THE EFFECTS OF OCCUPATIONAL SEGREGATION ON GENDER WAGE GAP IN KENYA

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DECLARATION

I declare this research paper is my original work and it has not been presented at any other university or institution for the award of a degree.

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DEDICATION

I dedicate this research paper to my son Christian Maina, my loving parents (Paul Maina and Rose Wambui) and my sister (Margaret Maina) for their unconditional love and support throughout my life and academic journey.

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LIST OF ACRONYMS AND ABBREVIATIONS

BMZ	Brown, Moon and Zoloth
CPS	Current Population Survey
DI	Duncan Index
EPIC	Equal Pay International Coalition
G20	Group of twenty
GDP	Gross Domestic Product
GNI	Gross National Income
HBS	Household Budget Survey
ICT	Information and Communication
ILO	International Labour Organization
LN	Natural Logarithm
KCHSP	Kenya Continuous Household Survey Programme
KES	Kenya Shilling
KNOCS	Kenya National Occupational Classifications
NGEC	National Gender Equality Commission
OB	Oaxaca-Blinder
OLS	Ordinary Least Squares
PPPs	Purchasing Power Parity
PSID	Panel Study of Income Dynamics
QLFS	Quarterly Labour Force Survey

SDGs	Sustainable Development Goals
SH	Shilling
UN	United Nations
USAID	U.S Agency for International Development
WEF	World Economic Forum
WMSII	Welfare Monitoring Survey

ABSTRACT

Occupational segregation has been identified as a primary cause of the gender wage gap. In this line, this paper aimed at investigating the effects of occupational segregation on gender wage gap in Kenya using the 2019 Quarterly Labour Force Survey for period January to March. The preliminary findings were that male workers are paid approximately 58.88979 percent more than female employees. In addition, the study measured the extent of the Occupational classification using the Duncan index and found that 42.73 percent of women need to change occupation for occupational integration to occur. Further, using the Ordinary Least Squares (OLS) regression there was a negative relationship between the log female wage and the proportion of women in employment. These results confirmed the theory of crowding model used. However, based on the findings inter occupational segregation does not significantly impact on wage since only 1.89 percent of it explained the gender wage gap. Thereby, focus on narrowing the gender wage gap should be on the impact of intra occupational segregation on gender income and or the unexplainable which are attributable to discrimination and culture/norm values.

CHAPTER ONE: INTRODUCTION OF THE STUDY

1.1 Background

The gender pay gap is among the greatest forms of social injustice as men and women earn different wage for the same job violating the principal of equal pay (International Labour Organization, 2019). In the job sector, it has been commonly used to assess the move towards gender equality both nationally and internationally. In Kenya, measures in place to reduce the gender pay gap and thus contribute to the achievement of Vision 2030 include the Sustainable Development Goal (SDG) number 8, target 8.5, and the Equal Pay International Coalition (EPIC) (United Nations, 2017). Also, more laws and regulations aiding in the promotion of equality include, the amended Employment Act (2019) and the Constitution of Kenya 2010. Further, the government has institutions in place that promote gender equality for example the National Gender Equality Commission (NGEC) established in 2011 and the Ministry of Public Service and Gender.

Globally, the real wage growth has been fluctuating between 1.6 to 2.2 percent in four years prior Covid-19 pandemic. For the year 2019, real wage dropped by 0.2 percent compared to the real wage in 2018 which had increased by 2.2 percent. In the advanced Group of Twenty (G20) economies, the growth of real wage increased to 0.9 percent in 2019 from 0.7 percent in 2018. In Africa, real wages declined by 3.6 percent in 2018 but increased to 0.3 percent in 2019. In Kenya, the real wage growth fell to 2.3 percent in 2019 from 3.2 percent in 2018 (ILO, 2020). Amidst the Covid-19 pandemic, the real Gross Domestic Product (GDP) contracted by; 4.2 percent globally, 5.8 percent in advanced economies and 1.9 percent in Sub-Saharan Africa compared to a growth of 2.7 percent, 1.7 percent and 3.2 percent in 2019 respectively. In Kenya, real GDP contracted by 0.3 percent in 2020 compared to 5.0 percent growth in 2019 (Economic Survey, 2021). A 2020 report by World Economic Forum (WEF) on gender wage gap, estimated that globally, on average, a woman's income is $10,000 (in Purchasing Power Parity, PPPs) less than a man earnings of $21,000 PPPs. Additionally, the 2020 U.S Agency for International Development (USAID) gender analysis report indicated that, on average, Kenyan men earn more than women. It was estimated that in 2015 males earned a Gross National Income (GNI) per capita of Sh350, 715 which was substantially higher than Sh242, 771 earned by females.

The most gender equal country according to WEF (2020) is Iceland having closed 88 percent of the gender gap. It is followed by Norway (84.2 percent), Finland (83.2 percent) and Sweden (82.0 percent). In Sub-Saharan African, some countries have closed over 75 percent of the gap i.e., Rwanda, Burundi, Gambia, and Guinea while some are yet to close at least 50 percent i.e., Ethiopia and Lesotho and Kenya having closed 67.1 percent. Globally, the labour force participation gap has been estimated to stay at 27 percent up to 2030. As of 2019, female labour participation rate was 47.2 percent and the male labour participation rate was 74.2 percent. In Kenya, the rate at which men participate in the labour force is higher than that of women as shown in table1.

Table 1: Labour participation rates of males and females (% of male and female population aged 15-64 years, modeled ILO estimates) in Kenya

Year	2014	2015	2016	2017	2018	2019
Male	77.45	77.94	78.4	77.8	77.17	76.53
Female	70.13	70.96	71.77	71.85	71.92	72.01

Source: ILOSTAT database, 2020

According to Langer et al. (2018) sectors of the economy identified as female-dominated include; education, social work, health, communication services, wholesale/retail, garment industry, tourism, and small micro-businesses while sectors such as energy, commercial agriculture, transport, trade, information and communication (ICT), maritime services, finance, manufacturing, construction and higher education/science are identified as male-dominated occupations. Similarly, according to the 2021 Kenya economic survey, wage employment by industry and sex show relative low participation of women in industries like Professional, transport, ICT, construction, trade, mining and quarrying and manufacturing sectors among others. Majority of the women workers were in the health and social work activities and producing activities of household for own use. Professions regarded as male-dominated have positive impact on earnings in contrast to occupations where female employees are predominant (Cozzi, 2017).

1.2 Statement of the Problem

Deciding on which profession to pursue is one of the chief choices people make in their lifespan which has a monetary implication on future earnings. In the past, the earnings variation for male and female was mainly due to differences in human capital factors e.g. education and experience (Anker, 1998). However, despite having achieved education parity that narrowed the gender wage gap Joy, (2003) demonstrated that the still existing earning difference possibly arise from occupational crowding, the state where women and men have predominated certain occupations. Kenya’s economic survey (2021), has evidence of occupational crowding, with women and men preferring and dominating certain occupations and probably causing the gender wage gap.

Research conducted by Wienberger (1999) and Boraas (2003) found that the males earn higher pay in counterpart to the females and this is due to the outcome of men entering fields that are high salaried and women choosing jobs where they are dominant in number relative to men. Similarly, a study done by Cozzi (2017), controlling for human capital determinants on wage, showed that being male or female in a male dominated job has a positive impact on income with the latter having a much larger impact.

Previous studies in Kenya have demonstrated the presence of gender wage gap in the country pointing important different determinants that explain it but have been unable to decompose earnings to distinguish between occupational wage gap and the unexplained wage gap (Kabubo-Mariara, 2003). Based on the 2021 statistics of the Economic Survey in Kenya, it is thus vital to test the importance of gender occupation distribution, and its effects on earnings and determine if occupational crowding has any influence on gender wage gap. Controlling for other important determinants of gender wage gap in Kenya, this study will therefore analyze the effect of gender distribution in an occupation on gender wage gap in Kenya.

1.3 Research Questions

1. What is the level of divergence of women and men in each occupation?
2. What is the degree of occupational segregation on the gender wage gap in Kenya?
3. What is the policy recommendation based on the study findings?

1.4 Research Objectives

The key objective of this research is to analyze the effect of occupational segregation on the gender wage gap in Kenya.

Specifically, this study seeks to;

1. Examine the level of divergence of women and men in each occupation.

2. Investigate the degree of occupational segregation on the gender wage gap in Kenya.
3. Draw policy recommendations from the findings of the research.

1.5 Significance of the Research

The study will be useful to a number of stakeholders, including policymakers in the Kenyan government, the society, researchers and scholars. For the government of Kenya, the study will inform on the best strategies to employ in narrowing the gender wage gap thereby bringing the country closer towards attaining vision 2030. The study will be of importance to the East Africa Community members who bare similarity to Kenya in terms of the economy, politics and culture. The study will also contribute to the value addition of the existing literature and will benefit academic researchers to undertake further studies on the topic.

1.6 Organization of the Research

The study is organized as follows: Chapter 1 is the introduction of occupational segregation on the gender wage gap. Chapter 2 analyses the theoretical and empirical literature of the topic. Chapter 3 gives the methodology and sources of data of the study. Chapter 4 is the analysis and results interpretation while chapter 5 gives the summary, conclusion and policy recommendations.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The chapter offers a review of the theoretical literature with keen attention to relevant theories. It also conducts a review of the empirical studies carried out in the topic area and finally provides a concise synthesis of key issues presented by other scholars.

