

Economics and Business Review

Volume 11 (1) 2025

CONTENTS

Editorial introduction

Monika Banaszewska, Michał Pilc, Konrad Sobański

ARTICLES

Environmental pollution and economic growth in the European Union countries: A systematic literature review

Błażej Suproń

Energy mix and its implications on the Vietnamese economy by 2030: A CGE analysis using GTAP-E-Power

Duy Chinh Nguyen, Jong-Hwan Ko

The impact of women's economic empowerment on human development in sub-Saharan Africa: A panel quantile regression approach

Lotfi Mekhzoumi, Sabrina Chikh-Amnache, Nabila Mekhzoumi

The effects of COVID-19 on Polish enterprises

Wojciech Kuryłek, Yochanan Shachmurove

Inflation expectations proprieties during the war: The case of Ukraine

Magdalena Szyszko, Aleksandra Rutkowska, Olena Matuzka

Financial inclusion, market concentration and underwriting performance: Empirical evidence from Central Eastern and Southeastern European countries

Bojan Srbinoski, Jordan Kjosevski, Klime Poposki, Stevcho Mecheski

Editorial Board

Monika Banaszewska (Editor-in-Chief), *Ivo Bischoff*, *Horst Brezinski*,
Gary L. Evans, *Niels Hermes*, *Witold Jurek*, *Tadeusz Kowalski*, *Joanna Lizińska*,
Ida Musiałkowska, *Paweł Niszczoła*, *Michał Pilc* (Deputy Editor-in-Chief),
Katarzyna Schmidt-Jessa, *Konrad Sobański*

International Editorial Advisory Board

Edward I. Altman – NYU Stern School of Business
Udo Broll – School of International Studies (ZIS), Technische Universität, Dresden
Conrad Ciccotello – University of Denver, Denver
Wojciech Florkowski – University of Georgia, Griffin
Oded Galor – Brown University, Providence
Binam Ghimire – Northumbria University, Newcastle upon Tyne
Christopher J. Green – Loughborough University
Eduard Hochreiter – The Vienna Institute for International Economic Studies
Mark J. Holmes – University of Waikato, Hamilton
Andreas Irmen – University of Luxembourg
Bruce E. Kaufman – Georgia State University, Atlanta
Robert Lensink – University of Groningen
Steve Letza – The European Centre for Corporate Governance
Robert McMaster – University of Glasgow
Victor Murinde – SOAS University of London
Hugh Scullion – National University of Ireland, Galway
Yochanan Shachmurove – The City College, City University of New York
Thomas Taylor – School of Business and Accountancy, Wake Forest University, Winston-Salem
Linda Gonçalves Veiga – University of Minho, Braga
Thomas D. Willett – Claremont Graduate University and Claremont McKenna College
Habte G. Woldu – School of Management, The University of Texas at Dallas

Thematic Editors

Economics: *Monika Banaszewska*, *Ivo Bischoff*, *Horst Brezinski*, *Niels Hermes*, *Witold Jurek*,
Tadeusz Kowalski, *Ida Musiałkowska*, *Michał Pilc*, *Konrad Sobański* • **Finance:** *Monika Banaszewska*,
Gary Evans, *Witold Jurek*, *Joanna Lizińska*, *Paweł Niszczoła*, *Konrad Sobański* • **Statistics:** *Marcin*
Anholcer, *Maciej Beręsewicz*, *Elżbieta Gołata*

Language Editor: *Robert Pagget*

Paper based publication

© Copyright by Authors, Poznań 2025

© Copyright for this edition by Poznań University of Economics and Business, Poznań 2025



This work is licensed under a Creative Commons Attribution 4.0 International License
<https://creativecommons.org/licenses/by/4.0>

<https://doi.org/10.18559/ebr.2025.1>

ISSN 2392-1641
e-ISSN 2450-0097

POZNAŃ UNIVERSITY OF ECONOMICS AND BUSINESS PRESS
ul. Powstańców Wielkopolskich 16, 61-895 Poznań, Poland
phone +48 61 854 31 54, +48 61 854 31 55
<https://wydawnictwo.ue.poznan.pl>, e-mail: wydawnictwo@ue.poznan.pl
postal address: al. Niepodległości 10, 61-875 Poznań, Poland

Printed and bound in Poland by:
Poznań University of Economics and Business Print Shop

Circulation: 80 copies

Economics and Business Review

Volume 11 (1) 2025

CONTENTS

Editorial introduction

Monika Banaszewska, Michał Pilc, Konrad Sobański 3

ARTICLES

Environmental pollution and economic growth in the European Union countries: A systematic literature review

Błażej Suproń 7

Energy mix and its implications on the Vietnamese economy by 2030: A CGE analysis using GTAP-E-Power

Duy Chinh Nguyen, Jong-Hwan Ko 31

The impact of women's economic empowerment on human development in sub-Saharan Africa: A panel quantile regression approach

Lotfi Mekhzoumi, Sabrina Chikh-Amnache, Nabila Mekhzoumi 55

The effects of COVID-19 on Polish enterprises

Wojciech Kuryłek, Yochanan Shachmurove 82

Inflation expectations proprieties during the war: The case of Ukraine

Magdalena Szyszko, Aleksandra Rutkowska, Olena Motuzka 108

Financial inclusion, market concentration and underwriting performance: Empirical evidence from Central Eastern and Southeastern European countries

Bojan Srbinoski, Jordan Kjosevski, Klime Poposki, Stevcho Mecheski 133

The impact of women’s economic empowerment on human development in sub-Saharan Africa: A panel quantile regression approach

 Lotfi Mekhzoumi¹

 Sabrina Chikh-Amnache²

 Nabila Mekhzoumi³

Abstract

This paper uses a panel quantile regression approach to study the economic empowerment of women in sub-Saharan Africa and how it impacts human development. Analysing data collected from 42 countries covering the period 2000–2023, the study looks at various indicators of women’s economic empowerment. The impacts of women’s economic empowerment are found to differ depending on quantile levels; female entrepreneurship shows a significant impact only at higher levels. Across all levels, marriage rights and workplace participation repeatedly show positive impacts. The Gender Development Index’s significant positive impact underscores the importance of gender equality for overall human development. Parenting rights

Keywords

- women’s economic empowerment
- human development
- sub-Saharan Africa
- panel quantile regression
- gender equality

Suggested citation: Mekhzoumi, L., Chikh-Amnache, S., & Mekhzoumi, N. (2025). The impact of women’s economic empowerment on human development in sub-Saharan Africa: A panel quantile regression approach. *Economics and Business Review*, 11(1), 55–81. <https://doi.org/10.18559/ebr.2025.1.1698>



This work is licensed under a Creative Commons Attribution 4.0 International License
<https://creativecommons.org/licenses/by/4.0>

¹ Faculty of Economics, University of Shahid Hama Lakhdar – El Oued, P.O. Box: 789 El Oued, Algeria, corresponding author: mekhzoumi-lotfi@univ-eloued.dz, <https://orcid.org/0000-0002-3752-7178>.

² Faculty of Economics, University of Mouloud Mammeri – Tizi-Ouzou, New Town, P.O. Box: 17 Tizi-Ouzou, Algeria, sabrina.chikh@yahoo.com, <https://orcid.org/0000-0002-1319-599X>.

³ Faculty of Economics, University of Shahid Hama Lakhdar – El Oued, P.O. Box: 789 El Oued, Algeria, nabilamekhzoumi@gmail.com, <https://orcid.org/0009-0008-7221-3677>.

and mobility show positive results at most levels, though there are some variations.

JEL codes: C23, J16, O15, O55

Article received 14 August 2024, accepted 13 January 2025.

Introduction

Women's empowerment (WE) is becoming ever more important as a main driver of general human progress, particularly in the economic sphere. This link is particularly relevant in sub-Saharan Africa (SSA), a continent with enormous potential for development, yet also with major obstacles. Understanding the dynamics between women's economic empowerment (WEE) and human development in this area is increasingly important as the world works towards the Sustainable Development Goals by 2030.

Women in the SSA are crucial for their economies; they help greatly with agricultural output, entrepreneurship, and the unofficial sector (Palacios-Lopez et al., 2017). However, they still face numerous challenges to participate fully in the economy, such as limited access to formal employment, financial services and education (Hallward-Driemeier & Hasan, 2013). These limitations not only impede women's own development, but they may also impede the advancement of society as a whole.

WEE has several meanings: labour force participation, access to and control over financial resources, and the capacity to make strategic life decisions (Kabeer, 1999). Human development, as conceptualised by Sen (1999) and operationalised via the Human Development Index (HDI), emphasises extending people's freedoms and capabilities outside of simple economic development. Although an increasing amount of research points to a favourable relationship between women empowerment and different development outcomes worldwide (Duflo, 2012), the particular dynamics of this link in the SSA remain under-researched. Furthermore, most of the current studies rely on cross-sectional data or country-specific case studies, which limits our understanding of how this relationship changes over time and across various national settings within the region.

