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Analysis of multi-country manufacturing value-added (MVA) using a dynamic panel model

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Industrialization is required to increase an economy's competitiveness and living standards, as well as to catch up to more developed economies; while low and lower-middle-income countries' average performance over the last five decades has been disappointing at 6.7 and 17.4%, respectively. Fabrication exports account for 37.1% of total low-middle-income average exports and 9.6% of low income. As a result, this article's main objective is to discover why manufacturing has historically played such a minor role in these economies. It has also looked into the influencing factors. Literature review was conducted. The study used national and multi-country panel data. There were multiple comparative descriptive analyses using tables and figures. The study used one-step system generalized-method of moments (GMM) model for longitudinal panel data. The study identified key factors limiting MVA share. MVA and the economic complexity index were positive and growing trends. Income growth correlates with manufacturing growth. The MVA share of low-income countries has fallen. Some factors affecting MVA share performance in low-income countries include credit availability and net foreign direct investment (FDI) performance. Regulatory quality, political stability and other factors directly impact MVA share. Export and GDP per capita have a positive significant impact on MVA in both the long and short run. While private credit has a negative impact. The research findings have policy implications, including increased manufacturing exports and higher GDP per capita income.

Key words: Manufacturing development, value-added, multi-country, causes, generalized-method of moments.

INTRODUCTION

Approximately one-third of the world's countries have high per capita incomes, while half have upper and lower-middle incomes (World Bank, 2021a). Most Sub-Saharan African countries have lower per capita incomes (World Bank, 2021a) and nearly 700 million people in the world live in extreme poverty (World Bank, 2018a; b). Economic structural transformation is directly related to manufacturing growth, according to historical, theoretical and empirical research (Lin, 2012; Rocha, 2018; Neuss, 2019). Economic fundamental transformation requires a fundamental change in industrial structure to overcome low-level development bottlenecks, barriers and rigidities (Martins, 2018; Rocha, 2018). Technological advancement, automation, progress and diversification have accelerated these developments (Lin, 2012; Yang, 2014). Sectoral shifts from low to high productivity

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(McMillan et al., 2014). To lead industrial technology, Great Britain became the primary fabrication center, which spread to other nations like Switzerland, Belgium and the Western world (Lin, 2012; Szirmai, 2012; Rocha, 2018). Japan, South Korea, Taiwan-China and China have all followed suit (Lin, 2011; Lin, 2012; Szirmai, 2012). Argentine, Brazil, Mexico, Chile and Colombia tried to increase their industrial share in the late nineteenth century (Paolera et al., 2018). Other developing countries, particularly in Africa, have attempted to promote the sector, although they have yet to be effective (Signé, 2018). Despite country differences, sector expansion and development increased GDP per capita, manufactured exports and employment (Rodrik, 2011; Krugman et al., 2012; Andreoni, 2013; UNDIO, 2018). Countries that have completed structural transition, have caught up and have joined or are on their way to joining the advanced high-income group. However, this package and achievements have not been replicated throughout the developing globe (Lin, 2018). The catching-up activity of fabrication is defined in latecomer economies as “wild geese fly in orderly ranks forming an inverse 'V,' exactly as airplanes fly in formation. This wild goose flying pattern is figuratively applied to the three time-series curves... each signifying import, domestic production and export of manufactured goods in less developed countries” (Akamatsu, 1962:11). This concept is more closely related to the success of East Asian manufacturing development in countries (Lin, 2011). These are the supporters of export-oriented versus import-substituted initiatives. Supporters of the latter claim that it relates the importance of learning-by-doing to industrialization (Krugman and Wells, 2006; UNIDO, 2015); whereas supporters of the former believe in the role of trade-learning (Lin, 2012). Import-substituting manufacturing progress occurs when trade restrictions such as quotas and tariffs are used to stimulate domestic manufacturing to substitute imported goods. The objective is to encourage the home market (Krugman et al., 2012). Exporting a manufacturing product has been linked to the product's quality and competitive price in the international market. These can be accomplished by substituting home production for imported ones (Andreoni, 2013; UNIDO, 2015). For a variety of reasons, the import substitution strategy has become fashionable and acceptable. The first argument was that the sector was still in its infancy; hence protection had gained favor among many politicians and economists (Krugman et al., 2012). The manufacturing production structure has been connected to upstream and downstream firms (UNIDO, 2018). Physical demand and supply relationships between economic sectors distinguish these ties (Rosenstein-Rodan, 1984; Rocha, 2018). Infrastructure is considered essential for industry growth. There are two types: hard and software (Lin, 2012). Examples of the former are telecommunications, roads and other public utilities. Other economic and political systems include social capital (Krugman and Wells, 2006; Lin, 2012). To gain access to specific inputs such as qualified labor, the cluster of enterprises focuses on specific geographical areas (Zhang et al., 2011). Many researchers and academics believe that to achieve multifaceted fabrication sector development, governments should implement appropriate and selective policies to advance their manufacturing sector development and reap the benefits (Cimoli et al., 2009; Bagchi, 2012; Scazzieri, 2014). In terms of successful industrial policymaking, the state determines the sector's progress. The starting scenario should be the best way to develop policy (Lin and Monga, 2010; Andreoni, 2013).

The problem statement, economic progress and development have resulted from the shift from agrarian to contemporary manufacturing, non-manufacturing industries and service sectors (Rosenstein-Rodan, 1984; Neuss, 2019). They have also resulted from structural changes. Considering these multifaceted aims of the sector, low and lower-middle-income countries have aspired to have robust industry advancement in general and manufacturing in particular, to change traditional agriculture to modern agriculture since the 1950s (Lin, 2012; UNDIO, 2017). To move this sector forward, the governments were given resources during the 1950s and 1960s to encourage private operators, however, under the command economy; the manufacture of states-owned heavy industries was the primary goal in not few low and lower-middle-income countries (UNIDO, 2017; Lin, 2018; Signé, 2018). Since the beginning of the 1990s, following the end of the socialist era, the states have established and implemented the free market system to bring about economic structural changes (Lin, 2018; Signé, 2018). Since 2000, the economy has been seeing rapid GDP growth consequently to the reforms. Although the sector's contribution to GDP has increased, the shift to manufacturing has been minor. Until 2019, the manufacturing output contribution of low-income countries is not more than 6.7% of GDP. In lower-middle-income countries, the figure is 17.4%. The structural shift has shifted to non-manufacturing and service industries. Neither industry employment nor exports have increased. By 2019, the sector's labor force contribution averaged 9.7% of the total labor force in low-income countries, versus 18.23% in lower-middle-income countries (World Bank, 2020a). In 2019, its exports accounted for around 9% of total exports, while the latter accounted for 37.07% (World Bank, 2021b). Textiles, leather and leather products, clothing, meat and associated outputs were the main manufactured goods exports (World Bank, 2020b). These data confirm the transformation's failure. Moreover, many African countries are ranked among the least transformed in 2014, using five indicators such as export competitiveness, economic diversification and technology upgrade (ACET, 2014). Unless corrective policy measures are implemented, premature deindustrialization

