

Gender differences in formal wage employment in urban Tanzania

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Abstract: This paper uses the latest Tanzania labour force survey—the Integrated Labour Force Survey—and a censored bivariate probit model to analyse gender differences in labour force participation and gender bias in formal wage employment in urban Tanzania. Our findings indicate that, compared to men, women are less likely to participate in the labour market and less likely to get formal wage employment, suggesting the existence of gender bias in the labour market in urban areas of Tanzania. However, after accounting for selection into labour force participation, the existing gender bias is narrowed for women with high school or university education. The regression results suggest that the existing gender differences in formal wage employment probabilities cannot entirely be explained by observable characteristics. The finding of a positive unexplained formal wage employment probability differential suggests that the possibility of gender discrimination against women in urban Tanzania cannot be completely ruled out.

Key words: labour force participation, formal wage employment, censored bivariate probit model, gender, discrimination, Tanzania

JEL classification: J13, J16, J21, J71

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1. Introduction

There has been growing concern about the quality of job opportunities available to women in developing countries. Women are disproportionately engaged in informal work which does not offer social protection such as a minimum wage and maternity leave (Fields 2019; Morton et al. 2014). In sub-Saharan Africa, for example, 63 per cent of women in wage employment are engaged in the informal sector (ILO 2016). In Tanzania, women work mainly in the informal sector,¹ which is mostly characterized by low-quality jobs which offer low employment terms, low remuneration, less protection, and little or no access to social security (ILO 2010; Lokina et al. 2017). Male workers account for 71 per cent of employment in the formal sector,² with women over-represented in low-paying jobs such as non-wage family helpers in agriculture and non-wage family helpers in non-agriculture (Lokina et al. 2017). Gender differences also persist in labour market participation despite the various measures and policies³ of Tanzania's government to curb it. Appropriate interventions to curb gender differences in labour force participation and formal wage employment opportunities depend on the factors and the sources of these differences.

A study on gender differences in employment opportunities is necessary to understand the underlying source of discrimination in the labour market. Gender differences in participation decisions in the labour market and other pre-labour market characteristics may influence the employment opportunities and gender representation in different sectors. Therefore, this study examines the factors that determine formal employment probabilities and the sources of gender bias in formal wage employment in urban Tanzania. We examine the gender bias in formal wage employment after considering the correlation between participation in the labour force and formal wage employment. Formal wage employment is important because working in the formal sector transcends the relatively high wages to include other benefits such as job protection, old-age social security, parental leave, sick leave, training opportunities, and career mobility. These additional benefits of formal wage employment suggest that any discrimination in formal wage employment may have severe negative consequences which go beyond wage inequality.

Studies on occupational segregation by gender demonstrate that female-dominated occupations are usually associated with lower returns than male-dominated occupations with similarly measured labour demand characteristics (see Aláez-Aller et al. 2011; Asaf et al. 2009; Blau and Khan 2017). The literature on gender differences in labour market outcomes in developing countries shows that female wages are significantly lower than male wages (for example, see Ahmed and Maitra 2010) with a decreasing gender wage gap (see, for example, Ahmed and McGillivray 2015). There is also discussion on the possible causes of the gender gap in wages and employment opportunities. Pre-labour market differences in education have been recognized as the primary source of gender segregation of employment (Baah-Boateng 2012; Wamuthenya 2010); other studies have attributed the differences in employment opportunities and the earnings gap to sheer gender discrimination against women (see, for example, Beaudry and Sowa 1994; Schultz 2003).⁴ Closely related papers to our study are Mohanty (2002) and Chen and Hamori (2010). Mohanty (2002) uses a bivariate probit model to estimate a worker's employment probability and the existence of gender and race discriminations among teenagers in Los Angeles County workers in the United States of America. Chen and Hamori (2010) also consider the likelihood of labour force participation and study gender discrimination in formal employment opportunities in China. The formal wage employment sector in sub-Saharan Africa is small and likely to be characterized by employment discrimination. Our paper therefore contributes to the literature on gender

¹ 'Informal economy' is sometimes used to connote the informal sector. However, 'informal sector' is more commonly used in Tanzania and the National Bureau of Statistics.

² 'Formal sector' is defined as including both the entire public sector and private sector enterprises and institutions that are formal in terms of registration, taxation, and official recording.

³ Some of the important recent policies and regulations to improve working conditions and address gender imbalances include the Employment and Labour Relations Act of 2004 (United Republic of Tanzania 2004a), the Labour Institutions Act of 2004 (United Republic of Tanzania 2004b), and the National Employment Policy of 2008 (United Republic of Tanzania 2008).

⁴ Gender discrimination occurs when differences in job hiring decisions and wage payments between gender groups (men or women) are largely based on differences in the sex of an individual rather than the productivity differentials of job applicants and employees respectively.

differences in employment and wages in sub-Saharan Africa.⁵ The study uses data from urban areas of Tanzania and a bivariate probit model to analyse the determinants and sources of the gender gap in formal wage employment.

Our findings indicate that gender is an essential factor in determining labour market participation and formal wage employment in urban Tanzania. We also find that women, compared to men, have a lower probability of participating in the labour force. This may be partly due to the traditional gender division of labour in households as women usually undertake the care work and the unpaid household activities, which disproportionately burden them. Besides, women are less likely to get work in formal wage employment, even after considering their lower likelihood of participating in the labour force. However, higher education (university and high school with professional certificates) reduces the gender bias against women in getting employment opportunities in formal wage employment. We also find that the existing large gender gap in formal wage employment probabilities in urban Tanzania comprises explained and unexplained components. Although it cannot provide conclusive evidence of the existence of gender discrimination against women, the finding of a positive unexplained differential in formal wage employment probability suggests that the possibility of such discrimination in formal wage employment opportunities cannot be completely ruled out in urban Tanzania.

The rest of the paper proceeds as follows. Section 2 sheds light on the data and descriptive statistics. Section 3 discusses the model specification and estimation strategy. The estimation results are presented and discussed in Section 4. Section 5 concludes and provides some policy recommendations.

