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Asymmetric Effects of ICTs on Women's Self-Employment in Sub-Saharan Africa

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ABSTRACT

This study investigates the asymmetrical effects of information and communication technologies (ICTs) on women's self-employment in 33 sub-Saharan African countries. Based on data obtained from the World Bank for the period 1996–2022, a non-linear autoregressive distributed lag model was applied to achieve the research objective. Specifically, the mean group and pooled mean group estimators were used. Regarding short-run asymmetric responses, the results show that positive shocks to ICTs have a positive impact on women's self-employment. However, in the long run, positive ICT shocks exert a negative effect. From a policy perspective, interventions to improve ICT adoption among women in sub-Saharan African countries are crucial. This study is the first to examine the asymmetrical relationship between ICTs and women's self-employment.

KEYWORDS

ICT, Self-Employment, NARDL, Sub-Saharan Africa

INTRODUCTION

Women's participation in the labor market influences not only the economy but also social dynamics (Ibourk & Elouaourti, 2023). Over time, it has become a subject of growing interest among researchers due to its significant impact on the economic development of nations (Halim et al., 2023). Indeed, compared to men, women bring different skills and ideas that have economic value (Lagarde, 2014). It should be noted that this approach, which promotes the status of women within strategic spheres of society, aligns with the vision of the United Nations Entity for Gender Equality and the Empowerment of Women on the one hand, and that of the African Women's Development Fund on the other.

Furthermore, the number of women in the labor market has increased over the years. According to Gopalan et al. (2024), this growth stems from the ongoing evolution of the digital world. In this sense,

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information and communication technologies (ICTs) have helped reduce barriers to entering the labor market, particularly by improving access to information through various digital platforms, thereby offering individuals, and women in particular, the opportunity to expand their professional networks and increase their visibility. Morley and Collet (2017), Vaton (2015), and Châteauneuf-Malclès (2011) argue that ICTs are driving the feminization of jobs.

In addition, the relationship between ICTs and women's labor market participation has generated a rich and sometimes controversial body of economic literature. From a theoretical perspective, the ideas proposed by these authors can be summarized into two main lines of argument: the push and crowding-out approaches. The first approach is based on the hypothesis that ICTs serve as a catalyst for women's labor market participation and draws on the theory of technology life cycles (Ruttan, 1959), the theory of disruptive innovation (Christensen, 1997), and uses and gratifications theory (Katz, 1959). The second approach posits that ICTs tend to exclude women from the labor market. It includes several theories, such as digital divide theory (DiMaggio & Hargittai, 2001), technological domestication theory (Silverstone & Morley, 1992), and information asymmetry theory (Akerlof, 1970).

Similarly, on the empirical front, the results obtained by researchers present a dichotomy. On the one hand, Ahmad et al. (2024) and Sun and Li (2025) found that ICTs have a positive effect on women's labor market participation in sub-Saharan Africa. On the other hand, Asongu and Odhiambo (2020) demonstrated that women's participation in the labor markets of sub-Saharan Africa is negatively influenced by ICTs. Despite their differences, all these studies highlight the role of ICTs in women's pursuit of and engagement in income-generating activities, based on a linear representation.

Since this analytical framework does not allow for determining the threshold at which the effect of ICTs can stimulate or reduce women's labor market participation, it has paved the way for research on the asymmetric effects of ICTs on women's labor market participation. Asongu et al. (2023) found that, in a sample of 42 sub-Saharan African countries from 2004 to 2014, a fixed broadband subscription rate of 9.187 per 100 inhabitants is necessary to fully offset the established net negative effect between ICTs and women's labor market participation. This result stems from a simple calculation based on the min/max method at the end of the estimation procedure using the generalized method of moments.

On this basis, Asongu et al. (2023) focused on three indicators commonly used to understand women's labor market participation. However, these indicators obscure the reality of self-employed women. Thus, the added value of this work lies in the econometric analysis of the link between ICTs, examined through the lens of internet use (which is now one of the main drivers of financial inclusion, particularly mobile money, access to information, and digital entrepreneurship in Africa), and women's labor market participation, examined through women's self-employment, which, according to Pasali (2022), constitutes one of the predominant forms of women's employment on a continent characterized by high informality. This new approach also provides an opportunity to extend the study period and account for changes in women's circumstances related to the 2019 coronavirus pandemic (COVID-19). Finally, the methodological contribution consists of estimating the non-linear autoregressive distributed lag (NARDL) panel model. It should be noted that this approach differs from the dominant techniques of asymmetric smooth transition cointegration, such as threshold autoregression and the error correction model (ECM). Indeed, it jointly models the dynamics of cointegration and asymmetry in a single equation and relaxes the assumption of non-stationarity.

Furthermore, the NARDL model simultaneously captures short- and long-term asymmetries by regressing women's labor market participation on the decomposition of ICTs into the sum of positive and negative partial sums. In the context of this study, the value of highlighting the negative and positive aspects of ICTs is justified, on the one hand, by the disruptions faced by women entrepreneurs in their use of the internet or landline/mobile phones, and on the other hand, by their optimal use of these tools. Indeed, according to the 2022 United Nations Office to the African Union report, internet outages in Africa disrupt the labor market to the point of threatening the survival of women-owned