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Inequality and female labour force participation in West Africa

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Abstract. This study examined the impact of income inequality on female labour force participation in West Africa for the period 2004 to 2016. The study employed the Gini coefficient, the Atkinson index and the Palma ratio as measures of income inequality. For robustness, the study also utilises female employment and female unemployment as measures of female labour force participation. The study employed the instrumental variable fixed effects model with Driscoll and Kraay standard errors to account for simultaneity/reverse causality, serial correlation, groupwise heteroskedasticity and cross-sectional dependence. The empirical results reveal that the three measures of income inequality significantly reduce the participation of women in the labour force in West Africa. The study also revealed that domestic credit, remittances and female education are positively associated with female labour force participation in the sub-region. Further findings reveal that economic development reduces the participation of women in the labour force in West Africa with the U-shaped feminisation theory not valid for the West African region. The study, however, revealed an inverted U-shaped relationship between inequality and female unemployment. Policy recommendations based on these findings are discussed.

1. Introduction

Achieving food security, poverty alleviation, gender equality, full employment and economic development for all in Africa, and particularly West Africa, will be a mirage if the challenge of poor female labour participation is not addressed. To achieve the Sustainable Development Goals (SDGs) by 2030, closing the gender gap in the labour force is quite indispensable (United Nations, 2018), and explains why researchers are now paying greater attention to female labour force participation. Women in West Africa, like their counterparts elsewhere, are very resourceful economic agents whose full participation in the economy's labour force can contribute greatly to economic growth. In many developed economies, women make up almost half of the labour force (World Development Indicators (WDI), 2020), which could partly be the reason for the fast developmental pace of these economies, and implies that women make many significant contributions to economic development when harnessed.

According to the International Monetary Fund (IMF, 2018), increasing women's engagement in the economy's labour force leads to significant increases in productivity and impact positively on economic growth. Akinyemi, Solanke and Odimegwu (2018) also observe that female

employment reduces the level of infant and child mortality. Despite its positive impact, data from WDI (2020) has consistently revealed that across West African countries, female labour force participation has remained dismal. Abney and Laya (2018) has noted that there are fewer women in the formal economic sector, which is particularly unfavourable for economic and human prosperity, as economies are unable to reap the trickle down positive spill overs of female labour force participation on other socio-economic indicators.

In addition to the low participation in the labour market, women in West Africa face significant discriminations. In the world of labour in West Africa, patriarchal ideology, educational attainment, household responsibilities and maternal commitment have led to the historic marginalisation of women. These factors automatically transmit to unequal opportunities for men and women. The feminization hypothesis also posits that in the early stages of economic development, female labour force participation declines. This is as a result of the adjustments in the structure of the economy from one which is based on agriculture to one based on industrialisation. However, in the later stages of economic development, with economies transforming into modern economies, fertility rates tend to decline accompanied with the rise in female education, leading to the rise in female labour force participation. This denotes a U-shaped relationship between economic development and female labour force participation.

However, one economic fundamental that has not gained much prominence in economic discourse pertaining to female labour force participation in West Africa is income inequality. Several studies have established links between income inequality and women participation in the labour force. Studies such as (Gronau, 1982; Nelissen, 1990; Björklund, 1992; Del Boca & Pasqua 2003; Amin & DaVanzo 2004; Western, Bloome & Percheski 2008; Harkness, 2010) found a strong link between income inequality and female employment. These studies reflect that while female employment may reduce income inequality, income inequality can also act as a determining factor which could deteriorate female labour participation. A consistent theory on the effect of gender inequality on employment by Klasen and Lamanna (2009) is that income inequality changes economic realities negatively and motivates externalities that limit opportunities for women, leading to increase in female unemployment and participation in the labour market. This belief pushed further by Asongu and Odhiambo (2019) are broadly consistent with the literature on relationships between unemployment, income inequality and economic prosperity (Witte & Witt, 2001; Brush, 2007; Odedokun & Round, 2001; Perugini & Martino, 2008; Van der Hoeven, 2010). Furthermore, income inequality also drives poverty which remains a determining factor for not just the participation of women in the labour market but also the participation of men in the labour market. Hence, to improve the female labour force participation rate, it becomes necessary to study how income inequality influences the labour force participation of women.

