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Gender economic inclusion and sustainable development in Africa

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1 The views expressed in this working paper are those of the authors and do not necessarily represent those of the ASPROWORDA, its Executive Board, or its management.

Abstract

Purpose – This study investigates how gender economic inclusion affects sustainable development in Africa.

Design/methodology/approach – The study is focused on 42 African countries for the period 2000-2019. It argues that enhancing gender economic inclusion in all sectors of society promotes and sets a better pace for the attainment of sustainable development in Africa. The gender economic inclusion variable used is the females employed as a ratio of the working-age. The study employs the Generalized Method of Moments as the main analysis method alongside the Ordinary Least Squares method.

Findings – The results shows that gender economic inclusion has a negative effect on sustainable development in Africa but reveals contradiction when income groups are taken into consideration as seen, wherein the middle-income group in Africa experiences a positive effect of gender economic inclusion on sustainable development.

Practical implications – As policy implications, this study recommends policy makers in low-income countries in Africa to do everything within their reach to have equitable gender inclusive societies, that is, to narrow the gap between the already wealthy class of women and the poor by having more women included in different economic sector activities which has the possibility of creating a more conducive atmosphere for sustainable development.

Originality/value – The study has complemented the extend literature by assessing the nexus between gender economic inclusion and sustainable development in Africa.

Keywords: Gender economic inclusion; sustainable development; Africa

JEL Classification: J16; Q01; 055

1. Introduction

In 2017, the Global Gender Report published by the World Economic Forum revealed that women make up a half of the world's population just like their male counterparts but despite this, the former do not have equal access to education, economic involvement, health assistance, financial earnings and resilience, and impactful decision-making power (Schwab *et al.,* 2017).The importance of having women participate more in societal, economic and environmental aspects cannot be understated given that such participation breathes grounds for increased returns in gross domestic product (Abney and Laya, 2018), environmental sustainability (Buckingham-Hatfield, 2002; Agarwal, 2010; Abney and Laya, 2018; Aust et al., 2020) overall economic prosperity (World Bank, 2015; Schwab *et al.,* 2017), and reduction of poverty (Buckingham-Hatfield, 2002; Efobi, Tanankem and Asongu, 2018) which is a key limiting factor of sustainable development. Gender economic inclusion in itself is crucial in building sustainable development since female participation in economic activities touches across most of the 17 mentioned Sustainable Development Goals (SDGs) outlined in the 2030 Sustainable Development Goals agenda (United Nations (UN), 2015). Gender economic inclusion is thus very important in the world and in Africa most especially because this region records very low female participation in formal economic activities (Efobi *et al.,* 2018; Offiong et al., 2021; Shabir & Ali, 2022; Sethy et al., 2023. Asongu & Odhiambo, 2024) when compared to the rest of the world. Therefore, this study seeks to assess how the enforcement of gender economic inclusion across divers economic spheres affects sustainable development in Africa and it is mainly inspired by two factors. The first of these factors is the pertinence of gender economic inclusion in strengthening and fostering sustainable development in this present SDGs era and secondly, gaps in literature.

Relative to gender economic inclusion and sustainable development, the UN Women (2014) have it that these two are pressing and inseparable needs that have to be met to permit full realization of women and girls human rights, as well to assist in a smooth transition to sustainable development by countries in the world. In reemphasizing the importance of gender economic inclusion for sustainable development, Agarwal (2018) has it that although the importance of gender has been recognized across some SDGs, the fact that some of these SDGs (such as 14 and 15) are silent on the role played, gender may make things more difficult in achieving the objectives set out by the SDGs if its role is neglected.

