



SCHOOL OF
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The Returns to Education in Uganda

Understanding the Relationship Between Education and Labor Market
Outcomes in Uganda.

by

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Abstract

The primary focus of this study is to determine the effect of additional education on the wage earnings structure in Uganda. The study is empirical and uses data obtained through the Uganda National Housing Survey (UNHS) 2015/16 in the World Bank Database. The study employs the Mincerian wage function as the main model with different specifications that cater for urban-rural, regional and gender dimensions. The cross-sectional Mincerian analysis is used to determine the relationship between education and earnings. Using these models, the study illustrates the variations in earnings in Uganda for individuals at different levels of educational attainment. The results of the study illustrate that an additional year of education increases wages significantly in Uganda, and that returns for both the formal sectors and self-employed individuals are similar. The study finds that females are still worse off compared to their male counterparts at lower levels of educational attainment. Only university education proves to be more important in closing the gender wage gap. The study also finds the urban-rural differences are bigger and worsens the gender wage gap. The policy lessons drawn from the study propose more gender wage equality and female-targeted education empowerment in Uganda, especially in rural areas.

Keywords: Education, earnings, Mincer function, labour market, Uganda.

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1.Introduction

1.1 Background

Some of the world's greatest challenges cannot be solved with elementary solutions or money. Several studies conducted state that Human Capital investment is unattainable without envisaging the importance of education on lifetime earnings (Crespo Cuaresma & Raggi, 2016; Foltz & Gajigo, 2012a; Kavuma et al., 2015; H. Patrinos, 2016). Education has been introduced as a weapon to solve some, if not most of the world's greatest challenges. With education, one is guaranteed better long-term life outcomes because of a job in the labour market or additional skills that allow them to be self-employed. Additionally, education being an investment equips one with necessary skills that can allow them to make an impact in their community since education has positive spillover effects that lead to societal transformation. Education has also broken inequality barriers in many parts of the world (Ki-moon, 2012; The World Bank, 2018). A recent report by the World Bank emphasizes that 'education delivers large and consistent returns in terms of income and is the most important factor to ensure equality of opportunities' (The World Bank, 2018). The presumption is that education has a direct effect on wages in that an additional year of school yields more earnings for an individual in the labour market. Essentially, investing in education not only benefits at an individual level but also, it is a necessary tool in combating the complex paradigm of poverty that hinders economic and development progress in society.

The Global Education First Initiative (Ki-moon, 2012) aims to achieve three objectives. The first is putting children in school from an early age. However, enrolling them in school should be on the premise that they advance in their education and acquire the relevant skills they can apply in the next stage. The second objective is principally quality over quantity. Although many developing countries provide access to education, the quality is poor and insufficient to develop the numeracy and literary skills that are fundamental for the labour market. This is what the 2019 progress report emphasizes in its discussion on the fourth Sustainable Development goal (United Nations, 2019). Finally, the education initiative from the UN and other international organizations believe that education should not be only restricted to the classroom but should be regarded as a transformative endeavor which connects to current trends of globalization. Fundamentally, if education is cultivated in the different global instruments that allow for integration, then certainly our societies

can improve and achieve sustainable development while at the same time participating in the global economy. As mentioned, education is a tool of hope and growth. It breaks barriers and this can only be done if it can transform and expand by interconnecting with several factors that are redefining the 21st century.

This study uses survey data to investigate the relationship between education and returns measured in wages. The study focuses on this relationship using the Mincerian wage function following similar methodological approaches in the field. While previous studies on the returns to education in Uganda have focused on the effect that the Universal Primary Education (UPE) has on returns to education (Crespo Cuaresma & Raggl, 2016), this study seeks to shed more light on the returns to education at different levels of educational attainment. Despite the modest literature that has been published on this research, not many people have focused on this relationship using the recent data, which this study benefits from. As such, the insights this study provides on this relationship are new and will serve to ignite further research.

1.2 Aims of the study

The aim of this research is multidimensional. The study investigates the relationship between education and earnings by exploring the gender, regional and urban/rural dimensions. The study will employ the Mincerian wage function to assess the returns to education. The main research question is “what is the relationship between years of schooling and wages in Uganda”? To answer this question, the study aims to;