⁵ Wamuthenya (2010), for example, uses a multinomial logit model (without considering labour force participation) to examine the determinants of formal and informal sector employment in the urban areas of Kenya. Agesa et al. (2013) also use a probit model in the first stage to correct for potential endogeneity in estimating the gender pay gap along the entire unconditional wage distribution in Kenya.

2. Data and descriptive statistics

2.1. Data

We use data from the latest Integrated Labour Force Survey (ILFS) 2014 (NBS 2014). The survey questionnaire responses contain detailed household information and individual characteristics such as time use, health, migration, education, and training. They also have detailed employment characteristics such as primary and secondary economic activities, usual and current economic activities, unemployment, hours of work, and employment income. The data covers persons aged five years or above who are official members of the selected households.

Our analytical sample data for this study comprises only urban households, totalling 8,078, with 56.7 per cent living in Dar es Salaam and the remaining 43.3 per cent of the households living in the other urban areas in Tanzania. The analysis focuses on individuals aged 15 to 60 years. Furthermore, the analysis excludes full-time students and the inactive population, such as the retired, the sick, and the disabled, but includes the unemployed. This exclusion leaves us with a sample of 15,603 individuals. These individuals are mainly either unemployed or employed as formal wage workers, informal wage employees, or self-employed. Formal wage workers include wage employees who work in the public sector, international organizations, and those in the private sector with formal employment contracts. Informal wage employees include all wage employees who do not have written contracts.

2.2. Descriptive statistics

Table 1 presents statistics on the labour force and different employment statuses. A total of 13,754 (88 per cent) of the sample are in the labour force and are either employed or unemployed. Twelve per cent of able individuals do not participate in the labour force—are not working and are not seeking employment—and about 86 per cent of these individuals are women. Out of 13,206 workers with different employment statuses, 42 per cent are in self-employment, 11 per cent are non-wage family workers, and 10 per cent are farm workers. Wage employment (formal and informal) constitutes only 38 per cent of the total employment. Out of a total of 4,975 workers engaged in wage employment, formal and informal workers constitute 52 per cent and 48 per cent, respectively. Also, roughly 20 per cent of the total workforce in urban Tanzania are formal wage employees, while 18 per cent of the workforce are informal wage workers.

Table 1 also shows the distribution of the labour force and employment status by gender. Out of the urban sample, 52 per cent are women. Of the 88 per cent of individuals who participate in the labour market, almost half are women. Moreover, only 14 per cent of all female workers (employed) in urban Tanzania are engaged in formal wage employment. The remainder are employed in the informal wage sector or are in self-employment, own farm work, or unpaid domestic work. Sixty-nine per cent of the employed women work as self-employed, unpaid domestic workers and own farm workers. Forty-nine per cent of the employed women in our sample are self-employed. In the case of informal wage employment, only 42 per cent are women. Women are under-represented in the formal wage sector (approximately 34 per cent), which indicates that the gender gap remains large in formal wage employment in urban Tanzania.

Table 1: Distribution of labour force and employment status by gender

	Male	Female	Total	Female as % of total
Total	7,459	8,144	15,603	52.2
Labour force participants	7,206	6,548	13,754	47.6
<i>Employed</i>	7,050	6,156	13,206	46.6
Wage employment	3,093	1,882	4,975	37.8
Formal wage employment	1,723	881	2,604	33.8
Informal wage employment	1,370	1,001	2,371	42.2

	Male	Female	Total	Female as % of total
Self-employment	2,784	2,711	5,495	49.3
Own farm work	737	547	1,284	42.6
Unpaid domestic workers	436	1,016	1,452	70
<i>Unemployed</i>	<i>156</i>	<i>392</i>	<i>548</i>	<i>71.5</i>
Labour market non-participants	253	1,596	1,849	86.3

Source: authors' calculation based on ILFS 2014 data (NBS 2014).

Table 2 provides summary statistics for the respondents by gender. The average age of the individuals (15–60 years) is 34 years, and 47 per cent are heads of household. On average, each household has 4.7 members. The average dependency ratio, defined as the ratio of the number of people within the 15–60-year age bracket to the total number of children and old-aged (above 60 years), is 0.33. With regard to marital status, 29 per cent of the individuals are single and 61 per cent are married or in a consensual union. Sixty-five per cent of men and 57 per cent of women in our sample are married or in a consensual union. Widows constitute about 9 per cent of the analytical sample compared to 4 per cent for widowers. In terms of education, 56 per cent of the samples have primary schooling as their highest level of education, 15 per cent have secondary schooling as their highest level of education, and 7 per cent have a university degree. Some of the individuals who completed primary or secondary school also have a professional certificate, but they constitute a relatively small proportion. Men in urban Tanzania are more educated than women. Only 5 per cent of women are university graduates compared with 9 per cent of men. However, 17 per cent of women either dropped out or have no education compared to 13 per cent of men.

Table 2: Means of variables (covariates)⁶

Variable	Male	Female	Total
Marital status			
Single (dummy, yes=1)	0.302	0.274	0.288
Married/consensual (dummy, yes=1)	0.649	0.572	0.609
Widow (dummy, yes=1)	0.009	0.063	0.037
Divorced (dummy, yes=1)	0.039	0.092	0.066
Education			
No education and school dropout (dummy, yes=1)	0.129	0.174	0.152
Primary school (dummy, yes=1)	0.529	0.582	0.557
Primary school plus other professional course (certificate) ⁷ (dummy, yes=1)	0.025	0.012	0.018
Secondary school (dummy, yes=1)	0.166	0.135	0.150
Secondary school plus other professional course (certificate) ⁸ /high school (dummy, yes=1)	0.064	0.044	0.053
University (dummy, yes=1)	0.087	0.054	0.070
Head of household (dummy, yes=1)	0.732	0.225	0.467
Household has child(ren) below five years (dummy, yes=1)	0.497	0.543	0.521

⁶ The whole sample distribution by region is provided in the Appendix (Appendix Table A1).

⁷ This is when an individual completes primary school education and, instead of joining secondary education, takes professional courses such as vocational training and gets a certificate.

