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Article

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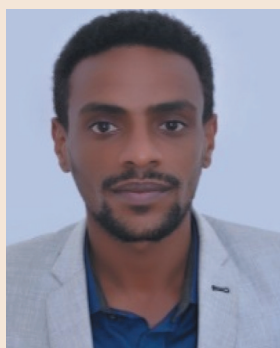
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GENERAL & APPLIED ECONOMICS | RESEARCH ARTICLE

The role and determinants of women labor force participation for household poverty reduction in Debre Birhan town, North Shewa zone, Ethiopia

Girma Mulugeta^{1*}

Abstract: Women participation in economic activities plays a critical role in driving economic development throughout the world. This study aims to analyze the role and determinants of women's labor force participation for reducing household poverty in the case of Debre Birhan town. To carry out this, the study used a cross-sectional study design. The data was collected by distributing questionnaires to a total of 291 sample households using multi-stage sampling technique. Logistic regression model was employed to analyze the determinants of women labor force participation by the collected data. The binary logit regression result identified that training, exposed to mass media and access to credit and education status of woman were found to be positive and significantly related to the probability of being participate. Moreover, Logistic regression model was employed in order to analyze the effect of woman labor force participation to household poverty reduction, with the probability of a household being poor as a dependent variable and a set of demographic and socioeconomic variables as the explanatory parameters. Based on this, out of the 291 surveyed household heads, 183(62.89%) of them were found poor. The result of this study confirms that women's participation reduces the household poverty. Therefore, this study recommends that household uses family planning, promotes woman to attend higher education, exposed to mass media, creating public or private daycare centers for child and access to credit for woman. At this juncture both the households and the government should have the joint effort and responsibility to find possible panaceas.



Girma Mulugeta

ABOUT THE AUTHOR

Girma Mulugeta Emeru completed his First Degree in Economics from Debre Berhan University and Master's Degree in Developmental economics from Hawassa University. He has been teaching at Debre Berhan University as a lecturer Economics of the last 6 years. He is interested in regional development, labor economics, and international trade research. He has been doing research on "Livelihood diversification strategies for urban development in North Shewa Zone, Ethiopia".

PUBLIC INTEREST STATEMENT

Currently, women unemployment is one of the major problems of many developing countries including Ethiopia. This paper examines the determinants of woman labor force participation and its effect to reduce household poverty in the Debre Birhan town. The results of this study have revealed that the training, exposed to mass media and access to credit and education status of woman were found to be positive and significantly related to the probability of being participate. The findings or results obtained from this research can impact the policy making, monitoring and evaluation activities of the government and different concerned agencies.

Subjects: Economics; Labour Economics; International Economics; Development Economics

Keywords: Women; labor participation; poverty; determinants; Debre birhan town

1. Introduction

Women participation in economic activities plays a critical role in driving economic development throughout the world. Empowering women economically can lift entire families and communities out of poverty. Worldwide experience shows that women's have a role in bringing economic growth, food security, family wealth, reduction of poverty FAO (2011) as cited in Dessie (2014).

Poverty is one of the most serious problems of human deprivation. As of today, poverty is an issue of global concern affecting people all over the world (World Bank, 2015). In developing economies, women play an important role by contributing to reduce household Poverty through adding to the supply of labor for economic activities. Overall employment of women in economic activities has several beneficial effects for women and their families (Rahman, 2013).

In the world, over 4.5 billion of population are engaged in different economic activities among those women's are estimated as 1.5 billion; in addition to this women make up 40% of the world workforce in agriculture, Quarter in trade and third in service. This participation contributed to increase the productivity 20% in Africa, 50% in developed nations (Matandare, 2018)

In Africa, where subsistence farming is predominant and shifting cultivation remains important, nearly all tasks associated with subsistence food production are performed by women. Women are the primary laborers on small farmers where they contribute 2/3 or more of all hours of work on food production, processing and marketing are female responsibilities (Todaro, 2006).

In sub-Saharan Africa, female participation rates have increased by 3.2 percentage points over the last two decades. This increase could well be due to the absence of or insufficient alternative income from social protection and persistent poverty, not allowing the option of dropping out of work. Moreover, limited opportunities to further their education or training also compel more women to work (UN, 2011). In addition, persistent male unemployment often leads to an increase in female labor force participation, in order to compensate for lack of income, but such increases in the female labor supply are likely to be absorbed among own-account and contributing family workers (ILO, 2016).

According to the Ministry of Finance and Economic Development (MOFED, 2007) and the Central Statistical Authority, the total population of Ethiopia around 84.5 million, 45.6% are female. When we see their character, greater than 15 and less than 15 are 58% and 42%, respectively. Despite women's have a great role in each and every development aspect of the economy their impact not equally valued by men due to different social, cultural, religious, financial and legal barriers prevailing in the country. As a result the country's total output was undervalued; women's don't get what they should get in return to their progress from year to year, the story is true for Ethiopia.

Ethiopia remains one of the world's poorest countries in 2000, 55.3% of Ethiopians lived in extreme poverty; by 2011 this figure was 33.5%. The proportion of the population living below the poverty line of less than one dollar a day at purchasing power parity is estimated to be 2% in 2000, while 78% of the population lived on less than two dollars a day. The economy is predominantly agricultural, as the agricultural sector accounts for about 80% of employment, and about 50% of GDP (Mesfin, 2012).

Women are more likely to be employed in jobs of low quality, underemployed, working long hours for low wages, engaged in dangerous work or receive only short term and/or informal employment arrangements. The inadequate employment situation of women has led to poverty in the household and fall to fostering economic growth (ILO, 2016).

