



FEMALE EDUCATION, LABOUR FORCE PARTICIPATION AND CHOICE OF THE EMPLOYMENT TYPE: EVIDENCE FROM UGANDA

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Abstract- We use maximum likelihood models to analyse the impact of female education on labour force participation and the choice of the employment type. The data were obtained from the Uganda Demographic and Health Survey 2006. Our results confirm the hypothesis that female education (at post-secondary level) increases the probability of female labour force participation. Additionally, female education at the secondary and post-secondary levels increases the likelihood of being engaged in wage employment. Measures to educate women beyond secondary level are greatly needed to increase female labour force participation and the choice towards wage employment.

Key words: *Female education, Labour force participation, Choice of employment type, Wage employment, Self employment, Uganda*

Introduction and study concern

For the past two decades or so, Uganda has undergone remarkable socioeconomic recovery and progress, with GDP growth averaging 6% per annum [1]. The government is committed to meeting the Millennium Development Goals (MDGs) with a major aim of eradicating poverty in a gender sensitive environment. Female education is recently recognised as an important vehicle for poverty reduction especially amongst the vulnerable groups; the women and children. Educated women participate in the labour force and hence supplement on the household income that helps to extend its budget possibility frontiers. They are also associated with low fertility rates leading to improved child quality outcomes such as improved nutrition, low infant mortality, high school enrolment and attainment rates. There is little wonder then that countries the world over are taking deliberate and purposive efforts to promote female education in order to increase female labour force participation and, by extension reduce the poverty levels. Owing to the usually strong synergies between female education and the overall socioeconomic progress, the government of Uganda is particularly interested in promoting female education, women entrepreneurship and employment opportunities by implementing the recently launched five-year (2010-2015) Uganda National Development Plan (NDP) that has replaced Poverty Eradication Action Plan (PEAP). Indeed, female education features

prominently in the government of Uganda's policy framework. For example, the government has since 1993 requested Makerere University¹ to add extra 1.5 points to girls who have applied for admission in order to enable a big number of girls join University education every year. These efforts have also been squarely supported by other stakeholders, especially donors to the education sector, who have established scholarship programmes targeting the girl child². All these efforts have been out of a great need to expand women employability both in the formal private and public sectors. This meant that women would shift their focus away from working at home (as housewives) or from petty household businesses marred with low or no returns to seeking and competing for well-paid jobs. In spite of these commendable efforts, hitherto, there was no empirical study to guide government policy in its attempt to increase female education, labour force participation, and the choice of better jobs. Whereas the Uganda Demographic and Health Survey Report [2] contains information relating female education, labour force participation and the choice of the employment type, it is more descriptive than empirical. Whereas the descriptive approach can identify the key factors of interest, it fails to

¹This is the leading public University in the country.

²The Carnegie Female Scholarship was established at Makerere University in 2001 targeting Ugandan female candidates mainly from the vulnerable / disadvantaged backgrounds and it is still ongoing.

elaborate on their statistical significance and robustness in different environments. This paper, therefore, comes in handy to address pertinent policy questions: Does the level of education acquired by a woman influence her labour force participation and the choice towards wage employment? If so, what level of female education has a significant impact on these choices in Uganda? What is the influence of other demographic and socioeconomic factors on female labour force participation and the choice towards particular employment types?

The reminder of the paper is as follows: the next section dwells on the literature survey and highlights the gap found in the literature. Section three exposes the theoretical framework and the estimation strategy. Section four presents a discussion of the main findings while section five concludes with the paper's implications for policy.

Selected literature

A fairly wide body of literature exists on the relationship between female education, labour force participation and the choice of the employment type [3-14]. These authors provide evidence that female education increases labour force participation and this contributes to their socioeconomic progress. This, in turn, increases their bargaining power within the household and contributes to the achievement of high quality child outcomes as many women spend a greater proportion of their income on children [7]. On the other hand, though, it is frequently argued in the literature that increased female education and labor force participation significantly reduces a mother's time allocated to her children. This may incidentally result into poor child quality outcomes. Upon these two conflicting arguments, a trade-off is generated in an educated woman's life. It is mainly due to the opportunity cost of either working outside home for a pay or to stay at home and take care of children for better outcomes such as a lower probability of child mortality [11]. Literature presents this as an opportunity cost hypothesis or theory [3]. Lam and Duryea argue that a woman's decision of staying at home or to participate in the labour market activities very much depends on the market wage rate relative to the reservation wage. The authors also argue that educated women have a very high inclination towards quality than quantity of children and this is a strong pushing factor towards labor force participation to earn an income that pays for this quality. All these considerations include trade-offs and all work in a combination to influence female labor force participation as well as a choice in favor of particular employment types.

