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Female Labor force participation and Sectoral Choices for females in Cameroonian Labor Market

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ABSTRACT: This study uses two models to analyze the determinants of female labor force participation (FLFP) and sectoral choices females in the Cameroon labor market. Data used in this study have been taken from the second Survey on Employment and the Informal Sector (EESI 2) conducted in 2010 in Cameroon. From the descriptive analysis, it was seen that out of the 34,500 observations 50.25% are women aged 15 to 65. A probit regression was used to analyze the determinants of FLFP. Among the key determinants of FLFP were age and education. More so, females who live in urban areas, who are household heads, and who have tertiary education are more likely to participate in the labor market. Using a multinomial logit model, the study analyses the sectoral choices for women given their participation in the labor market. The results also showed that females who have tertiary education, are Protestants, married, divorced and reside in urban areas are more likely to work in the industrial, commerce and service sectors. The policy implication on the basis of the above discussions is that if greater participation of women in the labor force is a desirable goal, Government should focus on the education for women and equally increase job opportunities in order to reduce the number of rural-urban migrating female jobs seekers.

KEYWORDS: Female, labor force participation, sectoral choices, probit, multinomial logit, Cameroon.

1 INTRODUCTION

Female employment in Cameroon like elsewhere provides for sustenance and enhances the quality of life, not only of the women but also the related people. In addition, it leads to economic growth and further development of human resource in the economy. Ever since the advent of human race, women have been putting in their share of economic and social effort, although immensely undermined (Mammen and Paxson, 2000). Their participation in labor force remains thin due to less employment and developmental opportunities for women, cultural and social barriers, discriminatory environment and low salaries. Moreover their economic efforts remains imperceptible because the majority of women are working in informal sectors of labor market (Sarwar and Abbasi, 2013). In Cameroon, discrimination attitudes are reflected in the labor market regulations. For example, in 2010, 87% of women in the labor force were employed in vulnerable employment compared to 67% of men and 58% of women in the labor force were employed in agriculture compared to 49% of men (World Bank, 2015). These gender differences are associated with unequal access of resources such as time, income and social status (Zamo-Akono, 2009; Siphambe and Motswapong, 2010).

However, female labor force participation in the formal sector in Cameroon tends to show an overall increasing trend in recent times even though still lagging behind male labor force participation (MLFP) and total labor force participation (TLFP)

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(Figure 1)[1]. FLFP is spread to almost all ages and particularly high from 20 to 45 years except for ages 12 to 19 years. The reason for this may be because they have attained higher education levels (In 2010, 65% of women aged 15 and above were literate compared to 78% of men) which increases their access to opportunities to work in market activities and raises their market productivity compared with home production (World Bank, 2015).

