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Inclusion in Sub-Saharan Africa**

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The Synergy between Governance and Trade Openness in Promoting Female Economic Inclusion in Sub-Saharan Africa¹

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Abstract

The debate on the need for Sub-Saharan African (SSA) countries to increase female participation in the economic sector has intensified the coming into force of the African Continental Free Trade Area (AfCFTA) and good governance. This study investigates the joint effects of governance (comprising of political, economic and institutional governance) and trade openness on female economic participation in SSA. The study employs panel data of 42 countries in SSA for the period 1996-2020. The empirical strategy is the dynamic System Generalized Method of Moments (SGMM) estimation technique. The findings reveal that the single effect of trade openness on female economic participation is necessary but not sufficient. Hence, complementing trade openness with good governance further enhances female economic participation in SSA. In general, the joint effect of trade openness and good governance should be a concern for policymakers to promote female economic inclusion.

Keywords: economic integration; governance; female economic participation; sub-Saharan Africa

JEL Classification: G20; I10; I32; O40; O55

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1.0 Introduction

In Sub-Saharan African countries (SSA), the overall gender gap is approximately 67.2% according to the 2021 Gender Gap Report. From these SSA countries, only Namibia and Rwanda have tried to bridge the gap by 80% (World Economic Forum, 2021). Women are for the most part less present in the formal economic sector because, women are largely self-employed in petty trading and/or engage in subsistence farming which are part of the informal economic sector (Food and Agricultural Organization 2011; Uduji and Okolo-Obasi 2020). However, in developing economies, the formal sector largely employs men. Policies are recommended to move more women to the formal economic sector since this will go a long way to improve economic and welfare externalities. Thus, involving more females in the formal economic sector can be more apparent when channels are involved. Such channels include female education, economic integration, good governance, information and communication technology (ICT), income inequality and financial services (Asongu and Odhiambo 2019a).

The argument of this study partly rests on the policies recommended and how the importance of good governance can be used to moderate the effect of trade openness on the female labour force in the formal economic sector in Africa. Also, the study is motivated by four main elements highlighted in scholarly and policy journals, particularly, (1) the low participation of women in formal economic sectors and the importance of including more women in the light of achieving Sustainable Development Goals (SDGs); (2) the contemporary relevance of trade openness in connection to the African Continental Free Trade Area (AfCFTA) and how trade openness affects female participation; (3) the relevance of governance in the promotion of females in the formal economic sector; (4) gaps in the extant literature on female inclusive development, trade openness and governance. The underpinning elements of the motivation related to the study are expatiated below.

First, the low inclusion of women in the formal sector in SSA has been on a rise relative to other regions in advanced economies, since women in Africa are normally involved in informal economic activities like subsistence agriculture (Ellis *et al.* 2007; Ramani *et al.* 2013; Efobi *et al.* 2018; Asongu and Odhiambo 2018). However, these challenges of gender discrimination in the economic sector have brought about policies to involve more women in formal activities as a means to optimize human resources for economic and sustainable development goals (Marquez 2017; Vancil-Leap 2017; Uduji and Okolo-Obasi 2018). In line with the narrative above, the 2030 Agenda for Sustainable Development articulated by world leaders in 2015 is aimed at achieving gender equality and empowering women which is integral

to each of the 17 Sustainable Development Goals (SDGs). Accordingly, the framework of gender exclusion underpinning this research pertains to at least two SDGs, particularly: SDG 5 which is to end all forms of discrimination against women and girls as well as promote equal rights and opportunities for females. Second, SDG 8 is to promote, sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all. This issue of gender exclusion is very important to SSA countries because women in the sub-region are the poorest in the world (Hazel 2010). The issue of gender inclusion is fundamental in the light of the documented relevance of gender inclusion in SDGs.

Second, trade openness is relevant in connection to the African Continental Free Trade Area (AfCFTA), notably because the implementation of the AfCFTA agreement will create the largest free trade area by articulating trade facilities that cut red tape to raise income. This is in line with this rise in trade openness of SSA evidenced by the African Continental Free Trade Area (World Bank 2020). Undeniably, trade openness should be a core consideration in addressing the concern of less female participation in the formal economic sector (UNCTAD 2021). This narrative draws on the motivation that trade openness promotes more female inclusion (Asongu *et al.* 2020). In addition to the above points, an analysis of the relevance of trade openness in gender economic inclusion in Africa is more important because unemployment is the most challenging issue in the present and future global policy issues (Hazel, 2010).

Third, good governance plays a relevant role and is an important channel via which economic sector development in Africa can be improved (Asongu and Kodila-Tedika 2016). Even though numerous strands of literature have focused on the gains of governance, long-standing problems of socio-political conflict, corruption and economic mismanagement still persists in SSA (Adegboye *et al.* 2020). However, a report from the World Bank has shown that the exclusion of women from the formal economic sector resulted in an estimated loss in income of about 2.5 trillion USD (World Bank 2018; Nkurunziza 2018). They further suggested that good governance in terms of formulation and implementation of relevant policies should be consolidated in order to curb the exclusion of females from the formal economic sector. Thus, these recommendations are taken into account in this research given that the trade openness pathway is acknowledged and empirically used as a mechanism by which the inclusion of women in the formal economic sector can be improved, conditional on good governance indicators. Hence investigating the connections between governance and trade openness is policy-relevant, not least, because of the region's unparalleled trade

agreement and Agenda 2063². Taking into account these recommendations from the World Bank is also consistent with a motivation on a gap in the scholarly literature. Accordingly, to the best of our knowledge, synergies between trade openness and governance within the remit of enhancing female economic participation in SSA have not been explored in the literature.

Fourth, the extant literature on female economic inclusion, trade openness and governance are elaborated in detail in Section 2. The present study is closely related to Asongu and Odhiambo (2020a) which has examined the thresholds of how ICT modulates the negative effect of income inequality on female economic participation. The authors' empirical strategy is based on the Generalised Method of Moments (GMM) with data from 2004-2014 using forty-two SSA countries. In this research, we similarly adopt a two-step system GMM econometric technique to investigate levels of governance that further complement the positive effect of trade openness on female economic inclusion in 42 sub-Saharan African countries spanning 1996-2020. This is because if trade openness has a positive impact on female economic participation, modulating it with good governance can further improve female employment in the economic sector. Thus, in addition to different problem statements from the alternate research, we use a different modulator. In specifics, we use six governance indicators to construct three governance indexes which are political governance (composed of voice and accountability and political stability), economic governance (comprising regulation quality and governance effectiveness) and institutional governance (composed of the rule of law and corruption control). These are obtained through principal component analysis (PCA) and constitute our moderators instead of ICT indicators used in Asongu and Odhiambo (2020a). Moreover, female economic participation comprises female labour force participation, female employment in agriculture and female employment in services, which are used as our outcome variables. Finally, trade openness is appreciated using exports plus imports of goods and services, as a percentage of gross domestic product (GDP).

The rest of the paper is structured as follows: the next section is devoted to a review of the literature on the linkages between trade openness, governance and female economic inclusion. Section 3 presents the data and methodology of the study. Section 4 outlines the techniques underpinning the empirical analysis. We present our results and discussion in Section 5 and the concluding implications and future research directions in Section 6.

² Established in 2015, the African Agenda 2063 forms the continent's resolve for achieving inclusive and sustainable development goals.

2.0 The theoretical moderating role of good governance

In this section, we articulate the intuition of how good governance can be used as a policy variable or moderator to improve the effect of trade openness on female economic participation. This intuition is in line with contemporary studies that have established good governance to be a relevant pathway by which economic development is promoted in SSA countries (Efobi 2015; Tchamyu 2021). The concept of good governance is a process of making a decision and managing public resources and affairs in a preferred way. The perception focuses on the responsibilities of government to meet the needs of the masses in the economy (Graham *et al.* 2003; Landell *et al.* 1991). Furthermore, according to the MENA-OECD Governance Programme,³ good governance initiatives are the basis for encouraging trade openness and promoting private sector development which go a long way to creating job opportunities for citizens specifically, women in the formal economic sector.

