Effects of Educational Assortative Mating on Female Labour Market Outcomes in Cameroon

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Abstract

Using the recent three waves of Cameroon Demographic Health Surveys, this paper investigates the effects of the degree of positive educational assortative mating on female full-time employment and occupational choices among married women. To achieve the set objectives, we employed the Control function Probit and the Control function multinomial probit. The control function probit results show that positive educational assortative mating increases the likelihood of full-time employment by 14.4%. Also, the control function multinomial probit results indicate a positive association between educational assortative mating and the probability of choosing professional, clerical, sales, and service occupations, and a negative relationship with the likelihood of choosing agricultural and skilled manual work. Policy implications suggest the promoting policies aimed at ensuring equal access to quality education for all individuals. Such measures can help alleviate educational disparities and enhance labour market outcomes for females. Additionally, policies supporting dual-career couples with high educational levels.

Keywords: Educational assortative mating, Female full-time employment, Occupational choices, control function, Cameroon

1. Introduction

The international community has set a goal to enhance the participation of women in the labor force, aiming to attain global gender equality by 2030, as outlined in the 2030 Agenda for Sustainable Development. However, it is crucial to acknowledge that achieving this goal on a societal and economic scale is contingent upon gender equality within families (ILO, 2020). Recent findings from the ILO and UN-Women indicate a strong correlation between the labour force participation rates of women and men and the composition of their households (UN Women, 2020). Research provides evidence of a significant decrease in labour force participation among married women compared to single women, emphasizing the impact of marital status on women's employment patterns (Goldin, 2014; Feridun, & Bahmani-Oskooee, 2018). However, the influence on labor market outcomes is not solely determined by the act of getting married but also by the characteristics of one's partner. Consequently, the choice of a partner is likely to have long-term strategic effects on the labour market outcomes of both women and men. In this light, this research examines the effects of educational assortative mating on female labor market outcomes in Cameroon, which is crucial for policies seeking to address persistent labor market gender gaps in the country.

The prevailing patterns of educational assortative mating have often been attributed to traditional gender roles, where men are viewed as primary earners and women as homemakers (Becker, 1991). Educational assortative mating patterns exhibit both dissimilarity and similarity in educational characteristics between partners. These patterns have important implications for various aspects of individuals' lives, including their labour force participation, particularly for women. Certainly, educational assortative mating can contribute to the gendered division of labour within households, wherein women often shoulder more responsibility for domestic tasks and childcare, constraining their full-time participation in the labor market (Pilossoph & Wee, 2019). Research suggest that when couples share similar educational levels, traditional gender roles and expectations may be reinforced, leading women to take on more domestic and caregiving responsibilities, thereby limiting their ability to fully engage in paid work (Zhang & Chan, 2018; Schwartz, 2013). The concentration of highly educated individuals in specific occupational sectors or industries can further exacerbate occupational segregation, restricting women's access to high-paying and high-status jobs (Black et al., 2005).

Understanding labor market outcomes for women is crucial because an increase in women's labor market participation is likely to enhance economic growth, productivity, and overall societal well-being. The United Nations Development Programme (UNDP) recognizes that women's economic empowerment, including their participation in the labour force, is essential for achieving gender equality and advancing human development (UNDP, 2018). The World Bank (2021) also acknowledges that closing gender gaps in labor force participation can contribute to economic growth and development, emphasizing the importance of creating an enabling environment that promotes women's labor force participation. Additionally, the Organization for Economic Co-operation and Development (OECD) highlights that increasing women's labor force participation is crucial for boosting productivity and economic prosperity. It underscores the importance of policies supporting work-life balance, promoting gender equality in employment, and providing opportunities for women's career advancement (OECD, 2017). Gender inequalities in the labor market can result in women being disproportionately affected by poverty and financial vulnerability (UN Women, 2020).

International bodies and the government of Cameroon have implemented various policies and initiatives to enhance female labor market outcomes. At the global level, organizations such as the International Labour Organization (ILO) and UN Women have actively advocated for policy interventions to reduce gender disparities in the workforce. The ILO has emphasized the importance of promoting equal pay, eliminating discrimination, and improving work-life balance to enhance women's labor market participation (ILO, 2020). UN Women has called for the implementation of gender-responsive policies and programs that address systemic barriers and promote women's economic empowerment (UN Women, 2020). At the national level, the Cameroon government has taken steps to boost female labour force participation through policies such as the National Gender Policy, the National Employment Strategy and the National Employment Fund's "Gender and Employment" program. These policies aim to facilitating women's integration into the labor market, enhance women's access to decent work, eliminate gender-based discrimination, and promote equal opportunities for career advancement (Ministry of Women Empowerment and the Family, 2019; National Employment Fund, 2020).

Despite this progress, women still face challenges that hinder their participation and advancement in the labour market. According to the World Economic Forum's Global Gender Gap Report, there is a substantial gender gap in labour force participation rates (World Bank, 2021). Additionally, women often experience lower employment rates, limited access to quality

jobs, and wage gaps (ILO, 2020). Particularly, female labour market outcomes remain poor in Cameroon. In 2021, the labour force participation rate in Cameroon stood at 71.77%. Women continue to face lower labour force participation rates at 67.45% compared to men at 76.18%, with limited access to decent employment opportunities (World Bank, 2021). Occupational segregation remains a significant concern, with women predominantly concentrated in sectors such as agriculture and services, while men dominate industries such as manufacturing and construction (Ministry of Women Empowerment and the Family, 2019). These trends highlight the need for continued efforts to address systemic barriers, biases, and discriminatory practices that hinder women's advancement and contribute to these disparities.