The role of the aspiration theory or hypothesis in driving female labor force participation cannot be underscored. The theory is founded on the premise that highly educated women, compared to their

uneducated counterparts, naturally have high expectations or aspirations for better jobs and high incomes. This acts as a vehicle for them to participate in the labor force in general and to seek better jobs in particular [15]. Whereas the different authors and theories aforementioned predict a positive relationship between female education and labor force participation, it is not without conflict. Whereas the positive influence of female education on labour force participation incontestably exists, literature presents no consensus on the nature of relationship and on the level of female education that may have a significant impact on female labour force participation. Some authors find that education of the woman has a strong positive influence on her labour force participation choice [4, 11, and 12]. On the other hand, some authors find that women who were not employed had significantly fewer children than those who were working contrasting earlier theory and evidence [see 6]. Yet, other authors find an insignificant coefficient on female education in the labour force participation model [5]. Therefore, a deeper understanding into these relationships is called for. Additionally, to the best of our knowledge, this is the first paper to address these relationships for the case of Uganda; hence it represents a real value added.

Theoretical framework and the estimation strategy

Literature exposes the theoretical foundations of female labour force participation choice following the neoclassical theory of consumer behaviour [16 and 17]. This strand of theory has mainly been used to study household demand for health or child quality. It is noteworthy that female labour force participation choice and that of employment type is embedded in the number of children desired and their associated quality. This issue is emphasized by [18], who argues that the household doesn't only derive satisfaction from the number of children raised but also from the quality outcome associated with each child. Following this line of argument, a household maximises a well behaved utility function subject to several constraints; budget, time, and child quality production constraints. Given the constraints, the household is assumed to make a choice amongst various goods; the composite good (x), number of children (c), children quality as reflected in terms of health and schooling (q_c), leisure time which measures the opportunity cost of the wage foregone (l), and taste (ϕ). In the household's utility function, children are treated as a special form of good, from which satisfaction is derived with a cost of time and money to raise them up. The utility function of the household can be written as:

$$U = U[x, c, q_c, l, \phi] \quad (1)$$

As aforementioned, the household is faced with a production constraint of the child quality outcome. In other words, the household must invest in the schooling and health of the child both in terms of money and time and this influences her choice to participate in the labour force and the type of employment she takes on. The child quality production function relates child quality inputs to child outcomes (child health and schooling). Child quality inputs include market purchased health and schooling inputs (e.g. medical care, tuition fees, books, uniforms etc.), time of the mother and father in producing child quality, education of the mother and father, and the term for the innate child healthiness or abilities.

$$q_c = q_c(n, t_{mc}, t_{fc}, e_m, e_f, \alpha) \quad (2)$$

Where $n, t_{mc}, t_{fc}, e_m, e_f$, and α refers to market purchased child quality inputs (such as health care and education services), time of the mother devoted to producing child quality, time of the father devoted to producing child quality, education of the mother, education of the father, and the innate child healthiness or abilities respectively.

The woman is faced with a time constraint. The basic thesis is that activities that intensively use a woman's time are mutually exclusive, implying that she cannot undertake all such activities at the same time [11 and 12]. Child bearing and early nurturing of children as well as home production activities including household chores, cooking, fetching water, firewood, etc., on the one hand, are mutually exclusive with formal employment for a woman, on the other [12]. Total time of either the mother or father can be allocated to leisure, work and production of child quality as follows:

$$T = l + w + t_c \quad (3)$$

Where T, l, w , and t_c is total time available to the mother, distributed to leisure, work, and producing child quality, respectively.

The household is also faced with a budget constraint that maps its expenditures to income. The household is assumed to expend money on the composite good, market purchased child quality inputs, and leisure time, respectively. The wage earnings of the mother and the father as well as the exogenous non-labour income contribute to the total available household budget.

$$B = p_x x + p_{q_c} q_c + p_l l \quad (4)$$

Where $B, p_x x, p_{q_c} q_c$, and $p_l l$ refer to the household total budget, the cost on; composite good, child quality inputs, and leisure time.

From this structural model, using the conventional optimization techniques, we derive the demand

function for female labour force participation. This demand function, expresses the endogenous variable (labour force participation) in terms of exogenous variables; female and male wages, prices of the; composite good, child quality inputs, and leisure time; mother and father education and household wealth.

$$l_m = l_m(w_m, w_f, e_m, e_f, w_h, p_x, p_n, p_l, \phi, \eta) \quad (5)$$

Where

$l_m, w_m, w_f, e_m, e_f, w_h, p_x, p_n, p_l$ and ϕ refer to female labour force participation, wage rate of the mother, wage rate of the father, education of the mother, education of the father, household wealth, price of composite good, price of child quality inputs, price of leisure good, and taste respectively. It is noteworthy that the expected lifetime wage rates of the mother and the father are imperative in influencing labour force participation. However, they are not directly observable and so we use the age cohorts of the mother and father as a proxy for the lifetime wage rates. η is included in the model to capture other characteristics that may have a bearing on female labour force participation. These include; locality (urban or rural), region dummies, and religion. Mother's education is expected to positively influence her labour force participation decisions. This is based on the premise that with a higher level of education and skills, staying out of work (because of having to take care of children) increases the opportunity cost of foregone income. However, it is noteworthy that increased schooling will increase the probability that a woman works in the labour market if and only if the schooling causes larger increases in her market wage rate relative to the reservation wage [11]. This means that low levels of schooling may not raise female labour force participation since the reservation wages may increase as fast as the market wages, the reverse is true for higher levels of education. On the other hand, a woman living in a wealthier household is more likely to be reluctant to participate in the labour force once compared to one living in a relatively poor household. Whereas the effect of a woman's social environment on fertility and participation choice may be uncertain, a woman living in the urban locality is more likely to be associated with factors that negatively affect fertility and yet positively influence labour force participation. A woman living in the urban area may have greater access to contraceptives and also better education, issues that may reduce fertility and increase labour force participation.