Over the last 20 years (1995–2015), the global female labor force participation rate has decreased from 52.4% to 49.6%. The corresponding figures for men are 79.9% and 76.1%, respectively. Accordingly, despite the slight drop in the percentage of both women and men in the labor force in 2015 compared to 1995, the gender gap in such participation has decreased slightly by 1 percentage point owing to the fact that women's labor force participation decreased to a lesser extent than that of men (Admasie, 2015).

According to Ethiopian labor force survey report, the unemployment rate of female and male at country level was 12.5% and 4.3%, respectively (Admasie, 2015). Similarly, the 2005 Ethiopian LFS reveal that an unemployment rate of female and male were 7.8% and 2.5%, respectively. According to the result of the two surveys, unemployment is more of a problem of women than that of men. This raises an interesting question about what are the determining factors of women's unemployment in Ethiopia (Admasie, 2015).

Women unemployment has an impact on family cohesion, level of poverty and results in different social problems like violence, prostitution, breakup of families and alcoholism due to hopelessness. It is accompanied by bad occupational prospects and impending economic deprivation, placing the wellbeing of a future family at risk (Schmitt, 2008).

Ethiopian women are involved in all aspects of society's life. Women are both productive and procreators and they are also active participants in social, political and economic activity of their communities. However, the varied and important roles they play have not always been recognized. The discriminatory political, economic and social rules and regulations prevailing in some part of the country have berried women from enjoying the fruits of their labor without equal opportunities, they have lagged behind men in all filed of self-advancement (Denu et al., 2005). In Ethiopia, unemployment rates have increased more for women than for men over the five years prior to 2004. The urban female women unemployment rate was 43.7% compared to 29.4% for urban male and women (Broussard & Tekleselassie, 2012).

Even though there are a number of studies have been conducted on the woman employment and poverty, as much as my knowledge is concerned there was no study that gives a complete picture of women's participation in economic activity could significantly reduce household poverty. For example, studies conducted by Rani, U., & Schmid, J. P. (2007) assessed the relationship between employment and poverty in India. Using probit model analysis, they specifically investigated the role of education level and status of employment on the poverty. However, the paper did not specify the role of women employment in the analysis that having working women could be one route to reduce the household poverty. Moreover, this study introduces a new methodological approach by employing logit model.

Other studies conducted by Kabeer and Mahmud (2004) assessed the relationship between globalization woman's employment and poverty in Bangladesh. They explored the idea of a woman's employment in the garment sector that is highly growing due to globalization in relation to household poverty reduction; however, they did not find conclusive evidence if woman's employment in the manufacturing industries could significantly reduce the poverty.

Similarly, in our country, study conducted by Mesfin (2012) studied the determinants of woman unemployment in Ethiopia, but he did not consider the effect of women's participation in the labor force to poverty reduction of a country.

In Debre Birhan town, the unemployment rate of female and male were 28% and 9.63%, respectively (DBTA, 2017). The fact displayed that the unemployment rate for women is higher than for men, implying that women are the most affected in the town. While these general facts are clear, the specific factors affecting woman labor force participation in the town have received little research attention. The determinants of woman labor force participation and its effect on

household poverty reduction in the town so far was not well assessed. In this stand, this study was conducted to examine the role and determinants of woman labor force participation for household poverty reduction. The results provide information for designing the relevant program and strategy for encouraging woman labor force participation in economic activity in the study area.

2. Materials and method

2.1. The study area description

The study was conducted in Debre Berhan, which is located in the North Shewa Zone of the Amhara Region, about 120 km north east of Addis Ababa on the paved highway to Dessie, the town has a latitude and longitude of 9°41'N 39°32'E. It was an early capital of Ethiopia and afterwards, with Ankober and Angolalla, was one of the capitals of the kingdom of Shewa (Figure 1). Today, it is the administrative center of the North Shewa Zone of the Amhara Regional State. The town is located along Ethiopian Highway 1, which connects Addis Abeba with the north of the country (DBTA, 2017).

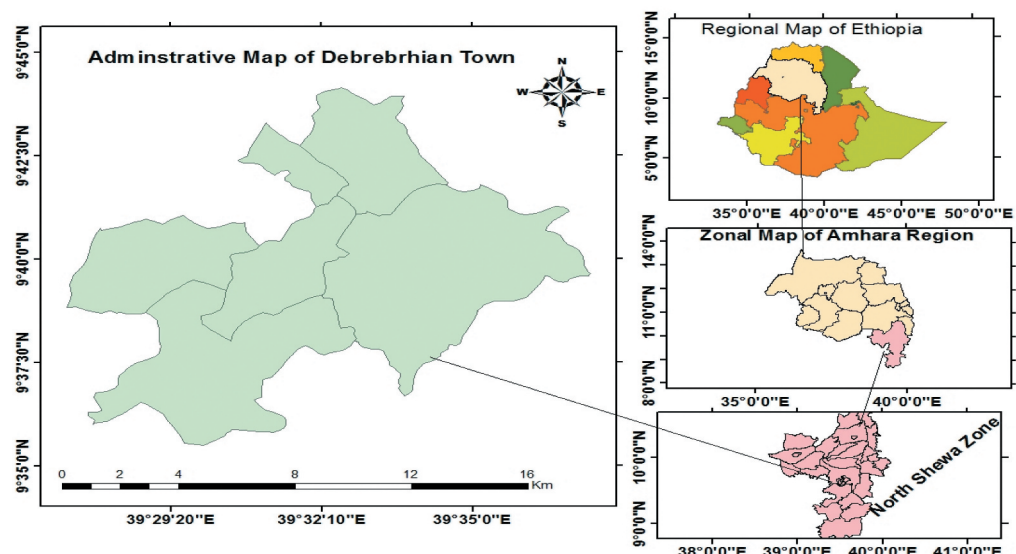
According to Debre Berhan Town Administration, the projected population of the city in 2015 is reach 84,944 people, out of this 41,248(48.6%) are males and 43,696(51.4%) are females. Out of the total number of the population of the city's administration, 38,588 people live in urban area, while the remaining 46,356 people live in the sub-urban area of the administration. Besides the potential water coverage of the city has reached 100% in urban area and 90% in rural area (DBTA, 2017)

The suitability of the town for investment is location advantage (near to Addis Abeba), better economic performance, good governance and other related issues. Since 2010–2015 fiscal year, 309 investors have invested in the town in different business sectors which create job opportunities for 8168 individuals. Investment in the town plays a great role in reducing unemployment and development of town (DBTA, 2017).