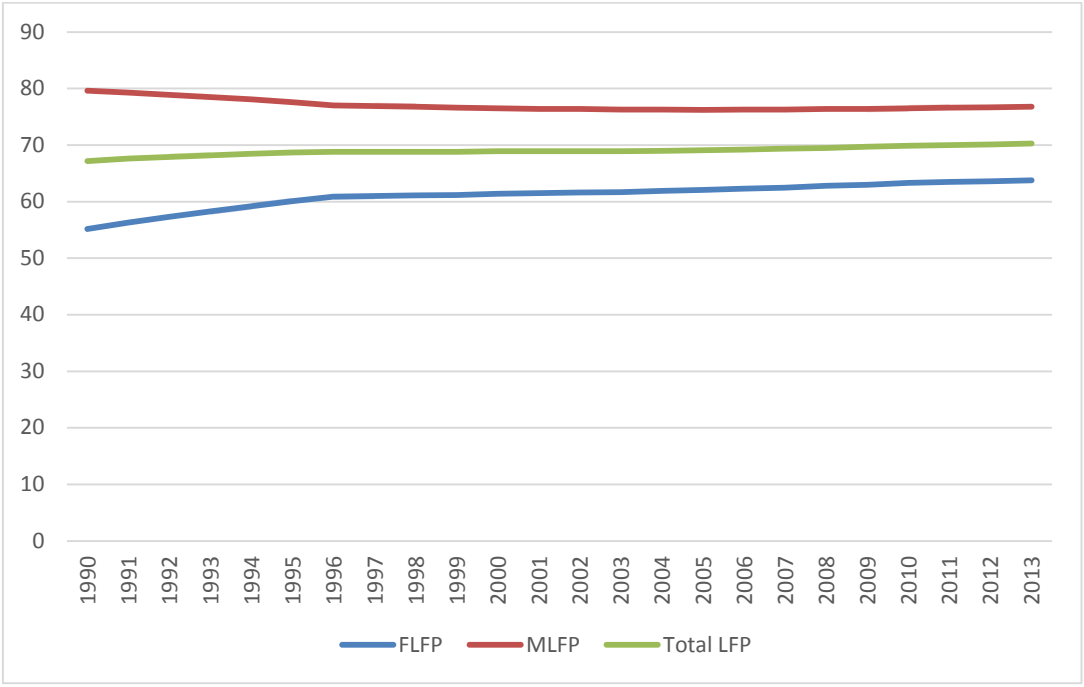

Figure 1: Labor force participation in Cameroon (Female, Male, Total)

Source: World Bank (2015)

In Cameroon like most developing countries, females constitute a significant share of the poor and the unemployed and most females are in the informal sector or work in low paying jobs. This could be due to them having few job opportunities because of educational attainment, occupational segregation, cultural barriers, etc. Despite these observations there is limited empirical work on the factors that influence participation decisions of females and sectoral choices for females in Cameroon. Therefore, this paper contributes to the existing literature by presenting the results of an empirical study on the participation of females in the labor force as well as examines the factors that determine the choice of sector by females in Cameroon.

2 LITERATURE REVIEW

In most countries, FLFP was studied to answer questions—what is the relationship between economic growth and FLFP, does the attainment of higher education lead to a decrease in female participation in the labor market, to what extent do the wages for women influence their participation in some sectors, does the participation of husbands in off-farm employment influence the decision of women to participate in economic activities, do household size and composition affect female participation in the labor market and many others.

[1]*According to World Bank (2015), the labor force participation rate is the percent of the population ages 15 and older that is economically active. That includes the employed and the unemployed individuals. Therefore, the FLFP rate is the percent of the female population ages 15 and older who are economically active. That includes the employed as well as the unemployed females.*

Researchers used various approaches to find answers to these questions. For example, most studies have used Ordinary Least Square (OLS) method, Probit, Logit, and Tobit models to test for factors that determine FLFP in many economic sectors in several countries. Some studies have found that various demographic, economic and social factors have an effect on FLFP in the labor market. They provide empirical evidence that FLFP is influenced by age, marital status, education level, household income, land ownership, access to credit, access to fertilizer, household size, etc. They argued that these factors have contributed to the increasing or declining rate of FLFP in the labor market as a whole.

A study done by Sackey (2005) using a probit model concluded that improvements in the educational status of females (in terms of both enrolment and years of schooling) as well as the tendency towards later marriage have been crucial to fertility reduction in Ghana.

A study by Mlatsheni and Leibbrandt (2001) in South Africa, on female labor force participation, found that divorced women are the most likely to seek employment, followed by married women, and lastly, single women. This may be because they are more likely to enter the labor market in response to their lack of prospects for economic dependence. Using Egypt as an example, Hendy (2011) explains that, in Egypt, women are likely to work before they get married. Her explanation for this is the high cost of marriage in Egypt. Women therefore need to work so as to afford these costs. Once married, women's work patterns generally differ according to the employment sector.

