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RESEARCH PAPER

Drivers of Female Labor Participation: Insights from West Africa

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Abstract

This research investigates the determinants of the rate of female labor participation in West Africa. We employ an autoregressive distributed lag technique on the panel data obtained from the World Bank and the International Labor Organisation (ILO) in order to examine the direction and the magnitude of the effects. The findings of this study suggest that a positive nexus exists between the levels of education and health of women and the rate of female labor participation. In the same way, a positive connection is observed between the rates of fertility and female labor participation. In agreement with some previous studies yet in contrast to others, a negative coefficient is established for the globalisation index: social globalisation is negative, political globalisation is positive, while economic globalisation confirmes both the positive and negative influence – although the negative coefficient dominates. This research, therefore, highlights important policy implications for the governments of the West African sub-region on how best to foster the participation of women in active employment.

Keywords: Female Labor Participation, Fertility, Institutions, West Africa.
JEL Classification: J13, J21, C23.

1. Introduction

There have been greater cognisance on the role of gender parity on sustained economic development and poverty reduction. This follows some progress recorded in the last two decades, such that a larger proportion of women, in history, are now well educated and engaged in productive labor market activities[1]. This progress is premised on the understanding that an unbalanced burden of the traditional (household) roles of women has long created a distortion to their labor

[1]. A stylized fact in support of this is the adoption of the 2030 UN Sustainable Develoment Agenda and the efforts of global leaders in attaining productive, full and decent employment for women, young people and the disabled, with equal pay for works of equal values (ILO, 2018).

market participation and educational attainments. Surprisingly and notwithstanding the global commitment and the progress so far recorded, the prospect of women in labor markets are far from parity with those of the men (ILO, 2018). Similarly, there have been particularly low female labor participation in West (as well as sub-Saharan) African countries, especially in the formal sector. While high unearned income among women is a possible reason for it (Solati, 2015), Asongu et al. (2019) observe that females are the most vulnerable members of the population, notably in developing countries, and they are only largely engaged in informal economic activities.

According to the African Development Bank (AfDB, 2019), while the estimated GDP growth rate for the West African sub-region, in 2018, was 3.3% – which is a 0.6% increase from the 2.7% recorded in 2017 – the total labor force participation rate stood at 59.9%. However, the female labor force accounted for 27.2% of the population, while the female labor force participation rate was 54.3% in the same period. This shows a huge disparity when compared to the male counterparts, whose labor force and participation rate stood at 32.7% and 65.6%, respectively (ILO, 2018).

An increased participation of women in labor market largely drives social and economic well being through inclusive growth (Sorsa et al., 2015), given the possibility of a much better, less corrupt representation when compared to the male counterparts (Dollar et al., 2001; Watson and Moreland, 2014). This is premised on individual work–leisure preferences, the variation of which depends on health shock (Cai, 2010) and education (Bratti and Cavalli, 2014). Specifically, Bratti and Cavalli (2014) are of the view that women tend to cater for more children when they have acquired advanced level education and engage in productive labor activities, since they could afford childcare. A cursory look into figure 1 confirms these assertions in the West African sub-region. The simulteneous rise in education and health conditions drive the participation of women in active labor market activities. This is evident from the fact that, even though there was a decline in the labor force participation in 2011, an increased rate is recorded for most of the periods. This may have equally driven the economic development experienced between the years (1996–2017).

To sustain these positive trends, however, there is a need for improved governance/institutional quality, which naturally enhances the participation of female members of the population in active employment. In otherwords, the rates of growth and development are largely threatened where there are weak institutions. For example, in underlying the adverse effect of civil conflict on productivity, Human Security Reports (2012) cited in Islam et al. (2016) documents that the tenure and reoccurence of civil wars and armed conflicts have significantly risen in the last five decades, a phenomenon that has assumed a more commonality than inter-state wars. Some cases in point in the sub-region include the recent coups in Guinea-Bissau and Burkina Faso, upheaval in Nigeria and Mali (Marc et al., 2015), where many authoritarian political systems have resorted to rights abuses and oppression in tackling violent protests against injustices (World Bank, 2011). This is in view of the weakness of the rule of law, as a result of which the justice system has been largely inefficient (Marc et al., 2015). Thus, civil conflict has been reported to have reduced the level of educational attainment; it ultimately reduces productivity and impedes development (Islam et al., 2016).

Among the many pros of globalisation is that it raises wages, output and productivity, and paves ways for more jobs (Gopinath, 2019). This is because globalisation conotes a cross border flow of commodities, services, capital, labor, information, as well as the synergy between diverse social, cultural and political norms. However, the socio-political strength, terms of trade and the bargaining powers of many countries have been largely neglected in the globalisation space. These may result in undesirable consequences if there are no adequate protections on the interests of local markets and industries, employees, as well as socio-cultural norms (Wako, 2018; De, 2014); the consequence of which may result in a declining female labor participation rate. In other words, globalisation may lead to job losses, as a result of reduced consumer prices from globalization. This is largely the case for those whose skills are not highly competitive in the global market – who may be especially women – and those in the manufacturing sector whose jobs may be outsourced at lower costs (Gopinath, 2019).

