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Manufacturing Value-Added (MVA) Share Development in Ethiopia: Causes and Determinants

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Industrialization is not only a prerequisite for increasing an economy's competitiveness and living standards, but it is also required for developing economies to catch up to more developed. However, Ethiopia's average performance over the last five decades has been rather unsatisfactory, with MVA accounting for 5.6% of Gross Domestic Product (GDP). The overarching goal of this article is to investigate the fundamental reasons why manufacturing has historically played such a minor role in Ethiopia's economy. It has also looked into the determinants factors that influence MVA. The study reviewed both theoretical and empirical literature. It used tables and figures to conduct descriptive, and the residual of the approximate Cobb-Douglas production function for Total Factor Productivity (TFP) analyses. To estimate determinant factors, the Autoregressive Distributive Lag (ARDL) model was used for time series data. The study identified key reasons and determinants that limit MVA share: volatile political environments, the tendency of major fabrication subsectors to decline, TFP remaining small and stagnant, and others. According to the empirical study, in the long run, GDP per capita and Foreign Direct Investment (FDI) variables have shown a significant positive association, whereas the real exchange rate index has a negative correlation with MVA. While, in the short run, the later variables, and manufacturing imports have a positive significant impact. The findings have policy implications such as proper policy design and stable implementation, avoiding premature deindustrialization, improving low TFP, attracting large-scale FDI, and increasing GDP per capita income, among other things.

Keywords: Manufacturing Value-Added, causes, determinants, ARDL, Ethiopia

Introduction

Economic structural transformation is directly related to manufacturing growth, according to historical, theoretical, and empirical research (Kaldor, 1967; Lin, 2012; Rocha, 2018; Neuss, 2019). Technological advancement, automation, progress, and diversification have accelerated these developments (Maddison, 1995; Lin, 2012; Yang, 2014). Sectoral shifts from low to high productivity (McMillan, Rodrik, & Verduzco Gallo, 2014). Its effects on technology, skills, and resource allocation have been increased (Lin, 2011; Rodrik, 2017; Martins, 2018). Manufacturing is the production of services and goods using shared production elements such as land, labour, capital, and raw material investment (Hirschman, 1958; Kaldor 1967; Chenery, 1979), achieving economic sector transformation within and across industries (Kaldor, 1967; Van Ark & Monnikhof,

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1996; Stiglitz, 2017; Neuss, 2019). The primary fabrication centre and leader of industrial technology was Great Britain (Kaldor, 1967; Lin, 2012; Szirmai, 2012; Rocha, 2018). Japan, South Korea, Taiwan-China, and China have all followed suit (Lin, 2011; 2012; Szirmai, 2012). Other developing countries, particularly Africa, have attempted to promote the sector, but to no avail (Signé, 2018). Despite country differences, sector growth increased GDP per capita, manufactured exports, and employment (Krugman, Obstfeld, & Melitz, 2012; Rodrik, 2011; Andreoni, 2013; UNDIO, 2018b).

So far, only a few countries have completed this package; however, success has not been replicated globally (Lin, 2018). In latecomer economies, fabrication is defined as "wild geese flying in orderly ranks forming an inverse 'V,' just like aeroplanes fly in formation… import, domestic production, and export of manufactured goods are each represented by a wild goose flying pattern" (Akamatsu, 1962, p. 11). This idea is related to East Asian success stories like Japan, South Korea, Taiwan, and China (Lin, 2011). Mass production accelerates the process of improving learning-by-doing, specialisation, and quality (UNDIO, 2018a). Connect subsectors, provide financial incentives, attract innovative investors, and promote technology extension (Altenburg & Melia, 2014). Infrastructure is considered essential for industry growth. There are two types: hard and software (Lin, 2012). Aside from them, institutional structures play an important role in industrial growth (North, 1989; Fu, 2000).

There have been many significant policy shifts and blows in Ethiopia's modern history. There was a 10-year plan in place to lay the groundwork for future endeavours, focusing on agro-processing industries and private sector involvement (Gebreeyesus, 2013; UNIDO, 2017). However, rule changes hampered the direction and practise (MOC, 2002; Ghebreyesus, 2013). After the transition, a socialist production system replaced capitalism (Hansson, 1995). Centralized planning dominated from 1974 to 1991 (FDRE, 2002). Heavy industry expansion became the main focus (Hansson, 1995). However, low productivity in the manufacturing and cooperative farming sectors hampered heavy industry development (Hansson, 1995; MOC, 2002). The Ethiopia People's Revolutionary Democratic Front (EPRDF) openly denounced socialism in 1991 (Hansson,1995; UNIDO, 2017). The Agriculture Development-Led Industry (ADLI) was created to increase smallholder agriculture production by improving access to modern agricultural extension services, inputs, and infrastructure connectivity (FDRE, 2002). The government created the export-led Industry Development Strategy (IDS) with ADLI. The IDS central theme was that industries, particularly manufacturing, should guide development efforts (FDRE, 2002; Ghebreyesus, 2013). IDS was inspired by East Asian success (FDRE, 2002). It identified major interventions like macroeconomic stability, financial stability, and human capital formation (FDRE, 2002; Newman et al., 2016). Ethiopia has made significant economic and social progress due to policies implemented (Gebreeyesus, 2013; Oqubay, 2015). Figure 1 shows the rapid growth of the non-manufacturing sector.

This study's main goal is to discover why manufacturing is so minor in Ethiopia's economy. The study looks into why the MVA share of GDP has remained low for so long. It will also look into the factors that affect these performances. Then conclude and make sector development suggestions.

The article has five parts. The first section covers the problem statement and study objectives. A literature review follows. The third section discusses the data and research method. The fourth section examines the low MVA share and determinant factors. Conclusions and policy implications follow.

