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Global Value Chain Participation and Inclusive Growth in Sub-Saharan Africa

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Abstract

Global value chain (GVC) participation has been identified as one of the means by which developing countries can attain inclusive growth yet little attention has been paid to it in sub-Saharan Africa (SSA). Motivated by the dearth of studies on SSA, we investigate the effect of GVC participation on inclusive growth for 19 SSA countries for the period 1991 to 2017, using the system GMM estimator. The results show that GVC participation drives inclusive growth through employment creation. We find that though SSA's foreign value addition is less than its domestic value addition, the former's impact on inclusive growth is higher than that of the latter. We recommend that policymakers support downstream industries to acquire technologies while incentivizing and attracting upstream industries into their countries.

Keywords: Global Value Chain, Inclusive Growth, Domestic Value Added, Foreign Value Added, Sub-Saharan Africa

JEL Classification: F14; F15; F43; F6; O4, Q55

1.0 Introduction

Sub-Saharan Africa (SSA) has seen a steady economic growth in recent times. Available evidence shows that the region achieved annual growths of 1.3 percent, 2.6 percent and 2.7 percent in 2016, 2017and 2018 respectively (United Nations 2020). In addition, growth in the region is expected to rise from 3.2 percent in 2019 to 3.6 percent in 2020 (IMF 2020). Despite all this, growth in the region still lags behind that of North Africa which recorded growth rates of 4.0 percent, 2.6 percent and 3.4 percent in 2017, 2018 and 2019 respectively and is projected to grow by 3.6 percent in 2020 (United Nations 2020). The higher GDP growth in the North African sub-region is mainly due to Egypt's strong growth momentum (African Development Bank 2019). Apart from South Asia, East Asia and North Africa, the SSA economy has outperformed other developing economies like those of Western Asia as well as Latin America and the Caribbean, and Western Asia (United Nations 2020).

Notwithstanding this relative improvement in growth, remarkable income inequality still remains in the region (see, Alvaredo et al. 2018). According to Ravallion and Chen (2019) and the United Nations (2020), the share of the population of SSA living in extreme poverty has risen in the past few decades; a situation which is contrary to that of other developing regions like Asia. This is surprising, given the fact that the SSA has grown steadily over the period. With its promising growth potential (United Nations 2020), SSA is still home to ten out of the nineteen most unequal countries in the world (Odusola et al. 2017).

These inequalities result in a number of undesirable social and economic conditions. They disrupt social solidity, create political instability, adversely affect investment, obstruct economic growth and diminish the impact of growth on poverty reduction (Aoyagi and Ganelli 2015; Kakwani and Son 2008). It is for these reasons that policymakers are calling for a

concerted effort aimed at equitable distribution of the benefits of economic growth and have, therefore, set for themselves a goal to reduce inequalities within and among countries (Sustainable Development Goal 10). As Anand, Mishra, and Peiris (2013) argue, the equitable distribution of income or benefits gained from economic growth triggers inclusive growth

Inclusive growth thus encompasses economic growth and equity in the distribution of benefits (Aoyagi and Ganelli 2015). In this chapter, we adopt a macro perspective and operationalize inclusive growth as growth in income and equitable distribution of income gained from growth. Earlier studies have identified a number of drivers of inclusive growth. One of these being the income level of a country. It is argued that as low-income countries grow with fewer people finding employment in high-paying jobs, income inequality rises and inclusive growth worsens. However, as the economy expands and opportunities abound for the masses, income inequality diminishes and growth becomes more inclusive. Other determinants of inclusive growth are investment in infrastructure, government spending, financial deepening, fiscal redistribution, inflation, output volatility, and unemployment. According to Anand, Mishra, and Peiris (2013) and Aoyagi and Ganelli (2015), these factors open up opportunities for people to be gainfully employed to contribute to economic growth and share in the benefits of growth. Sources of macroeconomic instability such as Inflation and output volatility, on the other hand, are found to retard inclusive growth (Aoyagi and Ganelli 2015). Another factor that has gained attention in the literature as a driver of inclusive growth is global value chain (GVC) participation (Anand, Mishra, and Peiris 2013). GVC refers to the fragmentation of the production process across different countries (Saito, Ruta, and Turunen 2013). GVC is also defined as the 'trade in value added' of an economy. "Trade in value added describes a statistical approach used to estimate the sources of value that is added in producing goods and services"

(Petersburg 2013, p. 9). It acknowledges the fact that global value chains imply that a country's exports at certain times rely on intermediate input imports and, in turn, value added by upstream industries in other countries. The trade in value added thus traces the value added by each country in the production chain.

There are two pathways through which GVC participation drives inclusive growth. First, GVC participation creates employment and incomes for people in countries by helping firms in participating countries to gain access to wider markets (World Bank 2019). This means that when a country participates in GVC, existing firms acquire new technologies to enhance both productivity and product quality. In line with this, subsidiary firms emerge to provide services like sorting, assembling, and distribution; all of which create employment, increase incomes, reduce poverty, and thus promote inclusive growth. Second, participation in GVC Has the potency of increasing the value addition of participating countries thereby supporting inclusive growth if the gains are shared equitably (UNCTAD 2013).

According to UNCTAD (2013), there are two main ways through which countries participate in GVC: (1) through domestic value addition, and (2) through foreign value addition. Domestic value addition involves the value added to exports of commodities that are originally produced by the exporting country to be used as intermediate inputs by other firms in other countries. Foreign value addition on the other hand, involves countries importing primary or intermediate inputs from other countries and adding value to them (by converting them into other intermediate or final goods) for export. In whichever form GVC is pursued, evidence shows that, relative to non-GVC participating countries, countries that engage in GVC are more inclusive as they tend to: (1) grow faster (Saito, Ruta, and Turunen 2013; Altomonte, Colantone, and

Bonacorsi 2018), (2) provide more durable employment opportunities, and (3) reduce poverty (World Bank 2019).

All countries in the world, in one way or the other, engage in GVC. However, compared to other regions, the participation of SSA in GVC is low. This is more so in the case of foreign value addition. This situation is due to the fact that there are relatively few downstream industries in SSA to convert imports from other economies into semi-finished and finished goods. As shown in Table 32.1, in 2017, the GVC participation rates of developed economies, developing countries, and the European Union were all higher than that of SSA (UNCTAD 2019). SSA's GVC participating industries are largely downstream and agriculture-based and thus participate in domestic value additions and export to upstream industries in the advanced and emerging economies. More worrisome is the fact that SSA lacks adequate technology to either boost productivity in their downstream industries or convert its commodities into semi-finished and finished goods for exports.

Table 1: Global value chain participation rate (%), by region, 2017

Region	Foreign value added (FVA)	Domestic value added (DVA)	Global value chain participation rate
Developing Economies	28	28	56
Africa	14	41	55
Sub-Saharan Africa	14	33	47
Asia	31	28	59
Transition Economies	13	44	57
Least Developed Countries	9	32	41
Developed Economies	32	28	60
European Union	38	27	65

Source: Authors' construct, 2020

To the best of our knowledge, even though GVC participation is the new face of global investment, production and trade (Sakamoto and Sung 2018), its effect on inclusive growth has

not been explored in SSA. Though there is no contention that, studies have been done on GVC participation on the one hand, and inclusive growth on the other hand, knowledge on whether or not the GVC participation and inclusive growth nexus holds in the SSA remains a void in the growth literature. Also, our focus on SSA is informed by policy as the region continues to remain highly unequal in terms of income distribution despite remarkable economic and social progress over the last two decades (see, UNTAD 2019). For instance, real per capita income in SSA has risen by 50 percent and infant mortality rate has fallen from 108 to 55 per 1000 live births between 2000 and 2018 (Zhang 2018). With limited manufactural and service export base as well as large pool of labor, SSA countries have a golden opportunity of reducing the high unemployment and income inequality trends through GVC participation (see, Allard et al. 2016). By specializing in a particular segment of the production chains, each participating country gets an opportunity to add to the production of goods and/or services and in turn increases its value addition to exports. Also, given that the composition of GVC participation in SSA differs from that of other economies (see, Table 32.1), it can be inferred that the effect of GVC participation on the different economies would differ.

