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# Unemployment and underemployment in Kenya: a gender gap analysis

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**Abstract:** This paper analyses the gender gaps in open unemployment and underemployment in Kenya, using data from the Kenya Integrated Household Budget Survey 2005/06. Unemployment and underemployment probability functions were estimated separately for men and women, using binary probit specification and the gender gap in each outcome was decomposed to determine what factors explain it. The probit estimates indicate that even after controlling for differences in personal and household characteristics, the women were still more likely than men to be unemployed or underemployed. Observable individual human capital characteristics, marital status, region of residence, non-labour income and individual's age were significant determinants of unemployment and underemployment. Decomposition results show that most (88.8percent) of the total female-male unemployment probability gap is explained by female-male differences in individual and household characteristics and only 11.2percent is unexplained. In contrast, only 5.4percent of the female-male underemployment probability gap is explained by female-male differences in individual and household characteristics while 94.6percent is unexplained. The key characteristics generating female-male gaps in unemployment and underemployment probabilities in Kenya are region of residence, age, education level, marital status and adverse shocks. This implies that policy interventions that aim to lower gender gaps in unemployment and underemployment should target the most affected age cohorts and locations. Policy should also give priority to interventions that narrow disparities in access to education and those that reduce adverse shocks.

**Keywords:** Unemployment, Underemployment, Gender

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## 1. Introduction

Although the national open unemployment rate in Kenya dropped from 14.6% in 1998/99 (see 1998/99 Labour Force Survey Results) to 12.7% in 2005/06 (see the Results of the 2005/06 Kenya Integrated Household Budget Survey), unemployment remains one of the major development challenges in Kenya. During the same period, underemployment increased from 4.8% in 1998/99 to 20% in 2005/06. Along with the twin problems of unemployment and underemployment, there are glaring gender and age-related gaps that have become a major concern for policy makers. The incidence of unemployment in Kenya is higher among females than among men (see Tables 1 and 2). Female unemployment is a key indicator of the extent to which females lack labour market opportunities to generate income (UNDP, 2010). In addition, levels of unemployment and underemployment

are key indicators of labour underutilisation (Sackey and Osei, 2006). High levels of labour underutilization is a concern as it imposes costs on individuals and the economy in lost output, income loss and psychological pain.

Despite documented gender disparities in labour utilization in Kenya, the socio-economic factors associated with these disparities are still unclear. Gender disparities in labour utilization may have several possible explanations. Human capital theory postulates that education of women is positively related to the likelihood of employment (Becker, 1962). The theory of labour market discrimination suggests that employers may have prejudice against women (Becker, 1957). Furthermore, social, cultural and structural barriers could negatively influence female participation in the labour force (Suda, 2002). Institutional forces like labour unions and minimum wages, and other labour regulations may also have a greater adverse effect on female than male employment. Given the foregoing, the broad objective of

this study is to examine gender differences in unemployment and underemployment in Kenya. Specifically, the study has three objectives: First, the study analyses the determinants of open unemployment. Secondly, it analyses factors behind time-related underemployment. Thirdly, it decomposes the gender gap in labour underutilisation to identify factors that explain it.

The rest of the paper is organised as follows. Section 1.1 presents the gender and age dimension of the labour market in Kenya while section 2 reviews the literature on the gender dimension in unemployment and underemployment. The methodology of the study is presented in section 3. Section 4 presents the findings while section 5 concludes and draws implications for policy.

### 1.1. Gender in Kenya's Labour Market

In the 1999 population census, there were 28.7 million Kenyans; men constituted 49.5% of the population and

women 50.5% (Republic of Kenya, 2010). By 2009 population census, the population was 38.6 million, representing an increase of 25.7% over the ten-year period (Republic of Kenya, 2010). Persons in the 15-64 years age bracket constitute the working age population. Out of this population, the labour force consists of employed and unemployed persons. The unemployment rate is therefore the percentage of unemployed persons in the labour force (Republic of Kenya, 2008). Unemployment varies substantially by gender and age in Kenya (Table1). Unemployment is highest among 15- 24 and 20-24 year-olds. In addition, unemployment is higher among females than males. For example, in the rural Kenya, male unemployment rate was 16.8% compared to 20.3% for females among 20–24 year-olds. Unemployment is higher in urban than rural areas. But in both areas, gender unemployment gap is present. The female–male gap is widest among the 20 -24 year-olds in rural and urban areas.

