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Level of Education and Female Labor Force Participation in Burkina Faso

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Abstract

Female labor force participation has gained the interest of development economists and researchers these last three decades. The paper seeks to analyze the link between female labor force participation and education level. Data for this paper come from the 2018/2019 Harmonized Survey on Households Living Standards (EHCVM). Using a logit model, the results reveal that after controlling for demographic and socioeconomic factors, a negative relationship between level of education and female labor force participation. Further, using years of schooling, results suggest a threshold effect showing that education matters only at higher level. Higher degree of education reduces the probability of being on labor force. However, literacy has a positive effect on labor force participation. The study suggests policies that ensure the sustainability of education attainment and promoting labor market opportunities through investments in education and training, and improvement of job-matching process.

Key words: female labor force participation, education, Burkina Faso

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1. Introduction

The labor force comprises individuals who are employed or unemployed and actively seeking employment and excludes the economically inactive including men or women involved in household production. Thus, the labor force participation rate is defined as the proportion of the working age population who are either employed or unemployed and seeking employment. During the past three decades, female labor force participation has gained attention among development economists and researchers due to its role in measuring progress being made in achieving gender equality. Female labor force participation (FLFP) is the prime indicator of the extent to which females participate in the economic activities of any country, of society (Baah-Boateng et al., 2013; Yakubu, 2010). If the FLFP is low in any country, then it implies that the resources of the country are not fully utilized (Cheema et al., 2021). Also, it is widely recognized that active participation of women in the labor force is essential for poverty reduction, and female labor force participation has a vital role in the economic growth of any country (Cheema et al., 2021; Pimkina and de la Flor, 2020; Verick, 2014).

As the seminal work of Becker (1962) stated in theory of human capital, individuals accumulate a set of skills through education or training which they can then use to join the labor market, become more productive or even earn higher wages. In fact, according to the human capital theory, the effect of education on the decision to participate in the labor market is explained by the fact that by accumulating human capital, women increase the gains they can expect beyond the reserve wage and by the same way lower the opportunity costs related to their participation (Mincer, 1974; Becker, 1993). Thus, the higher the educational attainment, the better the labor outcomes. Higher levels of schooling increase the opportunity cost of not entering the labor market, as higher education corresponds with higher potential earnings.

An overview of labor force participation trends during the past three decades reveals a declining trend in labor force participation for male and female in Burkina Faso. Female labor force participation remains low compared to male during the period 1990-2019. However, during the same period female school enrollment for all levels (primary, secondary, and tertiary) increased gradually (World Bank, 2022). The labor force participation rate for female was about 79% in 1990 while it sloped down to 60% in 2019 showing a high gap between female and male (World Bank, 2022). Further, in 2021 women accounted for 44.7% of total labor force in Burkina Faso and female labor force participation rate was 57.2% meaning that women are less active than men. (World Bank, 2022). In addition, it is revealed that 47.9% of working age women reported to be inactive because they are housewives (MFSNF, 2017). However, at the same time, efforts have been made regarding female education. Indeed, female school gross enrollment in primary was 94.28% in 2019 against 74.28% and 25 % in 2010 and 1990 respectively. For the secondary school gross enrollment, the rates were around 42% in 2019 against 19% in 2010 and 8.23% in 2000. The tertiary school gross enrollment is 5% in 2019 against 2.3%in 2010 and 0.34 % in 1990 (World Bank, 2022).

Thus, this research seeks to answer the following question: what is the relationship between education level and female labor force participation in Burkina Faso?

Empirically, the relative chances for a woman to be active double when one goes from without education to secondary and are quadruple when one attains higher education (Gakou and Kuépié, 2008). Furthermore, development economists have argued that the impact of education on labor force participation rates is not uniform across years of education. Verick (2014) notes that female LFPR are heterogeneous across regions,

age groups, with the school-age group showing falling labor supply due to higher school enrolment. He further points out that in regions with comparatively high female LFPR such as Sub-Saharan Africa (SSA), the quality of female employment is an important dimension, as many women must participate in the labor market due to poverty.

In Burkina Faso, the socio-cultural context seems to predispose the country to the maintenance of gender inequalities (Zan, 2009). In fact, women are victims of numerous forms of discrimination which are the consequences of a set of social, cultural, religious and other factors. In most societies in Burkina Faso, customary habits confine women to household chores because they must stay at home. Indeed, there is household division of labor and domestic activities including child caring fall strictly under women's domain, the labor force participation rate of women will be lower relative to that of men in the country. However, as women spend more time engaging in unpaid, informal care work, they have less time to work in the market (Pimkina and de la Flor, 2020). It is stated that once unpaid work is accounted for, women work more than men (World Bank, 2012). It is revealed that globally, women do three times as much unpaid care and domestic work as men. As a result of the unequal allocation of care responsibilities, many women experience time poverty which adversely affects their ability to participate in the labor market and work in the jobs that they may desire (World Bank Group, 2015). Living in a rural area, in a poor household, being married and having two young children all increase women's care workloads (UN Women, 2019).

The objective of this paper is to analyze the effect of education on female labor force participation in Burkina Faso. Thus, it is assumed that level of education has no influence on female labor force participation in Burkina Faso.

Despite this abundant literature on education and labor force participation, studies related to the SSA particularly for the specific case of Burkina Faso appear to be scanty to the best of our knowledge. Moreover, there are gaps in labor force measurement as studies on the topic miss to uniformly measure the labor force participation. Studies used individuals' employment status to measure labor force, and this underestimates the level of labor force participation i.e., the decision to work or not (Gross and Fempong, 2021; Totouom et al., 2018; Bbaale, 2014; Ackah et al., 2009; Atieno, 2006). While the available literature generally focuses on female employment (women who are employed), this paper centers on female labor force participation (women who are either employed or looking for employment) to take into account opportunities for job. The key distinction is that labor force participation captures the decision to actively engage with the labor market while employment represents an equilibrium outcome, resulting from the interaction of supply side (job seekers) and demand side (employers) of the market for female labor force (Pimkina and de la Flor, 2020).

Furthermore, most previous analyses of the relationship between female education and labor force participation have used aggregate time series data. While these studies can be instructive, female labor force participation can be more clearly understood by analyzing household-level data sets (Cameron et al., 2001). In addition, the paper uses the most recent household data available for the country. Our findings will contribute to the knowledge about the role of education on female labor force participation in low-income countries particularly in Burkina Faso.

The rest of the paper is structured as follow: Section 2 presents the theoretical and empirical literature review. The third Section carries out the methodology followed by results and discussion in Section 4. Section 5 concludes.