There are relatively few studies on income inequality and the economic participation of women in Africa. One such study is that of Asongu and Odhiambo (2019). This study, however, drifts away from their study by (1) accounting for cross-sectional dependence in the modelling exercise, and (2) employing three different measures of female labour force participation to account for

robustness. This study also concentrates on West Africa, a region where poverty is substantially prevalent with a high rate of infant and child mortality. Another study that investigated the influence of inequality on female labour force participation in Africa is that of Idowu and Owoeye (2019). Their study, however, also failed to account for cross-sectional dependence which, according to Iheonu (2019), can lead to estimation bias.

The present study whose scope covers 16 West African economies from 2004 to 2016 is novel in several ways. First, the study analysed the relationship between income inequality and female labour force participation in West Africa, a region where there is a dearth of studies despite the vulnerable nature of the region, and the need to attain the SDGs. Second, the study employed three measures of income inequality- the Gini coefficient, the Palma ratio and the Atkinson index, and female labour force participation rate to capture female labour participation. For robustness purpose, we utilise female employment and the female unemployment rate as they are measures of the economic participation of women (Asongu and Odhiambo (2019), (3) the study applied the instrumental variable Fixed Effects (FE) model to account for simultaneity/reverse causality as well as the Driscoll and Kraay (1998) standard errors to account for heteroskedasticity, serial correlation and cross sectional dependence. Based on the objective of this study, the testable hypothesis is that income inequality has no significant influence on female labour force participation in West Africa. The remainder of this study is structured thus: section two presents a review of the related theoretical and empirical literature, section three discusses the methodology and, while section four presents the estimation results and discusses the findings. Section five concludes the study and provides policy recommendations.

2. Literature review

Theories on female labour force participation can be traced back to the classical labour theory (CLT). Between 1960 and 1970, the fundamental speculations on female labour force participation rate rose significantly. The theories include the work-leisure hypothesis of Mincer (1962), the human capital theory of Becker (1964), and the time allocation hypothesis of Becker (1965). The theoretical underpinning of the study, however, follows that of Asongu and Odhiambo (2019), and Klasen and Lamanna (2009). This is based on the premise that income inequality alters the workings of the economy and propels negative externalities that limit the opportunities of women. The limited opportunities of women further deteriorate other socio-economic factors which can affect children.

Empirically, female labour force participation has received some attention in the literature on income inequality. These studies have however been focused on few economies. While there is extensive evidence for the American economy (Larrimore 2014, Valletta 2006; Pencavel 2006; Cancian & Reed 1999), there is fewer empirical research for the European economies (Del Boca & Pasqua (2003) on Italy and Breen & Salazar (2010) on the United Kingdom). There are equally fewer studies in Africa (Asongu & Odhiambo (2019); Idowu & Owoeye (2019)).

Asongu and Odhiambo (2019) investigated the effect of household income inequality on the

economic participation of women in sub-Saharan Africa (SSA) for the period 2004 to 2014 using the Generalised Method of Moment (GMM) methodology which accounts for endogeneity, serial correlation and heteroskedasticity. Their result revealed that income inequality (measured as the Gini coefficient and Palma ratio) reduces female employment and increases female unemployment rate (when income inequality is proxied by the Palma ratio).

Gradin and Tarp (2019) examined the gender employment gap in the non-subsistence economic sector in Mozambique. Their findings show a wider gender employment gap, and the gap is associated with low levels of female human capital and educational attainment. Idowu and Owoeye (2019) equally investigated the determinants of the demand and supply of female labour force participation rate in 20 selected African economies applying the seemingly unrelated regression estimation technique. Their study found that female labour force demand is positively associated with the growth rate of Gross Domestic Product (GDP) and income inequality, and negatively associated with wages, the growth rate of GDP per capita and poverty. Moreover, they reported an inverted U-curve relationship between economic growth and female labour supply in Africa.

The study of Alcaino (2009) used the Ordinary Least Square (OLS) and the instrumental variable econometric technique to study the determinants of female labour force participation rate in Chile for the period of 1854 to 2000. The result revealed that while wages significantly and positively affect female labour participation rate, consumption, life expectancy and fertility are negative determinants of female labour force participation rate. Yakubu (2010) found a positive and significant influence of education on female labour force participation rate for South Africa. Also, Forgha and Mbella (2016) studied the determinants of female labour force participation in Cameroon for 37 years using GMM estimation technique and revealed that fertility rate, dependency ratio, per capita income and male labour force were significantly the determinants of female labour force participation rate in Cameroon.

