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Estimating the Likelihood of Women Working in the Service Sector in Formal Enterprises: Evidence from Sub Saharan African Countries

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Abstract
The paper uses individual data for 9,957 female employees (drawn from a total sample of 29,332 individuals) in formal enterprises from 16 Sub-Saharan African (SSA) countries to analyse the likelihood of women in the service sector. A well-structured questionnaire was used in all the countries to collect the data required for the analysis. The data reveal that there is a significant higher presence of women (81.56 percent) working in services as compared to the manufacturing and agricultural sectors; indicating that the service sector is more favourable for women employment compared with men. This indicates that female employment not only in the service sector is a driver of growth, and thus high female employment rates indicate a country's potential to grow more rapidly. More so, in many developing countries women's employment is sometimes considered as a coping mechanism in response to economic shocks that hit the household. With regards to methodology, both demographic and household variables are used in the probit model. The findings indicate that there is a significant and positive participation of the female labor force in most of the countries. Age, household size, and tertiary education levels emerged as the most important and positive determinants in the model. Contrary to a priori expectation, the results show that marital status reduces the likelihood of a woman to be employed in the service sector. These findings could serve as useful inputs for the design of optimal sectorial employment policy measures aimed at promoting gender equality in SSA countries.
Keywords: women, service sector, likelihood, probit model, Sub Saharan Africa

1. Introduction

Women make up a little over half the world's population, but their contribution to measured economic activity, growth, and well-being is far below its potential (Elborgh-Woytek *et al.,* 2013). In SSA, like elsewhere, the labour market outcomes have a great impact on the well-being of women and most importantly on the economy as a whole. The rising involvement of women in development and the economy is central to economic growth (World Bank, 1995). However statistics indicate that the labour market in SSA is male-dominated, despite the fact that there are slightly more women than men in the Sub Saharan region (World Bank, 2013). Thus, female employment is currently one of the greatest development challenges facing countries globally, especially those in Africa. In 2011, female employment population ratio, globally, was estimated at about only 47.9% compared to male employment of 72.7.9%. For Africa as a whole, female employment population ratio was estimated at only 39.2% compared to male employment-to-population ratio of 69.2%. While estimates for SSA stood at 58.8% to 70.4% (Anyanwu, 2012).

The gender differences are associated with unequal access of resources such as time, income and social status. Greater value is placed on productive work outside home while the domestic labour is undervalued and in most cases unpaid (Verick, 2014). Furthermore, gender divisions in the labour market where women are concentrated in the service sector such as teaching and nursing are basically viewed as an extension of their domestic roles. Women in many SSA countries would likely be concentrated in the service sector (World Bank, 2015).

Women perform the vast majority of unpaid reproductive labour in SSA countries. However, a quick examination of the sectors of employment for the women that are engaged in paid labour indicates that the majority (17.4%) are in the teaching profession (Kasirye, 2011). The second largest source of women's employment is in the sales/retailing category. Agriculture is also an important source of paid employment for women—at least 15 percent of women are classified as agricultural workers. Indeed, nearly 47 percent of women in the public sector are agricultural workers—working on government-owned enterprises.

The World Bank statistics (2012) and WageIndicator surveys (2012) show that more women are employed in the service sector than any other sectors (agriculture and manufacturing). Therefore, this study seeks to estimate the likelihood and determinants of female employment is the service sector. The focus on women working in the service sector in SSA is particularly important for at least two reasons. First, women's employment in general and particular in the service sector is essential in the fight against poverty. This is not only because of the direct and interrelated contribution employment makes to household welfare, but also because of the personal power it provides women in shaping and making family decisions and in redirecting household spending on essential needs, especially in favour of children's education and healthcare (Anyanwu,

2012). Thus, female employment is a driver of growth, and thus high female employment rates indicate a country's potential to grow more rapidly. Secondly, it is also important because in many developing countries women's employment is sometimes a coping mechanism in response to economic shocks that hit the household.

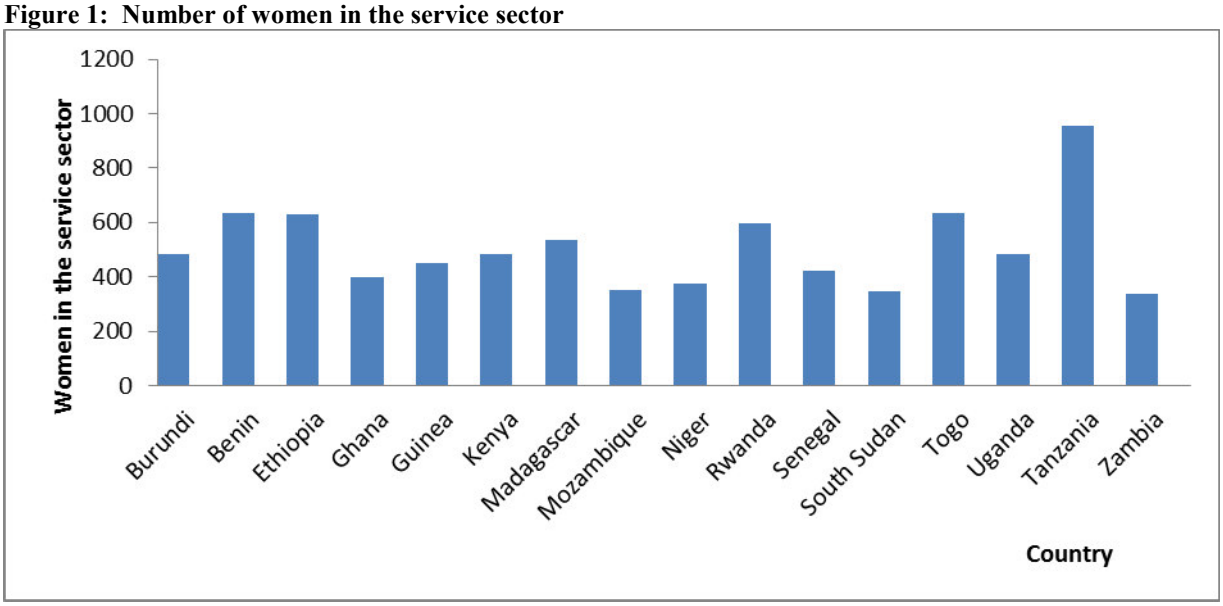
In SSA like in some other regions of the world, women constitute a significant share of the poor and the unemployed and most women are in the informal sector, work in low paying jobs or in the service sector. This could be due to them having few job opportunities in other sectors because of occupational segregation, cultural barriers, etc. Despite these observations there is limited empirical work on the likelihood of a woman to work in the service sector in SSA. Therefore, this paper presents results of an empirical study estimating the factors that would likely influence a woman to work in the service sector.