2 Literature review

This section covers the theory and empirical evidence on factors influencing labor force participation in general and the link with education in particular.

2.1 Theory on labor force participation

The conceptual framework of this study is based on the human capital theory (HCT). This theory is the most appropriate for analysis on the role of human capital in labor force participation (Becker, 1957, 1975)

Human capital theory

Put forward by Becker (1957), the human capital theory explains the link between education and participation of women in the labor force. It is stated that the individual's capital stock has an "innate ability," and can be extended to (i) prior participation in the labor force by education, (ii) during employment through on-the-job training, and (iii) experience. Thus, the theory postulates that those women with middle-school education or higher are more economically active than those without formal education (Nam, 1991). In this way, the theory lays emphasis on the voluntary choices in the lifetime of participants in the workforce as determinants of differences in occupation and remuneration. Moreover, an individual's lifetime earnings usually show a one-off return for formal education, and subsequent salary increases to reflect the individual's years of experience and job training on a specific area.

As proponent of the human capital theory, Becker (1975) further explains that over their working life, women are on the average, less productive when compared to men because they tend to take an employment break for maternity leave and child-care. Furthermore, they bear the responsibility of the unremunerated domestic chores. Thus, the human capital theory emphasizes the importance of education and training in the development of human capital. Over the life cycle, female labor force behavior is governed by various factors. Very complex mechanisms determine the decision to enter, stay on, or leave the labor market. These include economic (that is the labor market structure), individual (skills, marital status, labor force attachment, incentives and career expectations), and household characteristics (structure, domestic workload, presence and number of children).

Following this theory, many studies analyzed trends, economic and social determinants of labor force decision either at micro or macro level. This research focuses on the role of education in labor force participation. According to the macroeconomic literature, three main dimensions are considered as constraints on women's participation in the labor market, namely female education, marriage, and fertility. At microeconomic level, household characteristics like education, children, household income, age, and market circumstances are the factors explaining labor force participation across countries (Gross and Frempong, 2021).

2.2 Empirical evidence on the effect on education on female labor force participation

Previous studies have identified households and individuals' characteristics as the drivers of female labor force participation. Studies have highlighted that educational attainment is one of the most determinants of labor force participation in both developed and developing countries (Olusoji, 2006; Ejaz, 2007; Contreras et al., 2010; Ahmad and Fatima, 2011; Cheema et al., 2021; Ngeh, 2016; Njang Che and Sundjo, 2018; Yusnandar et al., 2020). For example, in Pakistan, it is showed that age, educational attainment, and marital status have significant and positive effects on FLFP (Ejaz, 2007; Ahmad and Fatima, 2011). In Ghana, Ackah et al. (2009) investigated the determinant of FLPP and express that both women's educational attainment and fertility determine women's labor force participation in Ghana. Their results showed that women with primary school education/above are more economically active than those with no education. Further, Ngeh (2016) by analyzing the determinants of female labor force participation and sectoral choices, show that females who have tertiary education and who reside in the urban areas are more likely to work in the industrial, commerce and service sectors in Cameroon.

As for the role of education on labor force participation, the literature revealed several channels through which education can later affect female labor force participation. In their review, Pimkina and de la Flor (2020) noted that, education can affect labor force participation (i) through formal schooling (educational attainment) and (ii) through continuing education (vocational and job training). Empirically, following human capital theory, previous works that focused specifically on the role of education on FLFP reveal mixed effects and can be classified into two groups of studies.

Studies on positive and linear relationship

The first group claims as the common belief a linear and positive relationship between educational attainment and FLFP. Earlier studies found that education has a positive effect on female labor force participation (Psacharopoulo and Tzannatos, 1987; Jakubson and Psacharopoulos, 1992). Jakubson and Psacharopoulos (1992) suggests that in Ecuador schooling has a positive effect on women's labor force participation, even though the effect is small. Further, the probability of labor force participation of a woman with 16 years of schooling is 11 percentage points higher than for a woman with no schooling. Psacharopoulo and Tzannatos (1987) also suggest that education appears to be only one of the many factors which affect women's decision to supply labor to the marketplace.

In Nigeria, Aromolaran (2004) used a probability model to examine the influence of education on labor force participation of married women. The findings show that wifes as well as husband's education at all levels positively influences participation of married women in different degrees in wage, self and total employment. In the same vein, Olowa and Adeoti (2014) by using three estimation techniques (OLS, instrumental variables and Heckman selection) reveal that in rural Nigeria, female education is necessary to ensure effective participation of women in the labor market. The results show that most educated females in rural Nigeria have a high probability of getting a job.

Using probit and multinomial logit, Sackey (2005) found in the case of Ghana, that female schooling matters in both urban and rural localities. The author shows that both primary and post-primary schooling levels exert significant positive impact on women's labor market participation and have an opposite effect on fertility. Baah-Boateng et al. (2013) focus on the role played by fertility and education to examine female labor force participation for both urban and rural dwellers in Ghana. Applying a logit model, authors

established that women with basic and tertiary education have a higher propensity of participation compared with those with no education.

Faridi et al. (2009) showed that there is a positive trend between education and female participation. Using a binary logit model, authors suggest that educated female having higher than a middle level is successful in attaining employment in Pakistan. In South Africa, Yakubu (2010) used a logit model to estimate the influence of education on labor force participation. After controlling for other demographic and economic factors, results show that there is a link between level of educational attainment and FLFP, which indicate that the higher the level of educational attainment, the more opportunities females in South Africa have in getting a job. Bbaale (2014) confirms the hypotheses that female education, especially at the secondary and post-secondary school levels, reduces fertility and increases the likelihood of females being engaged in the labor force in Uganda.

Studies on non-linear relationship

For the second group, in some few studies, the effect of education on FLFP is non-linear. The relationship often takes the form of a U-shaped function, with higher participation at lower and very high levels of levels of educational attainment. Also, it is revealed that contrary to common belief, the relationship between education and FLFP is weak and the evidence that portrays this relationship is thin (Pimkina and de la Flor, 2020). Cheema et al. (2021) in a logit model suggest a U-shaped trend with the education of the women in Pakistan. Contrarily, for Nagac and Nuhu (2016), after controlling for socio-demographic factors, find that effect of education on FLFP in Nigeria fallows an inverse "U shaped" pattern. Using a logit model authors state that labor force participation increases up to high school but then decreases with a higher education degree.