2.2 Review of Theoretical Literature

The crowding hypothesis discussed by Edgeworth (1922) reported that increased supply of labour in professions depress wage of minority group. This further reduces the supply of labour in the other occupations and hence high wage. In an economy with racial discrimination, white workers benefit from crowding of black workers in low status jobs. The phenomenon would further cause an incentive to the minority group to engage in criminal activities. Besides, misallocation of resources would occur as a result of crowding in low wage occupations affecting the economy. Similarly, Bergmann (1974) found that women find themselves in professions where their gender is high in numbers because of being closed out on predominantly male professions. This results in low wages paid to women compared to men and thus the existence of the wage gap.

The wage difference can also be explained by the theory of human capital which refers to the amount of skills and knowledge that is acquired through learning, experience and training (Perales, 2013). According to Mincer (1958) training and skill affects individual income distribution. By examining the causes of inequality in personal incomes, Mincer incorporated years of education and years of experience, with workers age used as a proxy to job experience. The findings reported that years forgone to pursue education get compensated with high income. On the other hand, more skill and experience acquired results in pay rise but later declines because of reduced performance productivity. Similarly, according to Becker (1964) investment of human capital is positively related to the time spent in that activity which produces increased returns. Women normally allocate little amount of resources in the acquisition or in updating of the human capital variables resulting them to be engaged in occupations that require lower skills and this translates to lower pay (Becker1985). Besides, household commitments done by women normally affect their career and work due to less involvement in the labour market and this causes loss of value of their skills and even at times foregone training (Polacheks's, 1981). The theory however has been criticized. First, the labour participation by women has increased significantly. This is due to the existence of homes where women are the heads and must work to supply for the needs of the family (Buvini, 1995). Secondly, domestic commitment by women has gone down due to late marriages, the use of home aids such as washers and cookers, and because of the existence of low fertility rates. Finally, it is notable to discover that secretarial works require more experience and knowledge than transport drivers and yet they receive lower pay (Anker, 1997).

In addition, the theory of statistical discrimination also explains the gender earning difference. According to Phelps (1972), a profit maximization firm discriminates against blacks or women compared to whites and men if they believe that they are less qualified, reliable, long-term, etc. and if the firms cost of gaining applicant information is high. In the same way, Arrow (1973), assumed that they are two groups of workers who are perfect substitutes and secondly, they exist large firms who use the same production function to produce similar products. Discrimination thereby occurs when the employer has a negative valuation on one group, or a positive valuation for the other group. For instance, when managers are recruiting, they tend to victimize against women because of their tendency to leave and go for maternity or resign when their husbands are relocated or get better jobs. These assumptions usually affect the decision-making of employing potential workers by the recruiters and results in employing male workers (Bielby and Baron, 1986).

Another theory that explains earning differentials is the theory of compensated wage differential hypothesis by Rosen (1986). Rosen explained that employees choose the total package of wage and non-wage work aspect. For example, a firm can offer a job with low earnings but has flexible working hours and light duties. Conversely, it could offer a job of high wages but has heavy responsibility and restrictive working hours. Given the scenario, women workers tend to choose the former and men latter giving rise to the gender wage gap. Controlling for skills and other variables that impact wage, high risk averse individuals' have high income. However, the theory only assumed perfect competition and no other forms of imperfect competition i.e., monopoly and oligopoly (purse, 2004). The hypothesis is significant in regards to the regulation of workplace compensation arrangements.

Finally, the feminist theory by Wollstonecraft (1792) which brings about the idea of stereotyping women based on their negative or positive abilities. Negative stereotype disqualifies females from jobs such as management, engineering, police, well driller, etc. as they are less willing to face physical danger, use physical force, travel and or their weak abilities in math and science. On the other hand, women desirable traits such as a greater level of honesty, physical attractiveness, etc. qualifies them for jobs such as housekeeper. Also, women are always willing to take commands, take lower wages, complain little and are tolerant of works that are repetitive making them suitable for occupations such as nurses, teachers etc (Anker, 1997).

2.3 Review of Empirical Literature

Empirical literature regarding the link between occupational segregation and the gender wage gap is two-fold. First, a strand of research providing evidence of occupational segregation influencing gender wage gap. Secondly, a strand of empirical literature evidencing that occupational segregation has little or no effect on the gender earning differences. This section therefore analyzes and presents the studies in both strands of the empirical literature.

Numerous findings on the proportion of women employment indicate a negative sign, hence decreasing wage (Blau and Beller, 1988; Sorensen, 1990; Macpherson & Hirsch, 1995 and Hori, 2009). According to Sorensen (1990), after controlling for a detailed explanatory variable including, education, experience, marital status, individuals with children, race, region, size of firm, union status, government employment, and 42 industry dummies, the proportion of women employed in occupation explained only 15 to 30 percent of the gender wage differences. Sorensen (1990) used the 1984 Panel Study of Income Dynamics (PSID) and the 1983 Current Population Survey (CPS) data set to estimate earning equation which demonstrated crowding hypothesis.

Teo (2003) studied the effect of varying occupational distributions on the gender wage differentials in Brunei using the labour survey dataset for 1995. The data analysed in the study comprised 4,008 females and 5,652 males. In the study, wage was the dependent variable, while age, education level, race, resident, employment sector and marital status were the control variables. The study used the multinomial logit estimation technique to examine the role of 9 occupational groups on wage gap differences. The author decomposed occupational differences into explained and unexplained terms. The results indicated that differences across occupational distributions contributed to wage differentials where it accounted for an estimated 18 percent of the wage differential and the unexplained differential accounted for 32 percent of gender wage gap hence noting that the unexplained variables such as discrimination and unmeasurable qualities made a larger impact on gender wage difference compared to productivity related variables.

Chakraborty (2020) also undertook a study to examine the gender differentials across India's private and public sectors using the 2018-2019 periodic labour survey datasets. In the study, Chakraborty (2020) used Oaxaca-Blinder (OB) decomposition approach, together with Brown, Moon and Zoloth (BMZ) technique for robustness checks and comparison purposes to identify the factors that explain gender wage differentials in India's private and public sectors. In the analysis, the author controlled for socioeconomic factors including place of residence, employment sector, and education. As expected, Chakraborty (2020) found existence of significant gender wage differentials was attributable to occupational discrimination. More specifically, the study established that women in rural areas faced higher gender gap across occupations compared to the urban women over the study period from 2018 to 2019. Further arguing that average wage differentials in rural and urban areas were likely to be reduced by 57% and 67% respectively if occupational discrimination could be eliminated in the labour force.

The study by Herrera, Dijkstra and Ruben (2019) examined gender segregation and the wage differences in Nicaragua. The authors using the Mincerian earning equation observed that a huge portion of gender income gap was explained by occupational segregation in Nicaragua. Besides, the unexplained gender wage gap accounted for 23 percent after controlling for age, years in education, sex, residence, employer, and cooperative member. Also, using the 2009 Living Standards Measurement Survey (LSMS) data set, the authors found that jobs dominated by women have lower incomes and that the gender income gap is bigger in occupations with higher gender segregation implying that women endure more from occupational gender segregation than men. The study covered 6,515 households and 30,432 people.

Goy and Johnes (2011) undertook a study to examine the effect of occupation distribution on the gender wage gap in Malaysia using data from the labour force survey dataset for the period 1985 to 2005. By applying the L-index approach occupational segregation was found not sensitive to economic development. In addition, the study found that increase in formal education does not narrow occupation distribution between genders and this was due to differences in their majors. The study failed to account for the extent of major differences associated with occupational segregation due to data limitation. Using the multinomial logit regression model, segregation in the Malaysian labour market was mainly explained by sex which accounted for an estimated 82% of the segregation as employment attached reward based on gender to persons with equal credentials.

A divergence from the studies that have established occupational segregation affects the gender wage gap. Some studies have also found that occupational segregation has little or no effect on the gender wage gap. Xiu and Gunderson (2015) studied the impact of occupational segregation on the gender wage gap in China using the 2005 census data. In particular, the study examined the extent to which gender wages in China were attributable to occupational differences. The study included a sample of 103 173 females and 142 827 males engaged in six occupational categories, including farming, fishing and forestry, manufacturing, sales and services, professional, office and administrative, and management. Using the 1973 Oaxaca-Blinder decomposition technique, the study established that occupation segregation, at the aggregate level, has little effect in explaining the gender wage gap. The study controlled for age, marital status, education dummy, hours worked and employer ownership dummy variables.

Liu et al. (2004) also examined the influence of occupation segregation on wage differentials among immigrants in Hong Kong using the 1996 census data. By adopting a multinomial logit regression technique and controlling for the effects of gender, marital status, education, experience and language, the study established that immigrants faced substantial barriers in joining high paying jobs than the natives and that the intra-occupational wage gap was more prominent amongst the immigrants than in the case of inter-occupational wage differences. Additionally, Liu et al., (2004) found that occupational segregation for the migrants tend to be narrow as the period of residence at the host country increases. Further, the authors found little or no occupational segregation and gender wage gap of migrants who arrived at Hong Kong when they were young. The authors concluded that job mismatch to the immigrants is what bars them in joining better-paying jobs.