The findings from this study could be useful from the policy point of view. Given a greater presence of female workers in the service sector, policies aimed at improving the livelihood of women may find it attractive and optimal to expand the service sector and as such as improving the business climate in many Sub Saharan African countries.

2. The service sector and employment in Sub Saharan Africa: The main facts

Africa has one of the world's largest female unemployed population. It is a population that will continue to grow over the coming decades and even double in size by 2035. Women account for approximately 51% per cent of total populations in the SSA countries. The increase in the size of the female population (especially the young female population) will also translate into a rise in the working age population (aged 15–64), which already grew at a yearly rate of 2.7 per cent from 2000 to 2008 (Elder and Koné, 2014). The demographic pressures in the region pose significant labour market challenges as the demand for jobs of the increasingly educated young women remains unmet. In 2011, Africa's female employment ratio was low at 39% compared to 69% for men (1.8 times higher than for women) (Anyanwu, 2012).

Figure 1: Number of women in the service sector



Source: WageIndicator face-to-face surveys (2012 – 2013)

After the "lost decades" of the 1980s and 1990s, which were marked by economic crises and structural adjustment, sub-Saharan Africa has benefited from increased economic growth since 2000. The positive trend has continued in the region despite the global economic crisis and political unrest. The real gross domestic product (GDP) growth rate declined to 2.2 per cent in 2009 but recovered to 4.6 per cent in 2010 and reached 5.0 per cent in 2012 (Economic Commission for Africa [ECA], 2013, pp. 6–8). Economic growth is driven in part by domestic demand, private consumption and investment in both the agricultural and service sectors, and has occurred in both resource-rich and resource-poor countries.

The 16 countries in which the WageIndicator face-to-face surveys were conducted are a fairly representative of the situation in sub-Saharan Africa. However, in a context of global recession, all economies are seen to be expanding Table 1. GDP growth is more moderate in the francophone countries compared to the English-speaking countries. Looking to the future, growth prospects are positive in all countries, with Zambia taking the lead with a strong expected annual GDP growth of 7.6 per cent between 2013 and 2014 (Figure 2).

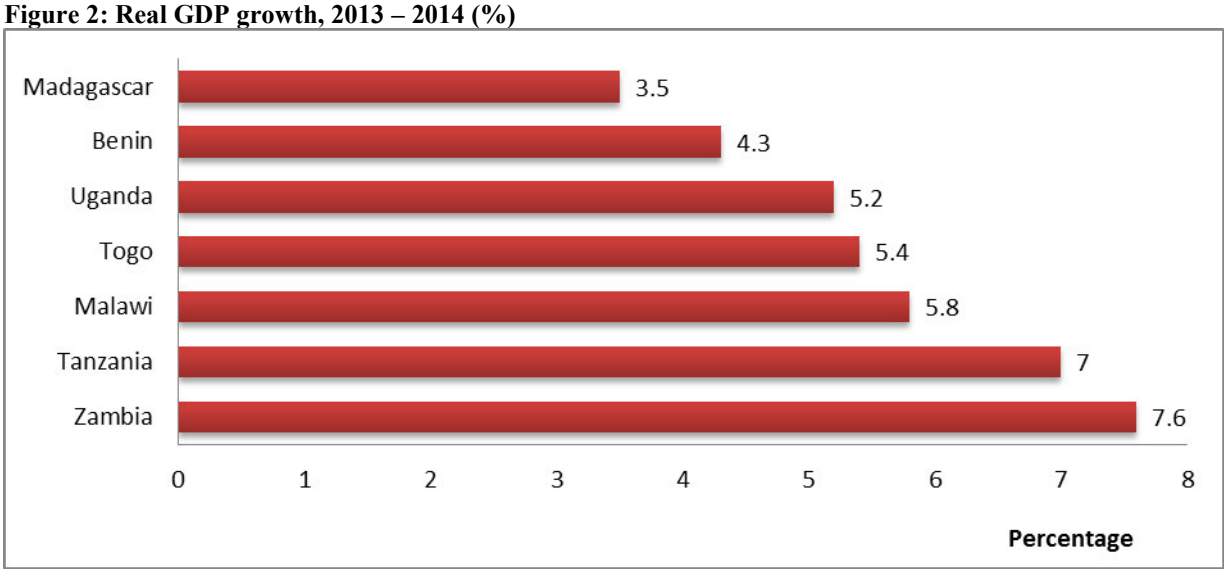
Table 1: Macroeconomic indicators for some Sub Saharan African Countries, 2012