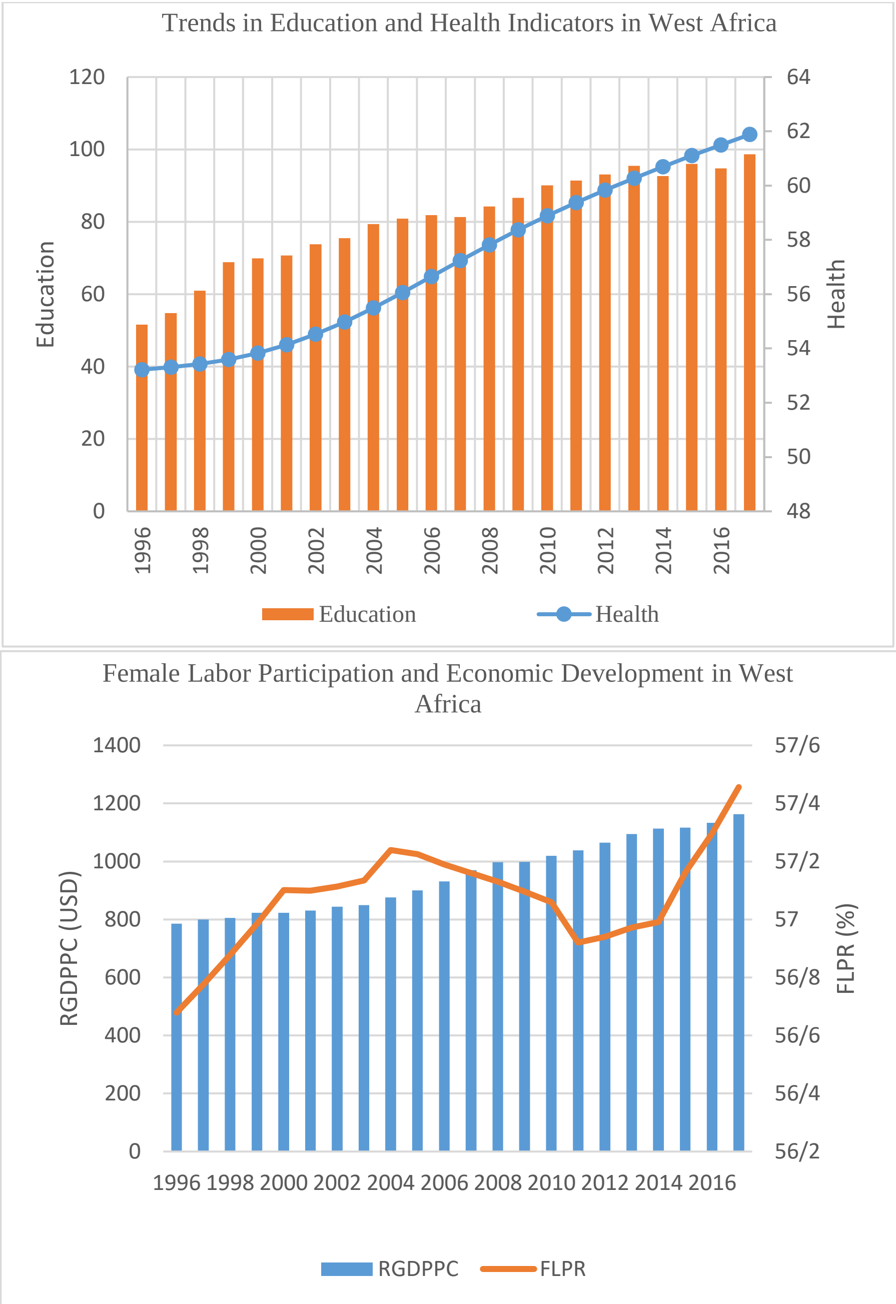

Figure 1. Trends in Education, Health, Economic Development and Female Labor Participation in West Africa (1996-2017)
Source: Data Obtained from World Development Indicators.

As an improvement upon the existing studies, this research equally investigates the role of governance/quality of institutions on female labor participation, being an important element that has been little examined in both the general and the West African literature. Also, a whole lot of studies have concentrated on the supply-side determinants (such as socio-economic, demographic, and household factors) of female labor participation, with less emphasis on the demand-side determinants (Fakih and Ghazalian, 2015 cited in Fatima and Khan, 2018). Following Fatima and Khan (2018), measuring the role of globalisation will not just contribute to the general literature, but will also explain the role of globalisation on the labor participation of West African women.

The remains of the paper is arranged in the following order; Section 2 reviews the existing literature; Section 3 presents the research methodolody; the empirical analysis are discussed in Section 4, while Section 5 draws conclusions and the implications of the findings.

2. Literature Review

Discussions on the labor participation of women have taken a centre stage in recent times as a result of gender disparity. Investigating the determinants of female labor participation has, however, received limited attentions in the West African literature. Cai (2010) explored the nexus between the rate of labor participation and health, using a simultaneous equation model – Two Stage Least Squares (2SLS) and Full Information Maximum Likelihood (FIML) – on the data obtained from Household, Income and Labor Dynamics in Australia (HILDA) Survey Annual Report. The findings reveal a significant and positive association between health and the rate of labor participation – for both females and males. In a related study, Cai and Kalb (2006) investigated the role of health on labor force participation, using the HILDA Survey and conducted a separate estimate for males aged 15–49 and 50–64, females aged 15–49 and 50–60. The authors found that, for each of the groupings, improved health conditions enhance the rate of participation in paid employment, although the the effect is larger for women and the older groups. On the reverse effect, the authors obtained that labor participation exert a significant and positive effect on the health of older females, as well as a significant and negative impact on the health of younger males. The effect of labor participation on health for older males and younger females is, however, insignificant.

In exploring the drivers of the labor participation of women in 18 OECD countries, Thévenon (2013) employed the 2SLS technique on the country-level data obtained from 1980 to 2007, wherein a positive relationship is obtained between female education and labor participation rate. This, however, contradicts the finding of Sorsa et al. (2015), who obtained a negative nexus between the two variables. Employing both the Probit and OLS regressions techniques on Indian data[1] for varying periods (1987, 1998, 1999, ..., 2012), Sorsa et al. (2015) also

[1]. Due to large regional disparities in the country, the authors equally analysed the relationship by region, and between urban and rural areas.

obtained a negative and positive coefficient, respectively, for incomes and financial development vis-a-vis the Indian female labor force participation. In a related study, Lv and Yang (2018) relied on data from a sample of 99 countries, for the period 1991-2012, and confirmed that women’s participation in politics exerts a significant and positive impact on FLPR. A curvilinear relationship between economic development and FLPR was equally verified, while the nexus between fertility and FLPR was found to be negative. Even though the levels of education and unemployment were insignificant, the coefficient of urbanization was confirmed negative.

Also, Samargandi et al. (2019) investigated the determinants of labor participation among Saudi women. Employing the autoregressive distributed lag (ARDL) technique on annual data spanning 1985-2014, the authors observed a positive role for each of female education (though insignificant) and cost of living on female labor participation. While the coefficient of each of governance quality and financial development is negative, the interaction of the former with government size yields a positive estimate; the latter, when interacted with (among others) governance quality, produces a positive relationship with female labor participation. Similarly, in a large cross-section of countries (for the periods 1985, 1990, and 1995), Dollar et al. (2001) confirmed the hypothesis that the involvement of women in politics reduces corruption.