The goal of this Chapter, therefore, is to estimate the effects of GVC participation on inclusive growth in SSA. We also explore channels through which GVC affects growth and proffer policy measures to enhance SSA's participation in GVC. It is hypothesized that participation in GVC has a positive effect on inclusive growth in the selected SSA countries. The uniqueness of this chapter lies in the fact that it is the first to examine the effects of the components of GVC participation on inclusive growth in the African context.

The rest of the chapter is organized as follows: The next section focuses on methodology. The last two sections provide discussion of the results, followed by conclusion and policy recommendations.

2. Methodology

Theoretically, participation in GVC contributes to inclusive growth through direct job creation and economic growth. GVC participation is an avenue for the employment of both skilled and unskilled labor, particularly for women if the economic activity is a labor-intensive one, thereby engendering inclusive growth. In developing economies like those of SSA, engaging in capital-intensive activities, on the other hand, limits employment growth and worsens exclusivity. As a result of technological diffusion associated with GVC participation, firms become more productive— contributing to a faster rate of economic growth. The expansion of the economy in turn creates avenue for more employment opportunities and rising incomes (UNCTAD 2013; World Bank 2019).

2.1 Empirical Strategy

We examine the effect of GVC participation on inclusive growth by specifying a baseline model as:

$$ln\,INGRW_{it} = \theta + ln\,INGRW_{i,t-1}\,\delta + \ ln\,GVC_{it}\,\pi + X_{it}\beta + +\propto_i + \mu_t + \varepsilon_{it} \ldots\ldots\ldots (1)$$

Where $ln\,INGRW_{it}$ is the log of inclusive growth for country i in year t, calculated as the simultaneous growth of both income and equity (Appendix A provides details on how inclusive growth was calculated); $ln\,INGRW_{i,t-1}$ is the inclusive growth lag representing the initial condition; $ln\,GVC_{it}$ is the log of GVC participation; X_{it} is a matrix of control variables for

country i in year t; θ is a scalar; β and δ are vectors of parameters; $\propto_i$ is country-specific fixed effects; μ_t is time effects; whereas ε_{it} is the general stochastic disturbance term.

We estimate Equation (1) using the system generalized method of moments (GMM) estimator. Unlike the traditional cointegration and ordinary least squares techniques, this approach resolves the endogeneity problem caused by the lagged dependent variable and the unobserved $\propto_i$ usual in growth models. Our parameter of interest, π, measures the effect of GVC participation on inclusive growth and forms the basis of our hypothesis. From Equation (1), we specify the general system GMM framework as:

$$ln\,INGRW_{it} = ln\,INGRW_{i,t-k}\sum_{k=1}^{p}\vartheta\delta + \ ln\,GVC_{it}\,\pi + X_{it}\beta + \propto_i + \mu_t + \varepsilon_{it} \ldots\ldots\ldots (2)$$

We also test the hypothesis that GVC participation has both direct and indirect effects on inclusive growth. To do this, we estimate another equation using the GMM dynamic pooled estimator as in the case of Equation (2) with an additional covariate which is an interaction between GVC participation and GDP growth (GDPG). A significant coefficient of this interaction will mean that the effect of GVC participation on inclusive growth is mediated by income growth. We observe bi-causality between the measures of GVC participation and the dependent variable, inclusive growth (see details on test for bi-causality in Appendix B). This endogeneity problem is external to the specification of our GMM model. To solve this problem, we construct an instrument (INT) from an estimated gravity equation (Altomonte, Colantone, and Bonacorsi 2018). Details on the construction of the instrument is presented in section 2.2.

2.2 Gravity Model Specification

Given that, the behavior of the stochastic disturbance term in any regression model mimics that of the dependent variable, in theory, the measures of GVC participation correlates with the disturbance term in our regression. This therefore biases the coefficients of the measures of GVC participation. To address this challenge, we construct an exogenous instrumental variable from an estimated gravity model with value additions to exports from country i to country j as the dependent variable (Altomonte, Colantone, and Bonacorsi 2018). The difference between the value addition to export (which is the dependent variable) in our gravity model and that of the measures of GVC participation in our empirical strategy lies in the fact that the value addition in the gravity model is value addition to export from one country to another while the GVC participation in our empirical strategy is value additions to exports from country i to the rest of the world. The gravity equation is specified as:

$$lnValue_{ijt} = lnPop_{it} + lnPop_{jt} + lnDistance_{ij} + Contiguity_{ij} + Landlocked_{j} + \varepsilon_{it} \ldots (3)$$

From Equation (3), value added to exports from country i to country j at time t (i.e $lnValue_{ijt}$) is said to be dependent on the natural logs of the populations of both countries at time t and time invariant dyadic variables: $lnDistance_{ij}$ is the log of the simple distance between the capitals of country i and country j in kilometres; $Contiguity_{ij}$ is a dummy taking value '1' if country i and country j share a border and '0' if otherwise; $Landlocked_{j}$ is a dummy with the value '1' if country j is landlocked and '0' if otherwise. We obtained data on the value additions to exports from the UNCTAD-Eora Global Value Chain Database. Data on the populations of the countries

were obtained from the World Development Indicators (WDI) while data on dyadic variables was sourced from the CEPII data in the GeoDist Database.

We then use only the deterministic part of Equation (3) as our exogenous instrument for the endogenous measures of GVC participation. We argue that though portions of value additions to exports from one country to another that are explained by the sizes of economies (population), how far the countries are apart, and other dyadic factors might significantly affect GVC participation, its value will be too small to have a significant effect on the GDP (and hence inclusive growth) of the exporting country. This is evident in observing a not significant coefficient of correlation between our instrument (INT) and inclusive growth (INGRW) as shown in Table 32.4. We however observe that our instrument and all the measures of GVC are strongly correlated (p-value < 0.01). Given these two observations, we conclude that our instrument is good. The gravity model estimates are presented in Appendix C.

3. Data Description

3.1 Data Sources

We employ a balanced panel data for nineteen (19) SSA countries for the period 1991 to 2017. The choice of countries is based entirely on data availability for a sufficiently long period. The observations per country is twenty-seven (27). SSA countries selected for our analysis are listed in Table 32.2.

Table 32.1: **Selected countries**

Angola	Gabon	Niger
Botswana	Gambia	Nigeria
Burundi	Ghana	Rwanda
Cameroon	Kenya	Senegal
Central African Republic	Madagascar	Seychelles
Chad	Mauritius	South Africa
Cote d'Ivoire		

Source: Authors' construct, 2020

We obtain data from three sources: the UNCTAD-Eora Global Value Chain Database, GeoDist Database, and WDI. The outcome variable, inclusive growth (INGRW), is measured as the growth in income and equity in income distribution, and is calculated following Anand, Mishra, and Peiris (2013). To obtain this measure, the product of the per capita income (PCI) and income equity index (IEI) for each country in a given year is estimated (see details in Appendix A). The equity index ranged from 0 to 1. An index of '0' means perfect inequity (i.e. only one person has all the income) while an index of '1' indicates perfect equity (i.e. income is shared equally to all persons).

The variables of interest are the three measures of GVC participation: domestic value added, foreign value added, and total value added. Domestic value added (DVA) is the value added to exports whose outputs are produced by domestic industries while foreign value added (FVA) is the value added to exports whose outputs are produced by foreign industries. Total value added (VA) is the sum of the domestic value addition and foreign value addition. Data on the three measures of GVC participation are obtained from the UNCTAD-Eora Global Value Chain Database.

Additionally, to capture the economic structure of the countries under consideration, we use share of employment in agriculture as a percentage of total employment (AGRIC) as a control variable. Similarly, we use gross fixed capital formation as a percentage of GDP (GFCF) as a proxy for the level of fixed investment in the countries. Data on both AGRIC and GFCF are obtained from the WDI. It is important to control for the share of employment in agriculture because it reflects the importance of the agricultural sector in employment and income generation for the poor, given that it forms more than 50 percent of employment in SSA (Timmer 2002; Hasan and Quibria 2004). The importance of controlling for GFCF in our model

stems from the fact that SSA countries are developing and capital formation is essential for growth (Kodongo and Ojah 2016). Also, spending on social and economic infrastructure does not only provide a conducive environment for businesses to thrive but also creates opportunity for people to participate in economic activity and benefit from the resultant growth (Ali and Son 2007).