will be unavoidable, especially in low-income economies. This research seeks to understand why manufacturing is so marginal in developing countries. The study looks into why the MVA share of GDP has remained low for so long. It will also examine the influences on these performances. The study will add to existing knowledge on manufacturing development, specifically output growth, determinants in developing economies. This study will provide policymakers with comprehensive information on the major drivers of sector growth. The study also makes policy suggestions for boosting industrial output. Based on the study's findings, the manufacturer can engage the government in public-private partnerships. To the researcher's knowledge, no comprehensive study combining descriptive and econometric research on MVA share has been conducted.

THEORETICAL AND EMPIRICAL LITERATURE REVIEW

Manufacturing is the production of services and goods using shared production elements such as land, labor, capital and raw material investment (Andreoni, 2013; UNIDO, 2015). In and across industries, manufacturing development is the result of economic sector transformation (Stiglitz 2017; Neuss, 2019). Transformation across sectors occurs when dynamism moves from agriculture to manufacturing. However, within sectors, the fabrication sector is moving from low to middle and high-tech (Pisano and Shih, 2009, Altenburg and Melia, 2014). It denotes a shift from fabrication subsectors like food and beverage, textile and garment, to computerization of technology accumulation (Stiglitz, 2017). MVA as a percentage of GDP is a major indicator of manufacturing expansion (UNIDO, 2015; Neuss, 2019). It implies structural change as evidenced by increases in fabrication output and export GDP (UNIDO, 2005; Herrendorf et al., 2014).

Manufacturing development theoretical literature

As per capita income rises, manufacturing production tends to rise relative to changing factor endowments (Lin, 2012). The country's geographical and demographic characteristics have also influenced progress (Krugman et al., 2012). According to this theory, low-income resource-intensive countries focus on light manufacturing, while high-income countries focus on capital manufacturing (Katz, 2006; Krugman and Wells, 2006; Andreoni, 2013; UNIDO, 2015). However, each country's circumstances necessitate a unique growth structure. This has led to a role for country-specific factors like culture, history and industrial policy (Chang and Lin, 2009). In comparison to traditional production activities, encouraging economic growth and reducing poverty (Lin, 2012). Manufacturing jobs are good jobs. Studies show that employment in firms is a major driver of economic growth, especially in developing countries (UNECA, 2015). Fabrication has grown due to increased capital and technology (UNECA, 2015). In national economic discussions, industrialization has been seen as driving technology. This organization claims that technological advancement and mass production are now intertwined. The technical dynamism and innovative cost-cutting processes allow producers to use it in mass markets (Neuss, 2019). A cluster is a group of firms that share expertise, have access to specialist inputs and a pool of qualified labor and other resources (Zhang et al., 2011). Krugman claims that companies in industrial clusters gain at least three well-known advantages. The affluence of markets and labor pooling are examples (Krugman, 1991). These 'collective efficiency' benefits may allow additional manufacturers to participate in fabrication output that would otherwise be unavailable to them (Schmitz and Nadvi, 1999). It is a growing genre that covers industrial collections and their role in economic progress (Zhang et al., 2011). By enacting selective industrial, technological and trade policies, states have been driving and speeding 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 (Peet, 2007). Others argue that countries should have selective rules in place to advance their fabrication while reaping the benefits (Cimoli et al., 2009; Rodrik 2004; Bagchi 2012; Scazzieri, 2014). It has a set of requirements. The initial situation should be the most appropriate and correct way to develop policy (Amsden, 2001; Altenburg, 2011). It has gained popularity in the last two decades. There is evidence of the goal of 'New Developmentalism' and 'New Structural Economics,' (NSE),' which share a Keynesian theory with the World Bank's framework (Andreoni, 2013). There is a basic investigative trial in distinguishing fabrication development as two interconnected courses. What is new in NSE? The primary architect, Professor Justin Yifu Lin, says "studies the determinants and dynamics of economic structure using neoclassical methods. Changes in factor endowments and continuous technological innovation drive sustained economic development, according to this theory" (Lin, 2012:5). Whereas a country's top industrial structure is determined by its relative advantage, which is defined by factor endowments at any given time, fabrication expansion is considered inevitable (Lin, 2012; Andreoni, 2013). A mix of "comparative advantage" tracking methodologies and soft and hard set-ups is envisaged by the NSE architecture (Chang and Lin, 2009). A government intervention to correct market failure is accepted on the NSE agenda. Thoughts on how policies will continue to operate in an open market, with the state only intervening

when necessary (Lin, 2012). The macro-level structuralist and Keynesian development approach NDev framework is composed of ten hypotheses (Heterodox economists, 2012). The idea was to promote sustainable growth, according to these experts. However, while markets should be the primary venue for this process, the state must provide the necessary institutions to support it (Stiglitz and Yusuf, 2001). Economic growth requires a national development strategy that takes advantage of globalization's prospects (Rodrik, 2004; Cimoli et al., 2009).