Hori (2009) examined the effect of labour market segregation on the gender wage gap in Ukraine using individual's wage census data for the year 2000. By employing the Duncan Index, which is a figure that demonstrates the percentage of men or women who would have to change occupations for the occupational differences between the two genders to reconcile, found that increase in the proportion of female (male) employment in both the female and male earnings equation respectively tended to reduce wages. Within the same study, Hori (2009) employed ordinary least squares (OLS) technique for robustness. In the study, age of the worker, length of continuous employment as a proxy for experience, education, enterprise size as well as industry sector were controlled for. The OLS results established that occupational distribution explained an estimated 5 percent of the gender wage gap in Ukraine hence little impact on the wage differential.

In another study, Khitarishvili, Rodriguez-Chamussy and Sinha (2018) examined the role of industrial and occupational segregation in explaining gender wage gap in Georgia. By using the Duncan Index and BMZ decomposition the study established that the gender wage gap in Georgia was mainly due to intra-sector segregation rather than inter-sector segregation. More specifically, using the Georgian Household Budget Survey (HBS) data set for the period 2004-2015, the study found a small effect of inter-sectoral segregation in explaining the presence of the gender wage gap. Additionally, 58 percent of gender wage gap within sectors were not accounted for by observed difference in characteristics such as marital status, educational attainment, and age, revealing that the main cause to the increasing gender income gap to be that of the unobserved barriers.

Similarly, Sung, Zhang and Chan (2001) studied the effects of occupation segregation on the gender wage gap using the 1981, 1986 and 1991 census survey datasets in Hong Kong. The study used the BMZ decomposition approach to disentangle the wage gap as it takes into account job differences. The econometric results found that gender wage differences attributed to occupation segregation were negligible and that the gender wage gap was primarily within occupations, implying that it was intra-occupational. However, the more significant portion of this intra-occupation wage was mainly due to the unobserved differences such as cultural beliefs and norms. In the study, Sung, Zhang and Chan (2001) included age, experience, experience squared, marital status, place of birth and education level as control variables in their analysis.

Relatively, similar findings are obtained by Strawinski, Majchrowska and Broniatowska (2018) when they assessed the relationship between occupation segregation and the gender wage gap in Poland. The authors adopted the Oaxaca and Blinder decomposition as the principal technique to determine the role of occupation discrimination on gender wage gaps. In developing the estimable model of the Mincer-wage equation, the authors controlled for the effects of age, experience, experience squared as well as job characteristics including size of the firm and sector. The study found that there exists a negligible relationship between occupational segregation and the gender wage gap. The authors argued that the gender wage gap in Poland could be a result of societal norm and habits.

Orraca, Cabrera and Iriarte (2016) examined the influence of occupation segregation on the gender wage gap in Mexico. Like other analysis the writers controlled for age, schooling, hours worked, sector, region, labour force participation, unemployment rate and marital status of the worker. By using the BMZ decomposition and Duncan index approach, the authors found that occupational segregation does not influence the female-male wage gap in Mexico. In particular, the study established that females in Mexico appeared to not experience bottlenecks in entering high paying occupations dominated by males. Additionally, Orraca, Cabrera, and Iriarte (2016) averred that the gender wage gap witnessed resulted from the compensating differences and not across profession categories segregation.

Kagundu and Pavlova (2007) investigated causes of gender wage differential in Uganda using Uganda national household survey of period 2002/03. The study used Oaxaca decomposition method to decompose the gender wage gap by sex and residence. The income equation estimated for both rural and urban showed that age and being married had a positive association with earnings, tenure of employment also had a positive association with wage but insignificant in the rural region, temporary workers in the private sector earned less than permanent workers, female permanent employees in public sector earned more to those in private sector and returns to education was more in urban than rural areas. The unexplained section of gender wage gap was higher in rural relative to urban with a large portion of the gap being due to employer driven differences in treatment. More specifically, 68 percent of the unexplained in rural areas was due to discrimination against women and 1 percent was due to nepotism against males. On the other hand, in urban areas, 24 percent was attributed to nepotism towards male and 22 percent was due to discrimination against women.

In Kenya, Kabubo-Mariara (2003) undertook a study to examine what determines wages in Kenya as well as decomposition of gender gap across sectors using the 1994 Welfare Monitoring Survey (WMSII) dataset. The study particularly aimed to test whether women participate less in the labor force due to their characteristics and gender discrimination in wages. By using both OLS and multinomial logit regression techniques, Kabubo-Mariara (2003) found that education as well as other demographic factors such as marital status and the age of the worker are important factors of income. In the same study, Kabubo-Mariara

(2003) further examined gender wage discrimination using both Oaxaca-Blinder decomposition and Neumark decomposition in Kenya. The study found existence of favoritisms towards men across all the employment sectors, but no evidence of discrimination against women.

2.4 Overview of Literature

From the reviewed empirical literature, it is evident that the results of the effects of occupation segregations on gender wage gap are yet from being conclusive due to evidence pointing towards mixed results. Whilst one strand of literature asserts that occupation segregation leads to the growing gender wage gap (see, for example, Herrera, Dijkstra and Ruben, 2019; Chakraborty, 2020) another strand of literature provides that occupational segregation has little or no effect on the gender wage gap (see, for instance, Xiu and Gunderson, 2015; Orraca, Cabrera and Iriarte 2016). From the reviewed literature, it is evident that Duncan Index, L-Index, BMZ decomposition and Oaxaca Blinder decomposition techniques offer robust methodological and analytical approaches for analyzing the effect of occupation segregation on gender wage gap. Based on this, this study sought to analyze the effect of occupational segregation on the gender wage gap in Kenya by applying the Duncan index approach because it was easy to understand and because of its prominence in work on occupational segregation.

CHAPTER THREE: DATA AND METHODOLOGY

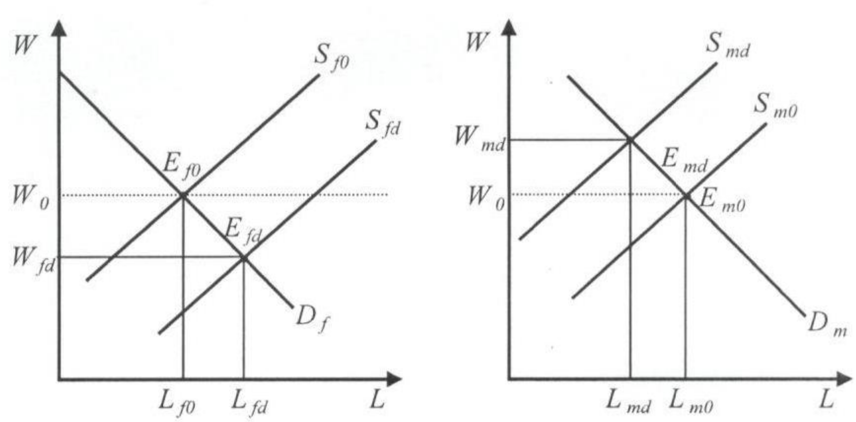
3.1 Introduction

This chapter describes the methodology of the study. It presents the theoretical framework suitable in explaining the link between the dependent and independent variables. It also presents how the study model is estimated and how it is used to project the gender wage gap.

3.2 Theoretical Framework

The study used the occupational crowding model put forward by Bergmann (1974) and his precursor Edgeworth (1922) to explain the effect of occupational difference and the gender wage gap. The study used the mentioned theory as it captures the gender composition in an occupation measured by the proportion of females in an occupation. The theory explains that women crowd in female type jobs over male type occupations leading to higher employment levels and lower earnings. According to Cozzi (2017), many women fill these lower-paying occupations because of their personal preference and shortage of alternative opportunities. On the other hand, men end up in female type occupations because of lack of knowledge on better opportunities.

First, holding the assumption that there are only two types of occupations in the labour market namely ‘male type occupation and female type occupation’. Secondly, that due to employer discrimination women’s access to the male type occupation is limited, thus low supply of female workers in men’s jobs. The supply curve in male type occupation thus shifts inwards raising wages and decreases the employment level as seen in Figure 1 (b). Since women are excluded from the male-type occupations, they flood into the female type occupation, the supply curve shifts outwards, wages fall and employment level increases as shown in Figure 1 (a). The crowding model is shown graphically in Figure 1 (a) and 1 (b). Predominant male occupations have higher wages due to low women proportion in employment and Predominant female occupations have lower earnings due to higher numbers of females in that occupation. Conclusively, the freedom of occupational choice by male workers have prevented men from flooding into male professions (Bergmann, 1974).



Female type occupation (Figure 1a) *Male type occupation (Figure 1b)*

Based on the theoretical framework presented above, a larger fraction of women employment in certain jobs affects wage negatively (Blau and Beller, 1988).

3.3 Methodology

This section presents the methodological approach used to estimate the effects of occupational segregation on the gender wage gap. In particular, the section presents the Duncan Index, the estimable model, data sources and diagnostic tests.

3.3.1 Duncan Index

This paper uses the dissimilarity index credited to Duncan and Duncan (1955) to examine the discrepancy in occupational distribution between men and women. This approach has been broadly applied in the previous studies i.e., Hori (2009), Khitarishvili, Rodriguez-Chamussy and Sinha (2018) and thus important in comparing the study findings.