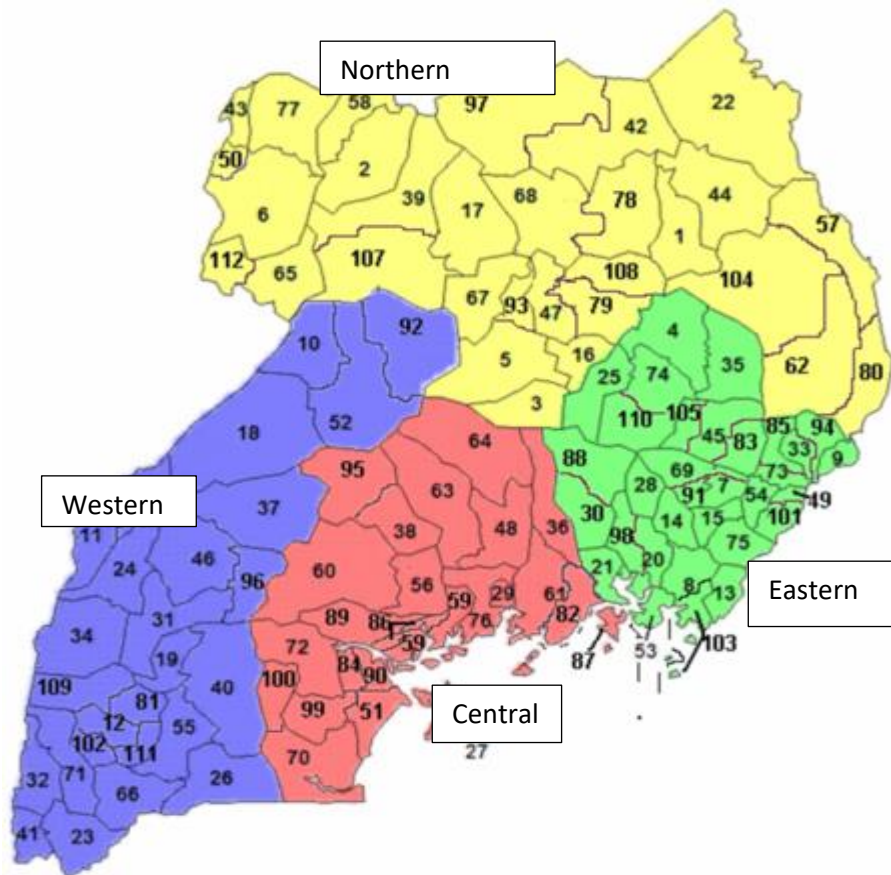
1. investigate the relationship between education and earnings incorporating the following dimensions
 - a. The rural/urban difference
 - b. Gender differences
 - c. Regional variations in the 4 Ugandan regions

Data used for the research is drawn from the Uganda National Housing Survey (UNHS) 2015/16 conducted by the Uganda Bureau of Statistics and the World Bank. The study is based on data from the surveys and findings from existing literature on the topic.

1.3 Uganda: A country overview

A landlocked country with a population of over 40 million (see Table 1) and situated along the Great Rift Valley, Uganda has thrived on being among the top African countries in providing access to education (CIA, 2020). The country is categorized by 56 different tribal groups and is divided into four regions- Eastern, Western Northern and Central (Figure 1). The largest tribe, the Baganda makes up majority of the population that occupies Lake Victoria around the northern shores. The country is very rich in cultural diversity and has three major languages spoken amongst the population- Bantu, Nilotic and Central Sudanic (Amone, 2015). A significant percentage of the land is used for agricultural purposes due to the country's rift valley location, with most of the population concentrated in the central (Kampala) and southern parts of the country, along the great lakes, Victoria and Lake Albert. Uganda's population is also largely rural, which makes up more than 70 per cent of the population with less than 5 per cent living in the capital, Kampala (Uganda Bureau of Statistics, 2018). The age dependency ratio, which, is the per centage of the working-age population has been decreasing since 2002 (103 per cent) and was at 95 per cent in 2018 (UBOS, 2018).

Figure 1. Ugandan map by regions



Source: Uganda Bureau of Statistics (2014)

