



DEMOGRAPHIC RESPONSES TO POLITICAL TRANSFORMATION IN AFRICA

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ABSTRACT

Gender inequality in Africa remains ambiguous because of the steep challenges of women empowerment and development. Little has been done on the influence of equitable governance on women's empowerment in Africa. Besides, previous empirical studies are limited to studying the influence of democracy on gender equality in education and fail to offer generalisable conclusions. These mixed results have motivated us to evaluate the relationship between a shift in political regime and different measures of women's empowerment in selected Africa countries. Data on indices of women empowerment and political transformation from 1980 through 2017 were analysed using the Pooled Mean Group Panel estimation procedure. It is expected that demographic responses should influence transformation in the political arena in Africa. Therefore, the African government, through legislative and executive domains, should demonstrate a sincere transformational plan for the inclusion of women at all levels.

Keywords: Women empowerment, Demographic Responses, Political Transformation, Pooled mean Group, Africa.

RESUMEN

La desigualdad entre los géneros en África sigue siendo ambigua debido a los grandes desafíos que plantean el empoderamiento y el desarrollo de la mujer. Se ha avanzado poco en cuanto a la influencia de la gobernanza equitativa en el empoderamiento de la mujer en África. Además, los estudios empíricos anteriores se limitan a estudiar la influencia de la democracia en la igualdad de género en la educación y no ofrecen conclusiones generalizables. Estos resultados contradictorios nos han motivado a evaluar la relación entre un cambio de régimen político y las diferentes medidas de potenciación de la mujer en determinados países de África. Los datos sobre los índices de potenciación de la mujer y transformación política desde 1980 hasta 2017 se analizaron utilizando el procedimiento de estimación del Panel de Grupos de Promedios Comunes. Se espera que las respuestas demográficas influyan en la transformación del ámbito político en África. Por consiguiente, el gobierno africano, a través de los ámbitos legislativo y ejecutivo, debería demostrar un plan de transformación sincero para la inclusión de las mujeres en todos los niveles.

Palabras clave: Empoderamiento de la mujer, Respuestas demográficas, Transformación política, Grupo medio mixto, África.

JEL Classification: C13, D78, J11, O55

1. INTRODUCTION

African politics has been marked by varying dramatic and development occurrences. These developments have varying and contradictory dimensions and instituted a significant source of challenge to understanding different political theory with schools of thought, providing varying interpretations and meaning. (Nugin, 2006). Africa political transformation aged back to time immemorial and no consensus on the most appropriate approach for interpreting the changes that are dominating African politics as regards the structure, content and dynamics. Efforts at conceptualising the changes in African politics have produced a veritable tower of Babel, with commentators not only speaking in different tongues but frequently past one another. The sense of confusion which is prevalent in the literature is indicative as much of the complexity of the changes themselves as of the crisis of theory in the study of Africa (Jennings, 2013; Wiredu, 2007). The characterisation of African politics as one that is contradictory in changes sometimes inspires hope and other times generate despair. The divide in the changes of African politics in terms of hope and despair has differentiated the scholarly and policy communities into Afro-optimist and Afro-pessimism camps (Cohen, 2013). However, the polarisation of thoughts offered by optimist and pessimists about the challenges and prospects of an egalitarian Africa we all desire, is too simplistic and subjective to serve as an enduring basis for capturing the dialectics of socio-political change and transformation (Curtis, Dzinesa, & Adebajo, 2012). A robust, comprehensive and evidence-based interpretation of underlying changes in Africa is quite apt and imperative. An attempt is made in this study to use accurate data, appropriate methodology to answer old questions on Africa political transformation in Africa with a view of coming up with findings that redefine policy and research on the subject matter. We examine the narrowing parameters that currently dominate the discourse on the processes and structures of change occurring in contemporary Africa as regards role women play in Africa transformation.

Women empowerment is a critical development concern around the world, especially in Africa (Mayoux, 1999; Njoh & Akiwumi, 2012). National and international initiatives have made an effort to reduce the disparities among women; the empowerment goals are yet to be wholly realised globally. In Africa, women have acquired significant influence on social, economic and political institutions through emancipatory actions and empowerment movements (Ampofo, Beoku-Betts, Njambi, & Osirim, 2004; Devlin & Elgie, 2008; Goetz, 1998). Nevertheless, family, cultural and socio-economic status of women significantly varies across regions, states, social groups and ethnic minorities around Africa (Jennings, 2013). Around 61 per cent of seats in the Rwandan Parliament, was women elected, ensuring Rwanda as the country with the highest seat for women in politics in Africa (Devlin & Elgie, 2008; Newbury, 1998). In Tunisia, women now make up 47 per cent of the local council positions (Anderson, Joseph, & Slyomovics, 2001; Arfaoui & Moghadam, 2016).