⁸ Similarly, this is when an individual completes ordinary level secondary school education (four years) and, instead of joining high school, takes professional training such as vocational training and acquires skills and a certificate.

Variable	Male	Female	Total
Female-headed household (dummy, yes=1)	0.098	0.328	0.218
Dependency ratio	0.313	0.353	0.334
Age	35.00	33.00	34.00
Household size	4.48	4.70	4.60

Source: authors' calculation based on ILFS 2014 data (NBS 2014).

Table 3 shows the correlation between formal wage employment and the covariates. As can be seen, there is a strong negative correlation between having no education or having completed only primary education and formal wage employment. On the other hand, having completed secondary school, secondary school with another professional course, high school, high school plus a professional course, or university are strongly associated with formal wage employment. The descriptive statistics from Table 3 suggest that the formality of occupation is likely to be influenced by individuals' education level. There is a positive correlation between being married or in a consensual union and formal wage employment. However, being single or unmarried, a widow or widower, and divorced are negatively associated with the probability of formal wage employment.

Table 3: Pairwise correlation of formal wage employment and covariates

Covariates	Formal wage employment
Age	0.1237***
No education	-0.1508***
Primary (dummy, yes=1)	-0.2717***
Primary plus other professional course (dummy, yes=1)	0.0119
Secondary school	0.0482***
Secondary plus other professional course/high school (dummy, yes=1)	0.2356***
University (dummy, yes=1)	0.4339***
Single	-0.0361***
Married/consensual (dummy, yes=1)	0.0848***
Widow (dummy, yes=1)	-0.0317***
Divorced (dummy, yes=1)	-0.0531***
Child (dummy, yes=1)	-0.0556***
Number of household members	-0.0807***
Female-headed household (dummy, yes=1)	-0.0523***
Dependency ratio	-0.1061***

Source: authors' estimation results based on ILFS 2014 data (NBS 2014).

3. Model specification and estimation strategy

Individuals, depending on their characteristics, decide whether or not to enter the labour force. Employers, on the other hand, decide to employ individual job seekers based on their individual personal characteristics. Our study follows the framework of Meng and Schmidt (1985), Mohanty (2002), and Chen and Hamori (2010) to estimate the determinants and probabilities of the formal wage employment of men and women in urban Tanzania. Let y_{1i} be a latent variable which represents the probability of an individual deciding to be in the labour force which depends on personal, human capital, family, household characteristics, and area of settlement denoted as X_{1i} . Let y_{2i} also be a latent variable denoting the probability that a worker is employed as a formal wage worker which depends on a vector of human capital characteristics of the individual and their area of settlement, denoted as X_{2i} . To this end, our model is formally stated as follows:

$$y_{1i} = X_{1i}\beta_1 + \varepsilon_{1i} \quad (1)$$

$$y_{2i} = X_{2i}\beta_2 + \varepsilon_{2i} \quad (2)$$

The unobserved values of y_{1i} and y_{2i} relate to the appropriately observed binary variables ($part_i$ and sel_i) according to the specified conditions stated below:

$$part_i = 1, \text{ if } y_{1i} > 0 \text{ and } part_i = 0 \text{ otherwise} \quad (3)$$

$$sel_i = 1, \text{ if } y_{2i} > 0 \text{ and } sel_i = 0 \text{ otherwise} \quad (4)$$

where $part_i = 1$ means that an individual is participating in the labour force, and $sel_i = 1$ denote that a worker would have the opportunity to be employed in a formal wage job.

Under the assumption that the error terms of Equation (1) and Equation(2) ε_{1i} and ε_{2i} follow a bivariate standard normal distribution with $E(\varepsilon_{1i}) = 0 = E(\varepsilon_{2i})$, and $V(\varepsilon_{1i}) = 1 = V(\varepsilon_{2i})$, and $Cov(\varepsilon_{1i}, \varepsilon_{2i}) = \rho$, the formal wage employment probability can be stated as:

$$P(\text{Formal}) = P(part_i = 1, sel_i = 1) = F(X_{1i}\beta_1, X_{2i}\beta_2; \rho) \quad (5)$$

where $F(\cdot)$ is the bivariate normal cumulative distribution function with correlation coefficient ρ . Although the participation or seeking behaviour of an individual is fully observed, formal wage employment can only be observed when $part_i = 1$. Thus, we have a censored sample to estimate the formal wage employment equation (Farber 1983; Meng and Schmidt 1985). Estimating the conditional formal wage employment probability by using a univariate probit model and utilizing only the sample of labour market participants produces inconsistent estimates when the correlation between error terms in Equations (3) and (4) is different from zero, i.e. $Corr(\varepsilon_{1i}, \varepsilon_{2i}) \neq 0$. Thus, a bivariate probit model with sample selection (bivariate probit with partial observability) will be estimated for formal wage employment. A censored bivariate probit model is therefore used to estimate jointly β_1 and β_2 of Equation (1) and Equation (2), respectively (see Meng and Schmidt 1985). The estimation procedure uses the maximum likelihood estimation with the log-likelihood function given by:

$$\ln(\beta_1, \beta_2, \rho) = \sum_{i=1}^n \{ part_i * sel_i \ln F(X_{1i}\beta_1, X_{2i}\beta_2; \rho) + part_i * (1 - sel_i) \ln [\Phi(X_{1i}\beta_1) - F(X_{1i}\beta_1, X_{2i}\beta_2; \rho)] + (1 - sel_i) \ln \Phi(-X_{1i}\beta_1) \} \quad (6)$$

where $\Phi(\cdot)$ is the univariate standard normal distribution function.

The worker's conditional formal wage employment probability can be obtained as follows:

$$\begin{aligned} P(sel_i = 1|part_i = 1) \\ &= P(part_i = 1, sel_i = 1)/P(part_i = 1) \\ &= P(Formal)/P(part_i = 1) \\ &= F(X_{1i}\beta_1, X_{2i}\beta_2; \rho)/\Phi(X_{1i}\beta_1) \end{aligned} \tag{7}$$

The estimated probabilities of men and women are used to compute unexplained differential job opportunities as indicators of gender bias in formal wage employment (Mohanty 2002). The estimation procedure adopted for the probabilities of labour force participation and formal wage employment assumes that the error terms for labour market participation and formal wage employment follow a bivariate standard normal distribution.