The literature on married women's labor supply decisions is extensive. For example, Cameron et al. (2020), Del Boca et al. (2018), Blau and Kahn (2017), Goldin (2014), Ragui et al. (2020). Some studies have equally been carried out on female labor force participation in Cameroon, providing insights into the factors that determines women's engagement in the labour market (Kuepie et al. 2013; Zamo-Akono, 2009). There is also an extensive body of literature that examines educational assortative mating patterns. However, very few studies have investigated the relationship between educational assortative mating and female labour market outcomes, for example, Christian & Falko, (2013) and Rania and Osnat (2022).

The contribution of this paper lies in its endeavour to comprehensively understand the impact of educational assortative mating on labour market outcomes, specifically focusing on female full-time employment and occupational choices in Cameroon. Given that educational assortative mating is poised to be a significant determinant of female labour market outcomes in Cameroon, the linkage remains largely unexplored. Hence, there exists a compelling necessity to delve deeply into the role of educational assortative mating in shaping women's labour market outcomes within Cameroon. Such an investigation holds promise in offering policymakers and stakeholders' valuable insights to formulate and implement effective strategies and policies aimed at fostering a more equitable and inclusive society. The main objective of this paper is to investigate the effect of educational assortative mating on female labour market outcomes in Cameroon. Specifically, the paper aims to (1) examine the effect of educational assortative mating on female full-time employment and (2) assess the influence of educational assortative mating on women's occupational choices in Cameroon.

2. Literature Review

2.1 Theoretical Background

Human capital theory, as articulated by Becker (1964), provides a lens through which the effects of educational assortative mating on labour market outcomes can be analysed. This theory posits that education enhances individuals' skills, knowledge, and productivity, leading to improved employment prospects and higher earnings. When couples share similar educational backgrounds, the positive effects of education on labour market outcomes may be amplified, as both partners contribute comparable human capital to their household (Goldin & Katz, 2002). Several mechanisms elucidate how educational assortative mating influences labour market outcomes: Differential Human Capital Accumulation, Division of Labor and Household Responsibilities, Occupational Segregation, and Social Norms and Expectations.

Educational assortative mating affects labour market outcomes by shaping the accumulation of human capital. Similar educational backgrounds between partners can reinforce gender disparities in educational attainment and skills, potentially resulting in unequal access to job opportunities and career advancement (Becker, 1991). Individuals may invest more in their human capital when anticipating uninterrupted labour force participation, such as through additional training. However, societal expectations, particularly regarding women's roles in caregiving and maternity leave, may hinder women's investment in market-related training (Polachek, 2004).

Furthermore, educational assortative mating influences the division of labour within households, potentially perpetuating traditional gender roles. Similar educational backgrounds may reinforce stereotypical gender divisions, with women shouldering more domestic responsibilities while men focus on career advancement (Sullivan & Joshi, 2014). This unequal division of labour can constrain women's availability for career pursuits, leading to lower labour force participation and constrained labour market outcomes (Mandel & Semyonov, 2005).

Additionally, educational assortative mating contributes to occupational segregation by aligning couples' career aspirations and choices. Couples with similar educational backgrounds may enter fields aligned with traditional gender roles, reinforcing occupational segregation and limiting access to diverse job opportunities for both genders (Schwartz & Mare, 2005). This

perpetuates societal expectations regarding gender roles in the labour market and hinders female labour force participation (Goldin & Katz, 2002).

Societal norms and expectations regarding gender roles also influence educational assortative mating and, consequently, labour market outcomes. Traditional gender norms prescribing men as primary breadwinners and women as homemakers shape educational choices and career aspirations, reinforcing gender inequalities in the labour market (Goldin & Katz, 2002).

2.2 Empirical Literature

2.2.1 Empirical studies on female participation in the labour market

Several studies analyse female participation in the labour market, investigating factors influencing women's decisions to work. Zamo-Akono (2009) studied urban Cameroon and found a positive correlation between fertility and female labour force participation, with working women having fewer children. Ragui et al. (2020) used multinomial logit models for four MENA countries, revealing a decline in public sector employment for educated women, leading to increased unemployment or decreased participation. Blau and Kahn (2017) explored the US gender wage gap's impact, emphasizing experience, education, and union coverage elimination as key factors in reducing it. Cameron et al. (2020) focused on Indonesia, finding a 13-27% impact of household and labour market characteristics on the gender wage gap. Goldin (2014) outlined historical trends and challenges in female labour force participation, addressing factors like education and work-family balance. Klasen (2019) noted a U-shaped relationship between educational attainment and labour force participation among women, influenced by schooling expansions in developing countries. Del Boca et al. (2018) reviewed European literature, highlighting institutional factors like family policies and childcare availability's role in women's employment choices. Kleven et al. (2019) investigated Denmark's context, discovering that having children, especially for highly educated women, significantly reduces female labour supply, contributing to gender inequality. These studies collectively illuminate the complexities of female labour force participation, influenced by diverse socio-economic factors and policy environments.