Aside from the periodic overvaluation of the exchange rate, too much reliance on foreign savings hinders the long-term prosperity of the country. Promoting exports, currency adjustments and domestic savings are also critical for predictable growth (Chang, 2004; Huang et al., 2014). How did low-income countries succeed in manufacturing? In the courses of industrial development, countries' performance has varied greatly. These historical achievements have been linked to a variety of strategies for its development of it (Weiss, 2011). Countries have rarely followed the same order in terms of institutional patterns of their manufacturing growth in comparison to recent history (Lin, 2012; Szirmai, 2012). For example, in the nineteenth century, the European economics of industrialization, which followed Britain in nearly identical steps, relied more heavily on the role of financial institutions, such as mobilizing savings for fabrication investment, whereas reinvested returns of firms themselves were more important (Szirmai, 2012; Rocha, 2018). Large multinational and national enterprises were the driving force of sector development in the late nineteenth century in Japan and the mid-twentieth century in Korea. In the case of Taiwan-Chain, the focus was on the smaller and medium-sized enterprises as well as the domestic private sector (Weiss, 2011). While, in the case of China, rich non-resident Chinese (Xu and Yeh, 2013) and foreign investors (Weiss, 2011) have played important roles. One of the game-changers in the path of fabrication progress is the establishment of special economic zones (SEZs). Particularly in the case of China, authorities established a variety of manufacturing and related economic development policies following the open-up and reforms (Sahoo and Bhunia, 2014). In terms of manufacturing development, SSA, excluding South Africa, is the world's largest laggard (Weiss, 2011). From 17% in 1981 to 11% in 2019, MVA as a percentage of GDP has fallen (World bank, 2020; and econstats.com, 2021). This is how these countries perform on average. From 22.7 to 27.5% of total merchandise exports, fabrication output exports have had a depressingly low trend for 24 years. As mentioned previously, East Asia's manufacturing sector is very different.

A lack of MVA share is due to several factors. The first point concerns the region's natural resource abundance (Altenburg, 2011; Weiss, 2011). An unfavorable business climate is the second explanation (Ellis et al., 2021). A country's purchasing power, landlocked or coastal, governance and relationships with neighbors all influence the potential for manufacturing expansion similarities between the two countries (Altenburg and Melia, 2014). Transport, infrastructure and services such as security, water and other essential supplies are costly in Africa, compared to Asia (Weiss, 2011). A lack of trade logistics and unpredictability in electricity supply all threaten the long-term viability of FDI (Chen et al., 2015). The market size influences FDI attraction (Morisset, 2000). This implies that trade agreements within and across regions help attract FDI to Africa (Jaumotte, 2004; Lederman et al., 2010).

Examining the empirical literature

An empirical study has shown the MVA share's relationship to GDP. Various studies using panel data found that credit availability had a significant direct impact on MVA in Kenya, Africa, South Asia and Nigeria (Nzomoi et al., 2012; Samouel and Aram, 2016; Maroof et al., 2018; Saidat and Wasiu, 2019). Evidence from lower-middle-income African countries confirms that private sector credit does not result in significant changes in MVA (Mcmillan et al., 2017; Martins, 2018). A long-term relationship between gross fixed capital formation and industrial value-added has been found in Nigeria using time series data from 1981 to 2015 (Josephine et al., 2017; Victoria, 2019). The study also found that capital development influenced Pakistan's manufacturing growth (Khadaroo and Seetanah, 2007). The Niagara study used 37 years of time-series data to determine the fabrication sector's role in GDP structural changes (Saidat and Wasiu, 2019). The data showed that economic variables like per capita income influenced South Asia's industrial development (Ejaz et al., 2016). In East Asia, an increase in per capita income was reported to have a greater influence on MVA (Jongwanich and Magtibay-Ramos, 2009). The study in Nigeria found that trade openness had a significant impact on the changing characteristics of the fabricating industry's proportion of GDP (Ng and Yeats, 1998; Babatunde, 2009; Saidat and Wasiu, 2019). The fixed effect panel data regression showed that free trade has a significant impact on industrial progress (Udegbunam, 2002). A study in four South Asian countries and another in Niagara using panel data found a significant link between manufacturing growth and trade openness (Ejaz et al., 2016; Josephine et al., 2017; Saidat and Wasiu, 2019). A study by 160 countries confirmed that agriculture has a significant impact on the growth of the manufacturing sector; the findings showed that agriculture and fabrication have a statistically significant positive correlation (Varkey and Panda, 2018). Contrary to another study, the relationship between agriculture and MVA and economic structural

change is inconclusive. Mcmillan et al. (2017) claim that agriculture's value added to the fabrication industry has little impact on sector change. While other Tanzanian research agrees that the former contributes significantly to the manufacturing sector (Shombe, 2005). A study in Mexico found that effective governance measures improve industry (Kraay et al., 1999). Using data from 1981 to 2015, the exchange rate showed a long-term positive relationship with MVA in Nigeria (Victoria, 2019). The equation for manufacturing growth in Africa shows that increasing domestic market size and trade openness are constant factors (Rodrik, 2008; Guadagno, 2012). Due to the state's effective governance service, the macro environment is stable, allowing manufacturers to operate rationally (Altenburg, 2011). Since stable macroeconomic conditions would reduce public debt while appropriate deficits would increase capital access for private manufacturing players (Mazanai and Fatoki, 2012; Samouel and Aram, 2016). These variables may be among the most critical to manufacturing progress in terms of value-added percentage of GDP (Udegbanum, 2002). The government's ability to foster growth in manufacturing and related sectors is also critical (Chamberlain and Smith, 2006). However, empirical researches in low and middle-income African countries confirm that trade openness and governance variables do not significantly affect fabrication development and structural transformation (Mcmillan et al., 2017; Martins, 2018). The study found a positive and negative relationship between inflation and economic progress in developing nations using a panel model (Rodrik, 2008; Martins, 2018). Using time-series data, the SSA study found that independent variables like government incentives and inflation had no significant relationship with manufacturing development

METHODOLOGIES FOR ESTIMATING MVA

Sources of data and measurement

From 1991 to 2019, 69 countries and 30 years were studied to determine the major factors of manufacturing sector development (World Bank, 2020). The research included both quantitative and qualitative longitudinal panel data. The study used secondary data sources. The data came from World Bank, World Development Indictors and EconStats, as well as the Worldwide Governance Indicator, Penn World Table, World Trade Organization and each country's statistics agencies if data on the previously listed international institutions was not accessible. The dependent variable is MVA percent of GDP, whereas the economic independent variables are agriculture value-added (AV), credit access (CA), manufacturing export (ME), Government final consumption expenditure (FC), Trade as a part of GDP (TO), Inflation, GDP deflator (annual percent) (ID), GDP per capita income (GP), governance effectiveness estimate (GE). The most prevalent units are percent share, governance index and per capita income in USD.

