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# Logistics Performance, Industrialization, and Domestic Value Addition in Africa: Insights from a Dynamic Panel Analysis Emphasizing Egypt's Role

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**Abstract**

*This paper examines how logistics services influence Domestic Value Added (DVA) in seven African countries from 2000 to 2022. Using dynamic panel GMM analysis, results show that a one-unit increase in the Logistics Performance Index (LPI) leads to a 1% rise in DVA ($p < 0.001$), highlighting the role of efficient logistics in supporting economic growth. This is especially crucial for landlocked and less developed nations that rely on coastal countries for their exports. A $109,953.73 increase in manufacturing value added (MAUVA) is linked to a 1% rise in DVA, emphasizing the importance of industrialization. Egypt, a key contributor, exemplifies how structural changes support inclusive growth. Surprisingly, GDP per capita negatively correlates with DVA (−76.60), suggesting structural inefficiencies or import dependence. Conversely, population size positively affects DVA, indicating demographic advantages. These findings stress improving trade facilitation, logistics infrastructure, and industrial growth to enhance domestic value addition. They have policy implications for resilient growth in Africa, especially within initiatives like the African Continental Free Trade Area (AfCFTA).*

**Keywords:** *Logistics Performance Index (LPI), Domestic Value Added (DVA), Economic Growth, African Continental Free Trade Area (AfCFTA), Structural Transformation.*

## Introduction

"*Global Value Chains (GVCs) are international production networks in which goods and services are generated throughout multiple countries, with each stage contributing incremental value before reaching the final consumer*". Within this context, Domestic Value Addition (DVA) refers to the economic value generated within a country's borders during production, encompassing profits, labor, and capital costs. DVA can be classified as value realized locally, value that could be localized with optimal policies, and value dependent on imports (Antràs, 2020; Harzendorf *et al.*, 2022).

Promoting domestic value addition is crucial for improving economies aiming to leverage GVC participation for sustainable growth. Empirical studies show that increased backward GVC linkages—where local exports (domestic production) are used as inputs for the production of other countries' exports—significantly boost DVA and employment. For example, research from India shows that enhancing GVC participation raises absolute DVA and provides new job opportunities. Moreover, diversifying DVA helps decrease commodity dependence, while mitigating exposure to price shocks, and strengthens international competitiveness, which is essential for African economies seeking to translate resource wealth into broad-based prosperity (Veeramani & Dhir, 2022; UNCTAD, 2024).

The seven African countries examined in this paper are: Egypt, the Central Republic of Africa, Uganda, Zambia, Rwanda, Botswana, and Mozambique. They show different levels of GVC integration and regional cooperation. Egypt stands out as a regional leader in manufacturing and logistics, with the Suez Canal serving as a primary pathway for global trade, and it's the only coastal country in the group. Conversely, the landlocked countries (all six remain countries) face logistical hurdles that limit their GVC participation. While some nations, such as Tanzania, have increased their GVC integration, others, like the Central Republic of Africa and Zambia, have seen declines. Regional efforts, especially through the African Continental Free Trade Area (AfCFTA), are ongoing but still at the initial phase. Egypt's investment in logistics corridors and port infrastructure demonstrates the region's efforts to boost connectivity and trade

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(World Economic Forum, 2023; Ouedraogo, 2024; International Centre for Trade and Transport Management, 2024).

Enhancing logistics performance is a key driver of DVA growth and positions Egypt as a potential continental trading hub. This paper reveals that a one-unit increase in the Logistics Performance Index (LPI) correlates with a 1% rise in DVA, which emphasizes the significance of efficient logistics in reducing trade costs and connecting landlocked neighbors to global markets. Egypt's strategic investments in logistics infrastructure, such as the Suez Canal Economic Zone and new port developments, are designed to assist as a gateway for African trade, especially for countries reliant on coastal access. Improved logistics also increase manufacturing value-added, further supporting DVA growth and economic upgrading (Daily News Egypt, 2024).