2.2.2 Assortative Mating and Female Labour Force Participation

Several studies have explored the nexus between educational assortative mating and labour market outcomes. Rania and Osnat (2022) utilized data spanning from 1965 to 2011 to examine how the educational gap between spouses influences married women's labour supply behaviour. Their dynamic life-cycle model revealed that when wives surpass husbands in education, the likelihood of employment significantly increases, with a gap as wide as 14.5 percentage points. Returns to experience accounted for approximately 52 percent of the observed employment disparity between women marrying "down" and "up." Counterfactual analyses demonstrated that changes in assortative mating patterns contributed roughly 25 percent to the rise in married women's labour force participation.

Christian and Falko (2013) investigated the correlation between assortative mating and female labour supply in the US, focusing on married women's hours worked relative to their husband's wage decile. They noted a shift in the pattern over time, attributing it to trends in assortative mating. The study found that increased female labour hours since the 1970s were driven by female wage growth and declining fertility, particularly among wives married to high-wage men.

Martin and Paul (2013) analysed the relationship between educational assortative mating and gender-specific earnings using Swedish population data from 1960 to 1974. Their longitudinal design revealed that being partnered with a more educated individual (hypergamy) correlated with higher earnings, while partnering with a less educated individual (hypogamy) correlated with lower earnings. Most earnings differences emerged before marriage, suggesting marital selection processes rather than direct effects of partner education on earnings. However, hypogamy among highly educated individuals showed slower earnings growth after union formation compared to homogamy and hypergamy.

3. Empirical Methodology

3.1 Measure of Educational Assortative Mating

To capture the variable of interest-educational assortative mating, we use the measure used by Kollamparambil (2019) to capture the degree of Positive Educational Assortative Mating (PAM) among couples. Contrary to some previous works on educational assortative mating such as Dribe and Nystedt (2013) and Hu and Qian (2015) that captures educational homogamy in a categorical manner, this measure captures Positive educational assortative mating in a

continuous fashion. In order to construct the degree of positive educational assortative mating index, educational variables of the partners are first normalized thereby constraining the education variables of the partners to take values between 0 and 1. Letting ${E^h}_i$ and ${E^w}_i$ to represent respectively the husband education variable and wife education variable, the standardized variables are given as:

$$ {R^h}_i = \frac{{E^h}_i - \overline{E_h}}{\sigma_h} \tag{1} $$

$$ {R^w}_i = \frac{{E^w}_i - \overline{E_w}}{\sigma_w} \tag{2} $$

Where ${R^h}_i$ and ${R^w}_i$ are the standardized education variables for the husband and wife respectively. $\overline{E_h}$ and $\overline{E_w}$ are the average husband education and the average wife education respectively meanwhile σ_h and σ_w are respectively the standard deviations of the husband education and wife education. The indicator for degree of positive educational assortative mating (PAM) is thus given as:

$$ PAM_i = |{R^h}_i + {R^w}_i| \tag{3} $$

Using the sum of the standardized years of schooling between spouses in Equation 3 effectively captures positive educational assortative mating. Higher values signify greater educational similarity between spouses.

3.2 Empirical Strategy: Control Function Modelling Strategy

Two models are applied in this chapter, the control function probit and the control function multinomial probit models. The probit model is used to evaluate the effect of positive educational assortative mating (PAM) on female full-time employment. The probit model ignores all occupational differences within sectors, therefore the control function multinomial probit model is applied to analyze the occupational differences within the sectors, if females participate in the labor market.

3.2.1 . Effect of Positive Educational Assortative Mating on Female Full-time Employment: Control Function Probit

Considering the female full-time employment (FTE) choice, we can model it as follows:

$$FTE^{*} = \alpha_0 + \alpha_1 PAM + \sum_{k=2}^{m} \alpha_k X_k + \mu_1 \quad (4)$$

Where FTE^{*} is the female full-time employment, PAM is independent variable of interest-positive educational assortative mating, X is the set of other explanatory variables that captures the characteristics of the interviewee that help to determine FTE^{*}, α_1 is the effect of PAM on female fulltime employment. α_k is a vector of parameters to be estimated and μ_1 is the error term. Note however that FTE^{*} is not observed but what is observed is the binary outcome in Equation (5) FTE = 1 and FTE = 0,

$$FTE = \begin{cases} 1, & if \ \alpha_0 + \alpha_1 PAM + \sum_{k=2}^{m} \alpha_k X_k + \mu_1 > 0 \\ 0, & if \ \alpha_0 + \alpha_1 PAM + \sum_{k=2}^{m} \alpha_k X_k + \mu_1 \leq 0 \end{cases} \quad (5)$$

At this level, a Logit or Probit model can be used to estimate the effect of positive educational assortative mating on female full-time employment. In this study, use is made of the Probit regression analysis since our dependent variable female labour force participation is binary.

