



# Factors Leading Female Labour Force Involvement in Rwanda

**Mbonigaba Celestin**

Business and Development Studies, Kibogora Polytechnic, Nyamasheke, Rwanda

Email: mboncele5@gmail.com

## **Abstract :**

*The study evaluates the determinants of female labour force participation in Rwanda. The specific objectives were to establish the determinants of female labour choice to working in different sectors in Rwanda, and investigate the factors which affect female labour force participation in Rwanda. To be able to respond to the research questions and objectives, the Rwanda labor force survey data of year 2018 data collected by National institute of statistics of Rwanda (NISR) was used. As this study, use national coverage data with a representative sample of 8936 households in the second round of august 2018, while the sample size in the first round of February 2018 was 8924 households. The validity and representatively of the sample was done and tested by NISR (2018). The documentation on administrative data was done to compare and triangulation of results from the survey. The documents targets were available annual reports that talk about female labor force participation rate in 2018. The data analysis was done by descriptive statistical method to analyze data into quantitative by showing frequency, percentages and cumulative percent, the cross tabulation was used to show the relationship between dependent and independent variables, and finally logistic regression models was used to predict the odds ratios and probability of being employed and access the main determinant of female labor force market outcome in Rwanda. The study findings were summarized in accordance with the research objectives. The survey respondent's female in employment ages includes 40.1% of female from urban and 59.9% female in employment age are from rural areas. Among which almost 40.8% of female surveyed were married with one husband. It is evidenced that many females are single not yet married (34.5%). The findings show that to analyse the socioeconomic and demographic factors determining the factors of female employment in public institutions and the choice of employment using labor force survey data collected by NISR in the year of 2018. The multinomial and binary models provided almost the same trends in explaining the determinants of female employment in Rwanda, explained by near similar coefficients and odd ratios either in magnitude and sings. This technique helped to examine probable determinants of female employment and the estimation of these probabilities of being employed or being government employee. Hence, the findings of this study help us to confirm that the problem of the study was solved, research objectives were achieved, and research questions were answered where we confirmed that there are different determinants of female labour force participation in Rwanda. Government should develop the Soft skills which are important for both men and women, women may benefit more from soft skills training to foster self-esteem, decision-making, negotiation skills, and perseverance, for example. Acknowledging women's time constraints, provide flexible schedules and various time options for participation in services (e.g., mornings, evenings, and weekends).*

## **Keywords :**

*female; labour; Rwanda.*

## **I. Introduction**

Labor force participation refers to getting involved in remunerated activities. The persons can participate in the labor force as employers, personnel or dynamic job seekers. Persons who are self- employed can be included if they produce products or services that can be marketed (World Bank, 2013). Ratio of female to male of proportion of a country's working-age population (ages

15 and older) that engages in the labour market, either by working or actively looking for work (Mujahid, 2014).

Female participation makes the labor market more competitive by reducing substantive increases in salary cost structure. It also has been established that increases in female participation in the lower-income deciles can have a statistically significant impact on poverty indicators. However, the evidence suggests that education, age, number of children, and living in rural areas are important explanatory variables to account for the behavior of women in the labor market. The previous models do not explain the relatively women who decide to participate in the workforce because they failed to consider other variables like cultural factors, including cultural models of men and women's social roles; masculine and feminine models transmitted by the family of origin (deyemi, et al, 2006).

Men are mainly participating in labor force than women. Hence gender in participation rate has been narrowing substantially in recent decades where men tend to participate in labor markets more frequently than women. There is an increase in the female labour market participation which has slowed down or even regressed slightly in recent years. This gender participation gap has been falling since 1990. Nevertheless, it seems that this is due to a universal decline in male labor force participation rates (Mujahid, 2014).

The labor force participation for female is high in some of the poorest and richest countries in the world. It is lowest in the countries with average national incomes somewhere in between. In India and Indonesia, the informal economy accounts for nine out of every ten women working outside of agriculture, in Kenya for 83 per cent, 40 per cent in Tunisia, 30 per cent in South Africa, 74 per cent in Bolivia, 67 per cent in Brazil, 44 per cent in Chile and also in Colombia, 48 per cent in Costa Rica, 69 per cent in El Salvador, 65 per cent in Honduras, 55 per cent in Mexico, 41 per cent in Panama and 47 per cent in Venezuela (United Nations, 2000).