Moreover, Cooray et al. (2017) investigated the role of political institutions on the nexus between trade openness and labor participation (male and female). Using the FE and GMM techniques on panel data obtained, 1985-2012, for 48 SSA countries, the authors generally observed that labor participation (male and female) rises with improved quality of institution, and that institutional quality facilitates a positive nexus between trade openness and labor participation (male and female). It is equaly evident from their findings that the linear term of education is positive, but turns negative as educational attainment rises. In the same vein, Agovino et al. (2019) tested the empirical link between labor market participation and the quality of institutions in Italy, using a spatial panel method (of the Spatial Lag of X) category on the provincial level data, over the period 2004-2012. Their findings reveal that institutional quality exerts a positive impact on the labor market participation (male and female) – although no effect was found on the participation gap. Conversely, the institutional quality was found to produce a positive (spatial) spillover, which reduces the participation gap and raises the rate of female labor participation in the nearby provinces. Grigoli et al. (2020) also explored the determinants of female labor participation in advanced economies. Their findings revealed significant and negative effects of automation on the labor participation of both women and men, while women education (secondary and tertiary) was found to be significant and positive.

A recent study by Shittu and Abdullah (2019) upheld both the role incompatibility and social response hypothesis in seven ASEAN countries. Employing the dynamic estimation techniques and Granger-Causality test, from 1990 to 2015, the authors found both negative and positive coefficients for female education via-a-vis female labor participation. Also, while no causality was found between the education and female labor participation, they reported a causality running from labor force participation through fertility. A related study was carried out by Hartani et al. (2015), using six ASEAN countries' data for the period 1995–2013. Their findings depict a long-run relationship between the rates of female labor participation and fertility, as well as a one-way causality running from fertility through female labor participation. Heath (2017) found that fertility reduces the supply of female labor in urban Ghana. Using six rounds of a panel survey, the author observed a decline in labor supply on the extensive margin, although women who remain in the labor force raise their work hours in response to a rise in fertility. In addition, Erten and Metzger (2019) investigated whether economic growth decreases gender gaps, using a cross-country dataset from 103 countries, between 1960 and 2015. The authors assert that economies with undervalued real exchange rate experience a rise in the labor participation of women and a declining gender gaps. While the level of female education was found to be statistically insignificant, the coefficient of fertility was only found to be significant (and negative) when different country-groups were compared.

Lim et al. (2019) explored the role of financial openness on fertility transitions in seven regions of the world. Using the least squares technique on an unbalanced panel data from 140 countries, from 1967 to 2016, the authors found a negative link between financial openness (which fosters financial development) and fertility in all the countries, as well as in Central Asia, Sub-Saharan Africa, and Europe regions. An inverse position is, however, confirmed for the Middle East and North Africa region, while it exerts no implications for South Asia, Latin America and Caribbean, and the East Asia and Pacific regions. Also, urban population is found to negatively affect fertility (with the exception of North America and South Asia regions), which may in turn increase the rate of female labor participation. In the same way, Idris et al. (2018) explore the nexus between financial development and fertility in Malaysia. Employing the ARDL technique on secondary data obtained for the period 1975-2013, the authors conclude that financial development exert an inverse relationship with fertility; this presents a possibility of an increase in the rate of female labor participation.

On the female labor participation – economic development nexus, Tam (2011) used a panel data of 134 countries, dated 1950-1980, on a dynamic panel data estimation to confirm the U-shaped relationship between the labor participation rate and the real GDP per capita. In agreement with this, Tsani et al.

(2013) employed the two-step simulation technique and general equilibrium modelling on South Mediterranean countries' data. Their finding confirmed the U-shaped female labor force function, such that higher labor participation promotes economic growth. Also, Asongu et al. (2019) examined the impact of globalisation on female labor participation in 47 SSA countries, for the period 1990-2013. Employing the panel-corrected standard error (PCSE) and fixed effects (FE) techniques, the authors found a significant and positive effect of each of female education and globalisation (including economic and social components; political components was insgnificant) on female labor participation.

Conversely, a negative impact of each of economic growth, democracy and fertility on the labor participation of SSA women was observed. In addition, a research conducted by Haque et al. (2019) gave insights into the nexus between the rate of labor participation, for both female and male, and the growth of Bangladeshi economy. Working with annual data spanning 1991-2017, the authors observed a reverse causality between economic growth and labor force participation. Again, each of female and total labor participation was reported to have a (short-run) positive impact on Bangladeshi economy, but a negative impact in the long-run. Moreover, Duval et al. (2010) employ the method of impulse-response function in assessing the persistence and magnitude of the effects of economic downturns on labor participation. Using data spanning 1960-2008 for a sample of 30 industrial economies, the authors found that severe recessions tend to exert a persistent and significant impact on labor participation, but moderate downturns do not. In the same vein, Al-azzawi and Hlasny (2019) found that with a higher index of female wealth in MENA countries, there is a lower probability of women participation in the labor force.

3. Research Methodology

3.1 Theoretical Framework and Model Specification

The role incompatibility hypothesis (Mason and Palan, 1981) supposes an inverse relationship between fertility and female labor participation rate, as a result of the stress of simulteneously performing the functions of motherhood and employee. This pressumes an inverse relationship between female labor participation rate and fertility. Conversely, the societal response hypothesis (Shittu and Abdullah, 2019; Ahn and Mira, 2002; Brewster and Rindfuss, 2000) assumes a simulteneous performance of the functions of employee and motherhood, and thus a positive relationship between fertlity and female labor participation rate. This positive link is largely attributed to institutional changes, which have enhanced efficient combination of work and child-care. As explained in Mishra and Smyth (2010), the factors attributed to this positive association include attitudinal changes towards job-participating mothers, the rising availability and affordability of childcare facilities, legislated paid parental leaves, and rising part-time employment rates – all of which have balanced the, hitherto, incompatibility between work and child-bearing. Therefore, a positive link is equally anticipated between governance/institutional quality and female labor participation rate.

Similarly, the endogenous growth theory (Lucas Jr, 1988; Romer, 1990) upholds that the growth of an economy is mainly engineered by internal, rather than external, factors. It accords a high-level emphasis on human capital, wherein investment in education, knowledge, and training promote technological advancements, which ultimately spurs economic growth. This theory further assumes that an economy's long-run growth is reliant on policy measures such that both the private and public sector institutions promote innovations through the enforcement of intellectual property rights, education subsidies, and funding for research and development. Given a relatively abundant human resource in developing, including the (West) African, economies, proper utilization presents the possibility of accelerating growth (Fatima and Khan, 2018 citing Hussain, 2012). As such, the encouragement of a female labor force, who rarely engages in productive activities in developing economies (Sen, 1990) tends to increase human capital and drive growth. Going by this assertion, a positive link is anticipated between economic growth/development and the female labor participation rate. Moreover, the optimum theory of population (Cannan, 1918) defines an ideal level of population that leads to a maximum per capita income. Hence, any upward trend above, or downward trend below, the optimum population size diminishes the per capita income. This may create a disincentive for female labor participation or spur it (when the augmentation of household income becomes a motive).

