Global Value Chain Participation and Current Account Balances in Landlocked African Countries

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Authors' contributions

This work was carried out in collaboration among all authors. Authors KGF was designed the study with the assistance of author NP. Authors KGF and NP scrutinized the background and the review of previous literature. Author KTC, performed the statistical analysis. Author KGF wrote the first draft of the manuscript. Which was read and corrected by author NP. All authors read and approved the final manuscript.

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ABSTRACT

The objective of this paper is to find out the direction of Global Value Chain Participation (GVCP) that contribute more to the Current Account Balance (CAB) in landlocked African countries from 2000 to 2018. Our specification follows the IMF's External Balance Assessment (EBA) model. The Feasible Generalized Least Square (FGLS) econometric technique is applied on data from three sources: (1) UNCTAD-EORA database for forward and backward participation indicators, (2) World Development Indicator (WDI) data set, for current account balance, foreign direct investment (FDI), population and trade openness and (3) Penn World Tables (PWT) for exchange rates. Results highlight a positive and significant contribution of forward GVCP on CAB in landlocked African countries. The study recommends that landlocked African countries should be active providers of value-added intermediary inputs to other Global Value Chain actors.

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ABBREVIATIONS

CA   : *Current Account*
CGER   : *Consultative Group on Exchange Rate*
DVA   : *Domestic Value Added*
DVX   : *Indirect Value Added*
EBA   : *External Balance Assessment*
FDI   : *Foreign Direct Investment*
FGLS   : *Feasible Generalized Least Square*
FVA   : *Foreign Value Added*
GCI   : *Global Competitiveness Index*
GVC   : *Global Value Chain*
GVCP : *Global Value Chain Participation*
IO   : *Input Output*
LLDC   : *Landlocked Developing Countries*
MRIO   : *Multi-Region Input-Output*
PWT   : *Penn World Tables*
SSA   : *Sub-Saharan African*
UNCTAD : *United Nations Conference on Trade and Development*
VS   : *Vertical Specialization*
WDI   : *World Development Indicator*

1. INTRODUCTION

Facilitating the Participation of Landlocked Developing Countries in Commodity Value Chains is an important strategy to boost the competitiveness of these countries [1]. Landlocked Developing Countries (LLDCs) face special challenges that are associated with their lack of direct territorial access to the sea which isolates them from world markets [2]. Many centuries ago, Adam Smith suggested that the inland parts of Africa and Asia were the least developed areas of the world and that due to the difficulty of trade in those areas, they would not benefit from the gains of specialization as their coastal neighbor [3]. Hundreds of years later, the Human Development Report paints a dark picture for the landlocked countries of the world [4]. Many Landlocked countries in Africa are low income and tend to engage more in intra-Africa trade than coastal or middle-income countries [2]. Generally, many African economies have struggled to improve their competitiveness in international interactions [5]. Researchers, free trade promoters and policy makers have resorted to many strategies to make African countries more competitive through productivity-boosting, quality amelioration and standard, technological

or knowledge transfer, aid to development, infrastructural development, [6], but a good number of these African countries still occupy the bottom positions in the 2019 global competitiveness index (GCI) ranking presented by the recent 2019 global competitiveness report [7]. This situation is worst for landlocked countries. The last in this classification is a landlocked country (chad) with a GCI of 35.1. Many other landlocked African countries occupy the bottom positions indicating that they still have serious competitiveness challenges.

Current account balance sustainability is very crucial for macroeconomic policy changes and decisions [8]. Disequilibrium in current account (CA) balance in many developing countries has become one of the most discussed topics in regional and international economics [9]. Countries use the current account balance of payments as an important macroeconomic indicator of the viability of the economy. It is a useful economic indicator because it represents other important economic variables like savings, investment and the budget balance. All these indicators have a direct impact on economic growth, exchange rate and economic competitiveness [8]. Large and persistent current account deficit may result in economic and currency crises, and reduction in international reserves [10]. After the Great Recession, significant current transfer inflows (including aid) have reduced the size of external imbalances in Africa, but the main reason for the recent accumulation of external debt and rising current account deficits is the sharp deterioration of the net exports balance being an aspect of current account balance related to productive activities. Higher costs of production, in general, complicates the participation of landlocked countries in global production [11,12]. Being Landlocked imposes additional costs on trade and reduces international competitiveness. The supply chain approach was put forward [13] and using such supply chain approach, the effect of being landlocked as one of many variables on trade was examined with the confirmation that landlocked economies encounter several difficulties [11]. Most African countries ran a current account deficit in 2017. Using average data for the period ranging from 2007 to 2017, the 2017 African development outlook classify