Debre Birhan has shown progress in socio-economic sectors in the last five years. According to DBM's (2015) report, new investments in manufacturing (38), construction (103), horticulture and dairy farming (27), tourism (hotels and restaurants) (88), education (16), and health (4) projects with a paid up capital of 1.5 billion birr were implemented by 276 investors (2006–2010). These investments opened employment opportunities for 6,897 persons. Besides, there are four government owned higher institutions such as Debre Birhan University, College of Teacher Education,

Figure 1. Geographical location of Debre Birhan town of north Shewa.

Source: GIS, Geography Department, Debre Birhan University (2018)



Technical and Vocational Training College, and College of Health Science; Blanket factory owned by joint venture were also contribute for the development of the town, particularly in creating employment opportunities for the people.

2.2. Research approach

The primary data was collected through questionnaires that were designed to provide statistical information on woman's education level, age of woman's, a number of children's, additional wage earner in the household, woman's exposure to mass media, household size, pregnancy of women, occupation of the household. For this, the unit of observation would be the household (defined as a group of persons eating and living together for more than six months of the year). Secondary data are collected from Debre Berhan city Administration, Finance & Economic Office, the Central Statistics Authority and other relevant documentary sources.

2.3. Sampling method and size

This study employed a multi-stage sampling procedure and appropriately allocate the sample to the strata of interest (Figure 2). The reasons of using stratified sampling technique are: it increases efficiency of estimates of overall population parameters by choice of strata that are homogeneous over the sampling units within each and to make the survey easier to administer operationally.

At the first stage, the town categorized into two categories based on their heterogeneous characteristics, namely high income and trading centers and low income and non-trading activity areas (DBTA, 2017). Hence, the samples were selected from each area using the proportional stratified sampling method. Based on the consideration of socio-economic activities (such as, trading centers and institutional area) of the areas, both high-income and low-income area divided into two stratum. In Stage two, two kebeles from high-income area and two kebeles from low-income area were selected by using stratified random sampling techniques. In the third stage, sample households were selected by using the Proportional Random Sampling method.

The determination of sample size is a common task for research. Inappropriate, inadequate, or excessive sample sizes continue to influence the quality and accuracy of research. In this study, the sample size is determined using a formula for continuous data given by (Cochran, 1977). The formula for calculating the sample size is,

$$n = \frac{(Z\alpha/2)^2 p * q}{(Mr)^2}$$

Z is confidence level; usually 95% of probability is taken as the known degrees of confidence for specifying the interval within which one may ascertain the existence of population parameters. Ninety-five percent confidence level means if an investigator takes 100 independent samples from the same population, then 95 out of the 100 samples were provided an estimate within the precision set by him. P is the degree of variability in the attributes being measured refers to the distribution of attributes in the population. The more heterogeneous a population, the larger the sample size required to be, to obtain a given level of precision and $q = 1-p$. Mr is the margin of permissible error between the estimated value and the population value. In other words, it is the measure of how close an estimate is to the actual characteristic in the population. According to Ethiopian National Planning commission (2016), the share of the population whose consumption (income) is below the poverty line (poverty incidence) in Ethiopia was 23.5% in 2016 fiscal year. Hence, let assume that the poverty incidence in the study area is 23.5% and $q = (1-P) = 0.765$. Level of significance to be 5% ($\alpha = 0.05$), $Z \alpha/2 = 1.96$ and marginal errors between the sample and population size to be 5% ($Mr = 0.05$)

$$\text{The sample size } n = \frac{(0.235)(0.765)(1.96)^2}{(0.05)^2} = 276$$

Finally, 10% of the sample size, which is 28, was added to the determined sample size 276 to compensate for none response rate. Thus, the required sample size for this study is 304.

2.4. Methods of data analysis

The data gained in the study were analyzed by employing logistic regression and descriptive data analysis technique with the help of stata version 14 software packages. The descriptive methods, the data result are organized in Table 1 by using percentage, graphs, and charts and by using mean, minimum and maximum. The analysis of this study was composed of two complementary parts. The first study identified the factors that affect woman labor force participation. Second, the study examined the effect of woman labor force participation in reducing household poverty by using logit modal in Stata Version 14.

2.5. Model specification

Economics model is precise in assessing the relationship between the explained and explanatory variables and predicts its significance. The policy implication of any study very much depends upon how close accurate is the specified model.

To examine the determinants of woman labor force participation and its effect on poverty reduction, the study was using logit modal. Logistic regression modeling approach is used when the response

Figure 2. Schematic presentation of sampling procedure.