This paper targets to tackle critical knowledge gaps by empirically analyzing the relationship between logistics services and DVA in Africa using dynamic panel General Method of Moments GMM analysis from 2000 to 2022. The objectives are to: 1) measure the impact of logistics on DVA amid regional integration. 2) Identify the role of industrialization in structural transformation. 3) Provide policy recommendations for leveraging AfCFTA to build resilient and inclusive value chains. The findings offer actionable insights for policymakers seeking to optimize trade facilitation, infrastructure investment, and industrial strategies across the continent (World Economic Forum, 2023).

## Literature Review

The theoretical relationship between logistics performance, domestic value addition (DVA), and economic development is secured in multiple interconnected frameworks. Endogenous growth theory posits that infrastructure quality, particularly logistics networks, directly influences productivity and trade efficiency by reducing transaction costs and enabling economies of scale. As proposed by Romer (1990), investments in transport and communication infrastructure generate positive externalities that foster innovation and output growth. This is operationalized through Global Value Chain (GVC) theory, where production fragmentation across borders creates interdependencies. Gereffi (2019) defines GVCs as "*cross-border networks of design, production, and distribution where value is incrementally added at each node*," with DVA representing the economic value retained domestically through wages, profits, and taxes during these processes.

Several papers employ the World Bank's Logistics Performance Index (LPI) to quantify logistics efficiency and its sectoral impacts. Shikur (2022) finds that logistics performance dimensions such as shipment, customs clearance, tracking and tracing, logistics services, and infrastructure have major and significant impact on agricultural, manufacturing, and aggregate economic growth in developing countries. Importantly, the scale of these effects is greater in the manufacturing sector than in agriculture, which highlights the centrality of logistics for industrial upgrading and value addition. The paper figures out that targeted investments in logistics infrastructure and services are important for accelerating sectoral growth and enhancing export performance.

Khadim *et al.* (2021) provide further evidence by analyzing 50 developing economies, demonstrating that efficient logistics infrastructure not only directly catalyzes economic output but also acts as a moderator that amplifies the productivity of labor and capital. Economies with higher LPI scores display significantly greater output elasticity, underscoring the importance of logistics as a catalyst for economic transformation and competitiveness. Similarly, Saini and Hrušecká (2021) identify logistics competence, infrastructure, and tracking & tracing as core LPI components that drive higher GDP per capita, even in landlocked and mid-sized economies. Their findings suggest that improvements in these logistics parameters are crucial for supporting broad-based economic development.

In the African context, practical studies regularly highlight logistics as a bottleneck and opportunity for economic integration and growth. Mubarik and Yakubu (2023) reveal that logistics performance is a core element of economic growth in West Africa, with infrastructure investments and trade facilitation policies strongly endorsed for unlocking the region's economic potential.

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The effect of logistics services and macroeconomic factors on economic outcomes is a gradually important study area, especially in developing regions like Africa. As globalization boosts and nations aim to integrate into global value chains, it is crucial to comprehend the factors that determine Domestic Value-Added (DVA) to support sustainable economic growth. DVA indicates the segment of a country's domestic gross output, serving as a significant measure of economic self-sufficiency and industrial strength. For African economies, developing DVA is crucial not only for decreasing import reliance but also for ameliorating trade balances and fulfilling long-term development objectives. Furthermore, the paper enhances theoretical understanding by reveling a negative link between GDP per capita and DVA, challenging traditional assumptions about income and DVA correlation, and emphasizing the urgent need for policies that promote domestic production in resource-dependent economies.

This paper analyzes how logistics services and various structural and economic factors affect DVA across seven African countries (Egypt, Botswana, the Central Republic of Africa, Rwanda, Uganda, Mozambique, and Zambia) from 2000 to 2022. Utilizing dynamic panel analysis (GMM), the paper investigates the connections between DVA and factors like market size (indicated by GDP per capita), industrialization (reflected by the share of manufacturing value-added in GDP), trade transaction costs (measured by the Logistics Performance Index), population size, and cross-border value-added exports. By tackling issues such as serial autocorrelation and including lagged dependent variables, the analysis maintains the robustness of its findings.