Besides, Totouom et al. (2018) in their paper on the role of education in achieving gender equality in labor force participation found mixed effects of education. Using instrumental variable, multinomial and binary logit, authors reveal the negative impact of being a woman on the probability of getting a job in Cameroon. Further, Totouom et al. (2018) show that the negative impact of education on the probability of employment only concerns the probability of working in the informal sector. In contrast, education is positively associated with the probability of working in the public and the private formal sectors. Authors explained the negative impact of education on employment by the preponderance of the negative effects in the informal sector.

In this above literature, while most studies are at macroeconomic level, only few studies use household or individuals level data, thus this study will fill the gap by analysis the effect of education on female labor force participation at individual level.

3 Methodology

The section firstly described the data and secondly the model specification and estimation are presented.

3.1 Data

The data used in this study comes from the Harmonized Survey on Households Living Standards (Enquête Harmonisée sur les Conditions de Vie des Ménages, EHCVM 2018-2019). The EHCVM 2018 is the first

edition of a nationally representative household survey conducted within the West African Economic and Monetary Union (WAEMU). The Burkina Faso EHCVM is implemented by the National Institute of Statistics and Demography (INSD) with the support from the World Bank and the WAEMU Commission. The EHCVM is a nationally representative survey of 7,000 households, which are also representative of the geopolitical zones (at both the urban and rural levels).The household and individual questionnaire provides information on demographics, education, health, employment and non-employment income, savings and credits, housing conditions, household's assets, food and non-food expenditure, food security and shocks, safety nets, agriculture, livestock, household nonfarm and other sources of income, and relative poverty.

Our outcome variable, labor force participation is determined as follows: if the person answered yes to any of the following main questions, the person is counted in labor force. In the last 7 days, "Have you worked on a farm for your own account?", "Have you worked on a farm owned or rented by household member?", "Have you worked on your own account?", "Have you worked for anyone who is not household member?", "Have you looked for job the past 30 days?", "Are you available to work?". Also, to take account of the dynamic trend of work, we consider the question, "Have you worked during the past 12 months?". Then we compute three measures of labor force participation, (i) the current labor force participation i.e., the last 7 days, (ii) the past labor force participation i.e., the last 12 months, and (iii) either current or past labor force participation.

Since our interest is on FLFP, we restricted our sample to females who are at the age of 15 and above. Following the regulation on working age population in Burkina Faso, we keep females who are 15-65 years. The final sample include 12,537 representative females.
To find the effect of education on FLFP, we use two measures of education, formal education attainment and literacy. For education level, we first created 5 categories for the education level of a female: (1) no education; (2) primary school; (3) post-primary school; (4) secondary school and; (5) tertiary education. Secondly, we count the completed years of schooling of female in the sample. For literacy, we measured it through the yes/no question whether the female is able to read, write in any language (French or local language). In addition to education, we control age, marital status, religion, ethnicity, urban/rural residence, household wealth status, presence of under six children in household, gender of household head, household size, education of household head. The description of the outcome variable, independent variables of interest and other covariates are presented in Table 1.

3.2 Model specification and Estimation Strategy

Our model of reference is based on the collective household model that provide a theoretical foundation for analysis of female labor force participation (Chiappori, 1988,1992). Chiappori (1992) developed a general collective model of household labor supply in which agents are characterized by their own preferences, and household decisions are assumed to be Pareto efficient. For Chiappori (1988), a collective household behavior determines females' labor supply decisions. Thus, the following specification is adopted:

$$FLFP = f(FE, FC, HC) \quad (1)$$

where $FLFP$ is female labor force participation, FE, FC and HC are female level of education, female characteristics (age, marital status, residency, ethnicity, religion), and household characteristics (size,

head's education, wealth status). FLFP is the outcome variable, while FC and HC are the control variables, and FE the variable of interest.

A standard and model of the decision of a woman to engage in labor force as a function of her level of education, and socio-economic characteristics can be specified. The description of the model is as follows:

$$FLFP_i = \beta_0 + \beta_1 FE_i + \beta_2 FC_i + \beta_3 HC_i + \mu_i \quad (2)$$

$FLFP_i$ is the participation status of the woman in the labor force which is equal to 1 if the *ith* woman participates in the labor force, and 0 if otherwise. In our model, the outcome variable, $FLFP$ is a dichotomous variable that can assume only two values: 1 if the female is either currently in the labor force (i.e., working or looking for work) and 0 if she is not. β_1 , β_2, and β_3 are vectors of parameters to be estimated.

The main variable of interest is FE_i which represents a vector of dummy variables of educational attainment of female (primary, post-primary, secondary and tertiary with no education as the reference dummy) or the completed years of schooling. The vector FC_i is the vector of women socio-economic characteristics such as age dummies (20-29, 30-39, 40-49, 50+ with 15-19 as reference group), marital status (married =1: unmarried = 0), religion dummies (Muslim, Christian with other religion as reference group) and ethnicity dummies (Mossi with other ethnics as reference); woman's location of residence. The vector HC_i represents household characteristics variables such as household size, gender and education status of head, household wealth status (poor=1, non-poor=0).

Due to the binary nature of the observed outcome variable, ordinary least square (OLS) or standard economic estimations are not appropriate for this model. Thus, based on what is in the literature, we applied to equation (2) a logistic regression estimation technique to the participation model to capture the education effect of female participation in the labor force. The choice of the logistic estimation is informed by the fact that the dependent variable is dichotomous (participate and not participate) and the model is useful in understanding the relationship between the predictors or explanatory variables and the binary response variable or dependent variable (Baah-Boateng et al., 2013).

4 Results and Discussions

This section presented the descriptive and analytical results followed by discussions.

4.1 Descriptive analysis

This section describes our key and control variables. Table 1 shows the descriptive statistics of all variables that are used in this study. Table 1 indicates that on average 54 % of women are currently in labor force the last 7 days. When considering the past 12 months activity of women, it revealed that 58% of women are in labor force. We observed a significant gap in labor force participation between men and women. Indeed, Table A1 in the appendix indicates that men labor force participation is higher than for female regardless the measure of labor force. For current labor force (last 7 days), 72% of men participate against 54% of women. During the past 12 months, 70% of men are in labor force while only 51% of women are participating. Considering type of work for women in labor force, Table A1 indicates that more men are involved either in unpaid, paid, and self-employment than women. Table A2 shows the variables between women that participate and those not participating in labor force. We see that among women who participate in labor force, 93% participate during the last 7 days and 91% during the last 12 months preceding the

survey. For the education, we observed in Table 1 that on average female completed only 3 years of schooling, 67% have no formal education at all, 12% have primary level, 16% have post-primary, 5% have secondary school education, and only 1% have a tertiary education. About 54% of women are literate. In addition, Figure A1 in appendix shows that 53% of literate women are in labor force against 55% of non-literate women and the gap in higher with urban female. In Figure A2, the disaggregation of education by age group shows that younger (15-19 age) are more educated than adults and elders. Indeed, while 44% of younger have no formal education, 85% of 40-49 age and 91% of 50 years and above group have no formal education.