*Table1. Unemployment rate by sex, region and age 2005/06*

Age	Rural			Urban			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
TOTAL	9.5	10.2	9.85	15	25.9	19.9	11.2	14.3	12.7
15 – 19	18.2	21.2	19.7	42.3	47.8	45.5	22.4	27.7	25
20 – 24	16.8	20.3	18.55	30.1	40.8	35.8	21	27.3	24.2
25 – 29	11.1	12.1	11.6	17.3	29.1	22.8	13.5	17.9	15.7
30 – 34	5.6	7.2	6.4	6.8	14.3	9.8	6.1	9.2	7.5
35 – 39	6.7	5.7	6.2	7.2	14.7	10.6	6.9	8.3	7.6
40 – 44	5.2	4.7	4.95	9.2	12.3	10.5	6.4	6.4	6.4
45 – 49	4.3	5.6	4.95	6.3	10.4	7.8	4.9	6.5	5.7
50 – 54	4.5	3.8	4.15	6.4	8.5	7.1	4.9	4.4	4.7
55 -59	4.8	2.8	3.8	4.9	6.2	5.3	4.8	3.2	4
60 -64	3.9	0.8	2.35	5.6	1.4	4.2	4.2	0.8	2.5

Source; Republic of Kenya (2008), Labour Force Analytical Report 2008

Table 2 shows unemployment rates by gender and age. Total unemployment rate fell to 12.7% in 2005/06 from 14.6% in 1998/99. During the two periods, unemployment was highest among 15 – 24 year olds and lower for older

ages. The gender unemployment gap is widest among 15 – 39 year olds and decline from 40 – 59 years. In 1998/99, female unemployment rate was almost double that of males in all age groups.

*Table2. Unemployment rates by age and sex, 1998/99 and 2005/06*

Age group	1998/99			2005/06		
	Male	Female	Total	Male	Female	Total
15 – 19	21.8	26.4	24.3	22.4	27.7	25
20 – 24	19	33.9	27.1	21	27.3	24.2
25 – 29	8.2	21.6	15.5	13.5	17.9	15.7
30 – 34	4.8	16.8	10.8	6.1	9.2	7.5
35 – 39	5	11.8	8.40	6.9	8.3	7.6
40 – 44	7.8	10.6	9.1	6.4	6.4	6.4
45 – 49	4.9	12.5	8.2	4.9	6.5	5.7
50 – 54	6.3	11.1	8.7	4.9	4.4	4.7
55 -59	14.2	12.7	13.5	4.8	3.2	4
60 -64	7.5	15.7	11.7	4.2	0.8	2.5
TOTAL	9.8	19.3	14.6	11.2	14.3	12.7

Source: Republic of Kenya (2003)-1998/99 Labour Force Survey; Republic of Kenya (2008)-Labour Force Analytical Report 2008

In addition to open unemployment, Kenya faces the

challenge of underemployment. An underemployed person involuntarily works less than normal duration of work determined for the activity and are available for additional work (Republic of Kenya, 2008). They work shorter hours or engage in lower skilled jobs as an alternative to open unemployment. In Kenya, a person is said to experience time related underemployment if they work less than 28 hours in one week (Republic of Kenya, 2008).

Of the total employed in the 2005/06 Kenya Integrated Household Budget Survey, over 20% were underemployed, almost five times more than in the 1998/99 Integrated Labour Force Survey (Republic of Kenya, 2003, 2008). This clearly reveals a spiral in underemployment in Kenya. Moreover, 55.4% of the underemployed in 2005/06 were females located in rural areas.

## 2. Literature Review

### 2.1. Labour Market Theory

Gender differences in unemployment may be explained by various factors from theory. One of the explanations given is difference in human capital. From the neoclassical theory (Hirsch, 2007), in which the human capital theory is embedded (Aurora, 2002; Becker, 1962), unemployment is found to be high among those with less human capital. Gender differences in unemployment rates across demographic groups are related to difference in human capital; more education is associated with lower unemployment (Ashenfelter and Ham 1979). This theory predicts higher unemployment for women and men with less human capital.

Political economists argue that labour market institutions can also influence the rates of unemployment. Labour market institutions such as trade unions set wages by rules and not through the price mechanism. Wage setting through rules forms part of the labour market legislation, which constitutes various laws that the government uses to govern the labour market processes and hence determine labour market outcomes. There are laws, for instance, which specify minimum wage rates and govern the process by which trade unions acquire bargaining rights and the procedures by which they and employers engage in collective bargaining (Hirsch, 2007). By not hiring workers with lower levels of capital higher unemployment rates are observed for the less educated and inexperienced. In the Kenyan context, this would mainly affect women especially in the rural areas where the majority of population resides.

Sociological factors may also explain differences in unemployment between male and female. The perception of the society towards gender especially in African communities has left women dragging behind in the development agenda. This is reflected from their low human capital acquisition, no right to own property and other cultural factors that discriminate against them.