### **1.1 Statement of the Problem**

In Rwandan Government, there is an improvement of the participation of females in economic activities where it has put in full-fledged the Ministry of gender and community. Women accounted for close to 44 percent of the labour force, mostly engaged as crop farm laborers, field crop and vegetable growers, stall and market salespersons, and domestic cleaners and helpers. Among employed persons with managerial positions, 27 percent were women, the participation of female counts for 64% in parliament (Minaloc Website, 2017).

Although the Rwandan government reported the increase in number of female in labour force in parliament, for other public institutions like the district level, women represent 6.7% and men were 93.3% as districts Mayors in 2015. Women Vice-Mayors in charge of Social Affaires represent 96.6% while men as Vice-Mayors in charge of economic affairs represent 86.6%. Women as District Executive Secretaries represent 17%. At sector level, women as Executive Secretaries represent 13% (Mifotra, 2017).

In justice, women fear taking their cases to courts due to their cultural background that does not encourage them to address relevant issues through courts. Even those who overcome the issue of fear face the challenge of paying for costly legal assistance. It goes without saying that most discriminatory laws have been revised. However, difficulties persist in that the populations are not informed about the gender sensitive laws that have been enacted, nor are they informed about their rights under these laws (NISR, 2016).

Gender-based violence (GBV) remains rampant despite of various measures adopted to address it. A significant number of gender discriminatory laws have been revised, although not exhaustively, but their dissemination needs to cover the entire national territory. Different influencing factors have been identified including poverty, ignorance, consumption of alcohol, to name a few. Women are the majority among the victims of GBV and men are the majority among the perpetrators. Women are the minority in key employment positions and they are the majority among the supporting staff (Migeprof, 2017). There is insufficient evidence and scarcity of the studies in Rwanda about the determinant factors which influence female labour force participation. This attract the researcher to cover the gap by establishing the determinant factors of female labor force participation in Rwanda.

## **1.2 Research Objectives**

The specific objectives of this study were as follows.

1. To establish the determinants of female labour choice to working in various public sectors in Rwanda.
2. To investigate the factors which affect female labour force participation in Rwanda.

## **II. Literature Review**

The maternal health influences the female labour force participation in public institutions, many studies report empirical relationship either between fertility and labour supply or, between health and labour market outcomes. In this paper, an extension of these ideas involves explicitly considering how fertility and health affect each other, and how they interrelate with labour force participation. A unifying framework is provided and a simultaneous three equations model developed to capture the interdependence between these variables as well as their respective determinants. The model is estimated using a cross-section data set obtained from a survey of the urban Cameroon population. The results indicate that fertility and health status are significantly interrelated, thus separate estimations of fertility (or health status) and participation will produce misleading results; working in either sector of the labour market significantly reduces fertility but, unlike many previous studies, fertility has a confident influence on the probability of labour force participation; there is robust suggestion that health and disability status is a significant determinant of employment, but the reverse depend on the labour market sector and on the health indicator used (Christian and Zamo-Akono, 2010).

The determinants of female labour force in Cameroon and its influence on the economic growth of the country using a times series approach for 37 years (1980-2014). Adopting a generalized method of moment technique of estimation with two models we observed that dependency ratio, fertility rate, male labour force and per capita income are clear determinants of female labour force in Cameroon. The economic growth equation shows opposite significant between female and male labour supply on economic growth over our period of the study (Njimanted, et al, 2016).

In this study carried out by Muhammad Umair, dependent variable was crime rate and independent variables were population growth, inflation, national income and economic growth. So he rejected the [Cerro & Meloni 2000] and accept the Gumus [2004] and Saridakis [2004] results, because crime and economic growth has strong relation between them, population has positive relation with crime and inflation and income has negative relations in short run. Due to t value which is less than 1.9 and p value shows more than 0.05 of all variables except economic growth. So, we can say there are no long run relationships of inflation, national income and population but

economic growth. Economic growth shows the inverse relation with crime. So, when the crime increase economic growth declines this is unfavorable situation for the country (Umar, 2019).