This paper aims to close these gaps by analysing the impact of WEE on human development across the SSA⁴ over the period 2000–2023. We use

⁴ List of countries included in the study: Angola, Benin, Botswana, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, Comoros, Democratic Republic of the

a Method of Moments Quantile Regression (MM-QR) panel approach to look at data from 42 countries and provide an in-depth study of this important link. Our study adds to the body of knowledge in a number of respects. Firstly, it thoroughly analyses WWE in the SSA using a variety of indicators. Secondly, the MM-QR approach enables one to gain an understanding of the heterogeneous effects of WWE. Finally, this study helps to broaden knowledge in development studies by including African feminist points of view and context-specific issues.

The basic structure of this article is as follows: Section 1 offers a summary of literature. Section 2 describes our hypotheses, econometric technique and data sources, while Section 3 addresses the empirical results within the context of current research. Section 4 presents the discussions about our results. The final section concludes with important observations and recommendations for the future directions of inquiry.

1. Literature review

In particular with regard to the SSA, WEE and human development have attracted a lot of interest recently. This review of the literature investigates theoretical frameworks, empirical studies, and contextual elements that highlight the impact of WEE on human development in the region. By aggregating already published studies, this review attempts to give a picture of the present level of knowledge and point out areas for future research.

According to Kabeer (1999), empowerment is the enhancement of individuals' capacity to make strategic life decisions in a context that had previously been denied to them. Golla et al. (2011) offer a more precise definition of WEE, asserting that a woman attains economic empowerment when she has the capacity to thrive and grow economically, as well as the authority to make and implement economic decisions that may impact development outcomes. Sen's capability approach primarily informs the concept of human development, which closely links to WEE. Sen (1999) argues that development should expand people's actual freedoms, not just increase national incomes. The UNDP Human Development Index operationalised this approach in 1990, measuring development through three dimensions: a long and healthy life, access to knowledge, and a decent standard of living. Building on Sen's work,

Congo, Djibouti, Equatorial Guinea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Ivory Coast, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Republic of the Congo, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe.

Nussbaum (2011) offers a list of fundamental skills that every democracy should foster, thus augmenting our knowledge of human progress.

Many theoretical models connect WEE to more general results in human development. Duflo (2012) suggests a bi-directional link between women empowerment and economic development, contending that while development itself can significantly help to reduce inequality between men and women, empowering women may help development. While Klasen and Lamanna (2009) offer a theoretical framework for how gender discrepancies in education and employment might affect economic growth, which in turn influences human development, Kabeer (2005) investigates how gender equality in these spheres might lead to other development outcomes.

When examining WEE in the SSA, it is crucial to consider the perspectives of African feminists. Arguing for the need-to-know local social structures and practices, Oyěwùmí (1997) questions the application of Western gender concepts to African societies. Tamale (2020) also stresses the need for decolonial approaches to grasp African women's experiences and empowerment, underscoring the need for context-specific research and treatments. These points of view emphasise the need to base research and policy on local reality and avoid the unquestioning acceptance of Western ideas in African settings.

Empirical studies across the globe support the need for WEE to achieve results in development. Using panel data from 1960–2000, Klasen and Lamanna (2009) examined a wide range of nations and found that gender disparities in employment and education greatly reduce economic growth. Verick (2014) offers a thorough analysis of the U-shaped link between female labour force participation and economic growth. Using Global Entrepreneurship Monitor statistics, Kelley et al. (2017) demonstrated that women's rates of entrepreneurship have been rising worldwide, benefiting employment creation and economic growth.

Financial inclusion also significantly influences WEE. Using Global Findex data, Demirgüç-Kunt et al. (2020) demonstrate that even if financial inclusion is generally rising, notable gender discrepancies still exist, especially in developing nations. Psacharopoulos and Patrinos (2018) present an updated worldwide picture of returns to education, demonstrating that women often have greater returns than men. These studies provide a broad framework for evaluating the possible effects of WEE on development outcomes.

With an eye especially towards the SSA, a number of studies have looked at several facets of women's financial empowerment. Examining data from 1991–2013 for 30 sub-Saharan African nations, Bandara (2015) found a positive correlation between women's labour force participation and economic growth. Examining trends in female labour force participation over 24 sub-Saharan African nations, Comblon et al. (2017) found notable variation in both patterns and drivers.

Regarding entrepreneurship, Campos and Gassier (2017) examined data from the SSA and concluded that women entrepreneurs have enormous un-

realised potential but also suffer from particular limitations. Training programmes have a greater impact on women entrepreneurs, according to a meta-analysis of African entrepreneurship initiatives by Campos et al. (2018). Aterido et al. (2013) found that women-owned firms across 37 African countries are less likely to receive loans.

Agriculture is still a vital industry for women's economic involvement in SSA. Challenging conventional wisdom, Palacios-Lopez et al. (2017) estimated women's contribution to agricultural labour using nationally representative data from 6 African countries. Reviewing data on WE in agriculture, Meinzen-Dick et al. (2019) underline the need for context-specific policies and interventions.

An area of growing interest is how technology might empower women economically. Asongu and Odhiambo (2018) found positive results when they examined the link between female economic participation in the SSA and mobile phone penetration. In 11 African nations, Mothobi and Grzybowski (2017) examined the gender disparity in mobile phone ownership and use, indicated important obstacles for women. These studies demonstrate the potential for technology to accelerate WEE in the region.

Ultimately, WEE depends much on the legal and policy environment. Emphasising recent changes and ongoing challenges, Hallward-Driemeier and Hasan (2013) offer a thorough investigation of legal and regulatory hurdles to WEE in Africa. Under the framework of the Sustainable Development Goals, UN Women (2019) examines advancements in WEE in Africa, highlighting important policy priorities. These studies underline the need to encourage WEE and human development through favourable legal and policy environments.

2. Hypotheses, data and methods

This study investigates the intricate impacts of WEE indicators on human development within sub-Saharan Africa. Considering the region's distinct socio-economic context, we propose multiple hypotheses regarding WEE's potential contributions to human development:

- H1:** Increased women's entrepreneurship enhances human development in SSA.
- H2:** Improved women's assets positively impact human development in SSA.
- H3:** Increased female labour force participation enhances human development in SSA.
- H4:** Enhanced workplace conditions for women influence human development in SSA.
- H5:** Enhancing gender development contributes to improved human development in SSA.

- H6:** Marriage rights and supportive parenthood policies enhance women's social conditions and contribute to human development in SSA.
- H7:** Enhanced women's mobility positively influences human development in SSA.
- H8:** Reducing occupational segregation and closing the gender pay gap positively contribute to human development in SSA.

Women's entrepreneurship generates employment, increases household incomes, and enhances community welfare, thereby fostering human development (H1). Reducing gender inequalities in inheritance and property law, supported by customary law and judicial precedent, empowers women to secure economic resources. This empowerment enables women to make strategic investments in health, education, and family well-being, thereby enhancing key human development indicators across the region (H2). Increased women's participation in the labour force enhances economic productivity and household incomes, thereby elevating living standards (H3). Guaranteeing women's legal abilities, safeguarding them from sexual harassment and discrimination, and fostering equitable career prospects together enable women to enhance economic growth and social advancement, thereby increasing human development (H4). Reducing gender disparities facilitates holistic human development through a more equitable distribution of resources and opportunities (H5). Secure marriage rights and supportive parenthood policies enable women to make decisions that positively impact their families and communities, thereby promoting human development (H6). Reducing constraints on women's agency and freedom of movement enables them to access better employment opportunities, engage in entrepreneurship, and participate more actively in economic and social activities. These improvements empower women to contribute to family welfare and societal progress, thereby promoting overall human development across the region (H7). Ensuring equitable access to diverse occupations and addressing wage disparities empowers women economically, enabling them to make greater contributions to household welfare, societal progress, and overall human development across the region (H8).

This study looks at data from 42 SAA countries from 2000 to 2023. Table 1 shows the dependent and independent variables, along with their sources. Socioeconomic considerations indeed make modelling the impact of WEE on human development complex, particularly in the context of sub-Saharan Africa. To address this complexity and eliminate bias, it is crucial to include all important factors in the analytical framework.