Gender gap in unemployment may also be due to difference in degree of labour market attachment between

men and women. Relatively weak attachment of women to the labour market generates disincentives to acquire human capital (Azmat et. al., 2006). Low levels of human capital make the gap between marginal product when in work and the reservation wage small. In addition, organisations that reduce labour turnover or employ on contract basis may increase the gender gap if women have a higher outflow rate from employment than men; with reduced hiring rate, the gap is magnified. The outflow of women maybe due to family responsibility such as care for young children, special children or the fact that men are supposedly breadwinners and should provide.

Another likely cause of the gap in unemployment and underemployment is discrimination. This occurs through disparities in hiring rates between males and females. However, where laws that prevent discrimination exist, it is exercised through differential hiring rates.

Psacharopoulos et al. (1989) argues that supply and demand for labour change during the process of development. In the early stages of industrialization, agricultural sector loses its importance as the main employer of women. Given that industries expand slowly as compared to contraction of agriculture, the result is an initial increase of female unemployment but the situation reverses with the expansion of service and government sectors. Labour shortages lead to higher availability of part-time jobs and higher wages for women giving rise to a U-shaped pattern of female employment in the process of development.

### 2.2. Empirical Studies

Focusing on Ghana, Sackey and Osei (2006) use probit model to study unemployment and underemployment as the human resource underutilisation. They found that in certain industries there is an association between poverty and underemployment. Rural areas were found to have high underemployment rates with the type of economic activity also influencing it. Females were more likely to be underemployed. Demographics, firm size and education were found to be the main determinants of unemployment. Higher education was associated with low probability of being unemployed. However the authors do not go further to make a decomposition of the gap between female and male in both unemployment and underemployment.

The sources of the gender gap in urban unemployment in Kenya were explored by Wamuthenya (2010). The study found that in 1986 and 1998 over 80% of female-male unemployment gap was due to observable characteristics. Household headship was the key factor driving gender unemployment gap. Disparities between men and women in the incidence of household headship explained 71% of the observed unemployment gap in 1986 and 91% in 1998.

While Wamuthenya (2010) provides valuable information about the gender gap in unemployment in Kenya, there is need for a fuller picture of how men and women fare in Kenya's labour market. This is achieved in the current paper in three ways. First, we take into account

workers in rural Kenya, especially because as indicated earlier, rural Kenya experiences substantial unemployment. This is a notable gap since majority of women reside in the rural areas and may be the most affected with underemployment. Secondly, we investigate gender differences in the incidence of underemployment so as to paint a fuller picture of labour underutilization in Kenya. Finally, we analyse the 2005-06 cross-sectional data set collected in a period characterised by economic recovery.

Kingdon and Knight (2000) examined gender and racial differences in the incidence of unemployment in South Africa. Cross sectional data was analysed to gauge the extent of employment discrimination. The incidence of unemployment was separated into two: entry into unemployment and duration of unemployment. The raw race-gap in the probability of unemployment is decomposed into explained and unexplained components.

Young uneducated Africans living in homelands and remote areas are particularly vulnerable to unemployment. They found rural unemployment rates to be higher than urban rates which could be explained by historical policies restricting mobility. The very long duration of unemployment among a large proportion (68%) of the unemployed suggests that demand-side constraints in the labour market explained most of the black-white unemployment gap. It was concluded that racial differences in unemployment was not due to the poorer productive characteristics of the African, coloured, and Indian groups as compared to the whites in South Africa.

Azmat *et al.* (2006) use panel data to estimate a probit model of being unemployed in OECD countries. In many of the European countries, with high unemployment rates, the female unemployment rate was substantially above that of male. The decomposition results suggest that human capital differences and labour market institutions can explain a large part of the gender gap in unemployment rates. Attitudes toward male and female unemployment are key to explaining the gap in countries where unemployment is high. Countries with large gender gap in unemployment rates tend to have larger gender gap in both flows from employment into unemployment and from unemployment into employment. This may be done by compressing wages or acting to the disadvantage of groups with lower levels of labour market attachment. The impact of human capital differences on unemployment rates dominates.

Fairlie and Sundstrom (1997) examine trend in unemployment among white and black men for the period 1880 to 1990. Using probit model and the standard Blinder-Oaxaca decomposition the study examines how racial characteristics have contributed to change in unemployment rate gap. The characteristics include region, industry and education. Decomposition results revealed that literacy levels explain the black- white unemployment gap. The gap was higher for the literate blacks than the illiterate. Literate black may have faced discrimination in hiring and/or regional differences in labour demand adversely affected blacks.