### III. Research Methodology

#### 3.1 Cross tabulations

Whereby Chi-square test was used to analyze the association between social economic status of female and the predictor variables

#### 3.2 Logistic Regression Model

The logistic regression model describes how the probability of a particular category depends on explanatory variables. It uses a linear model for the logit transformation of the probability, which is the log of the odds. For quantitative explanatory variable, S-shaped curve describes how the probability changes as the predictor changes. The logistic model is popular because the logistic function, on which the logistic regression model is based, provides estimates in the range 0 to 1 and an appealing S-shaped description of the combined effect of several risk factors on the risk for an event [4]. In this study, the corresponding odds is a value given by

$$\text{odds of [Event]} = \frac{P}{1-p}$$

With logistic regression the mean of the response variable  $p$  in terms of an explanatory variable  $x$  is modeled relating  $p$  and  $x$  through the equation  $p = \alpha + \beta x$ . Unfortunately, this is not a good model because extreme values of  $x$  gives values of  $\alpha + \beta x$  that does not fall between 0 and 1. With logistic regression we model the natural log odds as a linear function of the explanatory variable:

$$\text{logit}(y) = \ln(\text{odds}) = \ln\left(\frac{P}{1-p}\right) = a + \beta x \quad (1)$$

Where  $p$  is the probability of interested outcome and  $x$  is the explanatory variable. The parameters of the logistic regression are  $\alpha$  and  $\beta$ . This is the simple logistic model. Taking the antilog of equation (1) on both sides, one can derive an equation for the prediction of the probability of the occurrence of interested outcome as

$$p = P(Y = \text{interested outcome} / X = x, \text{ a specific vlaue}) \\ = \frac{e^{a+\beta x}}{1 + e^{a+\beta x}} = \frac{1}{1 + e^{-(a+\beta x)}}$$

Extending the logic of the simple logistic regression to multiple predictors, one may construct a complex logistic regression as

$$\text{logit}(y) = \ln\left(\frac{P}{1-p}\right) = a + \beta_1 x_1 + \dots + \beta_k x_k$$

Therefore,

$$p = P(Y = \text{interested outcome} / X_1 = x_1, \dots, X_k = x_k) \\ = \frac{e^{a+\beta_1 x_1 + \dots + \beta_k x_k}}{1 + e^{a+\beta_1 x_1 + \dots + \beta_k x_k}} = \frac{1}{1 + e^{-(a+\beta_1 x_1 + \dots + \beta_k x_k)}}$$

#### 3.3 Odds ratio

The odds ratio (OR) is a comparative measure of two odds relative to different events. For two events A and B, the corresponding odds of A occurring relative to B occurring is

$$\text{odds ratio } \{A \text{ vs. } B\} = \frac{\text{odds } \{A\}}{\text{odds } \{B\}} = \frac{P_A/(1-P_A)}{P_B/(1-P_B)}$$

Note: the multinomial logistic model gives n-1 equations, which are interpreted individually as in the case of binary model.

#### IV. Results and Discussion

**Table 4.1** Respondent by their economic activity

Economic activity	Freq.	Percent	Valid	Cum.
Agriculture forestry and fishing	1954	33.5	41.51	41.51
Mining and quarrying	9	0.15	0.19	41.7
Manufacturing	309	5.3	6.56	48.27
Electricity gas steam and air conditioning supply	6	0.1	0.13	48.4
Water supply, gas and remediation services	19	0.33	0.4	48.8
Construction	189	3.24	4.02	52.81
Whole sale and retail trade; repair of motor vehicles and motorcycles	826	14.16	17.55	70.36
Transportation and storage	20	0.34	0.42	70.79
Accommodation and food services activities	109	1.87	2.32	73.1
Information and communication	25	0.43	0.53	73.64
Financial and insurance activities	68	1.17	1.44	75.08
Real estate activities	5	0.09	0.11	75.19
Professional, scientific and technical activities	31	0.53	0.66	75.84
Administrative and support activities	92	1.58	1.95	77.8
Public administration and defense; compulsory social security	60	1.03	1.27	79.07
Education	169	2.9	3.59	82.66
Human health and social work activities	97	1.66	2.06	84.72
Arts, entertainment and recreation	18	0.31	0.38	85.11
Other services	67	1.15	1.42	86.53
Activities of households as employers	596	10.22	12.66	99.19
Activities of extraterritorial organizations and bodies	38	0.65	0.81	100
Employed	4707	80.71	100	
Unemployed	1125	19.29		
All female in labor force	5832	100		

*Source: Documentary Review from NISR (2018)*

Among employed women, 41.51% of them are engaged in agriculture, or forestry and fishing works, while very few 6.56% and 0.19% of female are in manufacturing, mining and quarrying activities respectively. About 17.55% of employed female are engaged in Whole sale and retail trade; repair of motor vehicles and motorcycles activities, 1.95% are in Administrative and support activities, and 1.27% are in Public administration and defense; compulsory social security.

