivity dynamics. Sigma convergence refers to a reduction in the dispersion of productivity levels over time, often measured using the standard deviation of log productivity across sectors or countries. Beta convergence examines whether sectors with lower initial productivity grow faster than those with higher productivity (Bernard & Jones, 1996). While beta convergence is necessary for sigma convergence, it is not sufficient, as asymmetric shocks may still widen dispersion. Evidence from developed economies generally supports convergence, especially within manufacturing. Baumol (1986) documented strong post-war productivity convergence among industrialized economies, driven largely by technological diffusion and capital mobility.

Manufacturing has been consistently identified as central to convergence because of economies of scale, technological spillovers, and trade integration (Rodrik, 2012). OECD studies similarly show strong manufacturing productivity convergence, underscoring industrialization's importance in development. In contrast, developing economies, particularly in Sub-Saharan Africa, display mixed convergence outcomes. Rafkin (1994) argues that institutional weaknesses, structural constraints, and limited human capital accumulation often hinder catch-up. Persistent productivity gaps suggest that convergence is conditional upon structural transformation. McMillan et al. (2014) emphasize that structural change—specifically labour reallocation from low-productivity to high-productivity sectors is a key driver of aggregate productivity growth.

2.2 Conceptual Framework

Historically, successful development has involved labour shifting from agriculture to manufacturing and modern services, generating higher overall productivity and poverty reduction (McMillan et al., 2014). However, many African economies have experienced labour movement into low-productivity informal services rather than high-productivity manufacturing. Rodrik

(2012) terms this phenomenon premature deindustrialization, which constrains productivity growth and slows convergence. Agriculture remains central in this debate because it employs a large share of labour in developing countries while contributing relatively little to GDP. Low mechanization, weak infrastructure, and limited credit access suppress agricultural productivity, sustaining sectoral gaps and weakening aggregate growth.

In Cameroon, structural transformation has been gradual and uneven. Agriculture still absorbs a significant share of labour, industrial growth remains modest, and much of service-sector expansion has occurred in informal, low-productivity activities. These characteristics suggest that sectoral convergence may be slow or incomplete. Yet empirical studies specifically examining sectoral labour productivity convergence in Cameroon are scarce, as most research focuses on aggregate growth. By analysing convergence across agriculture, industry, and services, this study fills an important gap in sector-level analysis.

The study's theoretical framework integrates neoclassical growth theory, endogenous growth theory, and structural transformation perspectives. While neoclassical theory emphasizes diminishing returns and technology diffusion (Solow, 1956), endogenous growth theory highlights innovation, human capital accumulation, and knowledge spillovers as engines of sustained productivity growth (Acemoglu, 2009; Romer, 1990). Structural transformation theory explains development through labour movement from traditional agriculture to higher-productivity sectors (Schmidt, 1966; Hirschman, 1965). Together, these frameworks provide a comprehensive basis for analysing sectoral productivity convergence and its policy implications.

2.3 Research Gaps

This study–distinguishes itself from previous studies on issues of productivity growth in the Cameroonian economy in the following aspects. Firstly, apart from investigating the presence or absence of Beta-convergence (Tabi, 2005), this study conducts a complete investigation of unconditional convergence by including the Sigma-convergence test. This approach helps to give a better insight into the issues of productivity movements, and how structural reforms can boost labour productivity and output growth, over time in the country. Secondly, it investigates the sources of the observed convergence or divergence in labour productivity, which were not done in previous studies. This helps to explain why and how labour productivity decline occurs, for policy interventions. Thirdly, it examines the speed of convergence in labour productivity to determine how fast effective policy coordination can help to close the labour productivity gaps in the overall economy.

3.0 MATERIALS AND METHODS

This section outlines the estimation procedures used to examine labour productivity dynamics in Cameroon from 1970 to 2023. The study investigates productivity movements within and across the agricultural, industrial, and services sectors, as well as the aggregate economy. Specifically, it

assesses whether less productive sectors are catching up with more productive ones, identifies the sources of convergence or divergence, determines the speed at which productivity gaps close, and evaluates how labour productivity growth responds to its key determinants. The study period is selected to capture the effects of major economic crises and structural shifts experienced over time. To analyze productivity movements, the study employs an unconditional convergence framework consisting of sigma and beta convergence tests.