Formulation of hypotheses

This study's independent variables are determined by the economic and political variables listed below. Formally, we tested hypotheses in the following ways:

H (1.1): First lag MVA percent of GDP (MVA_lag1) has a significant influence on MVA
H (1.2): In AV has an important effect on MVA.
H (1.3): ME has a considerable impact on MVA.
H (1.4): CA has a substantial influence on MVA.
H(1.5): FC has a significant impact on MVA.
H (1.6): TO has a meaningful effect on the production of MVA.
H (1.7): GP has a significant influence on MVA.
H (1.8): GE has a major impact on MVA.
H (1.9): ID has a significant effect on fabrication value addition.

Econometric estimation method

Before estimating using a one-step system GMM, the study used the fixed-effects model (FE) through the guide of the Housman test. However, the finding has failed due to the model suffered from heteroscedastic and serial correlation. Pesaran's cross-sectional dependence test in the FE model should be tested, according to the study. Long-term panel data may have a problem with cross-sectional dependence. As a result, the regression output indicates that the probability value was less than the desired lower limit of critical value. In addition, the model suffered from Groupwise heteroskedasticity. Hence, this study considers a dynamic panel-data, one-step system GMM model since it includes the lag of the dependent variable as an independent variable. GMM is augmented in one step, it is efficient and it is robust to autocorrelation and heteroscedasticity (Roodom, 2009). The presence of the lagged variable which is dependent on the experiential model indicates that there is a relationship between the error term and the regressors because lagged MVA percentage of GDP on u_{it} is a function of the effect of the country-particular factor. Because of this association, estimation of dynamic panel data Eq. (1) stands from the Nickell 1981; Robertson and Sarafidis 2015 bias, which goes only when T approaches infinity. GMM, as proposed by the authors cited in the previous section, is the preferred estimator in this instance. Endogeneity caused by the correlation between these country-specific effects and the right-hand side regressors is likewise eliminated by the system GMM model. The orthogonality provisions amongst the lagged differenced values of the regressed variable and errors are used in the instant conditions. This presumes that the original disturbances in Eq. (1)—the v_{it}—are not serially correlated and that the differenced error is thus the moving average of first-order; MA (1) with unit root (Baltagi et al., 2009). To that goal, two analytics are calculated employing the Arellano and Bond (1991) GMM technique to test for first and second-order serial correlations in the disruptions. It is the acceptable range the second-order serial correlation is appropriate. The number of moment situations improves with T, which is a unique aspect of GMM dynamic panel data analysis. As a result, a Sargan test is used to test the over-identification limits (Roodom, 2009). The level dynamic GMM estimation treats all variables save the lagged dependent variable as if they were exogenous implies that these variables assuming they are uncorrelated with dependent variable.

The model was modified from (Samouel and Aram, 2016). It was used to see how financial development affected industrialization. As a result, the model was created in the following manner:

$INDUSTRY_{it} = y_0 + y1INDUSTRY_{it}\text{-}1 + y2FIN_{it} + y3FDI_{it} + y4LAMRIG_{it} + y5GOV_{it} + y6REER_{it} + \ldots U_{it}$, (1) With: $Uit = \mu_i + \varepsilon_t + v_{it}$ (Samouel and Aram, 2016:226).

However, in this study case, we used to estimate the determinants

of MVA. Accordingly, the model has been modified as follows:

$INDUSTRY_{it=}$ $MVA_{i,t}$ MVA % of GDP at year t

Therefore: $MVA_{i,t} = \beta_0 + \beta_1 MVA_{i,t-1} + \beta_2 AV_{i,t} + \beta_3 CA_{i,t} + \beta_4 ME_{i,t} + \beta_5 FC_{,t} + \beta_6 TO + \beta_7 ID_{i,t} + \beta_8 GP + \beta_9 GE_{i,t} + U_{it}$

With: $U_{it} = \mu_i + \varepsilon_t + v_{it}$ where $U_{it=}$ disturbance term, $\mu_{i=}$ country individual fixed effect, ε_t effect., v_{it} = idiosyncratic error terms.

According to Baltagi et al. (2009), the presence of the lagged regressor variable in the empirical model indicates that there is a connection between the error term and the regressors since lagged MVA depends on U_{it}, which is a behavior of 'i' the country-specific impact. Due to this relationship, dynamic panel data evaluation of (i) suffers from the Nickell 1981; Robertson and Sarafidis, 2015 bias, which disappears only when T tends to infinity. In this scenario, the chosen estimator is GMM, as defined by Arellano and Bond (1991), which differs from the model to eliminate exceptional condition country effects or any time-invariant country-specialized variable. Roodman (2006) advocates using time dummies variables to improve the utilization of the GMM system approach. Furthermore, only endogenous variables with values of lagged of at least two periods are regarded as sound instruments. It should not surpass the number of groups, so the p-values of the Sargan test of over identifying limits and the Arellano-Bond test for serial association in second-differenced errors should be greater than 0.1, according to him, the test suggests instruments should be jointly valid if they are not connected with the error term (Samouel and Aram, 2016). Other authors use fewer lags to instrument endogenous variables because they believe that if all lags are employed, the number of instruments exceeds the number of groups, making the Sargan test weak and estimations incorrect. The coefficients β1, β2, β3, β4, β5, β6, β7, β8 and β9 in the equation, measure the short and long-run response of MVA share to changes in MVA lagged variable by one period, agriculture value-added (AV), credit access (CA), manufacturing export (ME), Government final consumption expenditure (FC), Trade as a part of GDP (TO), Inflation, GDP deflator (annual percent) (ID), GDP per capita income (GP) governance effectiveness estimate (GE).