Atieno (2006) analysed the determinants of female labor force participation in the case of the informal sector in Kenya. The author used the multinomial logit model to identify characteristics of individuals participating in different activities in the labor market. The results showed that education, represented by years of schooling, increases females' chances of being employed in the public and private sectors. Household headship and the urban location also had significant marginal effects. Land ownership was also found to increase females' chances of being in agriculture, public sector, private and unpaid family work, but not in the informal sector. These results however are surprising; one would expect a female who owns land to have more chances of participating in the informal sector. This is because the informal sector is a small sector in terms of people employed and often it is carried out in the owner's home or plot, so we expect females with land ownership to have more probability of choosing the informal sector because they have one of the main resources.

It is also important to note the non-economic aspects of female labor force participation, for example, religion. Countries with the lowest rate of women in the workplace are those with strong religious views about women in society and in business in particular. Some scholars have concluded that different religions have an influence on economic attitudes and female decisions to sectors of employment (Guiso *et al.,* 2003)

However, education is unquestionably the most fundamental and important form of human capital investment, which emphasizes the characteristics of the individual as an important determinant of work. Education and participation in the work force both depend on and affect a country's economic and general development. There is a positive correlation between education and female labor force participation, which has been documented by Sackey (2005), and Atieno (2006). This is not always the case, but a higher education attainment leads to a higher rate of participation in the labor market, especially in the case of women. This implies that there is a stronger tendency for a more educated woman to remain economically active than a less educated woman (Siphambe and Motswapong, 2010, Oluwaseyi, 2013).

This paper adopts the models used by Sackey (2005) and Siphambe and Motswapong (2010) to find the determinants of labor force participation in Cameroon and also to investigate the factors that determine their choices of sectors respectively. This paper adds to the existing literature of labor markets and most important in Cameroon where a few systematic studies have been carried out on female sectoral choices in the labor market.

3 METHODOLOGY

3.1 DATA AND DESCRIPTIVE STATISTICS

This paper uses the data from the second Survey on Employment and the Informal Sector (EESI 2) conducted in 2010. This survey takes place after every five years, with the first one carried out in 2005 (EESI 1) and the second one in 2010 (EESI 2)[2]. The first survey provides information on the labor market conditions and incomes from various activities; while the second

[2] *Enquête sur l'Emploi et le Secteur Informel (EESI 2)*

enables to appreciate the contribution of the informal sector to the economy, in terms of employment and added value. The second survey in 2010 (EESI 2) with a total of 34500 observations – of which 17,247 (50.25%) are females – enables to update the 2005 data and therefore to assess the evolution of non-agricultural informal sector. The sectors of choice are agriculture, industrial, commerce and services which include household economic activities. Agriculture according to the survey includes all persons who declared that they were working on their own or family lands or cattle post either in agricultural, livestock or fishing or as paid employees on similar establishments. Service and household economic activities refer to individuals who work with pay in an economic enterprise operated by a related person living in the same household. This may sometimes involve working in a household or a family business without pay.

Table 1 and Table 4 (appendix) present the descriptive statistics of the variables used in the analysis. Age is taken as the number of completed years of the females between 15 years to 65 years as this is in line with the definition of the labor force in Cameroon. Marital status was defined as dummies within the following categories; single, married, widowed and divorced or separated. Single is considered as a reference category. Household Headship is defined as a dummy, with female household head = 1, and 0 otherwise. According to Narayana and Shongwe (2010) household head is a key decision maker, the one who was acknowledged by other members as having the authority to make all major decisions within the household. Residence is defined as a dummy for the location of female, with rural = 0 and urban = 1. Female residential area is considered an important factor that determines whether the individual female will participate in the labor market or not and also choice of sector of employment.