3.2 Descriptive Statistics

Table 32.3 shows the summary statistics of the variables in our study. For instance, the average value of GVC participation is US$ 5,747,109. This is less than US$ 116,000,000 of high income and US$ 34,300 of emerging economies (Petersburg 2013).

Table 2: Summary Statistics of SSA, 1991 - 2017

Variable	Observation	Mean	Standard deviation	Minimum	Maximum
Income equity index	513	0.358	0.036	0.213	0.487
Per capita income (in US$)	513	5338.339	5999.849	496.084	26382.290
Inclusive growth (in US$)	513	1949.832	2273.340	105.433	10949.640
GDP growth	513	3.643	5.530	-50.248	35.224
Total value added (in US$)	513	5747109	16219758	34300	116000000
Domestic value added (in US$)	513	4941753	13515496	22400	94400000
Foreign value added (in US$)	513	804402.2	2801438	4870	21500000
Gross fixed capital formation	513	19.562	8.303	2.632	59.723
Employment in agriculture	513	52.981	24.863	4.600	92.842
Country-to-country value addition to exports	513	95.700	29.450	11.0441	148.318

Source: Authors' calculation using data from UNCTAD-Eora Global Value Chain Database, GeoDist Database, and World Development Indicators (WDI).

The average domestic value addition to exports is a little over six (6) times that of the average foreign value addition. The gap between foreign value addition and domestic value addition is common among all the selected 19 SSA countries (Appendix D). This partly explains the

region's low capacity to attract upstream industries. Since SSA economies are predominantly agriculture-based, most GVC industries are downstream and add very little to GVC. That is, SSA countries mostly exports products either in their raw states or after little processing to upstream industries in more advanced countries. Table 32.3 shows that the average capital formation in SSA is low, averaging around 20 percent of GDP during the study period. This suggests that these countries have low capital to invest in manufacturing, technology and other high growth-inducing ventures. The low capital formation thus leads to low investment in agricultural technology, which in turn results in low productivity in the agriculture industry (which accounts for more than 50% of total employment) poverty and inequality (Sembene 2015; Hickey, Moore, and Pellegrino 2001; Odusola et al. 2017).

The SSA sub-region is one of the most unequal regions in the world in terms of income distribution (Ravallion 2014; Ortiz and Cummins 2011). From Table 32.3, the average equity index for the selected SSA countries is 0.358. This low equity index confirms the big income gap reported by earlier researchers. According to the United Nations Office on Drugs and Crime (2005), the richest 10 percent in Africa earn 31 times more than the poorest 10 percent. The present chapter shows that the income gap is even wider in the SSA sub-region with even the most equitable country having an index lower than 0.5 (see, Table 32.3). The low-income equity in SSA implies that the real per capita income in SSA is, on the average, less than what is often reported. Put differently, the average share of national income that actually goes to a majority of the citizens is less than the per capita income value in official statistics. This is evident in Table 32.3, where the average per capita income among the 19 countries (US$ 5338.339) is almost thrice the average inclusive growth statistic (US$ 1949.832). The effect is that the regional and country specific economic pictures that are painted from GDP and per capita income statistics

perspectives are different from what is experienced by residents, which might consequently inform wrong policies and economic decisions.

A pairwise correlation analysis is carried out to inspect the correlation between variables and the results are reported in Table 32.4. The correlation coefficients between regressors (i.e. GVC, GFCF, AGRIC, and GDPG) are low (below 0. 5). This is evidence of no 'threat' of collinearity or multicollinearity in our empirical model.

Table 32.3: Correlation matrix for SSA, 1991 - 2017

CASE		INGRW	VA	DVA	FVA	GFCF	AGRIC	GDPG	INT
Dependent Variable	INGRW	**1.000**							
GVC	VA	**0.206**	**1.000**						
		(0.000)							
	DVA	**0.202**	**0.999**	**1.000**					
		(0.000)	(0.000)						
	FVA	**0.222**	**0.971**	**0.958**	**1.000**				
		(0.005)	(0.000)	(0.000)					
Control Variables	GFCF	**0.418**	**-0.087**	**-0.098**	**-0.030**	**1.000**			
		(0.036)	*(0.050)*	*(0.027)*	*(0.495)*				
	AGRIC	**-0.589**	**-0.406**	**-0.404**	**-0.402**	**-0.209**	**1.000**		
		(0.090)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*			
Other Variables	GDPG	**0.012**	**-0.013**	**-0.011**	**-0.025**	**0.186**	**-0.054**	**1.000**	
		(0.795)	*(0.767)*	*(0.811)*	*(0.576)*	*(0.000)*	*(0.221)*		
	INT	**-0.019**	**0.377**	**0.394**	**0.281**	**0.036**	**-0.124**	**-0.071**	**1.000**
		(0.664)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.422)*	*(0.005)*	*(0.110)*	

Source: Authors' calculation using data from UNCTAD-Eora Global Value Chain Database, GeoDist Database, and World Development Indicators (WDI).

Note: P-Values in parenthesis. For clearer understanding of the matrix, the variables are defined as follows: Inclusive growth (INGRW), total value added (VA), domestic value added (DVA), foreign value added (FVA), gross fixed capital formation (GFCF), employment in agriculture (AGRIC), GDP growth (GDPG), and instrumental variable (INT) which is the value addition to export from one country to another.

4. Regression Results

To examine the effect of GVC participation on inclusive growth in SSA, we regress the three measures of GVC participation together with our control variables on inclusive growth. Two regression estimates are presented in Tables 32.5 and 32.6. The former tests the hypothesis that GVC participation fosters inclusive growth in SSA while the latter investigates the pathways through which GVC participation affects inclusive growth in the SSA sub-region. In each of the models, the three measures of GVC participation are introduced into the models separately such that no two measures are used as independent variables in the same model. Total value added is used as the measure of GVC participation in the first model while domestic value added and foreign value-added measures of GVC participation are put into the second and third models respectively. The corresponding models are numbered (1), (2) and (3).

4.1 GVC Participation and Inclusive Growth in Sub-Saharan Africa

Our results show that all the measures of GVC participation foster inclusive growth in SSA (Table 32.5). This finding is consistent with findings on the effect of GVC participation on inclusive growth in some other parts of the world. For instance, Anand, Mishra, and Peiris (2013) have found that GVC participation impacts inclusive growth positively in emerging markets while Huang and Quibria (2013) provide similar findings using data on 74 foreign aid recipient countries. The effect of GVC participation on inclusive growth in SSA, though positive (as in the case of other economies), is small. From Table 32.5, even if SSA doubles its total value addition in trade, inclusive growth will, on the average, increase by only 0.7 percent.

Interpretation of the low impact of GVC participation on inclusive growth in SSA can be understood by examining our inclusive growth measure (see, Appendix A). Two possible interpretations are evident. First, GVC participation as a share of national income in SSA is too

small to cause a significant increase in per capita income (Petersburg 2013). Second, the distribution of the share of national income generated through GVC participation is done less equitably. Our discussion focuses on the second interpretation. GVC participation in SSA is largely through the production of primary commodities for further processing in upstream industries in other countries. According to the literature, GVC participation tend to impact highly on the inclusive growth of economies specializing in machinery, electronics, transportation, and other advanced manufactures and services (United Nations Industrial Development Organization 2015). Individuals in agrarian economies like SSA countries are therefore not able to benefit fully from GVC participation. The low GVC participation in SSA further explains the small coefficients of the measures of GVC participation (see, Table 32.2). GVC participation is expected to largely increase income equity and thus reduce poverty through employment. Given the low participation of SSA countries in GVC, the number of jobs created by GVC industries is low plausibly accounting for the non-inclusive growth trajectory in recent times.