A substantial body of empirical research demonstrates the critical role of logistics performance in driving economic growth, industrialization, and domestic value addition across both global and African contexts. A plethora of studies have employed the World Bank's Logistics Performance Index (LPI) to quantify logistics efficiency and its sectoral impacts. Road freight logistics, in particular, is shown to be vital for regional integration, market access, and the competitiveness of African industries, especially for landlocked countries that depend on efficient connections to coastal ports.

Recent research also explores the transformative impact of smart logistics technologies. For example, empirical evidence from China indicates that smart logistics significantly enhances the resilience of manufacturing industry chains by reducing transaction costs and improving logistics efficiency. These effects are robust across various model specifications and contribute to greater adaptability and stability in the face of economic shocks.

At the macroeconomic level, studies using structural equation modeling find that improvements in logistics performance have both direct and indirect effects on GDP, mediated through increased foreign direct investment and innovation (as measured by patents). Countries that ameliorate their LPI scores attract more investment and technological advancement, which in turn fuels higher economic growth.

Despite these advances, some research notes that the impact of logistics on trade openness and DVA in Africa is still emerging, with many countries only recently investing in logistics as a strategic sector. This points to a gap in the literature regarding the quantification of logistics' direct effects on DVA, particularly in the context of regional integration and the unique challenges faced by African economies. Table 1 illustrates a matrix of the current literature, the gaps found, and the contributions of the paper.

**Table 1: Literature Matrix; Current Knowledge, Gaps, and Contributions.**

| Dimension | Current Literature | Gaps in Literature | Contributions of the Paper |
|---|---|---|---|
| **Logistics-DVA Linkage** | Logistics performance (LPI) correlates with GDP growth (Khadim *et al.*, 2021) and manufacturing output (Shikur, 2022). | Lack of Africa-specific quantification of LPI's direct impact on DVA using sectoral metrics. | Quantifies LPI-DVA elasticity: 1% DVA rise per 1-unit LPI increase ($p<0.001$) in 7 African nations. |

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| Dimension | Current Literature | Gaps in Literature | Contributions of the Paper |
|---|---|---|---|
| **Industrialisation** | Manufacturing value-added (MVA) drives GDP growth (6% MVA → 1% GDP) in industrial economies (OECD, 2023). | Weak evidence on MVA-DVA elasticity in low-industrialization African contexts. | Establishes $109,953.73 MVA increase → 1% DVA rise, validating industrialization as a structural lever. |
| **Regional Integration** | Logistics corridors reduce trade costs but face fragmentation in Africa (Mubarik & Yakubu, 2023). | Underexplored role of hub economies (e.g., Egypt) in amplifying DVA for landlocked neighbors. | Positions Egypt's corridors as a replicable model, reducing transit costs for landlocked nations (e.g., Uganda, Zambia). |
| **Macroeconomic Drivers** | Population growth supports economic scaling (Bloom *et al.*, 2020); high GDP/capita may signal import dependency (Rodrik, 2018). | Contradictory evidence on GDP/capita-DVA relationship in resource-dependent African economies. | Population elasticity: +0.206% DVA; GDP/capita: −76.60, highlighting structural inefficiencies. |
| **Methodology** | GMM models used for growth-logistics links in Asia (Jangam & Rath, 2022). | Limited dynamic panel analysis of DVA determinants in Africa (2000–2022). | Employs dynamic panel GMM with diagnostic robustness (Prob(J-stat) =0.0574), addressing serial autocorrelation. |

Source: prepared by the author depending on (Rodrik, 2018; Bloom *et al.*, 2020; Khadim *et al.*, 2021; Jangam & Rath, 2022; Shikur, 2022; Mubarik & Yakubu, 2023; OECD, 2023)

This paper addresses vital Africa-specific quantification gaps by directly analyzing the elasticities between logistics performance (LPI) and domestic value addition (DVA), as well as the relationships between manufacturing value-added (MVA) and DVA, which were previously only inferred indirectly through GDP correlations. The results have significant policy implications for the African Continental Free Trade Area (AfCFTA), highlighting Egypt's logistics hub role and population-driven DVA growth as concrete strategies to enhance regional integration.