The probit model estimation for female full-time employment is of the following form:

$$Pr(FTE = 1|PAM, X) = \Phi\left(\alpha_0 + \alpha_1 PAM + \sum_{k=2}^{m} \alpha_k X_k\right) \quad (6)$$

In Equation 6, Φ denotes the cumulative distribution function of the standard normal distribution. α_0 represents the intercept term, α_1 represent the effect positive educational assortative mating on female full-time employment.

However, a typical female full-time employment equation is contingent upon a non-random decision: participation in the labor market. In the presence of such a censored choice that affect the outcome, a simple probit model is likely to produce estimates that are biased and inconsistent. Therefore, when estimating the structural equation (Equation 5.3), it is mandatory to acknowledge that individuals normally must decide whether to work or not. If the decision to work is not random, then it is imperative to consider sample selection biases when modeling female full-time employment. In this regard, the method proposed by Heckman (1979) is an appropriate approach to correct for these sample selectivity bias. To implement the Heckman sample selection correction, we first define a selection indicator (S). The selection indicator

takes the value 1 if the woman is working, and zero otherwise. The first step in the Heckman approach entails estimating the following probit model:

$$Pr(S_i = 1, |H) = G(H'\gamma) \tag{7}$$

Where,

$$S_i = \begin{cases} 1, & if\ the\ woman\ is\ working \\ 0, & if\ the\ women\ is\ not\ working \end{cases}$$

Where G(.) is a response probability generating function with values lying strictly between the interval $0 \leq G(.) \geq 1,$ for all real numbers (.) meanwhile H is a set of exogenous variables including an identifier. The variable employed to identify the selection equation is the nonself cluster proportion of working women. After predicting the probability probability, a probability density function and cumulative density function are generated. Following Heckman (1979), the probability density function is divided by the cumulative density function to derive the resulting inverse Mills ratio (λ).

Additionally, our independent variable of interest, positive educational assortative mating (PAM), is susceptible to endogeneity. The endogeneity of PAM is anticipated to stem from various sources, including mismeasurement. Mismeasurement can occur due to inaccuracies in the measurement or operationalization of PAM, leading to biases in the estimation of its effects on female full-time employment. Similarly, endogeneity might also arise from unobservable variables, such as innate ability, that are correlated with positive educational assortative mating (PAM). These unobservable characteristics, which are not directly measured in the analysis, may influence both PAM and female full-time employment. The endogeneity is addressed in this chapter using the residual inclusion approach. The instrument employed in this study is the non-self-cluster mean of positive educational assortative mating (PAM). The identification of PAM is based on the concept of social interactions to compute a non-self-cluster mean of PAM. This identification strategy has been utilized by Rahman and Mishra (2019), Baye et al. (2020), and Epo et al. (2023). To implement the residual inclusion approach, we estimate the reduced form (not explicitly modeled in this chapter) of PAM and predict the residual. The residual is then included as an additional variable in the structural equation. The full-fledged control function version of the female full-time employment is given as:

$$Pr(FTE = 1|PAM, X) = \Phi\left(\theta_0 + \theta_1 PAM\ + \sum_{k=2}^{m} \theta_k X_k\ + \delta_1\lambda + \delta_2\hat{\varepsilon} + \delta_3\hat{\varepsilon} * PAM\right) \tag{8}$$

Where θ and δ are parameters to be estimated. λ is the inverse mills ratio accounting for the selectivity bias and $\hat{\varepsilon}$ is the residual of the reduced form of PAM included to correct for endogeneity of PAM while the interaction term $\hat{\varepsilon} * PAM$ is included to account for unobserved heterogeneity. Since $\hat{\varepsilon}$ captures the unobservable variables in the reduced form of PAM, if its interaction with the PAM is statistically significant it indicates non-linear differences among individuals in terms of their unobservable attributes, which may be complementing with PAM (+ sign) or substituting for PAM (- sign). If δ_3 is statistically nonsignificant, then we fail to establish the presence of unobserved heterogeneity.

3.2.2. Modelling the Effect of Educational assortative mating Patterns on Occupational Choices: Multinomial Probit

In this study, we adopt Green (2003) to model our different occupational choices (DOC) using a random utility function. For the i-th woman faced with j choices of occupation, the utility of choosing an occupation type j is expected to take the following format:

$$U_{ij} = x_{ij}\beta_j + \varepsilon_{ij} \tag{9}$$

In Equation 9, U_{ij} is the utility derived by a woman i from choosing an occupation type j , $x_{ij}\beta_j$ is considered as the deterministic portion of the utility function while ε_{ij} denotes the stochastic portion of the utility function. When a woman i decides to go in for occupation type j, then it is considered that U_{ij} is the occupation type that yields the maximum utility among the different j types of occupation. The multinomial probit model can be presented in the probability format in the following manner:

$$P_{ij} = Max\left(\left(x_{i1}\beta_1, x_{i1}\beta_2, x_{i3}\beta_3, \ldots\ldots, x_{iJ}\beta_J\right) = x_{ij}\beta_j\right) \tag{10}$$

Subsequently, a multinomial model is used to analyze the role of educational assortative mating on different occupational choices (DOC) within the sectors if females participate in the labour market. Equation (11) is a standard multinomial Probit model of the form:

$$Pr(DOC_i = j|j = 7; X) = \Phi\left(\beta_0 + \beta_1 PAM + \sum_{k=2}^{m} \beta_k X_k\right) \tag{11}$$

There are seven different scenarios considered in our dependent variable, different occupational choices. That is, whether the woman working in; professional, clerical, sales, agriculture,

services, skilled manual, and unskilled manual. The unskilled manual work is set as the reference category.