African countries. This classification is based on the African development bank statistics and it reveals that out of the 9 African countries with a current account surplus, only one of them (Botswana) is a landlocked country [14].

Value chain as a new approach to competitiveness has a lot of virtues in terms of value addition and the segmentation of activities [15]. The value chain concept describes the full range of activities that firms and workers perform to bring a product from its conception to end-use and beyond including activities such as research and development, design, production, marketing, distribution and support to the final consumer [16]. The value chain approach has been the new development strategy proposed by researchers to policy makers and development promoters. It was pointed out by Ikuo [17] that this approach is increasingly becoming an important development strategy in less developed economies since it constitutes a system of industrial development which can be extended to a national level through an intercountry Global Value Chain (GVC). As a result, vertical specialization has led to the necessity of participation in GVC activities. Many studies including those conducted by Johnson and Noguera [18], Wang, et al. [19] emphasize vertical integration with the concept of value-added export. Others like [17] award more relevance to value chain mapping.

The objective of this paper is to find out the direction of GVCP that contribute more to current account balance in landlocked African countries. Its main purpose is to contribute to the existing literature on GVCP in African economies. The hypothesis to be tested goes thus: Forward participation into Global Value Chain contributes positively and significantly to Current Account Balance in Landlocked African countries. The rest of this paper contains a brief literature review, the methodology of this paper which encompasses some specifications on the data used and variables of the study and the technique of analysis. Further, we present and discuss results obtained from our regressions and a brief conclusion.

The theoretical literature on global value chain participation and resulting gains falls within the framework of cross border division of labor either at a product level or at the level of intermediate production in a fragmented production process. The mercantilists developed a selfish form of participation to accumulate as much gold as possible for a given economy [20]. As time went

on, the international division of labor came in with the segmentation of the world economies into core and periphery regions having well defined tasks as far as participation in world trade was concerned [21]. Here, main aspect of participating in international trade was at product level and countries participated concerning the resources they possessed [22]. Peripheral economies participated by exporting raw materials to industrial firms in core countries who have to export manufactured products to peripheral economies [23]. With the search of cheap labor, the new international division of labor advocated for the relocation of industries to some peripheral regions [24]. Here, due to technology transfer, the re-localized industrial firms into developing regions lead to the newly industrialized countries who could also participate by exporting manufactured products [25]. Core or advanced economies on their part moved to the service sector [25]. With globalization and remarkable progress in connectivity due to technology advancement and varied communication progress, the notion of trade-in intermediary goods was introduced around the 21st century as promoted by the new theory of international values being an extension of the Ricardian trade theory [26]. Different countries of the world could, therefore, participate in cross border trade by exporting intermediary goods constituting only part of a long production process. Under this line of thinking, Porter's theory of competitive advantage emphasized on interdependence at firm level [27], while Gereffi's theory focused on participation at the global scale with countries participation which benefits the entire production process through value addition [28].

Very few empirical works have analyzed the effect of global value chain participation on the current account balance. However, a causal link was expressed between increased levels of global value chain participation (GVCP) and increases in a country's current account [29]. Taking location as the main factor of participation, another author found that most African landlocked countries are located in upstream (forward participation), and provide mainly raw materials to the different networks of value chain while non-African landlocked countries are highly engaged in the downstream production (backward participation) close to the final consumers [30]. From the literature, the question that persists is: Which direction of GVC participation improve the competitiveness of landlocked African countries?