Table 1: Description of Variables

variables	Description
Participation	1 = employed and 0 = not employed
sector	Sectors of employment; 0 = Agriculture (based category), 1 = Industries, 2 = Commerce, 3 = Service sector
Age	Continuous variable ranging from 15 to 65 years
Age2	Age squared
Residence	Dummy for location of the female; 0 = rural (base category), 1 = urban
Household size	Household sizes of female household heads. It is a continuous variable ranging from 1 to 12
Household head	whether female is a household head or not; Binary variable; 1 if female is the household head and 0 otherwise
Marital status	0 if the female respondent is single (reference category), 1 if the female respondent is married or cohabitates and 2 if the female is divorced separated, or widowed;
Religion	Religion of the female participant; 0 if Catholic (reference catefory); 1= Protestant; 2= Muslims, 4=Otherwise; These categories were transformed into specific dummies.
Educational level	Highest level of education (for those who completed schooling) Education was classified in four levels: 0= No education (reference category); 1= Primary; 2= Secondary; 3= Tertiary (University and other related categories of higher education).
Regions	Cameroon has ten regions which were categorized as; 0 = Centre (based category), 1= littoral, 2 = Adamoua, 3 = East, 4 = Extreme North, 5 = North, 6 = North West, 7 = West, 8 = South, 9 = South West

3.2 THE MODEL

Two models are applied in this paper, the probit and the multinomial logistic models. The probit model is used to find out in a more general sense what factors explain female's decision to participate in the labor market. The probit model ignores all occupational differences within sectors, therefore the multinomial logistic model is applied to analyze the occupational

differences within the sectors, if females participate in the labor market. The probit model used in this paper has been adopted from Sackey (2005) and applied in the Cameroon context. Sackey (2005) estimated the model of labor force participation using a probit model to find out factors that explain females' decisions to participate in the labor market in Ghana. A probit model is a model for binary dependent variables based on the standard normal distribution. Multinomial logit model is a model for unordered multinomial outcomes in which the regressors vary across individuals (Cramer, 1986; 1991).

Multinomial logistic model is used to analyze the occupational differences within the sectors, if females participate in the labor market. Hence, the multinomial logistic model is used to identify the individual and household characteristics in employment types. It estimates the probability of individual i participating in sector j given a set of explanatory variables (Cramer, 1991). In the decision to participate in the labor market, any individual female is assumed to attach some level of utility U to any possible alternative choice. She will then choose the activity type or sector that offers the highest utility.

A female individual i faces the decision to choose among n alternatives and this can be described using a utility function given as follows:

$$U_{ij} = U_{ij}(Y_{ij}) + \mu_{ij}$$

where: U_{ij} is the utility that a female individual derived by choosing a particular sector j.

Y_{ij} is a vector of characteristics of the individual i.

μ_{ij} is the error term.

The explanatory variables used in this paper are as follows: age, age squared, residence, marital status, household size, education and household head. The dependent variable in the multinomial model is the proportion of females working in the various 4 categorized sectors (agriculture, industry, commerce and service).

4 EMPIRICAL RESULTS

4.1 THE PROBIT MODEL OF FEMALE LABOR FORCE PARTICIPATION

The probit model of female's decision to participate in Cameroon labor market or not is fitted on the data, depending on age, residence, household size, household head, marital status, religion, and education level of the females. All these variables determine the probability whether a female will participate in the labor market in Cameroon or not.

Table 2: Partial effects for probit model of participation

	(1)	(2)
Variables	Without Regional Dummies	With Regional Dummies
age	0.118***	0.128***
	(0.0115)	(0.0123)
Age squared	-0.0013***	-0.0015***
	(0.0001)	(0.0001)
Residence	0.477***	0.574***
	(0.0687)	(0.0804)
Household size	-0.0151	-0.0103
	(0.0105)	(0.0114)
Household head	0.292***	0.342***
	(0.0990)	(0.103)
Marital status		
Married	0.189**	0.202**
	(0.0840)	(0.0887)
Divorced/separated	0.242**	0.143
	(0.120)	(0.128)
Religion		
Muslims	0.0326	0.1030
	(0.0693)	(0.0735)
Protestants	0.338***	-0.169
	(0.101)	(0.117)
Others	-0.256**	-0.252**
	(0.119)	(0.125)
Educational level		
Primary	-0.0119	-0.346
	(0.647)	(0.634)
secondary	0.0303*	0.422**
	(0.647)	(0.635)
Tertiary	0.423***	0.825***
	(0.655)	(0.645)
Constant	-2.883***	-2.625***
	(0.678)	(0.674)
Regional dummies	No	Yes
log-likelihood	-1050.55	-951.1
Pseudo-R2	0.1573	0.2371
Prob > chi2	0.000	0.000
LR chi2	392.21	591.11
Observations	4,436	4,436