Following Green's [19; pp. 873] example, we estimate the labour force participation choice using a probit model. The respondent either works ($Y = 1$) or doesn't work ($Y = 0$) in the period in

which the survey was taken. This situation appears as follows:

$$\begin{aligned} \text{Pr ob}(Y = 1) &= F(\beta' X) \\ \text{Pr ob}(Y = 0) &= 1 - F(\beta' X). \end{aligned} \quad (6)$$

Where X is a vector gathering factors, such as, age, marital status, education, and so on, that explain the decision to participate in the labour force. Yet, β is the set of parameters that reflect the impact of changes in X on the probability. For a given regressor vector, we would expect:

$$\begin{aligned} \lim_{\beta' X \rightarrow +\infty} \text{Pr ob}(Y = 1) &= 1 \\ \lim_{\beta' X \rightarrow -\infty} \text{Pr ob}(Y = 1) &= 0. \end{aligned} \quad (7)$$

The normal probability distribution gives rise to the probit model as follows:

$$\begin{aligned} \text{Pr ob}(Y = 1) &= \int_{-\infty}^{\beta' X} \phi(t) dt \\ &= \Phi(\beta' X). \end{aligned} \quad (8)$$

The function $\Phi(\cdot)$ is a commonly used notation for the standard normal distribution. Following the conventional approach to applying the binary models, after the probit estimation, we compute the marginal effects for all the right hand side variables in order to obtain the probability of participation.

We estimate the female choice of employment type using a multinomial logit model following [12]. There are three main employment categories or outcomes (y), coded thus: 1 = Unpaid family worker; 2 = Wage employment; and 3 = Self-employment. Following Greene [19; pp. 913], we motivate the multinomial choice model by a random utility model. For the i^{th} consumer faced with J choices, suppose that the utility of choice j is

$$U_{ij} = z_{ij}'\theta + \varepsilon_{ij} \quad (9)$$

If the consumer makes choice j in particular, then we assume that U_{ij} is the maximum among the J utilities. Hence, the multinomial model is driven by the probability that choice j is made, which is

$$\text{Pr ob}(U_{ij} > U_{ik}) \quad \forall k \neq j \quad (10)$$

Let Y_i be a random variable that indicates the choice made. McFadden (1974a) has shown that if (and only if) the J disturbances are independent and identically distributed with Gumbel (type 1 extreme value) distribution [20],

$$F(\varepsilon_{ij}) = \exp(-\exp(-\varepsilon_{ij})), \quad (11)$$

the model for occupational choice is,

$$\text{Pr ob}(Y_i = j / w_i) = \frac{\exp(w_i \alpha_j)}{\sum_{j=1}^3 \exp(w_i \alpha_j)}, \quad \forall j = 1, \dots, 3. \quad (12)$$

The estimated equations provide a set of probabilities for the $J + 1$ choices for a decision maker with characteristics w_i . Because the probabilities sum to one over all choices, only J parameter vectors are needed to determine the $J + 1$ probabilities. A convenient normalization that solves the problem is to assume that $\alpha_1 = 0$. Therefore the probabilities are;

$$\text{Pr ob}(Y_i = j / w_i) = P_{ij} = \frac{\exp(w_i \alpha_j)}{1 + \sum_{k=2}^J \exp(w_i \alpha_k)}, \quad \forall j = 2, 3. \quad (13)$$

Whereas the coefficients of this model are difficult to interpret, we follow the conventional approach to applying choice models and compute the marginal effects of the characteristics on the probabilities.

An important property (and limitation) of the multinomial logit is that of the independence of irrelevant alternatives (IIA). This property states that the ratio of the probabilities of any two alternatives is independent of the remaining probabilities. McFadden (1973) suggested that IIA implies that the multinomial logit model should only be used in cases where the outcome categories “can plausibly be assumed to be distinct and weighed independently in the eyes of each decision maker” [21]. In this case, we are making the assumption that a woman’s level of education makes her choice of occupation type rather distinct and specific and may not be correlated with other alternatives.

Sources of data

The data used come from the DHS 2006 conducted by the Uganda Bureau of Statistics (UBOS). The DHS provides a rich source of data on the demographic characteristics of the country. They contain information on household size, age and sex distribution, religious affiliation, current labour force participation status, employment types of household members, the number of children ever born by a woman, marital status, household income, educational attainment of women and men as well as the average child mortality rates for different regions. The wealth index is provided in the data set and is describe to be constructed by combining information on household assets, such as ownership of consumer items, type of dwelling, source of water, and availability of electricity into a single asset index. The sample is split into five equal groups (quintiles) from 1 (lowest, poorest) to 5 (highest, richest). In all our estimations, the first quintile (poorest) is our base category.