## Methodology:

The impact of logistics services and macroeconomic factors on economic outcomes is a highly incremental study area, especially in developing regions like the African continent. As globalization accelerates and nations aim to integrate into GVCs, it is crucial to comprehend the factors that determine Domestic Value-Added (DVA) to support sustainable economic growth. DVA signifies the segment of a country's domestic gross output, serving as a significant measure of economic self-sufficiency and industrial strength. For African economies, fostering DVA is essential not only for reducing import reliance but also for improving trade balances and achieving long-term development objectives.

The paper examines how logistics services and various structural and economic factors affect DVA across seven African countries (Egypt, Botswana, the Central Republic of Africa, Rwanda, Uganda, Mozambique, and Zambia) from 2000 to 2022. Using the dynamic panel analysis (GMM), the research investigates the connections between DVA and factors like market size (indicated by GDP per capita), industrialization (reflected by the share of manufacturing value-added in GDP), trade transaction costs (measured by the Logistics Performance Index), population size, and cross-border value-added exports. By tackling issues such as serial autocorrelation and including lagged dependent variables, the analysis maintains the

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robustness of its findings. The results provide significant insights into the factors influencing DVA in these economies. Underscoring the importance of industrial growth, effective logistics systems, and demographic shifts have crucial implications for policymakers seeking to foster domestic production capabilities and improve their nations' standing in the international economy. The following sections provide a comprehensive analysis of the implications of these findings on the economic policy and future research.

The estimation command for the EViews software is presented in Equation 1. The results of this estimation, along with the coefficients of the GMM model, are elaborated in Equations 2 and 3, whereas the descriptive analysis is available in Table 2.

*Estimation Command:*

**GMM (CX=FD, GMM=PERWHITE) (DVA) (DVA (-1)) (PERCGDP) (POP) C (C2CVA) (GMAUVA) (LPI_SCORE) @ C2ZMVA C2UGVA C2RWVA C2MOZVA C2EGYVA C2CVA C2CAVA C2BOVA** **Eq. 1**

**The model is:**

**Estimation Equation:**

$$\boldsymbol{DVX_{it} = \beta_{i1} - \beta_{it}PERCGDP_{it} + \beta_{it}POP_{it} + \beta_{it}C2CVA_{it} + \beta_{it}GMAUVA_{it} - \beta_{it}LPI\_SCORE_{it} + \varepsilon_{it}}$$

**Eq. 1**

**Substituted Coefficients:**

$$\boldsymbol{DVA_{it} = -0.648 * DVA_{it-1} - 76.6 * PERCGDP_{it} + 0.206 * POP_{it} + 0.0008 * C2CVA_{it} + 109953.73 * GMAUVA_{it} + 866040.5\, LPI\_SCORE_{it} + \varepsilon_{it}}$$ **Eq.2**