Jana and Terrell (2007) analysed gender difference in unemployment in the Czech Republic, Germany, Poland and Russia. The study was motivated by the observation that in the post communist labour markets unemployment rates increased from zero to double digits. Moreover, gender differences in unemployment varied greatly across the communist countries. The unemployment gap was decomposed into six transition flows between labour market status. A further examination of the flows is done using a gender specific multinomial logit model.

It was found that the higher unemployment rate among women was primarily because women are less likely than men to leave unemployment for a job. This was prevalent for the married women in the Czech Republic. The single are likely to leave employment for unemployment. Age and education are found to be important in explaining flows of both men and women in all these economies. The less educated have high unemployment rates and the direction of flows being similar for education and age. Supply side factors like unemployment benefits may explain why women stay longer in unemployment. On the demand side employers may prefer men to women employees because hiring women is made costly by labour codes.

In an interesting study of underemployment among business school graduates from a Canadian university, Burke (1997) analysed self reported underemployment status using probit regression analysis. Age, career satisfaction and job involvement of the graduates was found to be highly correlated with underemployment. Female are also found to have higher chances of underemployment than male. In contrast, work situation characteristics were unrelated to probability of underemployment. However the findings are not representative, especially since the sample was drawn from graduates of only one university.

Wilkins (2006), used survey data to investigate the factors that influence underemployment in Australia. A multinomial logit model with four labour force states (unemployed, underemployed, otherwise part-time employed and fulltime employed) was estimated. The potential determinants considered include individual and neighbourhood characteristics such as family background, employment history and local labour market conditions. The results reveal that underemployment had many determinants in common with unemployment, but also several differences. For instance, age, educational attainment, disability and labour market history predict both unemployment and underemployment. On the other hand, housing situation and area of residence are irrelevant to both outcomes. However, family type, number of dependent children and number of jobs held in the year preceding the survey do not affect unemployment and underemployment in the same direction.

The literature review demonstrates that several studies have been carried out to examine gender gaps in unemployment. While several studies focus on developed and transition economies, relatively few studies exist for

African labour markets. In addition, most of the studies focus on only one form of labour underutilization-unemployment, leaving out underemployment. This paper extends the literature on labour underutilization focusing on Kenya in several ways. First, unlike the limited evidence available this study considers gender difference in unemployment in both rural and urban Kenya. Second, the study analyses the determinants of underemployment gender gap. Thirdly, the analysis draws on the most recent cross-sectional data from the Kenya Integrated Household Budget Survey.

### 3. Research Methods and Procedures

#### 3.1. Unemployment Model

Let  $U^*$  denote a latent variable that measures the individual  $i$ 's propensity to be unemployed. It is assumed to be a linear function of individual, household and regional characteristics ( $X$ ). This can be written as:

$$U_i^* = X_i\beta + \varepsilon_i \quad (1)$$

Where  $\beta$  is a vector of parameters and  $\varepsilon$  is the disturbance term. However,  $U^*$  is not observable. Instead, we observe if the individual is unemployed ( $U=1$ ) and ( $U=0$ ) if the individual is not unemployed. That is

$U_i = 1$  if  $U_i^* > 0$  if the individual is unemployed

$U_i = 0$  if  $U_i^* \leq 0$  if the individual is not unemployed (2)

The probability of being unemployed conditional on individual, regional and household characteristics can be derived and represented by equation (3) where  $\Phi$  is the standard normal Cumulative Density Function (Long, 1997).

$$Pr(U=1|X) = \Phi(X\beta) \quad (3)$$

Probit regressions for unemployment are estimated for three samples-males only, females only and males and females pooled. The estimates are used for decomposition of the gender gap in unemployment.

#### 3.2. Underemployment Model

Similarly, let  $M^*$  denote a latent variable that measures the individual  $i$ 's propensity to be underemployed. It is assumed to be a linear function of individual, family and regional characteristics ( $Z$ ). This can be written as;

$$M_i^* = Z_i\psi + u_i \quad (4)$$

The observable counterpart of  $M_i^*$  is  $M_i$  where

$M_i^* = 1$  if  $M_i^* > 0$  the individual is underemployed

$M_i^* = 0$  if  $M_i^* \leq 0$  the individual is not underemployed (5)

The probability of being underemployed conditional on individual, regional and family characteristics can be

written as in (6) where  $\Phi$  is the standard normal Cumulative Density Function.

$$Pr(M=1|Z) = \Phi(Z\psi) \quad (6)$$

Probit regressions for underemployment are estimated for three samples-males only, females only and males and females pooled. The estimates are used for decomposition of the gender gap in underemployment.