Country	Population (million)	Area (thousands of km2)	Population density (pop/km2)	GDP	GDP per capita	GDP growth rate (yearly average from 2004-12)%
Benin	9352	115	81	15505	1658	3.5
Madagascar	21929	587	37	21372	975	3.1
Malawi	15883	118	134	14581	918	5.6
Tanzania	47656	947	50	73498	1542	6.9
Togo	6283	57	111	6899	1098	3.3
Uganda	35621	242	147	50591	1420	6.9
Zambia	13884	753	18	23676	1705	6.3
Africa	1068444	30066	36	3359148	3204	5.4

Source: OECD StatExtracts, 2013

Even though the most important source of employment in Africa continues is the agricultural sector, the service sector has proved to be a potential source of employment for female workers in recent years. In 2012, between 65 and 70 per cent of the economically active female population in SSA was employed in the service sector. The contribution of the service sector to GDP stands at an average of 28.1 per cent for the countries included in the survey.

Figure 2: Real GDP growth, 2013 – 2014 (%)



Source: AfDB *et al*., 2013, figure 1.9.

The growth of the service sector in many African countries in the past decades has had major consequences on women, thus enhancing gender differences with respect to occupational status, career opportunities, occupational segregation and earnings. According to the literature, many factors can account for the increase of female employment in the service sector (Amin and Islam, 2014).

3. Theoretical explanations of the gender distribution in different sector

Historically, women have been a dominant part of the workforce in the service sector especially in health and education industries although their participation in other industries has increased in the last half-century. Women account for 80 percent of all nurses, as well as 72 percent of all pre-primary school teachers in most of the sub Saharan countries (World Bank, 2013). With these female-dominated industries being concentrated in the service sector, women's choice among different sectors may well be limited. The industry structures as determining factors of sector choice suggest that some people, especially women, may be pushed to work in the service sectors where the feminine industries are more prevalent rather than actively choose to work for other sectors. From a theoretical perspective, the observed gender differences in sectoral employment are the result of a combination of demand- and supply-side factors as well as occupational segregation by gender.

First, the demand-side factors reflect differences in the nature of the goods and services produced in a particular sector. Because the service sector in some countries are usually flexible in terms of working conditions, they may compensate their employees through more generous fringe benefits and family-friendly policies as well as provide goods and services that generate social benefits. Consequently, the service sector may adopt a compensation structure that attracts female workers who are motivated by participating in brain related jobs.

Second, on the supply side, each worker compares the monetary plus non-monetary benefits offered by

each sector and prioritizes a job in the sector that provides him or her with the highest utility. This choice is shaped not only by worker preferences but also by the constraints under which they make their choices. Female and male workers may have different preferences regarding their employment sector choices, and they do not confront the same constraints. For example, males and females may differ in their motivation to participate in the production of goods with social benefits. Moreover, employment sector choices are made within the context of social norms that govern the division of domestic tasks and may thus induce women to seek jobs in the service sector with family-friendly practices.

Third, intrinsic Motivation, along with extrinsic benefits is also associated with an employment sector. In this case, a female individual's sector choice may also shaped by her intrinsic motivation. Intrinsic motivation is defined as working for the sake of the work itself rather than for some detachable outcomes (Ryan and Deci, 2000). According to Ryan and Deci (2000), individuals have different kinds of intrinsic needs and orientations, and ―these intrinsic needs provide energy for them to act on the environment and manage aspects of their drives and emotions. When it comes to sector choice, people are expected to accept a job in a sector that provides a better fit for their own values and orientations than the other sectors do (Lee and Wilkins, 2009).

Finally, a competitive view of the labor market neglects the structural factors that interfere with the relative desirability of sectoral employment. Among these factors, an occupational segregation effect can explain the high representation of women in the service sectors. For example, the education, health and social care sectors, offer female-dominated occupations (e.g., teaching, nursing, personal services). Hence, the observed gender distribution across sectors is the result of a matching between sectors that are distinguished by different objectives and practices and workers whose preferences differ according to gender. Some empirical studies are reviewed that confirm the role of compensation structures, family-friendly policies, the nature of goods and services produced, and individual preferences in explaining the observed gender gap in sectoral employment.

Some studies find that the wage gain obtained by women from working in the service sector rather than the manufacturing is higher than that obtained by men. This result may be partly explained by the lower wage losses incurred by mothers in some service sectors as a result of career interruptions to have children and care for them compared with mothers in the manufacturing sectors (Nielsen *et al*., 2004).

One of the reasons for the relative over presentation and wage advantage of women in the service sectors is that they are treated more equally in these sectors than in other sectors. This difference in treatment between sectors is partly explained by the different distribution of qualifications between genders and by the finding that the career paths of men and women are more similar in the service sector than in others. Several studies confirm that the service sector also appears to treat women more equally than the manufacturing sector. Etienne and Narcy (2010) use a quantile regression technique to show that female employees in service sector and non-profit sector suffer less wage discrimination than those in the manufacturing sector and profit sector. In fact, Faulk *et al.* (2012) find a greater gender pay equity in sectors with a higher proportion of female-dominated occupations.

Ponthieux and Schreiber (2006) show that the sharing of domestic chores among couples is very slow to evolve; women devote twice as much time to housework as men do. Likewise, the time spent caring for children remains largely monopolized by women. Under these conditions, if there are substantial differences in the family-friendly practices of employers, then women may well be attracted to those sectors of the labor market offering the best opportunities for reconciling family and professional life.

However, the model of the free choice of employment sector is limited by constraints, such as the occupational segregation from which working women may suffer. Some of the most "female" occupations in SSA countries are more frequent in the service sector, including teachers, nursery assistants and low-level administrative employees in civil service.