Sigma convergence evaluates whether disparities in productivity levels across sectors decline over time, while beta convergence examines whether sectors with lower initial productivity levels grow faster than those with higher initial productivity. Together, these tests determine whether productivity gaps are narrowing both within sectors and across the broader economy. Where convergence is detected, the speed of adjustment is estimated to assess how quickly aggregate productivity gaps can be reduced. Sigma convergence is measured using the coefficient of variation (CV), calculated as the ratio of the standard deviation to the mean of sectoral productivity over rolling 10-year windows. A declining CV indicates convergence, while an increasing CV signals divergence. The rate of convergence is computed as the percentage change in the CV between two periods. To estimate the time required to eliminate half of the productivity gap, ln(2) is divided by the convergence rate, providing a useful measure for policy planning. Beta convergence is estimated by regressing the natural logarithm of the average annual growth rate of labour productivity on the natural logarithm of its initial level for each sector and the aggregate economy. This approach follows the methodology proposed by Sala-i-Martin (1995) and enables assessment of the speed and direction of sectoral productivity adjustment.

$$\frac{1}{T}[\ln Y_{i\,t+T} - \ln Y_{it}] = \alpha + \beta \ln Yit + e_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

This study estimates labour productivity convergence and its determinants in Cameroon using two complementary approaches. Beta-convergence is analyzed by regressing the natural logarithm of the average annual growth rate of labour productivity against the natural logarithm of its initial level over 10-year rolling periods (T = 10), using ordinary least squares (OLS) to obtain the β coefficient. A negative β indicates an inverse relationship, signaling beta-convergence, while a positive β reflects beta-divergence. To assess convergence across the productivity distribution, quantile regressions are conducted at Tau = 0.25, 0.5, 0.75, and 0.9 for each sector and the aggregate economy, identifying whether relationships vary at different productivity levels.

The second analysis employs a shift-share methodology to decompose labour productivity growth into three components: total growth effect (TGEFECT), capturing productivity gains from output per worker; total shift effect (TSEFECT), reflecting gains from labour reallocation across sectors; and total interaction effect (TINEFECT), representing the combined impact of growth and reallocation. Step one calculates each sector's value-added and employment shares annually from 1970 to 2023, alongside average sectoral productivity growth. Step two applies these values in

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Maddison's (2003) decomposition equation to quantify the contribution of each component to overall labour productivity growth. Together, these methods provide insight into convergence patterns, the speed of adjustment, and the structural drivers of productivity change across Cameroon's economy. The decomposition equation proposed by Maddison (2003) is specified in equation (2).

$$\frac{DY}{Y} = \sum_{j-1}^{K}\left(\frac{yi}{Y}\right)\left[\left[\frac{DY_j}{Y_j}\right]\right] + \sum_{j-1}^{K}\left[\frac{y_f}{y}\right]\Delta S_j + \sum_{j=1}^{K}\left(\frac{y_f}{Y}\right)\left(\frac{Dy_j}{y_j}\right)\Delta S_j \qquad (2)$$

$\frac{DY}{Y}$ is percentage change in aggregate labour productivity, Y is value added per worker (Aggregate economy), y_i is labour productivity of sector j, Y_j is initial output of sector j, and S_i is employment share of sector j. The variables are identified as follows.

1) Total Growth Effect (TGEFECT) = $\sum_{j-1}^{K}\left(\frac{yi}{Y}\right)\left[\left[\frac{DY_j}{Y_j}\right]\right]$ .... (3)

2) Total Shift Effect (TSEFECT) = $\sum_{j-1}^{K}\left[\frac{y_f}{y}\right]\Delta S_j$ .... (4)

3) Total Interaction Effect (TINEFECT) = $\sum_{j=1}^{k}\left(\frac{y_f}{Y}\right)\left(\frac{DY_j}{Y_j}\right)\Delta Sj$ .... (5)

After calculating the series for each sector using equations (3) to (5), the model in equation (6) is estimated using ordinary least squares (OLS) in EViews. The regression is done for each of the sectors and also for the whole economy.

$GLABPROD_{it} = \alpha_o + \alpha_1\, TGEFECT_{it} + \alpha_2\, TSEFECT_{it} + \alpha_3\, TINEFECT_{it} + e_{it}$ .... (6)

Data for this study were sourced from the African Development Bank Database for sectoral value added, employment, and labour productivity, and from the Total Economy Data Base–Regional Aggregates (2024) for aggregate productivity. The authors calculated value-added and employment shares, compiled data on productivity determinants, and computed percentage changes in labour productivity. Data reliability was cross-checked using the IMF database and Penn World Table Series (PWT Version 9.1), ensuring consistency across the agricultural, industrial, and services sectors in Cameroon.

4. RESULTS AND DISCUSSION

This section examines the statistical and econometric tests used to analyze productivity dynamics in Cameroon from 1970 to 2023. The study assesses convergence or divergence across agriculture, industry, services, and the aggregate economy, identifies sources of productivity changes, and evaluates key growth determinants. Descriptive statistics reveal persistent sectoral differences: agriculture shows consistently low productivity due to limited mechanization and climate

vulnerability; industry exhibits moderate growth constrained by infrastructure and external shocks; while services grow fastest, driven by urbanization, technology adoption, and economic diversification (Rodrik, 2018; Alicidi et al., 2018).