Table 5: Results on GVC participation and inclusive growth in SSA, 1991 -2017

Dependent Variable: Log of inclusive growth			
	(1)	(2)	(3)
Log of inclusive growth (-1)	0.970***	0.971***	0.967***
	(0.009)	(0.009)	(0.010)
Log of gross fixed capital Formation	0.059***	0.057***	0.059***
	(0.010)	(0.010)	(0.012)
Employment in agriculture	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)
Log of total value addition for export	0.007*		
	(0.004)		
Log of domestic value addition for export		0.007*	
		(0.004)	
Log of foreign value addition for export			0.009*
			(0.005)
Diagnostics			
Number of observations	513	513	513
Country fixed effects	YES	YES	YES
Time effects	YES	YES	YES
Table 5 Continued			
Wald χ^2	4.91×10^6	4.88×10^6	3.00×10^6
[P-value]	[0.000]	[0.000]	[0.000]
Hansen test	5.88	5.90	5.45
[P-value]	[0.437]	[0.434]	[0.487]
AR(2)	-1.59	-1.60	-1.57
[P-value]	[0.112]	[0.110]	[0.117]

Note: Standard errors in parenthesis; * p<0.1; ** p<0.05; *** p<0.01

The impact of GVC participation in SSA, therefore, does not only depend on the level of share of GVC on exports but also largely on the number and quality of jobs created by GVC industries. This is more evident when one compares the effect of domestic and foreign value additions on inclusive growth in the SSA (see, Table 32.5). Per our results, foreign value addition has a relatively higher impact on inclusive growth. That is, though domestic value additions in all the SSA countries under consideration far outweighs their foreign value additions as we show in Appendix D, a percentage increase in foreign value addition has a higher effect on equitable income growth. This effect on inclusive growth stems from the fact that foreign value additions

are done by upstream industries whose firms are mostly able to contribute significantly to national income and provide quality and high paid jobs. Employees of these industries are therefore able to earn good income, which translates into the reduction of income inequality between these employees and high-income earning citizens. Also, the high national income gained can feed into social investments and protection to improve welfare and equity. It should however, be noted that this result leans itself to the potential of foreign value addition in propelling inclusive growth in SSA without controlling for the current growth path.

Given that SSA's GVC participation is largely through domestic value addition, one would have thought that it should have a greater impact on inclusive growth. Domestic value addition in SSA is mostly done by downstream agriculture and agriculture-related businesses, which are largely labor-intensive and thus provide low quality jobs. That is, even though domestic value chain addition creates employment and serves as a source of income to a far greater number of residents of SSA, the income earned by individuals is too small (due to low productivity) to significantly reduce income inequality.

4.2 Pathways of GVC Participation to Inclusive Growth in Sub-Saharan Africa

In this section, we analyze the pathways through which GVC participation affect inclusive growth in the selected SSA countries (see, Table 32.6). In the preceding section, we argue that GVC participation in SSA countries contributes less to inclusive growth due to the low capacity of the region to: (1) develop downstream activities and (2) attract more upstream industries to contribute more to economic expansion and employment creation. In this section, we discuss how GVC participation translates into inclusive growth in the selected SSA countries. We do this by interpreting the coefficients of the 'standalone' measures of GVC participation and also the

coefficients of the multiplicative interaction terms of the measures of GVC participation and GDP growth in Table 32.6.

Table 6: Results on pathways to inclusive growth in SSA, 1991 -2017

Dependent Variable: Log of Inclusive Growth			
	(1)	(2)	(3)
Log of inclusive growth (-1)	0.975***	0.976***	0.977***
	(0.011)	(0.010)	(0.017)
GDP growth	0.061***	0.057***	0.054***
	(0.011)	(0.010)	(0.018)
Log of gross fixed capital formation	-0.000	0.000	-0.005
	(0.006)	(0.006)	(0.006)
Employment in agriculture	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)
Log of total value addition for export	0.015***		
	(0.006)		
LnVA*GDPG	-0.004***		
	(0.001)		
Log of domestic value addition for export		0.014***	
		(0.005)	
LnDVA*GDPG		-0.003***	
		(0.001)	
Log of foreign value addition for export			0.016
			(0.011)
LnFVA*GDPG			-0.004*
			(0.002)
Table			
Diagnostics			
Number of observation	513	513	513
Country fixed effects	YES	YES	YES
Time effects	YES	YES	YES
Wald χ^2	7.44×10^6	7.56×10^6	8.25×10^6
[P-value]	[0.000]	[0.000]	[0.000]
Hansen test	3.40	3.36	3.16
[P-value]	[0.758]	[0.763]	[0.788]
AR(2)	-1.46	-1.46	-1.67
[P-value]	[0.143]	[0.145]	[0.094]

Note: Standard errors in parenthesis; * p<0.1; ** p<0.05; *** p<0.0.
LnVA, LnDVA, LnFVA, and GDPG represents log of total value added, log of domestic value addition for export, log of foreign value addition for export, and GDP growth respectively.

Our results show that GVC participation in SSA has a positive direct impact on inclusive growth but the indirect effect showed otherwise (i.e. coefficient of interaction term is negative). A positive direct impact means that, at a given level of economic growth, an increase in GVC participation creates more (quality) jobs for citizens, inducing equitable distribution of income. The negative indirect effect of GVC participation on inclusive growth as shown in Table 32.6, however, signifies that growth in national income due to GVC participation is not shared equitably. This boils down to the fact that a large share of growth in incomes in SSA countries due to increase in GVC participation comes from activities of or benefits some few rich citizens (Ortiz and Cummins 2011). Overall, we find strong empirical evidence that, given the current trend of economic growth in SSA, a 1 per cent increase in GVC participation induces inclusive growth by 0.0004 per cent (net effect). In addition, given the current growth trajectory in SSA, a percentage point increase in domestic and foreign value additions, increases inclusive growth by 0.003 per cent and 0.001 per cent respectively. This suggest that, per the structure of the economies we consider, if growth occurs at the backdrop of domestic value addition, inclusive growth increases faster than if it is driven by foreign value addition.

5.0 Conclusion and Policy Implication

Following our results, we conclude that GVC participation induces inclusive growth in the SSA. Though the region's foreign value addition is less than its domestic value addition, the inclusive growth effect of the former is higher than that of the latter. This is so because upstream industries, which are mostly involved in foreign value additions, provide quality jobs and thus higher incomes to their employees as compared to downstream industries, which engage in domestic value addition. Also, as compared to downstream industries, firms in upstream industries have higher contribution to economic growth due to their use of improved technology.

We also show that the effect of GVC participation on inclusive growth in SSA is as a result of employment creation and the resultant growth in incomes. Also, though GVC participation increases economic growth, the prosperity is not shared.

The implications are that policymakers in SSA should map out strategies/policies to boost inclusive growth. Governments can do this by providing incentives to attract upstream firms into their countries as these firms boost both economic expansion and sustainable employment opportunities. Given that a large number of employees in the SSA are in the downstream industries, equity and inclusive growth is likely to increase faster if productivity in these industries is enhanced. High productivity implies that these employees earn higher incomes, thus reducing income inequality. To this end, governments in SSA should invest in labor-intensive technologies, and if possible, subsidize their use to help boost productivity in the sector. More importantly, to realize inclusive growth, governments should increase their social protection and investment spending to vulnerable groups.

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Appendices

Appendix A: Measurement of Inclusive Growth by Anand, Mishra and Peiris (2013)

To integrate equity and growth in a unified measure, Anand, Mishra and Peiris (2013) proposed a measure of inclusive growth based on a utilitarian social welfare function drawn from consumer choice literature, where inclusive growth depends on two factors: (i) income growth; and (ii) income distribution. Similar to the consumer theory where the indifference curves represent the changes over time in aggregate demand, Anand, Mishra and Peiris (2013) decomposed the income and substitution effect into growth and distributional components. The underlying social welfare function must satisfy two properties to capture these features: (i) it is increasing in its argument (to capture growth dimension) and (ii) it satisfies the transfer property – any transfer of income from a poor person to a richer person reduces the value of the function (to capture distributional dimension).