This study's contribution to extant literature is in two-fold. While other studies have examined the influence and nexus between gender economic inclusion and certain specific components of sustainable development such as poverty reduction, ecological transition and economic growth, to the best of our knowledge, this is the first study carried out to examine the influence of gender economic inclusion on sustainable development by making use of the composite sustainable development index. The study therefore brings in more evidence on the importance of enhancing gender economic inclusion by providing robust evidence from Africa. In the second place, the study provides evidence across different income groups due to the fact that countries with higher incomes across the globe tend to be countries that display a relative higher gender parity gap, thus facilitating the process of achieving inclusive sustainable development. The rest of the paper is structured as follows: Section 2 focuses on a brief literature review, Section 3 engages the data and methodologies followed by Section 4 with the results and discussion, and finally Section 5 which concludes with policy implications.

2. Literature review: gender and sustainable development in Africa

This section is particularly engaged in three main strands: (i) gender and inclusion, (ii) gender and sustainable development and (iii) gaps in the literature.

First, the popularity of gender economic inclusion in existing literature has spread over the years considering the influence it has in driving economic activities. As such, an increasing number of works that focus on gender economic inclusion and inclusive societies. The positive influence of gender inclusive societies has and is continuously being advocated for by many organizations across the world such as the OECD which has so far been instrumental in supporting and drawing attention on the importance of gender inclusive societies for reliable economic growth (OECD, IMF, ILO & World Bank Group, 2014). One of the policies engaged by these organizations is higher labor participation wherein they advocate for more inclusion of women into the labor force systems, being particularly the case of most G20 countries. The United Nations Women (2014) stated that in a world like this where sustainable development keeps facing unnumbered challenges, the centrality of gender equality cannot be undermined. Thus, Mlambo-Hgcuka, Under-secretary-general and executive director, UN women in her words "*Finally, women's knowledge, agency and collective action has huge potential to improve resource productivity,*

enhance ecosystem conservation and sustainable use of natural resources, and to create more sustainable, low-carbon food, energy, water and health systems. Failure to capitalize on this would be a missed opportunity. Women should not be viewed as victims, but as central actors in moving towards sustainability" (UN Women, 2014, p. 7). In relation to this, studies on gender economic inclusion and inclusive societies have had their focus on the way in which this subject matter affects sustainable development from different angles of the SDGs.

The inclusion of women across various economic domains has received particular attention in the financial world as several authors have it that financial inclusive societies turn out to provide more opportunities for women in the area of household contribution to bettering health and consumption which curbs poverty as well as providing economic prowess to contribute to a more active and profitable society in terms of growth (OECD, 2014; Pitt, 2014; Kairiza *et al.*, 2017). In Ethiopia, the government implemented several gender related policies due to the fact that evidence on gender inequality and discrimination are glaring as the economy faces a retarded development process due to high gender gaps and low female economic empowerment (Environmental Protection authority, 2012). An understanding of the importance of gender inclusive societies backed by the necessary intervening actions by governments across the globe such as in the case of Ethiopia will catapult the globe's achievement of an accelerated and profitable sustainable development. Other studies such as Alvarez (2013) and Stevens (2010) still on the issue of gender and inclusive societies have shown that achieving sustainable development is impossible without gender equality and the economic empowerment of women and that these variant serves as a precondition for and at the same time an indicator for sustainable development. Stevens (2010) further reiterates that not only does gender economic inclusion serve the purpose of sustainable development but that poor gender inclusive societies rather face worsening economic situations which breath social disturbances and environmental degradation. All of these therefore, reiterate the importance of developing and enhancing more gender inclusive societies.

Second, on the nexus between gender and sustainable development, Bayeh (2016) in a study on the role of empowering women and achieving gender equality in the sustainable development of Ethiopia, used a qualitative method of analysis, whilst building on data from secondary sources. Results revealed that the capacities of women in assisting to build the different dimensions of sustainable development in Ethiopia are relatively underutilized. The study revealed that women

make up half of the Ethiopian population but there exists an underutilization of women's potential in improving economic, political, social and environmental quality for development given the existence of a wide gender gap, thus concluding that the attainment of sustainable development without concrete inclusion of women at every step of the way is not realizable.