In a similar manner, we employed the control function version of multinomial probit to address the sample selectivity bias, endogeneity of PAM, and unobserved heterogeneity. We simply augment Equation 11 by including the inverse Mills ratio, residual, and interaction derived under the probit modeling. The control function probit is given as:

$$Pr(DOC_i = j|j = 7; X) = \Phi\left(\varphi_0 + \varphi_1 PAM + \sum_{k=2}^{m} \varphi_k X_k + \rho_1\lambda + \rho_2\hat{\varepsilon} + \rho_3\hat{\varepsilon} * PAM\right) (12)$$

Equation 12 is the control function version of the multinomial probit (*CF MNP*). φ_2 gives the effect of positive educational assortative mating (PAM) on female occupational choices.

4. Data and Descriptive Statistics

The study makes use of a pooled of the recent three waves of the Cameroon Demographic and Health surveys (DHS 2004, DHS 2011, and DHS 2018). The Cameroon Demographic and Health surveys are nationally representative data collected by the National Institute of Statistics. The Surveys provides detailed information on marriage and sexual activity, fertility and fertility preferences, family planning, infant and child mortality, reproductive health, child health, nutrition of children and women, malaria, HIV/AIDS related knowledge, attitude, and behavior, adult and maternal mortality, domestic violence, and female genital cutting.

Table 1 presents descriptive statistics derived from the pooled data of the 2004, 2011, and 2018 Cameroon Demographic Health Survey. The results indicate a female labor force participation rate of 75.9%, suggesting a significant presence of women in the labor market. Furthermore, the analysis reveals that 53.6% of female workers are engaged in full-time employment, indicating the prevalence of full-time work among women. Delving into specific occupational sectors, the descriptive findings unveil that a small fraction, 0.73%, of the workforce is employed in the Professional, Technical, and Managerial sector, indicating a relatively low representation in higher-skilled occupations. Additionally, the statistics illustrate that 0.87% of female workers are in clerical roles, while 18.1% and 42.2% are employed in sales and agriculture, respectively, underscoring the diverse occupational distribution among women. Moreover, approximately 4.4%, 5.6%, and 7.5% of female workers are in the service, skilled

manual, and unskilled manual sectors, respectively, indicating varying levels of occupational diversity and skill requirements within the female workforce.

Descriptive findings pertaining to different age groups reveal distinct proportions of individuals categorized within each bracket. Specifically, 29% of the population falls within the age range of 15 to 29, while 38.2% and 32.8% represent the proportions of individuals aged 30 to 39 and 40 to 49, respectively. These statistics provide valuable insights into the demographic distribution across various age cohorts. Such insights are essential for understanding age-related trends or patterns within the dataset, and they contribute to a comprehensive understanding of the population under study.

Table 1: Summary of Descriptive Statistics for Data

Variable	Mean	Std. Dev.	Min	Max
Labour force participation	0.7594	0.4275	0	1
Female full-time Employment	0.5355	0.4987	0	1
Positive Educational Assortative mating (PAM)	1.5506	1.0442	0.006	5.7736
Professionals	0.0073	0.0851	0	1
Clerical	0.0087	0.0931	0	1
Sales	0.1807	0.3848	0	1
Agriculture	0.4220	0.4939	0	1
Service	0.0437	0.2045	0	1
Skilled Manual work	0.0564	0.2307	0	1
Unskilled Manual work	0.0753	0.2638	0	1
Age group 15- 29	0.2900	0.4537	0	1
Age group 30 -39	0.3816	0.4858	0	1
Age group 40 -49	0.3284	0.4696	0	1
Rural residency	0.5912	0.4916	0	1
Male headed	0.7810	0.4136	0	1
Christians	0.6867	0.4638	0	1
Muslim	0.2373	0.4255	0	1
Other religions	0.0760	0.2650	0	1
D2004	0.2785	0.4483	0	1
D2011	0.4001	0.4899	0	1
D2018	0.3214	0.4670	0	1

Source: Computed by authors using Stata 17, DHS 2004, DHS; 2011 and DHS 2018.

Descriptive findings further indicate that 59.1% of women are rural residents, while 78.1% of women belong to male-headed households. The descriptive statistics show that 68.67% of individuals identify as Christians, 23.73% as Muslims, and 7.60% belong to other religions. The results indicate that among the women considered in the analysis, 27.85% were in 2004, 40.01% in 2011, and 32.14% in 2018.

5. Empirical Results

5.1 The Effect of Positive Educational assortative mating on Female Full-time Employment: A Control Function Probit

Table 2 presents the results of both the simple probit and the control function probit analyses examining the effects of educational assortative mating on female full-time employment in Cameroon, using pooled data from the 2004, 2011, and 2018 surveys. The simple probit results suggest that positive educational assortative mating increases the probability of full-time employment by 8.3%. However, it is important to note that this estimate may be biased due to sample selection and endogeneity issues related to the variable of interest, educational assortative mating. To address these potential biases, we implement a control function approach, which allows for the control of endogeneity in educational assortative mating, sample selection bias, and unobserved heterogeneity. The selection equation estimates, and the reduced form of PAM estimates are presented in Appendix 1 and Appendix 2.