Verme (2015) used an unbalanced panel data to test the validity of the U-shaped feminisation theory on the relationship between economic development and female labour force participation in the Middle East and North Africa (MENA) for the period 1990 to 2012. The study revealed that there was no clear statistical evidence of a U-shaped linkage between economic development and the female labour participation rate. This finding is contrary to the findings of Olivetti (2013), who studied 16 developed American economies. Chapman (2015) employed the pooled OLS in a panel of 20 MENA economies for the period of 1990 to 2012 to test the U-shape relationship between economic development and female labour force participation. The result revealed the existence of a U-shaped relationship between economic development and female labour force participation. This means that in the early stages of economic development, the participation of women in the labour market declines but starts increasing at later stages of economic development.

3. Method and data

3.1. Method

In understanding the influence of income inequality on female labour force participation in West Africa, the study employs the instrumental variable fixed effects model due to the following reasons (1) the instrumental variable fixed effects model is robust to simultaneity/reverse causality – a notable feature in income inequality and female labour force participation relationship, and (2) it accounts for unobserved heterogeneity in the modelling exercise. Following the study of Efobi et al. (2019), the issue of simultaneity/reverse causality is tackled through the process of instrumenting the indicators of inequality as well as the control variables with their first lags.

$$X_{i,t} = \alpha_0 + \alpha_j\left(X_{i,t-1}\right) + \varepsilon_{i,t}, \tag{1}$$

where $X_{i,t}$ is an explanatory variable (i.e. income inequality indicators and other control variables) in country *i* at time *t*. α_0 is a constant, $X_{i,t-1}$ is the first lag of the explanatory variable and $\varepsilon_{i,t}$ is the error term. In obtaining the instruments for the explanatory variables for the fixed effects model, we save the fitted values from the Ordinary Least Square (OLS) regression in equation (1). These fitted values are then utilised as instruments for each of the regressors in the model. The instrumentation process is executed by means of employing standard errors which are Heteroskedastic and Autocorrelation (HAC) consistent in nature.

The study presents a fixed effects model, where

$$f_{i,t} = \beta_0 + \beta_1 I_{i,t} + X_{i,t} + \vartheta_i + \mu_{i,t}. \tag{2}$$

Here, $f_{i,t}$ is female labour force participation rate. Female labour participation rate captures the ratio of total female labour force to total female population. For robustness checks, we re-define the female labour force participation as female employment and female unemployment rates, respectively. While female employment encompasses the total number of employed females in an economy, female unemployment captures the total number of unemployed females in the economy. $I_{i,t}$ represents three indicators of income inequality which includes Gini coefficient, Atkinson index and the Palma ratio. $X_{i,t}$ consist of control variables which includes domestic credit, remittances, female secondary school enrolment, a proxy for female education, and per capita Gross Domestic Product (GDP) and its square to analyse the possibility of a U-shaped relationship between economic development and female labour force participation as observed in the literature (Altuzarra, Galvez-Galvez & Gonzalez-Flores, 2019). Domestic credit to the private sector is included in the model based on the notion and verified by Verick (2014) that the availability of credit improves the participation of women in the labour market. The study as well includes remittances as a control variable based on extant literature which reveals a linkage between remittances and female labour force participation (Khan and Valatheeswaran, 2016; Azizi, 2018; Asiedu and Chimbar, 2020). In this study, we posit a positive relationship between

remittances and the participation of women in the labour market, particularly in the informal sector. We also include female education into the model as education is a significant determinant of female labour force participation (Ince, 2010) via the increase in human capital. ϑ_i is country specific effect and $\mu_{i,t}$ is the error term. The estimation of the fixed effects model utilises the Driscoll and Kraay (1998) standard errors which is robust to serial correlation, groupwise heteroskedasticity, and cross-sectional dependence (see, Iheonu, 2019; Iheonu et al., 2019).