The governance indicators which are elaborated in the data section reasonably conform to the fact that political, economic and institutional indexes of governance are important in providing a favourable atmosphere for job creation, employment and entrepreneurship in the economies. Also, it is widely accepted that countries with good governance tend to grow faster which creates more opportunities for women in the economic sector (Asongu and Odhiambo 2020b). In detail, components of good governance are assumed to play a salient role in driving economic development and female economic inclusion. The assumption of a positive nexus is consistent with the attendant literature on a positive relationship between trade openness and female labor force participation (Gaddis and Pieters 2012; Amin and Islam 2021). The underlying narratives and intuition lead to the following testable hypotheses that are further substantiated in the Section 2.1 and Section 2.2 respectively, with more insights from the literature.

Hypothesis 1: there are positive direct or unconditional effects of trade openness on female economic participation

Hypothesis 2: there are positive indirect or conditional effects from the interplay between trade openness and governance on female economic participation.

³The MENA-OECD Governance Programme Training Centre: *Better polices for inclusive growth and economic integration in MENA Region*. Published on October 6, 2016.

Before engaging the extant literature, the intuition for the study is simple to follow: trade benefits women workers (Hypothesis 1) and such benefits are more apparent in countries with better governance (Hypothesis 2). While the testable hypotheses are substantiated with the attendant literature in what follows, it is important to note that applied economics is not exclusively based on the acceptance and rejection of existing theories (Asongu and Nwachukwu 2016). This is essentially because this study which based on sound intuition, is inductive research (i.e. not deductive research). The main difference between inductive and deductive research is that inductive research can be used for developing a theory while deductive research aims at testing an existing theory (Asongu *et al.* 2022).

2.1 Trade openness and gender economic participation

A plethora of economic integration-gender economic participation studies have yielded mixed results. Despite most studies concentrating on developing countries, findings on the nexus between trade openness and female economic participation are diverse in developed economies. However, these mixed results can be attributed to different estimation strategies, types, periods of the dataset as well as the proxies used for gender economic participation and economic integration. We provide some literature on trade openness and female economic participation.

Following Suarez and Zoabi (2014), female labour force participation drops when trade integration broadens sectors intensive in female participation which widens the gender wage gap and vice-versa. This is because when men are formally employed, they earn higher salaries compared to women. According to the author, when a country concentrates on the female intensive sector, the male employees move to the expanding sector since other sectors contract, which in turn moves the female labour force out of formal employment. In sum, this theory was conducted using the U.S and Mexico bilateral trade data.

In the same line as the above intuition, Contessi and De Nicola (2014) unveil that international trade unsurprisingly affects industries and firm-level countries based on aggregate data with a comparative advantage on female employment, ownership and entrepreneurship, employing data from Middle Eastern and North African (MENA) countries. The study on the one hand discovers that women that encounter less *de jure* restrictions have a high probability of owning a business and being formally employed, especially within the remit of industries in which female employees are prioritised. On the other hand, there is an adverse effect on the female labour-intensive sector when *de jure* constraints are apparent. In summary, country specialization has a strong relationship in promoting female labour participation which is

consistent with qualitative brain-based technological bias as well as factor endowment trade theories.

Furthermore, Hyder and Behrman (2011) show that international trade significantly mitigates the differences between male and female economic participation through a shift in production from agriculture to the service and industrial sectors. The authors use half-century data from 1951 to 2008 in Pakistan and employ an exploratory analysis of five census reports and two latest Labor Force Surveys to draw the conclusion above. Considering an empirical study by Gaddis and Pieters (2017), the authors find that abolishing or reducing tariffs on trade liberalization will accelerate female economic participation in Brazil using a dataset from 1987-1994 and the difference-in-difference estimation technique. In addition, tariff reductions on trade affect both genders diversely for the reason that both men and women participate in distinct sectors of the economy and married women are more likely to be secondary earners in a household compared to men. The study pointed out that employment flows across sectors shifted from the agriculture and industry sectors to international trade and other services. Also, a greater proportion of the labor market and male unemployment were a result of an increase in female economic activity.

In the same way, Juhn *et al.* (2017) use a panel of North American Free Trade Agreement (NAFTA) countries and conclude that reducing tariffs encourage new firms to enter the export market, upgrade their technology and employ more females in blue-collar jobs. In sum, the study suggests that trade liberalisation is an important pathway that affects gender inequality. Nevertheless, Maqsood (2004) revealed that trade openness has a negative effect on female economic inclusion using panel fixed and random effects estimation techniques from 1990 to 2010 in South Asian Association for Regional Cooperation (SAARC) countries. Further, the study concludes that promoting international trade establishes a competitive environment for inhabitants from developing countries by boosting their knowledge and skills which prevent them from partaking in the labor market. In summary, competent and qualified human capital expertise can be a basis to increase the development rate of the country in the future.

Several studies reveal that there is a direct positive effect of globalization (Okşak and Koyuncu 2017; Asongu *et al.* (2019a); tax performance (Asongu *et al.* 2021) and FDI (Maqsood 2014) on female economic participation employing a panel data and system GMM, fixed and random effects estimation strategies for the studies. However, a study conducted by Asongu and Odhiambo (2019b) posits that inequality reduces female economic inclusion in SSA

countries using a dataset from 2004-2014 and a system GMM estimation technique to draw this conclusion.

Moreover, following the narrative of the extant literature on the impact of international trade on the female economic participation market, it is important to balance the narrative with an extra literature survey that adopts the argument that good governance could encourage gender economic participation.

2.2 The link between governance and female economic participation

The extant empirical literature on the linkages between good governance and female economic participation are not without controversy. For example, Milazzo and Goldstein (2019) documented that establishing that institutional reforms which are formal and informal norms play an important role by bridging the gender gaps in economic and political participation. The authors corroborate that concerning the current gender inequalities, there exist conventional masculine social structures where power is unequally distributed with men dominating authorities over women. However, these disparities in power can be seen through the arrangement of governance which can be attributed to discrimination of females. In sum, effective reforms focusing on gender inequality through changes in formal law can aid mitigate and tackle challenges of inequalities and also, power and norms can change for temporal interventions to yield effective long-term results.

Following the same narrative, Kelly (2019) points out some political challenges women face when they want to participate in governance which are: (1) high cost involved in taking part in politics. (2) Political parties not effectively encouraging women to stand for office. (3) Parties gearing towards men and patriarchal patronage systems. (4) Norms and cultural rules disqualifying and preventing female candidates to stand for office and finally deliberately exempting women from standing for office.

On the contrary, other studies reveal that educating more women promoted female economic participation in Nordic European countries from the 1960s which made way for more participation of women in the national legislation until a date in a low pace with the absence of any form of reform or quota being initiated in the national level (Dahlerup 2005). Further, women should be exposed to how to better understand leadership and decision-making roles to encourage them to participate in politics and governance effectively as well as strengthen their resolve to pursue their rights in their life by creating women awareness on gender policies and

human rights (NEPAD 2019). In specifics, effective advocacy plays a salient role in erasing the perception of women participation in decision making and leadership through dialogue forums in communities, change in attitudes, behaviours and information and education materials to support women. In sum, providing leadership and decision-making training as well as adopting policies and laws that need a representation of women on decision making bodies will go a long way to increase female participation in governance and politics.

In a more comprehensive insight, a qualitative study by Iversen and Rosenbluth (2008) performing a comparative analysis shows that electoral systems have a strong systematic impact on women's participation to the extent that encourages female political representation. However, the study further concludes that in countries that have a mixed electoral system, women perform better in office elected by political representation than single-member plurality and women have a greater probability to get elected to office which has shorter tenure and higher levels of turnover on average.

In the light of the above hypothesized direct impact of female participation on governance, female political representation elevates the educational attainment (Clots-Figueras 2012; Lahoti and Sahoo 2020); improvement on economic growth (Klasen 1999; Luci 2009; Mujahid and Zafar 2012); behavioural change as a form of improvement in female labor supply, significantly increase economic growth through demographic transition when fertility rate falls; corruption declines women participation in governance and women in governance decreases corruption (Bloom *et al.* 2009; Esarey and Schwindt-Bayer 2019).