**Table 2: Descriptive Analysis.**

| | DVX | PERCGDP | POP | C2CVA | LPI_SCORE | GMAUVA |
|---|---|---|---|---|---|---|
| Mean | 1038739.86 | 1691.88 | 25833738.50 | 3911354.88 | 2.48 | 11.62 |
| Median | 141000 | 770.60 | 14265814 | 719529.77 | 2.5 | 9.81 |
| Maximum | 8550000 | 7700 | 110990103 | 37738344.35 | 3.5 | 23.65 |
| Minimum | 28100 | 233.15 | 1726985 | 55321.942 | 1.196 | 4.62 |
| Std. Dev. | 2208582.11 | 2043.51 | 28939400.74 | 7607610.905 | 0.383 | 5.00 |
| Skewness | 2.612 | 1.754 | 1.6097 | 3.058 | -0.53 | 0.349 |
| Kurtosis | 8.469 | 4.848 | 4.481 | 12.373 | 3.837 | 1.665 |
| | | | | | | |
| Jarque-Bera | 383.673 | 105.51 | 84.241 | 840.378 | 12.257 | 15.232 |
| Probability | 4.859e-84 | 1.22998e-23 | 5.096e-19 | 3.268e-183 | 0.0021 | 0.0004 |
| Sum | 167237117.52 | 272392.107 | 4159231899 | 629728135.62 | 399.84 | 1871.18 |
| Sum Sq. Dev. | 780453586586124.9 | 668146125.48 | 1.33998e+17 | 9260118988486816 | 23.43 | 4002.33 |

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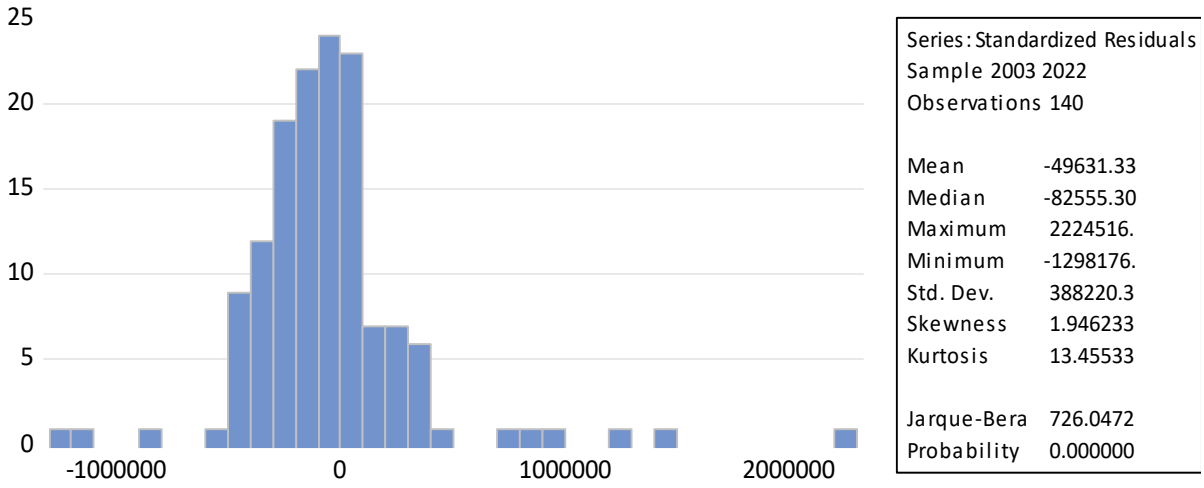
| | | | | | | |
|---|---|---|---|---|---|---|
| Obs. | 161 | 161 | 161 | 161 | 161 | 161 |

Source: Author calculated by Eviews 13.

*Diagnostic Tests:*

The normal distribution test must be performed for residuals to ensure that no serial correlation exists between them. The test results appear in Figure 30, where the probability of the Jarque-Bera test is equal to 0.0000, assuring the normal distribution for residuals.

**Figure 1: The Normal Distribution Tests for Residuals.**




Source: Author calculated by Eviews 13.

The unit root test was used to evaluate the stationarity of the variables. The findings show that all unit root tests suggest the variables (GVC, PERCGDP, GMAUVA) could be stationary at the level. In contrast, the variables (DVA, FVA, C2CVA, LPI_SCORE) appear stationary at the first difference. The T-statistics imply that the null hypothesis regarding the presence of a unit root cannot be rejected at a 5% significance level. This null hypothesis is based on the assumption of a standard unit root process for the IM, Pesaran, and Shin (IPS) tests and the ADF-Fisher Chi-square test. Conversely, the Levin, Lin, and Chu (LLC) approach presumes individual unit root processes. The Fisher test's probability is calculated using an asymptotic Chi-square distribution, while all other tests rely on asymptotic normality. Statistical significance for the variables is noted at 1%, 5%, and 10% levels, as outlined in Table 3.