Table (1): Summary of Descriptive Statistics for Variables of the Model

	LPROAGRIC	LPROECON	LPROIND	LPROSER	YEAR
Mean	830.33	7522.34	12261.17	5988.82	1996
Median	775.97	8808.87	10033.57	4695.41	1996
Maximum	1438.93	12197.79	27829.55	11591.9	2022
Minimum	469.65	1043.957	5891.835	3508.92	1970
Std. Dev.	296.10	3449.45	6612.18	2270.81	15.443
Skewness	0.86	-0.22062	1.13	1.16	4.04E-17
Kurtosis	2.57	1.54	2.948662	2.835143	1.7991
Jarque-Bera	6.87	5.15	11.28	11.89	3.1845
Probability	0.032	0.08	0.004	0.003	0.203
Sum	44007.75	398684.1	649842.2	317407.5	105788
Sum Sq. Dev.	4559148	6.19E+08	2.27E+09	2.68E+08	12402
Observations	53	53	53	53	53

Source: Authors (2025) using EVIEWS Econometric Package

4.2 ECONOMETRIC TESTS

4.2.1 PRELIMINARY ANALYSIS

I. Stationarity Tests.

Unit root tests are conducted to assess the stationarity properties of the time series data. The results show that most of the variables become stationary after first differencing, confirming their suitability for regression analysis. These findings are reported in Table (3).

Table (2): Results of Unit Root Tests for the Variables of the Model

Test	Test Statistic	P-Value	Cross Section	Observation
LLC	1.21233	0.8873	4	208
IPS	1.01450	0.8448	4	208
ADF Fisher Chi-square	5.72524	0.6780	4	208

Source: Authors (2025), Using the EViews Econometric Package.

II. Cointegration Test.

Cointegration tests are subsequently performed to examine whether long-run equilibrium relationships exist among labour productivity and its determinants. The results confirm the presence of cointegration, indicating that sectoral productivity and its explanatory variables share

stable long-term relationships. These findings are presented in Table (3) which shows the summary of Cointegration Rank Test.

Table (3): Summary of Cointegration Rank Test.

Hypothesized No. of C.E(S)	Trace Statistic	Test Critical Value (0.05)	P-Value
None*	73.4482	47.8561	0.0000
At most 1	27.8606	29.7971	0.0825
At most 2	9.2630	15.4947	0.3457
At most 3	0.3554	3.8415	0.5528

Source: Authors (2025), Using the EViews Econometric Package.

III. Vector Error Correction (VEC)

The Vector Error Correction (VEC) analysis was conducted to examine short- and long-run relationships among the series due to cointegration. Results confirm a long-run relationship, with most variables adjusting toward equilibrium aftershocks, except aggregate labour productivity, which tends to deviate. The speed of adjustment is slow, particularly in industry and services, with error corrections of 0.17% and 0.16% per period, while the aggregate economy adjusts at 0.22%.

IV. Evolution of Labour Productivity Growth (1970–2023)

Labour productivity growth across agriculture, industry, and services was generally slow between 1970 and 2023. Negative growth occurred during 1986–1995, coinciding with the mid-1980s economic crisis, currency devaluation, and salary cuts. Positive growth was observed in the early 1970s, early 1980s, and after 2010. Post-crisis reforms stabilized the economy, but productivity gains only became noticeable in the post-COVID-19 period. These trends highlight the sensitivity of Cameroon's productivity to economic shocks and the slow pace of recovery.