2. METHODOLOGY

2.1 Model Specification: The External Balance Assessment Specification

The EBA methodology has been developed by the IMF's Research Department to replace the former Consultative Group on Exchange Rate (CGER). EBA comprises three methods, each based on its corresponding CGER predecessor. Two methods are panel regression-based analyses of the current account and real exchange rate, while the third method is model-free and focused on sustainability analysis [31]. This study neglects the real exchange rate regression-based analysis. It is clear that EBA's two regression-based methods are the more ambitious, in terms of taking account of many factors in regressions, and then using those as a base for normative evaluation [31].

One essential difference is that EBA for current account analysis makes a sharper distinction between positive (descriptive) understandings of current accounts and makes normative evaluations. Another difference is that EBA takes into account a much broader set of factors, including policies, cyclical conditions, and global capital market conditions, that may influence the current account. This is done by distinguishing two stages of the regression-based methods:

The first stage is positive (descriptive), and focused on understanding current account developments, via the estimation of panel regressions.

The second stage provides estimates that are more suitable for a normative evaluation of current accounts. The second stage thus goes further, drawing on information from the regression results to estimate the contributions of "policy gaps" to current accounts.

The EBA methodology consists of the panel data regression, specified thus;

$$CA_{(it)} = \alpha + X_{(it)} * \beta + u_{(it)} \qquad (1)$$

Where CA denotes the current account balance relative to GDP for country i in period t, X is a set of economic fundamentals that are believed to determine the current account and u is the error term.

We design a panel data regression model to find out the effect of GVC participation on current

account balance. Here, the contribution of each determinant on the current account balance is investigated upon with the choice of control variables being guided by the literature on the determinants of current account balance. Our specification is similar to that express in a paper analyzing Global Value Chain Participation and Current Account Imbalances [29]. Global value chain participation (GVCP) which is our target variable has two main directions of participation in the literature to suit the objective of this paper. A country's participation can be backward (captured by Foreign Value Added abbreviated, FVA) or forward (captured by domestic value-added, abbreviated DVA or indirect value added abbreviated, DVX). Some authors denoted these terms vertical specialization (VS) for FVA and the remaining aspect of VS (VS1). Other authors combined the VS and VS1 shares, to assess the participation of a country in GVCs [32].

As the objective of this paper stipulates, we will separate forward and backward vertical linkages unlike those that combine them [33]. This manner of disintegrating GVC participation into forward and backwards participation has been used to assess trade integration and value chain by a team of researchers under the canopy of the IMF when assessing policy determinants of backward integration [34]. We apply this segmentation in our context since it helps to easily identify the type of GVC participation that has positively contributed to current account balance of landlocked African countries as our objective stipulates.

We, therefore, specify our model econometrically as follows;

$$CA_{(it)} = \alpha_{(0)} + \alpha_{(1)}LnDVA_{(it)} + \alpha_{(2)}LnDVX_{(it)} + \alpha_{(3)}LnFVA_{(it)} + \alpha_{(4)}LnGVC_{(it)} + \alpha_{(5)}FDI_{(it)} + \alpha_{(6)}RER_{(it)} + \alpha_{(7)}Unempt_{(it)} + \alpha_{(8)}Open_{(it)} + \alpha_{(9)}Mkt_{(it)} + u_{(it)} \qquad (2)$$

Where, $CAB_{(it)}$ = current account balance of country i at time t., $LnFVA_{(it)}$= the natural logarithm of Foreign value added in country i's export at time t., $LnDVA_{(it)}$= the natural logarithm of domestic value added in country i's export at time t., $LnDVX_{(it)}$= the natural logarithm of indirect value added in country i's export at time t., $LnGVC_{(it)}$=the natural logarithm of Global value chain of country i at time t., $FDI_{(it)}$=foreign direct investment of country i at time t., $RER_{(it)}$=real exchange rate of country i at time t., $Unempt_{(it)}$=Unemployment rate of country i at time t., $Open_{(it)}$=trade openness of country i at

time t. and Mkt$_{(it)}$= Existing market captured by population of country i at time t.

Also, α0 to α9 are parameters to be estimated, and u$_{it}$ is the error term with t varying from 2000-2018.