4. Estimation results

4.1. Determinants of labour force participation and formal wage employment in Tanzania

Table 4 presents estimates of the determinants of labour force participation and formal wage employment. Columns 2 and 4 present the results on labour force participation and columns 1 and 2 show the results on formal wage employment.⁹ The test of the hypothesis that rho is equal to zero is rejected at a 1 per cent level of significance, indicating that neglecting the correlation between the selection equation (labour force participation) and outcome equation (formal wage employment) will lead to inefficient estimates. The statistically significant correlation between labour force participation and formal wage employment indicates the importance of using the bivariate estimation method. The negative and significant rho suggests that unobserved variables that reduce the probability of entering the labour force also improve the probability of being selected into formal wage employment.

The gender of the head of a household, dependency ratio, presence of children in a household, and the number of people in a household are used to satisfy the exclusion restriction to identify the outcome equation (formal wage employment). We assume that these variables may affect the decision to participate in the labour force but will not have any effect on selection into formal wage employment. The labour force participation estimates in column 2 indicate that the dependency ratio reduces the likelihood of participating in the labour market. However, the presence of children in the household does not affect the likelihood of participating in the labour force. Individuals in households with many members are less likely to seek employment or participate in the labour market.

The results presented in column 2 of Table 4 indicate a negative coefficient for the female dummy variable in the labour force participation model, suggesting that being female reduces the likelihood of participating in Tanzania's urban labour market. The negative statistically significant coefficient on being married indicates that married people are less likely to participate in the labour force than their counterparts who are single. Compared to no education, primary school complemented with a professional course, secondary plus other professional course or high school, and university education levels improve the likelihood of participating in the labour force. Individuals with primary school education complemented with a professional certificate, secondary school plus other professional course, and university education possess some special skills needed by employers, hence increasing their willingness to seek employment. The coefficients on the educational attainment dummies in the formal wage employment equation (column 1) are positive and statistically significant. This result suggests that, compared with the reference category (no education and dropped out), having a primary education or higher improves the likelihood of working as a formal wage employee.

Table 4: Results of formal wage employment equation: censored bivariate probit model

Variables	No interactions		Interactions	
	(1) Formal wage employment	(2) Labour force ¹⁰ participation	(3) Formal wage employment	(4) Labour force participation
Female (dummy, yes=1)	-0.011	-1.009***	-0.260**	-0.642***
Age in years	-0.010	0.154***	0.028**	0.157***
Square of age	0.000*	-0.002***	-0.000	-0.002***

⁹ We first check for the presence of multicollinearity between all the independent variables. The correlation matrix presented in Table A2 in the Appendix rules out multicollinearity between the covariates. Also, the variance inflation factor (VIF) in the last column of the table confirms that there is no issue with multicollinearity.

¹⁰ Although religion and ethnicity could be important in explaining labour force participation, especially for women, the information on those variables is not available in the ILFS 2014 data.

Variables	No interactions		Interactions	
	(1) Formal wage employment	(2) Labour force ¹⁰ participation	(3) Formal wage employment	(4) Labour force participation
Primary (dummy, yes=1)	0.190***	0.045	0.288***	0.311***
Primary plus other professional course (dummy, yes=1)	0.536***	0.308**	0.560***	0.473*
Secondary	0.711***	-0.006	0.805***	0.092
Secondary plus other professional course/high school (dummy, yes=1)	1.389***	0.625***	1.378***	0.475***
University (dummy, yes=1)	2.009***	0.513***	2.015***	0.310**
Married/consensual (dummy, yes=1)	0.113***	-0.519***	0.011	-0.525***
Widow (dummy, yes=1)	-0.194**	0.001	-0.162*	0.000
Divorced (dummy, yes=1)	-0.212***	0.023	-0.213***	0.051
Child (dummy, yes=1)		0.037		0.318***
Number of household members		-0.025***		-0.025***
Female-headed household (dummy, yes=1)		0.206***		0.200***
Dependency ratio		-0.280***		-0.233**
Female#Primary school			-0.157	-0.323***
Female#Primary school plus professional course			0.299	-0.205
Female#Secondary school			0.049	-0.104
Female#Secondary plus professional course/jigh school			0.505***	0.216
Female#University			0.480***	0.377**
Female#Child				-0.381***
Constant	-1.343***	-0.325*	-2.115***	-0.642***
Observations	15,603	15,603	15,603	15,603
Regional dummies	YES	YES	YES	YES
Rho	-0.826***	-0.826***	-0.465***	-0.465***
Log-likelihood full model	-9327	-9327	-9268	-9268
Chi-square test	2,220	2,220	2,150	2,150
Prob > chi2	0.000	0.000	0.000	0.000

Note: coefficients are from the probit model estimates. ***, **, and * denote significance at 1%, 5%, and 10% level, respectively. The dependent variable is a binary variable equal to 1 if an individual is a formal wage employee and 0 if otherwise. The dependent variable is a binary variable equal to 1 if an individual has participated in the labour market (employed, unemployed, and seeking a job) and 0 if otherwise. The reference category for education dummies is no education or incomplete primary; for marital status, the reference category is single.

Source: authors' estimation results based on ILFS 2014 data (NBS 2014).

To understand the gendered differential impact of education and the presence of children in the household on labour force participation and selection into formal wage employment, we interact the female dummy with levels of education and presence of children. If the under-representation of women in formal wage employment is due to gender differences in educational attainment, then excluding the interaction between

the female dummy and education would bias the estimated coefficients of the female dummy and the various levels of education. Columns 3 and 4 of Table 4 report regression results which include these interaction terms.