A measure of inclusiveness is based on the concept of a concentration curve. Following Ali and Son (2007), Anand, Mishra and Peiris (2013) defined a generalized concentration curve, which they called social mobility curve, S^c, such that:

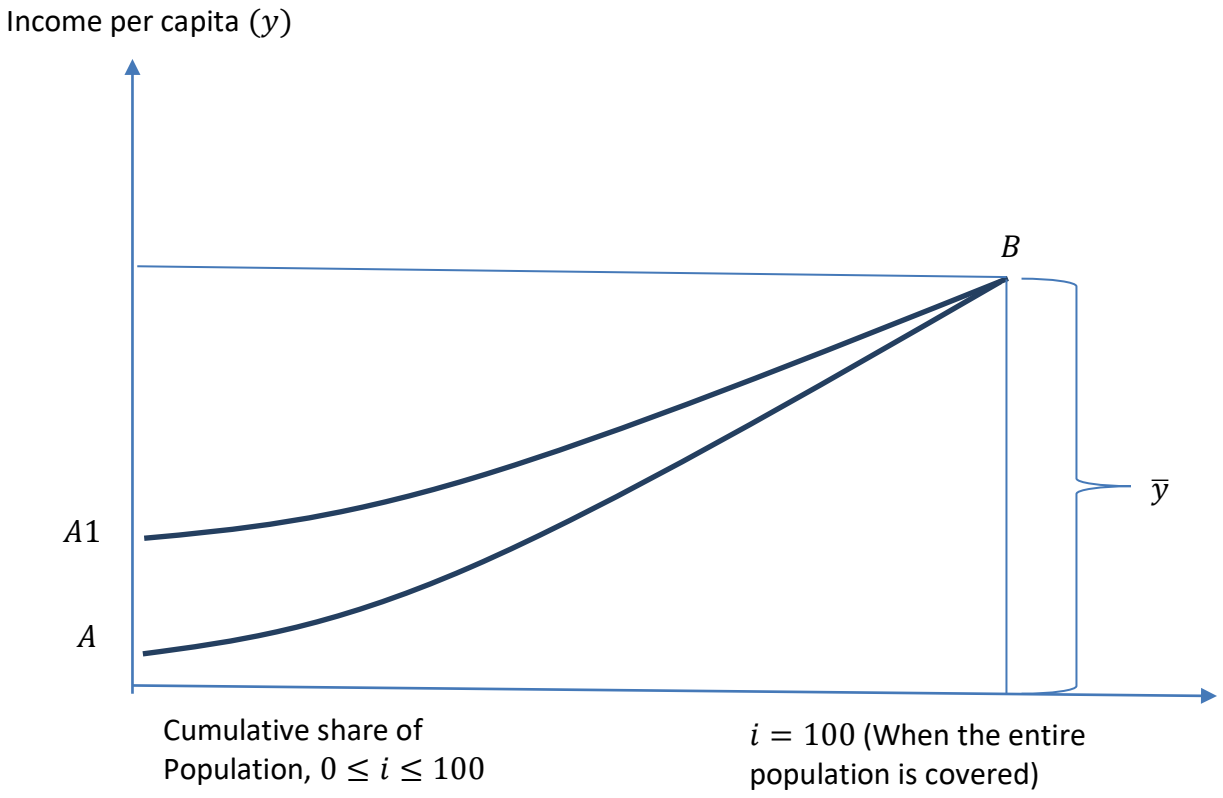
$$S^c \approx \left(y_1, \frac{y_1 + y_2}{2}, \dots\dots\dots, \frac{y_1 + y_2 + \cdots + y_n}{n}\right)$$

Where n is the number of persons in the population with incomes $y_1, y_2, \dots\dots, y_n$, where y_1 is the poorest person and y_n is the richest person. This generalized concentration curve is basically a cumulative distribution of a social mobility vector $S \approx (y_1, y_2, \dots\dots\dots, y_n)$ with an underlying

function $W = W(y_1, y_2, \dots\dots\dots, y_n)$ satisfying the two properties mentioned above to capture growth and distribution dimensions. Since S^c satisfies the transfer property, a superior income distribution will always have a higher generalized concentration curve. Similarly, since it is increasing in its argument, higher-income will also have a higher generalized concentration curve. As in Ali and Son (2007), the generalized concentration curves can be presented in continuous time to be more amendable to econometric analysis. The population is arranged in the ascending order of their income. Let $\overline{y}_i$ is the average income of the bottom i per cent of the population, where i varies from 0 to 100 and y_i is the mean income. Anand, Mishra and Peiris (2013) plotted $\overline{y}_i$ for different values of i (curve AB in Appendix A below). Curve AB represents a social mobility curve discussed above. Since a higher curve implies greater social mobility, growth is inclusive if the social mobility curve moves upward at all points. However, there may be degrees of inclusive growth depending on: (i) how much the curve moves up (growth); and (ii) how the distribution of income changes (equity). This feature of the social mobility curve is the basis of our integrated measure of inclusive growth. Thus, if two generalized concentration curves do not intersect, they could be ranked on social mobility (i.e. inclusiveness of growth). To illustrate the point made above, Appendix A depicts two social mobility curves with the same average income ($\overline{y}$) but different degrees of inclusiveness (i.e. different income distribution). Social mobility curve (A1B) is more inclusive than the social mobility curve AB, as the average income of the bottom segment of the society is higher.

APPENDICES

Appendix A: Social mobility curves



Source: Anand, Mishra and Peiris (2013)

To capture the magnitude of the change in income distribution, Anand, Mishra and Peiris (2013) used a simple form of the social mobility function by calculating an index (or social mobility index) from the area under the social mobility curve:

$$\bar{y}^* = \int_0^{100} \bar{y}_i \, di$$

The greater the $\bar{y}^*$, the greater is the income. If the income of everyone in the population is the same (i.e. if income distribution is completely equitable) then $\bar{y}^*$ will be equal to $\bar{y}$. If $\bar{y}^*$ is lower than $\bar{y}$, it implies that the distribution of income is inequitable. So, the deviation of $\bar{y}^*$ from

$\bar{y}$ is an indication of inequality in income distribution. Ali and Son (2007 use this feature of $\bar{y}^*$ and propose an income equity index (IEI) as:

$$\omega = \frac{\bar{y}^*}{\bar{y}}$$

For a completely equitable society, $\omega = 1$. Thus, a higher value of ω (closer to one) represents higher income equality. Rearranging,

$$\bar{y}^* = \omega * \bar{y}$$

Inclusive growth requires increasing$\bar{y}^*$, which could be achieved by: (i) increasing $\bar{y}$, that is increasing average income through growth; (ii) increasing the equity index of income, ω, through increasing equity; or (iii) a combination of (i) and (ii). Differentiating the above equation:

$$d\bar{y}^* = \omega * d\bar{y} + d\omega * \bar{y}$$

Where $d\bar{y}^*$ is the change in the degree of inclusive growth.10 Growth is more inclusive if $d\bar{y}^* > 0$. It also allows us to decompose inclusive growth into income growth and change in equity. The first term is the contribution of an increase in average income (keeping income distribution constant) while the second term is the contribution of changes in the income distribution (keeping the average income unchanged). Inclusive growth depends on the sign and the magnitude of the two terms.

Appendix B: Test for endogeneity (Bi-Causality) between inclusive growth and regressors for SSA, 1991 -2017

Dependent Variable:	Log of VA	Log of DVA	Log of FVA
lnVA (-1)	0.975***		
	(0.010)		
lnDVA (-1)		0.972***	
		(0.010)	
lnFVA (-1)			1.011***
			(0.012)
Log of inclusive growth	0.087***	0.094***	-0.020
	(0.023)	(0.023)	(0.035)
N	513	513	513

* p<0.1; ** p<0.05; *** p<0.01

Note: LnVA, LnDVA, LnFVA, and GDPG represents log of total value added, log of domestic value addition for export, log of foreign value addition for export, and GDP growth respectively. In each of the three (3) models, we controlled for Log of gross fixed capital formation (GFCF) and employment in agriculture (AGRIC); Standard errors in parenthesis. Statistical significance of the Log of inclusive growth shows bi-causality of GVC participation on inclusive growth.