**Table 3: Stationarity Tests for the Variables Inserted in the Model.**

| **Tests** | | **(Level default)** | | | | **(First difference)** | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Variables** | | Levin, Lin & Chu t* | Im, Pesaran, and Shin W-stat | ADF – Fisher Chi-square | PP – Fisher Chi-square | Levin, Lin & Chu t* | Im, Pesaran, and Shin W-stat | ADF – Fisher Chi-square | PP – Fisher Chi-square |
| **DVA** | Statistic | -1.5422 | 0.7344 | 7.7999 | 11.5576 | -6.9232 | -7.4543 | 76.4953 | 436.4432 |
| | Prob.** | 0.0615 | 0.0052 | 0.8995 | 0.6418 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

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| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **FVA** | Statistic | -1.6994 | 0.5088 | 10.1498 | 9.1555 | -6.6987 | -5.9103 | 60.0197 | 98.3799 |
| | Prob.** | 0.0446 | 0.6946 | 0.7511 | 0.8210 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **GVC** | Statistic | -1.9231 | 0.8641 | 7.6824 | 7.4932 | -6.8830 | -6.3589 | 64.8740 | 146.2974 |
| | Prob.** | 0.0272 | 0.8062 | 0.9052 | 0.9140 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **PERCGDP** | Statistic | -1.7885 | -0.7638 | 16.9004 | 14.5560 | -4.3492 | -4.4240 | 45.2240 | 58.7052 |
| | \ Prob.** | 0.0368 | 0.2225 | 0.2615 | 0.4092 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **POP** | Statistic | 1.7642 | 4.5644 | 4.7910 | 0.0710 | -3.5675 | -1.0522 | 20.1779 | 26.5268 |
| | Prob.** | 0.9612 | 1.0000 | 0.9885 | 1.0000 | 0.0002 | 0.1463 | 0.1246 | 0.0222 |
| **C2CVA** | Statistic | 1.0799 | 2.7285 | 2.3705 | 2.6453 | 0.0696 | -3.6935 | 38.0429 | 96.6795 |
| | Prob.** | 0.8599 | 0.9968 | 0.9998 | 0.9996 | 0.5278 | 0.0001 | 0.0005 | 0.0000 |
| **GMAUVA** | Statistic | -2.4334 | -1.4610 | 23.8143 | 15.1537 | -5.8659 | -5.7797 | 59.7943 | 95.6172 |
| | Prob.** | 0.0075 | 0.0720 | 0.0482 | 0.3677 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **LPI_SCORE** | Statistic | -1.4945 | 0.0756 | 14.0943 | 17.1911 | -4.9048 | -5.7410 | 61.2114 | 161.0736 |
| | Prob.** | 0.0675 | 0.5301 | 0.4427 | 0.2461 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

Source: Author calculated by Eviews 13

The output of the estimated Model regarding the effect of logistics services on Domestic value-added (DVA) can be found in Tables 4 & 5, while the correlation coefficient matrix is found in Table 6:

**Table (4): The Results of the Model, The Effect of Logistics Services on Domestic Value-Added (DVA)**

| Dependent Variable: DVA | | | | |
|---|---|---|---|---|
| Method: Panel Generalized Method of Moments | | | | |
| Transformation: First Differences | | | | |
| Sample (adjusted): 2003 2022 | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| DVA(-1) | -0.64840 | 0.324241 | -1.99976 | 0.0476 |
| PERCGDP | -76.600 | 194.1709 | -0.3945 | 0.6938 |
| POP | 0.2062 | 0.0853 | 2.41704 | 0.0170 |
| C2CVA | 0.0008 | 0.03456 | 0.02416 | 0.9810 |