Furthermore, in an attempt to link financial development to female labor participation, we follow Idris et al. (2018), who relied on the theoretical frameworks of several authors, including Cigno and Rosati (1992) and Filoso and Papagni (2011), that financial markets accessibility exerts a negative impact on the choice of fertility. This defines the complete substitutability hypothesis (Lehr, 1999; Cigno, 1993; Filoso and Papagni, 2015) that financial market is an alternative investment to childbearing (assumes also to be an investment), and that the former provides both capital and investment options whose anticipated returns exceed those of raising children. An alternative explanation is the attractiveness of women to labor market as a result of increased market wages, arising from financial development, given a declining fertility rate thereform. As noted by Sorsa et al. (2015), the independence of women, as well as work decisions, is enhanced by their access to bank accounts. This results in easy access to finance and selfemployment among women. Thus, a positive link[1] is expected between financial development and female labor force participation rate.

Both the Ricardian and the Heckscher-Ohlin theories[2] place labor at the center of economic emancipation. While the formal assumes labor as the only necessary factor input, the latter upholds the importance of both labor and capital. The Heckscher-Ohlin model assumes that structural changes in production towards those sectors that use abundant factors (labor or capital), with higher intensity, are induced by economic globalization. Fatima and Khan (2018, citing AlAzzawi, 2014; Bussmann, 2009) explain that since the female labor force mainly forms part of the semi-skilled and unskilled labor – which is the abundant factor-input in developing, including (West African), countries – the process of trade openness and economic globalization enhances employment opportunities for females. In other words, access to advanced technologies, arising from globalization creates new employment opportunities for females. In line with this proposition, we expect a positive link between globalization and the female labor force participation rate. Furthermore, the theory of human capital (Mincer, 1958; Becker, 1964) upholds that a higher level of education increases the likelihood of a better labor market outcome, such that an individual is assumed to be better off in the labor market at a higher level of education. Also, Grossman (1972) regards health as a stock of capital, whose initial stock rises by investment and depreciates by age, thus producing an output of healthy time. The theory of human capital equally explains that a negative shock to health arises out of health limitations (or conditions); this ultimately affects the supply of labor (Cai, 2010). As such, a positive association between female education and labor force participation rate, on the one hand, and female health and labor force participation rate, on the other hand, is presumed.

Going by the above economic theories, the following model[3] is specified to test the empirical relationship between the female labor participation rate (FLPR) and each of total fertility rate (TFR), globalization (GI), health of females (Health)[4], female education (SER), economic development (RGDPPC)[5],

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[1]. The traditional sector is characterised by low output and wages; the development of financial sector increases access to credit (by firms), which ultimately raises output and wages. The wage increase then shifts labor supply from the traditional to the modern sector, as a result of which the female labor force participation rises (Idris et al., 2018).

[2] See Obstfeld and Krugman (2003)

[3]. Each of the explanatory variables (including POP, SER, Health, and RGDPPC, which are taken as control variables in order to avoid a specification error) is selected based on literature review, practical significance, parsimony, and theoretical relevance.

[4]. Health is measured by life expectancy at birth, female (years), following the United Nations Development Programme (UNDP)'s definition of human development index (HDI); education is measured by the gross enrollment ratio of primary school, female (% gross).

[5]. We equally measured economic development by HDI. HDI is a summary measure for assessing the long-term progress in three basic dimensions of human development: a long and healthy life, access to knowledge, and a decent standard of living (Carrasco Miro, 2016). Again, following Bist

institution (ROL), financial development (FinDev), and female population (POP) in the West African sub-region;

$$FLPR_{it} = \beta_0 + \beta_1 TFR_{it} + \beta_2 GI_{it} + \beta_3 Health_{it} + \beta_4 SER_{it} + \beta_5 RGDPPC_{it} + \beta_6 ROL_{it} + \beta_7 FinDev_{it} + \beta_8 POP_{it} + \epsilon_{it} \quad (1)$$

Equation 1 models the relationship between FLPR and each of the explanatory variables. In other words, the dependent variable is FLPR; the set of explanatory variables are TFR, SER, Health, RGDPPC, POP, GI, ROL, and FinDev; β_i (i = 0,1,2,...,16) are the representative parameters for the intercept and slope coefficients; ϵ_{it} is the stochastic term, which captures the impacts of other variables that are not included in the model; i represents the cross-section (countries); t is the time-series (in years). This research uses the secondary data obtained from various sources, including the World Bank's World Development Indicators (WDI) – for the data on FLPR, TFR, Health, SER, RGDPPC, POP, and FinDev – and the World Governance Indicators (WGI) – for the data on ROL; the data on globalisation index (GI) is obtained from the KOF Swiss Economic Institute. The data obtained are from 1996 to 2017; the panel nature of the data is formed by pooling the cross-section (n = 16) with the time-series (T = 22) dimensions – bringing the sample size to 352[1] observations.

3.2 Panel Autoregressive Distributed Lag (PARDL)

The fundamental forms of the PARDL procedures are the mean group (MG), the pooled mean group (PMG) and the dynamic fixed effect (DFE). While the MG first differently estimates both the short-run and the long-run parameters for each cross-sectional unit and then averages them, the PMG maintains the same long-run parameters (αs) across units, and the DFE maintains the usual homogeneity assumption in slope parameters. The estimates from each restrictive option – PMG and DFE – are then compared to that from the unrestrictive case (MG) using the Hausman test[2].

The dynamic panel model has recently largely focused on models with large cross-sections (N) and time-series (T) dimensions. The asymptotic features of these panels are different from the traditional large N and T assumptions with homogeneous slope parameters, which are largely inconsistent, inappropriate and

(2018), as well as Idris et al. (2018), FinDev is measured by domestic credit to private sector (% of GDP).

[1]. Institution is measured by rule of law (ROL), in line with Briguglio et al. (2019) and Abdulahi et al. (2019). ROL has 304 observations because of the missing data for 1997, 1999 and 2001. Also, data on GI is not available for 2016; hence, its number of observations is 336.