4. Methodology

4.1 Data and variables

The study uses data from WageIndicator face-to-face surveys aiming to collect representative and comparable data concerning wages and working conditions in some Sub Saharan African countries. The choice of countries is defined by the funders (the Netherlands Development Aids). The data is particularly suited for our research objectives, because the survey questions allow for a sectoral segregation women in formal enterprises and more so, such data is currently not available from any other survey especially on African countries.

All surveys in all the countries followed the same two-stage sampling design, which is typically used in the World Bank's Living Standard Measurement Study household surveys in developing countries (Grosh and Munoz, 1996). The first stage included design weights by geographical population size, thereby controlling for distributions over districts according to the most recent national labour force surveys. Although the survey design covered all districts, in a few countries problems arose related to travelling of interviewers; in those cases as many districts as possible have been included. In the second stage a sample was drawn from official lists of enterprises or establishments such as a List of Establishments from the National Bureau of Statistics, a List of

Enterprises from the Employers Association, a List of Business Registry or alike. Given that the number of workers in the establishment is not included in all registers or for all establishments, a normal sampling procedure was followed, whereby each establishment had the same chance of being included in the sample, using the design weights.

The survey was conducted between 2012 (in East African Countries – Burundi, Ethiopia, Kenya, Rwanda, Uganda and Tanzania) and 2013 (in West Africa and francophone countries – Benin, Guinea, Madagascar, Niger, Senegal and Togo). Respondents were covering all the administrative regions in the countries with total of approximately 29, 332 observations (Tijdens *et al.,* 2014). Of the respondents involved in the sample, approximately 33.95% were women of which 81.5% per cent are working in the service sector.

The questionnaire is extracted from the WageIndicator web-survey, which is posted on the national WageIndicator websites in currently 75 countries[1]. These websites provide information on wages by occupation, minimum wages, labour law, collective agreements, and training opportunities, receiving millions of visitors. This web-survey is in the national language(s), is adapted to country peculiarities, and has questions on many subjects, including socio-demographic characteristics, wages, occupations, and work-related topics (Tijden *et al*., 2010). For the face-to-face interviews in the sub-Saharan countries the main questions from the web-survey have been selected[2]. The questionnaire addresses workers, both employers and employees, in registered enterprises, because it uses the establishment registers as sampling frame. The dataset has 123 variables. For all variables, missing values are below 4 per cent, with the exception of the firm size (Niger 8% missing). The total sample used for the analysis includes 29,332 observations.

Table 2 contains the list of countries used in the study along with the sample size (number of employees), as well as the proportion of women employed in the service sector.

Table 2: Countries and sample size with proportion of women in the service sector

Country	Sample size	Number of women in the service sector	Percentage
Burundi	1,679	485	28.89
Benin	2,002	633	31.62
Ethiopia	2,126	631	29.68
Ghana	1,413	398	28.17
Guinea	1,962	451	22.99
Kenya	1,515	485	32.01
Madagascar	2,018	537	26.61
Mozambique	1,283	352	27.44
Niger	1,808	377	20.85
Rwanda	2,074	595	28.69
Senegal	1,948	424	21.77
South Sudan	1,329	348	26.19
Togo	2,007	634	31.59
Uganda	1,306	482	36.91
Tanzania	3,360	954	28.39
Zambia	1,502	335	22.30
Total	29,332	8,121	

In estimating the likelihood in the service sector, it is assumed that the existence of factors, like age, marital status, household size, levels of education, as well as female labour participation rates (flfp) will influence their decisions. Table 3 shows the summary statistics of the variables.

[1] See for the questionnaires http://www.wageindicator.org/main/Wageindicatorfoundation/researchlab/wageindicatorquestionaires/wageindicator-offline-paper-salary-surveys-africa.

[2] Note that the web-data is not included in our analysis. Only the offline face-to-face surveys are included.

Table 3: Summary statistics

Variable	Measure	Observation	Mean	Std. Dev
age	Year	9927	32.93	9.1959
agesq	Year	9927	1168.881	690.8527
hhsize	Count	9880	3.788	1.774
mstatus	Dummy	9957	0.365	0.4817
no education	Dummy	2,539	0.2549	0.4358
primary	Dummy	1,057	0.1062	0.3081
secondary	Dummy	4,331	0.4349	0.4957
tertiary	Dummy	2,030	0.2038	0.4028
flfp	Count	9,957	72.7165	16.2612

From Table 3, the average age of a female employee is about 33 years. In other words, employees are mature and should be able to make rational decisions about their sectors of employment in each country. The mean household size is 4 members per household. This average household size is consistent for most families having "white-collar" in Sub Saharan Africa. Education is grouped into four categories of no education (25.50 percent of the female sample), primary (10.62%), secondary (43.50%) and tertiary (20.39%) respectively. On average, female labour participation is 72.7% for the 16 countries considered.

The dependent variable in this study is a binary variable. The variable takes the value of 1 if the woman works in the service sector, and 0 otherwise. There are a number of binary choice models which have been used in similar studies to predict a binary dependent variable from a set of independent variables. These include the linear probability model, logit model, probit model and tobit model mostly to estimate the determinants of FLFP in African countries (Motswapong, 2008; Damisa *et al*., 2007; Sackey, 2005; and Kombe, 1999). The probit model used in this study is appropriate for the analysis because the dependent variable is binary and the study assumed that the error term follows a normal distribution.