Several recent studies have attempted to tackle this challenge, providing more comprehensive and nuanced approaches. In line with the findings from these studies, including (Chikh-Amnache et al., 2023) and (Chikh-Amnache & Mekhzoumi, 2024), we apply the following model to our empirical investigation:

Table 1. Description of variables

Abbreviation	Variable name	Description	Source
Dependent variable			
HDI	Human Development Index	a composite indicator reflects average performance across essential dimensions of human development: health and longevity, knowledge, and standard of living	UN Development Programme
Independent variables			
FEPI	Female Entrepreneurship Indicator Score	evaluates the challenges that women encounter when starting and running businesses	Gender Data Portal
FPYI	Female Pay Indicator	laws that regulate occupational segregation and the gender pay gap	
FWPI	Female Workplace Indicator	women's legal rights, abilities, and workplace safeguards against sexual harassment and discrimination impact their career choices	
FPHI	Female Parenthood Indicator	examines the regulations that impact women's employment prior to, during, and following childbirth	
FMRI	Female Marriage Indicator	evaluates the legal limitations associated with divorce and marriage	
FMBI	Female Mobility Indicator	mobility assesses limits on a woman's agency and freedom of mobility	
FASI	Female Assets Indicator	examines gender inequality in inheritance and property law and instances where customary law and judicial precedent support legal systems	
FMLF	Female to male labour force participation	the ratio of the female labour force participation to the male labour force participation	
GDI	Gender Development Index	assesses disparities between genders in health, education, and economic resource control	UN Development Programme
Control variables			
GDPpc	GDP per capita	in (constant 2015 US\$) prices	World Bank Group
HE	Current health expenditure	covers healthcare items and services used throughout the year (% of GDP)	
GEE	Government expenditure on education	general government expenditure on education (current, capital, and transfers), expressed as a percentage of GDP	
PVE	Political stability and absence of violence/terrorism	gauges the probability of political instability and/or politically driven violence, such as terrorism	

Source: own compilation.

$$\begin{aligned}
HDI_{it} = & \beta_0 + \beta_1 FEPI_{it} + \beta_2 FPYI_{it} + \beta_3 FWPI_{it} + \beta_4 FPPI_{it} + \beta_5 FMRI_{it} + \\
& + \beta_6 FMBI_{it} + \beta_7 FASI_{it} + \beta_8 FMLF_{it} + \beta_9 GDPpc_{it} + \beta_{10} HE_{it} + \\
& + \beta_{11} GEE_{it} + \beta_{12} PVE_{it} + \varepsilon_{it}
\end{aligned} \tag{1}$$

The traditional approach to panel data analysis, Ordinary Least Squares (OLS) with fixed effects, has been widely used due to its simplicity and computational efficiency. This method effectively controls for time-invariant unobserved heterogeneity but is limited to estimating effects on the conditional mean. In contrast, quantile regression methods for panel data aim to provide a more comprehensive view of the relationship between variables across different quantiles of the conditional distribution. Quantile regression has become an essential tool in econometrics, allowing researchers to examine how covariates affect the entire distribution of the dependent variable, not just its mean. However, applying quantile regression to panel data, particularly in the presence of fixed effects, has posed significant challenges. A generalisation of a quantile regression data generating function can be written as follows:

$$y_i = \beta_0(\tau) + \beta_1(\tau)X_{i1} + \beta_2(\tau)X_{i2} + \dots + \beta_k(\tau)X_{ik} \tag{2}$$

Based on this specification, several characteristics should be considered:

- slopes $\beta_k(\tau)$ vary across quantiles only if the model is heteroskedastic;
- quantile regression can be considered as a semi-parametric-varying coefficient model, with unobserved running variable (τ);
- coefficients are percentile specific;
- it is possible to separate location effects (mean) from scale effect (deviation from the mean).

Quantile regressions are nonlinear models. Thus, one cannot just add dummies to address group fixed effects:

$$Q_\tau(y|x) = \beta_0(\tau) + \beta_1 X(\tau) + \sum \delta(\tau)_g \tag{3}$$

This creates an incidental parameter problem. Neither $\delta(\tau)$ s nor β s would be estimated consistently. Koenker (2004) proposed the penalised quantile regression method as one of the first attempts to handle quantile regression in panel data. This method incorporates fixed effects via a penalty term, allowing for quantile effects estimation while controlling for unobserved heterogeneity. However, it can suffer from the incidental parameter problem when the number of fixed effects is large relative to the sample size. Koenker (2004) assumes fixed effects only have an impact on location and shrink individual effects:

$$y_i = \beta(\tau)X + \delta_g \tag{4}$$

Canay (2011) proposed a two-step approach that first estimates fixed effects using a conditional mean model and then performs quantile regression on the demeaned data. This method is intuitive and relatively simple to implement but may introduce bias, particularly when the effects of covariates vary substantially across quantiles:

$$y = \beta X + \delta_g \quad (5)$$

$$Q_\tau(y - \delta_g | X) = \beta(\tau) X \quad (6)$$

The MM-QR approach, introduced by Machado and Silva (2019), represents a significant advancement in this field. MM-QR transforms the quantile regression problem into a set of moment conditions, allowing for efficient estimation even with high-dimensional fixed effects. This method avoids the incidental parameters problem and is computationally efficient for large datasets, addressing the key limitations of previous approaches. This method was developed to incorporate individual fixed effects. In principle, it is an extension of a strategy to estimate quantile regression coefficients using a restricted location-scale model, assuming the following structure:

$$y_i = X_i \beta + \varepsilon X_i \gamma \quad (7)$$

Thus, the quantile regression model is given by:

$$Q_\tau(y | X) = X(\beta + F_\varepsilon^{-1}(\tau)\gamma) = X\beta(\tau) X \quad (8)$$

OLS with fixed effects remains valuable for its simplicity and when the focus is on average effects. Traditional quantile regression or Koenker's penalized approach may be preferred when the number of fixed effects is moderate. Canay's two-step method offers a straightforward alternative when the assumption of location shift (i.e. fixed effects affect all quantiles equally) is plausible. However, for researchers dealing with large panel datasets and interested in distributional effects, MM-QR offers significant advantages. Its ability to handle high-dimensional fixed effects efficiently, coupled with its robustness to outliers and non-normal errors, makes it a powerful tool in modern econometric analysis (Machado & Silva, 2019).

We investigate the impact of WEE on human development in a panel of 42 sub-Saharan African countries, utilising the MM-QR approach for panel fixed effects. We use the MM-QR approach to project the distribution of conditional economic growth, which allows us to consider the possibility of heterogeneity. The model is as follows:

$$HDI_{it} = \alpha_i + X'_{it} \beta + (\delta_i + Z'_{it} \gamma) U_{it} \quad (9)$$

where $P\{\delta_i + Z'_{it}\gamma > 0\} = 1$. Individual i fixed effects are denoted by (α_i, δ_i) , $i = 1, 2, \dots, n$, and Z is a k -vector of transformations of the elements of X with probability 1 that are known to be differentiable. Model (9) could have the following expansions:

$$Q_{HDI}(\tau|X_{it}) = (\alpha_i + \delta_i q(\tau)) + Z'_{it}\gamma q(\tau) \quad (10)$$

X_{it} denotes the independent variables. Conditional on the location of explanatory variables, the response variable HDI has a quantile distribution denoted by $Q_{HDI}(\tau|X_{it})$. We define the τ th quantile ($0 < \tau < 1$) of the conditional distribution of the dependent variable, considering a set of independent variables X_{it} . The scalar coefficient i denotes the quantile- τ fixed effect, either for individual i or the distributional effect at τ . The distributional influence, unlike the habitual fixed effect, does not entail a change in location. As a result, the distributional effect replaces the influence of time-invariant individual traits, which, like other variables, could have different effects on different areas of HDI 's conditional distribution. Minimising the following optimisation yields the τ -th sample quantile estimate shown by $q(\tau)$:

$$\min_q \sum_i \sum_t \rho_\tau \left(\hat{R}_{it} - (\hat{\delta}_i + Z'_{it}\hat{\gamma}) q \right) \quad (11)$$

The check-function is indicated by $\rho_\tau(A) = (\tau - 1)AI\{A \leq 0\} + \tau AI\{A > 0\}$.

3. Results

Before commencing the analytical approach, econometric estimates must address multi-collinearity doubts through correlation analysis and the variance inflation factor (VIF). Tables A2 and A3 in the Appendix show that multicollinearity does not pose a problem for our empirical analysis. The correlation between FWPI and FMRI is the strongest at 0.578. The VIF values for all variables are below 5. Five quantiles of 0.10, 0.30, 0.50, 0.70, and 0.9 were selected in the quantile regression based on Formula (10) for estimating the coefficients of the dependent variables.