[2]. See, Al-Mamun and Sohag (2015) and Wako (2018).

leads to misleading results. Again, two important econometric problems associated with the dynamic panel model include (first) that the estimates of the parameters tend to produce biased estimates with both lagged dependent variables and fixed effects. In addition, the assumption of homogeneity on lagged dependent variable coefficients may result in biased estimates, when the dynamics are heterogeneous across the cross-sectional units (Weinhold, 1999). The PARDL technique is, therefore, useful in advancing the dynamic panel model with large *N* and *T*, whose slope parameters are heterogeneous across groups. While the PMG permits for the difference of the dynamic specifications among the cross-sectional units (Baltagi and Kao, 2000), the DFE reduces the two other basic problems, as it provides the diagnostic information regarding the level of panel heterogeneity, with no instrumental variables required in the estimation (Weinhold, 1999).

Given a system of equations, each of the variables in the relationship is presented with no regard to any specific order – as in the general relationship of the PARDL in Equation 2;

$$FLPR_{it} = \alpha_{0i} + \sum_{l=1}^{p} \alpha_{1li} FLPR_{i,t-l} + \sum_{l=0}^{p} \alpha_{2li} TFR_{i,t-l} + \sum_{l=0}^{p} \alpha_{3li} GI_{i,t-l} + \sum_{l=0}^{p} \alpha_{4li} Health_{i,t-l} + \sum_{l=0}^{p} \alpha_{5li} SER_{i,t-l}$$
$$+ \sum_{l=0}^{p} \alpha_{6li} RGDPPC_{i,t-l} + \sum_{l=0}^{p} \alpha_{7li} ROL_{i,t-l} + \sum_{l=0}^{p} \alpha_{8li} FinDev_{i,t-l} + \sum_{l=0}^{p} \alpha_{9li} POP_{i,t-l} + e_{it} \tag{2}$$

α's are parameters to be estimated; *e* is the stochastic term; and the subscripts *i* and *t* represent countries and periods, respectively, while *l* is the lag-order. *T* is assumed to be large enough to enhance model fitness for each of the separate groups, while the time-trend and other fixed regressors may equally be included. One characteristic of the cointegrated variables is that they are responsive to any deviation from the path of convergence. This implies an ECM for which the short-run variable dynamics are being influenced by the level of divergence from the equilibrium. Hence, the re-parametrization of the above equation into the error correction equation becomes necessary (Equation 3), where the short-run dynamics and the long-run relationship are expressed.

$$\Delta FLPR_{it} =$$
$$\phi_i (FLPR_{i,t-1} - \theta_i' TFR_{it} - \theta_i' GI_{it} - \theta_i' Health_{it} - \theta_i' SER_{it} - \theta_i' RGDPPC_{it} - \theta_i' ROL_{it} - \theta_i' FinDev_{it} - \theta_i' POP_{it})$$
$$+ \sum_{j=1}^{p-1} \lambda_{ij}^{*} \Delta FLPR_{i,t-1} + \sum_{j=0}^{q-1} \delta_{ij}' * \Delta TFR_{i,t-j} + \sum_{j=0}^{q-1} \delta_{ij}' * \Delta GI_{i,t-j} + \sum_{j=0}^{q-1} \delta_{ij}' * \Delta Health_{i,t-j} + \sum_{j=0}^{q-1} \delta_{ij}' * \Delta SER_{i,t-j} + \sum_{j=0}^{q-1} \delta_{ij}' * \Delta RGDPPC_{i,t-j} +$$
$$\sum_{j=0}^{q-1} \delta_{ij}' * \Delta ROL_{i,t-j} + \sum_{j=0}^{q-1} \delta_{ij}' * \Delta FinDev_{i,t-j} + \sum_{j=0}^{q-1} \delta_{ij}' * \Delta POP_{i,t-j} + \mu_i + \varepsilon_{it} \tag{3}$$

where:

$$\phi_i = -(1 - \sum_{j=1}^{p} \lambda_{ij}),\ \theta_i = \sum_{j=0}^{q} \delta_{ij} / (1 - \sum_k \lambda_{ik}),\ \lambda_{ij}^{*} = -\sum_{m=j+1}^{p} \lambda_{im}$$

$$j = 1,2,\ldots,p-1, and\ \delta_{ij}^{*} = -\sum_{m=j+1}^{q} \delta_{im} \quad j = 1,2,\ldots,q-1$$

From Equation 3, $\emptyset_i$ is the error correction term (ECT), which indicates the rate of convergence towards the equilibrium. Hence, there would be no evidence of a stable, long-run relationship if $\emptyset_i$ is zero; the parameter is expected to be negative and significant to imply convergence (Pesaran et al., 2001). Finally, to test the dependence nature of the residuals, the cross-sectional dependency tests developed by Pesaran (2004), Frees (1995), and Friedman (1937) are employed; wherein the null hypothesis of cross-sectional independence is tested against the alternative hypothesis.

4. Result and Discussion

4.1 Correlation Analysis

The results of the correlation analysis, which explain the degree of relationship between the dependent variable and each of the explanatory variables, is presented in Table 3.

Table 2. Pairwise Correlation Matrix

Variable	FLPR	TFR	GI	Health	SER	RGDPPC	ROL	FinDev	POP
FLPR	1.000								
TFR	0.112	1.000							
	(0.036)								
GI	-0.294	-0.445	1.000						
	(0.000)	(0.000)							
Health	-0.219	-0.686	0.451	1.000					
	(0.000)	(0.000)	(0.000)						
SER	-0.433	-0.061	0.397	0.260	1.000				
	(0.000)	(0.252)	(0.000)	(0.000)					
RGDPPC	0.557	0.089	-0.201	-0.015	-0.118	1.000			
	(0.000)	(0.094)	(0.000)	(0.777)	(0.027)				
ROL	-0.070	-0.366	0.286	0.631	0.150	-0.090	1.000		
	(0.224)	(0.000)	(0.000)	(0.000)	(0.009)	(0.117)			
FinDev	0.231	-0.089	0.059	-0.018	-0.053	0.295	0.062		1.000
	(0.000)	(0.094)	(0.282)	(0.739)	(0.320)	(0.000)	(0.282)		
POP	0.159	-0.100	-0.297	0.266	-0.263	0.136	0.345	0.085	1.000
	(0.003)	(0.060)	(0.000)	(0.000)	(0.000)	(0.010)	(0.000)	(0.111)	

Source: Research finding.
Note: probability values are presented in parentheses.