Dependent Variable: AGRIC			
	(1)	(2)	(3)
AGRIC (-1)	1.002***	1.002***	1.004***
	(0.005)	(0.004)	(0.003)
Log of inclusive growth	-0.190	-0.159	-0.152
	(0.404)	(0.381)	(0.329)
N	513	513	513

* p<0.1; ** p<0.05; *** p<0.01

Note: AGRIC represents employment in agriculture (AGRIC). In each of the three (3) models, we controlled for log of gross fixed capital formation (GFCF), log of total value added, log of domestic value addition for export, log of foreign value addition for export respectively; Standard errors in parenthesis. Not significant coefficients of Log of inclusive growth shows there is no bi-causality between employment in agriculture and inclusive growth.

Dependent Variable: Log of GFCF			
	(1)	(2)	(3)
Log of GFCF (-1)	-0.975***	-1.048***	-0.331
	(0.214)	(0.223)	(0.211)
Log of inclusive growth	-0. 020	0. 026	0.0001
	(0.035)	(0. 041)	(0. 0003)
N	513	513	513

* p<0.1; ** p<0.05; *** p<0.01

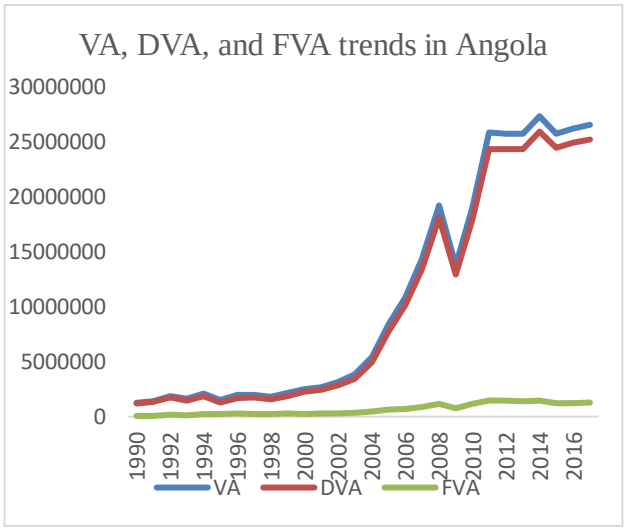
Note: GFCF represents gross fixed capital formation. In each of the three(3) models, we controlled for employment in agriculture (AGRIC), log of total value added, log of domestic value addition for export, log of foreign value addition for export respectively; Standard errors in parenthesis. Not significant coefficients of log of inclusive growth shows there is no bi-causality between gross fixed capital formation and inclusive growth.

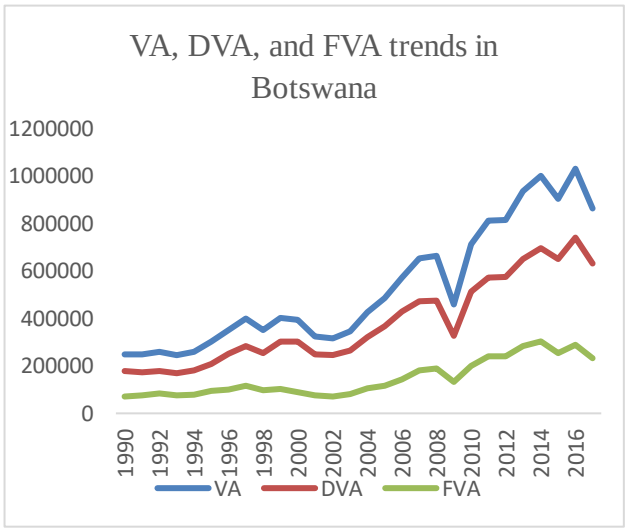
Appendix C: Gravity model estimates for SSA, 1991 -2017

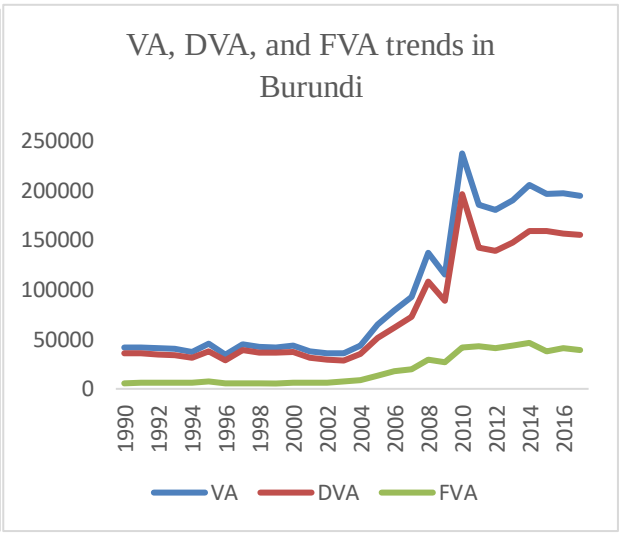
Dependent variable: Log of value addition to export from country to country	
	Estimates
Log of population of exporting country	0.369***
	(0.012)
Log of population of importing country	0.277***
	(0.013)
Log of distance to capital city of importing country	-1.686***
	(0.023)
Contiguity	-2.443***
	(0.109)
Landlocked	-1.412***
	(0.043)
Constant	8.342***
	(0.339)
Number of observations	10,388
Adjusted R-squared	0.45

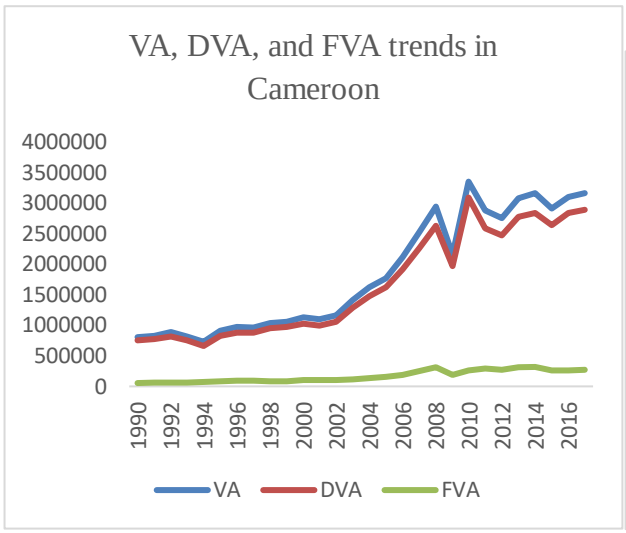
Note: Standard errors in parenthesis; * p<0.1; ** p<0.05; *** p<0.01.
Contiguity is binary in nature: '0' if the exporting and importing countries do not share a border and '1' if otherwise. Landlocked is also binary: '0' if the country is not landlocked and '1' if otherwise.

Appendix D: Trends in VA, DVA and FVA in selected countries, 1991 - 2017








VA, DVA, and FVA trends in Cameroon
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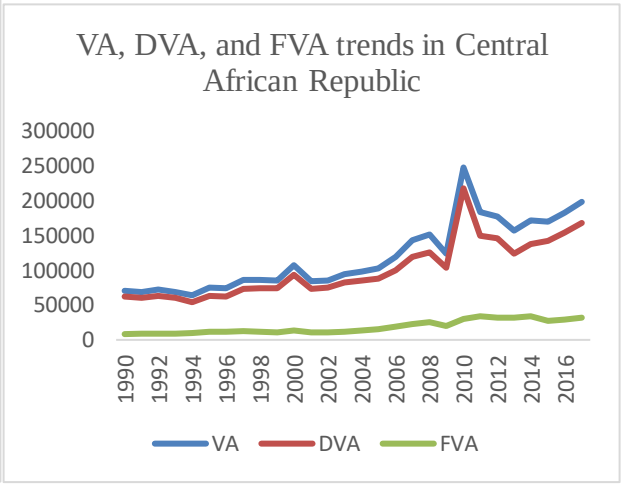
1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012 2014 2016
VA DVA FVA