The result that women's entrepreneurship (FEPI) has a statistically positive and significant effect on the dependent variable at the two highest quantiles supports Hypothesis 1. This implies that an increase in the number of women starting their own businesses is advantageous for the advancement of human development in SSA. Women entrepreneurs in SSA play a crucial role in generating employment opportunities, reducing unemployment rates, and fostering economic growth. They significantly increase household incomes,

reinvesting a higher proportion of earnings into their families, which translates into improved access to education, healthcare, and nutrition—key components of human development. Moreover, women entrepreneurs often address community needs, enhancing overall welfare. The concentration of impact at higher quantiles suggests a more pronounced effect in regions with stronger institutional frameworks and financial systems. The fact that there was no significant effect at lower quantiles suggests that women's entrepreneurship may need more help, like micro-finance services, targeted training programmes, and policies that remove gender-based barriers, in order to reach its full potential at all levels of development in SSA. Creating an enabling environment that fosters women's economic empowerment, including improved access to education, financial services, and supportive networks, is crucial to amplifying the positive effects of female entrepreneurship on human development throughout the region.

The result that women's assets (FASI) have positive and statistically significant coefficients across most quantiles shows how important fair property rights and inheritance laws are for human development in SSA. This finding strongly supports Hypothesis 2, namely that enhancing women's economic empowerment through improved asset ownership positively impacts overall human development. By reducing gender disparities in inheritance and property ownership, women gain access to secure economic resources, enabling them to make strategic investments in health, education, and family well-being. The ripple effects of women's economic empowerment extend beyond individual households, fostering broader economic growth and social development across the region.

The negative coefficients for female labour force participation (FMLF) at most quantiles show that the relationship between FMLF and human development is complex. This is contrary to Hypothesis 3, which states that having more women working has a positive effect on human development in SSA. While increased female labour force participation is often associated with economic growth and societal progress, the negative coefficients suggest that the quality and nature of employment play a critical role. Many women in SSA work in low-paying, informal or precarious jobs that may not significantly improve household welfare or meaningfully contribute to broader human development outcomes. Moreover, women may enter the labour force out of economic necessity rather than empowerment, which could limit their capacity to invest in health, education, and family well-being. Additionally, the lack of supportive policies such as childcare services, maternity leave and workplace protections may exacerbate the challenges women face, leading to trade-offs between work and caregiving responsibilities. These findings emphasise the need for policies that not only promote women's participation in the labour force but also ensure access to quality jobs and supportive infrastructure to maximise the positive impact on human development.

The findings indicate that women's workplace (FWPI) has a significant positive influence across all quantiles, corroborating Hypothesis 4 that improved working circumstances for women positively affect human development in SSA. This conclusion underscores the essential importance of women's legal rights, competencies, and workplace protections—such as measures against sexual harassment and discrimination—in empowering women to make significant career decisions and contribute successfully to economic and social advancement. Ensuring equal remuneration, secure working conditions and fair chances enables women to attain financial autonomy and career advancement. This empowerment enhances individual well-being and has a multiplier impact on societal development by augmenting family earnings, facilitating improved education and health results, and advancing gender equality. The uniform beneficial effect across all quantiles indicates that these workplace enhancements are advantageous for nations at different stages of human development, making them a vital policy priority for promoting sustainable development in SSA.

The GDI's consistently strong positive impact across all quantiles in the study underscores its essential role in promoting human development in SSA. This finding supports the Hypothesis 5, which asserts that enhanced gender development, indicative of diminished inequalities in health, education, and economic resources, positively influences human development. Addressing gender disparities in access to healthcare, education and economic opportunities can result in significant improvements in human development outcomes. These findings highlight the significance of targeted policies designed to mitigate gender inequality, as such initiatives promote the establishment of more equitable societies and support sustainable development throughout sub-Saharan Africa.

The variables that measure women's marriage (FMRI) and parenthood (FPHI) have positive effects that are significant across most quantiles. This supports Hypothesis 6 that marriage rights and policies that support parenthood improve women's social conditions and contribute to human development in SSA. Enhanced marriage rights, including secure property ownership, empower women by increasing their bargaining power and decision-making capabilities within households, leading to improved family welfare. Policies that support parenthood, such as maternity protections and childcare provisions, boost the ability of women to reconcile family responsibilities with economic participation. This dual empowerment enhances health outcomes for mothers and children, promotes educational investments, and contributes to overall economic stability. The findings indicate that addressing these social conditions enhances the well-being of individual women and produces a multiplier effect on societal advancement, thereby rendering these policies essential elements of sustainable human development strategies in SSA.

The finding that women's mobility (FMBI) has significant positive coefficients for the three highest quantiles in SSA supports Hypothesis 7 that better

women's mobility has a positive effect on human development. This finding suggests that women's ability to move freely and independently is particularly impactful in higher quantiles of human development, where structural barriers are less pronounced and opportunities for economic participation and entrepreneurship are more accessible. By reducing constraints on mobility—such as restrictive social norms, lack of infrastructure, or safety concerns—women can access better employment opportunities, engage in entrepreneurial activities, and participate more actively in public life. These factors contribute to enhanced household incomes, improved access to education and healthcare, and overall societal progress. The fact that most of the significant effects are in the highest quantiles suggests that mobility has a greater impact in areas where other factors that facilitate it, such as education or access to money, are already present. This highlights the importance of addressing mobility-related barriers as part of broader strategies to empower women and drive sustainable human development across SSA.

The result that women's pay (FPYI) is statistically insignificant across all quantiles in SSA is against Hypothesis 8, which states that closing the gender pay gap and reducing occupational segregation is beneficial for human development in the region. The hypothesis says that giving women equal access to different jobs and reducing wage gaps will help them financially, allowing them to make bigger contributions to household well-being and societal progress. This coefficient is not statistically significant, suggesting data accuracy or validity issues. Other socio-economic barriers may overshadow the impact of legal frameworks addressing occupational segregation and pay disparities, or they may not enforce them adequately. This result highlights the need for further investigation into the implementation and effectiveness of such laws, as well as a deeper exploration of structural factors that may limit their influence on human development in SSA.

The result that political stability and absence of violence / terrorism (PVE) had no statistically significant effect across all quantiles suggests that while stability and positive governance are important for economic growth, they may not have such an effect on human development. This could indicate that other factors, such as institutional effectiveness or social investments, play a more immediate role in shaping human development indicators. Conversely, the significant and positive impact of GDP per capita (GDPpc) across all quantiles reinforces the strong link between economic growth and improvements in living standards, health, and education. The negative coefficients for current health expenditure (HE) in the two highest quantiles highlight potential inefficiencies or inequities in health spending at advanced levels of development. This suggests that increased health expenditure alone may not translate into better health outcomes without addressing systemic issues such as resource allocation, accessibility, and quality of care. Lastly, the positive and statistically significant coefficient for government expenditure on education (GEE) in

Table 2. The MMQR regression on HDI

Variable	OLS		Quantile of HDI				
	location	scale	0.10	0.30	0.50	0.70	0.90
FEPI	-6.37e-06 (0.000111)	0.0001739* (0.0000963)	-0.0002867 (0.0002498)	-0.0001337 (0.0001709)	0.0000126 (0.000103)	0.000135* (0.0000694)	0.0002377*** (0.0000838)
FPYI	0.000096 (0.0001168)	-0.0000241 (0.0001013)	0.0001351 (0.0002651)	0.0001138 (0.000181)	0.0000935 (0.0001083)	0.0000765 (0.000073)	0.0000622 (0.0000883)
FWPI	0.0004566*** (0.0001044)	-0.0000249 (0.0000905)	0.0004967** (0.0002368)	0.0004748*** (0.0001617)	0.0004539*** (0.0000968)	0.0004364*** (0.0000652)	0.0004217*** (0.0000789)
FPHI	0.0003364*** (0.000124)	-0.0000393 (.0001075)	0.0003998 (0.0002814)	0.0003652* (0.0001921)	0.0003321*** (0.000115)	0.0003045*** (0.0000775)	0.0002812*** (0.0000937)
FMRI	0.0006211*** (0.0001953)	-0.0000868 (0.0001693)	0.000761* (0.0004428)	0.0006846** (0.0003024)	0.0006116*** (0.0001811)	0.0005505*** (0.000122)	0.0004992*** (0.0001476)
FMBI	0.0003312** (0.0001594)	-0.0000385 (0.0001382)	0.0003933 (0.0003616)	0.0003594 (0.0002469)	0.000327** (0.0001478)	0.0002999*** (0.0000996)	0.0002771** (0.0001205)
FASI	0.0003156** (0.0001254)	-0.000127 (0.0001088)	0.0005205* (0.0002837)	0.0004087** (0.0001938)	0.0003017** (0.0001163)	0.0002123*** (0.0000784)	0.0001373 (0.0000947)
FMLF	-0.0009692** (0.0004275)	0.0005637 (0.0003708)	-0.0018783* (0.0009626)	-0.0013821** (0.0006583)	-0.0009076** (0.0003963)	-0.0005108* (0.0002672)	-0.0001778 (0.0003224)
GDI	0.4732029*** (0.0619143)	-0.0177801 (0.0536958)	0.5018745*** (0.1405348)	0.4862251*** (0.0959374)	0.4712587*** (0.0574322)	0.4587441*** (0.0386922)	0.4482406*** (0.046812)
GDPpc	0.0000116*** (3.62e-06)	-2.86e-06 (3.14e-06)	0.0000162** (8.19e-06)	0.0000137** (5.59e-06)	0.0000113*** (3.36e-06)	9.30e-06*** (2.26e-06)	7.61e-06*** (2.73e-06)
HE	-.0010341 (0.0007188)	-0.0002407 (0.0006234)	-0.0006458 (0.0016309)	-0.0008577 (0.0011134)	-0.0010604 (0.0006667)	-0.001229*** (0.0004492)	-0.001372** (0.0005434)
GEE	0.0001896 (0.0007274)	-0.0000754 (0.0006308)	0.0003111 (0.0016507)	0.0002448 (0.0011269)	0.0001813 (0.0006746)	0.0001282*** (0.0004545)	0.0000837 (0.0005499)
PVE	0.0026487 (0.0037086)	-0.0007901 (0.0032164)	0.0039228 (0.0084147)	0.0032274 (0.0057447)	0.0025623 (0.0034394)	0.0020062 (0.0023175)	0.0015395 (0.0028034)
Cons	0.0078669 (0.0536362)	0.0073393 (0.0465166)	-0.0039682 (0.121765)	0.0024916 (0.0831203)	0.0086694 (0.049752)	0.0138351 (0.0335181)	0.0181708 (0.0405543)
Number of observations	1008	1008	1008	1008	1008	1008	1008