In another study by Efobi *et al.* (2018) on female economic participation with information and communication technology advancement for 48 countries in Africa from 1990 to 2014. Use was made of the Ordinary Least Squares (OLS), Fixed Effects (FE) and the Generalized Method of Moments (GMM) regression techniques and it was established that the improvement of technology leads to an increase in female economic participation. This therefore implicates that more societies become gender inclusive, the more economic participation and subsequently, favorable impacts on sustainable development.

Asongu & Odhiambo, (2020a) in their study on how enhancing gender economic inclusion affects inequality for 42 African countries for the period 2000 to 2014 established that the resultant effect of enhancing gender economic inclusion on inequality brings about a positive net effect. Hence, it was concluded that although gender economic inclusion is quite necessary, it is not sufficient in reducing inequality. As such, in this sustainable development era, to achieve sustainable development requires a complement of gender economic inclusion alongside other necessary measures to curb increased inequality which emanates from enhancing gender economic inclusion.

In the third strand, more contemporary literature has not focused on the subject examined in this study. For instance, Emeka et al. (2024) have investigated nexuses between gender economic inclusion, governance institutions and economic complexity in Africa. According to the narrative, Altuzarra et al. (2021) found that regardless of geography or economy, the gender gap in education and labor participation has a considerable negative impact on economic growth. In terms of gender dynamics and work prospects, Barza et al. (2020) discovered a positive association between increased economic complexity and female employment. Furthermore, Lapatinas et al. (2021) identified a U-shaped association between employment and economic complexity in terms of gender dynamics. Maurya (2023) discovered that women's participation in the labor force in more sophisticated areas of the economy acts as a conduit for gender-specific regulations, which

contribute to the economy's complexity. Akhtar et al. (2023) and Sulaiman, Muhamad, and Tang (2024) found that increased female labor force participation, higher female education levels, and an enhanced gender parity index all contribute to faster economic growth in Malaysia and Southeast Asia. Nwokoye et al. (2020), as well as Ruiters and Charteris (2020), have established that strong state policies supporting high levels of education can have a favorable impact on female labor productivity growth. Beton (2023) has posited that education has a critical role in increasing female labor force participation in Turkey, establishing a positive relationship between the two.

In the light of the above, study bridges the gap in the literature by providing evidence on how gender economic inclusion affects all the components of sustainable development (i.e. by using the sustainable development index) thus, having a more comprehensive exhibition of the influence of gender economic inclusion on sustainable development in Africa whilst providing robust results based on different income groups. It equally provides robust results across different income groups in Africa. This study therefore seeks to answer the following research question; how does the enhancement of gender economic inclusion affect sustainable development in Africa? This question will be answered by considering the methodology in the following section.

3. Data and Research Methodology

3.1 Data

Data used in the study are collected from 42 countries in Africa between the year 2000 to 2019. The choice of years and variables is particularly influenced by the availability of data. The data sources used to obtain data include the World Governance Indicators (WGI) of the World Bank which captures the government effectiveness control variable, the World Development Indicators (WDI) of the World Bank provides data on the independent variables and the remaining control variables. The Hickel database for the year 2020 is used to obtain data on the sustainable development index. The 42 countries are selected with respect to data availability constraints

3.1.1. Dependent Variable

The dependent variable is the SDI of Hickel, which depicts countries' efficiency in achieving development, especially human development. This index is a quotient of two factors; the human

development index and the ecological impact index. The Human Development Index (HDI) is a geometric mean obtained from the sum of life expectancy index, education index and an income index. On the other hand, the ecological index is made up of a material footprint and CO2 emission that is consumption based, calculated with respect to the extent to which they exceed per capita shares of planetary boundaries. This index has been used in empirical studies by Nchofoung*et al.* (2022).

3.1.2. Independent Variable of Interest

The independent variable of interest is gender economic inclusion. The measure used as proxy for gender economic inclusion is the females employed as a ratio of the working-age. Asongu& Odhiambo, (2020a) have adopted similar measures of gender economic inclusion. They argue that the resultant effect of enhancing gender economic inclusion on inequality brings about a positive net effect. As such, the hypothesis tested by this studyis as follows: gender economic inclusion enhances sustainable development in Africa.