#### 3.3. Decomposition of the Gender Unemployment (Underemployment) Gap

The extended Blinder-Oaxaca decomposition technique developed by Fairlie (2003) for nonlinear models was used to decompose the female-male gaps in unemployment and underemployment. The estimates of the probit specification used to decompose the gap into that part explained by female-male differences in the individual and household characteristics and the other part that is attributed to female-male differences in effects of these characteristics.

The predicted female-male unemployment gap is expressed as:

$$U_f^* - U_m^* = \Phi(X_f \bar{\beta}_f) - \Phi(X_m \bar{\beta}_m) \quad (7)$$

Where  $U_f^*$  and  $U_m^*$  are the predicted unemployment probabilities for females and males respectively.  $X_f$  and  $X_m$  are the vectors of individual characteristics for females and males respectively. Equation (7) was decomposed as:

$$U_f^* - U_m^* = \Phi(X_f \bar{\beta}_f) - \Phi(X_m \bar{\beta}_m) = [\Phi(X_f \bar{\beta}_f) - \Phi(X_m \bar{\beta}_f)] + [\Phi(X_m \bar{\beta}_f) - \Phi(X_m \bar{\beta}_m)] \quad (8)$$

The first term on the right hand side in brackets corresponds to the part of the gap that is due to group differences in distributions of  $X$ , while the second part corresponds to the portion due to differences in the coefficients on the determinants of unemployment.

The predicted underemployment gap is decomposed following the same procedure with  $M^*$  in place of  $U^*$ .

$$M_f^* - M_m^* = \Phi(X_f \bar{\beta}_f) - \Phi(X_m \bar{\beta}_m) \quad (9)$$

Decomposing equation (9) we get;

$$M_f^* - M_m^* = \Phi(X_f \bar{\beta}_f) - \Phi(X_m \bar{\beta}_m) = [\Phi(X_f \bar{\beta}_f) - \Phi(X_m \bar{\beta}_f)] + [\Phi(X_m \bar{\beta}_f) - \Phi(X_m \bar{\beta}_m)] \quad (10)$$

This nonlinear decomposition technique was employed together with the probit regression estimates to identify the causes of gender differences in unemployment and underemployment in Kenya.

#### 3.4. Data Source and Variable Definitions

The study used cross-sectional data from the Kenya Integrated Household Budget Survey carried out in late 2005 and early 2006. The survey covered 13,340

households across 1343 clusters randomly selected from all districts. The data were collected through personal interviews using a pre-prepared questionnaire by the Kenya National Bureau of Statistics. It is a comprehensive nationally representative dataset.

The sample for this study is restricted to persons in the working age population (15 – 64) who were in the labour force. The dependent variables in the probit specifications were a dummy for unemployment and a dummy for underemployment. The independent variables are age, marital status, human capital, shocks, non-labour income and region. The description and measurement of these independent variables is discussed below;

**Age:** The age of an individual is important in determining their labour force status. It is expected that male and female of the same age possess different characteristics and responsibilities. Age may also capture work experience. Five dummy variables were created: 15-24, 25-34, 35-44, 45-54 and 55-64. Age group 15-24 was the reference group during estimation.

**Marital status:** From literature reviewed it is observed that being single or married affects the flows in and out of employment. This was measured to see if the same applies for Kenya. A dummy variable was used where being married took a value of 1 and 0 otherwise.

**Gender:** One of the possible explanations for unemployment is the sex of the unemployed. Females are more likely to remain unemployed compared to men. This could be because of individual characteristics or discrimination. Gender is measured as a dummy variable where the responses take the value of 1 if the respondent was male, and take the value of 0 if female.

**Human capital:** Human capital theory postulates that individuals who have a higher education achievement have more human capital and a higher probability of being employed. The higher the educational level, the lower the unemployment or underemployment. Five dummies were generated according to the highest education level completed. The highest level of education is captured by four binary variables namely, primary, secondary, secondary form 6, and university. The reference group were those who had no education.

**Adverse shocks experienced:** Shocks may have an impact on labour market outcomes. Since shocks are unexpected occurrences, they end up destabilizing a person.

Examples include having a family member incapacitated, fire, death, loss of a salaried guardian or birth in a household. This may cause an individual to devote less time to work or move from employment to unemployment. Those who had experienced a shock of any kind took the value of 1 and 0 otherwise.

**Non-labour income:** The variable was used as a proxy for wealth. This is important in determining human capital acquisition or in influencing the decision to work or not and for how long to work. Higher non-labour income generates pure income effect reducing the likelihood of market work. The variable takes the value of 1 if household received non-labour income and 0 otherwise.