RESULTS AND DISCUSSION

MVA comparative descriptive and empirical analysis

MVA share by income levels

According to the countries' income levels, it has been producing numerous things with new models and trends. Looking at the global MVA over the last 30 years, we notice an upward tendency. Table 1 shows the sector value added in 1991 was around 5405 billion $ constant in 2015. In 2005, the value was 8703 billion dollars and in 2019, it was 13837 billion dollars. In terms of income level performance, low-income nations advanced 2.5, 0.32 and 0.33% of the global share in 1991, 2005 and 2019. As can be seen, both shares were modest and decreased from 1991 to 2005, and then remained stable for the rest of the study period. The performance of low- and middle-income countries differed greatly. As shown in the table, lower-middle-income countries have increased by 4.8, 5.6 and 8.1% over time, despite lagging behind upper-middle-income countries. Similarly, higher middle-income countries accounted for 19.7, 26.5 and 39.8% of sector development. They are now manufacturing centers alongside high-income countries. Aside from that, low-income countries have seen a far faster rise in the trend than high-income countries. However, in 1991, 2005 and 2019, the high-income group held 74.9, 63.5 and 51.8% of the share. Despite a gradual decline, the global share of high-income countries remains the highest. The overall trend assessments of manufacturing development indicated that as income levels rise, the probability of having a significant percentage of MVA rises. Increased income and the development of manufacturing have positive correlations.

MVA per capita and economic complexity

Producing more complex goods and acquiring productive knowledge (Hausmann and Hidalgo, 2011). The notion of acquiring productive skills in a country was summarized by Hidalgo and Hausmann (2009) and reviewed by Hausmann and Hidalgo (2011). The variety of a country's fabrication product structure and the originality of its products were discovered to measure economic complexity. Combining the two observations and using the computation procedure yields quantifiable complexity measures through reflections (Hidalgo and Hausmann, 2009). Manufacturing expansion and economic complexity have been directly tied to economic advancement (Hausmann and Hidalgo, 2011). It provided critical insights into various types of economic progress. It correlates positively with a country's production capability and development stage. A log of MVA per capita (constant, 2015 US$) group of countries by income level is shown, using Africa as the region. Figure 1 shows the relationship between high-income, upper-middle-income and low-middle-income countries, as well as Africa. So the color represents the country cluster. Manufacturing value per capita increased with economic complexity. Their color is blue. Based on 2018 statistics, the Log of MVA per capita and ECI are linked. As a result, the blue spots indicated the advanced economies. As can be seen, most countries in this group score above zero on the ECI. This means that these countries had a greater level of MVA understanding. As noted, not all high-income countries have equal ECI. Few had negative ECI scores, whereas some had higher positive values. In this group, Australia had an ECI of -0.53 and a log MAV of 3.5, not far behind Japan and Germany, which had -0.53. Not as diverse as other high-scoring countries' knowledge accumulation. Kuwait had a negative 0.7 ECI and a log MAV of 3.4. This shows that certain countries have higher industrial value-added but lower ECI. The red dots reflect the upper-middle-income group of countries. Despite the logarithm of the MVA is high close to the higher income category in this scenario, the ECI ratings were mixed. Almost half of the 38 countries have a

Table 1. MVA share based on global income level trends.

Countries	MVA(billions, constant 2015$)			MVA (percent)		
Grouping by income	1991	2005	2019	1991	2005	2019
World	5405	8703	13837	100.0	100.0	100.0
Low income	32	28	45	2.5	0.32	0.33
Lower-middle income	260	490	1116	4.8	5.6	8.1
Upper-middle income	1063	2310	5503	19.7	26.5	39.8
High income	**4050**	**5875**	**7173**	**74.9**	**63.5**	**51.8**

Source: Author computation based UNIDO Statistics Data (UNIDO, 2020a).

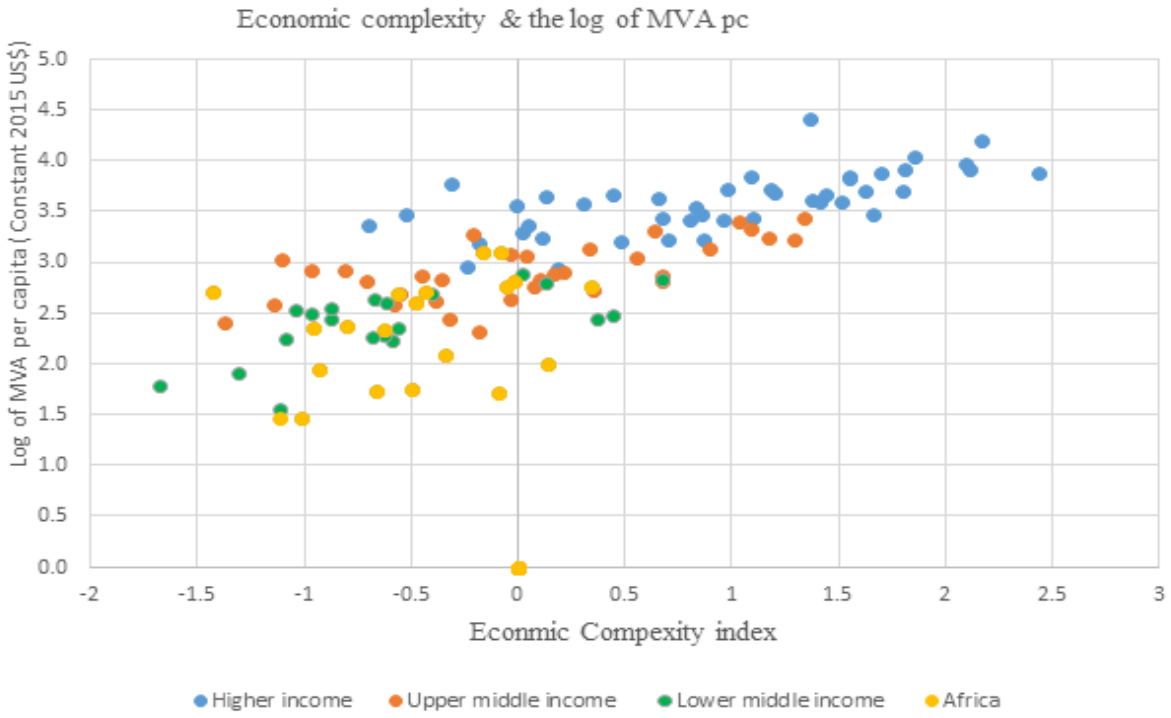

Figure 1. MVA Per Capita and ECI.
Sources: Own computation based on UNIDO Statistics Data Portal (UNIDO, 2020b) and country complexity rankings (2018).