The index is expressed as,

$$DI = ½ \sum \left| Fj/F - Mj/M \right| \qquad \text{With j=1..., m}$$

DI is the proportion of men or women who must change their jobs so that occupational distributions match between men and women. F_j is the number of women in occupation j, M_j is the number of males in occupation j, F is the total number of females in the labour market and M is total the number of males in the labour market.

When the index is zero, it shows same gender ratio present in all professions and while its 1 it indicates complete segregation in each profession (Duncan and Duncan, 1955). The study uses this index on 156 occupational titles.

3.3.2 Model Specification

The Mincerian earnings equation is estimated to test the crowding hypothesis. The model included the proportion of female workers in the occupation and other explanatory factors that affect wage (Sorensen, 1990). According to Mincer (1958) natural log of wage is used as opposed to the level of earnings as education has a multiplicative effect on earnings in a simple model.

Hence, the general earning equation is defined as;

$$LnW = F\beta g + X\alpha g + \mu \qquad (1)$$

Where g = *Females* or *Males*

More specifically, the female and male wage functions are separately shown in equation 2 and 3 respectively; with italicized f representing females and italicized m representing males.

$$LnWf = Ff\beta f + Xf\alpha f + \mu f \qquad (2)$$

$$LnWm = Fm\beta m + Xm\alpha m + \mu m \qquad (3)$$

LnW show the log of wages, F is the proportion of the women (men) in a certain occupation, X is the myriad of the control variables including education, experience, marital status, residence, hours worked, union and industry. The β indicate the F variable coefficient while α indicate the X variable coefficient and the error term is shown by μ in the model. By use of means, the error term is eliminated as shown in equation 4 and 5 respectively.

$$LnWf = Ff\beta f + Xf\alpha f \qquad (4)$$

$$LnWm = Fm\beta m + Xm\alpha m \qquad (5)$$

Further resolving equation 4 and 5 through getting the difference of the mentioned equations gives equation 6,

$$LnWm - LnWf = Fm\beta m - Ff\beta f + Xm\alpha m - Xf\alpha f \qquad (6)$$

The left-hand side of equation 6 capture the gender wage gap. Also, at the immediate right-hand side of equation 6 is the difference between *Fmβm* and *Ffβf* that measure the impact of the segregation in the occupation. Besides, the degree of job segregation on gender wage gap is obtained by equation 7,

$(Fm\beta m - Ff\beta f)/(LnWm - LnWf)$ (7)

Where;

Fm is the mean of male share of employment

βm is the variable coefficient of proportion of male in an occupation

Ff is the mean of female share of employment

βf is the variable coefficient of proportion of female in an occupation

LnWm is the mean male wage

LnWf is the mean female wage

Further, by calculating equation 7 using figures in table 3 and 11 the following results are obtained,

= (0.0031071*69.17346) -(-0.0097814*57.50382)/ (9.096375-8.685354)

=1.89.

The findings indicate that only 1.89 percent of the gender wage gap evaluated using means is explained by occupational segregation.

Using STATA 14.0, separate female and male Ordinary Least Squares (OLS) regression are estimated respectively.

The female estimable model:

Ln$y = \beta_0 + \beta_1$*(Proportion of women in an occupation)* + β_2*(Education dummies)* + β_3*(Experience)* + β_4*(Marital Status)* + β_5*(Residence)* + β_6 *(Hours worked)* + β_7*(Union)* + β_8 *(Industry dummies)* + *U*

Where the dependent variable Lny is the monthly log of female wage, β_0 is the constant coefficient, $\beta_1 \ldots \beta_8$ are the coefficients for each independent variable and *U* is the error term

While the male estimable model

Ln$y = \beta_0$ + β_1*(Proportion of men in an occupation)* + β_2*(Education dummies)* + β_3*(Experience)* + β_4*(Marital Status)* + β_5*(Residence)* + β_6 *(Hours worked)* + β_7*(Union)* + β_8 *(Industry dummies)* + *U*

Where the dependent variable Lny is the monthly log of male wage, β_0 is the constant coefficient, $\beta_1 \ldots \beta_8$ are the coefficients for each independent variable and *U* is the error term.

3.4 Variable Definition

Table 2: Variable definition

Variable	Description and Measure	Expected sign
Dependent Variable		
Monthly Basic wage/ salary	Logarithm of earnings	
Independent Variable		
The proportion of gender in an occupation	The proportion of workers who are female (male) in the worker's primary job (KNOCS codes)	Negative (see, Blau and Beller, 1988; Sorensen, 1990; Macpherson & Hirsch, 1995 and Hori, 2009)
Experience	Year when started working for employer; Continuous variable	Positive (see, Kabubo-Mariara, 2003 Hori, 2009)
Education	Highest level of education completed; categorical variable, 1 "No schooling",	Positive (see, Kabubo-Mariara, 2003)

	2 "primary", 3 "secondary" ,4 "university/college"	
Marital Status	Respondent marital status; dummy variable where 1=married, 0 otherwise	Positive/negative (see, Kabubo-Mariara, 2003 & Breusch and Gray, 2004)
Residence	Respondent residence; dummy variable where 1=urban, 0 =rural	Positive (see, Orraca, Cabrera and Iriarte,2016)
Hours worked	Respondent weekly working hours; dummy variable where 1 = full-time if hours worked >=40 hours0 = part-time if hours worked<40 hours	Positive (see, Orraca, Cabrera and Iriarte (2016)
Union	Member of a trade/labour union; dummy variable where 1 =yes, 0 =no	Positive (Sorensen, 1990)
Industry	Economic activity of the primary job; dummy variable where 1 "Agriculture" 2 "Manufacturing" 3 "Construction" 4 "Education" 5 "Health" 6 "Wholesale/retail" 7 "Finance" 8 "ICT" 9 "Mining" 10 "Others"	Positive (See, Sorensen, 1990 & Hori,2009)

3.5 Data Sources and Sample

This study uses the 2019 Quarterly Labour Force Survey (QLFS) of the Kenya Continuous Household Survey Programme (KCHSP) for period January to March. The survey sample size comprises 1,684 clusters and 25,260 households with 1,300 clusters for cross-sectional survey and 384 clusters for panel study. The data set had 86,647 observation and 175 variables.

3.6 Diagnostic Test

3.6.1 Heteroscedasticity

Heteroscedasticity is generally expected while using cross-sectional data set**.** It is a situation where the variance of error term varies across observations causing the standard error to be biased making it difficult for hypothesis testing to be carried out. Breusch-Pagan test is used to test its presence, and it is corrected using robust standard errors (Gujarati, 2009).

3.6.2 Multicollinearity

Multicollinearity exists when the independent variables are related to each other making the estimates for the regression coefficient to be unreliable and their significance misleading. To measure the degree of multicollinearity, Variance Inflation Factor is used for each independent variable (Gujarati, 2009).

3.6.3 Test for Normality

The study tested whether the error term is normally distributed with mean zero and sigma squared using Shapiro- Wilk test (Wooldridge, 2002).

CHAPTER FOUR: EMPIRICAL FINDINGS AND DISCUSSION

4.1 Introduction

In this chapter, empirical analysis results are presented. More specifically, the chapter discusses descriptive statistics of the data, diagnostic tests and reports on the regression results.

4.2 Descriptive Statistics

The study considered nine variables (one dependent and eight independent variables). The total sample observation was 86,647 individuals, encompassing 43,596 female respondents and 43,051 male respondents. However, working individuals in various professions consisted a total of 17,346 individuals, 7,293 females and 10,053 males. Table 3 illustrates the descriptive statistics for both men and women. The results show that, on average, experience and education is almost at per for both genders. Their slight difference in experience is of one year but both genders have attained at least secondary education. The results further indicate that mean log wage for men is higher compared to their female counterparts with a positive difference of 0.411021 implying that male workers are paid approximately 58.88979 percent more than women employees. This was comparable to a study done in Kenya by WEF (2017) who found that a Kenyan female is paid Kenya shilling (KES) 55 for every KES 100 paid to a man for similar work done. Similarly, the mean male share is higher to the mean female share, each reporting a mean share of 69.17346 and 57.50382 percent, respectively. In addition, women who are married constituted 61.21861 percent while married men composed of 73.27629 percent. More so, women in a union membership are less than the men and work less hours a week. Also, on average, female urban residents are slightly more than the male urban residents. Lastly, the health sector, on average, comprise an equal sex distribution.