Notes: The robust standard errors in parentheses. The statistical significance levels are as follows: *** at the 0.01 level, ** at the 0.05 level, and * at the 0.10 level.

Source: own calculations.

the fourth quantile demonstrates the importance of targeted investments in education for driving human development. This result underscores the need for a strategic allocation of resources to maximise the developmental impact of education spending. Together, these findings emphasise the complexity of human development in SSA (Table 2).

Figure 1 presents a graphical illustration of the results obtained from the panel quantile regression. Shaded areas represent the 95% confidence intervals for the estimates from quantile regression. The vertical axis displays the coefficients of the independent variables.

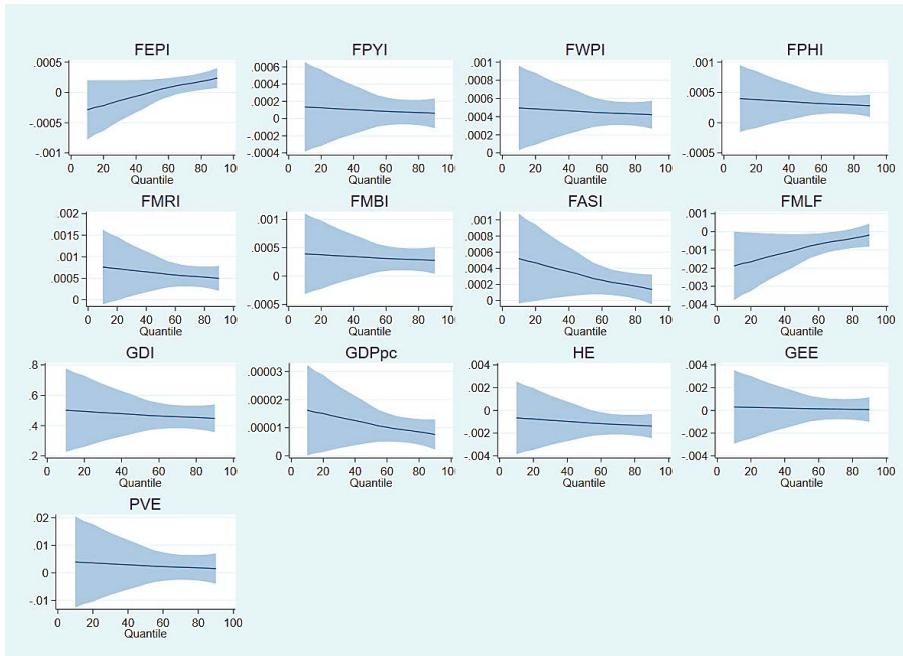


Figure 1. Quantile estimation on HDI

Note: Shaded areas represent 95% confidence intervals.

Source: own calculations.

Koenker and Bassett (1982) recommend using the Wald test to verify the equality of coefficients across quantiles. Based on the Wald test results (see Table 3), it is not possible to reject the null hypothesis of equality at the 5% level of significance for all the independent variables. The null hypothesis (H0) assumes that the effect of women's economic empowerment on human development is consistent across different quantiles of human development distribution in sub-Saharan African countries. This implies that the independent variables have a uniform impact on human development outcomes, regardless of a country's current level of development. The correctness of H0 suggests

Table 3. Wald test of homogeneity of the coefficients

	0.10				0.30			0.50		0.70
	0.30	0.50	0.70	0.90	0.50	0.70	0.90	0.70	0.90	0.90
FEPI	3.26 (0.0709)	3.30 (0.0693)	3.31 (0.0687)	3.32 (0.0686)	3.27 (0.0707)	3.30 (0.0692)	3.31 (0.0689)	3.26 (0.0711)	3.29 (0.0697)	3.25 (0.0712)
FPYI	0.06 (0.8117)	0.06 (0.8116)	0.06 (0.8116)	0.06 (0.8116)	0.06 (0.8116)	0.06 (0.8116)	0.06 (0.8116)	0.06 (0.8117)	0.06 (0.8116)	0.06 (0.8117)
FWPI	0.08 (0.7836)	0.08 (0.7836)	0.08 (0.7836)	0.08 (0.7836)	0.08 (0.7836)	0.08 (0.7836)	0.08 (0.7836)	0.08 (0.7836)	0.08 (0.7836)	0.08 (0.7836)
FPHI	0.13 (0.7147)	0.13 (0.7146)	0.13 (0.7146)	0.13 (0.7146)	0.13 (0.7147)	0.13 (0.7146)	0.13 (0.7146)	0.13 (0.7147)	0.13 (0.7146)	0.13 (0.7147)
FMRI	0.26 (0.6083)	0.26 (0.6081)	0.26 (0.6081)	0.26 (0.6081)	0.26 (0.6083)	0.26 (0.6081)	0.26 (0.6081)	0.26 (0.6083)	0.26 (0.6082)	0.26 (0.6083)
FMBI	0.08 (0.7805)	0.08 (0.7805)	0.08 (0.7805)	0.08 (0.7805)	0.08 (0.7805)	0.08 (0.7805)	0.08 (0.7805)	0.08 (0.7805)	0.08 (0.7805)	0.08 (0.7805)
FASI	1.36 (0.2428)	1.37 (0.2417)	1.37 (0.2413)	1.37 (0.2412)	1.37 (0.2427)	1.37 (0.2416)	1.37 (0.2414)	1.36 (0.2430)	1.37 (0.2420)	1.36 (0.2430)
FMLF	2.32 (0.1276)	2.34 (0.1261)	2.35 (0.1255)	2.35 (0.1254)	2.32 (0.1275)	2.34 (0.1261)	2.34 (0.1257)	2.32 (0.1279)	2.34 (0.1265)	2.32 (0.1279)
GDI	0.11 (0.7407)	0.11 (0.7406)	0.11 (0.7406)	0.11 (0.7406)	0.11 (0.7406)	0.11 (0.7406)	0.11 (0.7406)	0.11 (0.7407)	0.11 (0.7406)	0.11 (0.7407)
GDP _{pc}	0.83 (0.3617)	0.83 (0.3611)	0.83 (0.3609)	0.84 (0.3608)	0.83 (0.3619)	0.83 (0.3612)	0.83 (0.3610)	0.83 (0.3620)	0.83 (0.3613)	0.83 (0.3618)
HE	0.15 (0.6994)	0.15 (0.6993)	0.15 (0.6993)	0.15 (0.6993)	0.15 (0.6994)	0.15 (0.6993)	0.15 (0.6993)	0.15 (0.6994)	0.15 (0.6993)	0.15 (0.6994)
GEE	0.01 (0.9049)	0.01 (0.9049)	0.01 (0.9049)	0.01 (0.9049)	0.01 (0.9049)	0.01 (0.9049)	0.01 (0.9049)	0.01 (0.9049)	0.01 (0.9049)	0.01 (0.9049)
PVE	0.06 (0.8059)	0.06 (0.8059)	0.06 (0.8059)	0.06 (0.8059)	0.06 (0.8059)	0.06 (0.8059)	0.06 (0.8059)	0.06 (0.8059)	0.06 (0.8059)	0.06 (0.8059)

Note: The numbers in parentheses are *p*-values.