#### 4.1 Checking for multicollinearity among the variables to be used in the regression model

According to Kennedy (1992), a VIF greater than 10 indicates harmful collinearity. When the VIF reaches these threshold levels, researchers may feel compelled to reduce the collinearity by eliminating one or more variables from their analysis; combining two or more independent variables into a single index; resorting to a biased regression technique that can reduce the variance of the estimated regression coefficients; or, in rejecting a paper because VIF exceeds a threshold value. (Belsley *et al.*, 1980). The following tables show the results of the checking from STATA.

**Table 4.2** Multicollinearity test

Variable	VIF	1/VIF
Dummy female has a degree	3.69	0.271
Dummy language proficiency	2.81	0.356
Dummy computer literacy	2.71	0.369
Average Hours per week in Home duties	2.21	0.453
Average hours per week in caring for babies	1.98	0.506
Age of household head	1.91	0.525
Dummy degree of household head	1.77	0.565
Type of school attained	1.76	0.567
Average Age of female in labor force	1.53	0.655
Marital status	1.5	0.667
Residence (1=Urban, 0=rural)	1.35	0.739
Average household size	1.18	0.844
Employment status of head of household (1=employed, 0=not employed)	1.17	0.856
Number of years in school	1.02	0.979
Mean VIF	1.9	

Source: Documentary Review from NISR (2018)

The tables 2 revealed that there was no problem of multicollinearity among independent variables, since in all cases, the VIF < 10. Thus the study may proceed with all demographic independent variables to fit our logistic models.

#### 4.2 Checking for non-linearity between the dependent variable and independent variables and for non-normality of errors

The logistic regression does not assume a linear relationship between the dependents and the independents normally distributed error terms are not assumed. The following table is the output of STATA on the linearity between the dependent variable (type of employment : public or not public) and the independent variables: household size, age of household head (age), Marital status (Status), Residence, years of schooling, education levels, hours occupied in home works and caring babies.

From the table 3, observed that the largest correlation coefficient is 0.5950 which is recorded between Type of school attained and the Degree of female. This shows that there is no variable which exhibits any stronger linear association with the dependent variable.

The correlation coefficients are all different from zero, which implies that public age of respondent, marital status, year of schooling, degree of female, type of school, computer literacy, language, hours of caring babies, household size, hour of home duties, age of household, employment of the head, and region. Thus, these variables are being used in the logistic model.

**Table 4.3** Correlations between the variables in the model

<b>Variables in model</b>									
Public	1.00								
Age of Respondent	0.07	1.00							
Year of schooling	0.09	0.00	1.00						
Degree of female	0.37	-0.09	0.11	1.00					
Type of school attained	0.28	-0.06	0.04	0.60	1.00				
Hours of home duties	-0.07	0.04	-0.02	-0.17	-0.10	1.00			
Age of Household head	-0.01	0.38	0.00	-0.04	-0.02	-0.17	1.00		
Head Employments	0.04	0.03	-0.02	-0.01	0.00	0.03	-0.29	1.00	
Residence	0.08	-0.13	0.06	0.38	0.16	-0.31	-0.10	0.04	1.00

Source: Documentary Review from NISR (2018)

#### 4.3 Test of association between the dependent and demographic factors

As it was reviewed in literature that demographic characteristics of female (age, and marital status), together with economic variables household wealth, assets and other socio economic factors have an effect on women employability are summarized in table 4 The results indicate that there is association between type of employment and the following predictor variables: Age of the respondent, region (urban or rural), marital status, Hours occupied in home duties, degree/certificate of the head, type of school attained, degree/certificate of female, computer literacy, language, number of years in school, year of schooling of the head, and employment of the head of household.

**Table 4.4** Association between the dependent and Independent variables

<b>Variables in the Model</b>	<b>Chi square values</b>	<b>Df</b>	<b>Asymp. Sig. (2-sided)</b>
Age of respondents	116.739	62	.000
Region	40.187	1	.000
Married	25.35	1	.000
Hours home	142.755	91	.000
Age of head	95.517	74	0.05
Degree head	415.299	1	.000
Public school	457.61	1	.000
Degree female	815.118	1	.000
Computer	583.174	1	.000
Language	583.796	1	.000
Year school	1022.304	23	.000
School head	471.883	26	.000
Employment Head	9.571	1	.002

Source: Documentary Review from NISR (2018)

By using labor force data, at 5% level of significance all variables are significant (p-values<0.05) except the age of household head. The results from tables above showed there is no multicollinearity, serial correlation in data between independent variables and employment outcome. Therefore, all covariates and factors are being used in analysis. The results indicate that there is association between employment outcome and the selected demographic variables used in the table 4.4.