**Region (rural/urban):** The area of residence can be an important determinant of human resource underutilisation. The variable takes the value of 1 if rural residence and 0 for urban residence. Another seven regional variables are also included in the models. Regional variables may reflect many influences such as labour demand conditions, availability of labour market information, cultural and religious differences.

## 4. Results and Discussion

Probit models of unemployment and underemployment were estimated for three samples: men only, women only, and men and women pooled. The parameters were estimated using maximum likelihood method. The marginal effects are reported in Table 3.

### 4.1. Probit Unemployment model

Likelihood ratio tests for the estimated pooled, male only and female probit models reject the null hypothesis that all the regression coefficients of explanatory variables are zero at 1% level of significance. Thus the models with predictors fit the data better than the intercept only models.

Estimates of the pooled probit model indicate that gender has a negative and significant marginal effect (-0.005). It implies that men had significantly lower probability than women of being unemployed. Similar findings have been reported by Wamalwa (2009) and Wamuthenya (2010). Men and women in all age groups were less likely to be unemployed relative to those who were between 15 and 24 years. The age effects are larger for women than men.

*Table 3. Marginal effects of estimated coefficients for the unemployment model*

	Full Sample	Male Sample	Female Sample
Age with (15-24) being the reference age group			
Age group (25-34)	-0.031***	-0.006	-0.078***
Age group (35-44)	-0.059***	-.024*	-0.108***
Age group (45-54)	-0.070***	-.046***	-0.095***
Age group (55-64)	-0.075***	-.055***	-0.110***
Education with "No Education" being the reference category			
Primary level education	-0.002*	.0143**	-0.059***

Secondary level education	0.043***	.021***	0.069***
Secondary forms 5and 6	0.079***	.049*	0.162**
University education	-0.070**	-	0.114**
Gender (1=male, 0=female)	-0.005	-	-
Marital status (1=married, 0=other)	-0.102***	-.123***	-0.075***
Non-labour income	-0.035***	-.0182**	-0.062***
Shock effects (1=affected, 0=other)	0.052***	0.065***	0.015**
Region (1=rural, 0=urban)	.040***	0.031***	0.064***
Region of residence with Nairobi being reference			
Central	-0.039***	-.077***	0.043*
Coast	0.079***	.070**	0.018
Eastern	-0.024*	-.038**	-0.025
North Eastern	0.345***	.265***	0.502***
Nyanza	-0.007	-0.02	-0.018**
Rift Valley	0.021	-0.005	0.064**
Western	0.037***	0.013	0.059*
N	12735	9431	3264
LR chi-square	907.75***	798.19***	287.16***
R-squared	0.094	0.115	0.1062
Log Likelihood	-4381.376	-3071.879	-1208.788

\*\*\*, \*\*, \* denote that significance is established at 1% level, 5% level and 10% level respectively

In the pooled model, education levels have mixed effects on chances of unemployment. Relative to individuals without education, those with only primary education have lower probability of unemployment. While secondary graduates have relatively higher probability of being unemployed university graduates are less likely to be unemployed. The pattern of education effects is similar for both men and women except at university level. These effects of education on unemployment probability are in line with the human capital theory and the findings of Azmat et al., (2006), Sackey and Osei, (2006), and Kingdon and Knight (2000).

Marital status is significantly and negatively related to unemployment probability in the three models. Married individuals therefore have lower probability of being unemployed and the marginal effects are large for both men and women.

Individuals from households that received non-labour income were less likely to be unemployed. The probability of unemployment is lower by 0.034 in the full sample, 0.018 in males only sample, and 0.006 in females only sample. This might be because the availability multiple revenue streams enhance access to better education and health – therefore opening opportunities for employment.

The results also indicate that persons in households that suffered adverse shocks were more likely to be unemployed. Region of residence also significantly determines the probability of unemployment. Rural residents had 0.039 higher probability of unemployment than urban residents. In rural areas men are less likely than women to be unemployed. There are also spatial differences in

unemployment relative to Nairobi region. Men were less likely to be unemployed in most regions except North eastern and Coast, while women were more likely to be unemployed in most regions, except in Nyanza, where women were less likely to be unemployed.

#### 4.2. Probit Underemployment Model

Table 4 reports marginal effects of estimated underemployment model. The log-likelihood ratio test rejects the null hypothesis that all the regression coefficients of explanatory variables are zero at 1% level.