Source: own calculations.

that policies aimed at empowering women economically could have similar effects across countries in the region, irrespective of their position in the human development spectrum. The shared developmental challenges, similar policy environments, and comparable responses to women's empowerment interventions across sub-Saharan Africa could explain this uniformity. However, it is important to note that failing to reject H_0 does not necessarily mean the effects are identical across all quantiles, but rather that any differences are not statistically significant enough to warrant rejection of the null hypothesis.

The Wald test results enhance the reliability of our quantile regression analysis by demonstrating stability in the relationship between women's economic empowerment indicators and human development outcomes across different levels of development in SSA. This aligns with Machado and Silva's (2019) methodological framework for panel quantile regression, which emphasises stable patterns across the conditional distribution rather than specific segments driving observed relationships. The stability of coefficients across quantiles has significant policy implications, suggesting that interventions aimed at empowering women economically can yield consistent benefits, irrespective of a country's development level. This finding contributes to the broader literature by offering evidence for the applicability and effectiveness of women's economic empowerment initiatives across diverse developmental contexts within SSA.

4. Discussion

Women's entrepreneurship in SSA plays a crucial role in driving social transformation, alleviating poverty, and fostering economic growth, ultimately contributing to improved human development. This study's findings align with the perspective that female entrepreneurship serves as a powerful tool for women's empowerment, challenging established social and cultural norms while promoting economic independence. The research highlights the complex interplay between entrepreneurial success and the socio-cultural environment in Africa, where female entrepreneurs often demonstrate remarkable resourcefulness by leveraging social networks to navigate resource-constrained settings. However, the study also acknowledges the persistent hurdles faced by women entrepreneurs in Africa, including limited access to resources and enduring socio-political constraints. These findings contribute to the ongoing discourse on the transformative potential of female entrepreneurship in developing economies, as explored by Haugh and Talwar (2016). Additionally, they complement the work of Ojong et al. (2021) on the importance of social networks and adaptive strategies for women entrepreneurs in Africa. The

study's recognition of persistent challenges aligns with the observations made by Jaiyeola and Adeyeye (2021) regarding the obstacles to women's economic advancement in the region. Furthermore, the research supports the notion that targeted interventions can be highly effective in fostering enterprise growth, even in less developed areas, as demonstrated by Campos et al. (2018).

The study's findings on women's workplace in SSA align with and expand upon existing research on the topic. Flores et al. (2021), who emphasise the importance of job quality, labour empowerment, and workplace atmosphere, support this perspective. The study's findings also resonate with Monteiro et al. (2021), who highlight the significance of supportive work environments and women's inclusion in managerial roles for overall corporate performance and social responsibility. Additionally, the research aligns with Ketchiwou and Dzansi (2023) in recognising the detrimental effects of gender discrimination on women's career prospects and overall work performance. The study's emphasis on addressing women's needs in the workplace for improved job engagement and performance is consistent with the findings of Wafa et al. (2023), further underscoring the multifaceted nature of women's economic empowerment and its impact on human development in SSA.

This study's findings on marriage rights and parenthood policies in SSA reveal their fundamental role in promoting human development. The research aligns with Doss, Summerfield et al. (2014), regarding the importance of secure property rights within marriage for women's empowerment and household welfare. The study's results complement Delprato and Akyeampong's (2017) research on the educational benefits of delayed marriage, while also supporting Marphatia (2017) observations about the health implications of early marriage. In terms of parenthood's impact, the study's conclusions mirror Kabeer's (2018) in East Africa. The findings also support Bongaarts (2020) research on the relationship between women's education, family planning, and development outcomes, highlighting how supportive parenthood policies contribute to broader societal advancement through improved health outcomes, educational investments, and economic stability.

The study's findings on the GDI's positive impact across all quantiles in SSA demonstrate the fundamental importance of gender equality in driving human development. This comprehensive relationship aligns with Sen's (1999) foundational work on development as freedom and expands upon Kabeer's (2020) intersectional approach to understanding gender dynamics. The research reveals how gender equality improvements lead to widespread positive outcomes across multiple sectors, including health, education, finance, and agriculture, supporting the findings of Taukobong et al. (2016). Furthermore, the findings reinforce Manandhar et al.'s (2018) research on the interconnection between gender equality and the Sustainable Development Goals, particularly regarding how improved education and economic opportunities for women contribute to better health outcomes and overall societal welfare.

Women's mobility emerges as a crucial factor in advancing human development in SSA through multiple pathways, including enhanced economic participation, improved health outcomes, and overall well-being. The study's findings align with Porter's (2011) research on the fundamental role of mobility in women's economic emancipation, while extending beyond traditional mobility concepts to include technological innovations. The study's results also complement Taukobong et al.'s (2016) work on the relationship between mobility and health outcomes, while reinforcing Guli and Geda's (2021) findings on how improved infrastructure and mobility enhance women's labour market participation and family welfare.

The study reveals that women's assets have a significant positive impact on human development in SSA, supporting Doss, Kovarik et al.'s (2015) research on the critical role of women's property rights in development outcomes. The findings extend beyond Jones et al.'s (2020) work by demonstrating how women's economic resources and decision-making capabilities contribute to broader development indicators, not just nutritional outcomes. The research also builds upon Deere and Doss's (2006) concept of the "gender asset gap" by revealing a more nuanced relationship between asset ownership and development. Furthermore, this research links to Asaleye and Strydom's (2023) analysis of empowerment and development dynamics, showing how women's ownership of assets interacts with different social and economic factors to affect human development in the region.

The study's findings reveal a complex relationship between female labour force participation and human development in SSA, challenging conventional assumptions about women's employment and development outcomes. This research also aligns with Kabeer's (2016) analysis regarding the prevalence of low-quality, informal employment that fails to meaningfully contribute to household welfare or economic growth. The study's findings support Duflo's (2012) emphasis on the importance of job quality and supportive policies in realising the benefits of women's labour participation. Finally, these results particularly align with Thaddeus et al.'s (2022) perspective, which suggests that female labour force participation may constitute a liability rather than an asset for economic development in SSA.

Conclusions

The purpose of this study was to investigate the impact of WEE on human development in the SSA, employing a panel quantile regression approach. Our results offer several revelations. As shown by the different effects across quantiles for many indicators, WEE has different effects on human develop-

ment depending on different levels of development. Female entrepreneurship (FEPI) exhibits a threshold effect; it becomes important only at more developed levels. This implies that encouraging female entrepreneurship could need some degree of institutional and financial growth to noticeably affect human development.

Consistently showing positive effects across all development levels, workplace participation and marriage rights highlight their basic relevance for human development in the region. By reiterating the important contribution of general gender equality in promoting human development, the Gender Development Index shows a strong positive influence across all quantiles. Though there are some variances, indicating the complex interaction between these elements and larger social settings, parenting rights and mobility show positive impacts at most levels.

These findings contribute to the growing body of knowledge on WEE and development in SAA by providing a more complex picture of how several facets of empowerment affect human development at various levels of development. They emphasise the need for tailored policy approaches, taking into account the unique development situation of each nation or region. Our studies also emphasise the need to use intersectional and context-specific strategies in the design of treatments meant to advance WEE and human growth. One-size-fits-all policies might not be efficient across all development levels, as the different impacts across quantiles indicate.

Future studies should investigate the processes behind these different effects, including qualitative studies to offer a more in-depth understanding of the experiences of women in several development environments. Furthermore, looking at the long-term effects of particular empowerment initiatives could provide policymakers with important guidance.

Our research highlights the complexity of this link, even as it validates the general favourable impact of WEE on human development in the SAA. We should carefully customise policies meant to empower women to local conditions and development levels as the area continues to strive towards the Sustainable Development Goals to maximise their influence on general human development.

Appendix

Table A1. Descriptive statistics

Variable	Number of observations	Mean	Standard deviation	Min	Max
HDI	1008	0.4971657	0.1027258	0.26	0.806
FEPI	1008	71.55258	22.96635	0	100
FPYI	1008	55.62996	28.70812	0	100
FWPI	1008	61.18552	34.36917	0	100
FPHI	1008	40.01984	24.8371	0	80
FMRI	1008	59.74206	29.22931	0	100
FMBI	1008	79.86111	22.7226	0	100
FASI	1008	68.88889	28.06496	0	100
FMLF	1008	77.43058	16.72117	27.988	106.694
GDI	1008	0.8814048	0.0671612	0.632	1.019
GDPpc	1008	1879.743	2240.003	255.1003	14222.55
HE	1008	5.331658	3.058171	1.1072	34.40539
GEE	1008	3.873901	2.099578	0.4505197	14.75839
PVE	1008	-0.5058015	0.8680485	-2.847852	1.2236

Source: own calculations.