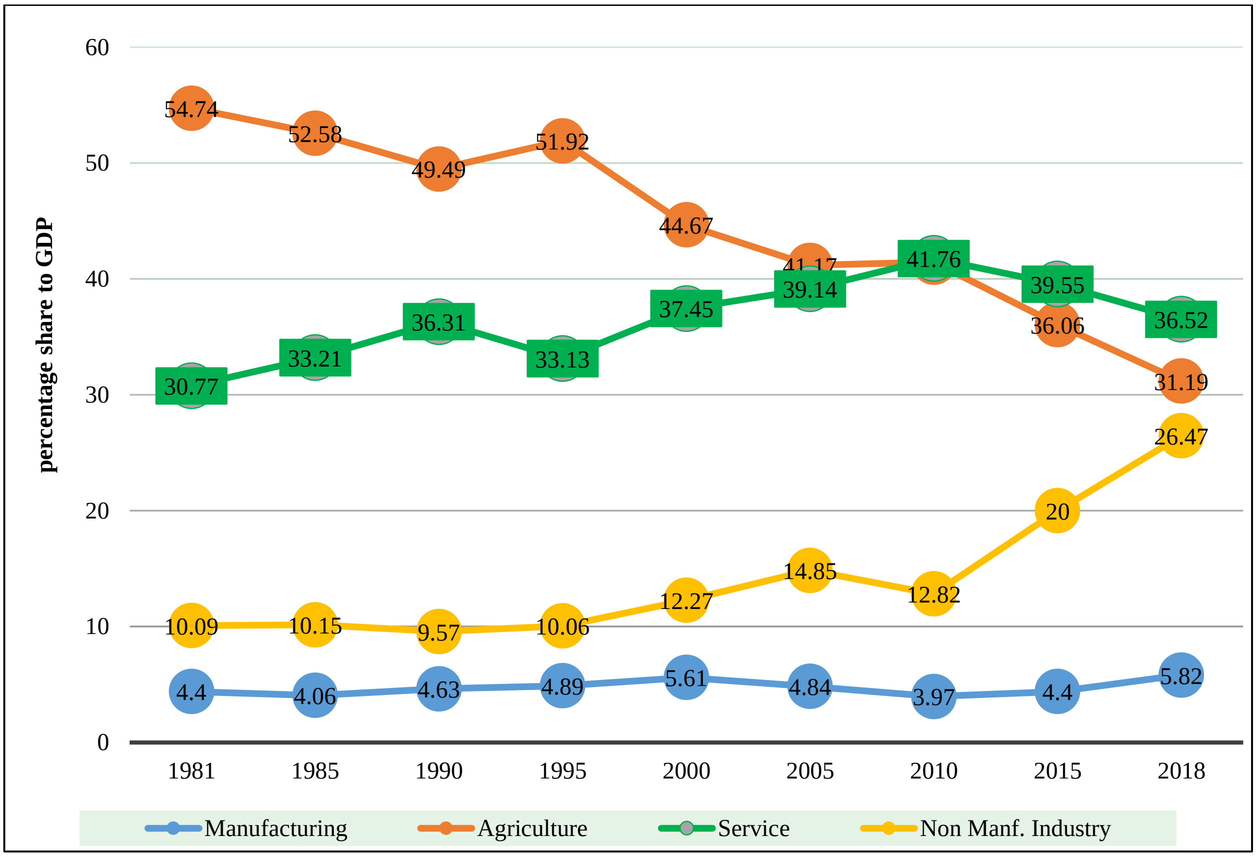

Figure 1. Sectoral contributions to GDP changes in Ethiopia's economy. Sources: Author computation based on the Global Economy (2019) Ethiopia data.[1]

Theoretical and Empirical Literature Review

Theoretical Literature of Manufacturing Development

All manufacturing and non-manufacturing sectors contributed to modern economic growth (World Bank, 2019; FAO, 2020). Continued economic success necessitates diversification, technological advancement, and possibly specialisation in future phases (Imbs & Wacziarg, 2003). Manufacturing drives the economy's increased productivity and innovation (Krugman, & Wells, 2006; Andreoni, 2013). The global economy had grown faster than it did before the Industrial Revolution (Kuznets, 1966; Maddison, 2003). Manufacturing's rapid rise in GDP share, coupled with agriculture's decline in GDP share, has shifted the economy toward higher-growth paths (Ocampo, Rada, & Taylor, 2009). The importance of manufacturing has increased efficiency, allowing advanced countries to catch up (Kaldor, 1967; Chenery, Robinson, & Syrquin, 1986; Chenery & Taylor, 1968). Manufacturing production tends to advance relative to changing factor endowments as per capita income rises (Lin, 2012). However, each country's circumstances necessitate a unique growth structure. History and industrial policies have thus influenced national factors (Lin & Chang, 2009). The country's emphasis on structural change, particularly manufacturing expansion, has the benefit of increased productivity (World Bank, 2011; Lin, 2012).

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[1] These sectoral economy data are available from database, https://www.theglobaleconomy.com/Ethiopia/Share_of_manufacturing/last (last accessed on 12/07/2020).

Fabrication has grown due to increased capital and precise technology (UNECA, 2015). It is the driving force of technology in national economic discussions. Given their technical dynamism and cost-cutting innovation, producers can use them in mass markets (Neuss, 2019). Mass production speeds up the process of improving learning-by-doing, specialisation, and quality (Altenburg & Melia, 2014; Su & Yao, 2016; UNDIO, 2018a). Globalisation has increased technology transfer from developed to emerging economies via FDI, joint ventures, and expertise and experience exchange (Lin, 2012). Countries have varying levels of technological and production capabilities, resulting in a wide range of capacities (James & Romijn, 1997; Katz, 2006).

With a variety of selective industrial, technological, and trade policies, states have helped accelerate structural changes in their economies since the 1800s (Rodrik, 2007; Chang, 2009; Krugman et al., 2012; Lin, 2012). The World Bank, IMF, and most economists have maintained their pro-market stance despite the rise of neoliberal policy support (Friedman, 1970; Williamson, 1990; Peet, 2007). However, many researchers and academics believe countries should adopt selective rules to advance their fabrication and reap the benefits (Cimoli, Dosi, & Stiglitz, 2009; Rodrik, 2004; Scazzieri, 2014; Bagchi 2012). Successful industrial policy-making principles must meet several criteria. The initial situation should be the most appropriate and correct way to develop policy (Amsden, 2001; Altenburg, 2011).

The last two decades have seen a surge in structural transformation economics. Both “New Developmentalism” (NDev) and “New Structural Economics” (NSE), which advocates Keynesian theory and shares the World Bank’s framework, have evidence of goal (Andreoni, 2013). New ideas and inputs in structural transformation economics and manufacturing policy face a basic investigative trial. What’s new in NSE framework? In the words of its creator, Professor Justin Yifu Lin, “it postulates that an economy’s economic structure is endogenous to its factor endowment structure” (2012, p. 5). While the NDev framework is based on economists’ contributions to macro-level structuralist and Keynesian development theories (Heterodox economists, 2012). While markets should be the primary venue for this process, the government must provide the necessary institutions to support it (Stiglitz & Yusuf, 2001; Rodrik, 2004).

How did some low-income countries succeed in manufacturing while others did not? The East Asian miracle’s performance has varied greatly (Kaldor, 1967; Lin, 2012; Szirmai, 2012). For example, in the 19th century, fabrication investment relied heavily on saving (Szirmai, 2012; Rocha, 2018). Large multinational and national corporations drove mid-20th century Japan and Korea. The role of non-resident Chinese (Xu & Yeh, 2013) and foreign investors (Weiss, 2011) in China decentralisation was implemented as part of the reform effort, giving local governments more power (Fu, 2000; Sahoo & Bhunia, 2014; Yang, 2014). Contrary to popular belief, Sub-Saharan Africa’s (SSA) manufacturing development has lagged behind the rest of the world (Weiss, 2011). MVA as a percentage of GDP fell from 17% in 1981 to 11% in 2019 (World Bank, 2020). The region’s poor MVA share performance has several explanations. The first point concerns the region’s natural resource abundance (Altenburg, 2011; Weiss, 2011). The second reason is the unfavourable industry environment (Ellis, McMillan, & Rodrik, 2021). The size of the market attracts FDI (Morisset, 2000). Furthermore, these investments require access to third-country markets, implying that regional and global trade agreements help attract FDI (Jaumotte, 2004; Lederman, Mengistae, & Xu, 2010).