Gender is a significant determinant of underemployment in the pooled model. Being a male decreases the probability of underemployment by 0.0582. Age effects are significant in the separate regressions. Age groups 25 to 34 and 35 to 44 have 0.049 and 0.0065 higher probability of underemployment respectively in the pooled model compared to 15-24 year olds. The probability of a male being underemployed declines from the age 35- 44 to the end of the working life. The probability of female underemployment is higher among 25 – 34 year olds by 0.06 and by 0.11 among 55-64 year old. The effects are significant at 1% in all age groups. Thus while underemployment increases with age among females it increases with age only among young males. It could be that as female grow older they have greater family responsibilities which reduces their working time.

Males with primary level education have lower probability of underemployment (0.025). But females with the same level of education have higher probability (0.0596) of being underemployed. Underemployment probability is

lower among those with secondary level education by 0.0544 in the pooled model, 0.0428 in the males only model and 0.0698 in the females only model. This is consistent with the findings of Wilkins (2006) and Sackey and Osei (2006). While education above secondary education is negatively related with underemployment, the effect is not statistically significant at conventional significance levels.

**Table 4.** Marginal effects of estimated coefficients for underemployment model

	Full Sample	Male Sample	Female Sample
Age group (25-34)	0.041***	0.033***	0.060***
Age group (35-44)	0.007	-0.026***	0.104***
Age group (45-54)	-0.007	-0.028***	0.071***
Age group (55-64)	-0.003	-0.020*	0.115***
Primary level education	-0.007	-0.025***	0.060***
Secondary level education	-0.054***	-0.043***	-0.070***
Form 5 and 6 level education	0.003	-0.005	0.018
University education	-0.019	-0.025	-0.023
Gender (1=male, 0=female)	-0.058***		
Marital status (1=married, 0=other)	-0.004	-0.007	0.019
Non-labour income	-0.035***	-0.009	-0.094***
Shock effects (1=affected, 0=other)	0.045***	0.05**	0.037***
Region (1=rural, 0=urban)	0.073***	0.057**	0.106***
Central	0.011	0.033	-0.052*
Coast	0.045**	0.038	0.046
Eastern	0.071***	0.080***	0.039
North Eastern	0.127**	0.156**	0.038
Nyanza	0.080***	0.092***	0.034
Rift Valley	-0.019	-0.016	-0.037
Western	0.122***	0.116***	0.113**
N	12220	8915	3305
<i>L R statistics</i>	618.12***	385.30***	278.83***
<i>Pseudo R-squared</i>	0.064	0.059	0.09
<i>Log Likelihood</i>	-4520.518	-3054.902	-1408.03

\*\*\*, \*\*, \* denote that significance is established at 1% level, 5% level and 10% level respectively

Marital status reduces the probability of underemployment for the male as well as in the pooled model. Married females have a 0.0189 higher probability of being underemployed. This could be explained by the fact that females are more likely to take up more household duties once they get married.

Receipt of non-labour incomes decreases the probability of being underemployed by 0.0349, 0.0092 and 0.0937 in the pooled, male and female models respectively. It is likely that, wealth would provide household members with better

education, health and other opportunities to enable them get more stable employment opportunities.

Shocks have a significant but adverse effect on underemployment. A shock increases the probability of being underemployed by 0.0446 in the pooled model, 0.0495 for males and 0.0369 for females. Lower probability of underemployment for female may be explained by the benefits females draw through membership in social groups that help them adapt better to shocks.

The region of residence significantly affects underemployment. For both gender, persons in rural areas have a 0.0725 higher likelihood of being underemployed as compared to 0.0569 and 0.1069 higher chances of being underemployed among male and female, respectively. As such, rural residence predisposes one to higher underemployment. Generally, underemployment was high in all provinces, *ceteris paribus*, except for female in central and males and females in the Rift Valley.

#### 4.3. Decomposition of the gender unemployment gap and underemployment gap

After the probit estimation, the Fairlie decomposition technique was used. The technique computes the difference in predicted probability of the dependent variable occurring between the two groups, male and female, and quantifies the contribution of group differences in the independent variables to the outcome differential. Table 5 presents the decomposition results based on the male coefficients. This means that if the females were given the characteristics of males we are interested to know what the unemployment and underemployment probability will be.

Females have a higher probability of unemployment at 0.145 as compared to males at 0.120. The male-female gap in predicted probability of unemployment is 0.0252 and the total explained male-female gap of unemployment is 0.0224 (88.8% of the gap). This implies that individual characteristics are key in explaining the gender gap in unemployment. Only 12.2% of the gap is unexplained and therefore determined by differences in the coefficients of the characteristics.