2.2 Technique of Estimation

From the above equations, individual model estimation is used to empirically examine the effect of each form of GVC participation on current account balance in African landlocked countries from 2000 to 2018. Considering the results obtained from the stationarity of variables, we use the Feasible Generalized Least Square (FGLS) econometric techniques to analyze our data. This technique is applied to obtain consistent and asymptotically more efficient estimates of parameters. Regressions are carried out using STATA 14 software and are presented in Table 3.

2.3 Data and Source

The data used in this study come from three secondary sources. These sources are WDI-2018, Penn World Table 1 and the new UNCTAD-EORA-WIOD database. The first set of data is obtained from the database of the World Bank, called the World Development Indicators (WDI-2018). The data obtained from this source are current account balance, FDI, Mkt or population, and trade openness. The next database is the Penn World Table where the variables exchange rate has been obtained. The last database is the UNCTAD-EORA-WIOD database from where the data on forward and backward participation is gotten. Until very recently, the coverage on African countries in Input-Output (IO) tables was sparse. Our paper uses the newly created Eora database, which provides global Multi-Region input-output (MRIO) tables, to derive value-added trade for 189 countries from 1990 to 2018. The main advantage of using the Eora database is the depth of its coverage, in terms of countries (189), and years (28 years). It is one of the best and rich database in GVC data as it has recently been used by scientific research in GVC. It covers 38 out of the 54 countries in Africa. While this extended coverage makes the database invaluable for this analysis, it is worth noting, however, that some data are missing in the IO tables and countries without data were simply excluded from the sample. Eora data has

already been successfully used by many researchers, including [35-38,29] and many others. Data from all databases used are annual and the period of the analysis is from 2000 to 2018. The reliability of the data is supposed acquired since these sources are always exploited to carryout economic studies both at national and international levels.

2.4 Sample

The sample for this work constitutes African landlocked countries shown in Fig. 1. Out of the 15 landlocked countries in Africa, we could assemble data for 8 of these countries and the rest were excluded due to data unavailability. The landlocked countries considered in our sample are Botswana, Burundi, Malawi, Mali, Niger, Rwanda, Uganda, and Lesotho. The period of study ranges from 2000 to 2018 given that chain activities are relatively recent.

2.5 Preliminary Tests

2.5.1 Descriptive statistics

The descriptive statistics table is presented in the appendix (Table 4). For the period of study, it suggests that the overall mean of forward participation captured by Lndva present depicts a somewhat less evenly spread rise. In particular, the marked widening of the min-max range suggests that some countries have increased their participation disproportionately. The standard deviation in the overall sample is, therefore, higher than that between different groups or countries, signifying that some countries slidely participate in GVC more than the others. Still with forwarding participation, the variable Lndvx shows that the mean is higher than the dispersion. We also observe that the overall dispersion is almost the same with the dispersion between economies. For backward participation, the descriptive statistics suggest a more uniform variation between and within economies (measured both by the standard deviation and the min-max range), suggesting that the rise of backward participation over this 19 years period has been spread relatively evenly across economies.

This may partly reflect that many African economies are closer to the origin (upstream) of production chains and are hence more likely to have strong forward export links with subsequent production stages.

Table 1. Correlation of variables

	cab	lndva	lndvx	lnfva	lngvc	unemp	fdi	pop	rer	open
cab	1.0000									
lndva	0.2744*	1.0000								
lndvx	0.2825*	0.7306*	1.0000							
lnfva	0.2695*	0.8496*	0.7176*	1.0000						
lngvc	0.3024*	0.8810*	0.8088*	0.9670*	1.0000					
unemp	0.2869*	0.1011*	-0.1119*	0.2661*	0.2013*	1.0000				
fdi	-0.5403*	-0.1462*	-0.1119*	-0.1470*	-0.1449*	-0.0355	1.0000			
pop	0.1207*	0.5574*	0.5325*	0.4450*	0.5205*	-0.4370*	-0.2008*	1.0000		
rer	-0.1842*	-0.1749*	-0.0259	-0.2447*	-0.2572*	-0.3724*	0.0022	0.1168*	1.0000	
open	-0.2315*	-0.1130*	-0.1107*	0.0010	-0.0571	0.2654*	0.3223*	-0.5738*	-0.2489*	1.0000

Source: computed by the authors using STATA 14

Fig. 1. Landlocked countries on the Map of Africa

2.5.2 Correlation between variables

Table 1 presents the correlations between variables.

