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Globalisation and Female Economic Participation in Sub-Saharan Africa

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Abstract

This study assesses the relationship between globalisation and the economic participation of women (EPW) in 47 Sub-Saharan African countries for the period 1990–2013. EPW is measured with the female labour force participation and employment rates. The empirical evidence is based on panel-corrected standard errors and fixed effects regressions. The findings show that the positive effect of the overall globalisation index on EPW is dampened by its political component and driven by its economic and social components, with a higher positive magnitude from the former or economic globalisation. For the most part, the findings are robust to the control for several structural and institutional characteristics. An extended analysis by unbundling globalisation shows that the positive incidence of social globalisation is driven by information flow (compared to personal contact and cultural proximity) while the positive effect of economic globalisation is driven by actual flows (relative to restrictions). Policy implications are discussed with some emphasis on how to elevate women's social status and potentially reduce their victimisation to male dominance.

Keywords Globalisation · Female · Gender · Inequality · Inclusive development · Labour force participation · Africa

JEL Classification E60 · F40 · F59 · D60 · O55

Introduction

Three main strands in contemporary development literature motivate this inquiry, notably: (1) the low participation of the female gender in the labour market; (2) the contemporary relevance of making globalisation more inclusive and (3) sustainable

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development challenges in terms of employment and inclusive development in Africa.

First, on the low participation of women in formal economic sectors, while women have traditionally been the most vulnerable group in the labour market, such vulnerability is comparatively most relevant in Africa [29].[1] According to the narrative, the female is for the most part, absorbed in informal economic sectors, notably: by engaging in small-scale sole business proprietorships and smallholding farming activities [13, 14, 31, 34, 59, 65, 72, 73]. Moreover, there is an evolving strand of literature on the pervasiveness of gendered representation of women's work [45, 46, 49, 61, 71–73, 77].

Second, no consensus has yet been reached in the literature on the effect of globalisation on development outcomes. Accordingly, while economic and financial instabilities have been documented to be the outcome of increasing globalisation and liberalisation, there are also some accounts in the literature on the positive rewards of globalisation, notably: in terms of international risk-sharing and allocation efficiency in resources [12, 42, 43, 58]. In essence, according to Azzimonti et al. [16], the development literature has been articulated along two main lines in the past 30 years: growing globalisation and increasing inequality. In essence, over the past decades, non-inclusive development has been particularly concerning in both developed [15, 57] and developing [48, 67, 68] countries.

Third, in the post-2015 sustainable development agenda, a particularly relevant issue is 'growing inequality' owing to increasing globalisation [76]. According to the narrative, whereas globalisation is an ineluctable phenomenon that promises to alleviate developing countries of socio-economic stringencies, it also threatens to disfigure the human face because it endangers the prosperity of nations and people by *inter alia* advocating for: self-interest over altruism and market power over governments [4]. Therefore, it is not very surprising that in certain developing countries, public support for the phenomenon is decreasing, with explorations of alternatives to the negative consequences of the capitalism-driven globalisation [4, 9, 41, 64].

In addition to above points, an inquiry into the importance of globalisation in the economic participation of women in Africa is even more relevant because unemployment is one of the most challenging present and future policy syndromes in the continent. Accordingly, the contemporary world is experiencing the most significant demographic challenge and Africa is at the centre of it. The population of the continent is projected to double by 2036 and represent about 20% of the world's population by 2050 [1, 5, 21, 75]. Given the apparent discrimination against women in Africa [32, 56], the underlying unemployment should logically be more apparent in the female gender.

The concern of female economic participation in Sub-Saharan Africa (SSA) compared to other regions of the world builds on scholarly evidence that women in the

[1] The term vulnerable is employed because of the concerns that may limit access to mainstream economic systems by specific factions of the population, which include: traditions, customs and other issues of structural nature.

region are the poorest in the world largely because of gender exclusion [29, 39]. Moreover, a recent report from the World Bank estimates the loss of income from the exclusion of women in the region to be about 2.5 trillion USD(United States Dollars) [52, 79]. The rest of the study is structured as follows. The data and methodology are engaged in Sect. 2 while the empirical results are presented in Sect. 3. Section 4 concludes with implications and future research directions.

Methodology and Data

Methodology

The relationship of interest is examined by specifying an equation that relates globalisation to economic participation of women (EPW, henceforth), as well as a set of control variables.

$$E.Participation_{it} = \alpha + \beta X_{it-1} + \delta V_{it-1} + \varepsilon_{it}, \quad (1)$$

where X is a vector for the different dimensions of globalisation that are of interest in this study and believed to affect EPW. Since the impact of globalisation on EPW is unlikely to be instant, these variables are therefore lagged. Hence, the average globalisation in the previous period is consequently expected to explain the average EPW of the current period. This type of specification is advantageous because it tends to reduce potential reverse causality between globalisation and EPW. The identifier "v" connotes vectors of additional covariates that can act as potential mediators through which globalisation influences EPW. These covariates can also act as exogenous factors affecting EPW, but not influenced by globalisation. Hence, they reduce possible variable omission bias that could have occurred with the relationship of interest, assuming they were not included. Importantly, the inclusion of the mediator in Eq. (1) should portray an efficient estimate of the effect of globalisation on EPW.

In Eq. (1), the error term is represented as "ε". In a standard Ordinary Least Squares (OLS) regression, the error term may be problematic, considering that the OLS assumes same variance and absolute independence of the error term for each regressor. To tackle this problem, robust standard errors can be estimated in case of within panel heteroscedasticity and autocorrelation. However, Bergh and Nilsson [19] argue that when considering variables, such as globalisation, there are likely evidences of an increasing *interaction* effect from inter-country linkages, since globalization fosters cross-country integration. Therefore, the possibility of within panel heteroscedasticity is ruled out because increasing country linkages imply that the errors within panel may be contemporaneously correlated across countries. To adjust for this situation, we follow Beck and Katz [17] suggestion of applying panel-corrected standard errors (PCSE) that allows for disturbances that are contemporaneously correlated across countries. For example, Bergh and Nilsson [19], Feng and Yuan [33], Gargouri and Keantini [36] used the PCSE to examine globalisation and life expectancy, technology innovation and carbon intensity spillover, and the determinants of public debt.