Table 3: Descriptive Statistics

Gender	Female					Male				
Variable	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max
Lnwage	7,287	8.685354	0.9124918	5.521461	11.79116	10,051	9.096375	0.8222713	5.298317	13.30468
Gender share of employment	7,287	57.50382	16.54376	0.57	100	10,051	69.17346	24.9767	8.62	100
Education	7,287	2.520928	0.91429	1	4	10,051	2.548801	0.8663306	1	4
Experience	7,287	2011.356	8.55959	1955	2019	10,051	2010.676	8.830459	1940	2019
Marital status	7,287	0.6121861	0.4872852	0	1	10,051	0.7327629	0.4425392	0	1
Union	7,287	0.0864553	0.2810545	0	1	10,051	0.0946175	0.2927004	0	1
Hours worked	7,287	0.648415	0.4774979	0	1	10,051	0.8013133	0.3990315	0	1
Residence	7,287	0.4816797	0.4996985	0	1	10,051	0.4746791	0.4993833	0	1
Industry	7,287	5.110745	3.307915	1	10	10,051	5.313402	3.662161	1	10

Source: Author's computation from Stata (2021)

The study further examine the female share of employment as well as the mean gender earnings as shown in annex 1 table 12. The female share of employment is crucial as it identifies occupations where female is least in and or are the majority. It is obtained by dividing the number of females employed in that occupation by the total number of males and females engaged in the same domain. It can be observed from the table that the female share of employment is highest(i.e.70 percent>=) among secretaries stenographers and typist (91.38%), followed by pre-primary education teachers (84.92 percent), brewers distiller and related workers (84.29 percent), chemists workers (80 percent), hairdressers barbers beauticians and related (79.09 percent), House stewards and housekeepers (77.66 percent), tailors dressmakers and related workers (76.60 percent) , weavers knitters and related workers (76.39 percent), physicist and related professionals (75 percent), street venders and related workers (74.94 percent), weaving knitting and sewing machine operator (72.73 percent),cleaners launders and domestic workers(71.98 percent), nursing and mid-wife (70.80 percent) and finally Decorators and other commercial workers (70 percent).

On the other hand female share of employment is least (i.e.30 percent<=) in the following jobs; motor vehicle drivers (0.57 percent), building trades workers (1.16 percent), machinery mechanics and fitters (1.25 percent), metal molders welders structural-metal (1.85 percent), transport labourers and handlers (2.17 percent), construction and maintenance labourers (3.38 percent), agricultural and materials handling (4.76 percent), messenger porters watchmen and related (4.96 percent), electrical engineering technicians (5.7 percent), fishery workers (5.83 percent), veterinary officers (7.69 percent), photographers image and sound recording (7.69 percent), non-ordained religion assistants

(9.09 percent), wood products machine operators (9.52 percent), protective service workers (11.11 percent), hunting and wildlife workers (11.11 percent), surveyors and cartographers (11.76 percent), government tax and exercise officials (12.5 percent), religious professionals (12.77 percent), building caretakers (14 percent), directors and chief executives (14.29 percent), fisheries wildlife and tourist officials (14.29 percent), police inspectors detectives customs (15.22 percent), mining and quarrying labourers (15.66 percent), other teachers and instructors (18.75 percent), athletes sportsmen and related workers (19.05 percent), government administrators (19.81 percent), local authority officials (19.23 percent), mining blasting stone cutting and related (20.69 percent), poultry dairy and livestock producers (21.29 percent), street nightclub and related musicians (22.22 percent), other client oriented clerks (25 percent), manufacturing labourers (25.81 percent), business service agents (26.83 percent) , security and finance dealers (27.27 percent), bakers pastry-cooks and confectionery (27.78 percent), medical/clinical officer (27.91 percent), Computing professionals (28.13 percent), sanitarians (28.57 percent), and shoe cleaning and other street services (29.17 percent).

Looking at the mean wages of both genders, jobs where men have more income compared to women include; directors and chief executives, computing professionals, religious professionals, electrical engineering technicians, veterinary officers, fishery workers, mining and quarrying labourers, construction and maintenance labourers, manufacturing labourers etc. On the other hand, Women working in certain female dominated occupations (i.e., Female share >=70 percent) have lower wage compared to the male workers. For example, female wage in nursing/mid-wife profession, pre-primary education teachers and secretaries' stenographers and typist is KES 31841.08, 9717.188, 17099.5 respectively whilst the males in the same profession earn KES 40217.65, 16225, 25000 respectively, giving rise to gender wage gap. These findings were like Cozzi (2017), who observed that female-dominated jobs have a negative impact on earnings. Moreover, there are occupations that comprise 100 percent females and no males e.g., compositors and type-setters or 100 percent males and no females e.g., chemical engineers did not identify any wage gap.

The study further examine the degree of divergence of males and females in occupation by calculating the Duncan index in table 4. A total of 156 occupations, is used to calculate the index. The results show that 42.7303617 percent of women need to change careers to ensure the distribution between the two sexes is equal.

Table 4: Duncan index for KNOCS code occupations

KNOCS Occupation Code	156 occupations
Year	2019
Duncan index	0.427303617

Source: Author's computation from Excel (2021)

4.2 Correlation Matrix

The correlation of the independent variables for both women and men are examined in Table 5 and 6, respectively. There is a positive association between fraction of females in each occupation, education, experience, marital status, union, hours worked, residence and industry with lnwage in the female correlation matrix as shown in table 5.

Table 5: Females Correlation matrix

Variables	lnwage	Femaleshare	Education	Experience	Marital status	Union	Hoursworked	Residence	Industry
Lnwage	1.000								
Femaleshare	0.0908	1.000							
Education	0.4560	-0.0697	1.000						
Experience	0.1389	0.0920	0.0944	1.000					
Marital status	0.0091	-0.0401	0.0349	-0.0393	1.000				
Union	0.3084	-0.0986	0.3113	-0.1264	0.0615	1.000			
Hoursworked	0.2982	0.0248	0.1992	0.0871	-0.0587	0.1273	1.000		
Residence	0.2693	0.1293	0.1990	0.1126	-0.0946	0.0513	0.1789	1.000	
Industry	0.4528	0.3141	0.1417	0.2583	-0.1173	-0.0141	0.2393	0.3287	1.000

Source: Author's computation (2021)

Similarly, in Table 6, the results report a positive association between fraction of males in each occupation, education, marital status, union, hours worked, residence and industry and a negative association of experience on the male lnwage.

Table 6: Males Correlation matrix

Variables	lnwage	Maleshare	Education	Experience	Marital status	Union	Hoursworked	Residence	Industry
Lnwage	1.000								
Maleshare	0.0588	1.000							
Education	0.3990	-0.0684	1.000						
Experience	-0.0095	0.0238	0.0727	1.000					
Marital status	0.1510	0.0667	0.0197	-0.2499	1.000				
Union	0.2846	-0.0234	0.3014	-0.1019	0.0992	1.000			
Hoursworked	0.1607	0.0808	0.0829	0.1066	0.0255	0.0639	1.000		
Residence	0.1904	0.0439	0.1927	0.0899	0.0009	0.0446	0.1033	1.000	
Industry	0.4634	0.1879	0.1339	0.1303	0.0548	0.0438	0.1854	0.2250	1.000

Source: Author’s computation (2021)

Further, it is evident from Table 5 and 6 that there is no strong correlation among the variables used in the study since all variables had a correlation index of less than 0.7.

4.3 Diagnostic Test

4.3.1 Heteroscedasticity

Using the Breusch-Pagan test, results for both female and male are presented in Table 7. The results reveal presence of heteroscedasticity since the p-value 0.0000 is significant, which leads to the rejection of the null hypothesis. The use of robust standard errors corrected it.

Table 7: Test for Heteroscedasticity

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity	Female	Male
Ho: Constant variance		
Variables: fitted values of lnwage		
chi2(1)	74.88	32.48
Prob > chi2	0.0000	0.0000

Source Author's computation (2021)

4.3.2 Multicollinearity

To test for multicollinearity, Variance Inflation Factors (VIF) is examined. It is expressed as VIF= 1/ (1 - R^2), where VIF is the variance inflation factor, R^2 is the coefficient of determination, and 1/VIF is tolerance. The VIF values of the two genders are shown in Table 8. All the variables had VIF less than 10, implying that there is no multicollinearity.

Table 8: Multicollinearity

Gender	Females		Males	
	VIF	1/VIF	VIF	1/VIF
FemaleShare/ Maleshare	1.38	0.726805	1.64	0.608548
Education				
Primary	2.74	0.365130	3.33	0.300501
Secondary	2.60	0.385217	3.19	0.313271
Tertiary	2.89	0.346619	2.84	0.352170
Experience	1.11	0.897576	1.14	0.880561
Marital status	1.04	0.958562	1.10	0.907814
Union	1.30	0.766972	1.25	0.800211
Hour worked	1.15	0.870841	1.08	0.925545
Residence	1.19	0.837181	1.15	0.871994
Industry				
Manufacturing	1.30	0.769727	1.28	0.778742
Construction	1.04	0.963259	1.76	0.569710
Education	1.99	0.503226	1.65	0.607798
Health	1.34	0.745723	1.14	0.875647
Wholesale/retail	2.01	0.496420	1.54	0.648137
Finance	1.12	0.895046	1.07	0.937246
ICT	1.01	0.991132	1.02	0.979661
Mining	1.03	0.972247	1.07	0.934047
Others	2.08	0.480252	2.09	0.479351
Mean VIF	1.57		1.63	

Source: Author's computation (2021)

4.3.3 Normality

In testing for normality of the error term, the Shapiro Wilk test is used. The results for females and males are shown in Table 9 and 10, respectively. The null hypothesis indicates that the error terms are normally distributed, whereas the alternative hypothesis suggests that the error term is not normally distributed.