Upon employing the control function method, the estimated effect increases to 0.1435, indicating that positive educational assortative mating is expected to increase the likelihood of female full-time employment by 14.4%. This finding can be justified through two economic mechanisms. Firstly, it reflects the accumulation of human capital within households, as partners with similar education levels often share similar values and backgrounds, creating an environment conducive to both pursuing full-time employment. Secondly, highly educated individuals typically have better access to job opportunities and networks, benefiting females in such households. Moreover, more equitable distribution of household responsibilities empowers females to pursue full-time employment without compromising family obligations.

Table 2: Effect of Educational Assortative Mating on Female full time Employment

	Simple Probit		Control function Probit	
VARIABLES	Coeff	dy/dx	Coeff	dy/dx
Positive Educational Assortative Mating (PAM)	0.2083***	0.0829***	0.3603***	0.1435***
	(0.0039)	(0.0015)	(0.0112)	(0.0045)
Age group 30_39	0.2036***	0.0808***	0.1910***	0.0758***
	(0.0141)	(0.0056)	(0.0158)	(0.0063)
Age group 40_49	0.3059***	0.1208***	0.3111***	0.1229***
	(0.0145)	(0.0057)	(0.0180)	(0.0070)
Rural residency	-0.3405***	-0.1345***	-0.2163***	-0.0858***
	(0.0124)	(00048)	(0.0210)	(0.0089)
Male headed household	-0.1294***	-0.0513***	-0.0482***	-0.0192***
	(0.0144)	(0.0057)	(0.0153)	(0.0061)
Christian religion	0.1095***	0.0436***	-0.0484**	-0.0192**
	(0.0194)	(0.0077)	(0.0224)	(0.0089)
Muslim religion	0.2486***	0.0981***	0.4148***	0.1618***
	(0.0221)	(0.0086)	(0.0253)	(0.0095)
D2011	0.1810***	0.0719***	0.0995***	0.0396***
	(0.0128)	(0.0051)	(0.0141)	(0.0056)
D2018	0.1755***	0.0696***	0.1072***	0.0426***
	(0.0146)	(0.0057)	(0.0154)	(0.0061)
IMR			-0.5590***	-0.2226***
			(0.0653)	(0.0260)
Residual			-0.1588***	-0.0634***
			(0.0120)	(0.0048)
PAM*residual			-0.0287***	-0.0114***
			(0.0019)	(0.0008)
Constant	-0.0436*		0.2450***	
	(0.0261)		(0.0470)	
Observations	72,286		72,224	

Source: Computed by authors using Stata 17, DHS 2004, DHS; 2011 and DHS 2018.
Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.

Additionally, the findings indicate that compared to women aged 15-29, women aged 30 to 39 and women aged 40-49 are more likely to engage in full-time employment by 7.6% and 12.9%, respectively. The finding that women aged 30 to 39 and women aged 40-49 are more likely to engage in full-time employment compared to younger women (aged 15-29) can be explained by several economic factors. Firstly, as women progress in their careers and gain experience over time, they may become more established in their professions, leading to increased opportunities for full-time employment. This phenomenon is often observed as individuals advance in their careers, accumulate skills, and build professional networks, which can enhance their employability and lead to higher rates of full-time employment. Additionally, women in

their 30s and 40s may have different life circumstances compared to younger women, such as fewer child-rearing responsibilities or greater financial stability, which can afford them more flexibility to pursue full-time employment. Moreover, societal norms and expectations regarding women's roles in the workforce may evolve with age, potentially reducing barriers to full-time employment for older women.

Furthermore, the results suggest that, in contrast to urban areas, women in rural areas are less likely to engage in full-time employment by 8.6%. The economic explanation for the finding that women in rural areas are less likely to engage in full-time employment compared to their counterparts in urban areas can be attributed to some factors. Firstly, rural areas often have limited job opportunities and a narrower range of industries compared to urban centers. Industries prevalent in rural areas, such as agriculture or small-scale manufacturing, may not offer as many full-time employment options as those in urban areas, where a more diverse range of industries and services are available. Additionally, rural areas may lack the infrastructure and amenities necessary to support full-time employment, such as reliable transportation systems, access to education and training, and childcare facilities. Moreover, cultural norms and societal expectations regarding gender roles may differ between rural and urban areas, potentially influencing women's labor force participation rates. In some rural communities, traditional gender roles may prioritize women's involvement in domestic and caregiving responsibilities over paid employment outside the home.