3.1.3. Control Variables

The control variables chosen are related to the existing literature on inclusive development. These variables include financial development, proxied by domestic credit to the private sector, globalization proxied by trade openness and foreign direct investments, governance captured by government effectiveness and lastly, economic growth. The variables are corresponding expected signs are provided in Appendix 1.

3.2 Model Specification and Regression Methodology

3.2.1. Model Specification

Since 2015 after the adoption of the sustainable development agenda, several policy institutions have with their knowledge, been seeking for the right policy instruments and pathway to put in place for the realization of the SDGs but most countries especially the developing countries still have a blurred vision with respect to the attainment of the SDG agenda. For this SDGs agenda to be successful, every national or economic domain particularity that could impact environmental,

economic and social developments should be put under serious exploitation. This is the case with gender economic inclusion, which is one of the societal aspects that has grown over the years and has been cited as a leading influencer on sustainable development. Gender economic inclusion could therefore impact the economy through its ability to enhance economic diversity through businesses, leading to better living conditions, hence human development. This therefore enhances economic activities such as trade and creation of more wealth for countries thus making countries attractive for foreign direct investments. This foreign direct investments on their part will enhance job creation and overall development in countries.

From the above, a theoretical model can be derived, linking gender economic inclusion and sustainable development.

SDI = f(Gender economic inclusion)

This can further be expanded to include all the control variables such that;

$SDI_{it} = \beta_0 + \beta_1 Fem_{it} + \beta_2 Account_{it} + \beta_3 Internet_{it} + \beta_4 Credit_{it} + \beta_5 FDI_{it} + \beta_6 Trade_{it} + \beta_7 Gov_{it} + \beta_8 Growth + \varepsilon_{it}$

Where β is the coefficient associated to each variable, ε is the error term, i is the cross-sectional dimension at period t. SDI is the sustainable development index which is the dependent variable, *Fem*, *Account* and *Internet* are the measures of, respectively, gender economic inclusion which stand for the females employed as a ratio of the working-age, share of adult women with a formal bank account and ICT – share of women aged 15-49 who use computer and/or internet at least once a week, and every day. *Credit*, *FDI*, *trade*, *Gov* and *Growth* are the control variables which represent domestic credit to the private sector, foreign direct investments, trade openness, government effectiveness and economic growth, respectively.

3.2.2. Regression Methodology

The methodology adopted in this study is the GMM based on the fact that cross sections are relatively more than the time periods of the study[2]. The use of this method is backed by the following: (i) number of countries (42 countries) is greater than the time period (20 years, 2000-

[2] The Stata software is used for the empirical analysis.

2019), (ii) consideration of cross-country characteristics due to the fact that the data is of a panel structure, and (iii) the problem of endogeneity (i.e. simultaneity and omitted variable problems) is addressed. The Roodman (2009) specification is adopted for use, as an extension of Arellano and Bover (1995). The use of this method is consistent with Nchofoung and Asongu, (2022); Tchamyou *et al.* (2019); Efobi *et al.* (2018) and Asongu and Odhiambo, (2020a). The inclusion of a lagged dependent variable is due to fixed effects considerations of the error and the panel bias observed when the OLS is used. The following equations constitute a summary of the GMM specification:

$$SDI_{it} = \beta_0 + \beta_1 SDI_{it(t-\mu)} + \beta_2 Fem_{it} + \beta_3 Account_{it} + \beta_4 Internet_{it} + \sum_{h=1}^{5} \delta_h W_{h,i(t-\mu)} + \eta_i + U_t + \varepsilon_{it}$$

$$SDI_{it} - SDI_{it(t-\mu)} = \beta_1(SDI_{it(t-\mu)} - SDI_{it(t-2\mu)}) + \beta_2(Fem_{it} - Fem_{i(t-\mu)}) + \beta_3(Account_{it} - Account_{i(t-\mu)}) + \beta_4(Internet_{it} - Internet_{i(t-\mu)}) + \sum_{h=1}^{5} \delta_h(W_{h,i(t-\mu)} - W_{h,i(t-2\mu)}) + (U_t - U_{t-\mu}) + (\varepsilon_{it} - \varepsilon_{i(t-\mu)})$$