4.2 Theoretical Framework of the Probit Model

The probit model is used to explain a dichotomous dependent variable with the empirical specification formulated in terms of latent response variable. The probit model defines the index of utility of women working in the service sector. In the probit model, y_i is a function of a woman's socioeconomic and household characteristics. $y_i = 1$ if the woman works in the service sector and 0 otherwise. Based on Greene (2003), the specification is as follows:

$$Y_i^* = \beta_0 + \sum_{k=1}^{k} \beta_i X_{ki} + \varepsilon_i \qquad (1)$$

In the Equation 1, the unobservable variable is represented by Y^*. The observable variable is a dummy represented by $Y = 1$ if $Y^* > 0$ and $Y = 0$ otherwise. $X_{ki} : k = 1$ represents the explanatory variables explaining the phenomenon of individual women, where i represents the individual women. β_i is the parameter that explains the effect of the explanatory variables for each individual woman on Y^*. β_0 is the intercept and ε_i is the stochastic term for each individual. In this model, the utilities are random which implies that the i^{th} woman will work in the service sector if and only if the utility exceeds that of working in other sectors. Therefore, the likelihood of a woman working in the service sector is given by a utility maximizing function.

$$P(Y = 1 | X_{ij}) = P(U_i^{service} - U_i^{others})$$
$$\Phi(\beta_i X_i - \varepsilon_i > 0) \qquad (2)$$

Where Φ is the cumulative distribution function of ε_i. The assumptions of ε_i determine the functional form for Φ.

$$P(Y = 1 / X_{ij}) = \Phi(Z_i) \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{z_i} e^{-\frac{1}{2}Z^2} \partial z$$

where $Z_i = \beta_i$ is probability if the i^{th} woman working in the service sector since $Y^* \to N(0)$.

The marginal effects of the model are given as follows:

$$\frac{\partial E[Y=1/X_{ij}]}{\partial X}=\left\{\frac{\partial F(\beta' X)}{\partial(\beta' X)}\right\}\beta=f(\beta' X)\beta \qquad (3)$$

where $f(.)$ is the density function that corresponds to the cumulative distribution. From Equation 3, the resulting model is given as;

$$\frac{\partial E[Y=1/X_{ij}]}{\partial X}=\Phi(\beta' X)\beta \qquad (4)$$

4.3 The Empirical Model

The study uses a probit model to estimate the likelihood of a woman working in the service sector for 16 sub Saharan African countries. The regressions are estimated to explore the association between particular female individual characteristics and employment in the service sector. The regression model uses information on the personal and household characteristics of female employees to predict the likelihood of being in the service sector.

The general equation of the model is specified as follows:

$$probit(p)=\beta_0+\beta_1x_1+\beta_2x_2+\beta_3x_3+...+\beta_kx_k=X\beta \qquad (5)$$

Equation (1) refers to a multiple explanatory variables and it can be revised and written as:

$$probit(p)=In\left(\frac{p}{1-p}\right) \qquad (6)$$

The model includes a set of explanatory variables as discussed above. The empirical model is therefore specified as follows:

$$\Pr(Y_{i}=1/x_1,x_2,...,x)=F(\beta_0,\beta_1x_1,\beta_2x_2,...,\beta_7x_7) \qquad (7)$$

Where $x_1,x_2,...,x_7$ are the explanatory variables such as: age, education level, household size and marital status of the female employee.

5. Results and Discussion

In this section the empirical results of the probit model are presented and interpreted. The probit model takes a linear function of the independent variables. In analysing the results, the marginal effects of the regression results and their statistical significance are looked at.

5.1 Regression Results with female labor participation rates and country dummies

Female labor force participation rate is a measure of the proportion of a country's female working age population that engages actively in the labor market, either by working or by looking for work. As the sum of the employed and (searching) unemployed, this indicator signals the relative size of the female supply of labor available to engage in the production of goods and services. It is an important factor in determining the sectors of employment for women in many SSA. According to Verick (2014), Women join the workforce in developing countries as a coping mechanism in response to shocks and the participation of women is the outcome of various macro and individual factors[1].

Since there is a selection problem in the data where only those who are already in the labor market were surveyed, a variable for female labor participation rates or country dummies are included in the regression analysis to control for the selection bias. This is because women participation may be correlated with the choices of females working or not. Country dummies are used in the regressions to account for institutional differences in the countries.

[1] Female force participation in Sub Saharan African is on average 63.5% (World Bank,

Figure 3: Female Labor force participation rates for the countries (World Bank, 2015)

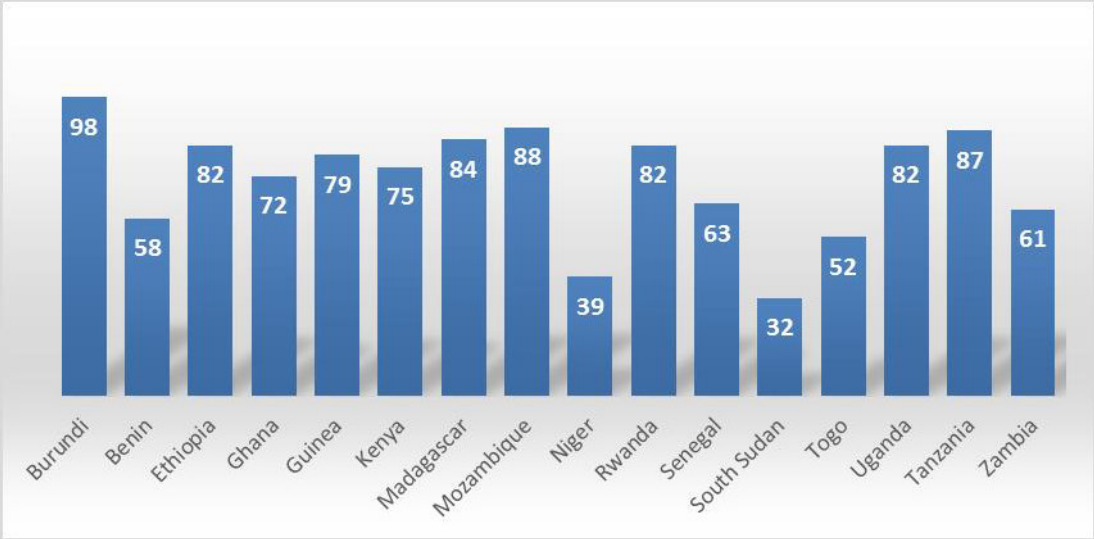


Table 4 present regression estimates of the likelihood of a woman to work in the service sector with female labor participation rates and country dummies included in the regression as determinants. The positive sign and significance of flfp shows that if female labour participation in any of these countries increases by 1 unit, the likelihood of a woman working in the service sector will also increase by 0.006 with all other variables held constant.