Examining the Empirical Literature

It was done to assess the MVA share of GDP determinant factor. Studies in Kenya, Nigeria, Africa, and South Asia found that credit availability positively influenced MVA (Nzomoi, Were, & Rutto, 2012; Samouel

& Aram, 2016; Maroof, Hussain, Jawad, & Naz, 2018; Saidat & Wasiu, 2019). However, some emerging markets confirm that private sector lending has no significant impact on MVA (McMillan, Rodrik, & Seplveda, 2017; Martins, 2018). Blomström and Kokko (1996) found that FDI had diverse negative, positive, and negligible relationships with MVA. However, a study in Nigeria found that FDI has no meaningful effect on the performance of the fabrication sector (Saidat & Wasiu, 2019). However, a study on South Asian economies found that FDI has a significant but negative impact on MVA (Maroof et al., 2018). Niagara's MVA was determined using 37 years of time series data; income per capita did not affect sector development (Saidat & Wasiu, 2019). However, economic variables like per capita income had a significant impact on South Asia's MVA (Jongwanich & Magtibay-Ramos, 2009; Ejaz, Ullah, & Khan, 2016). The exchange rate in Nigeria showed a significant and positive long-term relationship with MVA using 1981-2015 data (Victoria, 2019). A manufacturing growth equation in Africa shows rising imports as a constant factor of trade openness (Rodrik, 2008; Babatunde, 2009; Guadagno, 2012).

Research Methodology

Sources of Data

The study's descriptive and econometric analyses used quantitative time-series data from 1981 to 2019. The data came from the World Bank, the IMF, and the Ethiopian Central Statistics Agency (CSA). Moreover, the CSA's manufacturing survey panel data of Large and Medium Scale Manufacturing Industries (LMSMI) span 22 years, from 1996 to 2017.

Methods of Descriptive and Empirical Analysis

Using survey data, this study estimated multiple-factor one productivity for labour, capital, and intermediate goods. Using a Cobb-Douglas form of the production function (Abegaz, 2013; Daz-Bautista, 2017; Thanh, Ohno, & Huang, 2018), this technique is used in Ethiopia, Mexico, and Vietnam.

$$Y = A.\ K^{\alpha}.\ L^{\beta} \tag{1}$$[2]

where Y, K, L, and A are output, capital, labour, and TFP, respectively. Y denotes output, while K denotes plant and equipment, also known as the stock of physical capital, and L denotes the number of workers, and α and β are coefficients. A represents what we will refer to as productivity. Increases in A, or the device of the new technology, can be thought to represent technological advancement. Another consideration is the labour force's level of skill, as well as other factors that could be incorporated into A (Daz-Bautista, 2017).

Total sales value is used to measure the output of the production. The overall book value of fixed assets at the end of each year is valued by survey respondents and used to calculate the value of capital. Accordingly, TFP is calculated as the residual of the approximate Cobb-Douglas production function. Precisely, we calculate TFP at the firm level as,

$$Y_i = \beta_l L_i + \beta_k K_i + \beta_m M_i + \gamma_s + \omega_i + \varepsilon_i \tag{2}$$

where the logarithm of the firm's output is designated by Y_i, and measured by gross sales value; K_i, L_i, and M_i are the logarithms of firm i's costs of capital, labour, and materials, respectively; a vector of input elasticities of firms

[2] See, decomposition of labour productivity growth across the economy (growth accounting method). The growth accounting technique decomposes labour productivity growth into TFP growth capital intensification. The decomposition function is derived from a Cobb-Douglas form of the production function (Abegaz, 2013; Daz-Bautista, 2017; Thanh et al., 2018). Ethiopia, Mexico, and Vietnam all use the same method.

is represented by β, while γ_s is industry-specific of vector effects, and ω_i denotes a logarithm of firm i's TFP, whereas ε_i means an *i.i.d.* element depicting idiosyncratic variations from the mean due to unforeseen events such as measurement errors and external factors (D ́az-Bautista, 2017).

To resolve for TFP ($\hat{\omega_i}$): This study estimates (2)

$$\hat{\omega_i} = Y_i - \beta_k K_i - \beta_l L_i - \beta_m M_i - \gamma s \tag{3}$$

Valued TFP in normal scale can be stated as the exponential of $\hat{\omega_i}$, that is, $\Omega_i = e^{\hat{\omega} i}$.

We estimate TFP using Equations (2) and (3) for each year for the period 1996-2017.

The TFP estimation separately for each year facilitates the assessment of the development over time.

ARDL uses both explanatory and dependent variable lags as a regressor for empirical estimation (Charemza & Deadman, 1997; Greene, 2008). When independent variables change by one unit, the model excels at separating long-run and short-run responses (Gujarati & Porter, 1999). As opposed to Johansen co-integration procedures, which require large sample data for acceptable parameter estimation, it is a statistically significant method to determine the co-integration relationship among variables in small samples (Pesaran, Shin, & Smith, 2001; Nayaran, 2004).

Development of Hypotheses

H (1.1): The first difference of credit to the private sector (percent of GDP) (CA) has a significant influence on MVA to %GDP.

H (1.2): MVA to percent GDP is affected by the first difference in FDI net inflow (percentage of GDP).

H (1.3): MVA percent GDP share is affected by the first difference in GDP per capita (constant 2010 US$).

H (1.4): The first difference in the real effective exchange rate index (ER) has a considerable influence on MVA in terms of percent GDP.

H (1.5): The manufacturing import to merchandise import ratio (MI) influences the MVA share of GDP.

Empirical Model Specification

Model specifications: In general, the ARDL(p, q) model is borrowed and defined from Pesaran and Shin (1995) as follows:

$$Y'_t = \beta_{0i} + \sum_{i=1}^{p} \beta_i Y_{t-1} + \sum_{i=0}^{q} \beta'_i X_{t-i} + \varepsilon_{it} \tag{4}$$

where Y'_t is a vector that represents the dependent variable, while $(X'_t)'$ independent variables are allowed to be purely I(0) or I(1) or cointegrated. β_0, β_1, β_i… are coefficients.

β_0 is the intercept or constant of the model while "p" and "q" are associated with lags of dependent and regressors variables respectively, where i = 1…k which designates the number of the variables in the model, whereas the errors term (ε_{it}) designates the vector of the errors in the model. Unobservable zero means independent or serially uncorrelated. According to the ARDL model is the combination of endogeneity and exogenous variables. The model contains the lagged values of the dependent and explanatory variables which include the current and lagged values of the regressors as explanatory variables (Pesaran & Shin, 1995).