The variables in the GMM are considered as above. Due to the possibility of identification, restriction and simultaneity problems, all the independent variables are considered sources of endogeneity and there are all treated as endogenous variables. This basis finds its backing in the works of Asongu and Nwachukwu (2016); Tchamyou *et al.* (2019) and Nchofoung *et al.* (2021).

4. Results and discussion

In this section deals with the presentation of results, beginning with overall summary statistics, correlation statistics and then the results from the GMM regression which will comprise a distinction between income groups in Africa.

4.1 Summary statistics and correlation statistics

Table 1 below presents descriptive statistics of the variables included in the model.

"Insert Table 1 here"

Table 2 below presents the correlation table which depicts the strength and the direction which exist between the variables used in the model. Values range from -1 to +1: the closer they are to

1 indicates a stronger correlation between the said variables and the closer they are to zero reveals a weaker correlation. This analysis mainly puts to check the presence of multicollinearity amongst the independent variables.

"Insert Table 2 here"

4.2 Baseline regressions

This subsection presents the baseline results in Table 3 of the ordinary least squares (OLS), fixed effects (FE) and the Driscoll and Kraay (1998) estimate (1, 2 & 3 respectively). The results are somewhat similar but cannot be interpreted at this level due to some econometric constraints such the unchecked heterogeneity.

"Insert Table 3 here"

4.3 GMM results

The results below show the effect of gender economic inclusion (females employed as a ratio of the working-age) on sustainable development. Table 4 presents the results from the full sample using the GMM estimator while Table 5 and Table 6 present the results across different income groups.

Table 4 reveals that females employed as a ratio of the working age group does not have any influence on sustainable development when regressed with other variables (eq1). On the other hand, when it is regressed as the lone variable (eq2), it shows that it has a positive significant influence on sustainable development.

"Insert Table 4 here"

Table 5 below reveals that gender economic inclusion has a negative insignificant influence on sustainable development in low-income countries in Africa.

"Insert Table 5 here"

"Insert Table 6 here"

On the other hand, for middle income countries in Africa, Table 6 reveals that gender economic inclusion has a positive significant influence on sustainable development.

Summarily, the results depict two different effects. For the baseline line results, females employed as a ratio of the working age (economic gender economic inclusion) has a negative significant effect on sustainable development in Africa. The main results (GMM) reveal that this gender economic inclusion variable has a negative insignificant effect on sustainable development when regressed with other variables but has a positive significant effect on sustainable development when regressed alone. This negative result is partly in accordance with the results found by Asongu and Odhiambo (2020a) wherein it was discovered that enhancing gender economic inclusion rather leads to intensification of inequality, which is unfavorable for sustainable. They explained that enhancing gender economic inclusion rather creates a wider link between the already wealthier class of women who have the means of engaging in economic activities and the poor women who have little or nothing with respect to wealth and income. However, their results and conclusion show that gender economic inclusion is important for sustainable development but not a sufficient in itself to boost sustainable development; hence, the need to be joined with other economic, and societal variables. This negative result contradicts the results of Bayeh (2016).

On the other hand, a look at the various income groups in Africa reveals that for the low-income group, gender economic inclusion has a negative insignificant effect on sustainable development in Africa while for the middle-income countries, gender economic inclusion has a positive significant effect on sustainable development. This can be explained by the fact that in the low-income countries, the greater proportion of people in the agricultural sector are poor women who basically farm for subsistent needs (feeding) and a very few in the other economic sectors who live averagely. This thus reveals a relatively longer period for the fruits of empowering women in such communities to be considerably felt on development. With the middle-income countries, due to a certain level of advancement, narrowed inequality and low poverty situations, women are open to

better opportunities and livelihoodsin these countries thus, a better impact felt by their economic activities on development of such communities. Efobi*et al.* (2018) in their study find a significant positive effect of gender inclusive societies on development.