Few studies that have incorporated some conditional interplay through which trade openness could influence gender economic participation include those that have articulated, foreign direct investment (see Aguayo-Tellez 2012; Okşakand Koyuncu 2017) and education (Lindgren and Sievers 2014) to serve as moderators. Also, several authors use income inequality, governance, financial access and ICT dynamics as alternative moderators to establish thresholds that can enhance female economic inclusion. In specifics, inequality can be reduced through good governance measures which will attract more gender participation in the formal economic sector (Fosu 2009, 2015); inequality can also reduce the positive impact of governance on gender economic inclusion (Asongu and Odhiambo 2020b) while financial access reduces the negative effect of income inequality on female economic participation (Asongu *et al.* 2019b). Further, the authors highlight that ICT infrastructure can be a pathway

through which the effect of the income inequality gap can be alleviated on female participation in the formal economic sector in Africa (Asongu and Odhiambo 2019a).

From the above strands of literature, we agree on the positive unconditional effect of trade openness (international trade) on female economic participation though, the role of governance has not been engaged with the effect of trade openness on female economic participation. However, from the governance and female economic inclusion nexus, we observe that good governance reasonably encourages female economic participation. Thus, the link between trade openness and female economic participation is broad and hence, modulating the nexus with a policy indicator such as governance would further improve the policy relevance of the study, not least, because governance influences gender economic inclusion outcomes.

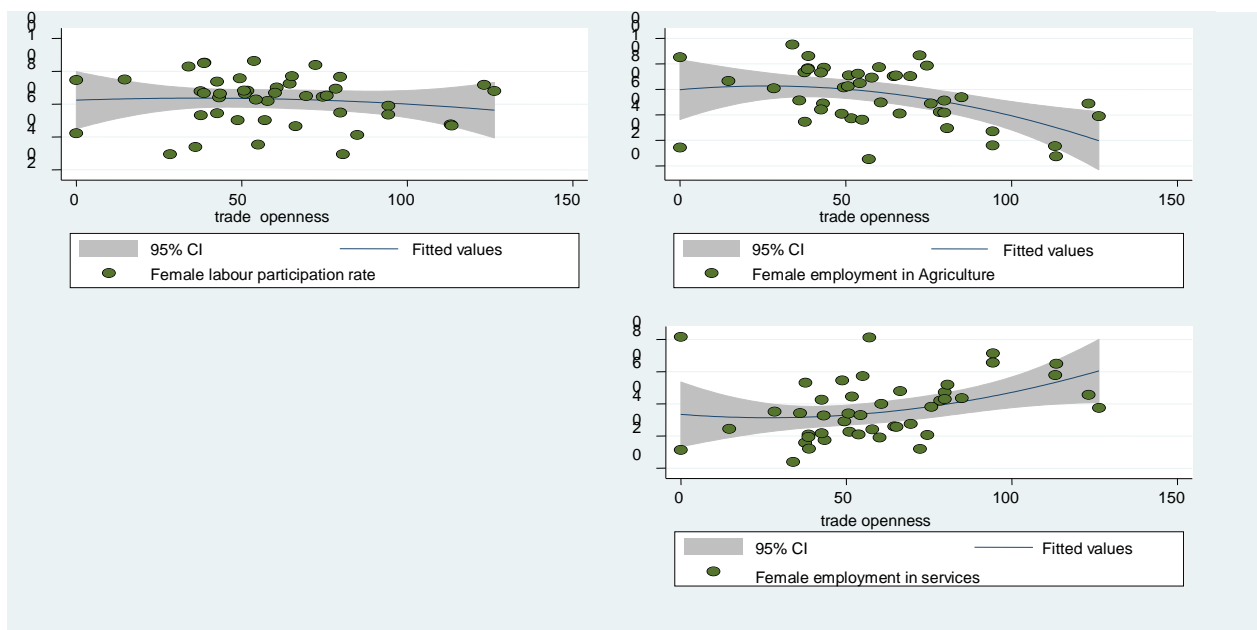


Figure 1: Trade openness and female economic participation nexus

Source: Authors

As apparent in Figure 1, the nexus between trade openness and female economic participation dynamics has many tendencies. Accordingly, there is a slightly negative or neutral nexus with female labour force participation, a positive nexus with female employment in services and a negative relationship with female employment in agriculture. However, established relationships are not causalities and hence, it is relevant to substantiate the underlying nexuses with more robust empirical evidence.

3.0 Data and Methodology

3.1 Data and variable justification

The macroeconomic dataset used for this study for the period 1996-2020 is from diverse sources. The sample comprises an unbalanced panel dataset of 42 SSA countries⁴. The period consists of three-year non-overlapping averages from 1996-1998; 1999-2001; 2002-2004; 2005-2008; 2009-2011; 2012-2014; 2015-2017 and 2018-2020. The choice of the study period and developing countries is due to the availability of data. Also, we use a sample of countries in Africa rather than a greater sample of more heterogeneous countries because the countries in our sample are more homogeneous and likely to be driven by similar factors (Asongu and Odhiambo, 2019a).

Further, the motivation of this research partly rests on Efobi *et al.* (2018). The outcome variable of interest is the economic participation of women (EPW), which is known as the active participation of females who are in the formal economic sector. Consistent with the underlying study, three main female indicators (i.e. female labour force participation, female employment in agriculture and female employment in services rate) are used as outcome variables for the analysis.

The female labour force participation rate is defined as the proportion of females in the labour force that is within the ages of 15 to 64, that is economically active and can supply labour for the production of goods and services during a specific period (World Bank, 2020). Female employment in agriculture is defined as persons who fall within the working age and are engaged in any activities to produce goods or services for payment or profit. The agriculture sector comprises activities in agriculture, hunting, forestry and fishing. Female employment in the service is well defined as persons of working age who are actively engaged in the service sector which comprises wholesale and retail trade and restaurants and hotels; transport, storage, and communications; financing, insurance, real estate, and business services; and community, social, and personal services. All are sourced from the International Labour Organisation. It is important note that, the dependent variable used in the study is female employment and not the ratio of female to male employment. However, predictions in the Heckscher-Ohlin and factor

⁴Angola; Benin; Botswana; Burkina Faso; Burundi; Cabo Verde; Cameroon; Central African Republic; Chad; Comoros; Congo Democratic Republic.; Congo; Cote d'Ivoire; Ethiopia; Gabon; The Gambia; Ghana; Guinea; Guinea-Bissau; Kenya; Lesotho; Liberia; Madagascar; Malawi; Mali; Mauritania; Mauritius; Mozambique; Namibia; Niger; Nigeria; Rwanda; Senegal; Seychelles; Sierra Leone; South Africa; Sudan; Sao Tomè and Príncipe; Tanzania; Togo; Uganda; Zambia.

endowment models are typically about the ratio of factors of production rather than their absolute levels (Brondoni 2021). Accordingly, an increase in demand for women workers relative to men workers due to higher trade has implications for the absolute employment of women and men.

The explanatory variables of interest in this study are: first, trade openness which is captured as the imports and exports of goods and services, because such is a widely used proxy for trade openness (Ofori 2021; Cooray et al.2012; Ofori and Grechyna 2021). Trade openness is the sum of exports and imports as a ratio of GDP of a country sourced from the World Development Indicators of the World Bank (2020). Trade is also captured as the main determinant of female participation in economic activities (Sauré and Zoabi 2014). The proxy for trade openness is informed by the elimination and removal of trade barriers which foster a free flow of goods and services among member countries in order to achieve a common market. In addition, this form of trading encourages specialization in countries thus leading to an expansion in some sectors while contracting others. Furthermore, trade is an important enhancer of female participation through its potential growth and spillovers (Sachs and Warner 1995). However, the impact of trade openness in terms of female employment into economic sectors is unequal across sectors (Wamboye and Seguino 2014). Second, following contemporary African inclusive governance studies (Ofori and Asongu 2021; Oluwatobi *et al.* 2015; Asongu and Nwachukwu 2015) we use six governance indicators which are sourced from World Governance Indicators of the World Bank into three components, namely: (1) political stability and voice & accountability (composed as political governance), (2) regulatory quality, government effectiveness (components of economic governance), (3) corruption-control and the rule of law (constituents of institutional governance). These three main indices are obtained using PCA which is elaborated in a subsequent section.