#### 4.4 The determinants of female labor in public institution in Rwanda: Logistic Regression Model Fitting

The Binary logistic regression analysis was used to examine the effect all independent variables on labor outcome of female in Rwanda. The table 5 presents the results of a binary regression coefficient in relation to the public employment of female in Rwanda and all variables are used in the model as they are found to be statistically significantly correlated with public employment of female as presented in table 5 The variables are re-examined in order to provide a clearer identification of the significant determinants of public employment of female in Rwanda.

The results are interpreted by comparing employment of female, either public servant or not a public servant through the coefficients and the odds ratios given by STATA output in table 5 The probability of being employed as public servant increases accordingly to the sign of betas, categories having positive coefficients are more likely to influence employment of female in public institution or organization while negative coefficients are less likely to influence employability of female in public institution compared to reference category which is being not employed in public institution.

**Table 4.5** Logistic regression model of determinants of female employment in public institutions in Rwanda

Women in Public employment	Coef.( $\beta_i$ )	Std. Err.	Odds Ratio	[95% Conf. Interval]		P. value (Coef)
Age in years	0.072	0.011	1.074	1.052	1.098	0.000
Marital status	0.123**	0.191	1.130	0.778	1.640	0.518
Number of years in school	0.224	0.044	1.250	1.147	1.362	0.000
Holding degree	1.909	0.417	6.811	3.002	15.454	0.000
Type of school	0.694	0.186	1.998	1.386	2.879	0.000
Computer literacy	0.063**	0.237	1.073	0.674	1.708	0.790
Language proficiency	0.200**	0.230	1.216	0.774	1.910	0.385
Time for child care	0.032	0.016	1.033	1.001	1.066	0.047
Household size	0.013**	0.042	1.013	0.933	1.099	0.756
Time for home duties	-0.025	0.010	0.975	0.957	0.994	0.009
Age of household head	-0.012**	0.011	0.988	0.969	1.008	0.270
Degree of household head	0.536	0.230	1.703	1.086	2.671	0.020
Employed Household Head	0.237**	0.199	1.267	0.857	1.873	0.235
Residence	-1.592	0.203	0.204	0.137	0.304	0.000
Intercept	-7.661	0.596	0.000	0.000	0.001	0.000

\*\* Not statistically significant because P-value (alpha) is greater than 5%. Source: computed from Labor force 2018 data

Source: Documentary Review from NISR (2018)

## V. Conclusion and Recommendation

### 5.1 Conclusion

We proposed multinomial and binary logistic models to analyses the socioeconomic and demographic factors determining the factors of female employment in public institutions and the choice of employment using labor force survey data collected by NISR in the year of 2018. The multinomial and binary models provided almost the same trends in explaining the determinants of female employment in Rwanda, explained by near similar coefficients and odd ratios either in

magnitude and sings. This technique helped to examine probable determinants of female employment and the estimation of these probabilities of being employed or being government employee. Hence, the findings of this study help us to confirm that the problem of the study was solved, research objectives were achieved, and research questions were answered where we confirmed that there are different determinants of female labour force participation in Rwanda.

## 5.2 Recommendations

Rwanda can increase female participation in the labor market by modernizing its legal framework, particularly as it relates to family law. From the supply side, young females are getting more and more education in urban areas, without necessarily getting a job. Government institutions should provide more information about the services offered at the employment Agency, including to public institution who can act as intermediaries for sharing information with the women they serve. Additionally, advertise success stories of women who found work through the Employment Agency's support measures, provide counseling to address gender-stereotypes and occupational segregation, for instance by promoting work opportunities for women in non-traditional sectors and occupations. Prioritize on-the-job training and job search assistance where interventions that provide practical work experience to women should be expanded. Moreover, complementary support on how to search for jobs and engage with employers have proven useful.

Development of Soft skills which are important for both men and women, women may benefit more from soft skills training to foster self-esteem, decision-making, negotiation skills, and perseverance, for example. Acknowledging women's time constraints, provide flexible schedules and various time options for participation in services (e.g., mornings, evenings, and weekends). Access and transportation for ensuring easy and safe accessibility of training locations, and cover travel expenses as needed. Child-care for providing child care assistance at training facilities or offer child care stipends, and develop the work environment where engage with employers to foster a women-friendly workplace (e.g., part-time, flexible hours, occupational safety and health).

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