Despite the appreciable increase in women representation in Africa, Africa challenges of unequal growth, low-income level, weak credit security, insecurity, illicit flow of funds and most pathetic high level of poverty remains unabated (Burnet, 2008; Kassa, 2015; Young, 2011). The international organisation, donors, financial institutions, investment partners, African government and the society at large are increasingly bothered about the diminishing role of women in all spheres of life despite their relative population advantage over the male in Africa and growing influence of gender equality debates around the world. The World Bank (2015) identified gender mainstreaming as a priority for development assistance and is in the process of implementing an ambitious strategy to this effect. We argued that women's empowerment is a development goal because social justice is an essential aspect of human welfare and is intrinsically worth pursuing and that women's empowerment is a means to other ends.

World Bank (2012), for example, identifies gender equality both as a development objective in itself, and as a means to promote growth, reduce poverty, and promote better governance. A similar dual rationale for supporting women's empowerment has been articulated in the policy statements put forth at several high-level international conferences in the past decades.

A small but growing body of academic work has examined the political identities and political participation for women empowerment in Africa. This growth of interest in the political subjectivities of African women is, in many ways, shaped by two core factors. First, it is in response to the popular framing of African women as disengaged, submissive and apolitical and how these framings are in some respects, becoming more entrenched in our political ideology to women participation. Much of the recent research seeks to challenge stereotypes in public and political discourses and provide more nuanced examinations of the political subjectivities of African women (Jennings, 2013). This intersects with the general increase in gender imbalances in society, and the need to focus on how African women think and respond to such discriminations. Second, a broader conceptualisation of what constitutes political engagement and the political agency has been central in enabling research to illustrate the political and active agency of African women. For example, feminist political geographers Ampofo *et al.* (2004); Jennings, (2013) and youth and citizenship studies scholars Bob-Milliar (2014); Honwana (2013); Narunsky-Laden (2010); Oyedemi (2015) have been influential in broadening politics beyond formal and global institutions to incorporate every day, embodied and informal practices that constitute part of the political.

In this study, an attempt is made to unravel the implications of political transformation for women empowerment in Africa using empirically tested arguments and findings. We employed the pooled mean estimation procedure to account for large structural transformation in African politics as induced by demographic responses. The choice of the pooled mean group (PMG) estimation procedure, is because the estimator provides consistent estimates of the parameters' averages Pesaran and Smith (1995). Bangake and Eggoh (2012) also show that the mean group estimator provides efficient long-run estimators for a large sample size. PMG permits parameters to be freely independent across groups and does not consider potential homogeneity between groups. Previous studies failed to take note of endogeneity problems inherent in ordinary panel model. Most studies on gender imbalances have failed to address issues of cross-sectional dependence. The usual panel method (random or fixed effects and GMM methods) force the parameters to be identical across countries and could lead to inconsistent and misleading long-term coefficients, a possible problem that is exacerbated when the period is long. One advantage of the PMG is that it can allow the short-run, dynamic specification to differ from country to country while making the long-run coefficients constrained to be the same. Furthermore, unlike the Dynamic Ordinary Least Square (DOLS) and Fully Modified Ordinary Least Square (FMOLS), the PMG estimator highlights the adjustment dynamic between the short-run and the long-run. The reasons for assuming that short-run dynamics and error variances should be the same tend to be less compelling. Not imposing equality of short-run slope coefficients allows the dynamic specification to differ across countries. Therefore, the long-run relationship between investment and savings is expected to be identical from country to country, but the short-run coefficients are expected to be country-specific. The null hypothesis of the homogeneity in the long-run coefficients can be verified with the Hausman test. Assuming that political transformation and women empowerment in Africa are first differenced $I(1)$ and cointegrated, the error term is supposed to be independently distributed across time. Against this backdrop, we examine the underlying structural relationship between political transformation and women empowerment in Africa.