The coefficient of the female dummy is negative and statistically significant in the labour force participation equation (column 4). This indicates that, compared to men, women are less likely to participate in the labour market, providing evidence of gender bias in labour force participation. The gender bias can be appropriately measured by the conditional marginal effects. Estimates of the conditional average marginal effects suggest that being female reduces the likelihood of formal wage employment by 6.5 per cent (see Table A6 in the Appendix). The significant negative coefficient on the female and child interaction term suggests a gender gap in labour market participation. The effect is stronger for women living in households with children. The coefficient on the number of household members in the labour force participation equation is significant and negative, indicating that individuals living in large households are less likely to participate in the labour force. Also, the negative and statistically significant coefficient on the dependency ratio suggests that people living in households with a high percentage of children and older people relative to the working-age group are less likely to participate in the labour force. The censored bivariate probit regressions with interaction between marital status and gender as a covariate also indicate that the gender gap in labour market participation is stronger for women who are married or in a consensual relationship (see Table A7 in the Appendix). Thus, the gender bias and therefore discrimination against women in formal wage employment opportunities is stronger for married women compared to men and single individuals.

The significant positive coefficient on the various levels of education (compared to no education) suggests that higher education improves the likelihood of getting an opportunity to work in a formal wage job. Conditional on labour force participation, primary education, primary education plus a professional course, and secondary education improve the probability of formal wage employment by 3.4 per cent, 13.9 per cent, and 16.4 per cent, respectively. Similarly, the average probability of getting a formal wage job increases by 47.6 per cent and 69.8 per cent for individuals with secondary plus a professional course/high school and university education levels, respectively (Table A6 in the Appendix).

The significant positive coefficient on the interaction terms between education dummies and the female dummy in the formal wage employment equation suggests that education affects how gender relates to formal wage employment probabilities. First, university and high school education levels narrow the gender gap (indicated by the negative and significant coefficient on the female dummy) in the probability of formal wage employment. The average changes in the probabilities of getting formal wage employment for women with high school and university levels of education, compared with women with no education and men, increase by 12.3 per cent and 10.4 per cent, respectively. Thus, the observed under-representation of women in formal wage employment is lessened for women with high school and university education. This finding also means that the observed differences in formal wage employment across gender may partly come from differences in education.

4.2. Probability of being formally employed, by gender

In Table 5, we present the results of the bivariate probit estimations using male and female samples separately to understand the determinants of gender disparities in the probabilities of formal wage employment of urban residents in Tanzania. Columns 2 and 4 in Table 5 indicate that schooling is an important determinant of female labour force participation but it does not affect men's participation in the labour force. Women with secondary education plus a professional course, high school education, or university education have a higher probability of participating in the labour market than their counterparts with no education. For men, the probability of labour force participation for the various levels of education is not statistically significant. Compared to the reference category (single men), married men have a higher probability of participating in the labour market, but married women are less likely to participate in the labour market. While female widows and divorcees are less likely to participate in the labour force than their counterparts who are single, the labour force participation of widowers and divorced men is not different from unmarried men. However, there is a significant difference in the likelihood of labour market participation between widows and married women. Table A7 in the Appendix indicates that, on average, married women are less likely to participate in the labour market than their counterparts who are widows. Compared to single women, the average probability of labour force participation is 17 per cent (and statistically significant at 1 per cent) lower for

married women and 3.5 per cent (statistically significant only at 1 per cent) lower for widows. It can also be seen that the presence of children in a household significantly reduces the likelihood of female labour force participation.

Table 5: Results of labour force participation and formal wage employment equations by gender: censored bivariate probit model¹¹

Variables	Female		Male	
	(1) Formal wage employment	(2) Labour force participation	(3) Formal wage employment	(4) Labour force participation
Age in years	0.016	0.142***	0.041***	0.196***
Square of age	-0.000	-0.002***	-0.000*	-0.003***
Primary (dummy, yes=1)	0.116	0.004	0.307***	0.154
Primary plus other professional course (dummy, yes=1)	0.826***	0.309*	0.574***	0.169
Secondary	0.810***	-0.031	0.832***	-0.019
Secondary plus other professional course/high school (dummy, yes=1)	1.784***	0.733***	1.419***	0.291
University (dummy, yes=1)	2.429***	0.767***	2.044***	-0.000
Married/consensual (dummy, yes=1)	-0.084	-0.777***	0.099*	0.598***
Widow (dummy, yes=1)	-0.188*	-0.199*	-0.127	0.308
Divorced (dummy, yes=1)	-0.267***	-0.128	-0.173	0.218
Child (dummy, yes=1)		-0.110**		0.130
Number of household members		0.005		-0.044***
Female-headed household (dummy, yes=1)		0.344***		-0.342***
Dependency ratio		-0.183		-0.340*
Constant	-1.816***	-0.985***	-2.573***	-1.199***
Observations	8,144	8,144	7,459	7,459
Regional dummies	YES	YES	YES	YES
Rho	-0.598***	-0.598***	-0.241	-0.241
Log-likelihood full model	-4990	-4990	-4005	-4005
Chi-square test	945.3	945.3	1,298	1,298
Prob > chi2	0.000	0.000	0.000	0.000

Note: ***, **, and * denote significance at 1%, 5%, and 10% level, respectively. The reference category for education dummies is no education or incomplete primary; for marital status, the reference category is single.

Source: authors' estimation results based on ILFS 2014 data (NBS 2014).

¹¹ Spouse's income and spouse's labour force status may affect a woman's decision to participate in the labour market, especially when participation is a household optimization decision. This information is only available for married individuals or those in a consensual relationship living in the same household in the labour force survey. We present results for the case when spouse's working status is included as an explanatory variable in Appendix Tables A3 to A5. The findings are similar to the results presented in Table 5.

Regarding the determinants of formal wage employment, the results in columns 1 and 3 of Table 5 indicate that education is essential in formal wage employment for both men and women. Primary school education (which increases the formal wage employment probability for men only), primary school with a professional course, secondary school (with or without a professional course), high school, and university levels of education improve the likelihood of being employed in formal wage employment for both men and women. There are no significant differences in the probability of being employed in formal wage employment between those who are single and those who are married. However, divorced individuals are less likely to get a job in formal wage employment than single individuals.