Table A2. Correlation matrix

	FEPI	FPYI	FWPI	FPHI	FMRI	FMBI	FASI	FMLF	GDI	GDPpc	HE	GEE	PVE
FEPI	1.000												
FPYI	0.027	1.000											
FWPI	0.317	0.452	1.000										
FPHI	-0.01	-0.15	0.059	1.000									
FMRI	0.239	0.418	0.578	-0.36	1.000								
FMBI	0.117	0.302	0.300	-0.11	0.247	1.000							
FASI	0.371	-0.001	0.271	-0.01	0.365	0.021	1.000						
FMLF	-0.12	0.077	0.016	-0.10	0.268	-0.23	0.304	1.000					
GDI	0.216	0.144	0.113	-0.02	0.191	0.004	0.333	0.224	1.000				
GDPpc	-0.11	0.064	-0.17	0.133	-0.11	-0.03	0.128	-0.13	0.323	1.000			
HE	0.179	0.138	0.091	0.115	0.139	0.053	0.244	-0.01	0.168	-0.11	1.000		
GEE	-0.06	-0.01	0.026	0.007	0.098	-0.03	0.024	-0.06	0.247	0.175	-0.28	1.000	
PVE	0.09	0.083	-0.09	-0.08	0.094	0.009	0.123	-0.10	0.321	0.427	0.04	0.280	1.000

Source: own calculations.

Table A3. VIF for independent variables

Variable	VIF	Tolerance
FMRI	2.49	0.402009
FWPI	2.34	0.427591
FASI	1.81	0.552489
FMLF	1.78	0.560930
GDPpc	1.72	0.581145
FPYI	1.63	0.612757
GDI	1.63	0.613298
FEPI	1.52	0.657848
PVE	1.46	0.683914
FPHI	1.40	0.712004
GEE	1.38	0.723878
HE	1.37	0.730959
FMBI	1.29	0.773770

Source: own calculations.

References

- Asaleye, A. J., & Strydom, K. (2023). Promoting women's empowerment: Linkages between financial development, employment and economic growth in selected African economies. *Sage Open*, 13(4), 1–19. <https://doi.org/10.1177/21582440231202413>
- Asongu, S., & Odhiambo, N. (2018). ICT, financial access and gender inclusion in the formal economic sector: Evidence from Africa. *The African Finance Journal*, 20(2), 46–66. <https://doi.org/10.2139/ssrn.3305000>
- Aterido, R., Beck, T., & Iacovone, L. (2013). Access to finance in sub-Saharan Africa: Is there a gender gap? *World Development*, 47, 102–120. <https://doi.org/10.1016/j.worlddev.2013.02.013>
- Bandara, A. (2015). The economic cost of gender gaps in effective labor: Africa's missing growth reserve. *Feminist Economics*, 21(2), 162–186. <https://doi.org/10.1080/13545701.2014.986153>
- Bongaarts, J. (2020). Trends in fertility and fertility preferences in sub-Saharan Africa: The roles of education and family planning programs. *Genus*, 76(1). <https://doi.org/10.1186/s41118-020-00098-z>
- Campos, F., & Gassier, M. (2017). *Gender and enterprise development in sub-Saharan Africa: A review of constraints and effective interventions*. World Bank Policy Research Working Paper, 8239. <https://ssrn.com/abstract=3067086>

- Campos, F., Frese, M., Goldstein, M., Iacovone, L., Johnson, H. C., McKenzie, D., & Mensmann, M. (2018). Is personal initiative training a substitute or complement to the existing human capital of women? Results from a randomized trial in Togo. *AEA Papers and Proceedings*, 108, 256–261. <https://doi.org/10.1257/pandp.20181026>
- Canay, I. A. (2011). A simple approach to quantile regression for panel data. *Econometrics Journal*, 14(3), 368–386. <https://doi.org/10.1111/j.1368-423x.2011.00349.x>
- Chikh-Amnache, S., Chikh-Bouabghela, N., & Mekhzoumi, L. (2023). How does female entrepreneurship affect happiness? *Central European Economic Journal*, 10(57), 180–197. <https://doi.org/10.2478/ceej-2023-0011>
- Chikh-Amnache, S., & Mekhzoumi, L. (2024). The influence of socioeconomic factors on female entrepreneurship in Southeast Asian countries. *Journal of Entrepreneurship in Emerging Economies*, 16(1), 33–70. <https://doi.org/10.1108/jee-12-2022-0371>
- Comblon, V., Robilliard, A., & Roubaud, F. (2017). *Gender analysis of labour market outcomes in sub-Saharan Africa: Recent evidence from Cameroon and Mali*. UN Women Discussion Papers, 16. <https://doi.org/10.18356/7bf28339-en>
- Deere, C. D., & Doss, C. R. (2006). The gender asset gap: What do we know and why does it matter? *Feminist Economics*, 12(1–2), 1–50. <https://doi.org/10.1080/13545700500508056>
- Delprato, M., & Akyeampong, K. (2017). The effect of early marriage timing on women's and children's health in sub-Saharan Africa and Southwest Asia. *Annals of Global Health*, 83, 3–4, 557–567. <https://doi.org/10.1016/j.aogh.2017.10.005>
- Demirgüç-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2020). The Global Findex Database 2017: Measuring financial inclusion and opportunities to expand access to and use of financial services. *The World Bank Economic Review*, 34(1), S2–S8. <https://doi.org/10.1093/wber/lhz013>
- Doss, C., Kovarik, C., Peterman, A., Quisumbing, A., & van den Bold, M. (2015). Gender inequalities in ownership and control of land in Africa: Myth and reality. *Agricultural Economics*, 46(3), 403–434. <https://doi.org/10.1111/agec.12171>
- Doss, C., Summerfield, G., & Tsikata, D. (2014). Land, gender, and food security. *Feminist Economics*, 20(1), 1–23. <https://doi.org/10.1080/13545701.2014.895021>
- Dufló, E. (2012). Women empowerment and economic development. *Journal of Economic Literature*, 50(4), 1051–1079. <https://doi.org/10.1257/jel.50.4.1051>
- Flores, L., Settles, I., McGillen, G., & Davis, T. (2021). Critical contributions to scholarship on women and work: Celebrating 50 years of progress and looking ahead to a new decade. *Journal of Vocational Behavior*, 126, 103490. <https://doi.org/10.1016/J.JVB.2020.103490>
- Golla, A. M., Malhotra, A., Nanda, P., & Mehra, R. (2011). *Understanding and measuring women's economic empowerment: Definition, framework and indicators*. International Center for Research on Women (ICRW). <https://www.icrw.org/wp-content/uploads/2016/10/Understanding-measuring-womens-economic-empowerment.pdf>
- Guli, V., & Geda, N. (2021). Women's participation in labor force in sub-Saharan Africa (SSA): A review of determinants and impacts. *Archives of Current Research International*, 21(2), 1–13. <https://doi.org/10.9734/ACRI/2021/V21I230228>

- Hallward-Driemeier, M., & Hasan, T. (2013). *Empowering women: Legal rights and economic opportunities in Africa*. The World Bank. <https://gsdrc.org/document-library/empowering-women-legal-rights-and-economic-opportunities-in-africa/>
- Haugh, H. M., & Talwar, A. (2016). Linking social entrepreneurship and social change: The mediating role of empowerment. *Journal of Business Ethics*, 133(4), 643–658. <https://doi.org/10.1007/s10551-014-2449-4>
- Jaiyeola, E., & Adeyeye, M. (2021). Obstacles along the path of women enterprises in Africa: A case study of Ogotun women in Ekiti state, Nigeria. *Heliyon*, 7(7), e07593. <https://doi.org/10.1016/j.heliyon.2021.e07593>
- Jones, R., Haardörfer, R., Ramakrishnan, U., Yount, K., Miedema, S., Roach, T., & Girard, A. (2020). Intrinsic and instrumental agency associated with nutritional status of East African women. *Social Science & Medicine*, 247, 112803. <https://doi.org/10.1016/j.socscimed.2020.112803>
- Kabeer, N. (1999). Resources, agency, achievements: Reflections on the measurement of women's empowerment. *Development and Change*, 30(3), 435–464. <https://doi.org/10.1111/1467-7660.00125>
- Kabeer, N. (2005). Gender equality and women's empowerment: A critical analysis of the third millennium development goal 1. *Gender & Development*, 13(1), 13–24. <https://doi.org/10.1080/13552070512331332273>
- Kabeer, N. (2016). Gender equality, economic growth, and women's agency: The “endless variety” and “monotonous similarity” of patriarchal constraints. *Feminist Economics*, 22(1), 295–321. <https://doi.org/10.1080/13545701.2015.1090009>
- Kabeer, N. (2018). *Gender, livelihood capabilities and women's economic empowerment: Reviewing evidence over the life course*. GAGE. <http://eprints.lse.ac.uk/id/eprint/90462>
- Kabeer, N. (2020). Women's empowerment and economic development: A feminist critique of storytelling practices in “Randomista” economics. *Feminist Economics*, 26(2), 1–26. <https://doi.org/10.1080/13545701.2020.1743338>
- Kelley, D. J., Baumer, B. S., Brush, C., Greene, P. G., Mahdavi, M., Majbouri, M., Cole, M., Dean, M., & Heavlow, R. (2017). *Global Entrepreneurship Monitor 2016/2017 report on women's entrepreneurship*. Babson College. <https://www.gemconsortium.org/report/gem-20162017-womens-entrepreneurship-report>
- Ketchiwou, G., & Dzansi, L. (2023). Examining the impact of gender discriminatory practices on women's development and progression at work. *Businesses*, 3(2), 347–367. <https://doi.org/10.3390/businesses3020022>
- Klasen, S., & Lamanna, F. (2009). The impact of gender inequality in education and employment on economic growth: New evidence for a panel of countries. *Feminist Economics*, 15(3), 91–132. <https://doi.org/10.1080/13545700902893106>
- Koenker, R. (2004). Quantile regression for longitudinal data. *Journal of Multivariate Analysis*, 91(1), 74–89. <https://doi.org/10.1016/j.jmva.2004.05.006>
- Koenker, R., & Bassett, G. (1982). Robust tests for heteroscedasticity based on regression quantiles. *Econometrica*, 50(1), 43–61. <https://doi.org/10.2307/1912528>
- Machado, J. A., & Silva, J. S. (2019). Quantiles via moments. *Journal of Econometrics*, 213(1), 145–173. <https://doi.org/10.1016/j.jeconom.2019.04.009>