2. LITERATURE REVIEW

Measurement Issues of Empowerment

Empowerment is Context-Specific

One of the significant difficulties in measuring empowerment is that the behaviours and attributes that signify empowerment in one context often have different meanings elsewhere (Mahmud, Shah, & Becker, 2012; Richardson, 2018; Shettar, 2015). For example, a shift in women's ability to visit a health centre without getting permission from a male household member may be a sign of empowerment in rural Bangladesh but not in, for example, urban Peru. Context can also be important in determining the extent to which empowerment at the household or individual level is a determinant of development outcomes. It could be argued, for example, that if investments in public health systems are stable, then women's role as the intermediaries for their children's health through better education or decision-making power in the household will be less meaningful than when this is not the case. (N Kabeer, 2001; Kamal, 2011).

The variation in the nature and importance of empowerment across contexts poses a challenge in terms of both consistency and comparability in measurement schemes. How important is the context in defining empowerment in different settings? Does the context-specific nature of empowerment mean that we must continuously reinvent indicators to suit socio-economic, cultural and political conditions? What is the role of context in determining the relationship between women's empowerment and development outcomes? How dependent is this statistical relationship on the choice of indicators and whether or not they are appropriate to the setting in question?

In the 1990s there have been a few pioneering efforts at sorting out some of these issues through empirical research (Cook et al., 2011; Kabeer and Nations, 1999; Mason and Smith, 2000). The body of work emerging from this research unequivocally confirms the importance of context in both defining and measuring the impact of women's empowerment on development outcomes. Although not entirely conclusive concerning several of the other challenges that context specificity represents, this work also sets the stage for exploring measurement and analytical schemes that can better address these challenges. The group of "Status of Women and Fertility" studies conducted by Mason and her colleagues aimed for comparability in measuring women's empowerment and its impact of reproductive behaviour across five settings in Asia: India, Pakistan, Thailand, Philippines, and Malaysia (Mason & Smith, 2000). Although there were small variations in wording to make each question appropriate to the country setting, there was an effort to employ similar indicators across countries and within 59 community settings in the five countries. In her 1998 analysis, for example, Mason can compare "economic decision-making power in the family" based on a scale constructed from six indicators that were collected relatively consistently across the five countries.

In this approach, contextual factors are brought in as important determinants at the analytical rather than the measurement stage. Thus, analyses from this set of studies include community-level measures on family systems, marriage systems, religion and ethnicity, female participation in the workforce, rates of child mortality, etc. Jensen

(2002) employs a similar approach by developing an index of the gender contexts in four communities using eight indicators, such as mean spousal age difference, percentage of wives in modern work, mean score on wives' physical mobility, and percentage of wives who control how to use income. A consistent set of findings from this approach is that the contextual factors are often more critical in determining women's empowerment and its outcomes than individual-level factors. At the same time, there is inconsistency in the studies' findings on which particular contextual conditions are most empowering to women. Mason (1998) summarises: "While our analysis suggests that the community context is essential for the empowerment of individual women, it also makes clear that the community conditions which empower women tend to be idiosyncratic rather than universal."

Studies that apply indicators across cultures can be useful for making international or interregional comparisons concerning an external yardstick of power, women's status or gender equity, but they raise the issue of how appropriate similar indicators are in measuring empowerment across settings. An alternative potential approach to addressing the challenges of context is to rely on a consistent conceptual framework for measuring empowerment and its effects but to allow flexibility in the specific indicators used to define the critical components of that framework across different settings. Any given context, at any given point of time, can be seen as having behavioural and normative "frontiers," that need to be crossed for women to be empowered along a specific dimension, within a specific arena. Specifying these frontiers helps define the indicators of relevance to that particular context, at that particular time. This is the approach that Schuler *et al.* (1997) advocate. In their work on Bangladesh, India and Bolivia, Schuler and her colleagues relied on a common conceptual framework in which they specified the dimensions along which women's empowerment or its effects could vary. In measuring the dimensions, however, they used indicators relevant to each particular country and community setting. Their analysis also allowed for greater or lesser weight on specific dimensions as opposed to others across contexts. Hashemi and Schuler argue that initial groundwork through qualitative and exploratory methods, conceptual analysis, and stakeholder consensus through participatory processes is essential to establishing parameters that define empowerment in specific country and development project contexts (Hashemi, Schuler, & Riley, 1996).