The PCSE technique permits for the inclusion of a unit-specific first-order autocorrelation (*AR1*) term that is specific to each country, in order to derive the correction for serial correlation, while retaining the unbiased OLS coefficient estimates. Reed and Webb [60] suggest that the PCSE efficiently provides a way of obtaining better performance on standard error when the number of time periods is close to the number of groups that is being observed (i.e. T is close to N). To control for potential unobserved heterogeneity, the specifications include: (1) country dummies that capture the stable differences between countries in terms of EPW, and (2) period dummies to capture the influence of policy shocks that may affect women in multiple countries at the same time.

Following Bergh and Nilsson [19], this study also estimates the relationship of interest using the OLS fixed effects regressions that adjust for clustering over countries. The fixed effects model is chosen as a complementary analysis because it is able to yield covariance matrix estimates that are consistent under the general conditions of within-panel heteroscedasticity and autocorrelation [19].

Data

The study creates a panel dataset for the period 1990–2013, using different data sources. The dependent variable of interest is the Economic Participation of Women (EPW), which is defined as the active participation of women in formal economic activities. Two indicators are used, consistent with Signorelli et al. [62]. They include: *female labour force participation rate* and *female unemployment rate*. The *female labour force participation rate* (*flprt*) is measured as the proportion of females in the labour force that are aged 15–64 by the total working age population [78]. The *female unemployment rate*(*umrat*), on the other hand, refers to the proportion of the female labour force that is available for work and currently not gainfully employed. The second measure is used for robustness checks.[2] The female labour force participation rate is used as our primary outcome variable because it is generally considered a better indicator of economic participation, unlike the unemployment rate. Also, it is more representative of the number of women that are involved in economic activities [29]. The data comes from the International Labour Organisation (ILO) key Indicators of the Labour Market and the World Bank's World Development Indicators [78].

Globalisation, which is the degree of social, economic, political, and cultural connection between countries for common outcome, is measured using the updated *KOF* globalisation index by Dreher et al. [27]. This index identifies globalisation from three perspectives, which includes *economic globalisation– KOF1*(e.g. using trade and investment flows, as well as restrictions to these flows), *social globalisation—KOF2* (e.g. using personal contact, information flow

[2] The two indicators (female labour force participation and female unemployment rate) measure different aspects of EPW. The first measure considers the participation rate of women in the labour force, while the second measure considers the unemployment rate. The pairwise correlation between these two variables shows about 40 percent percentage association.

and cultural proximity) and *political globalisation—KOF3* (e.g. using number of foreign embassies, memberships in international organisations and number of international treaties entered into by the country). Both the composite index that contains the aggregation of the three dimensions of globalisation (*KOF*) and the disaggregated form as earlier discussed are used in this study. The composite index was derived based on equal weights across the three dimensions of globalisation. Whether the composite or the disaggregated measure, the index takes values between 0 and 100, where higher values indicate more globalisation, and vice versa. Noting that this index is favoured in some studies (e.g. [19, 29], it is important to mention that there are other measures of globalisation such as financial and trade openness as used in Asongu [6]. However, this measure does not consider the kind of categorisation of globalisation that is required to achieve the objective of this study.

The selection of additional control variables is mainly influenced by consensus in literature on some of the factors that determine EPW. For example, the study controls for *real GDP per capita* (PPP adjusted); *female school enrolment* [28, 63]; *fertility rate* [20, 47]; and the type of political institution of the country, measured as *democratic freedom* [29]. These control variables are conservatively related to the determinants of EPW. To capture the demographic structure of the sampled countries, the study corrects for the national *dependency ratio* in the specifications—i.e. the share of young (people within age < 15) and old (age > 64) relative to the working age population. The intuitions behind the inclusion of these variables are highlighted as follows: the *real gross domestic product* (*GDP*) *per capita* (*rgdp*) is a measure of economic development, which implies more economic activities for individuals and better social mobility and employment. The *female school enrolment* (*sec_enrol*) and *fertility rate* (*fert_rat*) are reflective of the extent to which individuals are educated and enlightened, and are less tied with home care activities in order to have more time to be actively involved in economic activities. Whereas schooling provides for opportunities of knowledge acquisition and hence, a competitive edge in the labour market, fertility decreases the propensity of women to get actively involved in the job market because of constraints associated with pregnancy. *Democratic freedom* (*dem*) and *dependency ratio* (*dep_ratio*) show the extent to which individuals are less restrained as well as freer to be involved with economic activities. Hence, more freedom and less restraint should logically be associated with more economic participation (Table 1).

To test the robustness of the results, several control variables and other analytical techniques are applied. For instance, the study checks whether rapid changes in the growth of urban population affects our relationship of interest. The analysis also checked for the sensitivity of the results to changes in government consumption as a share of GDP (measuring government size), the legal system of each sampled country (capturing issues related to social tolerance) as well as other country-specific features like: natural resource prevalence, health, level of technology advancement and the level of industrialisation, among others.

Table 1 Variables' definitions

Variables	Definitions	Sources
Flprt	Female labour force participation rate (flprt) is measured as the proportion of females in the labour force that are aged 15–64 by the total working age population	ILO key Indicators of the Labour Market
Umrat	Female unemployment rate (umrat) refers to the proportion of the female labour force that is available for work and currently not gainfully employed	
KOF	This is the aggregation of the three dimensions of globalisation (KOF) as displayed in the KOF globalisation index	Dreher et al. [27]
KOF1	KOF 1 is a measure of economic globalization, obtained by aggregation of variables such as trade and investment flows, as well as restrictions to these flows	
KOF2	KOF 2 is a measure of social globalization, obtained by aggregation of variables such as personal contact, information flow and cultural proximity, etc.	
KOF3	KOF 3 is a measure of political globalization, obtained by aggregation of variables such as number of foreign embassies, memberships in international organisations and number of international treaties entered into by the country	
Rgdp	This data is the real gross domestic product divided by the total number of population in the respective countries. These data is gotten from WDI	World Bank's World Development Indicators
sec_enrol	Average years of schooling for population that are over 15 years old	
fert_rate	The fertility rate measures the average number of children per woman in the population	
Dem	This is the average of political rights and civil liberty as obtained from the Freedom House database. The initial variable ranks from 1 (free) to 7 (not free). However, the values were reordered by subtracting the initial measures from 8. Hence, the measure in this paper ranks from 1(not free) to 7 (free)	
dep_ratio	Dependency ratio measured as the share of young (people within age < 15) and old (age > 64) relative to the working age population	