For controls, we consider two main variables employed from World Bank indicators of the World Bank, namely: GDP growth (annual %) and female life expectancy at birth. These control variables are based on econometric prudence. In specifics, we limit our control variables to two based on (1) the imperative to avoid instrument proliferation. This is because relevant studies on GMM use either two controls (Bruno *et al.* 2012) or no control variable (Osabuohien and Efobi 2013; Asongu and Nwachukwu 2017). (2) Intuition and extant literature. It is important to note that, in GMM, there is a choice between controlling for variable omission bias and having robust results, not least, because adding more variables in

the conditioning information set engenders instrument proliferation even when instruments are collapsed (Asongu and Odhiambo 2020c, p. 678).

While the literature indicates that GDP growth increases female participation in economic sectors (Su *et al.* 2019; Shahid 2014), alternative studies have also found a suppressing effect in the short run since there is a U-shape relationship between female labour participation and economic growth (Doğan and Akyüz 2017). Moreover, we consider female life expectancy at birth as a determinant of female economic participation (Bloom *et al.* 2009). The data description of the variables and sources are provided in Table 1.

Table 1: Description of Variables

Variables	Signs	Definitions of variables	Sources
<i>Dependent Variables</i>			
Female Economic Participation	flpr	Labour force participation rate, female (% of female population ages 15-64) (modeled ILO estimate)	ILO
	empagr	Employment in agriculture, female (% of female employment) (modeled ILO estimate)	ILO
	empser	Employment in services, female (% of female employment) (modeled ILO estimate)	ILO
<i>Predictor variables</i>			
Trade	open	Imports plus exports of goods and services (% of GDP)	WDI
Political governance	PolGov	First principal component that embodies voice and accountability and political stability	PCA
Economic governance	EcoGov	This embodies regulation quality and governance effectiveness	PCA
Institutional governance	InstGov	First principal component of corruption control, And rule of law	PCA
<i>Control variables</i>			
GDP growth	gdpg	Gross domestic product (GDP) growth (annual %)	WDI
Life expectancy	lifexp	Life expectancy at birth, female (years)	WDI
<i>PCA variables</i>			
Control of corruption	CC	Control of Corruption captures perceptions of the extent to which public power is exercised for private gain,	WGI

Governance effectiveness	GE	including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests Government Effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies	WGI
Political stability	PS	Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism.	WGI
Rule of law	RL	Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence	WGI
Voice and accountability	VA	Voice and Accountability captures perceptions of the extent to which a country's citizens can participate in selecting their government, as well as freedom of expression, freedom of association, and a free media	WGI
Regulation quality	RQ	Regulatory Quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development	WGI

Note: WDI: World Development Indicators of the World Bank. PCA: Principal Component Analysis. ILO: International Labour Organisation. WGI: World Governance Indicators of the World Bank.

3.2 Principal Component Analysis

We follow the approach of Asongu and Nwachukwu (2015) to adopt the principal component analysis (PCA) technique of bundling the governance indicators which we use as our explanatory variables. This analysis is adopted to reduce the complexity and higher correlation problems with variables into a minimal set of uncorrelated principal components (PCs) among the set of governance indicators as shown in Table 2. Hence, the PCA is performed to reduce the redundancy of similar information in the political, economic, and institutional governance indicators. The PCA is a statistical method and the most used algorithm for factor analysis that allows us to summarize information of highly correlated indicators into a common set of uncorrelated indicators shared by the original variables which are referred to as principal

components (PCs). The components are obtained by linearly combining the original dataset and are ordered according to the information they convey. The corresponding correlation matrix is shown in Table 3 below.

Accordingly, we bundle our six indicators by performing 3 independent PCAs to obtain three separate factors (political, economic and institutional governance). We select the first component for each of the independent PCAs. The *first* PC, which is political governance, embodies voice and accountability and political stability. Political governance forms the process by which leaders are selected and replaced to decide and formulate policies. The *second* PC is economic governance, comprising regulation quality and governance effectiveness. This form of governance coordinates economic policies and captures the capacity of the government to implement policies and deliver a service as well. The *third* is institutional governance involving rule of law and corruption control. It signifies the respect of the law by both the State and citizens as well as respect of institutions that rule the connections among them (Andrés *et al.* 2015).

The selection criteria used to retain these common factors are acceptable and in line with Kaiser (1974) and Jolliffe (2002) since all the eigenvalues for each PC are greater than one (see Table 3) and the scree plot gets flatter after the first factor (see Appendix A.1). For example, in Table 1 which is shown below, it can be seen that political governance (PolGov) has an eigenvalue of 1.647 and represents more than 82 per cent of explained variation for each input variable in component one.

Table2: Correlation

Matrix

Variables	CC	GE	PS	RL	VA	RQ	PolGov	EcoGov	InstGov
CC	1.000								
GE	0.834	1.000							
PS	0.652	0.633	1.000						
RL	0.870	0.897	0.757	1.000					
VA	0.710	0.740	0.647	0.806	1.000				
RQ	0.743	0.889	0.607	0.867	0.761	1.000			
PolGov	0.710	0.740	0.647	0.806	1.000	0.761	1.000		
EcoGov	0.743	0.889	0.607	0.867	0.761	1.000	0.761	1.000	
InstGov	1.000	0.834	0.652	0.870	0.710	0.743	0.710	0.743	1.000

Note: P.C: Principal Component. CC: Control of Corruption. GE: Government Effectiveness. PS: Political Stability. RL: Rule of Law. VA: Voice & Accountability. RQ: Regulation Quality. CC: Control of Corruption. PolGov (Political Governance): First PC of VA & PS. EcoGov (Economic

Economic governance (EcoGov), has an eigenvalue of 1.777 and explains more than 94 per cent of variation of each input variable in component one. Also, institutional governance (InstGov) has an eigenvalue of 1.740 and represents more than 94 per cent of explained variability for each input variable in component one. Further, we use the varimax method of rotation suggested by Kaiser to compute our index from the first principal component for all three independent PCA. Thus, since all the criteria are satisfied for component one in each separate PCA, we select component one for each separate PCAs. Three governance indicators are thus apparent. Hence, we use panel data for our analysis since the data can generate artificial homogenous patterns among countries. Furthermore, the motivation for this form of disaggregation explained above is adopted to achieve more homogeneous panel data that are free of heterogeneity bias. As far as we know, the PCs can be used to formulate political, economic and institutional governance. Thus, this is in line with the governance components of the problem statement. Therefore, we have used three independent factors for governance because to the best of our knowledge there is no proxy for such three forms of governance. Further, we also show the trend of good governance—comprising political, economic and institutional governance among countries the Sub-Saharan Africa region. Though several countries in the SSA sub-region (see e.g., Chad, Lesotho, Togo, Uganda) lag behind concerning political governance, economic governance and institutional governance in terms of the measuring rod of Kaufmann *et al.* (2010), the general trend as we show in Figure 2 is encouraging (see Figure A.2).