VA, DVA, and FVA trends in Central African Republic
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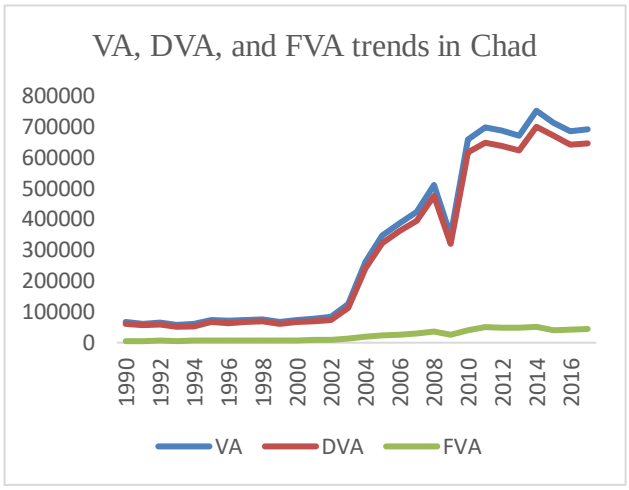
1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012 2014 2016
VA DVA FVA


VA, DVA, and FVA trends in Chad
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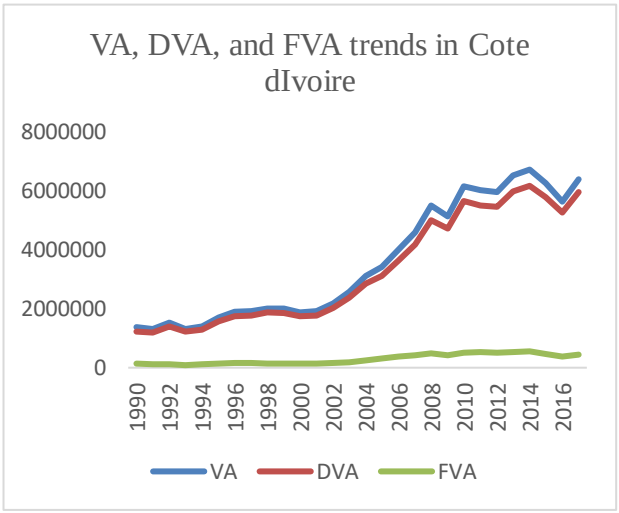
VA DVA FVA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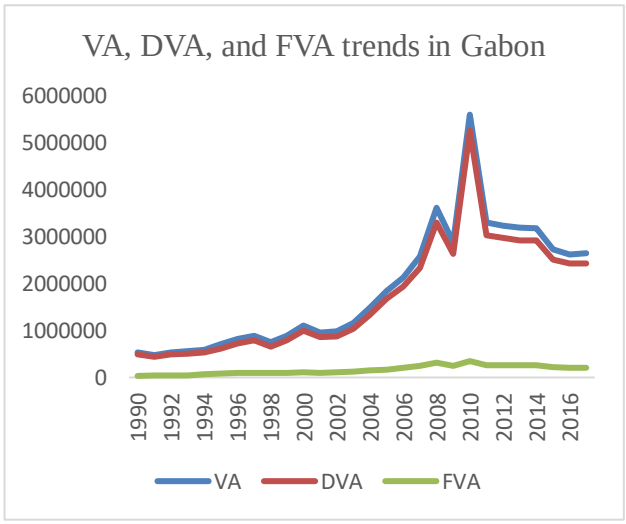
VA DVA FVA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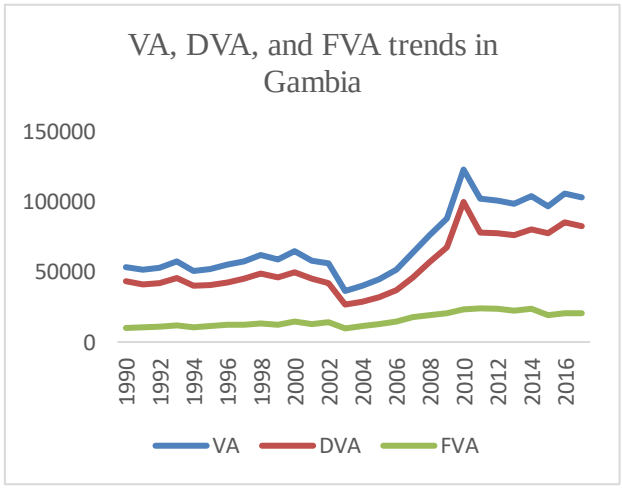
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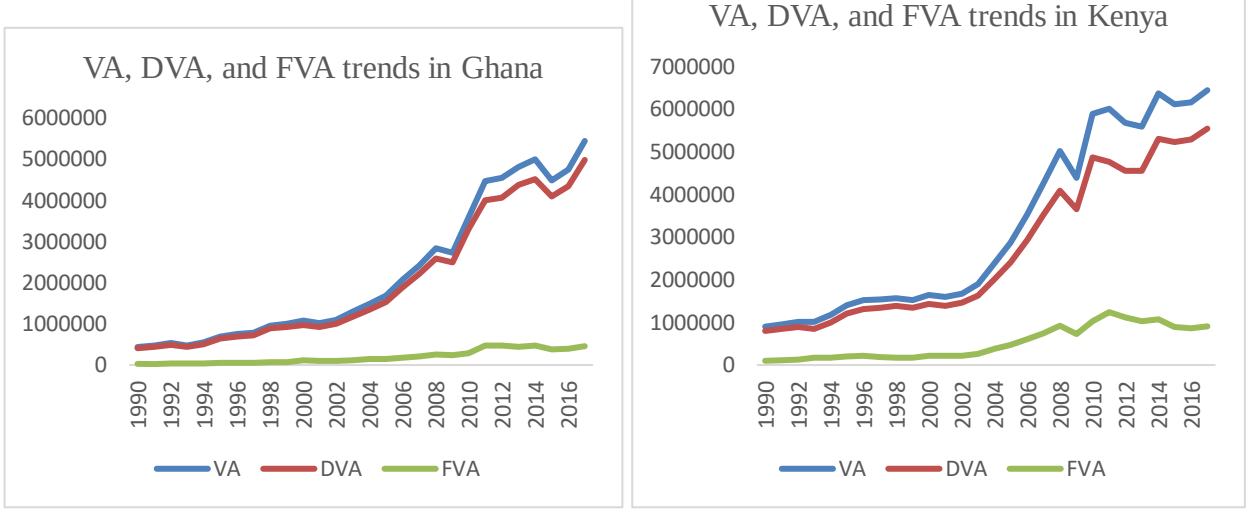
VA DVA FVA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VA, DVA, and FVA trends in Kenya
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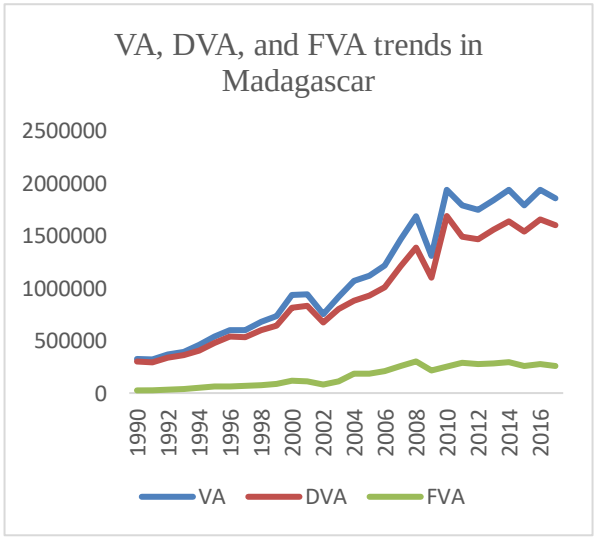
FVA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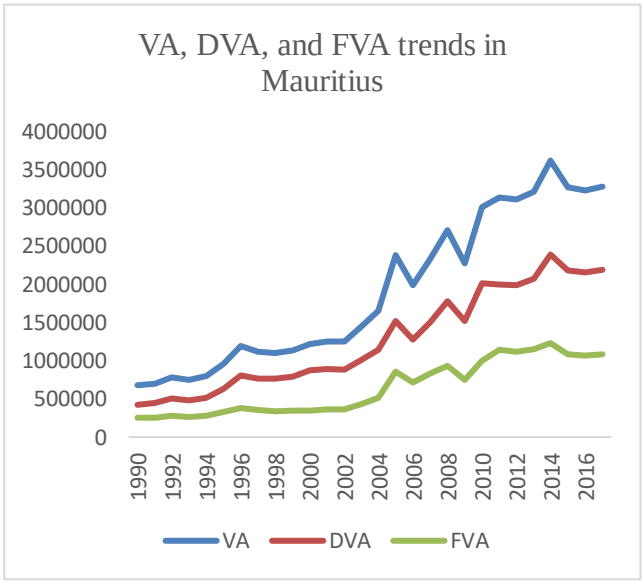
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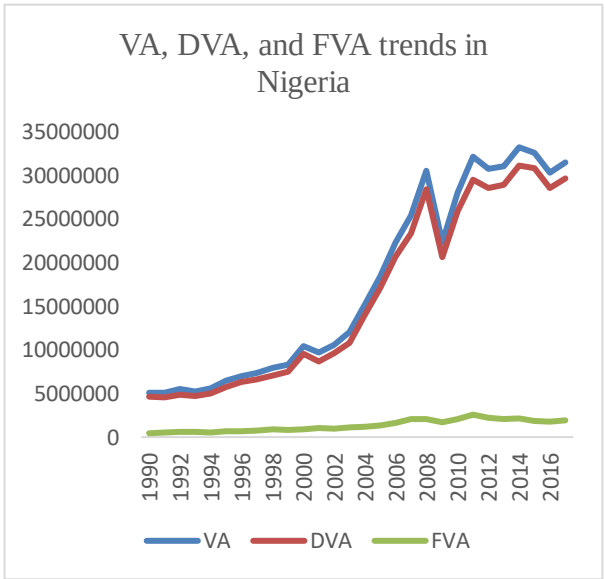
FVA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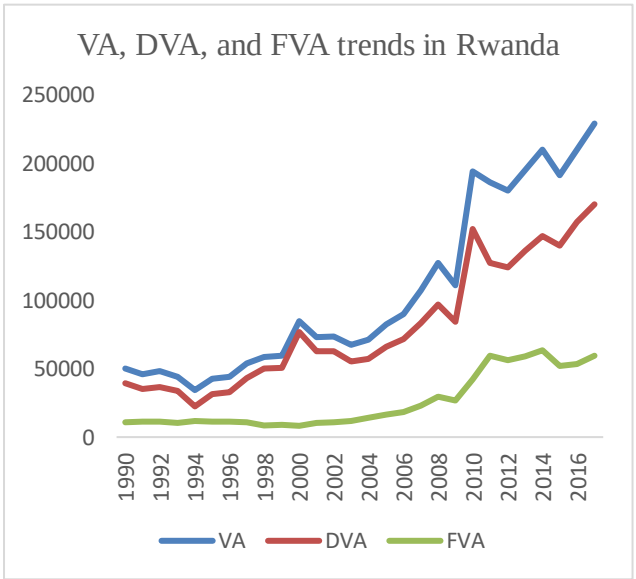
FVA