Table 2 Summary statistics of main variables

Variable	Mean	SD	Min	Max	N
flprt	61.64	17.19	18.80	90.30	360
umrat	12.83	11.05	0.20	47.10	125
KOF	38.13	10.40	8.53	66.21	359
KOF1	43.23	14.73	9.78	85.54	320
KOF2	25.54	11.52	6.58	64.09	367
KOF3	51.56	17.87	13.55	90.78	359
rgdp°	7.710	0.955	5.651	10.782	359
sec_enrol	33.21	25.58	2.42	115.14	253
fert_rat	5.41	1.30	1.51	7.75	375
dem	3.56	1.61	1.00	7.00	368
dep_ratio	88.46	12.97	41.12	111.81	376

°The real GDP per capita (i.e. *rgdp*) was disclosed in its logarithm in order for the means of indicators to be comparable. The other abbreviations connote - unemployment rate "*umrat*"; total globalisation "*KOF*"; economic globalisation "*KOF*1"; social globalisation "*KOF*2"; political globalisation "*KOF*3"; secondary school enrolment rate "*sec_enrol*"; fertility rate "*fert_rat*"; democracy "*dem*"; dependency ratio "*dep_ratio*"

The initial sample consists of an unbalanced panel of 47 Sub-Sahara African (SSA) countries for which data are available.[3] Out of the 49 countries in SSA (i.e. all 54 African countries excluding Algeria, Egypt, Libya, Morocco and Tunisia), two counties are not included because of data availability constraints, namely: (1) South Sudan for which data is only available from 2011 because the country only recently became politically-independent and (2) Burkina Faso because of limited data availability. The period comprises three-year non-overlapping averages from 1990 to 2013 (i.e. 1990–1992; 1993–1995; 1996–1998; 1999–2001; 2002–2004; 2005–2007; 2008–2010; 2011–2013). The non-overlapping average was preferred in order to reduce data issues, as there were some missing values for some of the sampled countries. As a result, the effective sample is smaller than the population of possible observations. For the estimation, the sample to similar sizes across the tested specifications was restricted. The list of the sampled countries is presented in Table 7 in the Appendix.

The summary statistics of the main variables of interest are presented in Table 2. The standard deviations of EPW (i.e. *flprt*) and the measure of the demographic structure of the country (i.e. *dep_ratio*) are high among the series. This indicates high variation between the populations EPW of the sampled countries.

[3] The 47 countries include: "Angola, Benin, Botswana, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo Democratic Republic, Congo Republic, Côte d'Ivoire, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome & Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Zambia and Zimbabwe".

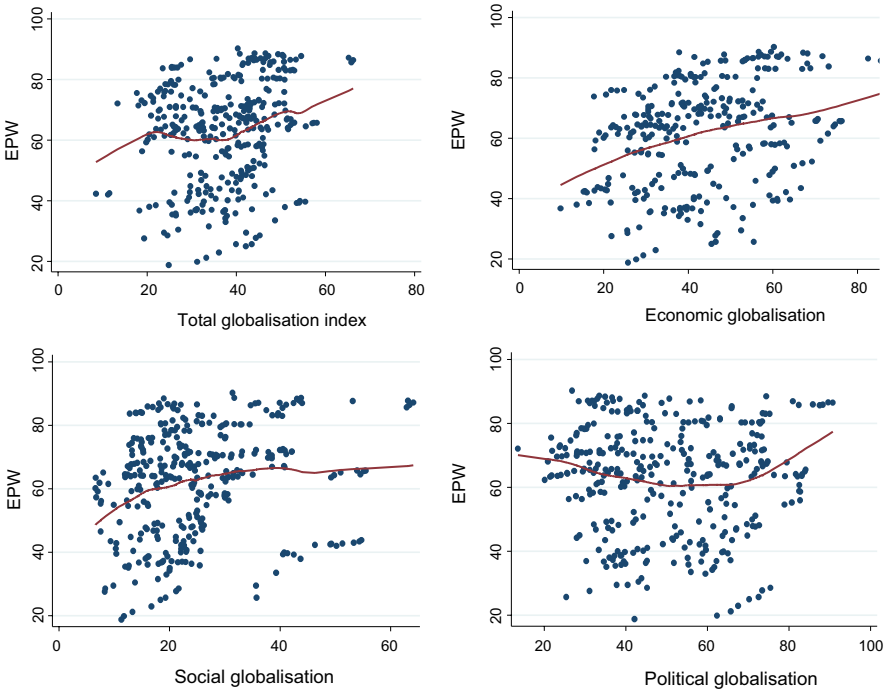

Fig. 1 Locally weighted regression (Lowess) unconditional association between components of globalisation and EPW. *Source and note* Computed from the sample. There is a common bandwidth of 0.8 for the four graphs

The standard deviations of the four indicators of globalisation were also very high.

To surmise the descriptive statistics, the study presents the local regression graphs plotting non-parametric bivariate relationships between each measure of globalisation and EPW prevalence in the respective countries in Fig. 1. The figures reveal that the relationship between globalisation and EPW appears to be non-linear and positive for higher levels of globalisation. This tendency is quite pronounced for the economic globalisation index. It appears that at higher levels of social globalisation, EPW remains high: thus, as countries increase in this form of globalisation, an equivalent increase is observed for the trend of EPW. On the other hand, it appears considerably weaker for the social and political globalisation, and the relationship still remains non-linear. The same trend is observed for total globalisation: a non-linear relationship (i.e. an increase of EPW at early stages of total globalisation and then a continuous increase, but at higher stages of total globalisation). This result suggests that at heightened globalisation, the EPW in SSA increases, and vice versa.

Secondary data is used for the study and hence, as opposed to the requirement of engaging the data collection process as it is recommended when a research builds on primary data, this study has disclosed original sources of the variables that can be consulted for more insights into the primary data collection process.

Empirical Results

Before presenting the estimation results, we perform some diagnostic tests to determine outliers and multicollinearity: the latter has the potential to inflate the standard errors and thus, bias our results. Considering the outlier check, we use the Hadi technique ("mcd" syntax in *Stata*) to check for outliers. The study does not detect any outliers from the series.[4] The multicollinearity check was performed using the pairwise correlations between the variables of interest. The result of this exercise is presented in Table 8 in the Appendix. From the table, a close relationship amidst the indicators of globalisation, among others, could be observed. Real GDP per capita and democracy were the only control variables found to be free of strong associations with the other explanatory variables. Therefore, these two variables will be included as a baseline, and the other variables will be included interchangeably to reduce incidences of bias.