This approach, however, does require a balancing act between the "universalist" principles around which empowerment must be conceptualised, and the localisation of context-specific indicators. The underlying structures of gender inequality are often invisible to the actors in a particular social milieu; they are often experienced as "natural" and, as such, inalterable. However, individuals find ways to exercise agency, and to control others, even in contexts where they are comparatively powerless. In exploring the viability of indicators and building stakeholder consensus through participatory processes, there is the danger that indicators may be "too" internally defined, reflecting the limited viewpoint of the actors. The contextual nature of empowerment suggests that "universal" measures may be impossible. However, further comparative research might reveal whether some empowerment indicators are "more universal" than others.

Empirical Literature

Empirical research on gender issues in the fields of anthropology, sociology, demography, and economics has acquired increasing levels of sophistication during the past three decades. From being limited to qualitative studies in anthropology, empirical work on women's status began appearing in sociological and demographic studies in the 1970s. During the following decade, the shift from women's status to a better understanding of gender inequality and concepts such as female autonomy and power moved the field forward. In the 1990s, the call for better theoretical models allowing for gender differences and the accompanying data to test them both at the macro and micro levels began to take hold within economics. While gender issues, especially as they relate to development, are not in the mainstream of any of these disciplines, significant intersections exist across all four. Natural affinities have also begun to develop. Thus, the critique of the unitary household model and experimentation with a range of bargaining models of power in economics has some natural affinity with conceptual frameworks emphasising decision-making and control within demography and sociology. Researchers who have recognised and realised the value of interdisciplinary intersections in their work have perhaps made the most significant contributions in moving this field forward (Ampofo *et al.*, 2004; Goetz, 1998; Hashemi *et al.*, 1996; Kassa, 2015; Paudel & de Araujo, 2017; Shettar, 2015).

3. METHODOLOGY

3.1 Theoretical Framework and Model Specification

In modelling the demographic responses to political transformation in Africa, the study follows the unified growth theory as in Galor and Weil, (2000). The unified growth theory captures the growth process over the entire course of human existence, highlighting the critical role of the differential timing of the transition from Malthusian stagnation to sustained economic growth in the emergence of inequality across countries and regions. The theory argued that during most of human existence, technological progress was offset by population growth, and living standards were near subsistence across time and space. However, the reinforcing interaction between the rate of technological progress and the size and composition of the population has gradually increased the pace of

technological progress, enhancing the importance of education in the ability of individuals to adapt to the changing technological environment. The rise in the allocation of resources towards education triggered a fertility decline enabling economies to allocate a larger share of the fruits of technological progress to a steady increase in income per capita, rather than towards the growth of population, paving the way for the emergence of sustained economic growth. The theory further suggests that variations in biogeographical characteristics, as well as cultural and institutional characteristics, have generated a differential pace of transition from stagnation to growth across countries and consequently divergence in their income per capita over the past two centuries.

Our paper contributes to this literature on unified growth theory by bringing to light new determinants of the extended transition process inherent in political transformation. Our model incorporates novel and additional mechanisms consistent with observed stylised facts. The model emphasises the importance of the role played by women in the development process. More precisely, we describe how a virtuous circle linking female empowerment, human capital accumulation, and endogenous technological progress could have triggered demographic and economic transition. The model encompasses the different phases of the process: a phase of stagnation, a take-off triggered by technological progress, and a phase of sustained economic growth accompanied by a demographic transition, driven by gender empowerment.

From the Unified growth theory, hyperbolic distribution describing growth is represented by a reciprocal of a linear function:

$$s(t) = \frac{1}{a - kt} \quad (1)$$

where $s(t)$ is the size of the growing entity, in our case the gender imbalances, while a and k are positive constants. We proceed to specify the functional relationship of our model.

$$WOMEN_{EMP_{it}} = f(POL_{TRANS_{it}})$$

Where $WOMEN_{EMP_{it}}$ is women empowerment and $POL_{TRANS_{it}}$ is political transformation. i is the cross-sectional characteristics of our unbalanced panel data set, and t is the time dimensional characteristics.

$$WOMEN_{EMP_{it}} = A + \sum_{i=1...54}^{n=1} \gamma_n GDPPC_{it} + \sum_{i=1...54}^{n=1} \pi_n SOC_{INCL_{it}} + \sum_{i=1...54}^{n=1} \omega_n EDU_{EXP_{it}} + \sum_{i=1...54}^{n=1} \beta_n POL_{INST_{it}} + \mu_{it} \quad (2)$$