Discussion of Results

Introduction

This section presents a discussion of the results of the analysis of the relationship between female

education, labour force participation, and female choice of the employment type. In the analysis, we include other factors that have an impact on labour force participation and choice of the employment type based on theory and evidence from other studies. We begin with a discussion of the descriptive evidence on female labour force participation and choice of the employment type in relation with the relevant household characteristics to provide a foundation for the quantitative results. The summaries are generated using the sample weights implying that they are nationally representative.

Descriptive evidence

We present descriptive statistics on the relationship between individual/household characteristic on female labour force participation and the choice of the employment type. The findings of the analysis of the DHS 2006 show that most women in Uganda participate in the labour force. On the average, 73%, 25%, 10%, and 51% women were currently working, worked at home, had wage employment, and were self-employed, respectively (ref. table 1). Women with no education were more likely to be working compared to their educated counterparts. It is revealed that 82% of women with no education were currently working compared to only 67% of women with post-secondary education. It is noteworthy that the percentage of women who were currently working falls as one moves from no education to secondary education but rises again at post-secondary level of education. This can be attributed to the fact that it is easier for uneducated women and those at lower levels of education to accept any jobs that they find at first offer. On the other hand, educated women tend to search longer for those jobs that can fit their level of education. Also most of uneducated women or those with low education work on family farms and others operate petty household businesses. Comparing the two relatively high levels of education, 67% of women at post-secondary level of education were currently working compared to only 58% of women at secondary level. It may be the case that women at post-secondary level have acquired enough skills that increase their employability compared to their counterparts at secondary level. This underscores the role of female education beyond secondary level. The government programme of free secondary education is a good start and should be strengthened.

Our findings highlight the role of female education in the choice of the employment type. It not surprising to observe that only 11% of women with post-secondary education are working (staying) at home compared to 25% of women with no education (ref. table 1). The same result can be observed for women that are self-employed. We find that only 17% of women with post-secondary education are

self-employed compared to 61% of women with no education at all. On the other hand, 50% of women with post-secondary education have wage or salary jobs compared to only 8% with no education. It is observed that the percentage of women (14%) with wage jobs at secondary level is not even half that of women at post-secondary level (50%) highlighting the role of higher education in increasing the chances of decent employment. It is worrying that there is a high percentage of women (61%) in self-employment with no education. It implies that the success of their businesses is at stake due to lack of basic knowledge in isolating costs from revenues and determining a profit margin (booking keeping). Either way, education of the woman is instrumental in increasing wage employment, reducing the percentage of women working at home or in self-employment. It is worth noting that self-employment is a key solution to unemployment problem in developing countries, but should again be coupled with high education for ensuring better results.

The results reveal that partner's education is an important ingredient in the woman's choice to participate in the labor force and the type of employment to undertake. It is observed that 80% of women whose partners had no education were currently working compared to 70% of women whose partners had post-secondary education (ref. table 1). The percentage of women who were currently working is observed to decline with partner's level of education. It may be the case that educated partners have the means to provide for the family adequately making their spouses reluctant to participate in the labor force. Considering the choice of employment type, it is revealed that 21% of women whose partners had no education worked at home compared to 18% of women whose partners had post-secondary education. Looking at wage employment, 23% of women whose partner's had post-secondary education were involved in wage employment compared to only 8% whose partners had no education. The results also reveal that only 44% of women whose partners had post-secondary education were self-employed compared to 62% of women whose partners had no education. Overall, partner's education drives women more to wage employment than working at home and being self-employed. It may be the case that educated men marry educated women and hence a higher likelihood of participating in wage employment than staying at home or being self-employed.

It is interesting to note that wealth status of the household is an important factor influencing female labor force participation and the choice of the employment type. It is revealed that 84% of women in the poorest quintile were currently working compared to only 58% of their counterparts in the richest quintile (ref. table 1). The percentage of women who were currently working is observed to

decline the higher the wealth quintile. It may be the case that households that are well-off gain access to basic needs very easily and may not require a mother to supplement on the household income hence a lower propensity to work. Considering the choice of the employment type, only 12% of women in the richest quintile stayed at home compared to 31% of their counterparts in the poorest quintile. A similar result is observed for women that are self-employed. Only 37% of women in the richest quintile were self-employed compared to 58% of women in the poorest quintile. On the other hand, 21% of women in the richest quintile have wage jobs compared to only 7% of women in the poorest quintile. This may be attributed to the fact that households in the richest quintile can afford higher education making it more likely for women to be in wage or salary employment than staying at home or being self-employed. It worth noting that the pattern that our results follow for female education and employment choice, is the same that is followed under wealth quintiles suggesting a very close relationship between these two determinants.