In Table 1, the average age of women in labor force is 33 years and 85% of women are in reproductive age (15-49 years). It is also shown that 79% of females are married in our sample. About 42% of females live in urban areas; 62% of our sample is Muslim, 30% is Christian, and 8% practices traditional religion. Half of women belong to the Mossi ethnic group. About 74% of women live in household with children under age 6 with on average 2 children under age 6. Table 1 also shows that 36% of women live in poor household, 26% have an educated head of household.

In Figure 1 we see how female labor force participation changed by education level. Globally, female labor force participation is higher for women with no education. It decreased for those with primary and post-primary level, and from post-primary level it increases again until tertiary level and reach the highest level. Considering residency, for both urban and rural area female labor force decreases from no education to post-primary, then increases again. But while the increase continues in urban area, there is a decrease from secondary to tertiary level in rural area. This is not surprising as urban area offers more opportunities for individuals with higher level of education.

Figure 2 shows the change of female labor force participation with age groups both for urban and rural areas. We observe that both in urban and rural Burkina Faso, as age increases labor force participation first increases up to the age of 40-49 (age 30-39 for urban and age 40-49 for rural), and then it decreases. In their early ages or after age of 50, some women are not willing to work. While for the age after 50, may be because of physical and health conditions we observe a decrease in labor force participation, during early age due mainly to education, labor force participation is lower.

To isolate the effect of education on labor force participation after controlling other determinants, we use an econometric model. The next section will develop our logit model and analyze the effect of education level on female labor force participation.

4.2 Discussion of econometric results

The logit model helps to investigate the effect of the education level and years of schooling on the female labor force participation status controlling for other control variables. As the interpretation of logit regression results (coefficients) only show the direction of effect, the marginal effects are used to analyze the empirical results. The marginal effects calculated at the mean values of the variables are presented in Table 2 and Table 3. A partial model that captures only education and literacy effect on the probability of a woman participating in labor force is presented in the first three columns (1, 2, and 3) for pooled, rural, and urban samples respectively. In columns 4, 5, and 6 we add control variables to education as complete

model. However, our interpretations focus on the full model. For dummy variables, marginal effect shows the change in probability when dummy variable changes from 0 to 1.

Table 2 results reveal significant negative effect of educational level on female labor force participation. This result contradicts the theoretical argument that the higher the level of education the more likely an individual is expected to participate in the labor force. Females with primary, post-primary, secondary and higher are less likely to participate in labor force compared with their counterparts with no education. The magnitude of the marginal effect is higher for post-primary. Indeed, a female with post-primary has 11.3% lower probability of being in labor force compared to a female with no education and the effect is higher in urban (11.2%) than rural area (9.8%). Also, results show that primary level only significantly lowers the probability of being in labor force in rural area (-0.044).

Table 3 results show that education represented by years of schooling negatively affects female labor force participation. Female labor force participation is likely to decrease with years of schooling. Indeed, a year of schooling reduces the chance of participation in labor force by about 3%. However, years of schooling squared has a positive and significant coefficient, showing that beyond a certain year of schooling female have higher chances of participating in labor force even the magnitude is low. Considering area of residence, results reveal that the effect of years of schooling only matters for urban female and literacy for rural female. Then, these results contradict those of Sackey (2005), Ackah et al. (2009), and Baah-Boateng et al. (2013) in Ghana, Nagac and Nuhu (2016), Olowa and Adeoti (2014) in Nigeria, Yakubu (2010) in South Africa. These authors found that education has a positive impact on female participation. Ackah et al. (2009) suggested that primary education and above increase the participation in labor force than no education.

These results might not be surprising in Burkina Faso due to the lack of adequacy between education and employment opportunities. Also, sometimes more educated people job preferences do not meet available jobs, and this results in higher unemployment among most educated and an underemployment particularly for youth. Further, a large proportion of young individuals stop going to school very early to enter into the labor force. In addition, the country counts 80% of active population in agriculture as unskilled workers. Moreover, an earlier study corroborates our results. Indeed, Kuepie et al. (2006) observed in seven West African countries (including Burkina Faso) that unemployment rates are higher among individuals (20% to 21%) with completed primary to secondary education, and lower (14.6%) for individuals without minimum level of education. Moreover, the authors suggested that the unemployment rate drops slightly among individuals who have completed at least a year of higher education. However, globally literacy has a positive effect on labor force participation. Results show that a literate female has 3.4% higher probability of being in labor force and thus effect is higher and only significant for rural female (0.040).. This result might be explained by the fact that literacy programs help to empower beneficiaries and provide them with skills to initiate self-entrepreneurship and income generating projects. This in turn increases individuals' participation in labor force and paid work.

Effect of key control variables on female labor force participation

Further, considering the socio-economic variables effects, results suggest that age, marital status, urban residency, religion, ethnic, and households characteristics (wealth, size, head gender) significantly affect female labor force participation. Age groups results suggest that young and adults are more likely to participate in labor force relative to the old with the magnitude of the probability being higher for adults

(40-49 age) than younger (20-29 age). However, a female in the group of 50 years and above has 10.4% lower probability of being in labor force and the effect is higher in urban area. Also, results indicated that a female in the reproductive age (15-49 age) has lower probability of being in labor force than their counterparts older and the effect is higher for a female in urban area. Indeed, a female in reproductive age has 19.7% lower probability of being in labor force and this probability is higher for females in urban area. Indeed, a female in urban area has 33.5% lower probability of being in labor force compared to 9.1% for female in rural area This result is not surprising as nowadays with educational reform which support female education, females in their early age 15-19 years are not willing to work. For elders the low participation is due to physical and health conditions. These results are in line with Njang Che and Sundjo (2018), Baah-Boateng et al. (2013), Ejaz (2007) who found that labor force participation increases with age.