5. Conclusion and Implications

The objective of this paper was to empirically investigate the effect of gender economic inclusion on sustainable development in Africa. The methodology involved the use of the OLS for comparative checks of results, the Fixed effects estimator, to control for individual heterogeneity, the Driscoll and Kraay estimator to check for cross sectional dependence between the different panels and the GMM, to correct simultaneity bias and unobserved heterogeneity. The results shows that gender economic inclusion has a negative effect on sustainable development in Africa but reveals contradiction when income groups are taken into consideration as seen, wherein the middle-income group in Africa experiences a positive effect of gender economic inclusion on sustainable development.

As policy implications, this study recommends policy makers in low-income countries in Africa to do everything within their reach to have equitable gender inclusive societies, that is, to narrow the gap between the already wealthy class of women and the poor by having more women included in different economic sector activities which has the possibility of creating a more conducive atmosphere for sustainable development. Lessons can be captured from the case of Ethiopia as revealed by the Environmental Protection Authority, (2012) wherein the government implemented several gender related policies due to the fact that evidence on gender inequality and discrimination had glaring effects as the economy faced a retarded development process due to high gender gaps and low female economic empowerment (Environmental Protection authority, 2012). While the middle-income countries in Africa a better off, and enjoy the positive influence of gender inclusive societies on their development, policy makers in the low-income countries have to re-strategize on how to close gender empowerment gaps amongst their women.

Finally, the study leaves room for future research works. Firstly, the gender variable used here is generally an economic variable, therefore other environmental, technological and political variables should be considered. Secondly, country specific studies should equally be carried out for the sake of country specific policy implications and recommendations. This will provide further

research and evidence in understanding the effect of gender om sustainable development. Thirdly, in order to improve insights into the nexuses, while the focus of the present study is on how gender economic inclusion affects sustainable development, future studies can take on board more sociological and anthropological viewpoints, especially as it pertains to understanding the role of women in looking after the family. Given apparent data availability constraints, such a complementary perspective will require primary data collection while the present study is based on secondary data.

Table 1: Summary of descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
sdi	837	.534	.109	.282	.791
employm	820	53.524	19.595	8.36	86.01
dcps	751	22.401	24.288	.008	142.422
fdi	743	-8.397e+08	2.160e+09	-2.511e+10	8.749e+09
trade	762	71.707	33.433	20.723	225.023
gdpc	839	2187.653	2800.99	111.927	16213.481
govteff	798	-.623	.569	-1.922	1.057

Source: computed by authors. sdi: sustainable development index. employm: females employed as a ratio of the working-age. dcps: domestic credit to the private sector as % of GDP. fdi: foreign direct investment. trade: trade openness. gdpc: GDP per capita. Govteff: government effectiveness.
Source: Authors

Table 2: Matrix of correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) sdi	1.000						
(2) employm	-0.586	1.000					
(3) dcps	0.417	-0.399	1.000				
(4) fdi	-0.187	0.159	-0.228	1.000			
(5) trade	0.249	-0.298	0.154	-0.003	1.000		
(6) gdpc	0.586	-0.558	0.494	-0.174	0.369	1.000	
(7) govteff	0.239	-0.252	0.644	-0.181	0.141	0.406	1.000

Source: computed by authors. sdi: sustainable development index. employm: females employed as a ratio of the working-age. dcps: domestic credit to the private sector as % of GDP. fdi: foreign direct investment. trade: trade openness. gdpc: GDP per capita. Govteff: government effectiveness.
Source: Authors