Regional differences in female labor force participation and the choice of the employment type is also evident in our findings. The eastern region leads all other regions with 80% of women that were currently working. It is followed by the western (78%), then northern (75%), and the central region comes last with 61% (ref. table 1). It should be noted that the central region is more urban (houses the capital city of the country) than all other regions and hence the likelihood of finding a job is rather small. Yet, in other regions women are easily employed in agriculture and other family businesses, even without education, because those regions are more rural than urban. Considering the choice of the employment type, only 12% of women in the central region work at home compared to 33%, 35%, and 25% of women in the east, north, and west, respectively. The same result is observed for self-employment. Only 46% of women in the central region were self-employed compared to 53%, 50%, and 57% of women in the east, north, and west, respectively. On the other hand, 15% of women in the central region have wage jobs compared to only 6%, 8%, and 9% of women in the east, north, and west respectively. It may be the case that since the central region is more urban, it has more highly educated women who are more likely to find wage employment and hence participate less in self-employment and working at home compared to all other regions. General location differences are also prominent in our results. The rural area is associated with 77% of women who were currently working compared to only 56% in the urban area. This again can be attributed to the ease of finding employment in agriculture for rural women which is not the case for urban dwellers. For the choice of employment type,

28% of women in the rural areas were working at home compared to only 9% in the urban areas. The same is observed for self-employment where only 36% of women in the urban area were self-employed compared to 55% of women in the rural area. On the other hand, 23% of women in the urban area had wage employment compared to only 7% in the rural area. This scenario may be attributed to the fact that private and public sector wage jobs are overly concentrated in the urban areas. This coupled with higher education of women in these areas drives women more to wage employment than self-employment or staying at home.

There is no significant difference between female headed households and others as far as labor force participation is concerned. However, only 22% of women in female headed households work at home compared to 26% of women in other households. Also 51% of women in female headed households are more likely to be self-employed compared to 52% of women in other households. On the other hand, 14% of women in female headed households have wage jobs compared to only 8% of women in other households. These results underscore the independence of the woman in making decisions to work outside the home, especially on the wage job.

Age cohorts of women reveal some interesting findings (ref. table 1). Women in the age cohort 15-19 were less likely to be currently working with 63% compared to 82% of women in the age cohort 45-49. This is not surprising since women in the age cohort 15-19 years are mostly still in schooling having completed only secondary level for the case of Uganda's education system. As expected, the percentage of women who were currently working is observed to increase with the age of women. Considering the female choice of employment type, 33% of women in the age cohort 15-19 were working at home compared to 26% in the age cohort 45-49. The percentage is observed to decline with age up to the age cohort 35-39 when it rises again. This may be attributed to the fact women in the young age groups may not have given birth to many children that may demand their presence at home. But later, starting with the age cohort 35-39 a woman may decide to stay home to raise the children with maximum motherhood care. It is also revealed that only 9% of women in the age cohort 15-19 were having wage jobs and the scenario is much similar to women in the later age cohorts starting with 35-39. Yet, women in the age cohort 20-34 have a slightly higher percentage due to the fact that by that age women may aggressively go into wage employment but later on revert to take care of the children. Considering self-employment, only 35% of women in the age cohort 15-19 are self-employed compared to 59% of women in the age cohort 45-49. The percentage is also observed to increase up to age cohort 30-34, and then it falls

for the later cohorts but doesn't reach the lowest level of 35% for the age cohort 15-19. This may be attributed to the fact that, unlike other forms of employment, self-employment does not necessarily conflict with maternal roles hence the percentage of women employed there keeps high even when they get more children to care about.

The results on marital status are rather mixed. It is revealed that 76% of married women were currently working compared to 69% of unmarried women. Considering female choice of employment type, only 24% of married women were working at home compared to 27% of unmarried women. This is rather surprising because more married women would work at home to take care of children. It is further revealed that 14% of unmarried women are working for a wage compared to only 8% of married women. This is not surprising because married women in developing world depend on their spouses for the daily household needs. Considering self-employment, 58% of married women are self-employed compared to only 40% of unmarried women. This is as expected because much of self-employment does not conflict with child bearing and early nurturing of children which to a big extent befits married women more than their unmarried counterparts.

The fertility behavior of a woman is revealed to be important in influencing her labor force participation as well as employment type choices. Only 62% of women with no children were currently working compared to 80% of women with at least five children. Considering the choice of employment type, 32% of women with no children worked at home compared to 25% of women with at least five children. This seems to suggest that having many children may be a driver for a woman to move out and supplement on the household income. Indeed, a high percentage of women (61%) who are in self-employment have at least five children compared to only 32% of women with no children. This emphasizes a point made earlier that self-employment may not necessarily conflict with maternal roles. It is interesting to note that only 6% of women with at least five children are involved in wage employment compared to 12% of women with no children. This is as expected because most wage jobs squarely conflict with maternal roles most especially if a woman has many children.