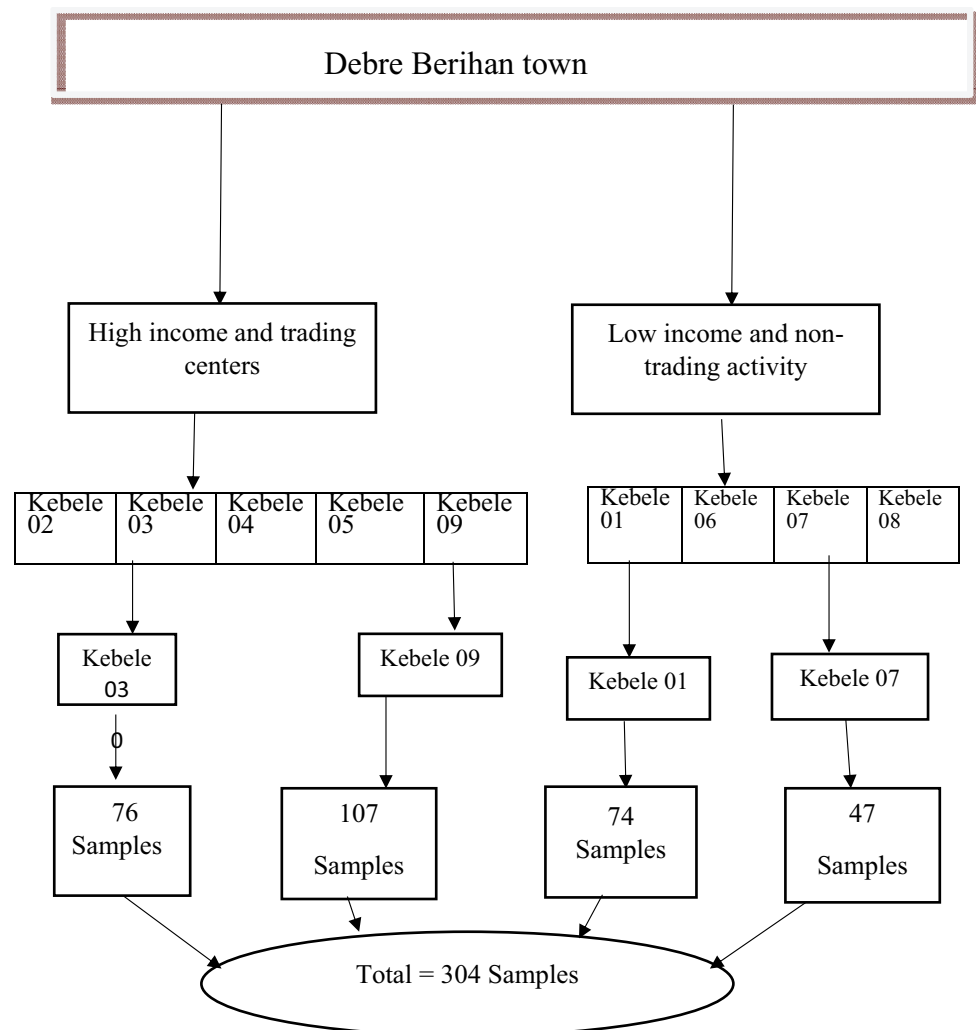


Table 1. Description of variables and expected sign rement and description of variables measurement

Variables	Definition	Type of variable	
Dependent Variables			
WPS	Woman labor force Participation	Binary	
POV	Poverty status of the household	Binary	
Independent Variables Definition Type of variable Expected sign			
WEDU	Woman education	Categorical	+
WAGE	Women's Age	Continuous	+
WMM	Exposure to any Mass Media	Categorical	+
WPEDU	Husband's Education Level	Categorical	–
WMS	Woman's marital status	Categorical	–
WTRAN	Training	Dummy	+
WAGEM	Age of Women at first marriage	Continuous	–
HHSIZE	Household Size	Continuous	–
PRCHILD	Presence of Child under 5 years of age	Dummy	–
SEXHHEAD	Sex of Head of Household	Dummy	+
PREGNANCY	Pregnancy Of Women	Dummy	–
hhincome	Household Income	Continuous	–
WACFS	Accesses to credit	Dummy	+
WMEM	Membership	Dummy	+
POV	Household Poverty	Dummy	–

variable is qualitative in nature or categorical and independent variables may be either continuous or categorical. Logistic regression allows one to predict a discrete outcome, such as group membership, from a set of predictor variables that may be continuous, discrete, dichotomous, or a mix of any of these (Gelman & Hill, 2006).

The logistic regression is preferred to multiple regression and discriminate analysis as it is mathematically flexible and easily used distribution and it requires fewer assumptions (Hosmer et al., 1997). Unlike discriminant analysis, the logistic regression does not have the requirements of the independent variables to be normally distributed, linearly related, nor equal variance within each group (Tabachnick et al., 2007) Binary logistic regression is a form of logistic regression which is used when the dependent variable is dichotomous and the independent variables are of any type (Hosmer, D. W., Hosmer, T., Le Cessie, S., & Lemeshow, S, 1997).

Logistic model, as compared to its competitor, the probit model, is less sensitive to outliers and easy to correct a bias. In instances where the independent variables are categorical or a mix of continuous and categorical, logistic analysis is preferred to discriminant analysis (Agresti, 2007).

The assumptions required for statistical tests in logistic regression are far less restrictive than those for ordinary least squares regression. There is no formal requirement for multivariate normality, homoscedasticity, or linearity of the independent variables within each category of the response variable. However, the assumptions that apply to the logistic regression model include: meaningful coding, inclusion of all relevant and exclusions of all irrelevant variables in the regression model and low error in the explanatory variables (Gujarati, D. N., & Porter, D. C., 1999).

In the terminology of logistic regression analysis the odds of a success are defined to be the ratio of the probability of a success to the probability of a failure.

Let, Y be an $n \times 1$ vector of response variable with $y_i = 1$ if the i^{th} Household poverty Status is below poverty line and $y_i = 0$ if the i^{th} household poverty status is above poverty line, X is an $n \times (k + 1)$ design matrix of explanatory variables, θ is a $(k + 1) \times 1$ vector of parameters. The data layout for X is given as follows.

$$X = \begin{Bmatrix} 1 & X_{11} & X_{12} & \dots & X_{1k} \\ 1 & X_{21} & X_{22} & \dots & X_{2k} \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ 1 & X_{n1} & X_{n2} & \dots & X_{nk} \end{Bmatrix}$$

X without the leading column of 1s, is termed as predictor data matrix.