- Manandhar, M., Hawkes, S., Buse, K., Nosrati, E., & Magar, V. (2018). Gender, health and the 2030 agenda for sustainable development. *Bulletin of the World Health Organization*, 96, 644–653. <https://pmc.ncbi.nlm.nih.gov/articles/PMC6154065/>
- Marphatia, A., Ambale, G., & Reid, A. (2017, October 18). Women's marriage age matters for public health: A review of the broader health and social implications in South Asia. *Frontiers in Public Health*, 5. <https://doi.org/10.3389/fpubh.2017.00269>
- Meinzen-Dick, R., Quisumbing, A., Doss, C., & Theis, S. (2019). Women's land rights as a pathway to poverty reduction: Framework and review of available evidence. *Agricultural Systems*, 172, 72–82. <https://doi.org/10.1016/j.agsy.2017.10.009>
- Monteiro, A., García-Sánchez, I., & Aibar-Guzmán, B. (2021). Labour practice, decent work and human rights performance and reporting: The impact of women managers. *Journal of Business Ethics*, 180, 523–542. <https://doi.org/10.1007/s10551-021-04913-1>
- Mothobi, O., & Grzybowski, L. (2017). Infrastructure deficiencies and adoption of mobile money in sub-Saharan Africa. *Information Economics and Policy*, 40, 71–79. <https://doi.org/10.1016/j.infoecopol.2017.05.003>
- Nussbaum, M. C. (2011). *Creating capabilities: The human development approach*. Belknap Press. <https://doi.org/10.4159/harvard.9780674061200>
- Ojong, N., Simba, A., & Dana, L. (2021). Female entrepreneurship in Africa: A review, trends, and future research directions. *Journal of Business Research*, 132, 233–248. <https://doi.org/10.1016/j.jbusres.2021.04.032>
- Oyèwùmí, O. (1997). *The invention of women: Making an African sense of western gender discourses*. University of Minnesota Press. <https://ci.nii.ac.jp/ncid/BA35591042>
- Palacios-Lopez, A., Christiaensen, L., & Kilic, T. (2017). How much of the labor in African agriculture is provided by women? *Food Policy*, 67, 52–63. <https://doi.org/10.1016/j.foodpol.2016.09.017>
- Porter, G. (2011). 'I think a woman who travels a lot is befriending other men and that's why she travels': Mobility constraints and their implications for rural women and girls in sub-Saharan Africa. *Gender Place & Culture*, 18(1), 65–81. <https://doi.org/10.1080/0966369x.2011.535304>
- Psacharopoulos, G., & Patrinos, H. A. (2018). Returns to investment in education: A decennial review of the global literature. *Education Economics*, 26(5), 445–458. <https://doi.org/10.1080/09645292.2018.1484426>
- Sen, A. K. (1999). *Development as freedom*. Knopf. <https://ci.nii.ac.jp/ncid/BA43059927>
- Tamale, S. (2020). *Decolonization and Afro-feminism*. Daraja Press. <https://www.amazon.com/Decolonization-Afro-Feminism-Sylvia-Tamale/dp/1988832497>
- Taukobong, H., Kincaid, M., Levy, J., Bloom, S., Platt, J., Henry, S., & Darmstadt, G. (2016). Does addressing gender inequalities and empowering women and girls improve health and development programme outcomes? *Health Policy and Planning*, 31(10), 1492–1514. <https://doi.org/10.1093/HEAPOL/CZW074>
- Thaddeus, K., Bih, D., Nebong, N., Ngong, C., Mongo, E., Akume, A., & Onwumere, J. (2022). Female labour force participation rate and economic growth in sub-Saharan Africa: "A liability or an asset". *Journal of Business and Socio-economic Development*, 2(1), 34–48. <https://doi.org/10.1108/jbsed-09-2021-0118>

- UN Women. (2019). *Annual report 2018–2019*. United Nations Entity for Gender Equality and the Empowerment of Women. <https://www.unwomen.org/en/digital-library/publications/2019/06/annual-report-2018-2019>
- Verick, S. (2014). Female labor force participation in developing countries. *IZA World of Labor*. <https://doi.org/10.15185/izawol.87>
- Wafa, A., Riadh, H., & Abbas, M. (2023). Theoretical evidence and empirical investigation of the impacts of women's psychological needs on the environment, well-being, and performance at work. *International Journal of Professional Business Review*, 8(11), e02266. <https://doi.org/10.26668/businessreview/2023.v8i11.2266>

Aims and Scope

The aim of **Economics and Business Review** is to provide a platform for academicians from all over the world to share, discuss and integrate their research in the fields of economics and finance, including both behavioural economics and finance, with a key interest in topics that are relevant for emerging market economies. The journal welcomes submissions of articles dealing with micro, mezzo and macro issues that are well founded in modern theories or based on empirical studies and which are valuable for an international readership.

Your paper your way policy

The authors are initially expected to adjust their manuscripts to meet the basic requirements presented in the submission checklist below. Once the text has been accepted for publication, authors must adhere to all guidelines available on our website: <https://journals.ue.poznan.pl/ebr>

Basic requirements

- The submission has not been previously published nor is it under consideration for publication elsewhere (or an explanation has been provided in Comments to the Editor).
- The submitted manuscript must be anonymous. A separate title page must also be submitted, specifying each author's affiliation, email address, and ORCID iD. Acknowledgements and references to research grants should be included on the title page.
- The manuscript should be prepared in OpenOffice, Microsoft Word, or RTF document file format.
- The length of the manuscript should not exceed 8,000 words (including figures and tables, references, and footnotes).
- The manuscript includes an abstract of 100 to 150 words and is divided into clearly distinctive sections, including Introduction and Conclusions. The Introduction should state the aim of the study, research methods, main results, and particularly the study's contribution to international literature. The final paragraph should outline the article's content.
- All tables and figures should be numbered and presented consecutively according to their order in the text. Tables and figures should be as self-explanatory as possible, so readers do not need to refer to the main text to understand the information presented. The sources of all data used in tables and figures must be specified.
- The authors should use a consistent referencing style throughout the text.

The submission must be made via the **submission system**: <https://journals.ue.poznan.pl/ebr/submission>

More information and advice on the suitability and formats of manuscripts can be obtained from:

Economics and Business Review

al. Niepodległości 10

61-875 Poznań

Poland

e-mail: secretary@ebr.edu.pl

<https://journals.ue.poznan.pl/ebr>

Subscription

Economics and Business Review (EBR) is published quarterly and is the successor to the Poznań University of Economics Review. The EBR is published by the Poznań University of Economics and Business Press.

Economics and Business Review is indexed and distributed in Scopus, Claritave Analytics, DOAJ, ERIH plus, ProQuest, EBSCO, CEJSH, BazEcon, Index Copernicus and De Gruyter Open (Sciendo).

Subscription rates for the print version of the EBR: institutions: 1 year – €50.00; individuals: 1 year – €25.00. Single copies: institutions – €15.00; individuals – €10.00. The EBR on-line edition is free of charge.