. Married women relative to unmarried are more likely to participate in labor force with higher magnitude for rural female. This result corroborates Ejaz (2007) and Ahmad and Fatima (2011) in Pakistan. Married women in the rural area tend to live in household with many people to assist with homework, thus increasing their opportunity to be in labor force than their counterparts in urban. In terms of religion, Christian and Muslim women relative to other religions are found to have a smaller probability of participating in the labor force. Further Muslims are twice less likely to participate than Christians and the effect is only significant in rural sample. Similarly, Njang Che and Sundjo (2018) found in Cameroon that Muslim female are less likely to work. This result may be evident since the Muslim customs and tradition in certain often hinders their women from participating in labor force as a female place is the house taking care of children and husband. Results indicate that ethnicity has a positive effect on labor force participation. Indeed, a female belonging to Mossi increases the probability of being in labor force compared to other ethnics. Even small, the effect is only significant for female in the urban area.

Further, results show that the number of children under age 6 in household has no significant effect on labor force participation. This is due to the fact in our sample, the average number of under age 6 in households is low (1.78) to have effect on female participation. This result contradicts Ejaz (2007) and Njang Che and Sundjo (2018). While Ejaz (2007) suggests that number of children in the household reduce the probability of being in labor force, Njang Che and Sundjo (2018) found that the number of under-fives matters in Cameroon. Even magnitude is low, household size reduces the probability of being on labor force. Indeed, females in higher household size are only 0.7% less likely to participate in labor force than their counterparts. This result is confirmed with Cheema et al. (2021) in Pakistan who found that household size reduced the chances of being on labor force.

Table 2 results indicate that a female in a poor household has lower probability of being in labor force with a higher magnitude in the rural area. A female in poor household is 11% and 4% less likely of participating in the labor force in rural and urban areas respectively. The unexpected result can be explained by the fact that poor households tend to lack basic literacy and skills, and this limits their opportunity on labor force. This result contradicts Gross and Frempong (2021) who found that being in a wealthier household reduced female labor force participation in Ghana. A female with male as household head is less likely to participate in labor force compared to her counterpart with female head with higher magnitude in rural area (-0.240). Educated household head reduces the probability of being in labor force for only rural women.

Robustness check

As robustness check, we estimate the effect of education and literacy on female labor force participation by using two different measures of labor force, the current labor force status versus the past labor force participation. Table A3 revealed a similar trend of education effect with slight differences in magnitude. If the trend for some covariates is the same with current labor force, for other the trend is in line with the past measure. For example, while post-primary and secondary school lower the probability of being in labor force, tertiary education reduces this probability for the past labor force status in urban area.

5 Conclusion and Policy Implications

While there were improvements in female education, women labor force participation declined considerably. Using binary logit model, the study analyzed the effect of education on female labor force participation controlling for other socio-demographic factors. The results revealed negative relationship between education level, years of schooling and female labor force participation. However, the years of schooling square show a threshold effect meaning that female with higher education are likely to profit from education. Further, results show that literacy matters than formal education as a literate female is more able to participate in labor force. When considering the socio-economic variables, results suggest that age, marital status, urban residency, religion, ethnic, and households' size, wealth status, male headed significantly affect female labor force participation. Age is found affecting labor force participation following an inverse "U shaped" relationship. Moreover, reproductive age (15-49 years) reduces female labor force participation. Further results suggest that while Mossi ethnic ethnicity has a positive effect, religion (Muslim and Christian), and household size, negatively affect female labor force participation. Moreover, female living in a poor household are less likely to participate in labor force.

Although education level (with primary, post-primary and secondary & higher level) and years of schooling have negative effect on labor force participation, it is important for policy makers to ensure the sustainability of the gains of female education obtained so far. Meanwhile, policies aimed at promoting job opportunities for females can have implication for improving labor force participation. Further, the positive effect of literacy suggests the importance of the writing and reading skills in labor force participation, and thus improving access and quality of education will enhance female job opportunities. The findings of this study highlight the necessity for the country of having a linkage between educational system and labor market opportunities. There is the need to invest in education and training to improve the job-matching processes. Therefore, more young girls will be able to further their education, enhance skills to allow their efficient participation in labor force, and in turn get better jobs opportunities in the future.

Table 1: Descriptive statistic of variables

Variable	Obs.	Mean	Std. dev.	Min	Max	Definition
Dependent variables						
Labor force (7days)	12,537	0.54	0.498	0	1	1=women in labor force only the past 7 days
Labor force (12 months)	12,537	0.52	0.499	0	1	1=women in labor force only the past 12 months
Labor force (combined)	12,537	0.58	0.494	0	1	1=women in labor force the past 7 days or 12 months
Education						
No Education	12,537	0.67	0.472	0	1	1=women have no formal education
Primary	12,537	0.12	0.319	0	1	1=women have primary level; 0=otherwise
Post-Primary	12,537	0.16	0.368	0	1	1=women have post-primary level; 0=otherwise
Secondary &Tertiary	12,537	0.06	0.234	0	1	1=women have secondary or tertiary level; 0=otherwise
Years of schooling	12,537	3.087	4.620	0	21	Number of years of schooling completed
Literate	12,537	0.54	0.498	0	1	1= women can read and write in any language
Socio-economic variables						
Age	12,537	33.05	13.455	15	65	Women age in years
Reproductive age	12,537	0.85	0.356	0	1	1 = women are in reproductive age 15-49 years
Age group						
Age15-19	12,537	0.25	0.436	0	1	1=women belong to 15-19 years
Age20-29	12,537	0.29	0.452	0	1	1=women belong to 20-29 years
Age30-39	12,537	0.19	0.395	0	1	1=women belong to 30-39 years
Age40-49	12,537	0.13	0.339	0	1	1=women belong to 40-49 years
Age50+	12,537	0.13	0.34	0	1	1=women age above 50 years
Residence	12,537	0.42	0.494	0	1	1 = women live in urban area; 0 =in rural
Marital status	12,537	0.70	0.46	0	1	1=married; 0=unmarried (married included in union)
Religion						
Muslim	12,537	0.62	0.484	0	1	1= women are Muslim; 0=otherwise
Christian	12,537	0.30	0.457	0	1	1= women are Christian; 0=otherwise
Traditional religion	12,537	0.08	0.271	0	1	1= women are animist; 0=otherwise
Ethnicity (other ethnics as reference)						
Mossi	12,486	0.50	0.5	0	1	1=women are “Mossi”
Gourmatche	12,486	0.06	0.234	0	1	1=women are “Gourmatche”
Peulh	12,486	0.08	0.278	0	1	1=women are “Peulh”
Bobo	12,486	0.04	0.184	0	1	1=women are “Bobo”
Senoufo	12,486	0.04	0.198	0	1	1=women are “Senoufo”
Child under 6	12,537	0.74	0.439	0	1	1=presence of child under age 6 in household
Children	12,537	1.73	1.827	0	14	Number of children under age 6 in household
Wealth status	12,537	0.36	0.481	0	1	1=household is poor; 0= household in non poor
Head gender	12,537	0.86	0.343	0	1	1= household head is male; 0=head is female
Household size	12,537	8.83	5.733	1	51	Number of household members
Head education	12,537	0.26	0.44	0	1	1=head has at least primary level; 0=no education
Head job sector	11,447	0.63	0.482	0	1	1 = head of household is working is agriculture