Table 9: Shapiro-Wilk W test for normal data for Females

Variable	Obs	W	V	Z	Prob>z
Lnwage	7,287	0.97555	92.430	12.011	0.00000
Femaleshare	7,287	0.95793	159.022	13.451	0.00000
Education					
Primary	7,287	0.99993	0.281	-3.372	0.99963
Secondary	7,287	0.99958	1.599	1.245	0.10648
Tertiary	7,287	0.99889	4.195	3.805	0.00007
Experience	7,287	0.82504	661.400	17.233	0.00000
Marital status	7,287	0.99995	0.204	-4.218	0.99999
Union	7,287	0.99708	11.047	6.374	0.00000
Hour worked	7,287	0.99990	0.393	-2.476	0.99336
Residence	7,287	0.99998	0.082	-6.638	1.00000
Industry					
Manufacturing	7,287	0.99534	17.611	7.612	0.00000
Construction	7,287	0.93464	247.088	14.621	0.00000
Education	7,287	0.99760	9.074	5.852	0.00000
Health	7,287	0.98907	41.308	9.874	0.00000
Wholesale/retail	7,287	0.99965	1.333	0.762	0.22308
Finance	7,287	0.97883	80.042	11.630	0.00000
ICT	7,287	0.77567	843.006	17.893	0.00000
Mining	7,287	0.93464	247.088	14.621	0.00000
Others	7,287	0.99927	2.748	2.683	0.00365

Source: Author's computation (2021)

Results from Table 9 show that Primary and secondary education dummy, marital status, hours worked, residence, and wholesale/retail industry dummy variable are normally distributed at a 5 percent level of significance. The other variables are not normally distributed.

Table 10: Shapiro-Wilk W test for normal data for Males

Variable	Obs	W	V	Z	Prob>z
Lnwage	10,051	0.98564	71.815	11.444	0.00000
Maleshare	10,051	0.90548	472.695	16.489	0.00000
Education					
Primary	10,051	0.99995	0.239	-3.831	0.99994
Secondary	10,051	0.99978	1.084	0.216	0.41438
Tertiary	10,051	0.99906	4.686	4.135	0.00002
Experience	10,051	0.84683	765.994	17.781	0.00000
Marital status	10,051	0.99977	1.164	0.407	0.34197
Union	10,051	0.99809	9.528	6.036	0.00000
Hour worked	10,051	0.99951	2.441	2.389	0.00844
Residence	10,051	0.99998	0.094	-6.332	1.00000
Industry					
Manufacturing	10,051	0.99701	14.964	7.244	0.00000
Construction	10,051	0.99848	7.583	5.424	0.00000
Education	10,051	0.99761	11.972	6.647	0.00000
Health	10,051	0.98663	66.870	11.253	0.00000
Wholesale/retail	10,051	0.99882	5.909	4.756	0.00000
Finance	10,051	0.97179	141.085	13.252	0.00000
ICT	10,051	0.88126	593.788	17.099	0.00000
Mining	10,051	0.98588	70.597	11.398	0.00000
Others	10,051	0.99979	1.063	0.163	0.43512

Source: Author's computation (2021)

From Table 10 above, variables that are normally distributed included Primary and secondary education dummy, marital status, hours worked, residence and other industry dummy variable, while the other variables are not normally distributed at a 5 percent level of significance.

4.4 Discussion and interpretation of results

Table 11 below shows separate Ordinary Least Square (OLS) regressions for females (column 2) and males (column 3), respectively. The regression results indicate a coefficient of determination of 69.65 percent for females and 52.12 percent for males. This implies that the explanatory variables in the model explain only 69.65 percent of the variation in female wage. In comparison, only 52.12 percent variation in male wage is explained by the explanatory variables in the model. The findings report that when all the independent variables in the model assume zero value, the log female pay will be 5.99475 units while the log male wage will be 19.07609 units.

The study findings show a negative coefficient of the proportion of women in each occupation that is statistically significant at 1 percent level of significance. This implies that it is an essential determinant of female wage. Further, holding all other factors constant, when the proportion of women in each occupation increases by one unit, the female wage will decrease by 0.97814 percent. The study findings are in line with various studies (Johnson and Solon 1986; Blau and Beller 1988; Sorensen, 1990; Macpherson and Hirsch, 1995 and Hori, 2009). On the other hand, a positive coefficient on the proportion of males in each occupation was observed and it was statistically significant at 1 percent level of significance. Thus, implying that, a one unit increase in the proportion of men in each occupation increases male wage by 0.31071 percent, at ceteris paribus. The results relate with Cozzi (2017) who found that jobs where males are high in numbers have more income.

The returns to education dummies are negative for individual women with primary or secondary education and positive for women with tertiary education in the female wage structure. These imply that a female individual with tertiary education earns more than a female individual with no education by 34.91849 percent. Likewise, an individual female with primary and secondary education makes less wage than one with no education by 13.59517 percent and 2.90137 percent respectively. The primary and tertiary dummy coefficients are all significant at 1 percent level of significance but the secondary dummy was insignificant. On the other hand, individual male education dummies are all positive except primary education dummy. Their respective coefficients are all statistically significant at 1 percent level of significance except the secondary dummy that is significant at 10 percent. A male with secondary education earns more by 4.17554 percent and 48.98012 percent if he has a university education compared to an individual male with no education. However, a male individual with a primary education earns less by 9.16438 percent than a male individual with no education. The wage regression for both genders hence conclusively found that tertiary education yields high pay and the returns to tertiary education was greater for males than females and this could be due to their difference in what they major at college (Goy and Johnes, 2011). Similarly, these findings are supported by Herrera, Dijkstra and Ruben (2019) who controlled for the rate of return to schooling and noted that more education yields more pay.

The effect of experience on wages was positive and insignificant for the female regression while negative and statistically significant at 1 percent level of significance in the male model. This means that one additional year of experience for female individual increases their wage by 0.10641 percent, keeping all other factors constant. Similarly, one additional year of experience for a male individual reduces their wage by 0.54716 percent, keeping all other factors constant. Research conducted by Qu, Guo & Wang (2019) found that the inverse relationship between experience and wage to be as a result of decrease in one's productivity. However, most studies provide evidence of a positive relationship of the mentioned variable (Kabubo-Mariara, 2003 & Hori, 2009).

The effect of the marital status variable is not significant in the female model but it is significant in the male model at 1 percent level of significance. In both regressions, a positive coefficient on the marital status variable is observed. An individual female who is married earn 1.90572 percent more compared to a female who is not married, while a married man earns more than the unmarried man by 9.71573 percent. According to Cohen and Haberfeld (1991) the outcome is because high income men tend to marry compared those with low income. It also showed that married women have less premium on wage than married men (Breusch and Gray, 2004). Additionally, the union coefficient is positive and statistically significant at 1 percent level of significance in both the female and male regression. Being in a union increases a woman earnings by 19.58549 percent and male earnings by 18.10047 percent respectively at ceteris paribus compared to the non- union members of the two sexes. Sorensen (1990) offered a similar perspective that income is positively associated with union membership as they bargain for workers' salaries thus helps in narrowing income inequality.

Working as a fulltime employee result in higher earnings for both female and male individuals by 4.46975 percent and 0.17247 percent respectively compared to working as part-time wage earner. The hours' worked coefficient is positive and statistically significant at 5 percent level of significance on the female model but is positive and insignificant in the male regression. This is comparable to some studies who found increasing returns to hours on output (Feldstein, 1967; Craine, 1973; Leslie, 1984). As well, female and male individuals who work at the urban areas receive higher income compared to those living at the rural parts by 4.47244 percent and 1.55508 percent respectively. The residence coefficient is both positive but only statistically significant at 5 percent level of significance in the female model. As expected, Orraca, Cabrera and Iriarte (2016) found similar results of increased earnings by individuals working in the urban zones.

The industry dummies for individual women are all positive except in the construction and mining industry which are negative. These imply that a female individual in the manufacturing, education, health, wholesale/retail, finance, ICT, and other sector earns more than a female individual in the agriculture sector by 133.4268 percent, 174.4287 percent, 228.87448 percent, 132.5135 percent, 180.3547 percent, 183.3368 percent, and 136.559 percent respectively. Likewise, an individual female in the construction and mining sector earns less than a female individual in the agriculture sector by 9.11566 percent and 97.11205 percent respectively. The dummy coefficients are all significant at 1 percent level of significance except the construction coefficient. The findings are consistent with Lass and Wooden (2019) who observed that casual employees are associated to low productivity and wage and hence the earning difference. On the other hand, individual male industry dummies are all positive and statistically significant at 1 percent level of significance. An individual male in the manufacturing, construction, education, health, wholesale/retail, finance, ICT, mining and other sector earns more than a male individual in the agriculture sector by 56.13076 percent, 30.24906 percent, 122.2767 percent, 152.4471 percent, 101.9583 percent, 152.3183 percent, 118.5812 percent, 41.01864 percent and 97.289 percent respectively.