If the model is no cointegration, which means the relationship of the dependent and explanatory variables is not long-run, the ARDL can be specified as (p_1, q_1, q_2, q_3, q_4, q_5, q_6) according to the review of the previous practices mentioned before. Hence;

$$\Delta MVA_t = \beta_{01} + \sum_{i=1}^{p} \beta_{1i}\, \Delta MVA_{t-i} + \sum_{i-1}^{q} \beta_{2i}\, \Delta FDI_{t-i} + \sum_{i=1}^{q} \beta_{3i}\, \Delta CA_{t-i} + \sum_{i=1}^{q} \beta_{4i} MI_{t-i} + \sum_{i=1}^{q} \beta_{5i}\, \Delta GP_{t-i} + \sum_{i=1}^{q} \beta_{6i}\, \Delta ER_{t-i} + \varepsilon_{it} \quad (5)$$

While if there is cointegration it includes the error correction model (ECM), the ARDL model is specified as

$$\Delta MVA = B_{01} + \sum_{i=1}^{p} \beta_{1i}\, \Delta MVA_{t-i} + \sum_{i=1}^{q} \beta_{2i}\, \Delta FDI_{t-i} + \sum_{i=1}^{q} \beta_{3i}\, \Delta CA_{t-i} + \sum_{i=1}^{q} \beta_{4} MI_{t-i} + \sum_{i=1}^{q} \beta_{5i}\, \Delta GP_{t-i} + \sum_{i=1}^{q} \beta_{6i}\, \Delta ER_{t-i} + \lambda ECT_{t-1} + \varepsilon_{it} \quad (6)$$

where:

$Y'\mathrm{t} =$ MVA_t = Manufacturing, Value-Added share to (% of GDP) at year t,

X includes:

CA = Domestic credit access to private sector (% of GDP),

FDI = FDI (% of GDP),

GP = GDP per capita (constant 2010 US$),

ER = Real effective exchange rate index of Ethiopia,

MI = Manufacturing import to (% of merchandize import),

Δ is the first difference.

Where $\lambda = (1-\sum_{i=1}^{p} \beta_i)$ is the mathematical representation of lamda, speed of adjustment parameter with a negative sign lags of independent variables represented by “p” while “q” lags are applied for exogenous variables, and both are the optimal lag orders.

ECT = (MVA_{t-1}-θX_t) the error term, where $\theta_=$ is the long-run parameter.

β_{1i}, β_{2i}, β_{3i}, β_{4i}, β_{5i}, and β_{6i} are the short-run dynamic coefficient of the model’s adjustment or the long-run equilibrium.

Descriptive and Empirical Analyses and Results

Descriptive Analyses

Manufacturing development saga: Initial condition matters. An empire existed before 1974, and manufacturing began in the mid-1950s. The government implemented three five-year development plans between 1956/1957 and 1974, including the industry growth plan (MOC, 2002; Gebreeyesus, 2013; UNIDO, 2017). The first term of the blueprint focused on education and infrastructure to prepare for industrialization (MOC, 2002). The second five-year plan was centred on agro-processing (Gebreeyesus, 2013). The third development plan, to be implemented between 1968 and 1973, emphasised commercial agriculture, with subsistence agriculture expected to grow at a rate of around 6% per year in connection with manufacturing (UNIDO, 2017). During the Command Economy (1974-1991), the state controlled the manufacturing sector (World Bank, 1985). Heavy industry expansion became the main focus (Hansson, 1995). Largely funded by Ethiopian framers’ resources, it delivered as “surplus” and “quota” from agricultural peasant cooperatives (UNIDO, 2017). In 1986, the state-owned roughly 95% of the value-added and 93% of the employment in LMSM (World Bank, 1985). Many businesses produced low-quality goods and operated at or below capacity. As a result, the firms built fewer establishments, from 369 in 1985/1986 to 275 in 1990/1991 (Newman et al., 2016).

Ethiopia has been on a market-led economic trajectory since 1991. The government has devised and implemented multifaceted approaches intertwined with changes to ensure policy implementation. As a result, the “Structural Adjustment Programme” (SAP) has been in place since 1992-1999 (FDRE, 2002). Its goals were to smoothly transition from a command economy to a market economy while stimulating the private sector (Gebreeyesus, 2013). During that time, the MVA increased by 5% on average in 1996, and by around 3% each year at the end of the programme year (FDRE, 2002; Gebreeyesus, 2013).

The following section compares and contrasts the three regimes' sector policies.

Comparisons of industrial policies with regimes. Since the mid-1950s, different policy paths have been followed by industrial policies, which are given comparatively as follows.

Table 1

A Summary of Comparative Industrial Policy Over Regime Changes

	Pre-1974 Imperial period	1974-1991 The military regime	Post-1991 The EPRDF period
Policy guide	Market economy	Plan economy	Market-oriented (developmental approach)
Private/public role	Led by private	Led by the government	State at a driving seat with a strong role of private
Pattern of ownership	Private foreign-owned had a dominant share	State-owned companies	The dominance of domestic private-owned companies
Priorities	Labour-intensive, import-substitution such as food & beverage, textile, cement	Import-replacing & labour-intensive, and heavy fabrications.	Export-focused & labour-intensive manufacturing such as agri-processing, leather, textile, cement
Main instruments	Protection of domestic market via tariff & prohibition of rival imports provision of incentives (tax holidays, reduction of tax on capital goods, etc.) & favoured credit policy	Quantitative limits & high tariffs to protect the domestic market Subsidize & finance to sustain domination of the state-owned enterprises	Support directly for chosen manufacturing & export sectors via incentives (tax holidays, a decrease of indirect tax for imported capital goods, land provision for establishment up to industry park provision, capacity building, favoured credit scheme, one-stop services, & others)
The role of state	Human resource & infrastructure development financing & ownership of selective firms	Planning & managing the public enterprise as the command economy actor	Human resource development & infrastructure, ownership of selective industries, and capacity building of the private sectors

Sources: Author compilation by reviewing various policy documents.

Ethiopia's MVA contribution to GDP. Over the last 50 years, Ethiopia's MAV share of GDP has averaged 5.6 percent, SSA countries 11%, and lower-middle-income countries 14% (World Bank, 2020). Ethiopia lags behind the SSA and lower-middle-income averages (World Bank, 2020). This was one of the most obvious signs of structural failure (Lin & Monga, 2019). When the food and beverage industries dominate a country, it means they have taken lower stage economy. When a country's fabrication sector dominates the production of basic metals and machinery, it is considered upper-middle-income (Weiss, 2011). Figure 2 shows the total MVA and its subsector share over time. Food and beverage value-added contributed approximately 41% of total MVA in 1995/1996. In 2015/2016, the contribution was reduced to 35%. Despite the decline, this subsector still contributes over one-third to Ethiopia's fabrication sector development. Approximately 10% of MVA came from textile fabrication the year before, but that contribution dropped to 3% the following year. The leather and footwear subsector contributed 9% of the total value added in 1995/1996. In 2015/2016, it was only 3%. Unlike the previous subsectors, chemical, non-metallic minerals, fabricated metal, and motor vehicles have risen in value. Chemical industries contributed roughly 3% in 1995/1996, but this increased to 11% in 2015/2016.