Several variables significantly explain the gender gap in unemployment in Kenya. These include age group, level of education, marital status, region of residence, non labour income, province of residence and effects of shocks. The variables that reduce the unemployment gender gap are higher education levels, non- labour income, and region of residence. However, marital status, effects of shocks, residing in all other provinces except North-Eastern increase the gap. Education levels give mixed results in explaining the gap. Secondary education increases the gap while primary level and post secondary education reduces the gap. This may imply that for males and female jobs that require less educational skill gives them equal opportunity.

Like in the unemployment case, the female predicted probability of underemployment is higher (0.1779) than that of male (0.1187). The gap in predicted probability of underemployment between males and females is 0.05923



with the explained part is 0.0032 (5.41% of the gap).

Being in lower age groups, low education levels, receipt of non-labour income, residing in rural areas, Central, Eastern and North Eastern regions reduces the female-male underemployment gap. However, marital status, higher levels of education, being above 45 years old, adverse shocks and residing in urban areas, Western, Nyanza and Coast regions increases the gender underemployment gap.

**Table 5.** Gender unemployment and underemployment gap

	Model	
	Unemployment (Male coefficients)	Underemployment (Male coefficients)
Age group (25-34)	9.85E-05	-0.0001
Age group (35-44)	-0.0004***	-0.0004**
Age group (45-54)	0.0006***	0.0011**
Age group (55-64)	0.0009***	0.0002**
Primary level education	-0.0005*	-8.50E-05
Secondary level education	0.0016***	-0.00212***
Form 5 and 6 level education	-0.0006*	0.0001
University education	0	0.0001
Marital status(1=married, 0=other)	0.0086***	0.0005
Non-labour Income	-0.0011**	-0.0004
Shock effects(1=affected, 0=other)	0.0093***	0.0040***
Region (1=rural, 0=urban)	-0.0040***	-0.0055***
Central	0.0028***	-0.0005
Coast	0.0018***	0.0003*
Eastern	0.0014**	-0.0004
North Eastern	-0.0003	-3.95E-06
Nyanza	0.0019	0.0016*
Rift Valley	0.0002	0.0009
Western	0.0002	0.0041**
<i>Total explained gap</i>	0.0224	0.0032
<i>Gap in the probability (G=1- G=0)</i>	0.0252	0.0592
<i>Probability (G=1)</i>	0.1201	0.1187
<i>Probability (G=0)</i>	0.1452	0.1779

G=1, G=0 denotes male and female respectively, \*\*\*, \*\*, \* denote that significance is established at 1% level, 5% level and 10% level respectively

## 5. Conclusions and Recommendations

The goal of this study was to examine gender differences in unemployment and underemployment probabilities and to determine to what extent the greater unemployment and underemployment observed among women than among men might be due to differences in their observed characteristics in Kenya. Using cross-sectional survey data binary probit regression analysis is conducted for the pooled sample of men and women, then separately for men

and women. The probit regression results reveal that individual's age, education level, marital status, receipt of non-labour income, adverse shocks, and region of residence are significant correlates of unemployment and underemployment.

A central policy question, then, is to what extent gender differences in unemployment and underemployment can be attributed to gender differences in age, education and other observable characteristics. The decomposition results show 88.8% of the predicted gender unemployment gap can be explained by such differences. But only 5.41% of the predicted gender underemployment gap was explained by such differences. A large part of the gender gap in underemployment is unexplained by the individual, household and region characteristics.

The decomposition results also reveal variables that contribute to increasing or reducing gender gaps in unemployment and underemployment. Rural residence reduces the female-male gaps in predicted unemployment and underemployment. The devolved government structure, passed in the 2010 constitution, should focus on creation of job opportunities, more intensely for females so that location is not a source of disadvantage in human resource utilisation of men and women.

Receipt of non-labour income also reduces the female-male gap in both unemployment and underemployment. Perhaps non-labour income facilitates job creation by financing household enterprises start-ups and expansion. Such enterprises tend to provide jobs for women. The government should therefore encourage wealth creation. This could be through expansion of cash transfer programmes, improving access to financial services, facilitating market access through good road infrastructure especially in rural Kenya.

Adverse shocks were found to significantly raise the female-male gap in the probability of unemployment and underemployment. The government should intervene to avert some shocks like crop loss due to floods or crop disease. For instance, areas prone to floods could have dams built to harvest water during heavy rains and use it for crop production during the dry season. Proper research on crop disease and pest control should be funded by the government.

Having secondary education reduces the female-male unemployment and underemployment gap. Scholarship programmes for girls can help more females attain secondary level education to have a better chance to compete with their male counterparts for jobs. In addition, government affirmative action policy to increase the number of females in public employment can target jobs that require secondary level of education at the entry level. Such females can then be encouraged to acquire higher education to increase their productivity. This can be done by bonding the sponsored employees for a period of time after completion of the funded programme.

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