Baseline Estimations

Table 3 presents the results for the relationship between globalisation and EPW, while controlling for the real GDP per capita and democracy status of the country. Regressions using the panel-corrected standard errors—PCSE (with *Stata* syntax "xtpcse") suggest that the composite *KOF* Index is positively related to EPW: an increase in the composite index of globalisation significantly improves the EPW of the sampled countries. Considering the components of the index separately (Columns 2a, 3a and 4a), it appears that the previous result for the composite *KOF* index is driven by economic globalisation. A significant relationship between social globalisation and EPW is found; however, the magnitude of the coefficient was marginal. For the political globalisation, the results show no significant relationship with EPW. The effect of GDP per capita and the measure of democracy is negatively related to EPW.

For the fixed-effects (FE) estimation results in columns 1b–4b of Table 3, the study finds that it supports the earlier findings that there is a positive association between the composite index of globalisation and EPW. More so, the finding shows support that economic globalisation has a positive effect on EPW. More so, though marginal, social globalisation still maintains a positive and significant relationship with EPW. However, the effect of political globalisation on EPW turned negative and was significant at the 10% levels. The result indicates that countries with morediplomatic presence (like embassies and consulates) and that are more involved with the international community (in terms of treaties and ratifications) tend to experience a lower average EPW.

Table 4 shows how the results behave when including additional control variables using the PCSE estimation technique. The positive association between the

[4] Instead, the Hadi technique suggests that KOF indexes are collineared. Hence, we estimated the regression by including each of the indexes one at a time.

Table 3 Relationship between globalisation and EPW

	1a	1b	2a	2b	3a	3b	4a	4b
Dependent variable: female labour force participation								
KOF_{t-1}	0.159** (0.063)	0.110* (0.062)	–	–	–	–	–	–
$KOF1_{t-1}$	–	–	0.198*** (0.055)	0.198*** (0.055)	–	–	–	–
$KOF2_{t-1}$	–	–	–	–	0.086** (0.040)	0.080** (0.039)	–	–
$KOF3_{t-1}$	–	–	–	–	–	–	−0.066 (0.049)	−0.064* (0.027)
rgdp°	−0.152** (0.076)	−0.079*** (0.019)	−0.046** (0.020)	−0.046** (0.021)	−0.076*** (0.018)	−0.077*** (0.019)	−0.067*** (0.019)	−0.068*** (0.010)
dem	−0.036* (0.011)	−0.032** (0.011)	−0.037*** (0.012)	−0.037*** (0.012)	−0.030*** (0.010)	−0.030*** (0.011)	−0.038*** (0.011)	−0.038*** (0.006)
Constant	−6.520 (5.893)	4.430*** (0.277)	−2.180 (0.692)	3.839*** (0.301)	−4.160 (5.004)	4.549*** (0.209)	−10.446** (5.089)	5.017*** (0.072)
R-squared	0.088	0.106	0.128	0.122	0.134	0.126	0.123	0.115
Wald χ^2	30.330	12.260	40.460	12.670	50.170	15.350	45.550	8.260

The PCSE estimations include both the country and period dummies; the panel-corrected standard errors are included in brackets. The Fixed Effects estimations include the country and period fixed effects and the robust standard errors are in brackets

*Denotes statistical significance at 10% level

**Denotes statistical significance at 5% level

***Denotes statistical significance at 1% level

°The real GDP per capita (i.e. *rgdp*) was presented in its logarithm form. The other abbreviations connote- total globalisation "*KOF*"; economic globalisation "*KOF*1"; social globalisation "*KOF*2"; political globalisation "*KOF*3"; democracy "*dem*"

Table 4 Relationship between globalization and EPW (including additional control variables)

	1a	1b	1c	2a	2b	2c	3a	3b	3c	4a	4b	4c
Dependent variable: female labour force participation												
KOF_{t-1}	0.112*** (0.063)	0.099 (0.082)	0.120* (0.064)	–	–	–	–	–	–	–	–	–
$KOF1_{t-1}$	–	–	–	0.198*** (0.055)	0.245*** (0.072)	0.211*** (0.056)				–	–	–
$KOF2_{t-1}$	–	–	–	–	–	–	0.085** (0.040)	0.100* (0.053)	0.087** (0.040)	–	–	–
$KOF3_{t-1}$	–	–	–	–	–	–	–	–	–	−0.065 (0.049)	−0.073 (0.058)	−0.071 (0.050)
rgdp°	−0.102*** (0.022)	−0.152*** (0.034)	−0.070*** (0.022)	−0.067*** (0.025)	−0.142*** (0.038)	−0.030 (0.025)	−0.097*** (0.023)	−0.143*** (0.033)	−0.068*** (0.022)	−0.093*** (0.022)	−0.131*** (0.034)	−0.054*** (0.022)
dem	−0.039*** (0.011)	−0.045*** (0.016)	−0.024 (0.011)	−0.044*** (0.013)	−0.066*** (0.019)	−0.033*** (0.012)	−0.036*** (0.011)	−0.042*** (0.015)	−0.028*** (0.011)	−0.047*** (0.012)	−0.047*** (0.003)	−0.036*** (0.011)
fert rate	−0.033* (0.019)	–	–	−0.031* (0.019)	–	–	−0.028* (0.019)	–	–	−0.036* (0.019)	–	–
sec_enrol	–	0.004** (0.002)	–	–	0.005*** (0.002)	–	–	0.003** (0.002)	–	–	0.003*** (0.002)	–
dep_ratio	–	–	0.001 (0.001)	–	–	0.002 (0.002)	–	–	0.001 (0.002)	–	–	0.002 (0.002)
constant	−6.520 (5.641)	4.969 (7.287)	−4.732 (6.446)	0.577 (5.772)	11.345 (7.638)	−3.657 (5.643)	−1.422 (5.323)	4.688 (6.776)	−5.173 (5.215)	−6.939 (5.399)	−3.903 (6.811)	−12.017** (5.327)
R-squared	0.088	0.143	0.114	0.135	0.166	0.132	0.139	0.169	0.135	0.133	0.154	0.126
Wald χ^2	30.330	37.530	41.120	42.830	38.190	42.680	52.720	47.450	51.04	49.77	42.09	47.12
Prob > χ^2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0

Table 4 (continued)

The PCSE estimations include both the country and period dummies; the panel-corrected standard errors are included in brackets