Source: Author from EHCVM (2018)

Table 2: Marginal effects of Logit Regression (Pooled sample), by Locality (Urban vs Rural)

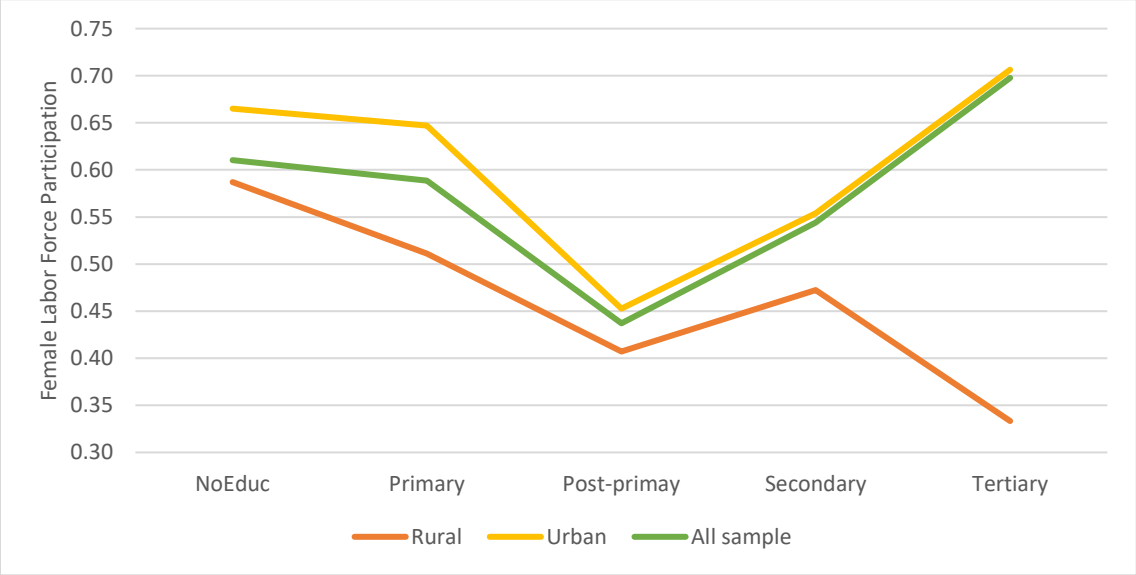
	Partial model			Full model		
	Pooled	**Rural**	**Urban**	**Pooled**	**Rural**	**Urban**
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Education (No education as reference)						
Primary school	-0.054***	-0.104***	-0.033	-0.009	-0.044*	0.008
	(0.015)	(0.022)	(0.020)	(0.017)	(0.025)	(0.024)
Post-primary	-0.212***	-0.214***	-0.232***	-0.113***	-0.098***	-0.112***
	(0.014)	(0.021)	(0.019)	(0.017)	(0.027)	(0.023)
Secondary & tertiary	-0.078***	-0.156***	-0.101***	-0.048***	-0.057	-0.047*
	(0.022)	(0.059)	(0.025)	(0.023)	(0.066)	(0.029)
Literate	0.058***	0.048***	0.037*	0.033***	0.040***	0.019
	(0.011)	(0.014)	(0.019)	(0.012)	(0.015)	(0.021)
Age group (age 15-19 as reference)						
Age20-29				0.069***	0.016	0.143***
				(0.014)	(0.019)	(0.020)
Age30-39				0.182***	0.076***	0.320***
				(0.014)	(0.020)	(0.020)
Age40-49				0.196***	0.115***	0.306***
				(0.016)	(0.021)	(0.023)
Age50+				-0.104***	-0.042	-0.238***
				(0.039)	(0.048)	(0.067)
Married				0.158***	0.170***	0.135***
				(0.013)	(0.018)	(0.018)
Reproductive age				-0.197***	-0.091**	-0.335***
				(0.032)	(0.044)	(0.041)
Urban				0.032***		
				(0.011)		
Religion (other religion as reference)						
Muslim				-0.074***	-0.091***	0.016
				(0.017)	(0.019)	(0.045)
Christian				-0.033*	-0.046**	0.040
				(0.018)	(0.021)	(0.045)
Mossi				0.020**	0.012	0.028*
				(0.009)	(0.012)	(0.014)
Number of children				0.002	0.005	-0.006
				(0.004)	(0.004)	(0.008)
Head is male				-0.174***	-0.240***	-0.124***
				(0.015)	(0.025)	(0.020)
Household size				-0.007***	-0.006***	-0.009***
				(0.001)	(0.001)	(0.002)
Poor				-0.089***	-0.107***	-0.040**
				(0.011)	(0.013)	(0.020)
Head is educated				-0.011	-0.056***	0.021
				(0.012)	(0.018)	(0.016)
Log likelihood	-8420.455	-4922.667	-3464.155	-7913.280	-4692.655	-3146.807
Pseudo-R^2	0.0139	0.0103	0.0259	0.0733	0.0566	0.1152
Observations	12,537	7,257	5,280	12,537	7,257	5,280

Source: Author from EHCVM (2018); Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 3: Logit marginal effects of years of schooling on female labor force participation