The correlation Table 1 clearly confirm existing theory of a positive correlation between GVC and GVC participation to African country's current account balance. This means that current account balance can be ameliorated by improving the form of participation in GVC. This is true with all forms of participation due to their respective positive correlation with current account balance. This direct link between GVC and indicators of competitiveness has been established theoretically by many authors.

Also, GVC participation is positively correlated with unemployment rate with the exception of indirect value added with a negative correlation as depicted by our results in Table 1.

There is however a negative relationship between GVC participation and FDI, implying that foreign direct investment is detrimental to GVC participation. Though surprising, it can be justified with the assertion that foreign direct investment in Africa has specific targets which may not necessarily be value addition or the development of activities which promote GVC activities.

The population of a country is positively correlated with all forms of GVC participation.

Table 2. Panel unit root tests results

Variables	Common unit root process			Individual unit root process		
	Levin-Lin-Chu unit-root test			Im-Pesaran-Shin unit-root test		
	statistics	Prob.	Decision	statistics	Prob.	Decision
cab	-3.9324	0.0000	I(0)	-1.3733	0.0448	I(0)
unemp	-6.0668	0.0000	I(0)	-7.5329	0.3249	I(1)
fdi	-4.2823	0.0000	I(0)	-5.4937	0.0000	I(0)
pop	-23.4312	0.0000	I(0)	-1.5456	0.9965	I(1)
rer	-6.8537	1.0000	I(1)	-9.0668	0.0000	I(0)
open	-4.1076	0.7994	I(1)	-9.0668	0.9177	I(1)
lndva	-7.5032	0.0000	I(0)	-12.1850	0.9233	I(1)
lndvx	-7.5115	0.0000	I(0)	-10.2180	0.004	I(0)
lnfva	-8.6952	0.0000	I(0)	-11.0306	0.1397	I(1)
lngvc	-8.6445	0.0000	I(0)	-12.4170	0.4137	I(1)

Source: Authors' calculation

Participation does not only limit the country to the exchange of intermediary goods but also the market where they will sell other products. Countries with higher population and size, therefore, stand better chances of participating as raised by FAO [39].

GVC participation is negatively correlated with real exchange rate which is the price of the national currency. This is logical given that as the cost of obtaining the national currency increase, GVC partners find it difficult to link to the country.

Forward participation is negatively correlated to trade openness principally due to low competitiveness of products from African countries. However, backward participation captured by Lnfva, is positively correlated with trade openness. This means African countries can develop transformation facilities to make use of intermediary inputs from other countries.

2.5.3 Unit root tests results

Table 2 presents the panel unit root tests of the variables used.

Based on the stationarity panel tests results presented in Table 2, some variables are stationary at level while others are stationary at first difference. Specifically, the results of common unit root (Levin, Lin Chu) show that variables such as real exchange rate and trade openness are not stationary at level but become stationary at first difference. Other variables notably unemployment rate, current account balance, population, domestic value added, indirect value added, foreign value added, foreign direct investment inflows, global value chain are stationary at level at 1 or 5% level of

significance. This indicates that for each variable there is not a common autoregressive structure for all of the observations. The results of individual unit root (Im, Pesaran, Shin), show that four variables are stationary at level (current account balance, foreign direct investment, real interest rate and indirect value added) and the rest become stationary at first difference (unemployment rate, trade openness, domestic value added, foreign value added, global value chain, population). Further, a variable like trade openness contain common and individual unit root and need to be differenced to become stationary. With this assertion, some authors admit that variables of a model are cointegrated at I(1) signifying that there exist a long a long term relation between variables of each of our model [40]. At this stage, we need to estimate our model using the FGLS technique.