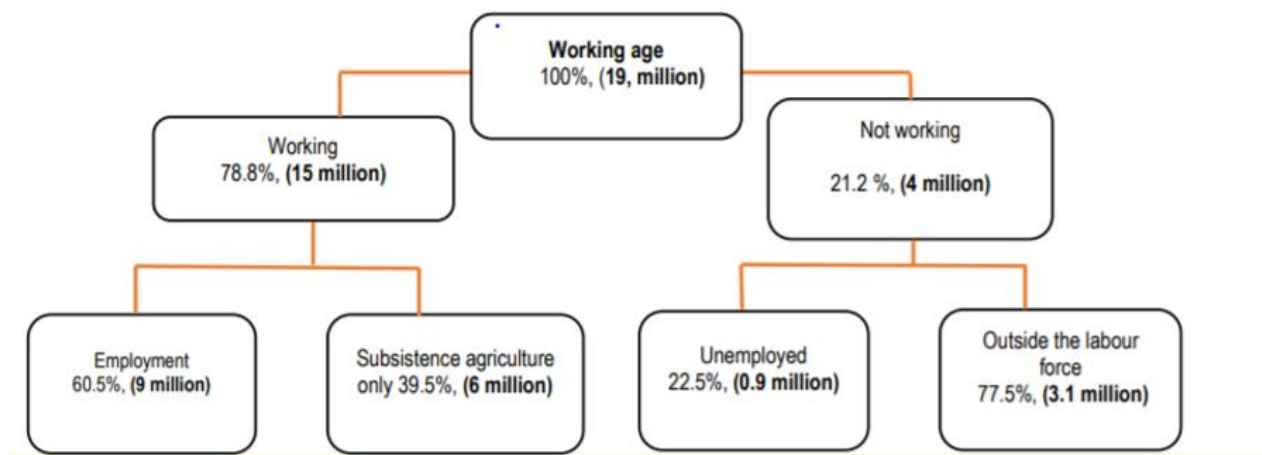
Table 1. Ugandan population by regions

| Region | Population (1991) | Population (2002) | Population (2014) | Population (2019) |
|----------|-------------------|-------------------|-------------------|-------------------|
| Central | 4,8435,94 | 6,575,425 | 9,529,227 | 11,184,500 |
| Western | 4,547,687 | 6,298,075 | 8,874,862 | 10,264,700 |
| Eastern | 4,128,469 | 6,204,915 | 9,042,422 | 10,512,200 |
| Northern | 3,151,955 | 5,148,882 | 7,188,139 | 8,346,600 |
| Total | 16,671,705 | 24,227,297 | 34,634,650 | 40,308,000 |

Source: Uganda Bureau of Statistics (2019)

One common feature in the country as seen in many developing countries of the region is the young and increasing population. The Ugandan Bureau of Statistics (UBOS) report reveals that the population is made up of individuals 14 years and below who, make up 48.21 per cent, followed by those who are between 25-54 years who make up 26 per cent (Uganda Bureau of Statistics, 2018). According to the World Bank, more than ‘700,000 young people reach working age every year in Uganda, and only 75,000 jobs are created per year’ (World Bank, 2020). The working force is largely concentrated in the agricultural sector has aided in reducing poverty levels in the country. Figure 2 below represents the distribution of the working population and shows that the labour force makes up more than 60 per cent of the employed population in the country, with close to 40 per cent engaged in the agricultural sector.

Figure 2. Distribution of working and non- working population



Source: Uganda Bureau of Statistics (2019)

The implementation of Universal Primary Education (UPE) in 1997 became a fundamental tool in providing access to education countrywide. The program was implemented by the government of Uganda and essentially abolished school fees. This, in turn, helped to reduce poverty by increasing student school enrolments. The UPE permitted children to attend primary school for free since tuition fees were eliminated. The impact was on drop-out rates, which declined significantly after fees were removed. Furthermore, the increase in attendance of females through this access has motivated more girls to get into school. Through this dedication, one can see that a small

developing country that was under colonial rule still strived to fight poverty by ensuring that society has access to education. As the focus on education has been key in the country, Uganda has made tremendous progress in the efforts to improve literacy levels and overall education for the population. With the enactment of article 30 and 34 (2) of the 1995 Constitution of the Republic of Uganda, the country had ensured access to education as a necessity in improving the lives of individuals from early development and paving the way for the long term outcomes (UBOS, 2018).

Despite the government's aim of transforming Uganda from a low to a middle-income country by 2020 and having education playing a fundamental role in the achievement of the country's overall development (Uganda Bureau of Statistics, 2017), the level of females who drop-out continues to increase (Atekyereza, 2001; Swift & Gena, 2013; The World Bank, 2018; World Bank, 2019). This is especially so at the tertiary level, where the level of enrollment for females is much lower than that of males. In this regard, the educational levels and labour market outcomes will continue to dominate the interests of policymakers and researchers. Dynamics of the relationship between educational attainment and returns will have to be explored from different angles. This study contributes to this by focusing on gender and regional differences.

1.5. Outline of Research

The study uses a quantitative case study approach to investigate the relationship between education and earnings. The overall structure of the study takes the form of five chapters. The first chapter of the paper will be the literature review that examines existing literature on human capital and the correlation between education and wage earnings. Chapter three will consist of the methodology and some theoretical discussions. Chapter 4 will present data description, including details on the sources used, and the estimations and discussion of the results. Chapter 5 will conclude the study and suggest potential policy implications and future studies. The final part will be the reference list, followed by the Appendix section.