Table 3: Baseline regressions

VARIABLES	(1) OLS Dependent variable = sdi	(2) FE Dependent variable = sdi	(5) Driscoll &Kraay Dependent variable = sdi
employm	-0.002***	-0.005***	-0.005***
	(0.000)	(0.001)	(0.001)
	-0.345	-0.880	-0.880
dcps	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)
	0.163	0.354	0.354
fdi	-0.000*	0.000*	0.000
	(0.000)	(0.000)	(0.000)
	-0.054	0.030	0.030
trade	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
	0.009	0.039	0.039
gdpc	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)
	0.343	0.199	0.199
govteff[6]	-0.019**	-0.005	-0.005
	(0.008)	(0.009)	(0.018)
	-0.104	-0.029	-0.029
Constant	0.588***	0.743***	0.743***
	(0.020)	(0.035)	(0.033)
	.	.	.
Observations	555	555	555
R-squared	0.459	0.173	
Number of id		36	
Number of groups			36

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Authors. sdi: sustainable development index. employm: females employed as a ratio of the working-age. dcps: domestic credit to the private sector as % of GDP. fdi: foreign direct investment. trade: trade openness. gdpc: GDP per capita. Govteff: government effectiveness.
Source: Authors

Table 4: GMM results (full sample)

VARIABLES	(1) eq1 sdi	(2) eq2 sdi	(3) eq3 sdi	(4) eq4 sdi	(5) eq5 sdi	(6) eq6 sdi	(7) eq7 sdi
L.sdi	1.004***	0.986***	0.936***	0.679***	0.840***	0.895***	0.659***
	(0.0197)	(0.0612)	(0.0176)	(0.0611)	(0.0395)	(0.0239)	(0.0831)
employm	-0.000303	0.00162***					
	(0.000187)	(0.000579)					
dcps	-0.000480***		6.34e-05				
	(9.53e-05)		(7.62e-05)				
fdi	-0***			-0*			
	(0)			(0)			
trade	2.36e-05				-0.000370**		
	(5.25e-05)				(0.000178)		
gdpc	-2.68e-06***					-1.11e-06*	
	(5.47e-07)					(6.76e-07)	
govteff	0.00976*						0.0410*
	(0.00548)						(0.0222)
Constant	0.0396***	-0.0794	0.0377***	0.180***	0.118***	0.0640***	0.214***
	(0.0151)	(0.0570)	(0.00822)	(0.0337)	(0.0279)	(0.0128)	(0.0371)
Observations	534	776	713	710	722	795	754
Number of id	36	41	42	41	39	42	42
ar2p	0.366	0.454	0.392	0.982	0.355	0.374	0.796
sarganp	0.960	0.965	0.209	0.981	0.967	0.834	0.993
hansenp	0.571	0.316	0.110	0.00340	0.0333	0.0929	0.00649
chi2	349790	10970	936611	6999	17842	44672	5591
chi2p	0	0	0	0	0	0	0
ar1p	0.0617	0.0419	0.0412	0.0365	0.0283	0.0435	0.0156

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Authors. sdi: sustainable development index. employm: females employed as a ratio of the working-age. dcps: domestic credit to the private sector as % of GDP. fdi: foreign direct investment. trade: trade openness. gdpc: GDP per capita. Govteff: government effectiveness.
Source: Authors

Table 5: GMM results across different income groups (Low Income group)