**** p<0.01, ** p<0.05, * p<0.1; standard errors in parenthesis*

The probit model takes a linear function of the explanatory variables and applies a nonlinear transformation using the normal distribution function. The coefficients are interpreted as qualitative effects (Siphambe and Motswapong, 2010). Therefore, a negative coefficient means that a female is less likely to participate in the labor market, and a positive coefficient implies that a female is more likely to participate.

Table 2 shows that the variable age is statistically significant at 5% level of significance with a coefficient is 0.118 which implies that with other variables held constant if age increases by one unit, on an average the probability of a female participating in the labor market in Cameroon increases by 0.118 units. This suggests a positive relationship between the two. Female labor participation increases with age because females grow older they realize the need of working in order to sustain their needs. Age-squared coefficient is also significant at 5% level of significance but negative. This means that as a female participant grows up she reaches a certain age where her probability of participating in the labor market becomes

low. This finding conforms to Mincer's (1962) inverted U-shaped age profile. Studies by Nnadi and Akwiwu (2005) and Siphambe and Motswapong (2010) found the similar results.

Education is one of the most important determinants of female labor force participation. Taking no education as a reference category, the results show that a female having tertiary education increases the likelihood of her participating in the labor market. Females who had completed tertiary education had 1.02 times more likely to be employed (at a 1 percent level of significance) compared to the reference category. Also, females with secondary education are more likely to be employed but only at a 10 percent level of significance. Our results show that tertiary education exerts a significant and positive impact on female labor force participation. The findings are similar to the results of Sackey (2005) and Oluwaseyi (2013).

In terms of marital status, results show a positive and significant coefficient (at 1% significant level). This reflects that married females are more likely to participate in the labor market. Several researches found contrary results (Wambugu, 2002 and Atieno, 2006). The reason for this positive and significant results may be that married females may not be willing to stay at home to carry out household duties. This may also mean that there is household budget sharing, therefore the wife need forgo household activities in order to earn supplementary family income by participating in the labor market.

As for divorced and separated women, the results also show a positive and significant effect of female participation in the labor market. This means that divorced or separated females may not be assisted financially in their households. Therefore, the results show that divorced and separation impact positively on the labor force participation.

In terms of household number the results show a negative and insignificant coefficient implying that the household number has a negative effect on the female's entry in the labor market but it is not statistically significant. However a study by Oluwaseyi (2013) shown a positive and insignificant effect of household size.

4.2 SECTORAL CHOICES USING MULTINOMIAL LOGIT MODEL

Table 2 shows the determinants of female labor force participation. Therefore, Table 3 present multinomial logit regression estimates of the choice of employment sectors that females are likely to choose if they participate in the labor market. Among the sectors of employment, the industrial sector is omitted because it is the reference or base category.

The results indicate that female participation in the industrial, commerce and service sectors is likely to increase with residence (urban) as compared to the agricultural sector. This may be because the agriculture is predominantly practice in most of the rural areas. Hence most people migrant from the rural to urban area in Cameroon in search of jobs in other non-agricultural sectors. More so, sectors that pay higher wages are found in urban areas. According to Siphambe and Motswapong (2010), the urban areas have a vast majority of employment opportunities, so females would choose which of the sectors have good working conditions and pay higher wages.

The married and divorced or separated (with respect to single females) are more likely to participate in the industrial, commerce and service sectors. Married females and divorced are likely to choose these sectors rather than the agricultural because there is long term job security. This result means that being married or divorced has a positive effect on female participating in the labor market. Most especially for the divorced or separated, due to lack of financial support from husband, the women have no choice but to participate in the labor market in the so as to support themselves and their children.