Let the conditional probability that the outcome is present (probability of success) be given by:

$$\pi = \frac{P(Y=1) = \exp^{(0+1x_1+2x_2+\dots+kx_k)}}{1+\exp^{(0+1x_1+2x_2+\dots+kx_k)}} = \frac{\exp^{(X)}}{1+\exp^{(X)}} \dots \dots \dots (3.1)$$

Using (3.1), we obtain the odds of success as

$$\text{odds}(Y = 1) = \frac{\pi}{1-\pi} = \text{logit}(\pi) = \log_e^{(0+1x_1+2x_2+\dots+kx_k)} \dots \dots \dots (3.2)$$

In logistic regression analysis, it is assumed that the explanatory variables affect the response through a suitable transformation of the probability of the success. This transformation is a suitable link function of, and is called the logit-link, which is defined as:

$$\text{logit}(\pi) = \frac{\pi}{1-\pi} = \log_e^{(\theta_0 + \theta_{1x_1} + \theta_{2x_2} + \dots + \theta_{kx_k})} \dots \dots \dots (3.3)$$

The transformed variable, denoted by logit (π) is the log-odds and is related to the explanatory variables as:

$$\text{logit} = \eta(x) = \theta_0 + \theta_{1x_1} + \theta_{2x_2} + \dots + \theta_{kx_k} = X'\theta \dots \dots \dots (3.4)$$

Where $\theta = (\theta_0, \theta_1, \theta_2 \dots \theta_k)$ are the model parameters and $X = (X_0, X_1 \dots X_k)$ with $X_0 = 1$, are explanatory variables.

The above equations give suitable representations of the success probability, odds, and log-odds. Indeed, these representations facilitate interpretations of parameter estimates. The parameter refers to the effect of X_i on the log odds that $Y = 1$, controlling the other X 's in the model.

Let Y be the woman's participation status, if the i^{th} woman is among the participate category, $Y_i = 1$, otherwise $Y_i = 0$. Now let P_i be the probability that $Y_i = 1$ and $(1-P_i)$ is the probability that $Y_i = 0$. Supposed Y^* , a latent variable, is defined as

$$Y_i^* = \theta X_i + \Sigma_i$$

Where Y_i^* is the unobservable variable, which is estimated by the dummy variable Y , which takes a value equals 1 (thus Y_i^* exists); otherwise, 0 (thus Y_i^* does not exist); θ is the parameter to be estimated; X_i is the independent variable; and Σ_i is the unobserved error term. The binary logit regression measures the association between probability of being participate or not participating as a dependent variable and by including different independent variables.

2.6. Logistic regression model for the determinants of women labor force participation

$$WPS = \alpha + \theta_1 WAGE + \theta_2 WAGE2 + \theta_3 HHSIZE + \theta_4 WAGEM + \theta_5 WTRAN + \theta_6 WEDU + \theta_8 WMM + \theta_9 PRCHILD + \theta_{10} PREGNANCY + \theta_{11} WACFS + \theta_{12} WMM + \theta_{13} WEDU + \theta_{14} SEXHHEAD + \theta_{15} hhincome + \theta_{16} POV + \epsilon$$

To study the effect of woman labor force participation on reducing poverty, the study will take the dependent variable is household poverty status (1 = above poverty line; 0 otherwise).

$$2.7. POV = \alpha + \theta_1 WPS + \theta_2 WEDU + \theta_3 HHSIZE + \theta_4 SAXHHED + \theta_5 HOCCU + \theta_6 WACFS + \theta_7 EXPN + \theta_8 SAVING + \theta_9 ASSET + \epsilon$$

Household poverty is closely linked with demographic characteristics of the household, especially the family size, sex of the head of the household, age composition and literacy of the head of the household. Household size is prime demographic factor and it is generally positively related with the poverty status. He suggested that large family size is likely to put extra burden on a household's assets and resource (Chaudhry et al., 2006). According to Ajakaiye and Adeyeye (2002) summarized the determinants of poverty at the household level. These consist of age and education of different household members, number of income earners, household composition and size, assets owned by the household, access to basic social services, gender, ethnicity of head, location variable (rural or urban), sector of employment and remittances to household and so forth.

2.8. Description of variables and working hypothesis

The dependent variable of this study is Woman participation status (1 = Participate; 0 Not participate).

$$WPS = \begin{cases} 1 & \text{if the woman participate} \\ 0 & \text{otherwise} \end{cases}$$

Age of woman (WAGE): In this study, age is defined as the number of completed years of the respondents at the time of data collection. Different empirical analyses have pointed out that the probabilities of labor force participation of women differ by age. Literature shows that as age progresses women acquire experience in knowledge in work and as age increases participation in the labor force increases (Gobebo et al., 2017). In this regard, the assumption in this study is this variable taken as positively influences woman labor force participation.

Household size (HHSIZE): Household size refers to the total number of household members who are living and eating together for at least six months in a year. It is a continuous variable. Women unemployment is higher for those women with larger family size (Dessie, 2014; Gobebo et al., 2017). In this study, it is expected that family size affects woman labor force participation negatively.

Women Marital status (WMS): It is a Dummy variable, which refers to the marital status of woman and takes the value 0 for married, 1 Otherwise. A married woman has the burden of the domestic chores which limits their participation in the labor force; therefore, married woman is less likely to participate in economic activities (Naqvi et al., 2002) assert that being married is negatively associated with participation in both urban and rural areas, with a particularly large effect in urban areas. Separated and divorced women are also less likely to participate in rural areas, but not in urban areas. In both places, it seems less likely for widowed women entering the labor market. The assumption of this study is that the earnings of the husbands constitute non-labor income for those women, which reduces their likelihood of participating in the labor force. In this regard, this variable is expected to negatively influence woman labor force participation.