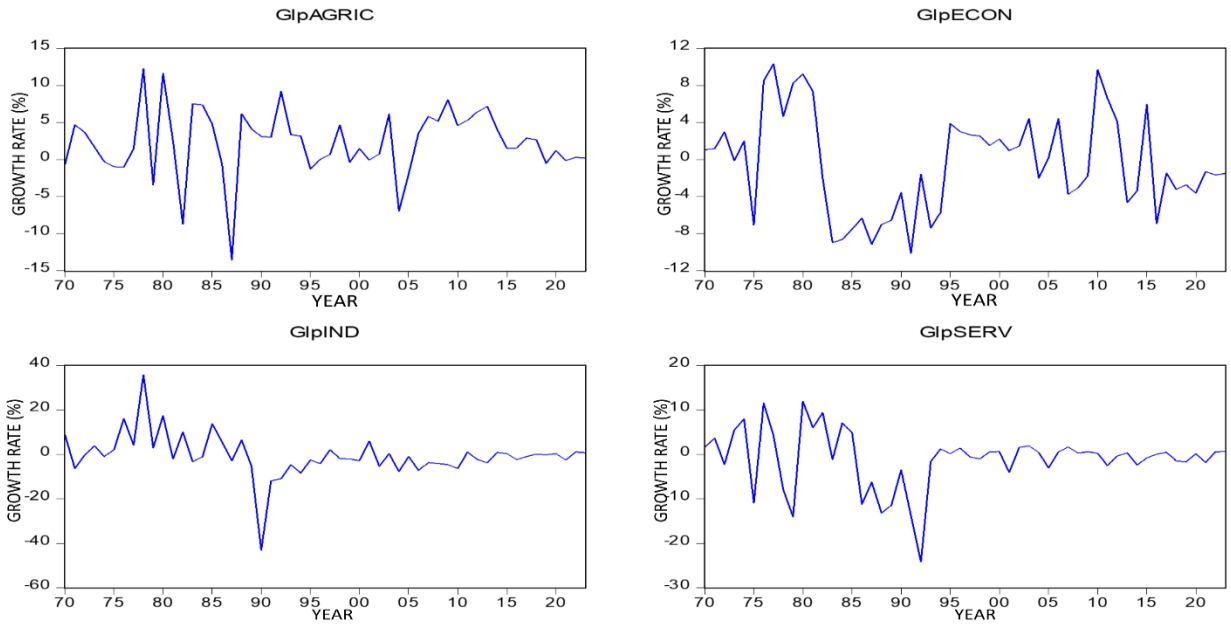

Figure (1): Evolution of the Growth of Labour Productivity in the Agriculture, Service, and Industrial sectors and the Aggregate Economy from 1970-2023. Source: Author (2025) Using the EViews Econometric Package.

4.2.2. Diagnostic Tests on the Model or Residual Diagnostic Tests

Model diagnostic tests are also conducted to ensure robustness. The heteroscedasticity test confirms constant error variance, while serial correlation and multicollinearity tests show no significant violations of regression assumptions. The stability of the models is further confirmed by specification tests. These diagnostic results are presented from Tables (5) to (8):

I. Heteroskedasticity Test.

The Breusch-Pagan-Godfrey test was conducted to detect the presence or absence of heteroscedasticity in the model. Our results show that the test statistics (BP= 3.1041) is greater than the P-Value (0.2235) at a 5% level of significance. This suggests no serious problem of heteroscedasticity in the model.

Table (4): Heteroscedasticity Test for the Model

Test Statistic (BP)	Degrees of Freedom	P-Value	Decision
3.1041	F (4, 49)	0.2235	No Heteroscedasticity

Source: Authors (2025) Using EViews Econometric Package

II. Serial Correlation Test.

The Breusch-Godfrey Serial Correlation LM Test was conducted to determine the presence of serial correlation in the residuals. The results show that the value of the F-statistic (F = 70.65402)

is greater than the P-Value (0.3660), suggesting no serious problem of serial correlation in the model.

Table (5): Breusch-Godfrey Serial Correlation Test for the Model

Test Statistics	Degrees of Freedom	P-Value	Decision
70.65402	F (2, 47)	0.3660	No Serial Correlation

Source: Authors (2025) Using EViews Econometric Package.

III. Multicollinearity Test.

The multicollinearity test is based on the variance inflation factor (VIF). The results show that VIF is less than 10 (VIF< 10). Indicating no serious multicollinearity problem in the model. It is important to note that Uncentered VIF gives the value when the model has a constant term, and the centered VIF gives the values when the model does not have a constant term.

Table (6): Multicollinearity Test Results

Variables	Coefficient of Variance	Uncentered VIF	Centered VIF
LPECON	0.000114	13.837654	1.34469
LPIND	2.26E-05	24.12849	5.440969
LPSERV	0.000173	39.34210	4.884190
C	5534759	31031.38	NA

Source: Authors (2025) Using EViews Econometric Package

IV. Ramsey Reset Test

The Ramsey Rest Test for model misspecification was also conducted. The results indicate that the value of the F-Statistic (70.1117) for the test is greater than the P-Value (0.2040) chosen significant level of 5 % or P-Value is greater than 0.05, suggesting that our model does not suffer from misspecification problems.

Table (7): Ramsey Reset Test for Model Stability.

Test Statistic	Degrees of Freedom	P-Value	Decision
70.1117	F (1, 48)	0.2040	No Misspecification

Source: Authors (2025) Using EViews Econometric Package

V. Jarque-Bera Test for Normality

The Jarque-Bera (JB) test was conducted to examine the normality of model residuals. The null hypothesis assumes a normal distribution of the error term, tested against the alternative of non-normality. Results show a JB statistic of 2.1538 with a P-value of 0.34067, which is not significant at the 5% level. This indicates that the residuals are normally distributed, suggesting the model

does not suffer from serious econometric problems and can reliably be used to interpret convergence results.

4.3. Results and Discussion

The convergence analysis reveals mixed patterns across sectors in Cameroon from 1970 to 2023. Sigma convergence, measured by the coefficient of variation (CV), indicates that high CV values reflect sigma-divergence, while low values indicate sigma-convergence. Overall, stronger convergence is observed in industry and services compared to agriculture. Beta and sigma coefficients, along with the coefficient of determination, provide detailed insights into sectoral and aggregate convergence over the study period.

4.3.1. Results for Convergence Between the Sectors and the Aggregate Economy

The agricultural sector exhibits a cyclical pattern of convergence. The CV increased from 7.82% (1970–79) to 8.5% (1990–99), declined to 4.7% (2000–09), and then rose sharply to 12.0% (2010–23). This fluctuation reflects the sector's vulnerability to economic shocks and climate variability, consistent with FAO (2021) reports on yield fluctuations in Africa. Persistent underperformance is linked to structural inefficiencies, limited mechanisation, and inadequate investment in research and development (Christiansen & Martin, 2018; FAO, 2021). In contrast, industry and services demonstrate more consistent convergence, highlighting sectoral differences in productivity growth and adjustment.