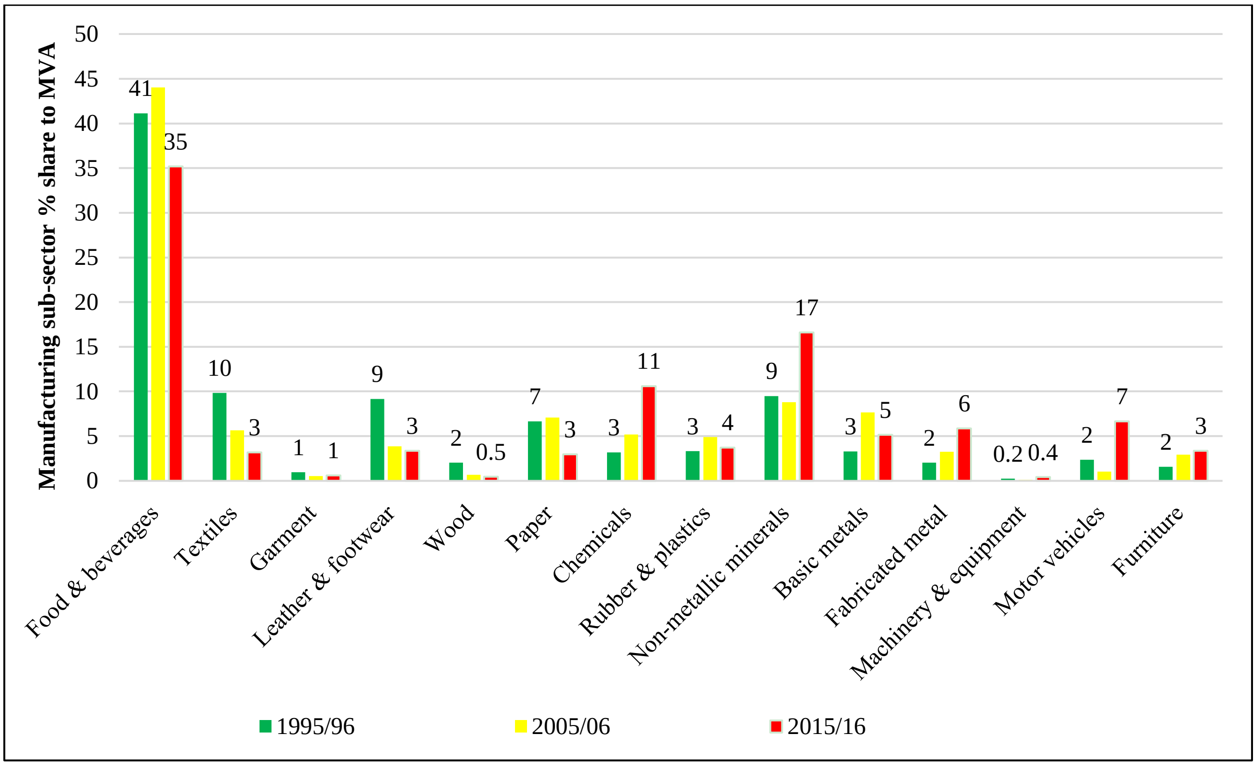

Figure 2. The subsectors' contributions to MVA throughout time. Source: Own computation based on PSI[3] (2020) & for 2015/2016 year data[4] (UNIDO, 2020).

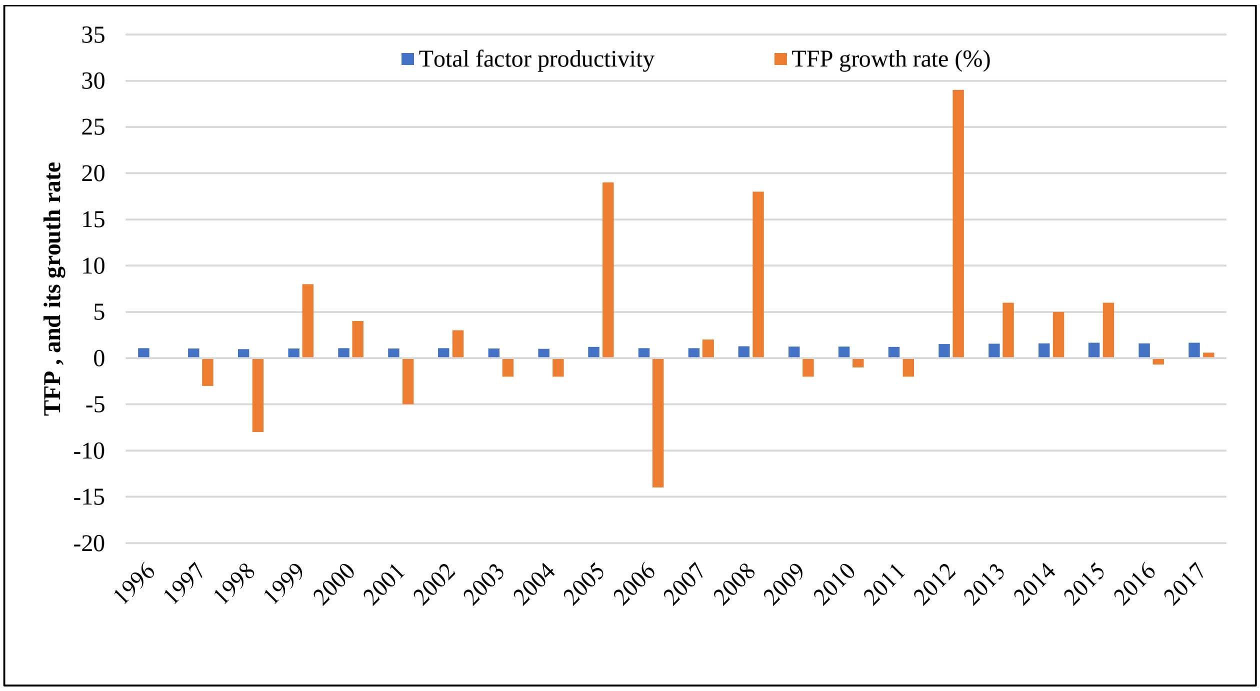

Figure 3. Manufacturing TFP level. Source: Authors' computation based on CSA's LMSMI firm-level survey data.

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[3] Notes: Policy Studies Institute Ethiopia Productivity Report, printed in Addis Ababa, https://psi.gov.et/ETproductivityreport_20200212.pdf (last accessed on 01/04/2021).

[4] This datum is available from country profile of UNIDO database, Ethiopia https://stat.unido.org/last accessed 1/18/2021.

Manufacturing TFP and its rate of growth. The graph in Figure 3 depicts overall productivity and growth. TFP has been consistent and very low in Ethiopian manufacturing firms. The annual growth rate is also shown in red, and it has been volatile, ranging from -14 percent in 2006 to +29 percent in 2012. Despite their small size, growth rate trends remained relatively stable and seemed to be increasing after 2012.

Comparison of labour productivity with peer countries. Figure 4 compares Ethiopia's value-added per worker to that of low- and lower-middle-income countries. To compare Ethiopia's position with its peers, we used estimated productivity in 2010. From 1991 to 2019, the country's value-added production lagged. Ethiopia's labour productivity fell below the SSA average in 1991, 2005, and 2019. Ethiopia's industry value-added labour productivity was 16% lower in 2005 and 51% lower in 2019. The findings suggest that low value-added labour productivity has been one of the main barriers to international competition.