Table 11: OLS Wage Equation Estimate

Variable	Female (lnwage)	Male (lnwage)
Proportion of female/male in an occupation	-0.0097814*** (0.0006508)	0.0031071*** (0.0003698)
Education		
Primary	-0.1359517*** (0.0219024)	-0.0916438*** (0.0207032)
Secondary	-0.0290137 (0.0228038)	0.0417554* (0.0220967)
Tertiary	0.3491849*** (0.0314884)	0.4898012*** (0.0303747)
Experience	0.0010641 (0.0007287)	-0.0054716*** (0.0006786)
Marital status	0.0190572 (0.012545)	0.0971573*** (0.0133108)
Union	0.1958549*** (0.0262882)	0.1810047*** (0.023192)
Hours worked	0.0446975** (0.0138485)	0.0017247 (0.0153749)
Residence	0.0447244** (0.0129526)	0.0155508 (0.0122193)
Industry		
Manufacturing	1.334268*** (0.0451334)	0.5613076*** (0.0392341)
Construction	-0.0911566 (0.2013418)	0.3024906*** (0.0238168)
Education	1.744287*** (0.0331269)	1.222767*** (0.0283042)
Health	2.2887448***. (0.0499161)	1.524471*** (0.0604094)
Wholesale/retail	1.325135*** (0.0218269)	1.019583*** (0.0211907)
Finance	1.803547*** (0.0673359)	1.523183*** (0.0808747)
ICT	1.833368*** (0.1391611)	1.185812*** (0.1371725)
Mining	-0.9711205*** (0.2660824)	0.4101864*** (0.03843)
Others	1.36559*** (0.0264125)	0.97289*** (0.0192612)
Constant	5.99475*** (1.462222)	19.07609*** (1.36428)
N	7,287	10,051
R-sq	0.6965	0.5212

*Robust standard errors in parentheses. *** p<0.01, ** p<0.05 & * p<0.1*

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter summarized and made conclusions based on empirical findings. It also provided policy implications of the conclusions and areas for further research.

5.2 Summary of Empirical Findings

The main objective of this study was to determine the effect of occupational segregation on the gender wage gap in Kenya. The study employed the 2019 Quarterly Labour Force Survey (QLFS) of the Kenya Continuous Household Survey Programme (KCHSP) for period January to March. Log of wage (for females and males separately) was regressed against the proportion of females or males in an occupation, education level, experience, marital status, union, hours worked, residence, and industry.

The results according to this formula $(Fm\beta m - Ff\beta f)/(LnWm - LnWf)$ indicate that occupational segregation explains only 1.89 percent of the gender wage gap. On the other hand, the Duncan index reveals that 42.7303617 percent of women need to change occupations to ensure the distribution between the two sexes is equal. This implies that women need to shift to jobs that are predominantly male such manufacturing relative to positions dominated by females like teaching occupation to attain full integration.

The regression results also revealed a differential impact of explanatory variables on the log of wage for females and males, respectively. For instance, experience was positive and insignificant in the female model compared to the male model that showed a significant and negative relationship of the experience variable to the log of wage.

In addition, secondary dummy and construction dummy was negative and insignificant in the female model and positive and significant in the male regression at 10 percent and 1 percent level of significance respectively. More so, in the female model, fraction of women in a profession and mining industry dummy was negative while in the male model, fraction of men in a profession and mining industry dummy was positive. However, both were significant at 1 percent level of significance.

5.3 Conclusions

The study concluded that the Proportion of women in the occupation was negative and significant, and the Proportion of males in the job was positive and significant. Tertiary education dummy was positive and significant while the primary dummy was negative and significant in both genders. However, secondary education was negative and insignificant in the female model but positive and significant in the male regression. A large portion of womenfolk completed university, but a larger share of men completed the same. The level of work experience variable was positive and insignificant for females and vice versa for males. The marital status variable was found to be positive for both sexes and only significant in the male regression with a married man having more wage premium to a married woman. In addition, the union variable was positive and significant for both genders with women having a larger return by being part of a union. Besides, hours worked were found insignificant in the male wages but positive and significant in the female estimation. The area residence variable was all positive in all genders and only significant in the female model. Finally, industry dummies were all positive except construction and mining and were all significant except construction dummy in the female model while all positive and significant in the male model.

From the study findings, we conclude that the Proportion of female in an occupation, education primary and tertiary, union variable, hours worked, residence, industry-manufacturing, education, health, wholesale/retail, finance, ICT, mining and others played a significant role in influencing female wages. In contrast, experience, marital and industry-construction played an insignificant role in explaining female wages. The variables proportion of males in an occupation, all education dummies, experience, marital status, union and all industry dummies had a significant influence on male wages. In contrast, hours worked and residence had insignificant influence on male wages.

5.4 Recommendation

The government should create programs for girls and young women that incentivize them to pursue careers labeled male-dominated thus get well-paying occupations later and hence help close the gender wage gap. Besides, mentorships by female role models to the young girls and women to take up the challenge would boost their aggression. The placement of quotas to the male occupations through advertisement of jobs only meant to be applied by women applicants, thereby providing them with an opportunity to earn higher wages and narrow the earnings gap is advised. Finally, workplace should discourage requesting workers to provide previous employment pay history to curb pay decisions that would have been caused by discrimination to trickle down to current job.

5.5 Areas for Further Research

The study paper only examined the effect of inter-occupational segregation on gender wage differential in Kenya. Minimal effect of between occupation segregation was observed and thus the study recommends investigating the effect of within (Intra) occupation segregation on gender wage gap to examine its impact on earnings inequality.

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ANNEX 1

Table 12: Female share of employment and Mean Female and Male Wage

KNOCS occupation code	Male	Female	Total	Female share of employment	Mean Female wage	Mean Male wage	Gap
Legislative and constitutional official	3	0	3	0		133775	
Local authority officials	21	5	26	0.1923	20150	35715.38	-15565.38
Government administrators	85	21	106	0.1981	27561.54	28327.5	-765.9609
Senior officials of special interest	5	4	9	0.4444	32095	34000	-1905
Directors and chief executives	18	3	21	0.1429	31000	102500	-71500
Specialized departmental managers	47	30	77	0.3896	55642.86	77580.44	-21937.58
Other departmental managers	20	13	33	0.3939	41520	43000	-1480
Non-departmental managers	555	694	1249	0.5556	9257.143	22222.33	-12965.19
Other administrators and managers	41	30	71	0.4225	31144.45	47436.36	-16291.92
Physicist and related professionals	2	6	8	0.75	30000	15000	15000
Chemists	1	4	5	0.8	9000	10000	-1000
Computing professionals	23	9	32	0.2813	22750	22888.89	-138.8887
Architects and town planners	7	0	7	0		26025	
Surveyors and cartographers	15	2	17	0.1176	63500	21180	42320
Mechanical engineers	34	0	34	0		36450	

KNOCS occupation code	Male	Female	Total	Female share of employment	Mean Female wage	Mean Male wage	Gap
Electrical electronics and telecommunications	13	0	13	0		24333.33	
Health professionals	45	27	72	0.375	59738.89	42411.11	17327.78
Nursing and mid-wifely professionals	33	80	113	0.7080	31841.08	40217.65	-8376.566
Agriculturalists and related professionals	34	21	55	0.3818	23400	15827.69	7572.313
University and post-secondary teachers	21	12	33	0.3636	132080	79651.09	52428.91
Secondary and technical institute teachers	178	99	277	0.3574	26787.5	35190.46	-8402.965
Special education teaching professionals	5	5	10	0.5	30000	18750	11250
Education methods advisers and assessors	3	2	5	0.4	30000	120000	-90000
Other teaching professionals	12	13	25	0.52	15511.11	26657.14	-11146.03
Lawyers	8	6	14	0.4286	38750	97500	-58750
Economists	3	0	3	0		600000	
Sociologist anthropologist and related	2	0	2	0		70000	
Other social science and related professionals	8	10	18	0.5556	28480	27360	1120
Accountants auditors and tax assessors	61	30	91	0.3297	28630	57671.43	-29041.43
Personnel and occupational professional	8	11	19	0.5789	17500	26709	-9209
Other business professionals	36	57	93	0.6129	19384.62	20640	-1255.385

KNOCS occupation code	Male	Female	Total	Female share of employment	Mean Female wage	Mean Male wage	Gap
Archivists' librarian and related professionals	2	4	6	0.6667	6500	30000	-23500
Religious professionals	82	12	94	0.1277	5166.667	23458.06	-18291
Sculptors painters and related professionals	29	0	29	0		5290	
Technical draughts-men	5	0	5	0		20000	
Civil engineering and related professionals	24	0	25	0		43922.22	
Electrical engineering technicians	33	2	35	0.057	12000	15020	-3020
Chemical engineering technicians	3	0	3	0		39081	
Photographers image and sound recording	12	1	13	0.0769	7000	70000	-63000
Auxiliary nurses	0	10	10	1	32444.45		
Medical/clinical officers	31	12	43	0.2791	40675	27209.09	13465.91
Sanitarians	5	2	7	0.2857	4000	1500	2500
Dental technicians	3	0	3	0		99000	
Physiotherapist and related associate	2	2	4	0.5	24000	120000	-96000
Veterinary officers	12	1	13	0.0769	30000	56750	-26750
Pharmaceutical officers	10	5	15	0.3333	45500	17000	28500
Other associate medical nursing and nutrition	10	22	32	0.6875	22468.18	44500	-22031.82
Life science technicians	5	6	11	0.5455	24500	16333.33	8166.667