Quantitative evidence

Female labour force participation

From the analysis, we note that women's education, at the post-secondary level, plays an important role in their labour force participation. In Table 2 we present the results of the regression of women who were currently working at the time of the survey. Women with a post-secondary level of education are about 6% more likely to be working compared to

their counterparts with no education at all. Our findings are not surprising because education at a higher level (post-secondary level) enhances the skills of women and increase the chances of their being able to be employed. From the aspiration theory discussed earlier in the literature, highly educated women have high aspirations for good jobs and high incomes and hence they are more likely to search for employment in general and decent employment in particular. By extension, this implies that highly educated women are more likely to have fewer children as they trade-off child care for work and earnings. Therefore, government efforts to eradicate poverty as conceived in the NDP and MDGs should target to increase female labour force participation. This will be achieved through policies that aim to increase education of the woman beyond secondary level. The government of Uganda is currently implementing Universal Secondary Education. This is just a good start but not adequate to increase female labour force participation. The government and other stakeholders, especially the donors, should aim to achieve majority female education beyond secondary level for admirable results including labour force participation resulting into, lower fertility and mortality, and good child nutrition outcomes.

The partners' education (all levels) also plays an important role in the women's ability to work. We find that women whose partners have a primary, secondary and post-secondary education are between 4-5% more likely to be working compared to their counterparts whose partners have no education at all. This may suggest that educated men are more enabled to find employment for their partners, either from their contacts or by establishing businesses for them. It may also mean that educate men marry educated women who are more likely to find employment. Overall, in order to increase female labour force participation in a developing country context, men should also be involved. This can be achieved either through education or through sensitization campaigns or both that elaborate on the importance of a working mother in a household. Otherwise, it is a common practice in developing countries for men to suffocate the employment potential of their spouses even though they may be highly educated.

The impact of age cohorts on women's participation in the labour force cannot be underscored. Women in the age cohort 20-24 are about 5-6% more likely to be working compared to their counterparts in the 15-19 age cohort. On the other hand, the influence of age cohort 25-49 on female labour force participation is generally the same, they are 8-9% more likely to be working compared to their counterparts in the 15-19 age cohort. It is noteworthy that the impact of the age cohort 20-24 on female labour force participation (5-6%) is smaller than for 25-49 (8-9%). This can be

attributed to the fact that for the age cohort 20-24 years the majority are expected to be still in school (in Uganda, on average, students finish their first degrees when they are 23 years old). The delay to enter the labour force in most cases comes with the advantage of attaining a higher level of education which increases the chances of attaining more productive employment opportunities.

Women residing in rural areas are 8% more likely to be in the labour force compared to their counterparts in the urban areas. This corroborates earlier descriptive evidence in table 1. This is not surprising because in the rural areas of Uganda women easily find employment on the family farms and sometimes on the neighbours' farms or they operate petty household enterprises. However, it is rather hard to find a job in urban areas mainly due to open urban unemployment evident in many developing countries, Uganda inclusive. It worth noting that there is need to look into the productivity of the nature of jobs held by women in the rural areas. Whereas they may be on job working, they may be earning too little to support their households. Although it is beyond the scope of this paper, I argue that many employed women especially in the rural areas are actually under-employed. Therefore, in order to make increased female labor force participation more meaningful, government effort is needed to improve the nature of activities women undertake may be by advancing soft loans to them among other interventions.

Regional differences reveal interesting results. Women in the East, North and West are 7%, 4%, and 8% respectively, more likely to be working compared to their counterparts in the central region. This also corroborates the earlier descriptive evidence in table 1. The central region being more urban than rural makes it more difficult to find a job despite a higher level of education. Like argued earlier on, the productivity of jobs in the rural areas need to be considered in order to have a gainful female labour force participation in addition to government effort to avail more jobs in the urban areas. Consistent with the descriptive evidence, women in poor households are more likely to be working compared to those in the relatively rich households – women in the 2nd to the 5th wealth quintiles are 5-13% less likely to be working compared to those in the 1st (poorest) quintile. This means that richer households can gain access to basic needs easily without necessarily having a mother's contribution to the household budget. Surprisingly, the number of children and marital status are not statistically significant in influencing female labour force participation. Their inclusion in model 2 leaves all the other variables robust in influencing female labor force participation.

Female choice of employment type

In table 3 we present results of the multinomial logit estimation of the choice of employment type by women. From the data, we are able to retrieve three employment categories for the women: working at home, wage employment and self-employment (this is used as the base category in our analysis). Wage employment as used in the subsequent discussions does not necessarily imply public formal sector employment. Within the context of the Ugandan economy most wage employment candidates tend to be in either the private formal or the public formal sector of the labor market. If a woman is in a female headed household, she is 5% less likely to work at home once compared to their counterparts in other households. On the other hand, she is roughly 3% more likely to work for a wage once compared to their counterparts in the male headed households. It also means that being in a female headed household lowers the probability of working at home by 5%, yet, increases the probability of working for a wage by 3% relative to the probability of being self-employed. Both effects are statistically significant at one percent level. The intuition of this result is that being in a female headed household underscores the need for a woman to care of the family and hence is more likely to seek for wage employment compared to their counterparts in male headed households. This result also emphasizes importance of the independence of the woman in taking key decisions in a household amongst which is to participate in the labor market. Government advocacy is needed in the promotion of women independence at household level in order to achieve admirable outcomes.