2.Literature Review

The importance of education outcomes in developing countries has been one of the most poignant topics of discussion and of relevance in achieving the United Nations Sustainable Development goals (United Nations, 2019). Despite the relatively few studies as a result of limitations on data, literature is increasing and continues to be compiled on the investments in education and the consequential returns in Sub- Saharan Africa (Barouni & Broecke, 2014; Fink & Peet, 2014; Michaelowa, 2000; H. A. Patrinos & Psacharopoulos, 2010; Psacharopoulos & Patrinos, 2018).

Jacob Mincer illustrates the theory of employment earnings for one's lifetime using a concave shape which will only change shape depending on the fall of investments overtime in an individual's work life (Mincer, 1975). The equation has been popularized in estimating and explaining the relationship between education and job earnings. Harry Patrinos in his analysis of the Mincer theory has emphasized the importance of the equation as it gives detailed estimates that can be useful in policy making strategies in several countries. He further states that, 'the mincer equation suggests that each additional year education provides a private (i.e. individual) rate of schooling' (H. Patrinos, 2016). Thus, policy makers and governments should fully utilize the results from the equation since they show how beneficial it is for an individual if the country expands resources on different education levels especially the higher degree or university level. In turn, this will allow for future planning on how to provide availability of restricted resources such as funding or student loan programs.

In estimating the returns to education in developing countries and using a household survey with samples between the year of 1985 and 2012, Fink and Peet (2014) reported 6.5 per cent of returns to education. Their results further show that returns are lower in the rural parts. Consistent with these results are findings in Patrinos and Psacharopoulos (2018) analysis 'which found that an additional year of education increases wages by 10 per cent in low income countries and that returns to female are lower than that of males. Depken et al., (2019) examine the returns to education to South Africa and employ the instrumental variable (IV) and ordinary least squares (OLS) model to their study. Their results report over 18 per cent returns with the highest increase recorded in the rural part of the country. The findings are consistent with existing literature investigating this relationship in different countries of the region (Alvi & Dendir, 2020; Foltz & Gajigo, 2012b;

Nikolov & Jimi, 2018; Shimada, 2016). Despite the recent findings by Patrinos and Psacharopoulos (2018) that returns have been decreasing in developing countries, evidence is provided in the literature for several countries in the Sub-Saharan region.

David Card, a major scholar in the field, explains that ‘the correct measure of education is the number of years of completed education; and second, that each additional year of schooling has the same proportional effects on earnings, holding constant years in the labor market’ (Card, 1999). In other words, education at any level throughout an individual’s life whether completed or uncompleted is an important determinant of wages in the labor market. More scholars (Blagg & Blom, 2018) researching on the returns to education argue that, despite the notion of higher education being a breakthrough and paying off for many, the returns are not constant and tend to change with time. Furthermore, with respect to education levels, Fink and Peet (2014) report the highest returns at tertiary level and the lowest at primary education level. Lassibille and Tan (2005) estimate the returns to education in Rwanda with the employment sector characterized as endogenous in their study. They find that, wages increase with an additional year of schooling. The results are consistent with more East African countries such as Kenya (Shimada, 2016), Tanzania (Nikolov & Jimi, 2018) and Ethiopia (Alvi & Dendir, 2020). With the Ugandan data, we will be able to explore this and find out if the competition of an education level matters.

Returns to females have differed across several studies. In assessing education returns in the Gambia, Foltz and Gajigo (2012) find surprising results indicating that the female gender earns 16 per cent less than males despite the high enrolment rates of females in education. Similarly, the female gender is worse off by earning 29 per cent less than males in South Africa (Depken et al., 2019). However, when they conduct their analysis on a rural urban dimension, females in the urban areas earn more (21 per cent) more than males compared to those residing in the rural areas who, earn 14 per cent less. More authors (H. A. Patrinos & Psacharopoulos, 2010; Psacharopoulos & Patrinos, 2004, 2018) have found similar results and this may indicate the presence of a gender wage gap.

Further literature continues to surface and explains that the type of program chosen also influences earnings. For example, an additional year of schooling such as a master’s in Social Work may be different from that of engineering (Kavuma et al., 2015). In most parts of Sub-Saharan Africa, the subject of mathematics is still a fear among many and thus, participation is very low in the subject.

However, with the rapid increase of technology and the quest to integrate into the global market, emphasis is starting to be put on the importance of sciences in education. As such, ‘one potential reason why parents invest relatively little in their children’s education is that they, or their children, may not be aware of the sizeable returns to education in the labor (Glewwe & Muralidharan, 2016). This provides evidence that parents do not also put many investments in the science programs especially in rural areas as they think it is not worth investing.