Table 5 also reveals gender differences in the impact of educational attainment on formal wage employment (columns 1 and 3). First, for both genders, a higher educational attainment improves the probability of formal wage employment. Second, the returns to education—in terms of opportunities for formal wage employment—for all the categories of educational attainment (except primary and secondary) are stronger for women. Table A7 in the Appendix indicates that, compared to women with no education or who dropped out, the probability of getting a formal wage job is 52.6 per cent higher for women with secondary education plus other professional courses or high school education, and 75.4 per cent higher for those with university education. For men, the probability of getting a formal wage job is 41.3 per cent higher for those with secondary education plus other professional courses or high school, and 63.7 per cent higher for those with university education when compared with their counterparts with no education.

Appendix Table A7 also indicates that for women, education is the most important determining factor in labour market participation and formal wage employment (see columns 1 and 2 of Table A7). The probability of female labour force participation improves with secondary and university education by 13.4 per cent and 14.0 per cent, respectively, compared with women with no education or who dropped out. In addition, having secondary and university education also enhances the formal wage employment opportunities of women. However, for men, educational attainment is not important for the labour force participation decision, even though it is a very important factor for getting formal wage employment. The result therefore suggests gender differences in the role of educational attainment in labour market decisions: education affects women's decisions with regard to labour market participation but not those of men. Education also improves formal wage employment opportunities for both men and women. For men, marital status seems to be the most important determinant of labour market participation: married men have a 3.7 per cent probability of entering the labour market compared with single or unmarried men.

Table 6 presents the average formal wage employment probabilities of men and women. The probability of participating in the labour market and the probability of being selected into formal wage work by employers are reported in columns 2 and 3 of the table. Columns 2 and 3 were computed from $Avg\{\Phi(X_{1i}\beta_1)\}$ and $Avg\{\Phi(X_{2i}\beta_2)\}$, respectively. The coefficients β_1 and β_2 are obtained from estimating Equation (6). The probabilities of the formal wage employment and the conditional probabilities of formal employment in columns 4 and 5 of Table 6 are estimated using Equations (5) and (7).

The censored bivariate probit has the advantage of separating the probability of labour force participation from the probability of formal wage employment selection. Column 1 shows that males have a higher likelihood of participation in the labour force than women—the average probability of participation in the labour force for men and women is 96.6 per cent and 80.4 per cent, respectively. Column 3 shows that the average 'unconditional' formal wage employment probabilities for men and women are 23.0 per cent and 10.8 per cent, respectively. The higher unconditional formal wage employment probability for men is a direct result of the higher participation probability. This suggests that differences in formal wage employment probabilities between men and women can still arise in the absence of discrimination by employers in the formal sector.

Table 6: Average probabilities of formal employment between females and males: censored bivariate probit model

Gender	(1)	(2)	(3)	(4)
	P(Parti)	P(Sel)	P(Formal)	Conditional selec. prob. = P(Formal)/P(Parti)
Male	0.96601	0.23997	0.2302	0.23606
Female	0.80367	0.1643	0.10759	0.12171

Source: authors' estimation results based on ILFS 2014 data (NBS 2014).

The average 'conditional' selection probability for men is also higher than that for women—23.6 per cent and 12.2 per cent for men and women, respectively. The difference in the conditional probability may suggest some evidence of discrimination against women. However, Mohanty (2002) emphasizes that the 'observed' differences in conditional probabilities do not necessarily indicate the presence of discrimination. As noted earlier, differences in participation probabilities can lead to differences in conditional selection into formal wage employment. The result on unconditional selection suggests that, given women's individual and demographic characteristics, 16.4 per cent of them would likely be selected by employers in formal wage jobs if they were all able to make themselves available for employment. This result compares favourably to the conditional formal wage employment of 12.2 per cent. Thus, about 4.2 percentage points of additional women are more likely to get a formal wage job if all women participate in the labour market. This finding suggests that some women outside the labour force have characteristics that could secure them formal wage employment conditional on entering the labour market.

Following Mohanty (2002) and Chen and Hamori (2010), we use unexplained gender differences in employment probabilities to estimate the presence and the extent of discrimination in the labour market. The coefficients on covariates from the male regression are used as the discrimination-free coefficients for male and female workers. Using these coefficients, the total conditional formal wage employment probability differentials between males and females are decomposed into explained and unexplained components. The results, based on censored bivariate probit estimates, are reported in Table 7.

Table 7: Decomposition of formal employment probability differential, between females and males¹²

Total estimated differential	0.114***
Explained	0.098***
Unexplained	0.016***
Percentage due to endowments	86.052
Percentage due to unobserved factors	13.948

Note: in estimating explained and unexplained differentials, the male coefficients are used as discrimination-free coefficients. ***, **, and * denote significance at 1%, 5%, and 10% level, respectively, of the mean differences between men and women.

Source: authors' estimation results based on ILFS 2014 data (NBS 2014).

The results in Table 7 indicate that the total estimated differential of formal employment probability between men and women is approximately 0.114. The result indicates that the part of the differential that can be explained by observable characteristics is about 0.099 (86.2 per cent) and the remaining 0.016 (13.8 per cent) is unexplained. Thus, the estimated differential is mainly due to the observed endowments. The explained formal wage employment probability differential between men and women is statistically significant, which suggests that, compared to women, men have a considerable advantage in getting the opportunity to work in formal wage employment based on the observable characteristics. On the other hand, the statistically significant positive unexplained differential effect of male and female formal wage employment suggests some

¹² Unexplained = $Avg\{F(X_{1i}^F, \beta_1^F, X_{2i}^F, \beta_2^M; \rho^F) / \Phi(X_{1i}^F, \beta_1^F)\} - Avg\{F(X_{1i}^F, \beta_1^F, X_{2i}^F, \beta_2^F; \rho^F) / \Phi(X_{1i}^F, \beta_1^F)\}$; β_2^F and β_2^M are female and male coefficients of the formal wage employment selection equation. The male coefficients, β_2^M , are used as no-discrimination coefficients.

evidence of gender bias against women in formal wage employment. Thus, the results suggest that the possibility of discrimination against women cannot be denied. However, the unexplained gender gap in formal wage employment cannot be wholly described as discrimination as differences in the unobserved characteristics of men and women could also account for the gender gap.