Table 4: Marginal effects after Baseline Probit Regression

	(1)	(2)	(3)
Age	0.0118***	0.0131***	0.00848***
	(0.0100)	(0.0101)	(0.0101)
Agesq	-0.0004***	-0.0004***	-0.0003**
	(0.0001)	(0.0001)	(0.0001)
Hhsize	0.0186**	0.0177**	0.0218**
	(0.0088)	(0.0088)	(0.0089)
Primary	-0.175***	-0.128**	-0.103*
	(0.0526)	(0.0532)	(0.0537)
secondary	-0.00127	-0.0212*	-0.0248
	(0.0371)	(0.0371)	(0.0372)
Tertiary	0.0342*	0.0345***	0.0227**
	(0.0440)	(0.0440)	(0.0441)
Mstatus	-0.0610*	-0.0543*	-0.0528*
	(0.0319)	(0.0318)	(0.0319)
Constant	0.915***	1.354***	1.182***
	(0.181)	(0.192)	(0.185)
Flfp	No	0.00626***	No
		(0.00104)	
c_dummy	No	No	Yes***
Observations	9,850	9,850	9,850
Wald chi2	115.84	152.25	173.25
Prob > chi2	0.000	0.000	0.000
Pseudo R2	0.02	0.03	0.03
Log likelihood	-4653.8568	-4632.2237	-4623.9226

Notes: Significance *** 1%, ** 5%, * 10%, Robust standard errors in parentheses.

From the probit model results in Table 4, the likelihood ratios with a *p*-values of 0.0000 show that the model used in this study as a whole is statistically significant. In other words, the null hypothesis that all the

slope coefficients are simultaneously equal to zero is not rejected. The coefficients of the variables in the model were estimated at 95% confidence interval level. Therefore, this explains that the model used is robust in estimating the likelihood of women in the service sector in SSA. The variables include age, age-squared, household size, marital status and level of education with no educational level being the base category.

The results shows that the age coefficient is 0.01 meaning that with other variables held constant if age increases by one unit, on an average the likelihood of a woman working in the service sector increases by 0.01 units. This suggests a positive and significant relationship between the two. Women working in the service sector increases with age because as women grow older, they achieve higher educational levels and subsequently move away from other sectors such as agriculture to seek for employment in the service sectors.

Age-squared coefficient is significant at 1% level of significance and has a negative coefficient. This means that as a woman grows older, she reaches a certain age where her probability of seeking employment in the service sector decreases. The findings are in accordance to Mincer's inverted U-shaped age profile. The results show a positive effect of age and a negative effect of age squared implying that as women get older the effect of age in the service sector is lessened

Marital status is an important variable which influence the likelihood of a woman to enter into the service sector. Some empirical studies using probit/logit models have found marital status to have both positive and negative effects on employment decisions across the different social set up. Table 4 shows that marital status has a negative and significant relationship with a woman's employment in the service sector. This reflects that married women are less likely to work in the service sectors. The reason may be that married women may stay at home to carry out household duties. This may also mean that there is no household budget sharing, therefore the wife need not forgo household activities for employment implying that married woman might be assisted financially by their husbands. Therefore, the argument can be put forward that marriage impact negatively on service sector employment.

Household size is an important variable influencing the likelihood of a woman working in the service sector. There is a positive association between the household size and the likelihood of a woman working in the service sector. The relationship is significant at 5 percent level of probability. According to Faridi, *et al.* (2009), larger numbers of dependents in a household exert pressure on female partners of the household for their economic and financial contribution. Hence, as the number of dependents increases, the household's demand for female economic contribution also increases.

From a supply-side perspective, education has an important impact on a woman and individual's decision to choose between sectors of employment. Education variable was defined as dummies within the following categories: no education, primary education, secondary and tertiary education. No education is the reference category. The coefficient of primary education is negative and significant implying that at lower levels of education, women may likely end up being employed in other sectors (such as agriculture) than the service sector. Secondary education is negative and mostly statistically insignificant in the model. Only the coefficient of tertiary education is positive and statistically significant. Therefore, a woman with a higher level of education is more likely to be employed in the service sector than a female with lower education level. This is because when women invest in human capital they become more productive and marketable in the service sector than in the agricultural sector. As a result they have more employment opportunities in the labor market than less-educated females. This result is in line with findings by Atieno (2006), Damisa *et al.* (2007) and Motswapong (2008). More so, according to Spirings (2015) since employers in the manufacturing and agricultural sectors generally prefer the cheapest labor, women who are highly educated will prefer to seek for employment in the service sectors when they decide to enter the labor market.