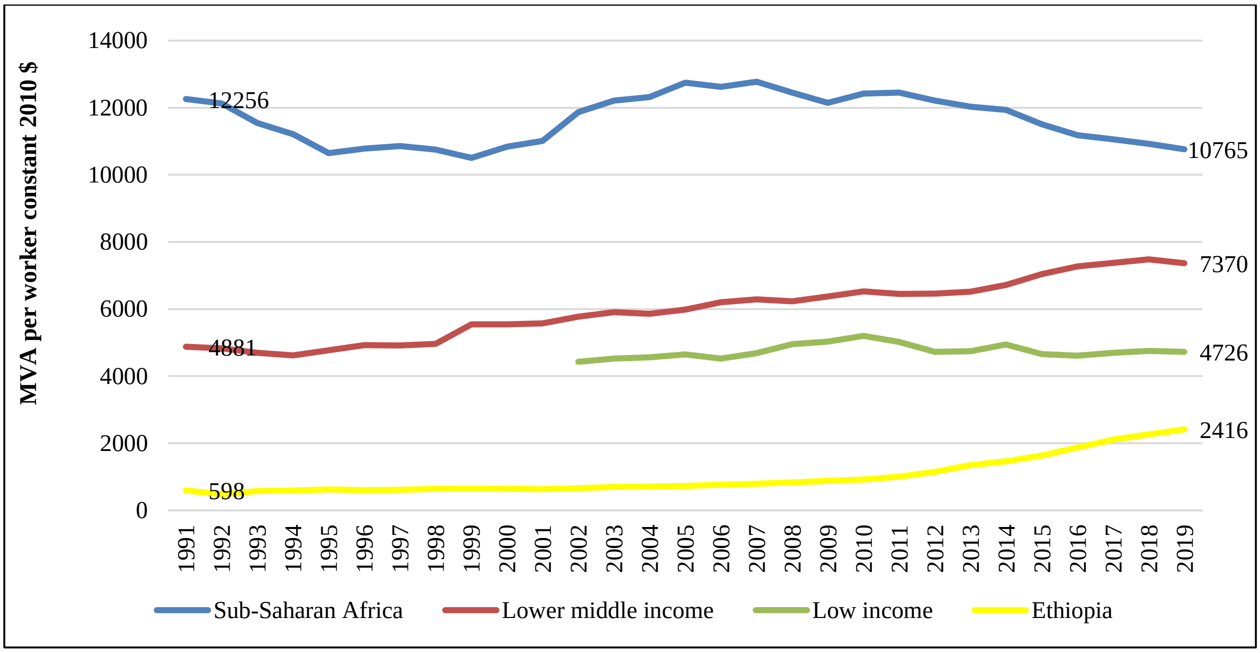

Figure 4. Ethiopia's labour productivity trends compared to peer countries, by Income Group. Source: Author computation based on the data from World Development Indicators[5] 2020.

Manufacturing sector supporting institutions matter. Based on perceived goals, the state established institutions to support industry and growth (Oqubay, 2015; UNIDO, 2018b). The institutional setup has been restructured in response to policy orientations and practises over the last two decades. Decentralized organisations have been created to promote the growth of manufacturing while also targeting specific subsectors with key functions. In addition to textile and garment subsectors, UNDP also supports leather and leather industry subsectors (Gebreeyesus, 2013; Shiferaw & Söderbom, 2019). Moreover, the creation of industrial parks is regarded as one of the most important strategies for attracting FDI. While institutional changes and promotions have improved the sector's primary indicators, it has not improved. There were many reasons. For example, the institutions' limited ability to assist businesses due to a lack of qualified experts and poor plan execution (Altenburg, 2011, Oqubay, 2015).

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[5] This datum is accessible from World Bank database, https://databank.worldbank.org/reports.aspx?source=2&series=NY.GDP.MKTP.KD.ZG&country=# (last accessed on 01/06/2021).

Following are some of the major causes of lower MVA over the last five decades. The next section examines and identifies impediments to sector growth.

Determinants of MVA in Ethiopia: Empirical Analyses

Correlation coefficients and summary statistics. To summarise the data, Table 2 shows the variables and their values as well as the years they were collected. The large standard deviation of MVA, GP, and ER indicates the time series data's heterogeneity. Except for MI, the first difference in the summary mean of each variable is less than the standard deviation indicating a wide range of means. The table also shows the variables' minimum and maximum values.

Table 2

Summarize the Time Series Data Statistics and its Results

Variables	Observations	Mean	Std. Dev.	Min	Max
ΔMVA	38	0.0315559	0.6910464	-2.044214	2.088723
ΔGP	38	9.841876	17.32791	-30.90422	34.36218
ΔCA	38	0.2912273	1.396942	-2.2	4.206847
ΔFDI	38	0.0169039	1.383194	-3.34454	3.102195
ΔER	38	-0.3975264	29.89859	-134.112	89.12299
MI	39	67.90915	7.304252	50.12345	84.58099

Source: Author's computation using Stata Software Version 14.

What is the correlation coefficient for this time series data? The table and analyses that follow show its features. The strength and direction of a relationship between variables are described. Stata software showed 38 observations. Table 3 shows the correlations. Every one of them has weak positive and negative relationships with the MVA dependent variables.

Table 3

Correlational Matrix of the Variables

Variables	ΔMVA	ΔGP	ΔCA	ΔFDI	ΔER	MI
ΔMVA	1.0000					
ΔGP	0.2983	1.0000	-	-		
ΔCA	0.2291	-0.1440	1.0000	-	-	-
ΔFDI	0.3287	-0.1003	0.0161	1.0000		
ΔER	-0.1948	0.0674	-0.1102	-0.0345	1.0000	-
MI	0.2768	0.3360	0.1693	-0.0331	0.0213	1.0000

Source: Author's computation using Stata Software Version 14.

Requisite analysis (tests for stationarity, co-integration…). The study used the Augmented Dickey-Fuller (ADF) test to determine the model's stationarity. It followed the econometric guidelines in Table 4 using Stata software. For these indicators, the statistical values should exceed the probability values because the model's guiding principle sets a 5% level. The ARDL co-integration technique moved all variables in the tests because it can operate on any I(1) or (0) (Pesaran et al., 2001). So the variable is integrated with Degrees 1 or I(1) or I(0) (Handoyo, 2019).

Serial correlation can be tested using the Durbin Watson autocorrelation. As a result of the test, the Durbin-Watson d-statistic(6, 38) = 2.490762, which is larger than 2 and significantly greater than the R^2 value.

This disproves the model's serial correlation. The Breusch-Godfrey LM test for autocorrelation yielded Chi2 3.153 with a probability of 0.0758, exceeding the model's critical value of 5%.

Normality is an important criterion. The Jaque-Bera normality test is suggested. With 0.54 Chi2 and 0.7631 probability, the model validates the result. This finding is desirable because it rules out hypotheses as normal.

Table 4

Augmented Dickey-Fuller Test for Unit Root Tests Results

ADF-test results for series with linear trend and intercept				
Variables on level	ADF-test statistic	Variables on first difference	ADF-test statistic	Level of integration (order of integr.)
MVA	-2.398	ΔMVA	-6.938*	I(1)
FDI	-2.780	ΔFDI	-6.279*	I(1)
CA	-0.287	ΔCP	-3.834*	I(1)
GP	0.900	ΔGP	-5.072*	I(1)
ER MI	-2.477 -4.543*	ΔER -	-6.960* -	I(1) I(0)

Note. * indicates that all variables are significant at a 5 % level of significance. Source: Author's computation using Stata Package Version 14.