negative ECI score. The graph clearly illustrates that these countries' understanding of the industrial sector and other sources of development are not diverse and limited. Despite the disparities in performance, around 18 countries earned positive ECI, indicating a favorable and reasonably good level of knowledge accumulation among group members. The lower-middle-income nations group is represented by the green color in the third lower-level layer. Thirty-three countries were covered in this category. In terms of the MVA and ECI, they were on the third level. Because they were in the lower-middle-income bracket, their results reflected their degree of development. Similar trends had been seen in the case of Africa, as depicted in the figure. As indicated by the orange color, the majority of countries fell into the lower middle and low-income brackets. The majority of them had lower ratings in both measures. The overall trend of these four classifications of countries based on income levels, MVA and economic complexity index was positive and growing. The tendency has significant implications in that the accumulation of knowledge led to the diversification of the expansion of the manufacturing sector, which in turn led to a significant contribution to fabrication production and then MVA.

Economic and political factors influencing sector development

We identified in the previous discussion that the MVA share of GDP has performed differently in low, middle and high-income nations. Numerous direct and indirect

Table 2. As a percentage of GDP, FDI and credit access to the private sector.

Countries Group	FDI % GDP				Credit Access to private (% GDP)			
	1980	2000	2010	2019	1980	2000	2010	2019
Low income	-0.01	0.82	0.30	0.32	8.2	7.0	10.7	12.2
Lower middle income	0.03	0.01	0.71	0.76	20.2	27.2	42.3	45.2
Upper middle income	0.13	0.33	1.28	0.40	42.0	59.8	77.2	123.3
High income	0.63	4.88	3.29	1.78	84.2	155.9	144.1	147.3

Source: Author computation based on WDI (This data avalaible https://databank.worldbank.org/reports.aspx?source=2&series=NY.GDP.MKTP.KD.ZG&country=, last accessed 6/8/2021)

Table 3. Estimates of government effectiveness, political stability and regulatory quality.

Country group by the level of income	Average government effectiveness: Estimate			Political stability and absence of violence/terrorism: Estimate			Regulatory quality: Estimate		
	1996	2006	2019	1996	2006	2019	1996	2006	2019
Low income	-1.121	-1.089	-1.190	-1.13	-0.96	-1.14	-1.112	-1.045	-1.09
Lower middle income	-0.476	-0.649	-0.563	-0.28	-0.46	-0.40	-0.474	-0.651	-0.55
Upper middle income	-0.23	-0.26	-0.16	-0.15	-0.21	-0.13	-0.205	-0.254	-0.30
High income	0.981	1.024	0.94	0.79	0.80	0.75	1.01	0.01	0.92

Sources: Author computation based on WGI data (Sources for analyses; https://databank.worldbank.org/source/worldwide-governance-indicators, last accessed 6/8/2021).

political and economic factors contribute to the disparities in income-based performance. Among these fundamental factors are economic reasons such as the availability of local private credit to the sector, net FDI outflows, gross fixed capital formation, agriculture value-added and trade. Among the political factors are governance effectiveness, political stability, regulatory quality estimation and others. Let us explain the role of the factors using three examples: FDI net inflow and national access to credit to the sector as economic factors and political factors such as political stability and absence of violence, governance effectiveness and regulatory quality estimates have been included in Tables 2 and 3. These economic indicators have been displayed in Table 2 from 1980 to 2019, to examine the trend over time based on income level. In terms of FDI, low-income nations received -0.01, 0.82, 0.30 and 0.32% of their GDP in 1980, 2000, 2010 and 2019, respectively. The performance has been so poor and it has been a consistent pattern from 2010 to 2019. Similarly, in the same period, these countries' credit to private was 8.2, 7.0, 10.7 and 12.2% of the GDP. In the case of lower-middle-income countries, roughly 0.03, 0.01, 0.71 and 0.76% of FDI from GDP have been achieved. Similarly, the performance of national credit to the private sector percentage of GDP was 20.2, 27.2, 42.3 and 45.2% in 1980, 2000, 2010 and 2019, respectively. In both indicators, countries lower-middle-income, achieved well than the low-income group. Similar patterns have been identified in the group performance of upper-middle and high-income nations in both indicators. As a result, we can conclude that limited credit availability and poor net FDI inflow performance are among the causes of poor MVA share performance in low-income countries around the world. Political issues can either help or hinder the development of industrial value-added and output export. The income level classification of countries was used to examine these indicators. Using World Bank global governance indicators, 28 low-income nations, 50 lower-middle-income countries, 56 upper-middle-income countries and 70 high-income countries were identified. The figures in the table represent the average performance of these countries throughout the specified period. In 1996, 2006 and 2019, the average government effectiveness in low-income nations was -1.12, -1.09 and -1.19, respectively. Over the last 20 years, the performance has been almost constant and very low when compared to other groups. Similarly, the performance of the lower-middle-income governance effectiveness index was -0.48, -0.65 and -0.56 for the same period. The achievements have been higher than those of the low-income group; however, this varies from time to time. While the upper-middle-income countries performed -0.224, -0.257 and -0.160 index, the former two categories of countries performed better. Whereas high-income countries achieved 0.98, 1.02 and 0.94 scores, the rest achieved the lowest. The government effectiveness achievements of these income-grouped countries are directly related to the MVA share as shown in Figure 1. The performance of various income categories has been consistent with what we've identified

Table 4. Summary of statistics.