Where

where γ , π , ω and β , are the elasticities of GDP per capita $GDPPC_{it}$, policies for social inclusion $SOC_{INCL_{it}}$, government education expenditure $EDU_{EXP_{it}}$ and political instability, respectively. $GDPPC_{it}$ is gross domestic product per capita GDP per capita in Africa countries, A is the efficiency of the political economy; $SOC_{INCL_{it}}$ is policy for social inclusion. The policies for social inclusion and equity cluster includes gender equality, equity of public resource use, building human resources, social protection and labour, and policies and institutions for environmental sustainability; $EDU_{EXP_{it}}$ gives African government expenditure on education and $POL_{INST_{it}}$ is depth of political instability in Africa; i is cross-sectional characteristics, and t is the time-series dimension of the data set (1986-2017). Given the purpose of this study which examines the demographic responses to political transformation in Africa, we take the semi-logarithms and time derivatives of equation (2), we generate the following dynamic function:

$$\ln WOMEN_{EMP_{it}} = A + \sum_{i=1...54}^{n=1} \gamma_n \ln GDPPC_{it} + \sum_{i=1...54}^{n=1} \pi_n \ln SOC_{INCL_{it}} + \sum_{i=1...54}^{n=1} \omega_n \ln EDU_{EXP_{it}} + \sum_{i=1...54}^{n=1} \beta_n \ln POL_{INST_{it}} + \mu_{it} \quad (3)$$

3.2 Data Sources and Measurements

Our study used panel data for twenty (20) African countries based on regional classification. Africa is divided into five (5) major regions. The regions are Southern Africa (South Africa, Zimbabwe, Botswana, and Angola), East Africa (Kenya, Burundi, Tanzania and Rwanda), Equatorial Africa (DR Congo, Cameroun, Gabon and Equatorial Guinea), West Africa (Nigeria, Ghana, Senegal and Ivory Coast) and Africa Transition Zone (Eritrea, Sudan, Burkina Faso and Mali). The choice of countries is guided by the desire to limit attention to Africa

countries, and by the availability of reliable data on macroeconomic aggregates for demographic responses to political transformation in Africa. Structural component characteristics of variables across this region are assumed to exhibit substantial homogeneity (Bell & Jones, 2015; Honaker, King, & Blackwell, 2011). Variables description remains as earlier defined. The data are mainly obtained from the World Bank Database (World Bank, 2017) and other appropriate sources described in details in subsequent headings.

Table 1: Variable Description

Abbreviation	Description	Variable	Source
$WOMEN_{EMP_{it}}$	Women Empowerment	Women participating in 3 decisions (Own health, major household purchases and visiting family)	Demographic and Health Surveys
$GDPPC_{it}$	GDP Per Capita	GDPPC	World Bank National Accounts Data and OECD National Accounts Data Files.
$SOC_{INCL_{it}}$	Policy for social inclusion	Gross Fixed Capital Formation	World Bank National Accounts Data and OECD National Accounts Data Files.
$EDU_{EXP_{it}}$	Government Education Expenditure	Government Education Expenditure	UNESCO Institute for Statistics
$POL_{INST_{it}}$	Political Instability	Political Stability and Absence of Violence	World Governance Indicator

Women's participation in decisions being made in their households that is households in which they usually live with their spouse and/or children with or without others is widely accepted as a universal indicator of women's empowerment. The ability of women to make decisions that affect their personal circumstances is an essential element of their empowerment and serves as an important contributor to their overall development (World Bank, 2017). GDP per capita is gross domestic product divided by midyear population. 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. The policies for social inclusion and equity cluster includes gender equality, equity of public resource use, building human resources, social protection and labour, and policies and institutions for environmental sustainability. General government expenditure on education (current, capital, and transfers) is expressed as a percentage of total general government expenditure on all sectors (including health, education, social services, etc.). It includes expenditure funded by transfers from international sources to the government. General government usually refers to local, regional and central governments. Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism.