5. Conclusion and policy implications

This study set out to examine gender inequalities in some aspects of Tanzania's urban labour market outcomes. A representative sample of individuals in the labour force whose ages range from 15 to 60 years was used for the analysis. Specifically, the study determined how gender differences affect the choices of individuals to participate in the labour market and to examine whether there was any evidence of gender inequality in formal wage employment.

The findings from the study suggest that women are less likely to enter the labour market than their male counterparts. Also, the lower level of labour force participation is stronger for women living in households with children. We also found that the likelihood of women working or looking for employment improves as their education levels increase. The paper also found evidence of gender bias in formal wage employment opportunities, even after accounting for gender differences in educational attainment and labour force participation decisions. However, women's higher educational attainment (university and high school) reduces the observed gender bias in securing formal wage employment in urban Tanzania. Estimates of conditional probabilities suggest that the prevailing gender differences in formal wage employment are mainly explained by differences in personal and household characteristics, such as education, age, and marital status, between men and women in urban Tanzania. However, the statistical significance in the unexplained component of the gender differences in the probability of formal wage employment suggests there is a gender bias against women in their search for formal wage employment, although a general conclusion about discrimination against women cannot be drawn from the results.

Policies to combat gender differences in opportunities in formal wage jobs remain important in Tanzania. Understanding the factors which influence individuals to participate in the labour force and which influence their selection by formal wage employers could help policy makers to identify the areas that can be changed to improve labour force participation. For instance, stakeholders, including policy makers, the private sector, civil society, and producer organizations, should work together to reduce gender inequalities in labour force participation. Our findings suggest that women are disadvantaged in both labour force participation and human capital development and that these translate into the low probability of formal wage employment for women. This means that the observed gender differences in formal wage employment can largely be attributed to educational achievement and family characteristics, such as marital status, presence of children, and number of household members, which reduce female labour force participation.

The problem of low labour force participation and lower representation of women in formal wage employment can be managed in three ways. First, as formal wage employment (especially in higher-paying and decent jobs) demands a higher level of education than self-employment and informal paid jobs, drastic policies should be tailored to improve women's education levels. This could be done by setting policies which would make it easier for women to attain formal education up to the highest level. Indeed, although there has been significant progress in gender parity at the primary and secondary levels (United Republic of Tanzania 2018), evidence shows that the proportion of girls in tertiary education institutions is still low compared to that of boys (Tanzania Commission for Universities 2016). One way to increase girls' access to higher education is to undertake affirmative action to facilitate their easy access to higher education. These affirmative interventions could include scholarship packages for female students who need them. Second, policy makers and other stakeholders must address the issue of women's heavy involvement in domestic activities. Possible ways to reduce this burden on women include promoting and providing technologies geared to reducing the time spent on domestic work, supporting a more gender-equal division of domestic work or men helping in childcare and domestic work, and providing access to social services such as the public provision of childcare. Third, policy makers should create and implement gender-based labour market policies to improve the chances of women in formal wage employment in urban Tanzania. Affirmative legal action with gender quotas which mandate organizations, both public and private formal organizations, to employ a minimum number of women relative to total employees would help to achieve greater representation of women in formal wage employment.

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Appendix

Table A1: Distribution of sample by region

Region	Frequency	%
Dodoma	361	2.31
Arusha	399	2.56
Kilimanjaro	257	1.65
Tanga	305	1.95
Morogoro	530	3.4
Pwani	252	1.62
Dar es Salaam	8,738	56.00
Lindi	173	1.11
Mtwara	252	1.62
Ruvuma	315	2.02
Iringa	229	1.47
Mbeya	725	4.65
Singida	160	1.03
Tabora	314	2.01
Rukwa	187	1.2
Kigoma	326	2.09
Shinyanga	204	1.31
Kagera	152	0.97
Mwanza	729	4.67
Mara	200	1.28
Manyara	198	1.27
Njombe	129	0.83
Katavi	75	0.48
Simiyu	174	1.12
Geita	219	1.4
Total	15,603	100

Source: authors' calculation based on ILFS 2014 data (NBS 2014).

Table A2: Correlation matrix between all the covariates

	Female	Age	Primary	Primary certificate	Secondary	Secondary certificate/ high school	University	Married/ consensual	Widow	Divorced	Presence of a child	Number household members	Female-headed household	Dependency ratio	Variance inflation factor (VIF)
<i>Female</i>	1														1.15
<i>Age</i>	-0.0902*	1													1.62
<i>Primary</i>	0.0528*	-0.0093	1												2.08
<i>Primary certificate</i>	-0.0486*	0.0481*	-0.1528*	1											1.11
<i>Secondary</i>	-0.0425*	-0.0964*	-0.4701*	-0.0572*	1										1.72
<i>Secondary certificate/ high school</i>	-0.0438*	0.0346*	-0.2661*	-0.0324*	-0.0997*	1									1.3
<i>University</i>	-0.0664*	0.0968*	-0.3067*	-0.0373*	-0.1149*	-0.0650*	1								1.39
<i>Married/consensual</i>	-0.0797*	0.3409*	0.0339*	0.0250*	-0.0472*	0.0069	0.0596*	1							2.19
<i>Widow</i>	0.1408*	0.2238*	0.0107	-0.0167*	-0.0436*	-0.0106	-0.0193*	-0.2453*	1						1.39
<i>Divorced</i>	0.1061*	0.1028*	0.0342*	0.0136	-0.0584*	-0.0152	-0.0366*	-0.3325*	-0.0524*	1					1.38
<i>Children</i>	0.0468*	-0.1285*	0.0374*	-0.0062	-0.0241*	-0.0331*	-0.0291*	0.2182*	-0.0743*	-0.0527*	1				1.74
<i>Number household members</i>	0.0453*	0.0034	0.0082	-0.0027	-0.0151	-0.0296*	-0.0176*	-0.0091	-0.0347*	-0.0670*	0.3569*	1			1.35
<i>Female-headed household</i>	0.2793*	-0.0314*	-0.0165*	-0.0210*	-0.0076	-0.0039	-0.0325*	-0.4709*	0.2879*	0.2758*	-0.0898*	-0.0750*	1		1.51
<i>Dependency ratio</i>	0.0902*	0.0372*	0.0586*	0.0004	-0.0695*	-0.0517*	-0.0683*	0.1965*	-0.0152	0.0127	0.5957*	0.4342*	-0.0188*	1	1.81

Note: * denotes significance at 5%

Source: authors' Estimation Results based on ILFS 2014 data (NBS 2014).