*Denotes statistical significance at 10% level

**Denotes statistical significance at 5% level

***Denotes statistical significance at 1% level

°The real GDP per capita (i.e. *rgdp*) was disclosed in its logarithm form. The other abbreviations connote - total globalisation "*KOF*"; economic globalisation "*KOF*1"; social globalisation "*KOF*2"; political globalisation "*KOF*3"; democracy "*dem*"; fertility rate "*fert_rat*"; secondary school enrolment rate "*sec_enrol*"; dependency ratio "*dep_ratio*"

aggregate globalisation index and EPW was still maintained across all specifications and at the 1 and 10% levels of significance. This is apart from Column 2, when the level of female education was included in the regression analysis: the overall globalisation index lost its significance at this point. Thus, suggesting that the relationship between the overall globalisation index and EPW is sensitive to the level of female education. Overall, the positive association was still maintained. The economic globalisation indicator remains positive and significant across specifications. The magnitude of the effect is rather stable, with an average coefficient value of approximately 22%, suggesting that a 1% increase in economic globalisation increases EPW by about 22%. For the social globalisation, a positive and significant impact on EPW was established. The political globalisation variable is consistently insignificant across the estimations of Table 4.

The positive result that was found for most of the globalisation variables and even the composite index of globalisation tends to confirm the findings of Signorelli et al. [62] that more openness is associated with a higher EPW. Though the authors' study did not consider globalisation as a main indicator, they included it as a potential and serious factor that can affect female labour force participation. The signs of GDP per capita and democracy did not change across the estimations (see columns 1a–4c). As expected, the variable "fertility rate" displays a negative sign across the columns where it was featured in Table 4. The coefficient was consistently significant at the 10% level of significance. On the other hand, the educational level of women was found to have a positive and significant impact on their level of economic participation. Still, a similar result appears in studies from Bloom et al. [20] and Cipollone et al. [24], who found fertility rate as having a negative impact on the economic participation of women, whereas education has a positive impact.

The negative effects of the GDP per capita and democracy variables both in Tables 3 and 4 are unexpected. It is important to note that the effect of GDP per capita may be negative if economic growth is not broad-based on the one hand and if the benefits of economic prosperity are not evenly distributed on the other hand. In essence, economic prosperity that is skewed to specific industries like extractive industries is not likely to drive employment from a broad perspective. This is the case with most African countries where economic growth is substantially driven by the export of natural resources [53, 54]. Moreover, when economic prosperity is not evenly distributed, the theoretical construct of GDP per capita (ratio of economic growth on population) may not yield the desired effect on improving conditions for social mobility and decreasing features of employment vulnerability. This tendency is most apparent in Africa in the light of the evidence that extreme poverty has been growing in the continent in spite of it enjoying more than two decades of growth resurgence [8, 35, 44, 69]. The negative effect of democracy can be explained through the time and level hypotheses needed before enjoying the full benefits of democracy. In essence, most African countries are characterised by immature and weak democracies [10]. The democratic scenarios in African countries, on the other hand, may not be inclusive: critically excluding certain groups of the population like women. Most women in Africa are excluded from the industrial growth process partly because they constitute a large proportion of the non-industrial labour force [59], and their low level of human capital development may explain the furtherance

away from being included in the democratic process.[5] Thus, it is important to consider gender sensitive policies in the African democratic process.

The positive effect of globalisation on EPW in SSA countries can be seen from two intuitive backgrounds. First is the economic openness effect, where globalisation enhances the inflow of investment, firms and industrial growth [37] that creates more employment opportunities and therefore accommodates more individuals (that would have been excluded) in the job market. The second is the social value reconstruction effect that globalisation brings: this implies that globalisation improves the social perception and tolerance for some groups like women to be actively involved in the labour market. This group of individuals may be strongly affected by social intolerance within the society, assuming globalisation is not enhanced. For instance, some SSA countries like Zimbabwe [51], Zambia [34], Uganda and Rwanda [2, 26] face some level of gender inequity in the labour market. This is largely caused by patrimonial paradigms or heritage regimes that are upheld by the society and which naturally hedges out women from actively being involved in the labour force. With social globalisation, there is a favourable shift in the societal perception of the role of women, which gives them better advantages to participate in formal labour employment. Berggren and Nilsson [18] pointed this fact out in their study on globalisation and transmission of social values.

Robustness Checks

Table 5 includes the list of the PCSE regression coefficient estimates of the composite globalisation index as well as the coefficient and significant values of the sub-indices for several sensitivity tests. The tests include all the control variables as in Table 4, because the baseline results did not change despite the inclusion of the other control variables like fertility rate, secondary enrolment and even the dependency ratio. To begin the sensitivity tests, we first confirm that our results hold when all the control variables are included in a single equation. This estimation was performed using the PCSE. Second, we confirm that our results did not change when estimating a random effects model. We follow the wisdom of Bergh and Nilsson [19] that since the number of cross sections is way higher than the time period, using a random effects model will put a lot of weight on cross-country variation.

Next, we examine the robustness of the results by including—separately—the level of industrialisation, technology infrastructure, macro-economic condition (measured using inflation rate) and the adult health condition (using the number of adults—ages 15 + - that are newly infected with HIV). We considered these four additional control variables as important following the intuition in United Nations Industrial and Development Organisation-UNIDO [74] and Gui-Diby and Renard [38] for industrialisation and its effect on employment growth; Efobi et al. [29] on technology and female economic activities; Diaz-Bonilla [25] on macro-economic condition effect on industrialisation, which affects employment and economic

[5] See Tseloni et al. [71] for further discussion on the negative relationship between democracy and women economic participation.