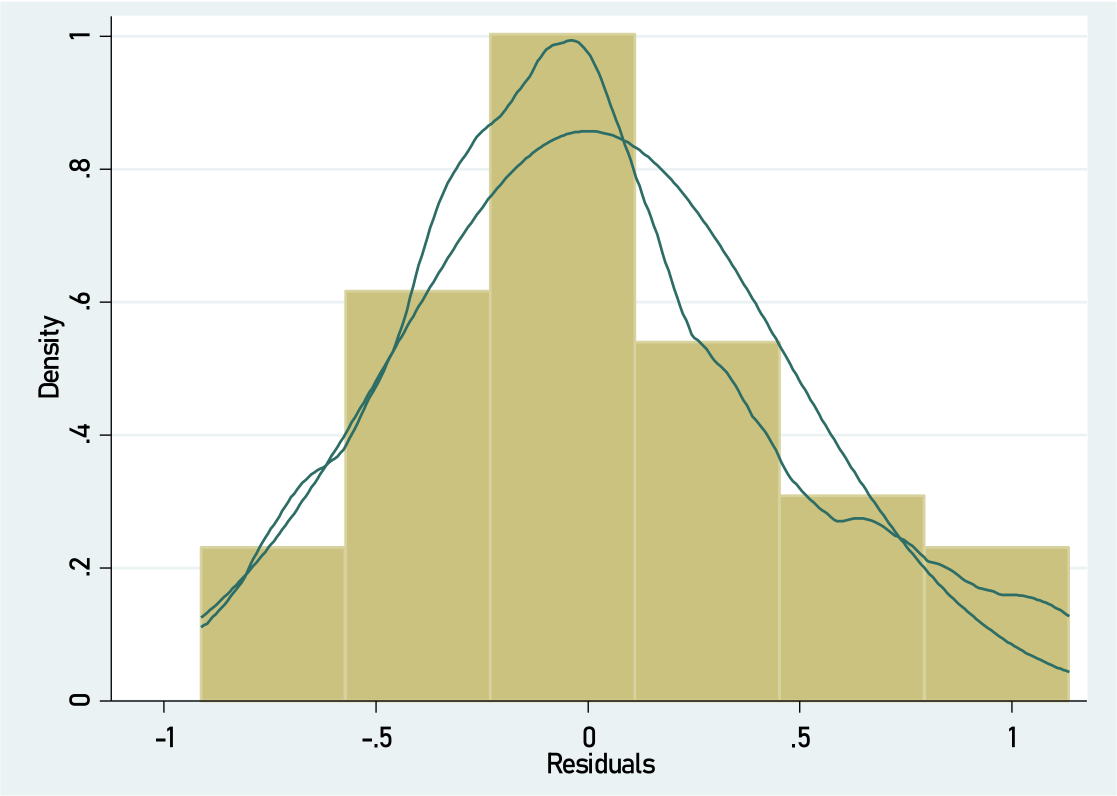

Figure 5. Normally distributed. Source: Author's computation using Stata Package Version 14.

The heteroscedasticity test determines a model's heteroscedasticity (Gujarati & Porter, 1999). The Stata package test results show Chi2(20) = 23.26, with Prob > Chi2 = 0.2762. It exceeds the "p" value's 5% critical value. This indicates homoscedasticity, which is desirable.

The model's stability is tested using the stability test. Both short- and long-run parameters must be tested (Pesaran & Pesaran, 2009). So the CUSUMQ, 6a and 6b, and CUSUM are used to test parametric stability. As a result, long-run estimates are stable.

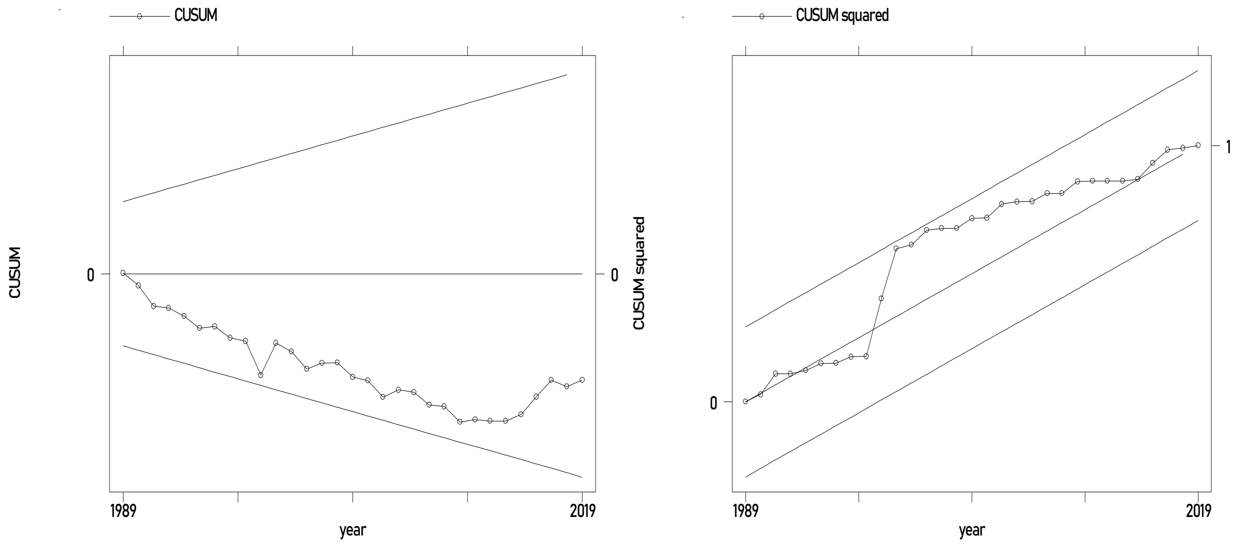

Figure 6. CUSUM and CUSUM SQUARE. Source: Author's computation using Stata Package Version 14, where the borderline ranges at a 5% significance level.

Because different variables have optimal lags, the ARDL model with the appropriate number of lags will address endogeneity issues (Pesaran & Shin, 1997; 1999; Wooldidge, 2013). These authors say there is no need to double-check the endogeneity test result. Encouragingly, the Durbin (score) and Wu-Hausman probability values were both large and greater than the 5% critical value, indicating no endogeneity issues.

The cointegration bounds test (p, q). Pesaran et al. (2001) and Nayaran (2004) suggested a lag for yearly time series data. The Akaike Information Criterion (AIC) is used to select the best ARDL model (Lutkephl, 2005). The co-integration bounds test was measured by comparing critical values to F-statistics. The test is significant at a 5% level. With a 5% probability, the upper bound for the F-statistic (8.743) was 3.79. As a result, the findings show a long-term relationship between Ethiopia's MVA share of GDP and the factors studied.