Woman's Age at the first Marriage (WAGEM): it is a continuous variable and expected that the earlier the women are married, the more likely they are not to be engaged in the labor force (Roy et al., 2017).

Training for Woman (WTRAN): Different studies suggest that giving training to women provides contextualized job knowledge and increases participation in paid work (Dessie, 2014). It is

a dummy variable taking value 1 if a woman says “Yes” 0 otherwise. In this study, it is expected that giving training to women increases the participation in the labor force.

Woman education (WEDU): Woman’s education is one of the basic factors for participation in the labor force. The achievement of lower education level reduces the chance of getting productive jobs (Iweagu et al., 2015). The participation rate of less educated woman tends to be lower than the participation rate of more educated woman in developing countries because their skills and competencies may not correspond to the demand of labor market (Faridi et al., 2009). Female education has long been an important factor for women empowerment. A number of empirical studies found that increases in female’s education could boost female wages. Empirical evidence also shows that increasing female education leads to the improvement of human development factors such as child’s health and education (Morrison & Morrison, 2007). In this study, education was ranked in this category, taking 0 for woman have no education, 1 for primary education, 2 for secondary 3 for TVET/ College and 4 for university and above. This study assumes that as the level of education increases, they are expected to have more exposure to the external environment and accumulated knowledge through learning than increasing participation into the labor force.

Exposure to any mass media (WMM): It is categorical variable, taking 0 if the woman has no exposure to any mass media, 1 less a week and 2 at least once a week. The highest percentage of woman’s unemployment was observed for woman who have no any exposure to mass media, as opposed to the lowest percentage of unemployment, which was recorded for a woman with an exposure of at least once a week (Mesfin, 2012). In this regard, women’s exposure to mass media have positively influences woman labor force participation.

Pregnancy (PREGNANCY): It is a dummy variable by taking 1 if a woman says” Yes”, 0 for No or Unsure. The pregnant woman in the household was less likely to participate as compared to non- or unsure pregnant woman in the household (Dessie, 2014). In this study, it is expected that the pregnancy of a woman negatively affects the participation of woman.

Woman’s Access to Credit (WACFS): Credit plays a significant role enhancing the woman participation in paid work being as a startup capital. It is seen that access to credit would have positive influences to women’s participation in paid work (Dessie, 2014). In this study, it is a dummy variable taking 1 if women get access to credit 0 otherwise. Thus, this study hypothesizes a positive association between credit access and participation.

Husband Income (hhincome): It is a continuous variable which affects woman labor force participation. According to different literatures, if higher amount of husband income that comes from higher reservation wage will have lower probabilities of woman participation (Iweagu et al., 2015). Thus, a negative sign on the coefficient for husband income is expected.

Membership in communities (WMAB): It is also a dummy variable taking 1 for member of a community-based institution such as “iddir”, “Ikkub”, “Mehaber” and another, and 0 for non-members. (Akpan, 2010) suggests that social institutions are an important means of perpetuating reciprocity of households in their macroeconomic life and increase negotiation power and political lobbying of members. In this study, it is hypothesized that there is a positive contribution to labor force participation.

Husband education level (WPEDU): It stands for the education level attained by the partner. They were ranked in this category, taking 0 for partners who have no education, 1 for primary education, 2 for secondary, 3 for TVET/College and 4 university and above. A woman who has a higher education husband has a higher income and a lower probability of participation in the labor force (Baah-Boateng, 2013). Thus, the negative sign on the coefficient of husband education and participation of woman in the labor force is expected.

Household Poverty (POV): In this study, household poverty is one of the variables that may affects the woman labor force participation. Poverty is dichotomous in nature, 1 when a household is below poverty line and 0 when a household is above poverty line (Yared, 2005).

Sex of the head (SEXHHEAD): Refers to the gender of the head of the household and takes the value 1 for Female is the head and 0 for Male. The study done by the researchers shows that the coefficient on the sex head of the household indicating that a woman is head of household to be positive and significant indicating higher likelihood of labor force participation (Dessie, 2014). In this regard, positive signs are expected.

3. RESULT AND DISCUSSIONS

3.1. Descriptive statistics

Table 2 shows that from the total sampled respondent's household's head only 18.04% of female headed households were participating in the labor force, while 91.96% of male headed households have participated in paid work. From the total number of female headed respondents included in the sample, 47.76% of them are not participating, from a comparable figure for male headed households is only 52.24%, respectively. The chi-square test shows that there is a sufficient or strong relationship between the sex of the head of the household and their participation, which is confirmed by the ($X^2 = 57.19$ and $P = 0.00$)

Another important characteristic assumed to have distinction to woman labor force is occupation of the head and education level of the head. This is because both education and occupation directly or indirectly affect the income earned by the individual of all household heads. The percentage of household head with no education, primary, secondary, TVET/College and University and above level of education with respect to their proportion of total sample households were 7.14%, 15.18%, 11.16%, 20.54% and 45.54%, respectively, of them women are participating in paid work. The chi-square test, it shows that there is a sufficient or strong relationship between woman's husband education level and their participation which is confirmed by the ($X^2 = 32.30$ and $P = 0.00$). This implies that woman's in the households with lower levels of education are more prone to unemployment compared to those households with higher level in the Debre Birhan town.