Table 5 Robustness checks

Variations	Composite *KOF* index	Significant components		Comments
Include all control variables	0.141* (0.081)	$KOF1_{t-1}$	0.321*** (0.075)	For all the estimations, real GDP, democracy, fertility rate and dependent ratio was significant and signed as earlier described
		$KOF2_{t-1}$	0.095* (0.051)	
		$KOF3_{t-1}$	−0.110** (0.055)	
Performing the random effects estimation, including robust standard errors	0.088*** (0.034)	$KOF1_{t-1}$	0.267*** (0.042)	All the control variables were significant and maintained consistent signs as in Table 4. Only secondary enrolment did not maintain its consistent significant value
		$KOF2_{t-1}$	0.067** (0.030)	
		$KOF3_{t-1}$	−0.085*** (0.030)	
Controlling for the level of industrialisation (using the GFCF as % of GDP)	0.203** (0.090)	$KOF1_{t-1}$	0.267*** (0.078)	For most of the estimations, the secondary enrolment variable was not significant. The signs and significant values of other control variables remained as given in previous estimations
		$KOF2_{t-1}$	0.093* (0.052)	
		$KOF3_{t-1}$	−0.078 (0.061)	
Controlling for the level of technology development in the sampled countries; measured as the mean of mobile phone and internet usage per 100 persons	0.146* (0.078)	$KOF1_{t-1}$	0.316*** (0.075)	Just like in the other estimations, the secondary school enrolment remained non-significant. The signs and significant values of the other variables are as in Tables 3 and 4. The technology variable was not significant in all the estimations
		$KOF2_{t-1}$	0.085* (0.051)	
		$KOF3_{t-1}$	−0.091* (0.054)	

Table 5 (continued)

Variations	Composite *KOF* index	Significant components		Comments
Controlling for the macroeconomic condition of the country. This variable is computed as the consumer prices annual percentage change from the WDI	0.183** (0.091)	$KOF1_{t-1}$	0.336*** (0.079)	The secondary enrolment variable remains insignificant. The inflation variable was not consistent in its significant values. The other variables were consistently signed
		$KOF2_{t-1}$	0.101* (0.054)	
		$KOF3_{t-1}$	− 0.133** (0.063)	
Controlling for adult health conditions in the country. We used the number of adults (ages 15+) that are newly infected with HIV. This data is from the WDI	0.123 (0.083)	$KOF1_{t-1}$	0.393*** (0.066)	The adult health condition was significant and a 1% increase in its value will result in a less than proportionate increase in EPW. The secondary enrolment variable remained non-significant, while the other variables had similar sign and significance as in Tables 3 and 4
		$KOF2_{t-1}$	0.124** (0.013)	
		$KOF3_{t-1}$	− 0.106* (0.055)	
Using female unemployment as alternative explained variable	− 1.176*** (0.432)	$KOF1_{t-1}$	− 1.233*** (0.442)	The real GDP per capita and the secondary enrolment variable was consistently insignificant. The signs of the variables were the same as in Tables 3 and 4
		$KOF2_{t-1}$	− 0.020 (0.307)	
		$KOF3_{t-1}$	− 0.685** (0.279)	
Considering a different measure of female education. We used school enrolment, tertiary (gross), gender parity index (GPI) as alternative measures. This data is from the WDI	0.149* (0.080)	$KOF1_{t-1}$	0.256*** (0.074)	As expected, the signs of the globalisation variable follow a similar pattern as in Tables 3 and 4. The new measure of education was not significant in any of the models
		$KOF2_{t-1}$	0.070 (0.053)	
		$KOF3_{t-1}$	− 0.147** (0.065)	

Table 5 (continued)

Variations	Composite *KOF* index	Significant components		Comments
Controlling for urban population growth. Since most formal employments are in urban settlements, then controlling for the population that competes for job placement becomes very important. This data is from the WDI	0.119 (0.145)	$KOF1_{t-1}$	0.308*** (0.074)	The variable "urban population growth" was significant in all the estimation models. Thus, suggesting that it is an important explainer of EPW. As expected, the variable "secondary enrolment" was not significant across the estimations. As in Tables 3 and 4, the other control variables follow usual signs and significant values
		$KOF2_{t-1}$	0.121** (0.052)	
		$KOF3_{t-1}$	−0.131** (0.056)	
Common law colonies (20 countries)	0.113 (0.091)	$KOF1_{t-1}$	0.412*** (0.081)	The other control variables were consistently signed and significant values remained within the range of 1–10%. Only real GDP per capita variable was not significant in most of the estimations
		$KOF2_{t-1}$	−0.070 (0.062)	
		$KOF3_{t-1}$	−0.146*** (0.053)	
Civil law countries (26 countries)	0.115* (0.088)	$KOF1_{t-1}$	0.225*** (0.077)	The signs of the control variables were the same. However, the significant values were different for most of the variables
		$KOF2_{t-1}$	0.170*** (0.044)	
		$KOF3_{t-1}$	−0.042 (0.066)	
Only low income countries (25 countries)	0.356*** (0.194)	$KOF1_{t-1}$	0.492** (0.199)	The subsample include only those countries with a GNI per capita of $1045 or less in 2014
		$KOF2_{t-1}$	0.288*** (0.150)	
		$KOF3_{t-1}$	0.112 (0.174)	

Table 5 (continued)

Variations	Composite *KOF* index	Significant components		Comments
Only middle income countries (22 countries)	0.176 (0.139)	$KOF1_{t-1}$	0.222* (0.121)	Middle-income countries include those with GNI per capita of more than $1045 but less than $12,736, while high-income economies are those with a GNI per capita of $12,736 or more. From our sample, only Equatorial Guinea and Seychelles are high-income countries
		$KOF2_{t-1}$	0.214*** (0.068)	
		$KOF3_{t-1}$	− 0.054 (0.087)	
Only countries with relative less conflict occurrences (12 countries)	0.079 (0.084)	$KOF1_{t-1}$	0.252*** (0.081)	The classification was based on Asongu [7] classification of countries according to the extent of conflict occurrence within the country. The signs of the globalisation variables did not change
		$KOF2_{t-1}$	0.081 (0.055)	
		$KOF3_{t-1}$	− 0.147** (0.066)	
Only countries with high conflict occurrences (35 countries)	0.189** (0.075)	$KOF1_{t-1}$	0.203*** (0.048)	The political globalisation variable now turned positive and significant. Other results did not change
		$KOF2_{t-1}$	0.032 `(0.053)	
		$KOF3_{t-1}$	0.179*** (0.054)	

The PCSE estimations include both the country and period dummies; the panel-corrected standard errors are included in brackets. The Fixed Effect estimations include the country and period fixed effects and the robust standard errors are in brackets. The abbreviations connote—total globalisation "*KOF*"; economic globalisation "*KOF*1"; social globalisation "*KOF*2"; political globalisation "*KOF*3"

*Denotes statistical significance at 10% level

**Denotes statistical significance at 5% level

***Denotes statistical significance at 1% level

participation in developing countries; and Asiedu et al. [3] on the linkage between health conditions and economic participation of workers in SSA countries. Interestingly, the sign and significant values of the main indicators of globalisation remained consistent as in Tables 3 and 4. Clearly, the overall globalisation index was positive and significant for almost the entire estimations. The economic and social globalisation index was positive and significant for the entire checks, while political globalisation index was negative and significant for most of the estimations.