Table 3: Multinomial Logit estimates of choice of employment sectors by females (Agricultural sector is the base category)

	(2)	(3)	(4)
Variables	Industrial	Commerce	Services
age	0.107***	0.0278	0.0629***
	(0.0358)	(0.0169)	(0.0197)
Age squared	-0.0011**	-0.000118	-0.000520*
	(0.0005)	(0.0002)	(0.0003)
Residence	1.190***	1.604***	1.430***
	(0.1820)	(0.0886)	(0.0997)
Household size	0.0418*	-0.0173	-0.0162
	(0.0249)	(0.0132)	(0.0148)
Household head	-0.222	-0.123	-0.364
	(0.2780)	(0.1120)	(0.1321)
Marital Status			
Married	0.716***	0.538***	0.732***
	(0.238)	(0.0995)	(0.1162)
Divorced/Separated	0.790**	0.482***	0.728***
	(0.3451)	(0.1363)	(0.174)
Religion			
Muslims	0.169	-0.000961	0.102
	(0.181)	(0.0849)	(0.0923)
Protestants	0.988***	0.901***	0.572***
	(0.257)	(0.131)	(0.162)
Other religions	-0.0114	-0.0228	-0.228
	(0.285)	(0.127)	(0.150)
Educational level			
Primary	1.266	1.337	1.282*
	(0.887)	(733.6)	(831.7)
Secondary	1.124*	1.411*	1.399***
	(1,887)	(733.6)	(831.7)
Tertiary	1.024***	1.448***	1.531***
	(0.887)	(0.7336)	(0.8317)
Constant	-1.551	-1.493	-1.424
	(1,887)	(733.6)	(831.7)
Log-likelihood	-5134.986		
Pseudo-R2	0.1449		
Prob>chi2	0.000		
LR chi2 (39)	1740.75		
Observations	5,703	5,703	5,703

**** p<0.01, ** p<0.05, * p<0.1; standard errors in parenthesis*

Education is important in allocating female workers among the various sectors as compared to the industrial sector (base category). Education as shown in Table 1 was categorized into four (no education, primary, secondary and tertiary) with no education being the based category. The results from Table 3 show that females with tertiary and secondary education are more likely to participate in the in all the sectors as compared to participating in the agricultural sector. This may indicate that these sectors' hiring criteria puts emphasis on tertiary and secondary education much more than the agricultural sector does. Therefore, primary education discourages entry into the non-agricultural sectors compared to the agricultural sector.

The results show that female participation in the industrial and service sectors increases with age as compared to the agricultural sector. This may be because as women grow older they realize the importance of getting "white collar" jobs in other sectors than the agricultural sector. Therefore, the more a female gets old, the more she participates in the industrial and service sectors in Cameroon. Age squared has a negative and significant coefficient for all employment sectors, showing that beyond a certain age females have lower chances of participating in the labor market.

Religion was categorized into four (Catholics, Muslims, Protestants and others) with Catholics being the base category. However, the results are only positive and significant for protestants. The results also show that females are protestants are more likely to participate in the industrial, commerce and service sectors than in the agricultural sector. Household characteristics are also important in determining females' participation in the labor force. However, household size and household headship are not significant in this model.

5 CONCLUSION

The main objective of this paper was to analyze the determinants of female labor participation as well as analyze the occupational differences within the sectors of employment for female in the Cameroonian labor market. The paper used data from the 2010 survey on employment and informal sector and applied probit model to analyze the determinants of FLFP and multinomial logit models to estimate the choice of employment sectors that females are likely to choose if they participate in the labor market.

The results from the probit model show that age, household head, married, being divorced or separated, as well as secondary and tertiary educational levels increase females' probabilities of participating in the labor market. Urban residence also has a positive effect on the participation in the labor market. Females who live in urban areas are more likely to participate in the labor market than those who live in rural areas. A possible explanation for the observation is that in urban areas there are more job opportunities as compared to the rural areas so females have larger pool to choose from hence they are more likely to participate in the urban areas.