3.2. Data

The study employs a panel of 16 West African countries from the period 2004 to 2016. The period captured in the study is due to data availability constraints in the sub-region. The three indicators of female labour force participation are sourced from the World Development Indicators (2019), while the three indicators of income inequality are sourced from the Global Consumption and Income Project (GCIP). The control variables would be captured by the following variables: (1) domestic credit to the private sector (% of GDP), (2) remittances (% of GDP), (3) female secondary school enrolment (% gross), (4) per capita GDP (constant US$), and (5) per capita GDP (constant US$) squared.

Table 1. List of Variables and Sources.

Variables	Definitions	Source
Female labour force participation rate	Labour Force Participation rate, female (% of female population 15-64), modelled ILO estimate	WDI (2019)
Female employment	Employment to population ratio, 15+, female (%), modelled ILO estimate	WDI (2019)
Female unemployment	Unemployment, female (% of female labour force), modelled ILO estimate	WDI (2019)
Gini coefficient	Gini coefficient	GCIP
Atkinson	Atkinson index	GCIP
Palma	Palma ratio	GCIP
Domestic credit	Domestic credit to the private sector (% of GDP)	WDI (2019)
Remittances	Remittances (% of GDP)	WDI (2019)
Female education	Female secondary school enrolment (% gross)	WDI (2019)
GDP per capita	GDP per capita (constant US$)	WDI (2019)
GDP per capita- square	The Square of GDP per capita (constant US$)	Authors computation

Source: Authors compilation.

The Gini coefficient is complemented in this study because it does not account for extreme values of the income distribution (Asongu & Odhiambo, 2019). According to Zhang and Naceur (2019), it is difficult for the Gini coefficient to show welfare of low-and-high income groups. The Atkinson and Palma ratio controls for extreme values of the income distribution (Cobham, Schlogl & Summer, 2015; Asongu & Odhiambo, 2019). While the Atkinson index essentially validates which end of the income distribution contributes most to income inequality, the Palma ratio addresses the Gini coefficient's non-sensitive nature to changes at the top and bottom of the income distribution. For ease of interpretation, the study converts GDP per capita and its square to their natural logarithm. The countries employed in this study are Benin, Burkina Faso, Cabo Verde, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, and Togo.

4. Presentation and analysis of results

4.1. Descriptive statistics

The descriptive statistics presents the means, the minimum and maximum values, the standard deviation of each of the variables as well as the total number of observations. First, Table 2 shows that the dataset is unbalanced. It is also revealed that there is no large difference in the minimum and maximum values of the income inequality indicators, which suggests similarities across space and time. The study, however, reveals substantial differences in the minimum and maximum values of the indicators of labour force participation, which invariably reflects variations across West Africa and the observed time period. Domestic credit to the private sector and female education exhibits similar characteristics. Remittances and the natural logarithm of GDP per capita, however, do not have a substantial difference between the minimum and maximum values which is clearly shown by their standard deviations of 0.89 and 1.48, respectively.

Table 2. Descriptive Statistics of the Variables.

Variables	Observations	Mean	Standard Deviation	Minimum	Maximum
Gini	207	0.5749	0.0227	0.4882	0.6108
Atkinson	207	0.6809	0.0483	0.5098	0.7527
Palma	207	5.8497	0.8998	3.0159	7.5243
Female Labour Participation	208	57.9203	12.7308	30.868	82.138
Female employment	208	53.4298	13.5246	26.014	79.309
Female unemployment	208	6.1215	4.3123	0.219	13.912
Domestic credit	207	17.0186	12.7121	1.2480	65.7418
Remittances	208	5.8497	0.8998	3.0159	7.5243
Female Education	129	37.1401	22.1352	6.6145	95.4110
GDP	208	22.6124	1.4818	20.3531	26.8637

Source: Authors compilation.

4.2. Results

Empirical results in table 3, table 4 and table 5 show the relationship between income inequality and female labour force participation in West Africa. The results are divided into three tables, with each table having a different dependent variable to capture female labour force participation. Results from table 3 reveal that all three measures of income inequality reduce female labour force participation significantly in West Africa. This can be revealed by their probability values which are statistically significant at conventional levels. It is also revealed from table 3 that domestic credit, remittances and female education significantly improves the participation of women in the labour force. The positive relationship between domestic credit and female labour force participation supports the conclusion of Field, Martinez and Pande (2016) where access to credit integrate women into the labour force. However, the remittance-female labour force participation relationship does not correspond with the findings of Azizi (2018), who found out that remittances reduce female labour force participation. This disparity in findings could be as a result of the region-specific characteristics of West Africa. On the other hand, GDP per capita and the square of GDP per capita significantly reduces female labour force participation in West Africa.