Table (8): Beta-Coefficient (β), Sigma-Coefficient (σ), and Coefficient of Variation (CV) of Labour Productivity in the Agricultural Sector

Variables	1970-79 -	1980-89	1990-99	2000-09	2010-22 -	1970 – 2023
Mean	508.88	634.394	739.930	846.051	1285.786	830.34
Sigma-Convergence (C.V. (%))	7.82	7.48 ↓	8.47 ↑	4.66 ↓	11.95 ↑	35.6
Beta-coeff. (β)	0.51	0.114	0.028	0.022	-0.014	0.01
Prob.	(0.033)	(0.002)	(0.002)	(0.001)	(0.2316)	(0.00004)
Implied Convergence (%)	7.13	1.21	0.2	-2.48	0.14	0.019

Source: Authors (2025) Using EViews Econometric Package. ↑Means Divergence. ↓Means Convergence.

The Industrial sector experienced substantial divergence in the 1990s (CV = 40.3 %), coinciding with structural adjustment programs and currency devaluation in 1994. However, the post-2000 reforms and infrastructure investments in the sector led to strong convergence (CV = 4.5 % by 2010-23). This underscores industry's role as the anchor of productivity growth and convergence,

due to scale economies, higher capital intensity and strong technological spillover in Cameroon's economy, (Rodrik, 2012; Alicidi et al., 2018).

Table (9): Beta-Coefficient (β), Sigma-Coefficient (σ), and Coefficient of Variation (CV) of Labour Productivity of the Industrial Sector

Variable	1970 - 79	1980-89	1990- 99	2000-09	2010-22	1970-2023
Mean	2368.5	23650.3	12698.8	8637.5	6229.5	12261.2
Sigma-Convergence (C.V. (%))	9.99	12.25 ↑	40.273 ↑	9.9 ↓	4.49 ↓	53.93
Beta-coeff. (B)	0.001	0.002	0.002	0.001	-0.006	0.000044
Prob.	(0.667)	(0.059)	(0.0001)	(0.588)	(0.482)	(0.834)
Implied Convergence (%)	0.01	0.02	0.02	0.01	0.06	0.0018

Source: Authors (2025) Using EViews Econometric Package. . ↑Means Divergence. ↓Means Convergence

The Services sector displayed extreme divergence in the 1970s (CV = 37.5 %), but steadily converged to just 3.07 % by 2010-23. Some evidence of sigma convergence occured during the period 1980-89 by 11.5 %, and in the period 2000-09 by 1.44 %. These evidence of sigma-convergence indicates growing formalisation, digital adoption, and strong sectoral linkages over the past two dacades (UNECA, 2023).

Table (10): Beta-Coefficient (β), Sigma-Coefficient (σ), and Coefficient of Variation (CV) of Labour Productivity in the Services Sector

Variable	1970-79	1980-89	1990-99	2000-09	2010-22	1970-2023
MEAN	6055.6	9832.85	5353.35	4648.4	4500.4	5988.82
Sigma-Convergence (C.V. (%))	37.49	11.50 ↓	20.99 ↑	1.44 ↓	3.07 ↑	37.92
Beta-coeff. (B)	-0.002	-0.002	-0.005	-0.021	-0.002	-0.001
Prob.	(0.356)	(0.493)	(0.655)	(0.027)	(0.395)	(0.437)
Implied Convergence (%)	0.02	0.02	0.05	0.21	0.01	0.002

Source: Authors (2025) Using EViews Econometric Package. . ↑Means Divergence. ↓Means Convergence

For the **Aggregate Economy level**, divergence peaked in 1990–99 (CV = 43.03 %), driven by crisis-induced instability, before declining steadily to 14.8 % by 2000–09. It continued again in an upward trend to 25.0 % between 2010 to 2022, and the results are statistically significant. The

weak evidence of sigma convergence suggests that less productive sectors tend to grow faster than more productive ones. The slow speed of convergence, indicates structural barriers such as limited technology diffusion, labour immobility, and institutional inefficiencies. However, the long-run convergence trajectory suggests that macroeconomic stability, sectoral reforms, and cross-sectoral linkages have gradually narrowed disparities in the Cameroon economy. These findings are consistent with broader evidence on structural transformation challenges in developing economies (Dimitrios, 2017; IMF, 2021).