3. RESULTS AND INTERPRETATION

Table 3 shows the panel estimation of parameters of the model labelled equation (2) above. Each column represents a regression.

Table 3 reports the results of our regressions on a sample of 8 landlocked African countries having data on backward and forward participation. We conduct 5 regressions, alternating our target variables to verify the robustness of our results. The results obtained through out the five regressions do not change significantly permitting us to make some Economic interpretations and link it to those obtained in previous works. Our interpretation starts with the general significance of the model and a keen attention is given to the significance and signs of coefficients obtained from the regressions. Our model is globally good based

on its statistical significance whose probability stands at 0.0000 in the different regressions. The paragraphs that follow elaborates the interpretation of various coefficients obtained in our results.

Forward participation is captured with two indicators (Domestic Value Added and Indirect Value Added). Our results in Table 3 shows that the indicator, Domestic Value Added (Lndva) is regressed twice, (the first time excluding other target variables and the second time including all variables). The panel regression coefficients are all positive and highly statistically significant at 1%, affirming the assertion that forward participation in GVC for landlocked African countries display larger current account balances. Still in the domain of forward participation, we have the indicator Indirect Value added (Lndvx) which is also regressed twice (the first time excluding other target variables and the second time including all variables). The panel regression coefficient is equally positive and highly statistically significant at 1%, confirming the assertion that forward participation in GVC for landlocked African countries display larger current account balances. Results from this two forward participation indicators explain the fact that most landlocked African countries' exports is constituted of raw material or unprocessed intermediary products needed by other actors in the global chain networks. Working on GVC participation and current account imbalances using the IMF EBA, it was suggested that countries which exhibit stronger GVC participation also display higher current account surpluses [29]. Their detail results show that backward and forward participation positively and significantly relate to current account balances. Also, our result is very similar to that of a team of FAO researchers in 2016, who analyzed the Global Value Chain participation and position of a large sample of countries, including Sub-Saharan African (SSA). Their result reveals that, despite the low trade shares at the global level, SSA countries are deeply involved in GVC participation and the relevance of their international linkages is increasing with time, although still limited to upstream (likely unprocessed) production stages of the chain. The main transmission channels for economic and social upgrading include forward links through the sale of GVC-linked intermediates to the local economy, and stimulating production and/or productivity in various downstream sectors [41]. This work obtains one of the first results showing the contribution of GVCP to

current account balance in landlocked African countries.

Backward participation on the other hand is captured by one indicator called Foreign Value Added (FVA). This indicator is regressed twice (the first time excluding other target variables and the second time including all variables) and the results show that its coefficient is not significant and has a negative sign when other target variables are excluded from the regression. This signifies that landlocked African countries do not use intermediate inputs from other countries in the world. The negative sign means that as landlocked African countries participate forwardly by using intermediary inputs from other value chain actors, it will deteriorate their current account balance. However, after conducting several regressions based on the IMF's EBA model, another study found that backward and forward participation positively contribute to current account balance [29]. We obtain contradictory results in the context of landlocked African countries.

The variable LnGVC has a coefficient which is positive but not statistically significant in the first regression even as it becomes statistically significant with a negative sign when all the variables are included in the regression signifying that global value chain performance in general highly deteriorate the current account balance of landlocked African countries. This could be justified from the views of authors who posit that landlocked countries participate in cross border exchange at a higher cost.

Based on the results obtained from our regression, the target variables reveal that during the period of our study (2000-2018), forward participation through its indicators contributed more to the current account balance of landlocked African countries as confirmed by the results obtained in the five regressions. This form of participation often do not generate more value added products but adding more value to landlocked African countries' products through innovation will be of great relevance. Also improving their connectivity to reduce supplementary cost is imperative for their success on the international scene.