The negative relationship between GDP per capita and female labour force participation is in line with the study of Altuzarra, Galvez-Galvez and Gonzalez-Flores (2019). In West Africa, it is plausible that high female labour force participation falls with economic development and rises with an economic decline. This is based on the intuition that women tend to support their families when the household is faced with financial constraint, particularly in times when the economy is on a decline. However, it is revealed that a further increase in GDP per capita tends to reduce the negative impact of GDP per capita on female labour force participation, as revealed by the coefficient value. This result contradicts the U-shaped hypothesis on the relationship between economic development (as measured by GDP per capita) and female labour force participation. In West Africa, later stages of economic development also have a negative consequence on female labour force participation.

Table 3. Instrumental Variable Fixed Effects Results (1).

Panel A: Dependent Variable: Female Labour Force Participation Rate			
Variable	(1)	(2)	(3)
Gini	-76.2262***		
	(0.007)		
Atkinson		-34.2202***	
		(0.003)	
Palma			-2.0532***
			(0.004)
Domestic credit	0.0861**	0.0786***	0.0852**
	(0.012)	(0.012)	(0.010)
Remittances	0.9422***	0.9033***	0.9120***
	(0.000)	(0.000)	(0.000)
Female education	0.3224***	0.3263***	0.3279***
	(0.000)	(0.000)	(0.000)
GDP	-8.3661***	-7.8659***	-9.0311***
	(0.000)	(0.001)	(0.000)
GDP^2	-3.0105**	-3.5341***	-2.4547
	(0.002)	(0.001)	(0.002)
Constant	417.3367***	410.3331***	374.3462***
	(0.000)	(0.000)	(0.000)
R^2 within	0.4281	0.4281	0.4219
F statistics	247.76***	234.47***	348.30***
Observations	116	116	116

Source: Authors compilation.
Note: *** and ** denotes statistical significance at 1% and 5% respectively.

In able 4, the results reveal that the three indicators of income inequality significantly reduce female employment in West Africa. This transmits to the fact that income inequality leads to a fall in the participation of women in the labour force. The result supports the finding of Asongu and Odhiambo (2019). Their study revealed that income inequality reduces the participation of women in economic activities. Domestic credit, remittances and female education have a positive and significant impact on female employment in West Africa. However, GDP per capita and the square of GDP per capita significantly reduces female employment in the sub-region. These results highlight the importance of credit access, remittances and education to female employment. Employing the female employment rate as a proxy for female labour force participation supports the findings in table 3, where a U-shaped relationship between GDP and female labour force participation do not exist. Instead, it is revealed that the rise in GDP per capita initially has a more pronounced negative consequence on female employment in West Africa. However, the negative consequence becomes less pronounced over time.

Table 4. Instrumental Variable Fixed Effects Results (2).

PANEL B: Dependent Variable: Female Employment			
Variable	(1)	(2)	(3)
Gini	-72.1611***		
	(0.003)		
Atkinson		-31.4244***	
		(0.001)	
Palma			-1.9751***
			(0.002)
Domestic credit	0.0789***	0.0713***	0.0784***
	(0.009)	(0.009)	(0.006)
Remittances	0.9134***	0.8668***	0.8902***
	(0.001)	(0.000)	(0.000)
Female education	0.2914***	0.2941***	0.2973***
	(0.000)	(0.000)	(0.000)
GDP	-8.6224***	-8.0797***	-9.3071***
	(0.000)	(0.000)	(0.000)
GDP^2	-1.5560**	-1.9499**	-1.0682**
	(0.019)	(0.014)	(0.044)
Constant	348.5136***	334.9005***	311.0345***
	(0.000)	(0.000)	(0.000)
R^2 within	0.3721	0.3690	0.3683
F statistics	41.38***	42.46***	47.31***
Observations	116	116	116

Source: Authors compilation.

Note: *** and ** denotes statistical significance at 1% and 5% respectively.