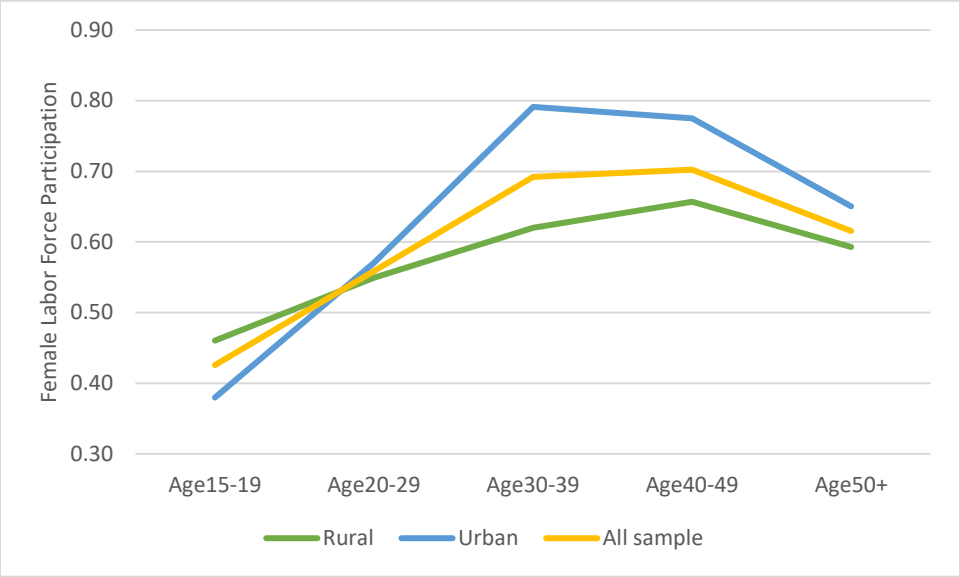
	Partial model			Full model		
Variables	**Pooled**	**Rural**	**Urban**	**Pooled**	**Rural**	**Urban**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Years of schooling	-0.0327***	-0.0216***	-0.0364***	-0.0137***	-0.0097	-0.0150***
	(0.0037)	(0.0075)	(0.0047)	(0.0041)	(0.0079)	(0.00542)
Years squared	0.0016***	0.0002	0.0018***	0.0005*	0.0001	0.0007*
	(0.0003)	(0.0007)	(0.0003)	(0.0003)	(0.0007)	(0.0003)
Literate	0.0619***	0.0483***	0.0442**	0.0361***	0.0405***	0.0243
	(0.0113)	(0.0143)	(0.0196)	(0.0122)	(0.0150)	(0.0215)
Controls						
Age group	No	No	No	Yes	Yes	Yes
Female characteristics	No	No	No	Yes	Yes	Yes
Household characteristics	No	No	No	Yes	Yes	Yes
Log likelihood	-8456.4189	-4924.9785	-3497.0688	-7927.2041	-4693.3106	-2671.531
Pseudo-R^2	0.0096	0.0099	0.0167	0.0716	0.0564	0.1504
Observations	12,537	7,257	5,280	12,537	7,257	5,280

Figure 1: Female Labor Force Participation and Education



Source: Author from EHCVM (2018/2019)

Figure 2: Female Labor Force Participation and Age



Source: Author from EHCVM (2018/2019)

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Appendix

Table A1: Labor force participation, type of work, education and gender

	Male (1)	Female (2)	Difference (1)-(2)
Panel A: Labor force participation			
Labor force (7 days)	0.722	0.54	0.182***
Labor force (12 months)	0.703	0.51	0.190***
Labor force (combined)	0.758	0.577	0.181***
Panel B: Type of work			
Unpaid work (self & family work	0.347	0.332	0.0147*
Paid work (self & government)	0.211	0.172	0.0388***
Family unpaid work	0.153	0.157	-0.00431
Self-employment	0.321	0.291	0.0302***
Panel C: Education level			
Completed years of schooling	4.454	3.087	1.368***
No education	0.527	0.665	-0.138***
Primary	0.174	0.114	0.060***
Post-primary	0.186	0.161	0.024***
Secondary & higher	0.111	0.058	0.053***
Observations	10,402	12,537	22,939

Source: Author from EHCVM (2018); * $p<0.05$, *** $p<0.001$

Table A2: Descriptive statistic by labor force participation measure and residency

Variables	Not participate	Participate	Rural	Urban
Labor force participation	0	1	0.56	0.60
Labor force past 7 days	0	0.935	0.51	0.58
Labor force past 12 months	0	0.906	0.52	0.52
No Education	0.614	0.703	0.81	0.47
Primary Education	0.112	0.117	0.09	0.16
Post-primary education	0.215	0.122	0.10	0.25
Secondary & higher	0.059	0.057	0.01	0.12
Literate	0.558	0.535	0.40	0.74
Years of schooling	3.6	2.7	1.6	5.1
Reproductive age (15-49 years)	0.867	0.839	0.84	0.86
Age (in years)	30.17	35.15	33.60	32.28
Age15-19	0.346	0.188	0.25	0.26
Age20-29	0.298	0.276	0.28	0.30
Age30-39	0.141	0.233	0.19	0.19
Age40-49	0.093	0.161	0.14	0.12
Age50	0.121	0.142	0.14	0.13
Residence (urban)	0.400	0.437		
Marital status (married)	0.608	0.759	0.76	0.60
Muslim	0.650	0.604	0.63	0.62
Christian	0.277	0.311	0.26	0.35
Ethnic (Mossi)	0.496	0.503	0.48	0.53
Presence of under 6 age	0.763	0.724	0.80	0.66
Number of under 6 age	1.91	1.60	2.12	1.18
Wealth status (poor)	0.419	0.322	0.49	0.19
Head gender (male)	0.902	0.836	0.91	0.81
Household size	9.68	8.20	9.78	7.52
Head educated	0.257	0.267	0.13	0.45
Observations	**5,297**	**7,240**	**7,257**	**5,280**

Source: Author from EHCVM (2018)

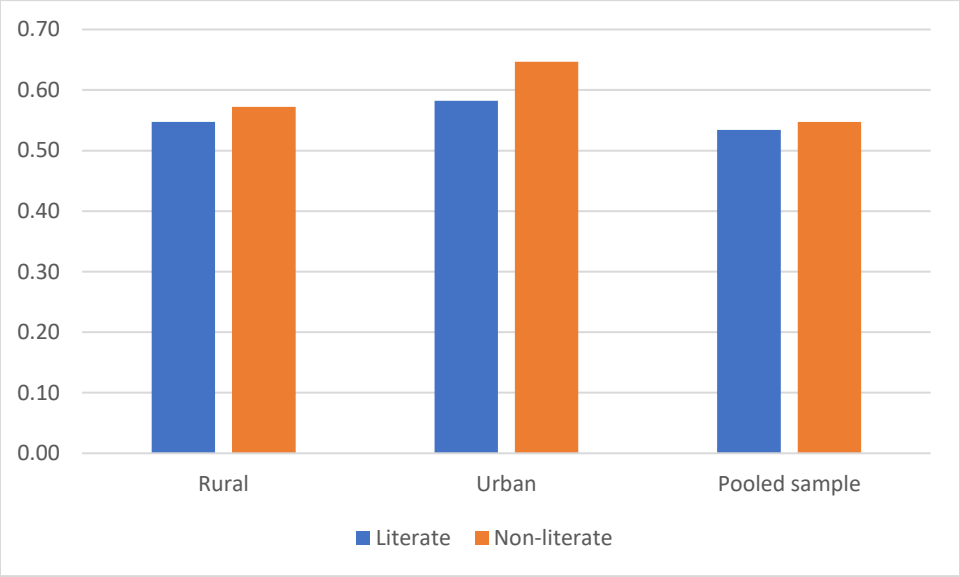
Table A3: Logit marginal effects of covariates on female labor force participation by type of labor force measurement