The role of female education in influencing her choice of employment type can not be overemphasized. Relative to the probability of being self-employed, women with primary education are 4% more likely to work at home and are roughly 3% less likely to attain a wage employment compared to their counterparts with no education at all. The influence of female education is even more assertive at a higher level of schooling. Women with post-secondary education are 37% more likely to be in wage employment (relative to the probability of being self-employed) compared to their counterparts with no education at all. Given that a quicker way to eradicate poverty is through the provision of employment, the government and other stakeholders should aim to provide female education beyond secondary level. This will increase their employability and by extension reduce poverty in line with the first MDG. As aforementioned, government's free secondary education is simply a good start that needs to be heightened to another level. However, given the big competition for the limited wage jobs, there seem to be higher education prerequisites for jobs that were

initially open to persons with relatively lower levels of education.

Women whose partners have at least primary education are 4%-9% more likely to work at home, relative to self-employment, compared to their counterparts with no education. This may be attributed to the fact that educated men are more likely to have a well-paying job and hence are better placed to take care of the family needs. By extension, their spouses may be reluctant to start their own businesses (self-employment) or to seek for employment outside the home. For the educated women, this may be possibly because their reservation wage is set at a higher level. For uneducated women, it can be argued that the opportunity cost of their staying at home is very low to push them to find work. As mentioned earlier, in an effort to increase female participation in the labor force, the set of policies must include the male partner's contribution.

Our findings on the wealth status of the household reveal interesting findings. Women in the richest wealth quintile are 6% more likely to be engaged in wage employment, relative to the probability of being self-employed, compared to their counterparts in the poorest quintile. However, those in the middle wealth quintile are 3% less likely to be engaged in wage employment, relative to the probability of being self-employed, compared to their counterparts in the poorest quintile. Yet, women in the poorer wealth quintile are 6% more likely to work at home compared to their counterparts in the poorest quintile. This may be linked to education, where women in the poorer households are less likely to again access to quality and higher education and hence less likely to gain access to wage employment.

Women in the western, eastern and northern region are 12%-18% more likely to work at home, relative to the probability of being self-employed, compared to their counterparts in the central region. Yet, women in the eastern region compared to the central region, are 4% less likely to participate in wage employment, relative to the probability of being self-employed. As expected, rural residents compared to urban residents, are roughly 7% more likely to work at home and roughly 8% less likely to participate in wage employment than in self-employment. This corroborates the fact that the majority of women staying in rural areas are less educated compared to those residing in the urban areas and hence are less likely to attain wage jobs. Considering age, women in the age cohorts 20-24, 25-29 and 30-34 years, compared to 15-19 years, are 4%-6% less likely to work at home, relative to the probability of being self-employed. These are age groups when individuals have finished schooling and hence are very active in the labor force and are more likely to seek for wage employment.

Conclusion

We use maximum likelihood probit and multinomial logit models to analyse the impact of female education on labour force participation and the choice of the employment type, respectively, for the case of Uganda. The data were obtained from the Uganda Demographic and Health Survey 2006. Our results confirm the hypothesis that female education (at post-secondary level) increases the probability of female labour force participation. Additionally, female education, especially at the secondary and post-secondary levels increases the likelihood of being engaged in wage employment. We also find that women in female headed households and those in the highest wealth quintile are more likely to participate in wage employment. Women in the rural areas are less likely to be engaged in wage employment compared to their counterparts in the urban areas.

Thus women's education can play an important role in poverty reduction not only because the income earned benefits their spouses, but most especially because it benefits the children. In particular, it may be invested in children's education and health, thus improving their future employment prospects.

The findings suggest that in order to expand the numbers of women in the labour force in general, and wage employment in particular; measures are needed to educate women beyond secondary level. The government programme to extend free education at the secondary level is a good start but needs to be heightened for better results. This should be embraced by all stakeholders, especially donors, with campaigns and resource allocations to enable girls attain education beyond secondary level.

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Appendix 1: Results

Table 1- Female labour force participation and the choice of the employment type by mean percentages

Category	Currently working	Working at home	Wage employment	Self Employment
Female education: No education	82	25	8	61
Primary	75	27	7	55
Secondary	58	19	14	38
Post-secondary	67	11	50	17
Wealth Status: Poorest quintile	84	31	7	58
Poorer quintile	80	35	5	54
Middle quintile	77	29	4.6	57
Richer quintile	73	23	7.6	56
Richest quintile	58	12	21	37
Region: Central	61	12	15	46
East	80	33	6	53
North	75	35	8	50
West	78	25	9	57
Location: Rural	77	28	7	55
Urban	56	9	23	36
Partner's education: No education	80	21	8	62
Primary	78	26	7	60
Secondary	73	19	12	56
Post-secondary	70	18	23	44
Religion: Catholic	76	25	10	54
Protestant	72	27	9	49
Muslim	64	19	9	50
Other	73	24	11	51
Female head	73	22	14	51
Not female head	73	26	8	52
Age cohorts: 15-19	63	33	9	35
20-24	70	23	12	49
25-29	77	21	10	60
30-34	79	21	11	60
35-39	79	25	9	57
40-44	78	24	8	58
45-49	82	26	8	59
Marital status: Married	76	24	8	58
Not Married	69	27	14	40
Number of children: 0	62	32	12	32
1-2	71	22	13	51
3-4	77	21	10	60
5+	80	25	6	61
Total	73	25	10	51
N	6454	2110	851	4418