Since the pairwise correlation matrix checks the bivariate relationship between the dependent and the explanatory variables, we observe the existence of a positive correlation between each of TFR, RGDPPC, FinDev, POP, and FLPR.

Conversely, a negative correlation is observed between each GI, Health, SER, ROL, and FLPR. Except for the coefficient of ROL, each of the correlation coefficients is significant at 5%.

4.3 Unit Root Analysis

To examine the unit root properties, and the order of integration of the variables, the results of both the first and the second generation tests are presented in Table 4.

Table 3. Analysis of Unit Root

Variable	First Generation Test					Second Generation Test
	Common Unit Root Process		Individual Unit Root Process			
	LLC	Breitung	IPS	Fisher-ADF	Fisher-PP	Pesaran
			Level			
FLPR	-1.905**	2.718	1.333	34.729	37.012	2.552
TFR	-13.191***	5.545	-18.430***	340.103***	34.750	2.371
GI	-4.376***	0.050	-2.713***	61.325***	53.431***	-1.944**
Health	-44.840***	3.864	-57.434***	1971.570***	82.345***	-11.100***
SER	-0.138	2.214	2.527	15.704	9.772	1.298
RGDPPC	-3.738***	2.318	-1.214	65.417***	33.321	-0.551
ROL	-2.807***	-0.507	-0.664	37.459	59.009***	1.910
FinDev	-0.572	1.494	0.863	22.505	21.261	-1.740**
POP	-11.221***	6.362	-13.206***	224.623***	65.374***	-8.275***
			First Difference			
FLPR	-0.468	2.416	0.953	28.827	58.095***	1.479
TFR	-8.285***	1.367	-1.861**	72.469***	16.245	-1.331*
GI	-8.111***	-4.821***	-7.053***	106.691***	215.550***	-4.880***
Health	-29.801***	-2.336***	-27.335***	316.901***	22.965	-12.041***
SER	-1.743**	-1.814**	-1.032	37.489*	85.371***	-6.979***
RGDPPC	-6.555***	-1.578*	-5.684***	87.418***	201.388***	-7.135***
ROL	-4.370***	-2.208***	-3.811***	68.563***	170.138***	0.488
FinDev	-2.4578***	-4.423***	-4.421***	74.822***	197.402***	-5.317***
POP	-15.590***	2.444	-25.431***	308.288***	10.620	-11.662***

Source: Research finding.
Note: ***, ** & * denote significance at 1%, 5% & 10%, respectively; Estimates are based on constant & trend condition.

Each of FLPR, TFR, RGDPPC, Health, GI, ROL, FinDev, and POP is found to be significant at varying critical values (1% and 5%) for one or more of the first-generation categories (individual or common unit root process) as well as in the second generation test; all at level. The implication is that the null hypothesis (Ho: unit root) may be rejected at those critical values. At first difference, however, all the variables show evidence of stationarity, since the null hypothesis is rejected at 1% and 5% (for some of the variables), and at 10% (for all the variables). This is evident from the fact that the z-statistic (or t-statistic) is greater than the critical value at each level of significance. Hence, the orders of integration are I(0) and I(1).

4.4 Panel Test of Cointegration

Table 4 presents the results of Pedroni and Kao cointegration tests.

Table 4. Cointegration Test

	Pedroni – Statistic	Kao – Statistic
Modified variance ratio	-7.074***	
Modified Phillips-Perron t	6.180***	
Phillips-Perron t	3.559***	
Augmented Dickey-Fuller t	4.066***	
Modified Dickey-Fuller t		2.257***
Dickey-Fuller t		1.789**
Augmented Dickey-Fuller t		0.441
Unadjusted modified Dickey		2.274***
Unadjusted Dickey-Fuller t		1.812**

Source: Research finding.

Note: *** & ** denote significance at 1% & 5%, respectively.

The results suggest that there is evidence of a stable and long-run relationship between the dependent and the set of independent variables. This is evident from the fact that each of Pedroni and Kao tests produces statistically significant estimate(s) in most of the specifications.

4.5 Panel Coefficient Estimation

Tables 5, 6, 7, and 8 present the results of the short-run and the long-run coefficients of the dynamic panel analysis. The coefficient of the cointegrating equation is significant and negative, as exhibited in the tables; this defines the convergence rate of the economy to the long-run equilibrium (Pesaran and Smith, 1995). For instance, in Table 5, the average rate of convergence explains that 27.6% of the short-run disequilibrium is being corrected every year so that the equilibrium state is attained in the long run.

Table 5. Coefficient Estimation

Dep. Var. = FLPR	Coefficient	Prob. Value	Coefficient	Prob. Value	Coefficient	Prob. Value
	MG		PMG		DFE	
Long-run Coefficient						
TFR	-0.646	0.769	5.392***	0.000	0.877	0.652
GI	0.007	0.758	0.044**	0.016	-0.409***	0.008
Health	0.085	0.785	1.144***	0.000	0.422	0.144

SER	0.0001	0.505	0.001	0.173	0.021***	0.000
RGDPPC	-0.010*	0.081	-0.002	0.105	0.015***	0.006
Short-run Coefficient						
Cointeq	-0.706***	0.000	-0.074***	0.012	-0.048***	0.000
D.TFR	22.588*	0.065	1.325	0.713	3.236***	0.003
D.GI	0.001	0.936	0.008	0.453	0.020*	0.058
D.Health	-1.433	0.121	-0.027	0.919	-0.104	0.117
D.SER	-0.0001	0.794	-0.0001	0.430	-0.0004*	0.078
CD Test	Pesaran's: -0.345		Frees': 4.633		Friedman's: 13.982	

Source: Research finding.

Note: The tests for cross-sectional (Pesaran, 2004; Frees, 1995; Friedman, 1937) are not significant at any of the critical values.