	Pooled sample		Rural		Urban	
Variables	**7 days**	**12 months**	**7 days**	**12 months**	**7 days**	**12 months**
Education (No education as reference)						
Primary school	0.004	-0.004	-0.028	-0.042*	0.025	0.015
	(0.017)	(0.017)	(0.025)	(0.025)	(0.024)	(0.025)
Post-primary	-0.129***	-0.126***	-0.137***	-0.118***	-0.110***	-0.120***
	(0.017)	(0.017)	(0.027)	(0.027)	(0.023)	(0.024)
Secondary & higher	-0.076***	-0.096***	-0.141**	-0.048	-0.057**	-0.09***
	(0.024)	(0.024)	(0.063)	(0.068)	(0.029)	(0.029)
Literate	0.024**	0.024*	0.032**	0.037**	0.012	-0.005
	(0.012)	(0.012)	(0.015)	(0.015)	(0.021)	(0.021)
Age group (age 15-19 as reference)						
Age20-29	0.083***	0.047***	0.032	0.008	0.152***	0.112***
	(0.014)	(0.014)	(0.019)	(0.019)	(0.020)	(0.021)
Age30-39	0.196***	0.187***	0.093***	0.078***	0.330***	0.343***
	(0.015)	(0.015)	(0.021)	(0.021)	(0.021)	(0.022)
Age40-49	0.200***	0.200***	0.114***	0.111***	0.317***	0.333***
	(0.016)	(0.016)	(0.022)	(0.022)	(0.024)	(0.025)
Age50+	-0.110***	-0.122***	-0.059	-0.059	-0.214***	-0.239***
	(0.037)	(0.037)	(0.047)	(0.047)	(0.063)	(0.054)
Reproductive age	-0.222***	-0.243***	-0.130***	-0.124***	-0.332***	-0.419***
	(0.033)	(0.033)	(0.045)	(0.045)	(0.043)	(0.044)
Married	0.168***	0.176***	0.175***	0.172***	0.140***	0.170***
	(0.013)	(0.013)	(0.018)	(0.018)	(0.018)	(0.019)
Urban	0.062***	0.006				
	(0.011)	(0.011)				
Religion (other religion as reference						
Muslim	-0.073***	-0.084***	-0.089***	-0.0950***	0.001	-0.008
	(0.017)	(0.018)	(0.019)	(0.0197)	(0.045)	(0.045)
Christian	-0.034*	-0.054***	-0.035	-0.0659***	0.011	0.011
	(0.019)	(0.019)	(0.022)	(0.0221)	(0.046)	(0.046)
Mossi	0.019**	0.046***	0.015	0.0301**	0.021	0.068***
	(0.009)	(0.009)	(0.012)	(0.0127)	(0.014)	(0.015)
Number of children	-0.004	-0.001	-0.006	0.00314	-0.003	-0.017**
	(0.004)	(0.004)	(0.005)	(0.005)	(0.008)	(0.008)
Head is male	-0.192***	-0.178***	-0.260***	-0.253***	-0.134***	-0.128***
	(0.015)	(0.015)	(0.024)	(0.024)	(0.020)	(0.021)
Household size	-0.006***	-0.008***	-0.002	-0.007***	-0.011***	-0.009***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Poor	-0.127***	-0.071***	-0.150***	-0.088***	-0.070***	-0.020
	(0.011)	(0.011)	(0.013)	(0.013)	(0.020)	(0.021)
Head is educated	-0.002	-0.009	-0.037*	-0.060***	0.020	0.029*
	(0.012)	(0.012)	(0.019)	(0.018)	(0.017)	(0.017)
Log likelihood	-7916.725	-7979.178	-4687.684	-4720.193	-3161.904	-2671.531
Pseudo-R^2	0.0847	0.0804	0.0678	0.0602	0.1190	0.1504
Observations	12,537	12,537	7,257	7,257	5,280	5,280

Source: Author from EHCVM (2018)

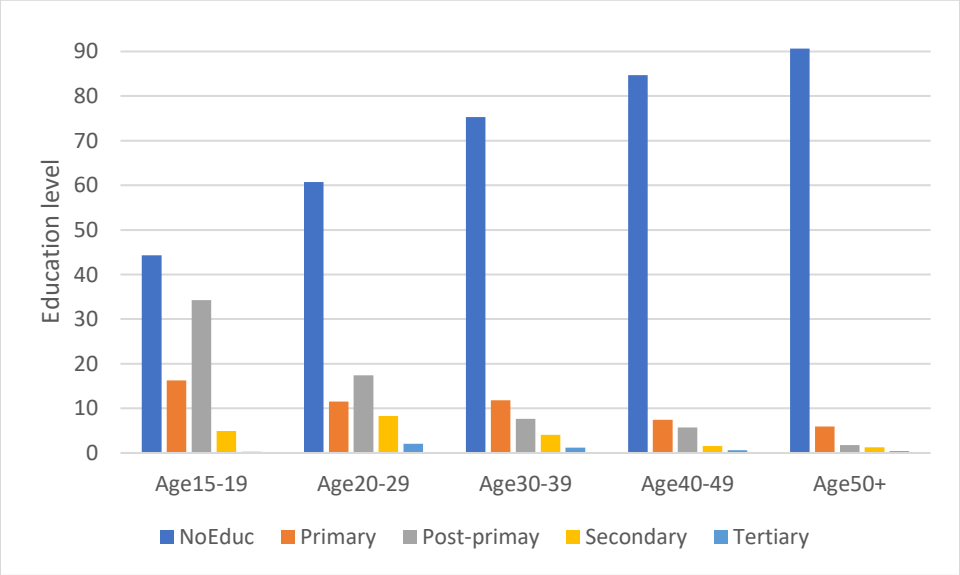
Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Figure A1: Female Labor Force Participation and Literacy



Source: Author from EHCVM (2018)

Figure A2: Female Age and Education attainment



Source: Author from EHCVM (2018)