Estimation results and discussion. ***ARDL short-run (ECM) estimation results.*** The dependent and regressor variables are shown in the ARDL regression Stata regression code ardl ΔMVA ΔGP ΔCP ΔFDI ΔER MI, lag(1,3,3,3,2,3). Also, the R2 is 94%. Table 5 lists the dependent and explanatory variables, their coefficients, t-values, and probability values. All of these interpretations assume cetreris Paribus is true on average.

Short-run impacts of credit to private sector percent of GDP, at the level difference (D.ΔCP) and first lagged level difference (D.CP) decline by 0.293 and 0.281 percentage coefficients at the 5, and 5 percent t-statistics significant levels (LD.CP). Short-run increases in domestic private sector credit as a percentage of GDP result in a decrease in the dependent variable's coefficients. This shows that increasing credit quantity has a negative impact on MVA. This appears to have different long- and short-run credit impacts on MVA. Short-term credit is expected to benefit manufacturing less. This finding is in line with Kpodar and Gbenyo's (2010) findings on long-run versus short-run credit impacts.

However, the real exchange rate index is positively related to MVA as a percentage of GDP. The level difference (D.ER) is positively associated with MVA at the 5% t-statistic. As a result, a 0.0180 increase in the real exchange rate increases the coefficient level. This finding is consistent with an investigation in Nigeria that used time-series data to examine whether the exchange rate has a significant and positive relationship with MVA over time (Victoria, 2019). MVA is positively impacted by manufacturing import at both the level difference (D.MI) and the first level difference (LD.MI), with coefficients of 0.115 and 0.101. Increasing the percentage of imported manufactured goods raises the first and second t-statistics significant levels by 1 and 0.1 percent, respectively (see Table 5). This is reflected in the two-period lagged level difference of (L2D.MI). In the short run, these are mostly imports of machinery and spare parts. This study is comparable to previous theoretical and empirical studies by (Babatunde, 2009; Saidat & Wasiu, 2019).

Table 5

Long and Short-Run Association Estimation Results ARDL(1,3,3,3,2,3)

Long run coefficients		Short-run (ECM) estimation results			
Variables	Estimation result	Variables	Estimation result	Variables	Estimation result
ADJ L. ΔMVA	-1.672*** (-6.08)	D.ΔGP	-0.0116 (-0.87)	D.ΔER	0.0180* (2.78)
ΔGP	0.0187** (3.30)	LD.ΔGP	0.00944 (1.13)	LD.ΔER	0.0880** (1.07)
ΔCA	0.134 (1.74)	L2D.ΔGP	0.000302 (0.04)	D.MI	0.115*** (3.35)
ΔFDI	0.255* (2.61)	D.ΔCA	-0.321* (-2.58)	LD.MI	0.101** (3.25)
ΔER	-0.00775* (-2.94)	LD.ΔCA	-0.246* (-2.39)	L2D.MI	0.0445* (2.29)
MI	-0.0146 (-0.82)	L2D.ΔCA	-0.187* (-2.17)		
Constant	1.077 (0.54)	D.ΔFDI	-0.254 (-1.45)		
N	35	LD.ΔFDI	-0.152 (-1.30)		
R-sq	0.94	L2D.ΔFDI	-0.0516 (-0.70)		

Notes. t-statistics in parentheses and were significant, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Sources: Author's computation using Stata Package Version 14.

Long-run estimation results and interpretations. Because the bounds test demonstrated the existence of long-run cointegration, the coefficients and degree of significance will be estimated next. The ARDL regression results from the long-run error correction analysis are shown on the left side of Table 5. The adjustment (ADJ) is significant, with a negative coefficient, indicating a long-run relationship between the dependent and regressor variables. The coefficient's value indicates the rate at which parameters are adjusted. This implies that the previous error can be corrected now. The first difference in GDP per capita (GP) between the independent variables has a long-run positive impact on MVA. In the long run, a one-dollar increase in GDP per capita ($2010 constant) results in a 0.0187 increase in the MVA share percent of GDP at a 1% t-statistics significant level, according to the coefficient value. Increasing per capita GDP should be critical to the growth of the fabrications industry, particularly the MVA. These findings have been confirmed by other theoretical and empirical studies. Economic variables such as increased per capita income had a positive significant impact on the MVA of East Asia and South Asia, according to various studies (Jongwanich & Magtibay-Ramos, 2009; Ejaz et al., 2016). Similarly, a percentage increase in FDI share to GDP (FDI) in the long run will result in a 0.255 percent increase in MVA at a 5% t-statistics significant level, as indicated by the coefficient of this variable. This finding emphasises the long-term significance of FDI. This investigation disagrees with a study conducted in South Asian economies, which found that FDI has a significant but negative impact on MVA

(Maroof et al., 2018), but agrees with a study conducted in Nigeria using time series data on the fabrication sector progress determinants, which found that FDI has meaningful effect on the fabrication sector performance (Udegbunam, 2002). In the long run, a one index increase in the actual exchange rate reduces the MVA by 0.00775 percentage points and has a one-percentage-point significant t-statistics. This suggests that, in the long run, the real exchange rate has a negative relationship with MVA. This finding contradicts the findings of a study conducted in Nigeria, which found that the exchange rate had a significant and positive relationship with fabrication value added (Victoria, 2019). Manufacturing import, on the other hand, has a negative relationship with MVA in the long run. The study contradicts itself with a significant and positive influence on industrial development (Udegbunam, 2002).

Conclusions and Implications

Conclusions

The reasons for low fabrication value-added share are identified. First, the unpredictable political environment has been hostile to the private sector due to frequent policy changes, exposing it to significant inefficiency. A country's level of development dictates that subsectors like food and textiles should contribute significantly to MVA. It has, however, been declining for two decades. This could be a sign of premature deindustrialization and one of the main reasons for the sector's instability. Third, TFP was found to be small and stagnant, contributing to the low MVA. Prior to 2012, its growth rate was erratic. Furthermore, compared to the average of low, lower-middle, and SSA countries, Ethiopian labour productivity is so low that it has hampered MVA development and the sector's overall transformation. Finally, manufacturing support institutions are vital. Limited ability to assist industries due to lack of qualified experts and poor plan execution.

The empirical findings confirmed that the real exchange rate index and manufacturing imports have a positive significant impact on MVA in the short run, while GDP per capita, FDI, and the exchange rate index have a significant impact in the long run. These findings are mostly consistent with other studies discussed in the subsection results and interpretation.

Policy Implications

As a result of these findings, policymakers should prioritise the fabrication sector's development by enacting the following incentive packages. Politicians and investors must work together to change and stabilise the volatile political situation, thereby stabilising recurring policy changes and other unstable conditions. The textile and garment industries, as well as the food and beverage industries, needed to diversify their efforts to avoid deindustrialization. Diverse and complementary policies and practises should be implemented to improve low TFP and labour productivity sectors. Change old policies, implement new policies to improve input competitiveness, raise GDP per capita, and lower the exchange rate index, all of which have a significant impact on MVA growth. Create supportive institutions to help companies execute their plans. Encourage FDI and joint venture investment to share knowledge, experience, capital, and an international market network.

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