5.2 Does education increase the likelihood of a woman to work in the service sector?

One of the strongest determinants of female employment in both developed and developing countries is educational attainment (Cazes and Verick, 2013). From a supply-side perspective, education has an important impact on a woman's decision to choose the sectors of employment. However, a nonlinear (or U-shaped) relationship between educational attainment and women employment is evident in many developing countries. The most uneducated women in poorer countries are the most likely to perform subsistence jobs and activities mostly in agriculture and informal sectors. Once women have more than a secondary school education, higher wages encourage them to join the labor force, particularly if appropriate jobs are available in the service. More so, when a country is poor, female labor participation is high because women work out of necessity, mainly in subsistence agriculture or home-based production. As a country develops, economic activity shifts from agriculture to industry, which benefits men more than woman and this forces women to seek for jobs in the service sectors. Therefore, this section seeks to resolve two issues. Does education help women with large household sizes or does it help elderly women to get employment in the service sector?

The interaction effects between secondary and tertiary education with age and household size are positive and significant which implies that older women who have more than secondary school level with larger

family sizes are more likely to be employed in the services sectors. These results show that as education levels rise, it enable women to take advantage of new jobs emerging in the service sector that are more family-friendly and accessible.

Table 5: Marginal effects of Regression results with Interaction effects of education with household size and age

	(1)	(2)	(3)	(4)	(5)	(6)
Age	0.0119	0.0132	0.00867	0.0104	0.0122	0.00713
	(0.0100)	(0.0101)	(0.0101)	(0.0105)	(0.0105)	(0.0105)
Agesq	-0.0004***	-0.0003***	-0.0003**	-0.0003***	-0.0004***	-0.0003**
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Hhsize	-0.00473	-0.00297	-0.00110	0.0182**	0.0173*	0.0215**
	(0.0187)	(0.0187)	(0.0189)	(0.0088)	(0.0089)	(0.0089)
Primary	-0.270**	-0.215*	-0.197	-0.175	-0.0877	-0.0806
	(0.120)	(0.120)	(0.121)	(0.192)	(0.193)	(0.194)
secondary	-0.0661	-0.0758	-0.110	0.228*	0.228*	0.192
	(0.0865)	(0.0863)	(0.0871)	(0.136)	(0.136)	(0.136)
Tertiart	0.0302*	0.0234***	0.0289*	0.0964*	0.0942**	0.108**
	(0.105)	(0.104)	(0.105)	(0.161)	(0.161)	(0.162)
Mstatus	-0.0610*	-0.0544*	-0.0529*	-0.0592*	-0.0526*	-0.0512
	(0.0319)	(0.0318)	(0.0320)	(0.0319)	(0.0318)	(0.0320)
primary*hhsize	0.0165	0.0148	0.0132			
	(0.0246)	(0.0246)	(0.0248)			
seco*hhsize	0.0420*	0.0381**	0.0381*			
	(0.0301)	(0.0301)	(0.0303)			
tertiary*hhsize	0.0336*	0.0292***	0.0356***			
	(0.0222)	(0.0223)	(0.0224)			
Flfp		0.006***			0.006***	
		(0.001)			(0.001)	
c_dummy			0.0251***			0.0249***
			(0.0032)			(0.0032)
primary*age				-0.00395	-0.00390	-0.00396
				(0.0046)	(0.0047)	(0.0047)
secondary*age				0.00396*	0.00269**	0.00328**
				(0.0058)	(0.0058)	(0.0058)
tertiart*age				0.00287**	0.00352***	0.00248**
				(0.0041)	(0.0041)	(0.0041)
Constant	0.939***	1.372***	1.217***	0.811***	1.239***	1.077***
	(0.187)	(0.197)	(0.191)	(0.200)	(0.209)	(0.203)
Observations	9,850	9,850	9,850	9,850	9,850	9,850
Wald chi2(11)	118.91	155.32	176.42	119.69	156.66	176.23
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000
Pseudo R2	0.02	0.03	0.03	0.02	0.03	0.03
Log likelihood	-4652.3825	-4631.079	-4622.323	-4651.9483	-4630.1619	-4622.3287

Notes: Significance *** 1%, ** 5%, * 10%, Robust standard errors in parenthesis

6. Conclusion

This paper is based on wage indicator survey carried out in 16 countries in SSA. A well-structured questionnaire was used in all the countries for data collection. The paper uses the female only data of 9,957 individuals. The study identifies various socioeconomic and household characteristics that influence the likelihood of a woman to be employed in the service and therefore applies the probit model in the analyses.

The findings shed light on a number of important aspects of women's decision to work in the service sector SSA. First, the findings indicate that there is a significant and positive participation of the female labor

force in most of the countries. Second, age, household size and tertiary education levels emerged as the most important and positive determinants in the model whereas primary education significantly reduces the likelihood of a woman being employed in the service sector. In contrast with a priori expectation, the findings reveal that marital status reduces the likelihood of a woman to be employed in the service sector.

One may argue that the selection of the service sectors by women is a result of individuals' voluntary choices. However, the literature on women's career choice argues that the gender differences in the perceptions of task competence foster gender differences in commitment to paths leading to that career even before an actual choice is made (Correll, 2001). In other words, there are gender differences in the beliefs of competences for various fields even in one's early stages of life such as childhood and adolescence (Wigfield and Eccles, 2002). As a consequence of these stereotypes for competences by sex, there are far more women than men studying so called ―feminine subjects such as nursing, education, that probably lead them to searching jobs in the service sectors while there are more males majoring in masculine fields such as physics, mathematics and engineering. The different paths that women take in preparing themselves for the job market then lead to obtaining most jobs in the service sectors. These findings could serve as useful inputs for the design of optimal sectorial employment policy measures aimed at promoting gender equality in SSA countries.

Further research in this area may considered collecting data both in the formal and informal enterprises in order to compare the performance and representation in the two sectors. More so, collecting data on female labor force participation will resolve the issue of selection bias.