We also observed that women in male-headed households are 1.9% less likely to engage in full-time employment. The lower likelihood of full-time employment among women in male-headed households could stem from traditional gender roles, where women are often expected to prioritize domestic responsibilities over paid work. Additionally, higher income levels or cultural norms within male-headed households may afford women the choice to forgo full-time employment. Findings also reveal that, compared to other religions, female Christians are less likely to engage in full-time employment, while female Muslims are more likely to consider full-time employment. The results also indicate that the year dummies D2011 and D2018 are positively significant, suggesting a significant increase in female full-time employment by 4% for the period 2004-2011 and by 4.3% for the period 2004-2018. This may be explained by various economic factors such as improvements in economic conditions, changes in labor market dynamics, or policy interventions over time. For instance, economic growth or changes in government policies promoting gender equality and labor market participation could

contribute to the observed increase in female full-time employment rates over the specified periods. Additionally, advancements in technology and shifts in industry composition may have created new job opportunities and reduced barriers to female labor force participation, further driving the observed positive trend in female full-time employment.

We observed that the inverse Mills ratio is negatively related to full-time employment. This finding suggests that the typical woman in the Cameroon labor market samples is less likely to engage in full-time employment than women randomly drawn from the population of women aged 15-49 in Cameroon.

We observed that the inverse mills ratio is negatively related to full-time employment. This finding shows that typical woman in Cameroon labour market in the samples would less likely to engage in full-time employment than women drawn randomly from the population of women in the age group 15-49 in Cameroon. Following the Hausman specification test of endogeneity, the significance of the residual term indicates that the variable of interest, positive educational assortative mating, was indeed endogenous. This implies that positive educational assortative mating is influenced by other factors within the model, rather than being exogenously determined. This finding underscores the importance of addressing endogeneity in the analysis to ensure the accuracy and reliability of the estimated effects of educational assortative mating.

5.2 The Effect of Positive Educational assortative mating on Occupational Choices: A Control Multinomial Probit

Table 3 presents the marginal effects of the control function multinomial probit estimates of the various occupational choices that women are likely to make when they participate in the labor market. Specifically, the table presents findings from a Control function Multinomial Probit Regression, examining the impact of positive educational assortative Mating (PAM) on occupational choices across various sectors. Each coefficient represents the estimated effect of PAM on the likelihood of choosing a specific occupation, while controlling for other factors.

The results reveal significant associations between PAM and occupational choices. Our findings indicate a positive association between positive educational assortative mating and the probability of choosing professional, clerical, sales, and service occupations, with sales exhibiting the highest effect, followed by service. These findings are based on the wisdom that women in marriage where both partners have similar levels of education often share similar

values, aspirations, and socioeconomic backgrounds. This alignment may lead to mutual support for career advancement and a shared understanding of the benefits of pursuing occupations requiring higher levels of education, such as professional roles. Additionally, educational assortative mating may indicate higher levels of human capital accumulation within households, enhancing the skills and qualifications of both partners and increasing their attractiveness to employers in various occupational sectors. Furthermore, couples with similar educational backgrounds may possess greater financial stability, allowing individuals to pursue occupations with potentially higher earning potential, such as sales or service-related roles.

Table 3: Effects of Educational Assortative Mating on occupational choices (Control function Multinomial Probit Regression)

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Professionals	Clericals	Sales	Agriculture	Service	Skill manual
PAM	0.0019***	0.0062***	0.0330***	-0.0801***	0.0228***	-0.0167***
	(0.0003)	(0.0005)	(0.0031)	(0.0049)	(0.0012)	(0.0028)
Age group 30_39	0.00024	0.0010*	0.0754***	-0.0478***	0.0067***	-0.0438***
	(0.0002)	(0.0006)	(0.0047)	(0.0066)	(0.0017)	(0.0039)
Age group 40_49	0.0010***	0.0020***	0.0872***	-0.0419***	0.0084***	-0.0700***
	(0.0004)	(0.0006)	(0.0054)	(0.0077)	(0.0020)	(0.0046)
Rural residency	-0.0015***	-0.0015**	-0.152***	0.395***	-0.0157***	-0.145***
	(0.0003)	(0.0007)	(0.0066)	(0.009)	(0.0022)	(0.0056)
Male headed	-0.0004**	-0.0006	-0.0177***	0.054***	-0.0065***	-0.0163***
	(0.0002)	(0.0005)	(0.0046)	(0.0063)	(0.0014)	(0.0040)
Christians	0.0003	0.00054	-0.0349***	0.0906***	0.0079***	-0.0311***
	(0.0004)	(0.0012)	(0.0083)	(0.0101)	(0.0029)	(0.0060)
Muslim	0.0015**	0.0061***	0.0358***	-0.0509***	0.0069**	-0.0384***
	(0.0007)	(0.0015)	(0.0084)	(0.0109)	(0.0034)	(0.0063)
D2011	-0.0004*	-0.0044***	0.567***	-0.428***	-0.0100***	0.109***
	(0.0002)	(0.0006)	(0.0061)	(0.007)	(0.0017)	(0.0039)
D2018	-0.0028***	-0.0027***	0.523***	-0.319***	0.0294***	0.0204***
	(0.0006)	(0.0006)	(0.0066)	(0.0072)	(0.0019)	(0.0045)
IMR	0.0038***	0.0025	0.393***	-0.688***	0.0440***	0.137***
	(0.001)	(0.0024)	(0.0184)	(0.0289)	(0.0070)	(0.0169)
residual	-0.0012***	-0.0028***	-0.0054	0.00092	-0.0080***	0.0390***
	(0.0002)	(0.0004)	(0.0035)	(0.0052)	(0.0013)	(0.0031)
PAM*residual	0.0004***	0.0006***	-0.0010	-0.0048***	0.0033***	-0.00069
	(7.24e-05)	(7.98e-05)	(0.000691)	(0.0010)	(0.0003)	(0.00055)
Constant						
Observations	72,286	72,286	72,224	72,224	72,224	72,224