Estimation Technique

In accounting for the dynamics of the demographic responses to political transformation in Africa, the study employs various econometric procedures. First, the pre-estimation tests (descriptive statistics, correlation matrix) and the panel unit root test was conducted to ascertain the characteristics of the variables. Secondly, we estimated the Pool Mean Group Estimation (PMG). The PMG model consists of averaging separate estimates for each group in the panel. According to Pesaran and Smith (1995), this estimator provides consistent estimates of the parameters' averages. Bangake and Eggoh (2012) also show that the mean group estimator provides efficient long-run estimators for a large sample size. It allows the parameters to be freely independent across groups and does not consider potential homogeneity between groups. Other panel methods (random or fixed effects and GMM methods) force the parameters to be identical across countries and could lead to inconsistent and misleading long-term coefficients, a possible problem that is exacerbated when the period is extended. Pesaran and Smith (1995) proposed an intermediate estimator that allows the short-term parameters to differ between groups while imposing equality of the long-term coefficients between countries. One advantage of the PMG is that it can allow the short-run dynamic specification to differ from country to country while making the long-run coefficients constrained to be the same.

Furthermore, unlike the Dynamic Ordinary Least Square (DOLS) and Fully Modified Ordinary Least Square (FMOLS), the PMG estimator highlights the adjustment dynamic between the short-run and the long-run. The

reasons for assuming that short-run dynamics and error variances should be the same tend to be less compelling. Not imposing equality of short-run slope coefficients allows the dynamic specification to differ across countries. Therefore, the long-run relationship between political transformation and women empowerment is expected to be identical from country to country, but the short-run coefficients are expected to be country-specific. The null hypothesis of the homogeneity in the long-run coefficients can be verified with the Hausman test. Assuming that political transformation and women empowerment are $I(1)$ and cointegrated, μ_{it} is supposed to be $I(0)$ for all i and is independently distributed across t . The choice of the lag length is based on the literature on the relationship between political transformation and women empowerment and confirmed by the Akaike Information Criterion (AIC) and Schwarz Bayesian Criterion (SBC).

4. RESULTS

Table 2: Descriptive Statistics of Data Set

	$WOMEN_{EMP_{it}}$	$GDPPC_{it}$	$SOC_{INCL_{it}}$	$EDU_{EXP_{it}}$	$POL_{INST_{it}}$
Mean	4.636	3.728	3.442	3.432	3.333
Median	3.727	1.662	2.432	2.233	2.222
Maximum	8.663	6.223	7.772	5.332	6.973
Minimum	2.272	1.113	1.968	1.233	1.334
Std. Dev.	2.232	1.822	1.233	3.458	2.224
Skewness	3.223	-1.222	2.233	1.773	1.627
Kurtosis	1.643	2.116	7.939	1.744	1.228
Jarque-Bera	186.010	17.575	267.762	452.762	232.333
Probability	0.233	0.787	0.927	0.341	0.843
Observations	640	640	640	640	640

Source: Authors, 2019

Note: The summary statistics were computed before taking the natural logs

Table 2 shows the mean and median values of the variables in the panel dataset lie within the maximum and minimum values indicating a high tendency of the normal distribution. All the variables are positively skewed. The kurtosis statistics showed that all the variables were platykurtic, suggesting that their distributions were flat relative to a normal distribution (values are less than 3). The Jarque-Bera statistics shows that the series is normally distributed since the p-values of all the series are not statistically significant at 5% level. Thus, informing the acceptance of the alternate hypothesis that says each variable is normally distributed.

Panel Unit Root Tests

Levin–Lin–Chu (LLC)

Panel unit root tests formulated by Levin, Lin, and Chu (2002) suggests the following hypotheses for testing stationarity in panel data.

Under the null hypothesis, LLC test shows that each time series contains a unit root, i.e., $H_0 : \rho_i = 0 \forall i$, and for the alternative hypothesis, each time series is stationary, i.e., $H_A : \rho_i = \rho < 0 \forall i$. Like other unit root tests in the literature, LLC assumes that the individual processes in each cross-section are independent. The LLC test is mainly based on the estimation of the following equation;

$$\Delta Y_{it} = \alpha_i + \delta_{it} + \theta_t + \rho_i Y_{it-1} + \zeta_{it}, t \quad (4)$$

Where $i=1, 2 \dots N, t=1, 2 \dots T$

This test might be treated as a pooled Dickey-Fuller or augmented Dickey-Fuller test potentially with different time lags across the units of the panel.

Im–Pesaran–Shin (IPS) Test

The IPS test formulated by Im, Pesaran, and Shin (2003) is the extension of LLC test incorporating heterogeneity in the dataset under the alternative hypothesis. Here, IPS test estimation is also based on Eq. (4). The null hypothesis is stated as $H_0 : \rho_i = 0 \forall i$ against the alternative hypothesis of $H_A : \rho_i < 0$ where $i = 1, 2, 3, \dots, N_1; \rho_i = 0, i = N_1 + 1, N_1 + 2, \dots, N$.