Table 3: Principal Component Analysis (PCA) for Governance (Gov)

Principal components	Component		matrix (loadings)				Proportion	Cumulative Proportion	Eigen Value
	VA	PS	RQ	GE	RL	CC			
First PC (PolGov)	0.707	0.707	-	-	-	-	0.824	0.824	1.647
Second PC	-0.707	0.707	-	-	-	-	0.176	1.000	0.353
First PC (EcoGov)	-	-	0.707	0.707	-	-	0.944	0.944	1.889
Second PC	-	-	-0.707	0.707	-	-	0.056	1.000	0.111
First PC (InstGov)	-	-	-	-	0.707	0.707	0.935	0.935	1.870
Second PC	-	-	-	-	0.707	-0.707	0.065	1.000	0.130

Note: P.C: Principal Component. CC: Control of Corruption. GE: Government Effectiveness. PS: Political Stability. RL: Rule of Law. VA: Voice & Accountability. RQ: Regulation Quality. CC: Control of Corruption. PolGov (Political Governance): First PC of VA & PS. EcoGov (Economic Governance): First PC of RQ & GE. InstGov (Institutional Governance): First PC of RL & CC

3.3 Empirical Estimation

The empirical rigour of this study rests on recent GMM-centric literature. In line with the objectives of the study, we adopt the two-step system GMM estimation strategy which depends on three main fundamental elements borrowed from previous studies (Asongu *et al.* 2021; Tchamyou 2019; Tchamyou *et al.* 2019). First, the sample countries (i.e., N) adopted in the study exceeds the number of time periods in each cross-section (i.e., T). Hence, the N>T condition is satisfied for the application of the technique. Second, from the three dependent variables of female economic participation, there exist persistence since the correlations between level series and their first lags are above 0.8, which is in line with the rule of thumb for satisfying persistence in a variable (Asongu and Odhiambo 2020; Asongu and Odhiambo 2019b). Third, the panel dataset of the study unveils cross-country variation which is accounted for in the estimations.

Consequently, the GMM approach employed in this research conforms to the Roodman (2009a, 2009b) approach and an augmentation of the Arellano and Bover (1995) estimation strategy. This strategy which has been documented accounts for the limited proliferation of instruments as well as cross-sectional dependencies (Fosu and Abass 2019).

Subsequently, we capture the standard GMM estimation procedure in equations (1) and (2)

$$fei_{it} = \lambda_0 + \delta_1 fei_{it-1} + \beta_1 open_{it} + \beta_2 gov_{it} + \sum_1^2 \theta_k v_{kit-\tau} + J_i + \mu_t + \varepsilon_{it} \quad (1)$$

$$fei_{it} - fei_{it-\tau} = \delta_1 (fei_{it-\tau} - fei_{it-2\tau}) + \beta_1 (open_{it} - open_{it-\tau}) + \beta_2 (gov_{it} - gov_{it-\tau}) + \sum_1^5 \theta_k (V_{kit-\tau} - V_{kit-2\tau}) + (\mu_t - \mu_{it-\tau}) + (\varepsilon_{it} - \varepsilon_{it-\tau}) \quad (2)$$

Next, to capture the hypothesised interaction effect of trade openness and governance on female economic participation, Equation (2) is modified to obtain Equation (3).

$$fei_{it} - fei_{it-\tau} = \delta_1 (fei_{it-\tau} - fei_{it-2\tau}) + \beta_1 (open_{it} - open_{it-\tau}) + \beta_2 (gov_{it} - gov_{it-\tau}) + \beta_3 ([open \times gov_{it} - open \times gov_{it}]_{it-\tau}) + \sum_1^2 \theta_k (V_{kit-\tau} - V_{kit-2\tau}) + (\mu_t - \mu_{it-\tau}) + (\varepsilon_{it} - \varepsilon_{it-\tau}) \quad (3)$$

Where, fei_{it} is an indicator for female economic participation comprising: (i) *flpr* (female labour participation rate), (ii) *empagr* (female employment in agriculture) and *empser* (female employment in service); i is countries; t is time in years; λ_0 is intercept; *open* is economic integration; *gov* is an indicator for political governance, economic governance and institutional

governance. Also, $open \times gov$ ($[open \times PolGov], [open \times EcoGov], [open \times InstGov]$) is the interaction term for governance indicators (political, economic and institutional) and trade openness; and V is the matrix of control variables defined as gdp for economic growth and $lifexp$ for female life expectancy at birth. Finally, τ is the coefficient of auto-regression; \mathbf{I}_i is the country-specific effect; μt is the time fixed effect and ε_{it} is the idiosyncratic error term. For a priori signs, we expect $\beta_1, \beta_2, \beta_3$ and θ_1 to increase female economic participation. Furthermore, we expect θ_2 to further improve female economic participation. To inform policymakers on the extent to which trade openness can be complemented with a policy variable (i.e., political, economic and institutional governance) to further improve female economic participation, we are consistent with an approach by Ofori and Asongu (2021). Accordingly, when both the unconditional and conditional effects have the same sign, it translates a synergy effect. In our case, in the light of the stated hypotheses, a positive synergy between trade openness and governance indicators on female economic participation is expected.

For GMM specification to satisfy a robustness check, we need to formulate the identification strategy underlying the specification approach. This study is in line with the extant GMM-centric literature that considers predictor variables (i.e., trade openness and governance indicators) as endogenous explaining and time periods as strictly exogenous (Tchamyou and Asongu 2017; Boateng *et al.* 2018). In light of the narrative above, we reveal that in evaluating and estimating the reliability of the estimates on female economic participation, we found that (1) our instruments are valid based on the Hansen test of overidentification; (2) overall, our models are significant based on the Wald test, and (3) the absence of second-order serial correlation in the residuals. Finally, the problem with endogeneity is also addressed in the research study since simultaneity is accounted for with the use of internal instruments and unobserved heterogeneity is also corrected by the use of time-invariant omitted indicators.

4.0 Results and discussion

4.1 Summary statistics

The section presents the summary statistics of the variables used in this empirical analysis. The data as presented in Table 4 show an average female labour force participation, female employment in agriculture and service outcome value as 62%, 53.5% and 37.7%, respectively.

Table 4: Summary statistics (1996-2020)

Variables	N	Mean	Std. Dev.	min	max
Corruption control	361	-.627	.612	-1.799	1.044
Government effectiveness	361	-.746	.59	-1.884	.973
Political stability	361	-.531	.874	-2.763	1.219
Rule of law	361	-.692	.632	-2.009	1.044
Voice and Accountability	361	-.582	.736	-2.209	.984
Regulation quality	361	-.668	.599	-2.244	1.039
Female labour force participation	361	62.008	15.073	28.747	88.607
Female employment in service	361	37.743	20.234	2.517	87.96
Female employment in agriculture	361	53.554	24.213	3.427	96.77
Trade openness	361	60.234	35.054	0	259.494
Political governance	361	0	1	-2.212	2.128
Economic governance	361	0	1	-2.631	2.848
Institutional governance	361	0	1	-1.917	2.729
GDP growth	361	3.869	3.48	-10.566	18.947
Female life expectancy at birth	361	58.623	7.276	38.018	77.813

Note: Std.Dev: Standard deviation. Min: Minimum. Max: Maximum. N: Observations.

Source: Authors' computation, 2021

Similarly, while we find an average value of 60% for trade openness, that of political, economic and institutional governance is zero with a standard deviation of one since those indicators are standardized and were obtained using the PCA, respectively. Further, the average value for the six governance indicators score is negative, signifying a case of weak institutional quality in Africa. The attendant correlations between these variables are presented in Table A.1 in the Appendices section.

4.2 Presentation of results

This section presents the findings on the conditional and unconditional effects of trade openness and governance indicators (composed of political, economic and institutional governance) on female economic participation using the system GMM regressions presented in Tables 5-8. These tables use female economic participation as the target variable composed of female labour force participation rate, female employment in agriculture and female employment in service, respectively. We consider each of the main specifications in line with the four explanatory variables of interest (i.e., economic integration, political governance,

economic governance and institutional governance). While the unconditional regressions enable the study to assess the direct effects of trade openness and governance dynamics on female economic participation, the conditional regression permit for the joint effects of trade openness and political, economic and institutional governance on female economic participation. In other words, the pathway regressions enable the study to investigate the role of governance dynamics in enhancing the effect of trade openness on female economic participation. Moreover, all the specifications are valid in the light of the information criteria which we discuss below.