Concerning the control variables included in our model, our results obtained can lead to the following economic interpretations. Starting with unemployment rate, results from the first four regressions reveal that unemployment rate

contributes positively to current account balances in Africa. The coefficients obtained show that this variable is statistically significant at 5% and 1% respectively in the first two and next two regressions. This means an increase in unemployment rate also lead to an increase in the current account balance of African countries. This is ironical but it can be attributed to the fact that the products exported by landlocked African countries is from employers who provide temporal jobs to the unemployed. Similar results were obtained by another study where authors discover a positive and significant relationship between unemployment and current account balance [42]. However, the last regression where all the variables are included gives a statistically significant negative coefficient.

We move to another variable called foreign direct investment (FDI) net inflows having a negative and statistically significant contribution to current account balance in landlocked African economies in regressions containing forwards participation variables. This signifies that FDI deteriorate countries current account balance in landlocked African countries. A recent study on macroeconomic variables and current account balance in Namibia obtained similar results using

three econometric methodologies [9]. Their results show that FDI deteriorates CAB as it had a negative relationship in all the models estimated. Using fixed effect panel data model to assess cross border competitiveness, another study found that FDI has a negative and significant relation with current account balance [42]. In the same direction, a study discovered a negative non-significant relation between FDI and current account balance [43]. A contradiction to our result was gotten by a study conducted in Ghana with results indicating that FDI positively and significantly contributes to employment quality outcomes which ameliorates current account balance [44]. In our third and fourth regression based on backward participation, coefficients maintain their sign but are not significant.

The next control variable is real exchange rate having a positive and statistically significant coefficients in all the five regressions as presented in Table 3. A study on the impact of trade openness on the relationship between current account and real exchange rates, found that real exchange rate positively influence current account balance [45]. Another study discovered a negative non-significant relation

Table 3. Panel estimation of parameters

Independent variables	Dependent variable : CAB				
	Cab	cab	cab	cab	cab
Lndva	2.405***				16.87***
	(0.789)				(3.212)
Lndvx		3.155***			4.122***
		(0.690)			(1.221)
Lnfva			-0.0786		4.287
			(0.858)		(3.328)
Lngvc				1.046	-25.87***
				(0.918)	(6.200)
unemp	0.220**	0.245**	0.287***	0.283***	-0.206*
	(0.104)	(0.0982)	(0.105)	(0.104)	(0.124)
fdi	-0.417**	-0.518***	-0.215	-0.303	-0.342**
	(0.193)	(0.187)	(0.202)	(0.200)	(0.162)
pop	-8.204***	-8.240***	-6.739***	-6.975***	-13.25***
	(1.373)	(1.282)	(1.327)	(1.337)	(1.377)
rer	0.00478***	0.00317***	0.00486***	0.00474***	0.00359***
	(0.000980)	(0.00101)	(0.00103)	(0.00101)	(0.00114)
open	-6.657***	-7.261***	-3.565	-5.109**	-0.820
	(2.037)	(1.894)	(2.292)	(2.222)	(1.860)
Constant	95.73***	91.27***	99.81***	91.58***	211.5***
	(21.15)	(20.43)	(23.18)	(22.68)	(24.49)
Observations	152	152	152	152	152
Number of countries	8	8	8	8	8

NB: Standard errors are in parentheses and *** p < 0.01, ** p < 0.05, * p < 0.1 indicate significance of parameters at 1%, 5% and 10% respectively; Source: Author's calculation from STATA 14

between real exchange rate and current balance [43]. Further, Real Effective Exchange Rates appreciations induce an expenditure switching effect away from domestic goods and into foreign goods, for a given level of expenditure, which increases the current account deficit, everything being equal.

Trade openness is another control variable having a negative contribution to current account balance in landlocked African countries. This signifies that more trade openness in Africa deteriorate the current account balance of landlocked African countries during the period of study. Many studies have confirmed this results especially a finding on the determinants of current account deficit where the variable on trade openness had a negative and significant relation with current account balance [43]. Earlier authors in the literature acknowledge the fact that trade openness has ambiguous effects on the current account balance. Less open economies may import less, which may reduce the current account deficit. However, the same countries may have difficulties servicing external liabilities, resulting in higher debt service costs and a greater current account imbalance. On the other hand, greater openness typically allows countries to undertake more investment and to finance the resulting current account deficits with capital flows from abroad. Also, international trade is an important channel for the transfer of technology, leading in the long run to economic development, thereby improving the current account balance.