Source: Computed by authors using Stata 17, DHS 2004, DHS; 2011 and DHS 2018.
Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.
Notes: Base category is unskilled manual

Conversely, positive educational assortative mating exhibits a negative effect on the probability of choosing occupations such as Agriculture and skill manual jobs. The negative effect of positive educational assortative mating on the probability of choosing occupations like Agriculture and skill manual jobs can be explained by several economic factors. Firstly, individuals in relationships characterized by educational assortative mating often possess higher levels of education, which may lead to aspirations for white-collar or service-oriented professions rather than manual labor-intensive occupations like Agriculture or skill-based jobs. Additionally, households where both partners have higher education levels may prioritize careers that offer higher wages, job security, and opportunities for advancement, which are often found in non-manual occupations.

Regarding women residing in rural areas, we observed that they are more inclined to engage in agriculture and less likely to consider occupations such as professionals, clerical positions, sales, service, and skilled manual jobs. The observed tendency of women in rural areas to favor agriculture over other occupational sectors, such as professional, clerical, sales, service, and skilled manual jobs, can be attributed to several economic factors. Firstly, rural areas often have economies that are heavily reliant on agriculture, with limited diversification into other sectors. As such, women living in rural areas may have fewer alternative job opportunities outside of agriculture, leading to a higher likelihood of engaging in farming-related activities. Additionally, cultural, and societal norms in rural communities may prioritize traditional gender roles, where women are expected to contribute to agricultural activities due to historical and cultural practices. Moreover, structural barriers such as limited access to education, training, and employment opportunities in non-agricultural sectors may further constrain women's choices, pushing them towards agricultural occupations as a primary source of livelihood.

6. Conclusion and Policy Implications

The main objective of this paper was to analyze the effect of positive educational assortative mating on female full-time employment as well as examine the different occupational choices within the sectors of employment for women in the labor market of Cameroon. The results from the control function probit model show that positive educational assortative mating increases the probability of full-time employment The results from the control function multinomial probit model suggest that positive educational assertive mating has a positive effect on the probability to choose occupations across all sectors, as opposed to opting for

agricultural or skilled manual work. An important conclusion from these results is that educational assortative mating is important in determining both female full-time employment and choice of employment sectors for women in the labor market of Cameroon.

The policy implication based on the above discussions is encourage policies that promote equal access to quality education for all individuals. This can help reduce educational disparities and improve overall labor market outcomes, including for females. There is also a need to develop policies that support dual-career couples, particularly those where both partners have high levels of education. This may include providing flexible work arrangements, affordable childcare options, and promoting work-life balance initiatives. Such support can help reduce the negative impact of educational assortative mating on female labor market outcomes.

The above findings equally recommend that the government should enhance vocational training programs and apprenticeships to provide alternative pathways to gain skills and enter the labor market. By offering diverse opportunities beyond traditional educational routes, women with different educational backgrounds can find suitable career options that align with their skills and interests. Implement initiatives to challenge and address gender stereotypes and biases in education and the labor market. This can involve promoting women's participation in non-traditional fields and addressing gender-based discrimination and bias in recruitment and promotion practices. The government should also create an enabling environment for female entrepreneurship and self-employment through targeted programs, funding opportunities, and business development support. This can provide women with alternative avenues for economic empowerment and flexibility in balancing work and family responsibilities.

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Appendices

Appendix 1: Probit Selection Equation of labour force participation

VARIABLES	(1) lfp
Age group 30_to 39	0.3994***
	(0.0122)
Age group 40 to49	0.5213***
	(0.0129)
Rural	0.3307***
	(0.0104)
Male headed	-0.1301***
	(0.0130)
Christians	-0.0554***
	(0.0201)
Muslim	-0.5018***
	(0.0215)
D2011	0.1435***
	(0.0121)
D2018	0.0925***
	(0.0131)
Non-self proportion of lfp	2.7288***
	(0.0390)
Constant	-1.6038***
	(0.0381)
Observations	105,444

Source: Computed by authors using Stata 14, DHS 2004, DHS 2011, and DHS 2018.
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Appendix 2: Reduced form estimates of Positive Educational Assortative mating (PAM)

VARIABLES	(1) PAM
Age group 30_to 39	-0.1754***
	(0.0131)
Age group 40 to 49	-0.4856***
	(0.0133)
Rural residency	-1.0974***

	(0.0122)
Male headed	-0.3616***
	(0.0152)
Christians	0.8886***
	(0.0179)
Muslim	-0.5062***
	(0.0186)
D2011	0.1291***
	(0.0130)
D2018	0.1268***
	(0.0144)
Nonself_cluster mean PAM	0.6846***
	(0.0066)
Constant	0.5706***
	(0.0253)
Observations	91,277
R-squared	0.4629

Source: Computed by authors using Stata 14, DHS 2004, DHS 2011, and DHS 2018.
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.