In the IPS test, it is presumed that all series is non-stationary under the null hypothesis and a fraction of the series is stationary under the alternative hypothesis. It is the difference with LLC test, in which all series are supposed to be stationary under the alternative hypothesis.

Table 3: Panel Unit Root Test

Variables	$WOMEN_{EMP_{it}}$	$GDPPC_{it}$	$SOC_{INCL_{it}}$	$EDU_{EXP_{it}}$	$POL_{INST_{it}}$
Levin-Lin-Chu (LLC)	1.218*	2.282*	0.922**	2.772**	1.553**
Im-Pesaran-Shin (IPS)	-1.722*	0.882**	-0.929*	-0.723**	-0.867**

*Significant at 1 %; ** significant at 5 %

Source: Authors, 2019

The outcomes of Levin-Lin (LL) and the Im-Pesaran-Shin (IPS) test are shown in Table 3 above. All test confirmed that variables were non-stationary at levels and are stationary after first difference except government revenue. It is hereby inferred that variables are first differenced stationary. These empirical outcomes did uncover not only the non-stationary properties of all the variables but also established a solid foundation for panel cointegration analysis. This is indispensable in this research because applying regressions on non-stationary variables can give misleading parameter estimates in the economic relationship among variables.

Table 4: Panel Cointegration Test

Method		Statistics
Pedroni Residual Co-Integration Test	Within Dimension	
	Panel v-Statistics	-1.772
	Panel rho-Statistics	0.872
	Panel PP-Statistics	-2.626
	Panel ADF-Statistics	-1.726
	Between Dimension	
	Group rho-Statistics	1.626
	Group PP-Statistics	-3.727
Kao Residual Cointegration Test	ADF t-Statistics	-5.626

Source: Authors, 2019

Table 4 affirms that no cointegration relationship exists using Pedroni and Kao residual cointegration test. Therefore, it is concluded that the dynamic panel regression model reveals the no long-term relationship among economic variables. Hence, we proceed to the pool mean group estimator for consistent long run averages.

Pool Mean Group Estimation

In analysing the demographic responses to political transformation in Africa, we rely on the work of Pesaran *et al.* (2006) which provided two important techniques in estimating non-stationary dynamic panels in which the parameters are heterogeneous across groups, they include the Mean Group (MG) estimator and the Pooled Mean Group (PMG) estimator.

In this paper, we place more emphasis on the PMG estimator. According to Pesaran *et al.* (2006), PMG is a combination of pooling and averaging of coefficients. The PMG constrains the long-run elasticity to be equal across all panels which yield efficient and consistent estimates only when homogeneity restriction is correct (Iwata, Okada, & Samreth, 2011). PMG also has the advantage of allowing for the heterogeneous short-run dynamics for each cross-section (Bangake & Eggoh, 2012). The short-run adjustment is allowed to be country-specific. This is due to different impact of vulnerabilities to external shocks, monetary policy and others.

This is quite different from the MG estimator which estimates separate regressions for each country while calculating the coefficients as unweighted means of the estimated coefficients for the individual cross-sections (Iheonu, Ihedimma & Omenihu, 2017). It allows for all coefficients to vary and be heterogeneous in the long run and short run. A pre-condition for the PMG technique lies on the result of the unit root test. This technique can be applied when all variables in the model are I(1) stationary, I(0) stationary or a mixture of I(1) and I(0) (Pesaran *et al.*, 1999). PMG being an ARDL model is sensitive to the choice of lag length, and hence we utilise the Hannan Quinn criteria to obtain our optimal lag length with result indicating that ARDL (1,1,1,1,1) is optimal. The result in Table 5 shows the result of the PMG and MG dynamic heterogeneous panel procedure. The result exhibits notable variations subject to the method of estimation.