Finally, available market captured by total population has a negative and statistically significant contribution to current account balance in landlocked African countries during the period of study. Working on GVC participation and current account imbalances, it was discovered that, there is negative and statistically significant relation between population growth rate and current account balances [29]. This result is logical because a larger population means that more goods will be imported for their up keep. This result could however be reversed if the existing market or population are productive enough to boost exports which will ameliorate the country's current account balance. Consequently, a study on macroeconomic variables and current account balance in Namibia discovered that population is positively related to current account balance [9].

The result displayed by control variables in most of the cases have been in line with theories with the exception of very few deviations in the context of landlocked African countries.

4. CONCLUSION

With the challenges encountered by landlocked African countries in joining the global production chain, the objective of this paper has been to find out the direction of GVCP that contribute more to the current account balance of landlocked African countries. The data for our analyses, comes from the recently developed Multi-Region Input Output (MRIO) table provided by UNCTAD-EORA database, the WDI-2018 database and the PWT. We specify our model with inspiration from the External Balance Assessment (EBA) developed by the IMF. We further use of the FGLS econometric technique to perform five regressions. The results show that forward participation in GVC positively and significantly contribute to the current account balances of landlocked African countries.

Our main recommendation is for policy makers in landlocked African countries to orientate their international dealings towards forward participation to ameliorate their current account balance. This implies that landlocked African countries should be active providers of intermediary inputs to other GVC actors worldwide. We further recommend that landlocked African countries should design policies that will favor the establishment of firms or industries involved in the provision of intermediate products. Also, infrastructures which ameliorate connectivity to the external world has to be developed to facilitate landlocked African countries' participation in GVC so as to ameliorate the current account position of these countries. This will drop trade related costs which complicates the participation of African countries in general and landlocked African countries in particular in cross border transactions and the exchange of intermediate products.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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APPENDIX

Table 4. Descriptive statistics

Variables		Mean	Std. Dev.	Min	Max	Observations
Cab	Overall	-5.266305	10.3021	-65.02892	29.48347	N=627
	Between		7.608529	-20.31197	10.88446	n=33
	Within		7.064572	-54.65775	20.43166	T=19
Unemp	Overall	9.855718	8.117093	.273	36.147	N=627
	Between		7.886091	.9601579	28.56974	n=33
	Within		2.342006	3.278876	24.69803	T=19
Fdi	Overall	4.846918	8.79168	-6.057209	103.3374	N=627
	Between		5.000131	.576605	26.29864	n=33
	Within		7.275102	-21.14967	81.88567	T-bar=18.8788
Pop	Overall	16.12537	1.480743	11.30382	19.09299	N=627
	Between		1.495852	11.37973	18.85578	n=33
	Within		.1391601	15.78724	16.47062	T=19
Rer	Overall	529.9033	919.2849	.5449192	8478.924	N=627
	Between		853.6514	1	3957.494	n=33
	Within		370.5639	-1441.437	5051.333	T=19
Open	Overall	.7296903	4025588	0	3.113541	N=627
	Between		.3269734	.3079742	1.870538	n=33
	Within		.2412802	-.1771745	2.354177	T=19
Lndva	Overall	14.07052	2.050635	0	18.36313	N=627
	Between		1.887273	10.96248	17.90384	n=33
	Within		.8635502	-3.230231	15.1329	T=19
Lndvx	Overall	12.98729	1.696928	9.315908	17.45468	N=627
	Between		1.649974	10.03374	16.93531	n=33
	Within		.4852147	11.30727	13.95444	T=19
Lnfva	Overall	12.27015	1.672293	8.718508	16.88257	N=627
	Between		1.595136	9.778769	16.36399	n=33
	Within		.5703221	10.39121	13.30607	T=19
Lngvc	Overall	13.46466	1.825052	9.919086	18.02812	N=627
	Between		1.772132	10.60913	17.53587	n=33
	Within		.5297778	11.84895	14.3625	T=19

Source: Authors computation

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