Table (11): Beta- Coefficient and Coefficient of Variation of Labour Productivity for the Aggregate Economy

Variable	1970-79	1980-89	1990-99	2000-09	2010-22	1970 – 2022
MEAN	3162.1	4601.99	3149.56	5711.34	5308.45	4438.89
Sigma-Convergence (C.V. (%))	12.87	17.35 ↑	43.03 ↑	14.77 ↓	25.0 ↑	33
Beta-coeff. (B)	0.0044	0.00154	0.00257	0.001	0.001136	0.001
Prob.	(0.322)	(0.0615)	(0.024)	(0.0497)	(0.305)	(0.077)
Implied Convergence (%)	0.044	0.0154	0.03	0.01	0.01	0.002

Source: Authors (2025) Using EViews Econometric Package. ↑Means Divergence. ↓Means Convergence

From our analysis of the coefficient of variation (CV), productivity dispersion across sectors has declined significantly over time. This indicates that there is some evidence of sigma-convergence between the sectors (during 2000-2009) and the results are statistically significant. The productivity dispersion noticed may be due to the economic crisis, policy shifts, and uneven sectoral development, reflecting persistent structural inequalities in productivity levels.

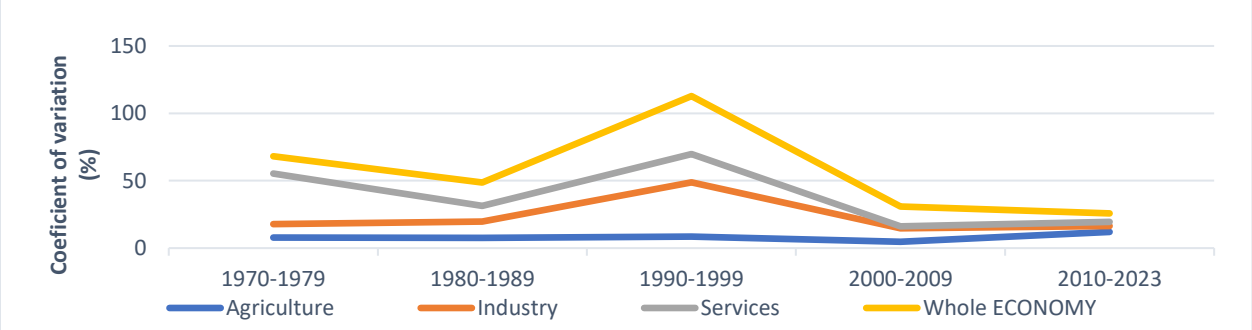

Figure (2): Evolution of Sigma-Convergence Pattern Across Sectors and the Aggregate Economy Between 1970-2023. Source: Arthur (2023) Using EViews Econometric Package.

4.3.2. Results for Convergence within the Sectors and the Aggregate Economy

Beta-coefficient analysis from 1970–2023 shows mostly positive and significant values across agriculture, industry, services, and the aggregate economy, indicating little evidence of within-sector beta-convergence. Occasional negative coefficients during 2010–22 were not statistically significant. These results suggest persistent structural inequalities in labour productivity, as low-productivity firms or subsectors do not automatically catch up due to weak institutional and technological mechanisms (Barro & Sala-i-Martin, 2004; Sondermann, 2014). Quantile regression further reveals heterogeneous effects of productivity determinants, with investment, education, and infrastructure having stronger positive impacts in high-productivity sectors, reinforcing existing disparities rather than reducing them across the economy. The detailed quantile regression findings between the different sectors considered and the aggregate economy, are presented in Tables (12) to (15) for the different quantiles (Tau = 0.25, 0.5, 0.75, and 0.9).

Table (12): Quantile Regression Results of Sectoral Labour Productivity Dynamics for the Sectors and the Aggregate Economy for Tau = 0.25

Variable	τ = 0.25			
	Agriculture	Industry	Services	Aggregate. Economy
Intercept	-3.421	-3.947	-3.141	-4.350
(S.E.)	(6.4915)	(6.4086)	(5.9800)	(4.725)
Beta Coefficient	0.159	0.1907	0.2980	0.190
(P-Value)	(0.6804)	(0.1956)	(0.0475)	(0.1710)
Implied Sigma-Convergence (%)	0.3	-0.3	-0.4	-0.3
N	54	54	54	54

Source: Authors (2025) Using EViews Econometric Package

Table (13): Quantile Regression Results of Sectoral Labour Productivity Dynamics for the Sectors and Aggregate Economy for Tau = 0.5

Variable	τ = 0.5			
	Agriculture	Industry	Services	Aggregate. Economy
Intercept	-1.303	-7.024	-1.404	-0.435
(S.E.)	(3.4403)	(5.2413)	(5.4315)	(4.8746)
Beta Coefficient	0.0836	0.1498	0.4248	0. 1031
(P-Value)	(0.0804)	(0.0491)	(0.0420)	(0.0572)
Implied Sigma-Convergence (%)	-0.4	-0.2	-0.2	-0.3
N	54	54	54	54

Source: Authors (2025) Using EViews Econometric Package

Table (14): Quantile Regression Results of Sectoral Labour Productivity Dynamics for the Sectors and Aggregate Economy for Tau = 0.75