As far as the relationship between households main lines of occupation and woman labor force participation, the relative percentage of household heads who have an occupation of civil servant, Merchant, Farmer and pension with unemployed woman are 34.33%, 25.37%, 38.81% and 0.89%, respectively. The chi-square test, it shows that there is a sufficient or strong relationship between household occupation and their participation which is confirmed by the ($X^2 = 30.53$ and $P = 0.00$)

If we look sampled households, educational attainment in relation to their sex, the result shows that from sampled female household's head 4.81%, 4.13%, 3.78%, 1.03% and 3.43% of them don't have formal education, attained primary school, secondary school, TVET/college and university and above education, respectively. Also, the male headed households have 13.05%, 10.31%, 17.87% and 35.4% of them don't have formal education, attained primary school, secondary school, TVET/college and university and above education, respectively.

Table 3 shows that there is a correspondence between woman's labor force participation and poverty. The table shows that in the sample, 183 (62.89%) of the households are poor and 108 (37.11%) are not poor. In the sample of households, 83 (37.05%) households in which women who participated in the labor force fall above the poverty line. It also shows that 23.02% women did not participate while 76.98% of women participated. It is also seen from the result that 37.31% households in which women did not participate fall above the poverty line.

Table 2. Chi square test results association between household head characteristics and woman labor force participation

Households Characteristics	Woman Labor force Participation				Total		Chi square
	Participate		Not participate				
	Number	Percent	Number	Percent	Number	Percent	
Sex of head Male Of household Female Total	206	91.96	35	52.24	241	82.82	$\chi^2 = 57.19$ & P = 0.00
	18	18.04	32	47.76	50	17.18	
	224	100	67	100	291	100	
Women's Husband No Educ Education Level Primary Secondary TVET/collage University & above Total	16	7.14	16	23.88	32	11	$\chi^2 = 32.30$ P = 0.00
	34	15.18	16	23.88	50	17.18	
	20	11.61	15	22.39	41	14.09	
	46	20.54	9	11.43	55	18.90	
	102	45.54	11	16.42	113	38.83	
	224	100	67	100	291	100	
Household Occupation Civil ser Merchant Farmer Pensioner Total	136	60.71	23	34.33	159	54.64	$\chi^2 = 30.53$ & P = 0.00
	62	27.68	17	25.37	79	27.15	
	24	10.71	26	38.81	50	17.8	
	1	1.49	2	0.89	3	1.03	
	224	100	67	100	291	100	

Source: own survey and computation, 2018

Table 3. Women's participation status and poverty

Woman Participation Status		Poverty status		Total
		Non poor	Poor	
Not Participate Participate	Count	25	42	67
	% within Participation Status	37.31%	62.69%	100.0%
	% within poverty status	23.15%	22.95%	23.02%
	Count	83	141	224
	% within Participation Status	37.05%	62.95%	100.0%
	% within poverty status	76.85%	77.05%	76.98%
Total	Count	108	183	291
	% within Participation Status	37.11%	62.89%	100.0%
	% within poverty status	100.0%	100.0%	100.0%

Source: own survey and computation, 2018

3.2. Econometric analysis

In econometric analysis, the study applies a method of binary logistic regression techniques. For the purpose of effective estimation of the model several diagnostics tests were tested. For instance, multicollinearity test, heteroscedasticity and goodness-of-fit test were seriously conducted for binary logit model.

3.2.1. Binary logit estimation results

The model were incorporating 16 independent variables that are assumed to affect woman labor force participation. In Table 4.14, Pseudo R^2 of the model indicated that the improvement of the full model is 72.70% over the intercept model. The higher pseudo R -squared values for the full model compared to the intercept models indicate that the fitted full models better predict the outcome of the dependent variable. Prob>chi2 statistics show that the variables are jointly significant at 1% significant level.

According to Table 4, 16 of 8 variables are found statistically significant at 1% (woman's age at the first marriage, women's training, woman education level (secondary education), women's presence of child under 5 years of age, women's exposed to mass media (less a week), access to credit services, membership, Husband education level (TVET/College) and sex of head of household) and 6 variables (woman's age, age square, woman's education level (University and above), husband education level (University and above), Household Poverty Status) are found statistically significant at 5% level of significance. In addition, family size and Woman's marital status are found to be statistically significant at 10% level of significance; however, 2 variables (Pregnancy and household income) were found to be statistically insignificant.

Moreover, to see the sign of the variables women's age, the woman's age at the first marriage, women's education level and women's exposed to mass media, women's access to credit services, training and marital status have a positive sign, and they are directly related to the woman labor force participation. The negative sign variables that are inversely related to the probability of woman's being not participate in the labor force or presence of a child under 5 years of age, pregnancy, membership, Family size, sex of head of the household, husband's income, husband education and household poverty status.

Table 4. Logit estimation result for woman labor force participation status

Woman Participation Status	Coef.	St.Err	Z-value	p-value	EX(β)	dy/dx
Woman age (WAGE)	0.728	0.307	2.37	0.018**	2.07	.0329
Woman age square (WAGE2)	-0.009	0.004	-2.20	0.028**	.991	-.000
Household Size (HHSIZE)	-0.344	0.177	-1.95	0.052*	.708	-.0155
Woman Marital status (WMS)	1.253	0.688	1.82	0.069*	3.50	.0567
Age at first marriage (WAGEM)	0.380	0.104	3.64	0.000***	1.46	.017
Training (WTRAN)	3.213	1.079	2.98	0.003***	24.8	.1454
Woman's Education (WEDU)						
Primary Education	-1.344	0.909	-1.48	0.139	.260	-.0696
Secondary Education	-2.878	0.926	-3.11	0.002***	.056	-.1594
TVET/Collage	1.189	0.803	1.48	0.139	3.28	.0607
University and Above	2.511	1.110	2.26	0.024**	12.31	.1244
Exposure Mass media (WMM)						
Less a Week	2.748	0.588	4.67	0.000***	15.61	.1248
At least Once a week	2.128	0.821	2.59	0.010**	8.40	.0985
Presence of child (PRCHILD)	-1.694	0.585	-2.89	0.004***	.183	-.0766
Pregnancy (PREGNANCY)	-0.269	0.759	-0.35	0.723	.763	-.0121
Access to credit (WACFS)	5.476	1.268	4.32	0.000***	238.9	.2479
Membership (WMEM)	-1.860	0.646	-2.88	0.004***	.155	-.0841
Husband Education (WPEDU)						