VARIABLES	(1) eq1 sdi	(2) eq2 sdi	(3) eq3 sdi	(4) eq4 sdi	(5) eq5 sdi	(6) eq6 sdi	(7) eq7 sdi
l.sdi	0.928***	1.060***	0.953***	0.878***	0.899***	0.817***	0.797***
	(0.0319)	(0.0533)	(0.00923)	(0.0123)	(0.0217)	(0.0264)	(0.0313)
employm	-3.87e-05	0.00507***					
	(0.000275)	(0.00147)					
dcps	-0.000102		0.000260				
	(0.000308)		(0.000165)				
fdi	0**			-0			
	(0)			(0)			
trade	0.000128***				-0.000306***		
	(1.53e-05)				(0.000112)		
gdpc	5.24e-07					2.46e-05***	
	(1.12e-05)					(6.85e-06)	
govteff	-0.000291						-0.00709
	(0.00662)						(0.00486)
Constant	0.0370	-0.369***	0.0244***	0.0615***	0.0696***	0.0776***	0.0925***
	(0.0253)	(0.123)	(0.00331)	(0.00690)	(0.00792)	(0.0119)	(0.0152)
Observations	185	304	277	255	256	304	288
Number of id	12	16	16	15	14	16	16
ar2p	0.763	0.0955	0.593	0.382	0.205	0.424	0.479
sarganp	0.936	1.000	0.804	0.947	0.970	0.999	0.838
hansenp	0.971	0.474	0.172	0.191	0.166	0.621	0.231
chi2	571882	1193	2.270e+06	231454	78893	68436	36558
chi2p	0	0	0	0	0	0	0
ar1p	0.0295	0.0922	0.0511	0.0612	0.0322	0.0382	0.0491

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors. sdi: sustainable development index. employm: females employed as a ratio of the working-age. dcps: domestic credit to the private sector as % of GDP. fdi: foreign direct investment. trade: trade openness. gdpc: GDP per capita. Govteff: government effectiveness.
Source: Authors

Table 6: GMM results across different income groups (Middle Income group)

VARIABLES	(1) eq1 sdi	(2) eq2 sdi	(3) eq3 sdi	(4) eq4 sdi	(5) eq5 sdi	(6) eq6 sdi	(7) eq7 sdi
L.sdi	0.977***	0.889***	0.887***	0.789***	0.633***	0.847***	0.403***
	(0.0334)	(0.0399)	(0.0284)	(0.0752)	(0.0474)	(0.0313)	(0.0787)
employm	0.000261*	0.00174***					
	(0.000153)	(0.000652)					
dcps	-0.000235***		6.54e-06				
	(5.37e-05)		(0.000178)				
fdi	-0			-0***			
	(0)			(0)			
trade	8.66e-05				-0.000379***		
	(5.54e-05)				(0.000109)		
gdpc	-2.15e-06***					-1.62e-06*	
	(3.33e-07)					(9.18e-07)	
govteff	0.0109*						-0.0299
	(0.00596)						(0.0278)
Constant	0.0178	-0.00451	0.0722***	0.127***	0.252***	0.0987***	0.341***
	(0.0256)	(0.0211)	(0.0193)	(0.0459)	(0.0298)	(0.0196)	(0.0368)
Observations	331	453	398	417	428	453	430
Number of id	23	24	24	24	23	24	24
ar2p	0.160	0.125	0.118	0.128	0.164	0.124	0.923
sarganp	0.405	0.997	0.747	0.943	0.946	0.833	0.998
hansenp	0.892	0.644	0.490	0.118	0.0243	0.370	0.0164
chi2	330953	11632	59406	14727	8659	38828	3746
chi2p	0	0	0	0	0	0	0
ar1p	0.157	0.112	0.123	0.0974	0.116	0.134	0.465

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors. sdi: sustainable development index. employm: females employed as a ratio of the working-age. dcps: domestic credit to the private sector as % of GDP. fdi: foreign direct investment. trade: trade openness. gdpc: GDP per capita. Govteff: government effectiveness.
Source: Authors

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Appendices

Appendix 1: Variables, extant literature and expected signs

Variables	Extant Literature	Expected Sign
Domestic credit to the private sector	*Nchofoung et al. (2022) and Chien et al. (2021)*	+
Trade openness	*Nchofoung et al., (2022), Asongu and Nwachukw (2017) and Sheikh et al. (2020)*	+/-
Foreign direct investments	*Nchofoung et al. (2022) and Aust et al. (2020)*	+/-
Government effectiveness	*Nchofoung et al. (2022), Bayeh, (2016) and Asongu and Odhiambo, (2020b)*	+
Economic growth	*Nchofoung et al. (2022), Chien et al. (2021) and Bayeh (2016)*	+/-

Source: Authors