KNOCS occupation code	Male	Female	Total	Female share of employment	Mean Female wage	Mean Male wage	Gap
Agronomy and forestry technicians	2	1	3	0.3333	27000	15600	11400
Ship deck officers and pilots	2	0	2	0		40000	
Securities and finance dealers	24	9	33	0.2727	26166.67	17033.33	9133.332
Insurance brokers and agents	8	6	14	0.4286	79000	45250	33750
Business service agents	90	33	123	0.2683	30316.67	18313.04	12003.62
Police inspectors detectives customs	39	7	46	0.1522	27600	32810.32	-5210.32
Government tax and excise officials	7	1	8	0.125	15000	17928.57	-2928.572
Business and public service middle level	16	12	28	0.4286	26750	21020	5730
Statistical and planning officials	2	1	3	0.3333	10000	42000	-32000
Fisheries wildlife and tourist officials	6	1	7	0.1429	27000	25000	2000
Lands agricultural and tourist officials	15	0	15	0		34166.67	
Other middle level personnel	10	7	17	0.4118	26525	25250	1275
Primary education teachers	338	324	662	0.4894	20016.9	22381.68	-2364.777
Pre-primary education teachers	27	152	179	0.8492	9717.188	16225	-6507.813
Other teachers and instructors	13	3	16	0.1875	7500	15437.5	-7937.5
Non- ordained religion assistants	50	5	55	0.0909	10225	7169.318	3055.682
Social workers and helpers	9	14	23	0.6087	28633.33	12141.67	16491.67
Athletes sportsmen and related workers	17	4	21	0.1905	4350	18356.25	-14006.25
Decorators and	3	7	10	0.7	600	8000	-7400

KNOCS occupation code	Male	Female	Total	Female share of employment	Mean Female wage	Mean Male wage	Gap
other commercial workers							
Radio television and other announcers	1	0	1	0		8000	
Street nightclub and related musicians	7	2	9	0.2222	6000	16200	-10200
Acrobats clowns magicians and related	5	0	5	0		20000	
Safety health and quality inspector	4	2	6	0.3333	24000	44250	-20250
Secretaries stenographers and typist	5	53	58	0.9138	17099.5	25000	-7900.5
Key board and office machine operators	1	1	2	0.5	22000	18000	4000
Numerical clerks	11	16	27	0.5926	26165.46	16100	10065.46
Material recording and transport clerks	21	10	31	0.3226	20881.86	23550.59	-2668.73
Library mail and related clerks	3	5	8	0.625	15333.33	19500	-4166.667
General office clerk	36	44	80	0.55	22536.67	21206.52	1330.145
Cashiers tellers and related clerks	33	31	64	0.4844	12742.45	22822.22	-10079.77
Information clerks	9	13	22	0.5909	22444.45	25000	-2555.555
Other client oriented clerks	6	2	8	0.25	21000	16400	4600
Shop assistants and demonstrators	380	486	866	0.5612	6958.75	8851.078	-1892.328
Hairdressers barbers beauticians and related	69	261	330	0.7909	8227.17	4454.545	3772.625
Undertakers and embalmers	1	0	1	0		30000	
Protective service	280	35	315	0.1111	20329.54	18082.92	2246.625

KNOCS occupation code	Male	Female	Total	Female share of employment	Mean Female wage	Mean Male wage	Gap
workers							
House stewards and housekeepers	44	153	197	0.7766	5913.622	9333.333	-3419.711
Cooks and other catering service worker	156	181	337	0.5371	7196.939	9371.415	-2174.476
Waiters bartenders	74	137	211	0.6493	7569.091	9097.708	-1528.617
Ship and flight attendants	0	3	3	1	9240		
Travel guides and ground attendants	11	0	11	0		21550	
Field crop vegetable and horticulture	431	452	883	0.5119	2763.034	4349.522	-1586.488
Poultry dairy and livestock producers	207	56	263	0.2129	6200	4126.087	2073.913
Crop and animal producers	363	391	754	0.5186	948.3065	3552.542	-2604.236
Fishery workers	113	7	120	0.0583	3000	10916.67	-7916.667
Subsistence agricultural and fishery	27	24	51	0.4706	2816.667	6500	-3683.33
Forestry and related workers	69	127	196	0.6480	4000	17846.77	-13846.77
Hunting and wildlife workers	8	1	9	0.1111	9000	12750	-3750
Mining blasting stone cutting and related	69	18	87	0.2069	250	7226.667	-6976.667
Building trades workers	684	8	692	0.0116	3100	6257.1	-3157.1
Metal molders welders structural-metal	106	2	108	0.0185	600	6450.658	-5850.658
Blacksmiths toolmakers and	10	0	10	0		800	

KNOCS occupation code	Male	Female	Total	Female share of employment	Mean Female wage	Mean Male wage	Gap
related							
Machinery mechanics and fitters	158	2	160	0.0125	500	9436.607	-8936.607
Solar equipment fitters and installers	2	0	2	0		10000	
Precision workers in metal and related	2	0	2	0		50000	
Compositors and type-setters	0	1	1	1	18000		
Butchers fishmongers and related	109	81	190	0.4263	3212.5	6250.556	-3038.056
Bakers pastry-cooks and confectionery	26	10	36	0.2778	9750	11164.33	-1414.33
Daily products makers	4	2	6	0.3333	1200	300	900
Fruit nut and related preservers	2	0	2	0		15000	
Brewers distiller and related workers	11	59	70	0.8429	1666.667	300	1366.667
Other food processing and related	13	16	29	0.5517	5200	13766.67	-8566.667
Wood treating cabinetmaking and related	40	0	40	0		8836.363	
Woodworking-machine setters	13	0	13	0		2850	
Weavers knitters and related workers	17	55	72	0.7639	7650	30000	-22350
Tailors dressmakers and related workers	55	180	235	0.7660	9438.462	9125.714	312.748
Fell mongers tanners and pelt dressers	3	0	3	0		3300	
Shoe-making and	35	0	35	0		9500	

KNOCS occupation code	Male	Female	Total	Female share of employment	Mean Female wage	Mean Male wage	Gap
related trades workers							
Well drillers and borers	6	0	6	0		650	
Mining plant operators	4	0	4	0		600	
Stone clay cement and other mineral producers	5	0	5	0		14500	
Metal smelting converting and refining	1	0	1	0		200	
Metal melters casters and rolling mill	4	0	4	0		5050	
Machine –tool and other metal working	12	0	12	0		5300	
Metal finishing plating and coating	2	0	2	0		18500	
Wood processing and pulp plant operator	12	0	12	0		1366.667	
Wood products machine operators	19	2	21	0.0952	300	13118	-12818
Paper products machine operators	2	0	2	0		21000	
Rubber and plastic products machine	3	0	3	0		10466.67	
Chemical heat-treating plant operators	1	0	1	0		25000	
Petroleum refining plant operators	5	0	5	0		14300	
Steam turbine boiler and engine operators	2	0	2	0		14300	
Metal and fishing processing machine	1	0	1	0		800	

KNOCS occupation code	Male	Female	Total	Female share of employment	Mean Female wage	Mean Male wage	Gap
operators							
Dairy products machine operators	2	0	2	0		400	
Grain and spice-milling machine operators	28	20	48	0.4167	5733.333	9191.667	-3458.333
Baked goods cereal and chocolate producer	2	2	4	0.5	7800	400	7400
Sugar production machine operators	5	0	5	0		26980	
Tea coffee and cocoa processing machine	6	3	9	0.3333	388.6667	13026	-12637.33
Electrical and electronic machine assemblers	4	0	4	0		1500	
Metal products assemblers	3	0	3	0		6000	
Textile and leather products assemblers	1	2	3	0.6667	14000	12460	1540
Railway engine drivers and related work	6	0	6	0		30333.33	
Motor vehicle drivers	1045	6	1051	0.0057	20000	12965.44	7034.563
Agricultural and materials-handling	20	1	21	0.0476	450	7096.154	-6646.154
Textile preparing spinning and winding	1	1	2	0.5	350	14000	-13650
Weaving knitting and sewing machine operators	3	8	11	0.7273	10780	5266.667	5513.333
Plant and machine operators and assemblers	8	0	8	0		14400	

KNOCS occupation code	Male	Female	Total	Female share of employment	Mean Female wage	Mean Male wage	Gap
Street venders and related workers	341	1020	1361	0.7494	5946.667	6666.071	-719.4048
Shoe cleaning and other street services	17	7	24	0.2917	9225	1480	7745
Cleaners launders and domestic workers	153	393	546	0.7198	4443.027	5891.532	-1448.505
Building caretakers	43	7	50	0.14	8700	7576.471	1123.529
Messengers porters watchmen and related	230	12	242	0.0496	7475	8163.24	-688.2402
Other sales and service labour/ers	129	111	240	0.4625	7939.8	8409.661	-469.8613
Farm –hand and related labourers	1220	864	2084	0.4146	1900.556	2918.444	-1017.888
Mining and quarrying labourers	70	13	83	0.1566	4271.429	6239.943	-1968.514
Construction and maintenance labourers	429	15	444	0.0338	2711.111	5400.688	-2689.576
Manufacturing labourers	46	16	62	0.2581	6003.846	6837.189	-833.3428
Transport labourers and handlers	135	3	138	0.0217	6733.333	3989.184	2744.15
Total	10,053	7,293	17,346				