The results from the multinomial logit model suggest that, education, protestant and being married are the most important factors in allocating female workers among industrial, commercial and service sectors as compared of working in the agricultural sector. In particular age encourages entry into the industrial and service sectors as compared to entry in the agricultural sector. Tertiary education may be particularly more significant in all sectors because it gives access to better opportunities in wage employment that are relatively secure and have stable income. The results also show that females with secondary education are more likely to participate in all the sectors even though with a lower level of significance. An important conclusion from these results is that tertiary education, marital status, urban residence and age are important in determining both FLFP and choice of employment sectors for females in the Cameroonian labor market.

The findings show that the better educated that women are, the more likely they are to participate in the labor market. However, the current conditions in the country shows that male education is prioritized over females' education. Hence, the enhancement in human capital, through female education will better equip the women to participate in the labor market and also to independently choose their sectors of employment

The policy implication on the basis of the above discussions is that if greater participation of women in the labor force is a desirable goal, Government should focus on the education for women and equally increase job opportunities in order to reduce the number of rural-urban female jobs seekers. This will give females a large pool of job opportunities to choose from. The study concludes that efforts to address the problem of women's access to the labor market should focus on improving their access to education and improving job opportunities as the important factors for improving their human capital.

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APPENDIX

Table 4: Descriptive Statistics of variables

Variables	Observation	Mean	Standard deviation
age	11953	29.430	15.390
Age2	11953	1103.47	1181.07
Residence	17247	0.527	0.499
Household size	2131	3.740	2.532
Household head	2,131	0.062	0.241
Marital status	**17,244**	**0.503**	**0.751**
single	11,279	0.327	0.469
Married	3,254	0.094	0.292
Divorced/Separated	2,711	0.079	0.269
Religion	***17,244***	***1.040***	***1.014***
Catholics	6,774	0.196	0.397
Protestants	4,765	0.138	0.345
Muslims	3,942	0.114	0.318
others	1,763	0.051	0.220
Educational level	**11,879**	**1.485**	**0.661**
No education	378	0.011	0.104
Primary	6,092	0.177	0.381
Secondary	4,677	0.136	0.342
Tertiary	732	0.021	0.144

Table 5: Probit model for FLFP using regional dummies

VARIABLES	Without Dummies	With Dummies
age	0.118***	0.128***
	(0.0115)	(0.0123)
Age squared	-0.00135***	-0.00147***
	(0.000151)	(0.000161)
residence	0.477***	0.574***
	(0.0687)	(0.0804)
Household size	-0.0151	-0.0103
	(0.0105)	(0.0114)
Household head	0.292***	0.342***
	(0.0990)	(0.103)
Married	0.189**	0.202**
	(0.0840)	(0.0887)
Divorced/separated	0.242**	0.143
	(0.120)	(0.128)
Muslim	0.0326	0.1030
	(0.0693)	(0.0735)
Protestants	0.338***	-0.169
	(0.101)	(0.117)
Other religions	-0.256**	-0.252**
	(0.119)	(0.125)
Primary	-0.0119	-0.346
	(0.647)	(0.634)
Secondary	0.0303*	0.422**
	(0.647)	(0.635)
Tertiary	0.423***	0.825***
	(0.655)	(0.645)
Littoral		-0.0426
		(0.0862)

Adamoua		-0.435**
		(0.194)
East		-0.00876
		(0.161)
Extreme North		-0.637***
		(0.170)
North		-0.528***
		(0.180)
North West		-0.660***
		(0.171)
West		1.003***
		(0.108)
South		-0.262
		(0.172)
South West		-0.424***
		(0.156)
Constant	-2.883***	-2.625***
	(0.678)	(0.674)
Observations	4,436	4,436

**** p<0.01, ** p<0.05, * p<0.1; standard errors in parenthesis*