Following the contemporary empirical literature that is based on the two-step system GMM approach (Asongu and De Moor 2017), the study articulates three post-diagnostic information criteria to investigate the validity of the models used for estimation. Given these established information criteria, all the specifications are valid. Especially, this research pays critical attention to the validity of several diagnostic tests. (1) The absence of second-order serial autocorrelation in the residuals which is evident in the (AR [2]) whose null hypothesis for no autocorrelation should not be rejected. (2) The test for over-identification restriction and validity of the instruments is addressed by the Hansen test since the p-value is insignificant. (3) Issues about the number of instruments that can compromise the validity of the model have been addressed (i.e., instrument proliferation) since the number of instruments for each specification must not be more than the corresponding number of countries in each estimation.

Table 5: GMM results on the effects of trade openness, governance and female labour force participation

Dependent variable: Female Labour Force Participation (flpr)								
Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Flpr (-1)	0.9985*** (0.0154)	0.9750*** (0.0158)	0.9749*** (0.0115)	0.9739*** (0.0066)	0.9794*** (0.0101)	1.0013*** (0.0144)	0.9915*** (0.0069)	0.9856*** (0.0097)
gdpg	-0.1088 (0.0649)	0.0560 (0.0503)	0.0124 (0.0251)	-0.0372* (0.0189)	-0.0531** (0.0233)	-0.0993*** (0.0367)	-0.0176** (0.0078)	-0.0134 (0.0103)
Lifexp	0.1030*** (0.0293)	0.1019*** (0.0239)	0.0362*** (0.0073)	0.0365*** (0.0085)	0.0331*** (0.0092)	-0.0353** (0.0140)	0.0380** (0.0148)	0.0385* (0.0200)
open		0.0112** (0.0051)				0.0100* (0.0057)	0.0081*** (0.0028)	0.0039** (0.0037)
PolGov			0.3298** (0.1274)			1.5899*** (0.4093)		
EcoGov				0.2579** (0.1277)			-0.7987*** (0.2274)	
InstGov					0.8671*** (0.2242)			-1.0714** (0.4131)
open × PolGov						0.0304*** (0.0061)		
open × EcoGov							0.0135*** (0.0031)	
open × InstGov								0.0191*** (0.0050)
Constant	-6.1413*** (2.1074)	-4.4963** (2.0820)	-0.6175 (0.7392)	-0.3282 (0.6770)	-0.3572 (0.8647)	1.7775 (1.3368)	-2.3024** (1.0928)	-1.7844 (1.3486)
Time effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Instruments	17	25	25	25	25	27	36	36
Observations	315	315	315	315	315	315	315	315
Countries	45	45	45	45	45	45	45	45
Wald	97122***	54219***	470786***	588018***	107497***	79991***	409859***	159449***
Hansen P-Value	0.236	0.202	0.777	0.868	0.451	0.158	0.234	0.233
AR (1)	0.0319	0.00748	0.00553	0.00921	0.0145	0.0702	0.0111	0.00991
AR (2)	0.877	0.132	0.164	0.148	0.157	0.490	0.169	0.168

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. Abbreviation: flpr; Female labour force participation rate; gdpg; economic growth; lifexp; female life expectancy at birth; open; trade openness; PolGov; political governance; EcoGov; economic governance; InstGov; institutional governance; Test of significance in bold values are in two ways. (1) The significance of estimated coefficients and the Wald test. (2) Failing to reject the null hypotheses of: (a) no autocorrelation in the AR (1) and (AR (2) tests and (b) the validity of the selected instruments lies in the Hansen tests.

Table 6: GMM results on the effects of trade openness, governance and female employment in agriculture

Dependent variable: Female employment in Agriculture (empagr)								
Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
empagr (-1)	1.0438*** (0.0179)	1.1971*** (0.0665)	1.0392*** (0.0264)	1.0295*** (0.0106)	1.0215*** (0.0091)	1.0267*** (0.0088)	1.0806*** (0.0099)	1.0550*** (0.0108)
gdpg	-0.2445 (0.1727)	-0.1274*** (0.0182)	-0.1032** (0.0483)	-0.1122*** (0.0274)	-0.0857*** (0.0185)	-0.0659*** (0.0108)	-0.0879*** (0.0084)	-0.0596*** (0.0137)
Lifexp	-0.1224 (0.0961)	0.3363** (0.1262)	0.0162 (0.0994)	-0.0553** (0.0221)	-0.0622*** (0.0199)	-0.0500 (0.0441)	0.0564** (0.0228)	0.1598*** (0.0256)
open		0.0241* (0.0132)				0.0210*** (0.0046)	0.0432*** (0.0097)	0.0164*** (0.0053)
PolGov			0.2535* (0.4983)			-3.2395*** (0.5671)		
EcoGov				0.5428** (0.2193)			-3.3481*** (0.5422)	
InstGov					0.3998* (0.2083)			-3.6983*** (0.6968)
open × PolGov						0.0259*** (0.0066)		
open × EcoGov							0.0435*** (0.0054)	
open × InstGov								0.0297*** (0.0094)
Constant	4.4425 (5.9045)	-33.8077*** (8.3232)	-4.4597 (5.8952)	0.5185 (1.6587)	1.2688 (1.4753)	-1.0724 (2.7688)	-11.9502*** (1.7983)	-16.0861*** (2.1555)
Time effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Instruments	17	30	18	19	19	45	45	45
Observations	315	315	315	315	315	315	315	315
Countries	45	45	45	45	45	45	45	45
Wald	8949***	4465***	6530***	51830***	58169***	233233***	331918***	711611***
Hansen P-Value	0.165	0.147	0.201	0.252	0.241	0.561	0.392	0.526
AR (1)	0.0237	0.0622	0.0192	0.0298	0.0274	0.0324	0.0523	0.0331
AR (2)	0.250	0.978	0.517	0.482	0.510	0.325	0.466	0.502

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. Abbreviation: empagr; Female employment in agriculture; gdpg; economic growth; lifexp; female life expectancy at birth; open; trade openness; PolGov; political governance; EcoGov; economic governance; InstGov; institutional governance; Test of significance in bold values are in two ways. (1) The significance of estimated coefficients and the Wald test. (2) Failing to reject the null hypotheses of: (a) no autocorrelation in the AR (1) and (AR (2) tests and (b) the validity of the selected instruments lies in the Hansen tests.

Table 7: GMM results on the effects of trade openness, governance and female employment in services

Dependent variable: Female employment in services (empser)								
Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
empser (-1)	1.0867*** (0.0783)	1.0688*** (0.0674)	1.0143*** (0.0368)	1.0309*** (0.0159)	1.0360*** (0.0120)	1.0371*** (0.0100)	1.0059*** (0.0080)	1.0350*** (0.0133)
gdpg	0.1487 (0.0938)	0.0727 (0.0649)	0.0203 (0.0412)	0.0708*** (0.0159)	0.0836*** (0.0184)	0.0246* (0.0143)	0.0068 (0.0057)	0.0304*** (0.0085)
Lifexp	-0.0234 (0.1494)	0.0214 (0.1147)	-0.0747 (0.0511)	0.0128 (0.0308)	0.0030 (0.0302)	0.2329*** (0.0225)	0.1736*** (0.0293)	0.0671* (0.0382)
open		0.0170* (0.0085)				-0.0030 (0.0018)	0.0121*** (0.0024)	0.0060** (0.0023)
PolGov			1.6644*** (0.5184)			0.4653** (0.1772)		
EcoGov				1.5529*** (0.2637)			0.5261** (0.2039)	
InstGov					1.4889*** (0.3269)			2.1872*** (0.2373)
open × PolGov						0.0193*** (0.0019)		
open × EcoGov							0.0137*** (0.0015)	
open × InstGov								0.0048*** (0.0011)
Constant	-0.0516 (6.8999)	-2.3338 (5.1421)	5.8212** (2.3232)	0.0689 (2.1696)	0.5865 (1.8963)	-12.5177*** (1.4691)	-8.5202*** (1.8730)	-2.1877 (2.1642)
Time effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Instruments	16	38	24	38	24	24	38	38
Observations	315	315	315	315	315	315	315	315
countries	45	45	45	45	45	45	45	45
Wald	650.7***	792.5***	4947***	31563***	16335***	267039***	67812***	70592***
Hansen P-Value	0.117	0.366	0.101	0.378	0.359	0.534	0.368	0.932
AR(1)	0.0791	0.0321	0.0250	0.0371	0.0437	0.0182	0.0214	0.0389
AR(2)	0.501	0.542	0.654	0.592	0.511	0.601	0.603	0.496

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1. Abbreviation: empser; Female employment in service; gdpg; economic growth; lifexp; female life expectancy at birth; open; trade openness; PolGov; political governance; EcoGov; economic governance; InstGov; institutional governance; Test of significance in bold values are in two ways. (1) The significance of estimated coefficients and the Wald test. (2) Failing to reject the null hypotheses of: (a) no autocorrelation in the AR (1) and (AR (2) tests and (b) the validity of the selected instruments lies in the Hansen tests.