(Continued)

Table 4. (Continued)

Woman Participation Status	Coef.	St.Err	Z-value	p-value	EX(β)	dy/dx
Primary	-0.089	0.891	-0.10	0.920	.914	-.0037
Secondary	-0.925	0.943	-0.98	0.327	.396	-.0383
TVET/Collage	-3.008	1.141	-2.63	0.008***	.049	-1215
University and above	-2.772	1.256	-2.21	0.027**	.062	-1122
Sex of head (SEXHEAD)	-2.592	0.694	-3.74	0.000***	.0748	-1173
Household Income (hhincome)	0.000	0.000	-0.13	0.900	.999	-1.46e-06
Household Poverty Status (Pov)	-1.467	0.672	-2.19	0.029**	.230	-0664
Constant	-17.565	6.406	-2.74	0.006***	2.35e08	
Mean dependent var	0.770	SD dependent var			0.422	
Pseudo r-squared	0.727	Number of obs			291.000	
Wald chi2(23)	88.618	Prob > chi2			0.000	
Akaike crit. (AIC)	133.718	Bayesian crit. (BIC)			221.878	
Robust standard errors in parentheses						
*** p < 0.01, ** p < 0.05, * p < 0.1						

4. Effect of woman labor force participation to household poverty reduction

Table 5 shows that pseudo R^2 of the model is 0.135, which indicated that the improvement of the full model is 13.5% over the intercept model. A full model provides a better fit than the intercept model. Prob>chi2 statistics show that the variables are jointly significant at 1% significant level. In this model, woman participation status, access to credit, household income, woman's wage, household saving were negatively and significantly related to the probability of being poor. On the other hand, household expenditure was positively and significantly related to the probability of being poor. Poverty rates are higher in households in which the woman doesn't participate in paid work.

5. Conclusion and recommendation

This paper analyzes the determinants of women's labor force participation and its effect on poverty reduction in Debre Birhan town, North Shewa zone, Amhara national regional state. The survey is cross sectional and largely uses primary data obtained through conducting a household survey. In order to assess the determinant factors of woman labor force participation data were collected from 291 respondents. The sample was selected using a multi-stage sampling design and the data were analyzed using both descriptive and econometrics method.

Table 5. Logit estimation result for poverty

POVERTY	Coef.	St.Err	Z-value	p-value	Ex(β)
Participation Status(<i>WPS</i>)	-1.068	0.424	-2.52	0.012**	0.344
Household Size(<i>HHSIZE</i>)	-0.097	0.078	-1.24	0.215	0.907
Access to credit (<i>WACFS</i>)	-1.048	0.356	-2.94	0.003***	2.851
Sex of head (<i>SEXHEAD</i>)	-0.566	0.381	-1.48	0.138	0.568
Household Income(<i>hhincome</i>)	-0.000	0.000	-3.08	0.002***	0.999
Household Asset (<i>ASSET</i>)	-3.08e-08	0.000	-1.85	0.065*	1.000
Expenditure (<i>hhexpn</i>)	0.001	0.000	3.97	0.000***	1.001
Woman's wage (<i>wwage</i>)	-0.001	0.000	-2.47	0.013**	0.999
Household Saving (<i>SAVING</i>)	-0.000	0.000	-2.18	0.030**	0.999
HH Occupation (<i>hhoccupn</i>)					
Civil servant	-0.531	1.404	-0.38	0.705	0.588
Merchant	-0.155	1.416	-0.11	0.913	0.856
Farmer	-0.642	1.449	-0.44	0.658	0.526
Education (<i>WEDU</i>)					
Primary School	-0.562	0.516	-1.09	0.276	0.570
Secondary School	-0.926	0.616	-1.50	0.133	0.396
TVET/Collage	-0.528	0.475	-1.11	0.266	0.590
University and above	-0.402	0.470	-0.85	0.393	0.669
_cons	2.048	1.609	1.27	0.203	7.754
Mean dependent var	0.629		SD dependent var		0.484
Pseudo r-squared	0.135		Number of obs		291.000
Chi-square	38.620		Prob > chi2		0.001
Akaike crit. (AIC)	366.163		Bayesian crit. (BIC)		428.610

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: computed from own survey, 2018

The variables women's age, the woman's age at the first marriage, women's education level, and women's exposed to mass media, women's access to credit services, training and marital status have a positive sign, and they are directly related to the woman labor force participation. The negative sign variables that are inversely related to the probability of women not participating in the labor force or presence of a child under 5 years of age, pregnancy, membership, family size, sex of head of the household, husband's income, husband education and household poverty status.

In the second model of binary logit model (for poverty) woman participation status, access to credit, household income, woman's wage, household saving were negatively and significantly related to the probability of being poor. On the other hand household expenditure were positively and significantly related to the probability of being poor.

Therefore, the local government should special attention to young women by providing them different job opportunities. The government and concerned bodies should prepare and provide training that makes woman to be active and competent to do whatever activities outside their home. Banks or other financial institutions should give credit for woman, in order to increase woman's labor force participation.

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Notes

1. Labor force participation is defined as people in the age group of 16–64 eligible to participate in the labor force that are actually participating in it, by working or looking for work (ILO, 2016).

2. Pseudo R^2 tells us that our model as a whole fit significantly better than an empty model (i.e., a model with no predictors).

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