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Appendix

Table 6: Summary statistics for the whole sample

Variable	Measure	Observation	Mean	Std. Dev
Age	Year	29222	34.35	9.54
Agesq	Year	29222	1271.12	737.39
Hhsize	Count	29173	3.81	1.83
Mstatus	Dummy	29332	0.42	0.49
Primary	Dummy	6983	0.24	0.43
Secondary	Dummy	8613	0.29	0.45
Tertiary	Dummy	6061	0.21	0.4
Flfp	Count	29332	71.45	16.61

Table 7: Results with female labour force participation rates and country dummies

Variable	(1)	(2)
Benin		0.0783*
		(0.0436)
Ethiopia		0.0231***
		(0.0432)
Ghana		0.0212**
		(0.0480)
Guinea		-0.183***
		(0.0450)
Kenya		0.0894*
		(0.0466)
Madagascar		-0.0679
		(0.0441)
Mozambique		0.0430
		(0.0494)
Niger		-0.255***
		(0.0464)
Rwanda		0.00580**
		(0.0436)
Senegal		-0.223***
		(0.0454)
South Sudan		-0.0809*
		(0.0492)
Togo		0.0775*
		(0.0436)
Uganda		0.222***
		(0.0480)
Tanzania		0.0145*
		(0.0397)
Zambia		0.205***
		(0.0484)
flfp	0.006***	
	(0.0009)	
Constant	1.3552***	-0.557***
	(0.0349)	(0.0324)
Observations	9,957	9,957

Note: *** p<0.01, ** p<0.05, * p<0.1, Robust standard errors in parenthesis

Table 8: Baseline probit model for the whole sample

	(1)	(2)	(3)
age	0.0331***	0.0332***	0.0265***
	(0.0054)	(0.0054)	(0.0055)
agesq	0.00203***	0.00202***	0.00122*
	(0.000)	(0.000)	(0.000)
hhsize	0.0362***	0.0363***	0.0541***
	(0.0047)	(0.0047)	(0.0049)
mstatus	0.148***	0.143***	0.266***
	(0.0172)	(0.0173)	(0.0211)
primary	0.00471	-0.00295	-0.0127
	(0.0225)	(0.0225)	(0.0230)
secondary	0.0525**	0.0590***	0.0232**
	(0.0212)	(0.0213)	(0.0230)
Tertiary	0.00826**	0.00711**	0.00137*
	(0.0233)	(0.0233)	(0.0238)
Constant	0.183*	0.0164	-0.0236
	(0.0988)	(0.105)	(0.108)
flfp	No	Yes***	No
Country Dummies	No	No	Yes***
Observations	29,063	29,063	29,063
pseudo R2	0.02	0.02	0.03
Prob>chi	0.000	0.000	0.000

Note: *** p<0.01, ** p<0.05, * p<0.1, Robust standard errors in parenthesis

Table 9: Probit model for the whole sample with interaction effects

Variable	(1)	(2)	(3)	(4)	(5)	(6)
age	0.0333***	0.0334***	0.0266***	0.0343***	0.0344***	0.0273***
	(0.0054)	(0.0054)	(0.0055)	(0.0056)	(0.0056)	(0.0057)
agesq	0.0020***	0.0020***	0.0012*	0.0002***	0.0002***	0.0001*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
hhsize	0.0417***	0.0404***	0.0596***	0.0362***	0.0363***	0.0541***
	(0.0086)	(0.0086)	(0.0088)	(0.0047)	(0.0047)	(0.0049)
mstatus	0.1490***	0.1440***	0.2670***	0.1480***	0.1430***	0.2650***
	(0.0173)	(0.0173)	(0.0211)	(0.0173)	(0.0173)	(0.0211)
primary	-0.0136	-0.0259	-0.0203	-0.103	-0.112	-0.102
	(0.0520)	(0.0521)	(0.0524)	(0.0840)	(0.0841)	(0.0845)
secondary	0.1230**	0.1170**	0.0831*	0.0324*	0.0329*	0.0211*
	(0.0482)	(0.0482)	(0.0497)	(0.0799)	(0.0799)	(0.0808)
tertiary	0.0232**	0.0212**	0.0226**	0.0437*	0.0442**	0.0349**
	(0.0537)	(0.0537)	(0.0542)	(0.0888)	(0.0888)	(0.0894)
prim*hhsize	0.00463	0.00591	0.00192			
	(0.0122)	(0.0123)	(0.0123)			
seco*hhsize	0.0189***	0.0156***	0.0158***			
	(0.0115)	(0.0115)	(0.0116)			
Tert*hhsize	0.0397**	0.0372**	0.0553**			
	(0.0127)	(0.0127)	(0.0128)			
prim*age				0.00321*	0.00323	0.00266
				(0.00241)	(0.00241)	(0.0024)
seco*age				0.0610*	0.0790	0.0740
				(0.0023)	(0.0023)	(0.0023)
Tert*age				0.0016*	0.0015**	0.0011*
				(0.0026)	(0.0026)	(0.0026)
Constant	0.166	0.00728	-0.0430	0.223**	0.0586	0.0397
	(0.102)	(0.108)	(0.111)	(0.110)	(0.115)	(0.118)
flfp	**No**	**Yes**	**No**	**No**	**Yes**	**No**
C_Dummies	**No**	**No**	**Yes**	**No**	**No**	**Yes**
Pseudo R2	0.02	0.03	0.03	0.02	0.03	0.03
Prob>chi2	0.000	0.000	0.000	0.000	0.000	0.000
Observations	29,063	29,063	29,063	29,063	29,063	29,063

Note: *** p<0.01, ** p<0.05, * p<0.1, Robust standard errors in parenthesis