Source: Authors' own analysis using the Uganda Demographic and Health Survey 2006

Table 2- Female labour force participation: Probit model (Marginal Effects)

	Model (1)	Model (2)
	Currently working	Currently working
Female head	0.028*** (3.19)	0.028*** (3.10)
Woman's education: Primary	0.015 (1.32)	0.015 (1.32)
Secondary	-0.012 (0.75)	-0.013 (0.79)
Post-secondary	0.063*** (2.88)	0.063*** (2.83)
Partner's education: Primary	0.044*** (3.62)	0.044*** (3.62)
Secondary	0.049*** (3.83)	0.049*** (3.84)
Post-secondary	0.043** (2.51)	0.043** (2.53)
Age cohort: 20-24 years	0.056*** (4.01)	0.052*** (3.51)
25-29 years	0.084*** (6.41)	0.080*** (5.18)
30-34 years	0.084*** (6.36)	0.082*** (5.14)
35-39 years	0.091*** (6.94)	0.091*** (5.68)
40-44 years	0.092*** (6.85)	0.093*** (5.81)
44-49 years	0.091*** (6.44)	0.091*** (5.51)
Rural resident	0.084*** (5.80)	0.085*** (5.82)
Religious affiliation: Protestant	0.002 (0.19)	0.002 (0.17)
Muslim	-0.045*** (3.29)	-0.044*** (3.23)
Other faith	0.014 (1.06)	0.014 (1.07)
Region: East	0.068*** (6.37)	0.069*** (6.48)
North	0.038*** (3.12)	0.040*** (3.22)
West	0.076*** (7.21)	0.077*** (7.27)
Wealth quintile: poorer	-0.050*** (3.23)	-0.050*** (3.25)
Middle	-0.077*** (4.33)	-0.076*** (4.29)
Richer	-0.117*** (6.20)	-0.117*** (6.20)
Richest	-0.134*** (6.15)	-0.135*** (6.15)
Married		-0.01 (1.14)
Number of children: 1-2		0.003 (0.19)
3-4		0.02 (1.00)
5+		-0.0001 (0.01)
Observations	6454	6454
Pseudo R-squared	0.11	0.11

Absolute value of z statistics in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%

Table 3- Female Choice of employment type: Multinomial Logit (Marginal Effects)

	(1)	(2)
	Working at Home	Working for a wage
Female head	-0.0524*** (4.12)	0.0324*** (3.90)
Female Education: Primary	0.0427*** (3.01)	-0.0247 ** (2.50)
Secondary	0.0332 (1.20)	0.0263* (1.66)
Post-secondary	-0.0246 (0.48)	0.3673*** (5.90)
Partner's Education: Primary	0.0549*** (3.10)	0.0038 (0.36)
Secondary	0.0387* (1.65)	0.0089 (0.69)
Post-Secondary	0.0919** (2.49)	0.0049 (0.30)
Age cohorts: 20-24	-0.0412* (1.75)	0.00375 (0.23)
25-29	-0.0578** (2.49)	-0.0193 (1.37)
30-34	-0.0544** (2.32)	-0.0035 (0.23)
35-39	-0.0098 (0.38)	-0.0063 (0.40)
40-44	-0.0015 (0.05)	-0.0133 (0.85)
45-49	0.0028 (0.10)	-0.0211 (1.42)
Rural resident	0.0654*** (2.94)	-0.0776*** (4.67)
Religious affiliation: Protestant	0.0431*** (3.07)	-0.0065 (0.84)
Muslim	-0.0155 (0.74)	-0.0139 (1.36)
Other faith	0.0234 (1.10)	0.0019 (0.16)
Region: East	0.1831*** (7.53)	-0.0378*** (4.40)
North	0.1814*** (7.45)	-0.0063 (0.58)
West	0.1199*** (5.02)	-0.000 (0.000)
Wealth quintile: poorer	0.0557*** (3.09)	-0.0075 (0.69)
Middle	0.0242 (1.21)	-0.0288*** (2.66)
Richer	-0.0146 (0.72)	-0.00006 (0.00)
Richest	-0.02698 (1.06)	0.0563*** (2.73)
Married included	yes	yes
Number of children included	yes	yes
Pseudo Squared	0.0835	0.0835
Observations	5837	5837

Note: Base category is self-employment. Absolute value of z statistics in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%