Variable	Observations	Mean	Std. Dev.	Min	Max
C_id	2,070	35	19.9213	1	69
Year	2,070	2004.5	8.657533	1990	2019
MVA	1,997	12.37191	7.383631	0.2326077	51.0151
MVA_lag1	2,070	1034.5	597.7018	0	2069
AV	2,046	24.32184	12.83552	2.860718	79.04237
CA	1,980	20.9994	18.96557	0	137.9121
ME	1,860	29.52349	28.40021	0	97.27158
FC	1,991	13.74097	5.819058	0.9112346	43.47921
TO	2,042	66.96436	37.8552	-50.9374	347.9965
ID	2,056	52.10927	655.4498	-29.17246	26765.86
GP	2,063	1321.865	970.4978	101.59	4828.626
GE	1,658	-0.7097726	0.7563865	-2.279422	10.56658

Source: Author's computation using Stata software version 14.

here. The same pattern has been detected in estimates of regulatory quality, stability political and the nonappearance of violence. Therefore, these political factors have a direct impact on manufacturing progress; when these indicators raise MVA share, the latter performance also increases; when the former indicator declines, the latter performance decreases. The global manufacturing sector development lessons confirm the existence of positive correlations between these variables.

Low and lower middle income nations MVA determinant factors

As demonstrated in the descriptive analyses subsection of this article, the shapes of fabrication output have stagnated in many nations, particularly in low-income groups. Thus, the study used dynamic panel data to analyze key determining factors that affect product development. To identify the major determinant factors for MVA share to the percent of GDP, the study estimated using the GMM to analyze the panel model for 69 low and lower-middle-income nations from 1990 to 2019, according to World Bank income-based classifications (World Bank, 2020). The countries were preferred based on income levels and data availability appropriate to the study's objectives. This study aims to estimate the relationship between multiple political and economic variables regressors and MVA using the one-step system GMM empirical model.

Empirical estimations and discussion

To analyze the properties of the data for the empirical regression, there is a summary of statistics for the dependent and regressor variables. As shown in Table 4, the statistical summary includes the number of observations, standard deviation, mean, maximum and minimum values. Before moving on to empirical findings and debates, the study provides some key descriptive statistics for the model variables. The variable observations range, with the lowest observation being governance effectiveness estimate (GE) at 1,658 and the largest being the first lag of MVA percent of GDP (MVA_lag1) at 2,070. The other variables fall somewhere in the middle. The mean values in the majority of the variables are greater than the standard deviations. This implies that each country's performance has not been broadly scattered around the mean. As seen in Table 4, the average of each variable varies, with varying minimum and maximum values. The standard deviations of variables such as the first lag of MVA percent of GDP (MVA_lag1), inflation GDP deflator annual percent (ID) and GDP per capita constant 2010 US$ (GP) are very large, indicating the heterogeneity of our panel data, possibly due to differences in country performance. While the standard deviations for government general final consumption spending as a % of GDP (FC), MVA percentage of GDP (MVA) and agriculture value-added percentage of GDP (AV) are 5.8, 7.4 and 12.8, respectively. This suggests that the data for these variables have relatively low deviations.

Correlational matrix

Table 5 shows the correlational matrix results. The link between variables is explained by correlation (r). As shown in the outcomes report, the correlation coefficient between regressors and reliant MVA (percentage of GDP) variables were validated. The table shows the degree and direction of the correlation between the variables. Some of the indicators tend to adhere to a

Table 5. Correlational matrix of the variables star (0.05) sig.

Variable	MVA	MVA_lag1	AV	CA	ME	FC	TO	ID	GP	GE
MVA	1									
MVA_lag1	-0.0619*(0.0056)	1								
AV	-0.2276* (0.0000)	0.0015(0.9458)	1							
CA	0.0758* (0.0009)	0.1174* (0.0000)	-0.4319* (0.0000)	1						
ME	0.2983* (0.0000)	0.0458(0.0484)	-0.2176* (0.0000)	0.3949* (0.0000)	1					
FC	-0.0305 (0.1810)	0.0600* (0.0074)	-0.2727* (0.0000)	0.1097* (0.0000)	-0.1324* (0.0000)	1				
TO	0.0174 (0. 4405)	0.0831* (0.0002)	-0.2329* (0.0000)	0.2675*(0.0000)	0.0500* (0.0322)	0.1822* (0.0000)	1			
ID	-0.0209 (0.3512)	0.0218 (0.3221)	0.0661* (0.0028)	-0.0561* (0.0125)	-0.0348 (0.1353)	0.0147 (0.5110)	-0.0230 (0.3000)	1		
GP	0.2207*(0.000)	-0.0209 (0.3420)	-0.6289* (0.0000)	0.4825* (0.0000)	0.1870* (0.0000)	0.1889* (0.0000)	0.3091* (0.0000)	-0.0296 (0.1801)	1	
GE	0.0266 (0.2885)	-0.0160 (0.0000)	-0.1782* 0.0000)	0.2712*(0.0000)	0.1549* (0.0087)	0.0656* (0.0087)	0.0357(0.1490)	-0.0700* (0.0045)	0.2209* (0.0000)	1

Source: Author's computation using Stata software version 14.

priori assumptions, while others do not. As shown in Table 5, independent variables such as CA, ME, TO, GP and GE have a weak positive correlation with MVA. On the other hand, MVA_ lag1, AV, FC and ID variables are inversely associated with MVA share and have a weak correlation to MVA. This means that neither positive nor negative association situations have a substantial problem with multicollinearity, as the pairwise association coefficient for any of the variables was determined to be more than 0.80 (Gujarati, 2003). The Stata output also displays the P-value test, which determines whether the correlation is statistically significant or not. Some variables, such as the first period lag of MVA, AV, CA, ME and GP, have a very low less than 5% level of significance. This suggests that these variables are significant. This implies that these measures forecast the likelihood that these variables have a non-zero relationship.