On the first objective of the research, we provide evidence in Tables 5, 6 and 7 to show that trade openness and governance are remarkable channels for inducing female labour force participation and female employment in agriculture (see Columns 2-8). First, the coefficients of trade openness are 0.011, 0.024 and 0.017, meaning that a 1% increment in trade openness directly enhances female labour force participation, female employment in agriculture and female employment in the services by 0.011%, 0.024% and 0.017% respectively in SSA countries.

In specifics, female labour force participation improves when there is an import and export of relevant goods internationally because this will get more people in the chain of production and/or distribution, not least, because more employees would be needed which will create more job opportunities for females as well as males, *ceteris paribus*. This can be attributed to the fact when countries in SSA open-up to international trade, they specialize in the production of goods and services in which they have abundant factors of production. According to the Heckscher-Ohlin model, under trade openness countries, should specialize in the production of goods and services in which they have a comparative advantage or abundant resources in production. In specifics, women in Africa specialize and participate more in producing labour-intensive goods since it requires low-skilled labour. Hence, women tend to specialize more in farming, mining, construction and fishing and since the agriculture industrial sector has been the classical exporter of goods in Africa it is logical to expect an increase in female employment in the respective sector. Moreover, females are also more likely to be involved in the services sector, which explains the established positive nexus for the sector.

Considering the second hypothesis, we investigate the conditional effect of trade openness on female economic participation in SSA through political, economic and institutional governance. We find strong evidence to show that via trade openness, these governance dynamics spur female economic participation in SSA. The uniqueness of our results is that all our governance dynamics are effective moderators of the effect of trade openness on female economic inclusion in SSA. Particularly, we find that political, economic and institutional governance interact with trade openness to display a positive synergy on female labour force participation, female employment in agriculture and services in Sub-Saharan Africa.

The validity of Hypotheses 1 and 2 can trigger policy actions given the aim of our research problem that, when trade openness is combined with good governance the positive

impact is higher in promoting female economic participation. Hence, the study design and outcome are such a way that there is a positive synergy between trade openness and governance indicators (i.e., political, economic and institutional governance) in promoting female economic participation.

For our controls, we find that irrespective of the type of female economic participation model specification, the lag of female economic participation is remarkable and statistically significant in driving current female economic inclusion. Additionally, we find that economic growth has a positive or negative effect on female economic participation. Thus, the expected sign for economic growth should be positive but most of our signs are negative which do not validate our expected sign. This can be explained by the fact that growth in SSA over the past decades has not been inclusive, which is the reason many countries in the sub-region did not achieve most Millennium Development Goals (MDGs) (Tchamyou, 2021). Finally, we observe that most of the coefficients of female life expectancy at birth are negative which validates a prior sign.

4.3 Further Discussion of Results

This research has evaluated how the dynamics of governance indicators interact with trade openness to eventually promote the inclusion or participation of more females in the formal economic sector. To make this investigation, two main hypotheses have been tested. The empirical results are in line with the tested hypotheses because trade openness directly (unconditionally) promotes female participation in the labour force, female employment in agriculture and female employment in service (Tables 5-7). The positive unconditional effect of trade openness conforms to Hypothesis 1. These results can be attributed to the fact that trade openness improves employment opportunities. Concerning Hypothesis 2, it is apparent that governance interacts with trade openness to further increase female participation in the labour force, female employment in agriculture and female employment in services (Tables 5, 6 and 7). This positive joint effect coefficient validates Hypothesis 2. The positive findings of the conditional effect are consistent with the literature supporting the perspective that government actions (political, economic and/or institutional) aimed at removing tariffs and barriers of trade openness enhance female economic participation (Lindgren and Sievers, 2014).

Furthermore, these findings are in accordance with literature that good government-led actions designed to promote female economic participation may lessen income inequality (Asongu and

Odhiambo, 2019b; Tchamyou, 2019a; Asongu and Kodila-Tedika, 2018) in the labour force sector.

5.0 Conclusion and future research directions

This study contributes to the debate on the need for SSA countries to promote gender economic inclusion. In light of the motivation of this study, we have examined the positive synergy between governance and trade openness in promoting female economic participation. The scope of the research draws on 42 countries in Sub-Saharan Africa with data spanning 1996-2020. Three gender economic indicators are adopted, namely: female labour force participation, female employment in agriculture and female employment in service. Six governance indicators are proxied as political governance (comprising political stability and voice & accountability); (ii) economic governance (entailing government effectiveness and regulation quality) and institutional governance (encompassing corruption-control and the rule of law) obtained through principal component analysis. The empirical estimation technique employed is the Generalised Method Moments (GMM). The following results are obtained: first, trade openness in terms of trade openness has a positive direct or unconditional effect on female economic inclusion. Second, the joint effect of trade openness and governance dynamics (i.e., political, economic and institutional governance) further enhances the positive effect of trade openness on female economic inclusion.

In the light of the findings, it is apparent that political, economic and institutional governance interact with trade openness to display a positive synergy on female labour force participation, female employment in agriculture and services in the sampled countries. Hence, while trade openness improves conditions for more women to be formally involved in the labour market, complementing such trade openness with policies of good governance improves the anticipated gender-inclusive benefits. The policy importance of the governance modulating variables can be understood from three main perspectives.

(i)The modulating role of political governance is because, the absence of political violence in the election and replacement of political leaders provides an enabling environment for more openness and attraction of investors which are conditions for a stable economy that can promote female economic inclusion from investment-related activities. (ii)For economic governance, measures conducive for industrialization, entrepreneurship and export-driven strategies will help complement the increase in trade openness which will provide more employment for females. (iii) Concerning institutional governance, if citizens and the State

respect the rule of law and institutions in place, there is a likelihood of an improvement in trade openness which will affect female participation positively.

The study leaves room for future research. First, future research can employ alternative measures of governance and female economic inclusion to assess whether the established findings withstand empirical scrutiny. Second, examining the established findings within country-specific and regional studies to improve policies is worthwhile. These future research directions are founded on two main caveats, notably: (i) the governance measures are perception-based measures that can be affected by existing consensus and bias and (ii) the GMM technique is tailored such that country-specific effects are eliminated in the estimation process in order to control for endogeneity.