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| | | | | |
|---|---|---|---|---|
| GMAUVA | 109953.732 | 55678.5682 | 1.9748 | 0.0490 |
| LPI_SCORE | 866040.495 | 228465.757 | 3.7907 | 0.0002 |
| | Effects Specification | | | |
| Cross-section fixed (first differences) | | | | |
| Mean dependent var | 63663.375 | S.D. dependent var | 294660.694 | |
| S.E. of regression | 398638.040 | Sum squared resid | 21294246467808.83 | |
| J-statistic | 3.6097746 | Instrument rank | 7 | |
| Prob(J-statistic) | 0.057441 | | | |

Source: Author's compilation using Eviews 13.

**Table (5): Coefficient Confidence Intervals**

| Coefficient Confidence Intervals | | | | | | | |
|---|---|---|---|---|---|---|---|
| Sample: 2000 2022 | | | | | | | |
| Included observations: 140 | | | | | | | |
| | | 90% CI | | 95% CI | | 99% CI | |
| Variable | Coefficient | Low | High | Low | High | Low | High |
| DVX(-1) | -0.64841 | -1.1854473 | -0.111362 | -1.2897 | -0.007 | -1.4957 | 0.1988 |
| PERCGDP | -76.600 | -398.2065 | 245.0057 | -460.6366 | 307.4358 | -583.972 | 430.77 |
| POP | 0.2062 | 0.064896 | 0.3475 | 0.0375 | 0.3749 | -0.0167 | 0.4291 |
| C2CVA | 0.0008 | -0.056321 | 0.05799 | -0.0674 | 0.0691 | -0.0894 | 0.0910 |
| GMAUVA | 109953.73 | 17733.07 | 202174.40 | -168.78 | 220076.24 | -35535.32 | 255442.78 |
| LPI_SCORE | 866040.50 | 487631.62 | 1244449.37 | 414175.04 | 1317905.95 | 269055.57 | 1463025.42 |

Source: Author's compilation using Eviews 13.

**Table 6 - Correlation Matrix Between the Model's Variables**

| | **DVX** | **PERCGDP** | **POP** | **C2CVA** | **GMAUVA** | **LPI_SCORE** |
|---|---|---|---|---|---|---|
| **DVX** | 1.000 | | | | | |
| **PERCGDP** | 0.231 | 1.000 | | | | |
| **POP** | 0.861 | 0.016 | 1.000 | | | |
| **C2CVA** | 0.938 | 0.265 | 0.836 | 1.000 | | |
| **GMAUVA** | 0.286 | -0.391 | 0.386 | 0.233 | 1.000 | |
| **LPI_SCORE** | 0.332 | 0.336 | 0.267 | 0.371 | -0.011 | 1.000 |

Source: Author calculated by Eviews 13.

The analysis investigates how logistics services affect Domestic Value-Added (DVA) in seven African countries from 2000 to 2022 using dynamic panel analysis (GMM). The results in Equation 3 and Tables 4 and 5 show a strong model fit, indicated by a Prob (J-statistic) of 0.0574, below 1%. This result confirms the model's significance at a 90% confidence level. Adjustments were made following diagnostic tests that

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detected serial autocorrelation in the residuals, as shown by a Durbin-Watson test score of 0.4253. As a result, one lag of the dependent variable DVA (-1) was included as an independent variable.

The results show that the coefficients for Market Size demand (GDP per capita) (PERCGDP) and Country-to-Country value-added exports (C2CVA) are not significant, with t-statistic probabilities of 0.6938 and 0.9810, both above 5%. Nevertheless, the signs of the coefficients for PERCGDP and C2CVA are consistent with expected outcomes, aligning with established theories and prior research.

Regarding the degree of industrialization in the economy, measured by the manufacturing value-added share in GDP (MAUVA), there have been notable positive effects on Domestic Value-Added (DVA). The estimation findings show that a 109953.73 dollar increase in GMAUVA leads to a 1% increase in DVA across seven African countries from 2000 to 2022.