Table 6. Coefficient Estimation

Dep. Var. = FLPR	MG		PMG		DFE	
	Coefficient	Prob. value	Coefficient	Prob. value	Coefficient	Prob. value
Long-run Coefficient						
TFR	-5.422	0.282	5.512***	0.000	3.260	0.166
GI	0.027	0.669	0.118***	0.010	-0.442***	0.012
Health	0.352	0.735	-0.839**	0.028	0.676**	0.027
SER	-0.002	0.603	-0.012**	0.016	0.005	0.300
RGDPPC	-0.032**	0.028	0.162***	0.001	0.016	0.439
ROL	-0.270	0.542	1.503*	0.061	-1.819	0.222
POP	-7.848	0.781	-13.991***	0.000	-6.669***	0.002
Short-run Coefficient						
Cointeq	-2.593**	0.028	-0.082	0.119	-0.083***	0.000
D.TFR	9.146	0.696	-12.451	0.235	5.164***	0.002
D.GI	-0.178	0.276	-0.012	0.551	0.034***	0.013
D.Health	5.639	0.346	0.872	0.305	-0.165	0.328
D.SER	0.007	0.114	0.003**	0.037	-0.0003	0.418
D. RGDPPC	0.059	0.225	-0.0005	0.927	0.00004	0.948
D.ROL	-1.617	0.125	-0.228	0.241	0.105	0.521
D.POP	4.162	0.525	-46.193	0.427	1.146	0.223
Observation	224		224		224	

Source: Research finding.

Table 7. Coefficient Estimation

Dep. Var. = FLPR	Coeficient	Prob. Value	Coeficient	Prob. Value	Coeficient	Prob. Value
	DFE		PMG		MG	
Long-run Coefficient						
TFR	-0.230	0.900	-0.226	0.791	-1.983	0.429
EcGI	-0.271***	0.003	0.060**	0.026	0.005	0.747
PoGI	-0.085	0.370	0.126***	0.000	-0.014	0.503
SocGI	0.0002	0.999	-0.377***	0.000	-0.052	0.468

Health	-0.002	0.994	0.338***	0.003	-0.197	0.641
SER	0.023***	0.000	0.0002	0.797	-0.0006	0.583
RGDPPC	0.020***	0.000	0.020***	0.001	-0.0004	0.948
FinDev	-0.003	0.125	0.003***	0.007	-0.001	0.168
Short-run Coefficient						
Cointeq	-0.050***	0.000	-0.043	0.198	-0.934***	0.000
D.TFR	3.458***	0.002	2.778	0.510	46.792	0.227
D.EcGI	0.014**	0.017	-0.001	0.918	-0.012	0.353
D.PoGI	0.007	0.179	-0.002	0.871	-0.007	0.808
D.SocGI	-0.022	0.125	-0.022*	0.082	-0.001	0.971
D.Health	-0.149**	0.031	0.333	0.349	-2.312**	0.044
D.SER	-0.0005**	0.045	-0.00004	0.895	0.001	0.532
D.RGDPPC	-0.001	0.111	0.0001	0.299	0.001	0.751
D.FinDev	0.00004	0.754	0.0002	0.381	0.0005	0.398
Observation	320		320		320	

Source: Research finding.

Table 1. Description of Variables and Sunmary Statistics

Variable / Identifier	Description	A'priori Expectation
FLPR	This is the ratio of the population, 15 years and above, that is economically active. It refers to members of the population who supply labor hours for the production of commodities and services during a specified period.	
TFR	This represents the number of children that would be born to a woman if she were to live to the end of her childbearing years, and bears children in line with the age-specific fertility rates of the specified year.	-/+
GI	This aggregates the political, social, and economic dimensions of globalisation, using equal weights. The overall KOF globalisation index is calculated as the average of the de facto and the de jure indexes. It ranges between 0 and 100; the higher the value, the more globalised an economy is.	+
Health	This indicates the number of years a newborn infant would live, if the prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.	+
SER	This is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown. Primary education provides children with basic reading, writing, and mathematics skills along with the basic knowledge of other subjects, such as geography, and natural science.	+
RGDPPC	This is the ratio of GDP to the midyear population. The GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2010 U.S. dollars	+
ROL	This reflects the perceptions of the extent to which agents have confidence in and abide by the rules of society: the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.	+
FinDev	This measures the financial resources dispatched to the private sector by financial corporations, through loans, purchases of nonequity securities, and trade credits and other accounts receivable, for which a claim of repayment is established. In some countries, these claims also cover the credit to public enterprises. The financial corporations include monetary authorities and deposit money banks, finance and leasing firms, money lenders, insurance corporations, pension funds, and foreign exchange companies where data are available.	+
POP	This is the percentage of the population that is female. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship.	-

Source: World Bank's definitions; KOF Swiss Economic Institute's definition on globalization.

Table 8. Coefficient Estimation

Dep. Var. = FLPR	PMG		MG		DFE	
	Coefficient	Prob. Value	Coefficient	Prob. Value	Coefficient	Prob. Value
Long-run Coefficient						
TFR	16.701***	0.000	-1.504	0.819	2.472	0.290
GI	-0.344***	0.000	-0.036	0.539	-0.450***	0.007
Health	6.916***	0.000	-0.413	0.790	0.640**	0.039
SER	-0.022***	0.000	0.005**	0.040	0.008*	0.060
HDI	0.013	0.165	0.011	0.873	0.001	0.744
ROL	2.085***	0.000	0.541	0.613	-1.624	0.260
POP	189.106	.	-28.446*	0.066	-7.466***	0.000
Short-run Coefficient						
Coint. eqn	-0.102	0.206	-0.848*	0.092	-0.082***	0.000
D.TFR	-20.158	0.645	51.471*	0.080	5.200***	0.001
D.GI	-0.004	0.858	-0.106	0.121	0.032**	0.019
D.Health	0.843	0.636	10.049	0.137	-0.192	0.264
D.SER	0.002	0.254	0.014	0.258	-0.0004	0.170
D.HDI	0.003	0.828	-0.045	0.317	-0.0002	0.349
D.ROL	-0.187	0.603	0.966	0.392	0.072	0.654
D.POP	-3.803	0.733	-43.099	0.287	-0.611***	0.000

Source: Research finding.

The coefficient of TFR is significant and positively relates to FLPR, both in the short run and the long run. The long-run coefficient explains that FLPR rises by 5.392% for a 1-child increase in birth per woman. A significant and positive coefficient is also obtained in Tables 6 and 8; this runs in contrary to the role incompatibility hypothesis, as well as several empirical studies (De la Rica and Ferrero, 2003; Zhang, 2017; Shittu et al., 2019; Mishra and Smyth, 2010). Our finding is, however, in line with the societal response hypothesis, as well as the studies conducted by Rindfuss and Brewster (1996), Shittu and Abdullah (2019), and Bratti (2003). A possible analysis of this finding stems from government policies in the West African sub-region, which have persistently created friendly environments for females to work, while still maintaining parental roles. As in Siah and Lee (2015), such policies range from rising opportunity costs of home-making, given a rise in women’s real wages, to rising demand for female labor force – wherein they are seen in various political, economic, and social engagements. Moreover, the need to cater for children’s needs may promote female participation in paid employment. This economic necessity is largely driven by poor access to social protection and a rising poverty level (ILO, 2018), as witnessed in West African countries.