Regression results and interpretations

As a result, Tables 6 and 7 present the outcomes of the models estimated respectively. As previously stated, the study used both political and economic aspects to determine the causes of the MVA share of GDP. According to the findings, one political factor has a positive association with the dependent variable. It does not, however, have a significant correlation with the dependent variable. While among economic determinants, manufacturing exports and GDP per capita (constant 2010 US dollars) have had a significant impact on MVA with a 5% significant level in the short run, on average cetris paribus. In terms of the association direction, manufacturing exports and GDP per capita have a positive relationship with the dependent variable. While, at a 5% level of significance, the coefficient of local credit to the private has an adverse impact on MVA. The coefficients of these variables confirm that, on average cetris paribus, a percentage change rise in credit to the private sector as a percent of GDP is related to a 0.281% decrease in the manufacturing sector in the short run at the specified level of significance. In the case of short-term credit, less reap is expected to benefit the manufacturing sector. This research identifies is in accord with the findings of a study conducted on Egyptian firms that found that limited credit access to the export market reduces export participation (Kiendrebeogo and Minea, 2013). While disagree with studies examining the effect of credit availability on MVA in Kenya, Africa, South Asia and Nigeria using panel data found that it had a considerable positive influence on it (Maroof et al., 2018; Saidat and Wasiu, 2019). In the case of manufacturing exports, a percentage increase in this variable is related to a 0.207% increase in MVA at a 5% significant level, assuming all other variables remain constant. This finding has theoretical and empirical foundations, implies that increased export encourages more production and is also consistent with a study conducted in China (Sahoo and Bhunia, 2014). Similarly, a dollar rise in GDP per capita increases the MVA share of GDP by 0.0025% in the short run at a 5% significant level, on average cetris paribus. This indicates that increased income leads to increased capital accumulation, investments, innovation and improved industrial development. This finding agrees with the study of economic variables such as per capita income having a

Table 6. MVA estimation using one-step system GMM in the short-run.

Variable (code)	Blundell-Bond (one-step)	Variables (code)	Blundell-Bond (one-step)
MVA _lag1	0.00285 (0.61)	FC	-0.202 (-0.56)
AV	-0.0817 (-0.75)	GE	0.781 (0.21)
CA	-0.281* (-2.06)	TO	0.0103 (0.41)
ME	0.207* (2.34)	ID	-0.01981 (-1.25)
GP	0.00254* (2.25)	Constant term	10.35 (1.190)
Number of countries (group) /Instrument	60/56	Year dummies	Yes
Observations (N)	1281	AR (2)	0.481
F- statistics	**22.68 (prob)= 0.000**	**Hansen test**	**0.547**

t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001. The values for the Hansen test, Arellano-Bond test for second-order serial correlation AR (2) and test for first-order serial correlation AR (1) are probability values.
Source: Author computation with Stata 14 statistical package.

Table 7. MVA estimation using one-step system GMM in the long-run.

Independent variable (code)	Blundell-Bond (one-step)
CA	-0.2816419* (-2.06)
ME	0.2071232* (2.34)
GP	**0.0025447* (2.25)**

Notes: t-statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001
Source: Author computation with Stata 14 statistical package.

meaningful impact on the fabrication progress of South Asia (Jongwanich and Magtibay-Ramos, 2009; Ejaz et al., 2016);while disagreeing with an empirical study conducted in Niagara that found that income per capita did not affect sector development (Saidat and Wasiu, 2019). The Arellano-Bond tests for the AR (2) second-order autocorrelation yielded a probability of 0.481. It indicates whether or not it shows serial correlation. Because the outcome is significantly greater than the range of the significant level, this model is not affected by serial correlation. The number of instruments used in the GMM system is 56, which is slightly less than the number of countries (group) 60, while the Hansen test is used to determine the validity of the instrumental variables and the result is 0.547, which is slightly higher than the validity standards suggested by Roodman, 2009 as a rule of thumb. Nonetheless, the test result is within an acceptable range. The model's joint significance is confirmed by F- statistics (Table 6). Only the significant variables have been estimated and presented in Table 7 for the long-run association of the dependent and independent variables. Credit to the private sector, as seen, has a negative association with the dependent variable. At the 5% significant level, a percentage rise in this independent variable is associated with a negative 0.28% increase in MVA in the long term, ceteris paribus. It has a similar effect in the short run. In the case of the long-run, this empirical finding disagrees with examining the effect of credit availability on MVA in Kenya, Africa, South Asia and Nigeria using panel data found that it had a significant positive influence on it (Samouel and Aram, 2013; Saidat and Wasiu, 2019). Whereas, in the long run, at the 5% significant level, a percentage rise in manufacturing exports is associated with a 0.207% increase in MVA. It has the same impact as the short run. It also agreed with the outcomes of a study performed in China to recognize the factors influencing manufacturing development (Sahoo and Bhunia, 2014). Similarly, given other factors constant, a dollar rise in GDP per capita is associated with a 0.0025% increase in the dependent variable in the long run at the 5% significant level and has the same effect in the short run. This is also consistent with South Asian empirical findings (Ejaz et al., 2016). The empirical findings were compared to the study hypotheses. The independent variables CA, ME and GP have a significant impact on MVA, implying that these variables are skewed in favor of the hypotheses, while the study hypothesis was rejected by remined variables.

CONCLUSION AND POLICY IMPLICATIONS

The goal of this article was to look into the underlying causes of poor performance as well as the factors that influence MVA share. Then, draw conclusions and make policy suggestions for sector advancement. Finally, we can draw the following conclusions based on the study findings. Overall trend assessments of manufacturing

development revealed that as income levels rise, the likelihood of having a significant percentage of MVA rises as well. This implies that increased income and increased manufacturing growth are positively related. The level of economic complexity and manufacturing progress are directly related to a country's current and future economic growth. Low-income countries' average value-added share has been declining in terms of MVA share by income level; while lower middle income has been rising. The multi-country study to determine the causes and determinants of MVA using dynamic panel data revealed that the shapes of fabrication output have stagnated in many countries, particularly in low-income groups. In both the low and lower-middle income categories, MVA as a share of GDP has remained nearly constant over time. In these countries, FDI influxes as a percentage of GDP remain stable, with a modestly increasing trend. As a result of the analyses, it is reasonable to conclude that poor FDI performance has been one of the primary reasons for low MVA. Government effectiveness is viewed as a proxy measure for industrial policy management capabilities. When compared to other competitors like low income nations, lower-middle-income groups have a higher average performance. The results of the one-step system GMM regression confirm that only economic determinants, such as manufacturing exports and GDP per capita, have a significant direct impact on MVA, whereas the coefficient of credit to the private sector has an inverse impact in both the long and short run. These empirical findings are largely supported by the theoretical and empirical research discussed this study. Policy implications, as a result, policy interventions are required to increase income and fabrication exports, thereby increasing MVA and credit access for firms in low and lower-middle-income countries should take these findings into account.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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