Table A3: Results on male and female censored bivariate equations (controlling for spousal working status)

Variables	Female	Male	Female	Male
	(1) Formal wage employment	(2) Labour force participation	(3) Formal wage employment	(4) Labour force participation
Age in years	0.016	0.143***	0.042***	0.197***
Square of age	-0.000	-0.002***	-0.000*	-0.003***
Primary school	0.116	0.004	0.307***	0.153
Primary school plus other professional course	0.826***	0.310*	0.575***	0.158
Secondary school	0.810***	-0.031	0.833***	-0.019
Secondary school plus other professional course/high school	1.785***	0.733***	1.421***	0.293
University	2.430***	0.766***	2.046***	-0.004
Married/consensual	-0.084	-0.744***	0.101*	0.473***
Widow	-0.188*	-0.193*	-0.126	0.332
Divorced	-0.267***	-0.126	-0.172	0.235
Child		-0.108**		0.125
Number of household members		0.004		-0.044***
1 if female-headed household		0.332***		-0.335***
Dependency ratio		-0.184		-0.332*
Spouse not working		0.045		-0.175
Spouse working		0.043		-0.006
Constant	-1.818***	-1.036***	-2.590***	-1.029**
Observations	8,144	8,144	7,459	7,459
REGIONAL DUMMIES	Yes	Yes	Yes	Yes
Rho	-0.597	-0.597	-0.209	-0.209
Log-likelihood full model	-4990	-4990	-4004	-4004
Chi-square test	944.6	944.6	1,303	1,303
Prob > chi2	0.000	0.000	0.000	0.000

Note: ***, **, and * denote significance at 1%, 5%, and 10% level, respectively. The reference category for education dummies is no education or incomplete primary; for marital status, the reference category is single; for spousal working status, the reference category is no spouse or no information on spouse

Source: authors' estimation results based on ILFS 2014 data (NBS 2014).

Table A4: Average probability of formal employment between females and males (controlling for spousal working status)

Gender	Censored bivariate probit (from female and male all sample)			
	(1)	(2)	(3)	(4)
	P(Parti)	P(Sel)	P(Formal)	Conditional selec. prob. = P(Formal)/P(Parti)
Male	0.96602	0.23962	0.23021	0.23607
Female	0.80367	0.1642	0.10759	0.12171

Source: authors' estimation results based on ILFS 2014 data (NBS 2014).

Table A5: Decomposition of formal employment probability differential between females and males (controlling for spousal working status)

	Bivariate model
Total	0.114
Explained	0.099
Unexplained	0.016
Percentage due to endowments	86.228
Percentage due to discrimination	13.772

Source: authors' estimation results based on ILFS 2014 data (NBS 2014).

Table A6: Conditional average marginal effects on probability of formal wage employment

Variables	(1) Formal wage employment
1 if female	-0.065***
Age in years	0.003***
Primary school	0.034***
Primary school plus other professional course	0.139***
Secondary school	0.164***
Secondary school plus other professional course/high school	0.476***
University	0.698***
Married/consensual	-0.010
Widow	-0.030*
Divorced	-0.038***
Child	0.002
Number of household members	-0.001*
1 if female-headed household	0.004**
Dependency ratio	-0.005
Average marginal effects of female and education interactions	
Female dummy Vs Education dummy	
Primary school <i>Vs No education</i>	-0.047
Primary school plus other professional course <i>Vs No education</i>	0.024
Secondary school <i>Vs No education</i>	-0.059
Secondary school plus other professional/high school <i>Vs No education</i>	0.124
University <i>Vs No education</i>	0.104
Observations	15,603
REGIONAL DUMMIES	YES

Note: ***, **, and * denote significance at 1%, 5%, and 10% level, respectively. The reference category for education dummies is no education or incomplete primary; for marital status, the reference category is single.

Source: authors' estimation results based on ILFS 2014 data (NBS 2014).

Table A7: Conditional average marginal effects on probability of formal wage employment

Variables	Female		Male	
	(1) Formal	(2) Selection	(3) Formal	(4) Selection
Age in years	0.002***	0.008***	0.004***	0.003***
Primary school	0.010	0.001	0.057***	0.010
Primary school plus other professional course	0.152***	0.070*	0.123***	0.010
Secondary school	0.125***	-0.007	0.199***	-0.001
Secondary school plus other professional course/high school	0.526***	0.134***	0.413***	0.016*
University	0.754***	0.140***	0.637***	-0.000
Married/consensual	-0.041***	-0.170***	0.028**	0.037***
Widow	-0.035**	-0.035*	-0.027	0.023
Divorced	-0.043***	-0.023	-0.036	0.018
Child	-0.003*	-0.025**	0.001	0.008
Number of household members	0.000	0.001	-0.000	-0.003***
1 if female-headed household	0.011**	0.078***	-0.003	-0.025***
Dependency ratio	-0.005	-0.042	-0.002	-0.021*
Observations	8,144	8,144	7,459	7,459
REGIONAL DUMMIES	YES	YES	YES	YES

Note: ***, **, and * denote significance at 1%, 5%, and 10% level, respectively. The reference category for education dummies is no education or incomplete primary; for marital status, the reference category is single.

Source: authors' estimation results based on ILFS 2014 data (NBS 2014).

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