Variable	τ = 0.75			
	Agriculture	**Industry**	**Services**	**Aggregate Economy**
Intercept	6.8316	5.8653	6.4891	5.096
(S.E.)	(9.5661)	(8.2214)	(8.5394)	(9.752)
Beta Coefficient	-0.206	0.2028	0.2294	0.2096
(P-Value)	(0.3710)	(0.0621)	(0.282)	(0.0225)
Implied Sigma-Convergence (%)	-0.3	-0.3	-0.4	-0.4
N	54	54	54	54

Source: Authors (2025) Using EViews Econometric Package

Table (15): Quantile Regression Results for Sectoral Labour Productivity Dynamics in the Sectors and the Aggregate Economy for Tau = 0.9

Variable	**τ = 0.9**			
	Agriculture	**Industry**	**Services**	**Aggregate Economy**
Intercept	**2.0958**	**3.7185**	**3.8597**	**3.132**
(S.E.)	**(6.5293)**	**(6.6786)**	**(6.5636)**	**(6.832)**
Beta Coefficient	**-0.3760**	**0.1168**	**0.2821**	**0.104**
(P-Value)	**(0.0300)**	**(0.4492)**	**(0.521)**	**(0.4913)**
Implied Sigma-Convergence (%)	**-0.6**	**-0.2**	**-0.1**	**-0.1**
N	**54**	**54**	**54**	**54**

Source: Authors (2025) Using EViews Econometric Package

Generally, the main drivers of convergence in the Cameroon economy are the industrial and the services sectors with an annual convergence rate of 8.93 % and 3.6 % respectively. The industrial sector has a halving time of approximately 8 years, and 20 years for the services sector. There is heterogeneity in the convergence dynamics accros the sectors and the aggregate economy, with the services and industrial sectors dominating at low-median productivity levels, while agriculture becomes more influential in the higher quantiles. This implies that policy should not be one-size-fits all but rather adaptive and focusing on services/ industrial expansion at the lower end, and intensifying agricultural modernisation at the higher end of the productivity distribution.

4.3.2. Results of Objective Two: How Labour Productivity Growth is influenced by its Determinants in the Economy.

In Cameroon, the main drivers of productivity convergence are the industrial and services sectors, with annual convergence rates of 8.93% and 3.6%, respectively. Halving times are approximately 8 years for industry and 20 years for services. Convergence dynamics are heterogeneous: industry and services dominate at low-to-median productivity levels, while agriculture becomes more influential at higher quantiles, suggesting adaptive, sector-specific policies—promoting industrial and services expansion at the lower end, and modernizing agriculture at the higher end. Decomposition analysis of productivity growth shows that the Total Shift Effect (TSEFECT) strongly reduces productivity across all sectors (89–99%), while the Total Growth Effect (TGEFECT) mainly affects agriculture. The Total Interaction Effect (TINEFECT) contributes positively, reducing growth minimally, especially in services (0.02%).

These results indicate that productivity improvements mainly arise from within-sector efficiency gains rather than labour reallocation, highlighting limited structural transformation and persistent concentration of labour in low-productivity activities like traditional agriculture.

Table 16: Results of Labour Productivity Growth Decomposition: Share Contributions and Percentage Contributions

Sector	Growth of Labour Productivity (%)	Total Growth Effect S (TGEFECT)	Total Shift Effect (TSEFECT)	Total Interaction Effect (TINEFECT)
Agriculture	-1.1981	-0.108 (8.99)	-1.0708 (89.37)	-0.0196 (1.64)
Industry	-3.619	-0.001(0.32)	-3.243 (89.61)	-0.375 (10.36)
Services	-1.8602	-0.0007 (0.04)	-1.859(99.94)	-0.000432 (0.023)

Source: Author's Calculations

This study identifies investment in physical capital as a key driver of labour productivity, particularly in industry and services, while trade openness facilitates technology transfer and access to international markets (Griliches, 1996). Human capital development through education and training significantly enhances productivity across all sectors. Infrastructure, especially in energy and transport, further supports productivity growth (UNIDO, 2022; UNECA, 2023). Structural constraints limit productivity, with agriculture affected by low mechanization, limited credit access, and climate vulnerability; industry constrained by weak technological capacity and reliance on primary commodities; and services hindered by informality and uneven digital infrastructure (UNCTAD, 2022; IMF, 2021).

Policy recommendations emphasize targeted interventions to promote sectoral convergence: modernizing agriculture via irrigation, mechanization, and research; strengthening industrial policy to foster value-added manufacturing and innovation; expanding digital infrastructure and

formalization in services; and developing human capital aligned with labour market needs. Institutional quality and governance improvements are also essential to create an enabling environment for productivity growth.

Overall, the study provides evidence of slow and conditional sectoral labour productivity convergence in Cameroon over five decades. While some catching-up occurs, persistent structural barriers maintain productivity gaps. Within-sector productivity improvements dominate, indicating incomplete structural transformation. Accelerating convergence and sustainable economic development require coordinated investment, infrastructure expansion, human capital development, innovation, and institutional reforms.