Other types of robustness checks were conducted to address issues surrounding replacement of variables and further inclusion of other forms of control variables. An alternative explained variable—female unemployment—was included as a measure of EPW, and then we considered a different measure of female education,[6] after which we included controls for urban population growth. For these checks, nothing changed in the signs and significant values of our globalisation variables. For instance, the signs of the total, economic and social globalisation index suggest that an increase can reduce female unemployment in SSA countries. The signs and significant values of the political globalisation index also suggest similar outcomes. For the inclusion of a different measure of female education and the urban population growth control variable, consistent signs and significant values (for most) were found as shown in Tables 3 and 4.

Yet another group of sensitivity checks that was of interest to us include examining whether our baseline results (as in Tables 3, 4) change when excluding some groups of countries. First, we include only common law countries and then other legal regime types as a sub-sample, to see whether the countries' legal system has an effect on our result. We deem this test necessary considering that some authors argue that there is a direct relationship between the legal system of a country and the freedom of economic participation of some population groups. For instance, Chiongson et al. [23] observe that the legal system of countries impacts the economic capacity of people, in terms of accumulating endowments, enjoying returns to such endowments, access rights and resources, and acting as free and autonomous agents in society. From our analysis, we find no significant change in the signs and significant values of the globalisation variables. This apparently gives us confidence in our initial description of the relationship between globalisation and EPW. Next, we use the World Bank classification of countries to separate the sample into low-income countries and then middle (and high) income countries. From our sample, only two countries are in the high-income category (Equatorial Guinea and Seychelles). The results in Table 5 are not in contrast with those in Tables 3 and 4. Moreover, the behaviour of the globalisation variables is consistent with those established in baseline results when we further control for conflict intensity among sampled countries.

To summarise, the positive effect of the overall globalisation index, the sub-index (economic and social globalisation) and then the negative political globalisation index on EPW, is very robust. The positive effect of the overall globalisation index on EPW is reinforced by the increasing impact of economic and social globalisation. Increasing economic and social integration with other countries may be important

[6] Since this variable consistently remained non-significant across the estimations in Tables 4.1 and 4.2.

Table 6 Relationship between globalization and EPW

Dependent variable: female labour force participation	Economic globalisation		Social globalisation		
	Actual flows	Restrictions	Personal contact	Information flows	Cultural proximity
$Globalisation_{t-1}$	0.130***	0.032	0.059	0.076**	0.024
	(0.042)	(0.049)	(0.039)	(0.037)	(0.029)
rgdp°	−0.150***	−0.176***	−0.154***	−0.159***	−0.158***
	(0.035)	(0.040)	(0.036)	(0.035)	(0.035)
dem	−0.008	−0.018	−0.015	−0.018	−0.015
	(0.015)	(0.017)	(0.015)	(0.015)	(0.331)
fert rate	−0.125***	−0.136***	−0.150***	−0.151***	−0.149***
	(0.043)	(0.046)	(0.043)	(0.042)	(0.042)
sec_enrol	−0.001	0.001	−0.001	0.001	−0.001
	(0.002)	(0.657)	(0.002)	(0.002)	(0.002)
dep_ratio	0.009***	0.010***	0.011***	0.011***	0.011***
	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)
constant	4.562***	5.133***	6.365	6.463	5.579
	(0.437)	(0.497)	(6.471)	(6.331)	(6.548)
R-squared	0.194	0.179	0.199	0.205	0.192
Wald χ^2	54.200	42.86	57.16	60.98	56.26
Prob > χ^2	0.000	0.000	0.000	0.000	0.000

The PCSE estimations include both the country and period dummies; the panel-corrected standard errors are included in brackets

*Denotes statistical significance at 10% level

**Denotes statistical significance at 5% level

***Denotes statistical significance at 1% level

°The real GDP per capita (i.e. *rgdp*) was disclosed in its logarithm form. The other abbreviations connote - democracy "*dem*"; fertility rate "*fert_rat*"; secondary school enrolment rate "*sec_enrol*"; dependency ratio "*dep_ratio*"

in improving the average EPW outcome in SSA countries. A closer examination of the negative relationship between political globalisation and EPW data reveals that it is only in countries with high conflict that political globalisation tends to have a positive and significant impact on EPW. This result does not tend to support the fact that political instability is needed to achieve higher political integration and a higher EPW; however, our result tends to point to the fact that countries need to open-up politically to achieve better EPW.

Extended Analysis by Unbundling Economic and Social Globalisation

The relationships between economic globalisation, social globalisation and EPW may well differ across the distribution of underlying globalisation variables. For one thing, these two sub-indexes are the main drivers of the positive effect of the overall globalisation index on EPW. Thus, the need to pay particular attention to its components, and to enhance the policy implication of our results; we therefore plug each of

the components into the estimation model and the results are presented in Table 6. We present the results of the control variables alongside our variables of interest, despite their proven consistency in Table 3 and 4.

For economic globalisation, there are two sub-indices as presented in the *KOF* globalisation database. Specifically they include actual economic flow[7] and restrictions (including import barriers, tariff and taxes and capital restrictions). On the other hand, social globalisation includes personal contacts,[8] information flows (such as internet and television usage, and trade in newspapers), and then cultural proximity (foreign restaurants and books available). From Table 6 it is evident that: first, for the economic globalisation, actual flows matter more in driving EPW than the restrictions that could be relaxed to improve economic integration. Although we observed a positive association for the restriction sub-index, the coefficient was not significant. For social globalisation, we observe that information flow is most important in driving EPW than personal contact and cultural proximity.

Concluding implications and future research directions

The following concluding remarks can be drawn from the study. First, actual flows in economic globalisation can be increased by tailoring inclusive policies both at the international and domestic levels. On the one hand, at the international level, policies of the World Trade Organisation (WTO) need to be less skewed in favour of wealthy nations, to the detriment of Africa. Whereas women in Africa are more employed (formally and informally) in the agriculture sector, exporting agricultural products to some developed countries is inhibited by very high tariffs. For instance, even by the standards of the European Union and the United States, some aspects of the free market ideology are strategically tailored to stifle free market competition that directly affects Africa's industrialisation process. To put these points into perspective, three contemporary examples are worthwhile. (1) Consistent with Joseph Stiglitz in 'Making Globalisation Work' [64], the United States would not be at the forefront of exporting cotton to the rest of the world, without subsidies offered by the USA government. (2) The same narrative maintains that a cow receives a subsidy of 2 USD per day in the European Union, while the majority of women in Africa are unemployed and live with less than 2 USD/day. (3) Above all, the principles of comparative advantage underpinning the neoliberal ideology are not taken into account in the European Union that allocates about half of its budget subsidies to agriculture and the agri-foods industry that represent just about 6% of its GDP [9]. Majority of women are engaged in the agricultural sector in African countries.