The relationship between Market Size/Demand (indicated by GDP/Capita) (PERCGDP) and Domestic Value Added (DVA) shows a negative correlation. Specifically, the coefficient is -76.600, suggesting that a $ 76.600 increase in market size or demand results in a 1% decrease in DVA across the seven African countries from 2000 to 2022.

The Trade Transaction Costs (TTCs), as shown by the Logistics Performance Index (LPI) score, exhibit a positive correlation with DVA, indicated by the positive coefficient. This relationship is statistically significant, demonstrated by a t-statistic probability of 0.0002 below the 5% threshold. Hence, an increase of 866040.5 in the LPI score leads to a 1% rise in DVA across the seven African countries from 2000 to 2022.

Additionally, the relationship between Population Size (POP) and DVA is significant, demonstrated by a t-statistic probability of 0.017 below the 5% threshold. The positive coefficient suggests a direct correlation; specifically, a 0.206% increase in population size leads to a 1 % increase in DVA for the seven African nations from 2000 to 2022.

The findings indicate a positive relationship between Country-to-Country value-added exports (C2CVA) and Domestic value-added (DVA), though this correlation does not achieve statistical significance, as mentioned previously.

## Conclusion

This study provides robust empirical evidence that logistics performance and industrialization are pivotal drivers of domestic value addition (DVA) in Africa, using dynamic panel GMM analysis of seven nations (2000–2022). Key findings reveal that a one-unit increase in the Logistics Performance Index (LPI) corresponds to a 1% rise in DVA ($p$<0.001), validating logistics efficiency as a catalyst for economic upgrading. Simultaneously, a $109,953.73 increase in manufacturing value-added (MVA) boosts DVA by 1%, confirming industrialization's transformative role. Contrarily, GDP per capita exhibits a negative DVA elasticity (−76.60), exposing structural inefficiencies in resource-dependent economies, while population growth positively influences DVA (elasticity: +0.206%), highlighting demographic dividends. These results bridge critical research gaps by: 1) Quantifying Africa-specific LPI-DVA and MVA-DVA elasticities, previously inferred only from GDP correlations. 2) Validating Egypt's logistics corridors as a replicable model for integrating landlocked neighbors. 3) Revealing paradoxical GDP/capita-DVA dynamics, urging policy recalibration toward domestic production.

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**Table 7: Policy Implications Matrix.**

| Key Finding | Policy Recommendation | Target Actors |
|---|---|---|
| **1% DVA ↑ per 1-unit LPI ↑** | Accelerate AfCFTA trade facilitation: Implement single-window customs, digitize port operations, and harmonize cross-border standards. | National governments, AfCFTA Secretariat |
| **$109,953.73 MVA ↑ → 1% DVA ↑** | Launch industrial clusters: Co-locate manufacturing zones with logistics hubs (e.g., Suez Canal Economic Zone) and incentivize high-value sectors (agro-processing, textiles). | Ministries of Industry, Development banks |
| **GDP/capita ↓ DVA (−76.60)** | Rebalance consumption: Impose tariffs on non-essential imports, subsidize domestic input production, and promote export diversification. | Central banks, Trade ministries |
| **Population ↑ → DVA ↑ (0.206%)** | Invest in demographic dividends: Scale vocational training in logistics/ manufacturing and youth entrepreneurship programs linked to GVCs. | Education ministries, the Private sector |
| **Egypt's hub effectiveness** | Develop trans-African corridors: Expand Egypt's "hub-and-spoke" model to connect landlocked nations (Uganda, Zambia) via dedicated rail/road arteries. | African Union, Infrastructure consortia |

Source: created by the author.

These policies collectively address the core constraints identified—logistics fragmentation, industrial under capacity, and import dependency—while leveraging Africa's demographic and regional integration potential. Future research should explore smart logistics technologies on DVA and sectoral value chain dynamics under AfCFTA implementation.

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