A mixed relationship is found between GI and FLPR, going by the estimates in Tables 5, 6, and 8. However, a significant and negative coefficient dominates the impact of GI on FLPR. This explains that FLPR declines by (an average of) 1.483% for a percentage increase in GI. An analysis of the dimensions of GI (Table 7) equally reveals that while social globalisation (SocGI) negatively influences the FLPR, political globalisation (PoGI) positively influences it, and economic globalisation (EcGI) both positively and negatively influences the rate of female labor participation – although the negative coefficient still dominates. These findings run in contrast to that of Fatima and Khan (2018); Asongu et al. (2019) as well as Oksak and Koyuncu (2017) who obtained a positive coefficient for economic, social, and overall globalisation, but a negative coefficient for political globalisation. While a positive relationship was anticipated, our findings correspond with those of Cooray et al. (2012) and (partly) Bussmann (2009). A possible explanation to this is found in Cooray et al. (2012), who likened it to the effect of a potential wage increase, arising from globalisation, which possibly raises the household level of income through that of the spouse. This phenomenon likely creates additional incentives for women to stay out of the labor force, and invest in higher education in anticipation of higher returns in the long-run. There is also the likelihood that competition, arising from trade, raises gender discrimination. As explained in Gaddis and Pieters (2017), technological advancements may be complementary to men, considering that women in developing, including (West) African, countries lag behind the men counterparts. This may create a disincentive to women, hence resulting in a declining rate of female labor participation.

Even though both positive and negative estimates are obtained in the effects of Health and SER on FLPR, the positive effect, in each case, far outweighs the negative one, with a statistical significance. These are in line with a priori expectations and suggest that an improvement in health and education, as forms of human capital, increases the rate of female labor participation by (an average of) 1.48% and (an average of) 0.004%, respectively. The former is in line with Cai (2010), who concluded that better health status raises the likelihood of engagement in paid employment for women. The latter finding supports those of Salehi-Isfahani and Taghvatalab (2019) and Thévenon (2013), who confirmed that increased women educational attainments have enhanced their participation in paid employment and raised the value of their times in the market relative to leisure.

In addition, POP is found to be significant and negative in both the short-run and the long-run. The long-run estimate explains an average decline in FLPR by 14.143%, if the POP rises by 1%. In explaining this possibility, Lim et al. (2019) assert that the preponderance of reduced fertility with a possible rise in female labor participation, apart from resulting in a declining future growth in population, leads to an increased ageing population. This, therefore, results in shortage of manpower and other huge associated costs (including social security and pensions) on the government.

Also, HDI is found to exert a positive (although non-significant) relationship with FLPR; the net effect of RGDPPC on FLPR is equally positive in the long-run. The latter estimate depicts an average increase of 0.029% in FLPR for a USD 1 increase in RGDPPC. This is consistent with Tsani et al. (2013) and the result of Tam (2011) who confirm Boserup's (1970) argument that the acces of male to advanced technologies and education largely displaces the female counterparts from participation in paid employment at early stages of development. At later stages, however, females gain greater access to advanced technologies and education, which ultimately promotes female labor participation. Similar to this is a positive coefficient obtained for FinDev, such that the FLPR goes up by 0.003% for a percentage-point improvement in financial development. This supports the finding of Sorsa et al. (2015), and that of Idris et al. (2018) who found that financial development reduces fertility, thus raising the rate of female labor participation; it, however, opposes the result obtained by Samargandi et al. (2019). This positive coefficient is in view of the understanding that financial development tends to promote the growth of entrepreneurship and private businesses, which ultimately results in increased employment (for women).

Finally, the effect of institutional quality on labor participation of women is found to be significant and positive; the FLPR increases by 1.794% if there is a unit improvement in ROL. This follows that an improved quality of institutions encourages female engagement in paid employment; this is in line with the societal response hypothesis. While this contradicts the result obtained by Samargandi et al. (2019), it goes in line with the findings of Cooray et al. (2017), as well as that of Agovino et al. (2019). In pointing out that different kinds of institutions act at different levels, Acemoglu et al. (2005) assert that while economic institutions pertain to the set of contiguous causes, political institutions relate to the deep grounds for development. In agreement, Aghion et al. (2008) maintain that economic and political freedoms promote innovation through their correlation with the freedom of product markets entry. Therefore, an enforcement of the rule of law and property rights traditionally propels growth and increase labor demand, as a result of increased investment. This potentially narrows the male – female labor participation gap by providing better working opportunities for women.

5. Conclusion

The paper employed an autoregressive distributed lag technique on the panel data obtained from various secondary sources – The World Bank, The International Labor Organisation – in order to measure the impact of the relevant factors that drive the rate of female labor participation in West Africa. Among the factors examined, the level of education and health of women were found to positively impact the rate of their labor engagements, thus upholding the human capital theory. In the same way, a positive nexus was found between the rates of fertility and female labor participation, thus confirming the societal response hypothesis. In agreement with some previous studies yet in contrast to others, a negative coefficient was obtained for the globalisation index: social globalisation negatively influenced the labor participation rate, political globalisation positively influenced it, while economic globalisation confirmed both the positive and negative influence – although the negative coefficient dominated. Going forward, the coefficients of female population, institutional quality, and economic development were, respectively, negative, positive, and positive. Our take home-home from this research is that each of the variables considered has a significant impact on the labor participation of West African women.

Going by the importance of women engagement in active labor services, with a view to fostering their financial independence and general economic prosperity, a significant policy implication is for the governments of the West African sub-region to pay more attention to improvements in education and health conditions. This is attained through increased investment in basic and advanced level education and healthcare. Again, this is in line with their traditional importance, as well as their tendencies to spur the rate of female labor participation. One other highly essential area is improvement in governance quality, by such policies that promote efficient work–life balance for the West African women. These include entrenching the rule of law and enhancing domestic financial development. In response to the negative coefficient obtained for globalisation, an appropriate policy is, again, the development of domestic policies and strengthening of local institutions in order that the negative effect might turn positive. A practical example is for the governments to be tough on dumping into the sub-region, while promoting domestic economy through the complementarity effect of female engagements in both formal and informal sectors.

Finally, future research is this area may be centered on the roles of religious and cultural practices, as well as the impact of COVID-19 on female labor participation.

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