[7] In terms of trade, foreign direct investment, portfolio investment and income payments to foreign nationals.

[8] Such as telephone traffic, transfers, international tourism, foreign population and international letters per capita.

Moreover, powerful multinational companies are engaging in illicit capital flight activities that are reducing tax revenue that should have been used by domestic governments to invest in activities that favour female economic participation. Whereas transfer pricing for tax avoidance is legal, tax mispricing or tax evasion is illegal. Unfortunately, international multilateral institutions do not yet have the jurisdiction and power to hold multinational companies accountable for transfer mispricing [11].

On the other hand, at the domestic level, sound import-substitution and industrial promotion policies are imperative, in addition to diversifying resource-driven economies to other sectors in order to promote inclusiveness in employment and ensure broad-based economic prosperity. In the light of skewed international trade policies to the benefit of developed countries, some protectionist policies are needed in Africa at this early stage of industrialisation. However, such protectionist policies should be ultimately curtailed with maturity of industry in order to mitigate complacency in innovation. This is essentially because, developed countries that are preaching free market competition and liberalisation depended on protectionist policies to set the foundations of industrialisation, economic development and female economic participation they now enjoy [22, 50].

Second, the information flow component of social globalisation can be improved by aligning various information and communication technology (ICT) policies with the economic participation of women [30, 40, 55]. Hence, in promoting *inter alia*, fixed broadband, internet and mobile phone ownership, the role of such ICT in boosting female employment should be carefully considered [66]. Such consideration could be made through ICT-specific schemes, universal ICT coverage policies and low pricing channels. Enhancing liberalisation of the ICT sector may also be a means to the above ends. In essence, women, especially female entrepreneurs should be provided with incentives that enable them to leverage on ICT in terms of, *inter alia*: cost effectiveness, interactions, adoption, efficiency, access and reach.

Overall, the positive effect of social and economic dimensions of globalisation on female economic empowerment is an indication that openness to the exchange of commodities and capital (i.e. economic globalisation) and images and people (i.e. social globalisation) has positive relevance in elevating women's social status and by extension in reducing their victimisation to male dominance.

Future research can focus on assessing how the negative effect of political globalisation and insignificant impacts of some components of social and economic globalisation can be improved to positively affect the economic participation of women. Moreover, assessing whether the established findings withstand empirical scrutiny within country-specific frameworks is worthwhile for more targeted policy implications. While this study has mainly focused on how women would participate as employees in companies and business ventures that are established as a result of foreign investments as well as other socio-political globalisation policies of sampled countries, the scenario whereby women would migrate out of their countries in search for jobs is not taken on board. Hence, it would be worthwhile to consider this alternative way in which globalisation can affect the participation of women in future studies. Furthermore, employing estimation techniques that can distinguish countries in terms of wage gaps, resistance to globalisation and levels of EPW in future studies will improve understanding of the established findings.

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Compliance with Ethical Standards

Conflict of interest The authors have no financial nor non-financial competing interests.

Availability of Supporting Data The data for this paper is available upon request.

Human and Animal Rights This article does not contain any studies with human participants or animals performed by the authors.

Appendix

See Tables 7 and 8.

Table 7 List of sampled countries

Angola (FC, M)	Congo, Rep. (FC, M)	Kenya (C, M)	Niger (FC, L)	Sudan (C, M)
Benin (FC, L)	Cote d'Ivoire (FC, M)	Lesotho (C, M)	Nigeria (C, M)	Swaziland (C, M)
Botswana (C, M)	Equatorial Guinea (FC, H)	Liberia (C, L)	Rwanda (FC, L)	Tanzania (C, L)
Burundi (FC, L)	Eritrea (FC, L)	Madagascar (FC, L)	Sao Tome and Principe (FC, M)	Togo (FC, L)
Cameroon (FC, M)	Ethiopia (FC, L)	Malawi (C, L)	Senegal (FC, M)	Uganda (C, L)
Cape Verde (FC, M)	Gabon (FC, M)	Mali (FC, L)	Seychelles (C, H)	Zambia (C, M)
Central African Republic (FC, L)	Gambia, The (C, L)	Mauritania (FC, M)	Sierra Leone (C, L)	Zimbabwe (C, L)
Chad (FC, L)	Ghana (C, M)	Mauritius (C, M)	Somalia (C, L)	
Comoros (FC, L)	Guinea (FC, L)	Mozambique (FC, L)	South Africa (C, M)	
Congo, Dem. Rep. (FC, L)	Guinea-Bissau (FC, L)	Namibia (C, M)	South Sudan (C, L)	

The letters C, FC, L, M and H imply respectively, common law and French civil law countries, low, middle and high income countries

Table 8 Pairwise correlation

	flprt	*KOF*	*KOF*1	*KOF*2	*KOF*3	rgdp	sec_en ~ l	fert_rat	dem	dep_ratio
flprt	1.000									
KOF	−0.119	1.000								
*KOF*1	−0.173	0.804	1.000							
*KOF*2	−0.326	0.624	0.507	1.000						
*KOF*3	0.096	0.561	−0.050	0.045	1.000					
rgdp	−0.100	0.294	0.574	0.466	−0.168	1.000				
sec_enrol	−0.272	0.678	0.681	0.798	−0.058	0.614	1.000			
fert_rat	0.116	−0.597	−0.601	−0.779	0.002	−0.480	−0.890	1.000		
Dem	−0.112	0.440	0.400	0.380	0.125	0.106	0.558	−0.479	1.000	
dep_ratio	0.172	−0.508	−0.529	−0.668	0.016	−0.540	−0.822	0.881	−0.385	1.000

The real GDP (i.e. *rgdp*) was disclosed in its logarithm form. The other abbreviations connote - total globalisation "*KOF*"; economic globalisation "*KOF*1"; social globalisation "*KOF*2"; political globalisation "*KOF*3"; democracy "*dem*"; fertility rate "*fert_rat*"; secondary school enrolment rate "*sec_enrol*"; dependency ratio "*dep_ratio*"

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