Table 5: Pool Mean Group Coefficients

Dependent variable: $WOMEN_{EMP_{it}}$	PMG	MG
Convergence coefficient	-0.0543 (0.0432) **	-0.2331 (0.0723)
Long-run Coefficients		
$lnGDPPC_{it}$	0.1223 (0.0321) **	-0.0232 (0.0272)
$lnSOC_{INCL_{it}}$	0.5486 (0.0054) *	0.0234 (0.0432)
$lnEDU_{EXP_{it}}$	0.8632 (0.0442) **	0.0043 (0.0982)
$lnPOL_{INST_{it}}$	-0.3342 (0.0064) *	0.8721 (0.0875)
Short-Run Coefficients		
$lnGDPPC_{it}$	-0.0032 (0.6622)	-0.0094 (0.0056)
$lnSOC_{INCL_{it}}$	-0.4526 (0.0052) *	-0.0057 (0.0062)
$lnEDU_{EXP_{it}}$	0.6543 (0.0321) **	0.0043 (0.0231)
$lnPOL_{INST_{it}}$	-0.7463 (0.0238) **	0.0054 (0.0732)
AUXILLIARY PARAMETERS		
Hausman Test	7.98 {0.158} *	
Number of Countries	20	
Number of Observation(s)	640	

Source: Authors, 2019

Note: All equations include a constant country-specific term. Standard errors are in parenthesis. t-statistics is in square bracket. *, **, *** denotes significance at 1%, 5% and 10% respectively. The short-run result is the average derived from the short-run estimate for each different cross-section.

The PMG estimation result shows that in the long run, *GDP per capita* drives women empowerment in Africa. This result is significant at 5% level of significance. A percentage increase in *GDP per capita* led to a 12.23 per cent increase in women empowerment in Africa. Policy for social inclusion in the long run induced women empowerment in Africa. A percentage increase in policy for social inclusion led to a 54.86 per cent increase in women empowerment in Africa. At the five per cent level of significance, the result shows that government educational expenditure has a positive impact on women empowerment in Africa. A percentage increase in government expenditure on education induced significant changes (86.32%) in women empowerment in Africa. However, at one per cent level of significance, political instability inversely predicts women empowerment in Africa. A per cent increase in political instability induced 33.42 percentage decrease in women empowerment in Africa.

However, in the short run, *GDP per capita* is seen to hurt women empowerment in Africa, but this result proves insignificant. This finding is also true for policy for social inclusion but significant at one per cent, implying a percentage increase in social inclusion in the short run led to 45.26% per cent decrease in women empowerment in Africa. Government educational expenditure is large enough to instigate a positive short-run impact on women empowerment in Africa because it is significant at 5%. A per cent increase in government educational expenditure induced 65.43% per cent increase in women empowerment in Africa in the short run. Political instability is inversely related to women empowerment in Africa in the short run as it is significant at 5%. A percentage increase in political instability induced 74.63% decrease in women empowerment in Africa in the short run.

The homogeneity of the long-run coefficient implied by the PMG technique cannot be assumed before estimation and as such a post estimation test is required. If the long-run homogeneity holds, the PMG estimate is said to be more efficient in comparison to the MG estimates, but when the long-run homogeneity fails to hold, the estimates of the PMG become inefficient compared to the MG technique. Hausman test result proves that there exists long-run homogeneity for the study sample, and hence the PMG technique is appropriate. The Hausman test result shows that we fail to reject the null hypothesis of long-run homogeneity at the one per cent level of significance, which indicates that a long run homogeneous relationship exists amongst the countries in the model. The convergence parameter allows adjustment from short-run to long-run, where there is homogeneity in political transformation-women empowerment coefficients across countries. The adjustment coefficient (-0.0543) has the

expected sign and is significant at the 5% level. This result shows that there is an adjustment dynamic from short-run to long-run in Africa demographic and political transformation.

5. CONCLUSION

In this paper, we use a comprehensive cross-country dataset of demographic responses to political transformation in Africa from 1986 through 2017. We rely on the pooled mean group estimation procedure to study this relationship, which allows us to account for the short-run and long-run dynamics of demographic responses to political transformation in Africa. The long-run results show that *GDP per capita*, policy for social inclusion and government educational expenditure positively drives women empowerment in Africa, while political instability inversely predicts women empowerment in Africa. Short-run results show that *GDP per capita*, policy for social inclusion and political instability are seen to hurt women empowerment in Africa. However, government educational expenditure has a positive short-run impact on women empowerment in Africa. The long-run results in consonance with the findings of Jackson and Rosberg (2018); Parnell and Crankshaw (2013); Paudel and de Araujo (2017); Teller and Hailemariam (2011). The short-run results were in tandem with the findings of Lindberg (2004); Mahmud and Tasneem (2014); McEwan (2003); Wittmann (2012). It is therefore recommended that the African government through legislative and executive domains, should demonstrate a sincere transformational plan for the inclusion of women at all levels.

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