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APPENDICES

Table A.1: Pairwise correlation matrix of variables, 1996 – 2020

Variables	Governance indicators						Outcome	Variables			Predictor Variables				Control Variables	
	CC	GE	PS	RL	VA	RQ	Flpr	Empser	Empind	Empagr	Open	PolGov	EcoGov	InstGov	GDPG	Lifexp
CC	1															
GE	0.834***	1														
PS	0.652***	0.633***	1													
RL	0.870***	0.897***	0.757***	1												
VA	0.710***	0.740***	0.647***	0.806***	1											
RQ	0.743***	0.889***	0.607***	0.867***	0.761***	1										
Flpr	-0.163**	-0.134*	-0.176***	-0.196***	-0.154**	-0.169**	1									
Empser	0.507***	0.485***	0.457***	0.492***	0.499***	0.421***	-0.612***	1								
Empind	0.293***	0.294***	0.318***	0.354***	0.250***	0.298***	-0.377***	0.421***	1							
Empagr	-0.512***	-0.494***	-0.477***	-0.518***	-0.492***	-0.441***	0.625***	-0.962***	-0.652***	1						
open	0.214***	0.174***	0.221***	0.188***	0.175***	0.211***	-0.118*	0.298***	0.361***	-0.357***	1					
PolGov	0.710***	0.740***	0.647***	0.806***	0.980	0.761***	-0.154**	0.499***	0.250***	-0.492***	0.175***	1				
EcoGov	0.743***	0.889***	0.607***	0.867***	0.761***	0.950	-0.169**	0.421***	0.298***	-0.441***	0.211***	0.761***	1			
InstGov	0.990	0.834***	0.652***	0.870***	0.710***	0.743***	-0.163**	0.507***	0.293***	-0.512***	0.214***	0.710***	0.743***	1		
gdpg	0.104*	0.151**	0.0364	0.127*	0.116*	0.171**	0.0877	-0.111*	-0.065	0.113*	-0.006	0.116*	0.171**	0.104*	1	
lifexp	0.374***	0.365***	0.364***	0.450***	0.352***	0.287***	-0.275***	0.482***	0.204***	-0.464***	0.087	0.352***	0.287***	0.374***	-0.046	1

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. CC: Corruption-Control. GE: Government Effectiveness. PS: Political Stability. RL: Rule of Law. VA: Voice & Accountability. RQ: Regulation Quality. Flpr: Female labour force participation. Empser: Female employment in service. Empagr: Female employment in agriculture. PolGov: Political governance. EcoGov: Economic governance. InstGov: Institutional governance. GDPG: GDP growth. Lifexp: female life expectancy at birth

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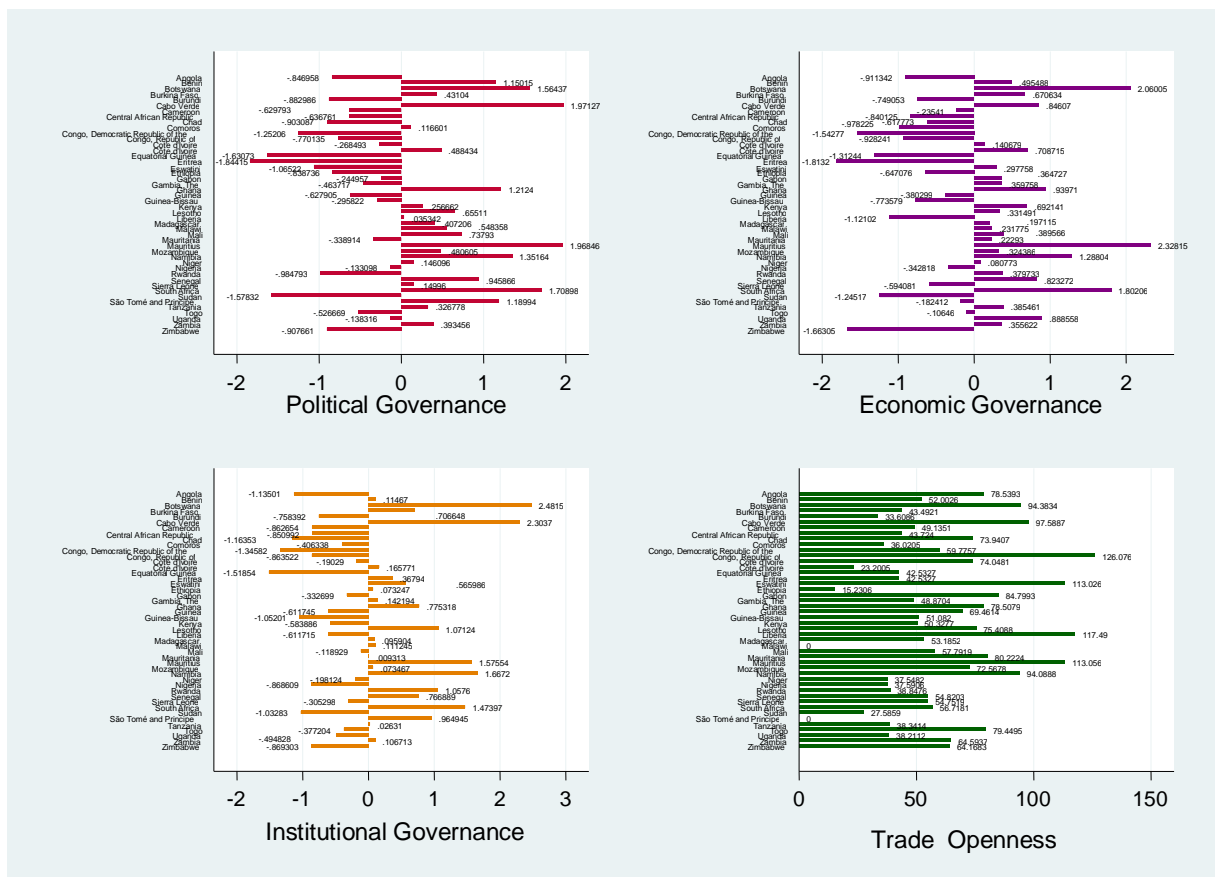


Fig. 2: Trade openness, Political, Economic and Institutional governance

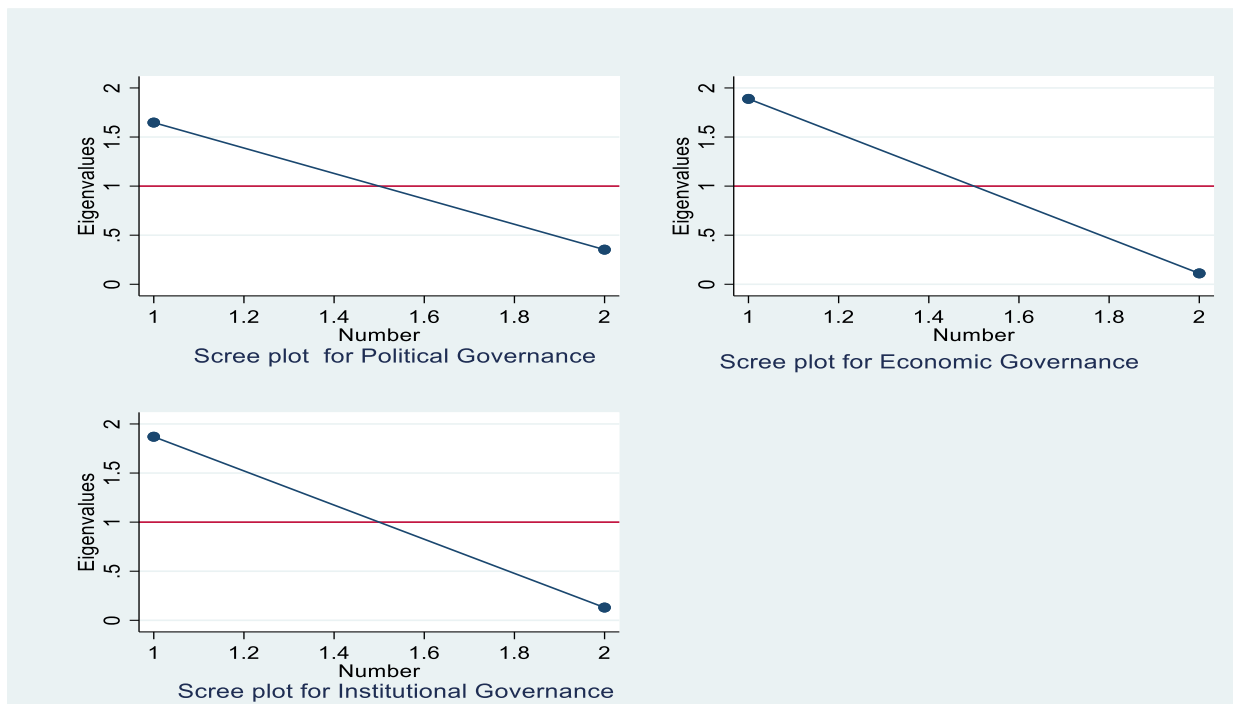


Fig. 3: Scree plot of Political, Economic and Institutional governance