VA, DVA, and FVA trends in Rwanda
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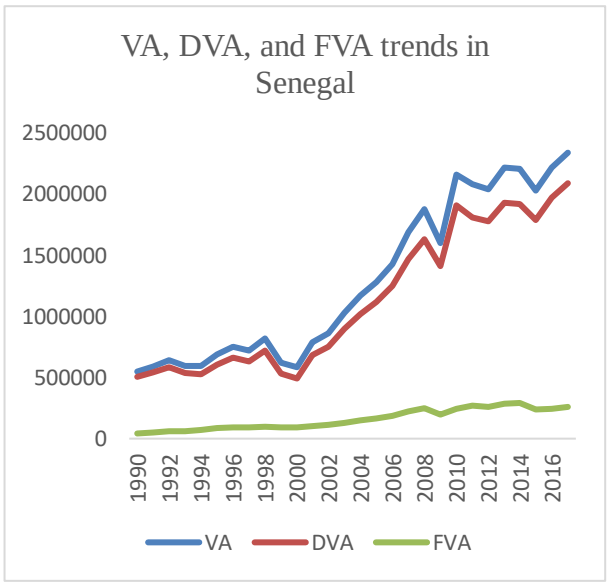
VA, DVA, and FVA trends in Senegal
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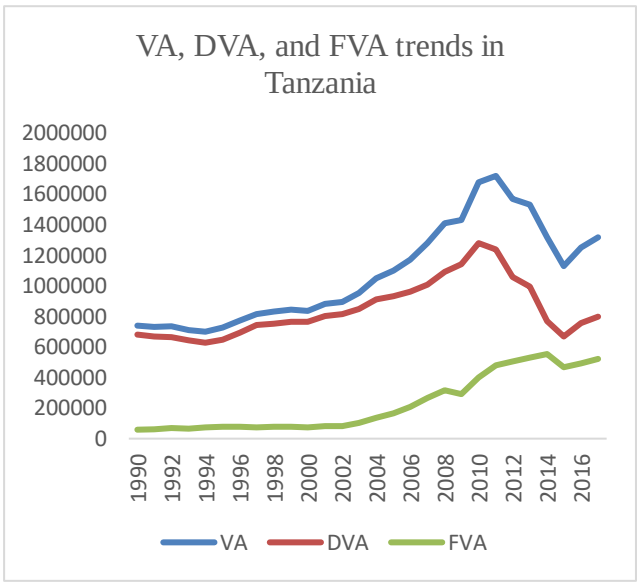
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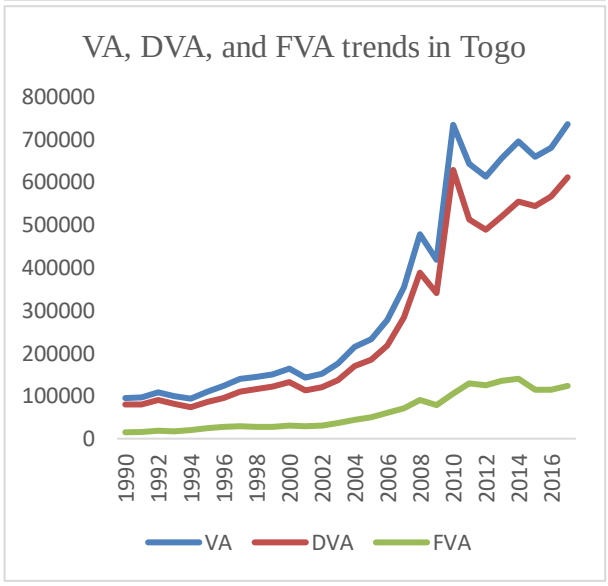
FVA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VA
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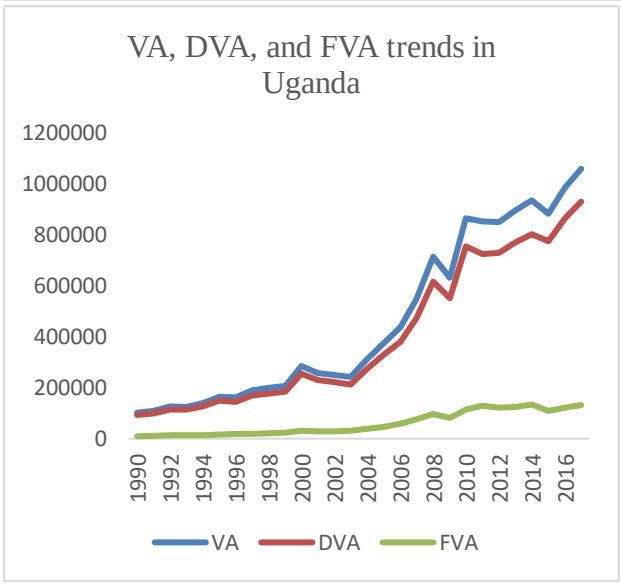
FVA


VA, DVA, and FVA trends in Uganda
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