5.0 CONCLUSION AND RECOMMENDATION

This study finds evidence of slow and conditional sectoral labour productivity convergence in Cameroon. While less productive sectors are gradually catching up, significant productivity gaps remain due to structural constraints. Accelerating structural transformation will require sustained investment in industrial development, agricultural modernization, infrastructure, and human capital. Strengthening institutions and promoting innovation are also critical for achieving faster productivity growth and sustainable economic development.

Declaration

The authors declare that this article entitled **Sectoral Labour Productivity Convergence in Cameroon: A Policy Perspective for Long Term Economic Growth,** carried out in The University of Bamenda, and The University of Maroua, in Cameroon, is our original work and has never been considered for publication elsewhere.

Declaration of Conflicting Interests

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REFERENCES

Acemoglu, D. (2009). *Introduction to Modern Economic Growth*. Princeton University Press.

Alicidi, C., Ferrari, A., & Guerzoni, S. (2018). Income Convergence and Divergence in the EU: Regional Patterns and Policy Implications. *European Policy Centre Working Paper*, (8), 1–25.

Barro, R. J., & Sala-i-Martin, X. (2004). *Economic Growth* (2nd ed.). MIT Press.

Baumol, W. J. (1986). Productivity Growth, Convergence, and Welfare: What the long-run data show. *American Economic Review*, 76(5), 1072–1085.

Bernard, A. B., & Jones, C. I. (1996). Productivity across Industries and Countries: Time series theory and evidence. *The Review of Economics and Statistics*, 78(1), 135–146. https://doi.org/10.2307/2109853

Christiaensen, L., & Martin, W. (2018). Agriculture, Structural Transformation and Poverty Reduction: Eight new insights. *World Development*, 109, 413–427. https://doi.org/10.1016/j.worlddev.2018.05.027

Cuadrado-Roura, J. R. (2001). Regional Convergence in the European Union: From hypothesis to the actual trends. *Annals of Regional Science*, 35(3), 333–356. https://doi.org/10.1007/s001680100078

Dimitrios, T. (2017). A 3D Index for Measuring Economic Resilience with Application to the Modern International and Global Financial Crises. *Economic Modelling*, 64, 34–48. https://doi.org/10.1016/j.econmod.2017.03.008

FAO. (2021). *The state of Food and Agriculture 2021: Making agri-food systems more resilient to shocks and stresses*. Food and Agriculture Organization of the United Nations.

Griliches, Z. (1996). The Search for R&D Spillovers. *Scandinavian Journal of Economics*, 94, 29–47.

Hirschman, A. O. (1965). *Strategy of Economic Development*. Yale University Press. ILO. (2023). *World employment and social outlook 2023: The role of digital labour platforms in shaping the future of work*. International Labour Organization.

IMF. (2021). *Cameroon: Staff Country Report 2021/184*. International Monetary Fund. https://www.imf.org/en/Publications/CR/Issues/2021/07/14/Cameroon-2021-Article-IV-Consultation-Staff-Report-462546

Maddison, A. (2003). *The World Economy: A millennial perspective*. OECD Development Centre.

McMillan, M., Rodrik, D., & Verduzco-Gallo, I. (2014). Structural Change, Productivity, and Employment in Sub-Saharan Africa revisited. *Journal of African Economies*, 33(2), 201–225.

Rafkin, J. (1994). *The End of Work: The decline of the global labor force and the dawn of the post-market era*. Putnam Press.

Rodrik, D. (2012). Unconditional Convergence in Manufacturing. *Quarterly Journal of Economics*, 127(1), 165–204. https://doi.org/10.1093/qje/qjr041

Rodrik, D. (2018). *Straight Talk on Trade: Ideas for a sane world economy*. Princeton University Press.

Romer, P. M. (1990). Endogenous Technological Change. *Journal of Political Economy*, 98(5, Part 2), S71–S102.

Sala-i-Martin, X. (1995). Regional Cohesion: Evidence and theories of regional growth and convergence. *European Economic Review*, 40(6), 1325–1352.

Sala-i-Martin, X. (2004). The Classical Approach to Convergence Analysis. *The Economic Journal*, 106(437), 1019–1036. https://doi.org/10.2307/2235375

Schmidt, C. (1966). *The Spatial Economy: An introduction to regional science*. McGraw-Hill.

Solow, R. M. (1956). A Contribution to the Theory of Economic Growth. *Quarterly Journal of Economics*, 70(1), 65–94.

Sondermann, D. (2014). Productivity in the Euro Area: Any evidence of convergence? *Empirical Economics*, 47(3), 999–1027.

Tabi, A. J. (2005). *Fiscal Policy and Sectoral Productivity Convergence: Implications for poverty reduction in Cameroon* [Doctoral dissertation, University of Dschang].

UNCTAD. (2022). *Economic Development in Africa Report 2022: Rethinking the foundations of export diversification*. United Nations Conference on Trade and Development.

UNECA. (2023). *Economic report on Africa 2023: Building resilient and inclusive economies*. United Nations Economic Commission for Africa.