In table 5, female unemployment is utilised as the proxy for female labour force participation. It is revealed that female unemployment is an increasing function of income inequality in West Africa. However, we do not see any statistically significant relationship between income inequality and female unemployment rate in West Africa.

Table 5. Instrumental Variable Fixed Effects Results (3).

PANEL C: Dependent Variable: Female Unemployment			
Variables	(1)	(2)	(3)
Gini	8.3113		
	(0.151)		
Atkinson		2.4112	
		(0.493)	
Palma			0.2828
			(0.175)
Domestic credit	-0.0041	-0.0026	-0.0047
	(0.751)	(0.836)	(0.725)
Remittances	-0.1505*	-0.1331**	-0.1573**
	(0.053)	(0.024)	(0.014)
Female education	-0.0452	-0.0441	-0.0469
	(0.266)	(0.257)	(0.219)
GDP	2.4087*	2.2600*	2.5847*
	(0.073)	(0.080)	(0.027)
GDP^2	-1.1225*	-1.2037*	-1.1112*
	(0.056)	(0.087)	(0.052)
Constant	2.3031	12.5605	0.9543
	(0.927)	(0.566)	(0.956)
R^2 within	0.0747	0.0726	0.0763
F statistics	93.21***	87.62***	40.11***
Observations	116	116	116

Source: Authors compilation.

Note: *** and ** denotes statistical significance at 1% and 5% respectively.

Furthermore, it is also revealed that remittances significantly reduce female unemployment while domestic credit and female education reduces female unemployment insignificantly. Furthermore, GDP per capita is revealed to significantly increase the female unemployment rate in West Africa. However, the square of GDP is seen to significantly reduce the female

unemployment rate in the region. This result shows the existence of an inverted U-shaped relationship between economic development and female unemployment. Earlier stages of economic development results in the increase in the female unemployment rate. However, later stages of economic development eventually result in a fall in the female unemployment rate.

5. Conclusion and relevant policy recommendations

The study has investigated the impact of income inequality on female labour force participation in West Africa utilising three measures of income inequality. The study employed the instrumental variable fixed effects model in order to correct for the possibility of simultaneity/reverse causality and individual heterogeneity. The study finds that the Gini coefficient, Atkinson index and the Palma ratio significantly influences female labour force participation rate and female employment negatively. However, the three indicators of income inequality increase female unemployment rate but not at any level of statistical significance. This result is consistent with the findings of Asongu and Odhiambo (2019). Further findings from the control variable show that domestic credit to the private sector, remittances and female education significantly increases the female labour force participation rate and female employment in West Africa.

Also, remittances and female education reduce female unemployment in West Africa. While remittances are revealed to be significant, female education is seen to be insignificant. The result has revealed the importance of migrant remittance to female labour force participation and as such, the importance of removing bottlenecks to enable the smooth flow of remittances into West Africa. Findings also reveal that GDP per capita and the square of GDP per capita decreases female labour force participation rate and female employment which disproves the U-shaped hypothesis for West Africa. We, however, found an inverted U-shaped relationship between GDP per capita and female unemployment, revealing that an initial response to economic development is the rise in female unemployment with a subsequent decline in female unemployment in West Africa at later stages of economic development. The study recommends the following based on findings, (1) there is an essential need for the adoption of inequality reducing policies in West Africa. The governments in the sub-region should also invest in sectors where women have a greater likelihood of participation. There is also need for quality infrastructure that drives economic activities as well as the adoption of a tax system that is progressive in nature to reduce income inequality, (2) it is necessary that the sub-region concentrates in developing the financial sector to improve access to credit. This can be achieved through a significant reduction in interest rates in financial institutions to enable borrowing, (3) the development of the financial sector would also reduce bottlenecks which would aid the increase in remittances flow into the West African sub-region, (4) human capital development in the form of female education should also be prioritised in West Africa. The positive linkage between female education and female labour force participation should be a focal point for West African countries on the need to pursue the girl child education. Finally, the study also reflects on the importance of changing the socio-cultural norms in Africa, where many women participate more in the labour market only when economic activities

are declining in order to support their spouses. As highlighted, in periods of rising per capita GDP, women draw out of the labour market and tend to cater more for their husbands and children leaving their husbands to cater for the family. Conclusively, the feminisation theory fails to hold in West Africa.

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