In addition, factors arise that affect the returns to education are institutions. By its nature, an developing countries’ institutions may not be effective enough in yielding progress. Policy implementation remains a challenge given that many developing countries have dysfunctional public institutions (Acemoglu et al., 2004). Although Psacharopoulos and Patrinos (2010) provide evidence that Sub-Saharan Africa as being one of the few regions with high returns to education, various issues arise in the long-term implementations of education policies in the region. One example is the fact that Africa is governed not only by political, but also cultural institutions that, may not entirely support the enforcement of education. Patriarchal beliefs tend to hinder the progress of both the education system and the labor markets. The importance of educating a male child in Africa, though reduced, is still heavily embedded in cultures across the region especially in rural regions. For generations, patriarchal systems continue to prevail on the continent that emphasize that the male child should be educated first. At the same time, females have been groomed to start families and be responsible for their household (Rossi & Rouanet, 2015). Such persistent cultural attitudes continue to hinder the progress of gender equality and girls’ education in the region. In several rural areas of the regions were households have six or more children with an unstable income or no presence of parent, critical decisions are made regarding which child goes to school. In most cases, assets are sold for the oldest child to get an education.

Usually, the female child is overlooked, and more focus is put on the male child (Baloyi & Manala, 2019; Nwokocha, 2007; Rossi & Rouanet, 2015; The World Bank, 2018). Thus, more investment must be directed to him since the female is only trained to take care of a home and expand her family. This in turn has increased birthrates due to ‘low levels of education, teenage pregnancy and prevailing cultural attitudes that justify the need for large families’ (UNESCO, 2015). Discussing the principle of education investments and its returns in Sub Saharan Africa requires gender discussion especially when it comes to discussing labor market outcomes. As said by the United

Nations in the Girl Education Initiative (UNGEI) ‘educating the girl child is educating a nation’ and doing this produces a significant effect on the returns to education and eventually, addressing different facets of poverty reduction.

The investment in education from early childhood is also fundamental in determining the later outcomes of child development (Heckman, 2000). The quality of education and the outcomes it produces in developing countries has been paramount subject of discussion and importance in achieving the United Nations Sustainable Development Goals. Scholars (Blagg & Blom, 2018) argue that, despite the subject of higher education being a breakthrough and leading to better life outcomes for many, the returns are not constant and tend to change overtime. Other authors have (Heckman et al., 2018; Psacharopoulos & Patrinos, 2004) highlighted that when explaining the returns to education, it is imperative to discuss the diversity of individual abilities such as cognitive and non- cognitive and that individuals should continue to add an additional year of schooling especially but, only if their returns exceed the cost of education. Heckman et al. (2016) gathered in their extensive study that having a high school diploma or a college degree increases the chances of an individual’s earnings and that, schooling has a significant causal effect on health and earnings. In the case of sub-Saharan Africa, such a statement does not fully hold since access to an additional year of schooling is restricted by high tuition costs and other factors and individuals usually are faced with a conundrum because the returns do not exceed the costs.

Years of schooling has had different effects in different parts of the world. For example, a variety of education levels are limited in the United States unlike in most European countries. The education system in some countries like Germany provides individuals with the option to continue into different streams of education or join the labour force after completing high school education. Vocational training tends to be dominant and well-paying in the developed regions, yet it is overlooked in most developing regions. The goal is to have a degree, and this study will show the difference. In Uganda, technical and vocational education training programs play a fundamental role for individuals who have various reasons of not attending higher education upon completion of primary and secondary schooling (UNESCO, 2014), yet they are often regarded inferior to university degrees.

The debate on whether school grades or credentials and years of schooling as a measure has become a rising subject of discussion, especially in the developed countries. The ‘sheepskin effect’ (Card,

1999) is a phenomenon which states that individuals with a higher academic qualification earn higher wages compared to those without similar qualifications. Yet, they have the same amount of knowledge and essential skills. The phenomenon is further explained by the ‘signalling’ effect which sums up the fact that having a university degree marks prestige and signifies the individuals has abilities that will be beneficial (Altonji & Pierret, 1998; Silles, 2008). Thus, this makes employers pay higher wages. Sub-Saharan Africa’s educational system have evolved since the post-colonial period. In most low paying jobs, having a high school diploma is required as a qualification. However, that means that you cannot advance to a better paying job because one lacks the additional qualifications required for a proper paying job. Thus, the emphasis of a college degree has become standard in most labour sectors of the African countries (Dolton & Silles, 2008). Furthermore, in the past ten years, having an additional college degree has become more coveted in the labour market for many countries and priority is given to those than individuals with a high school graduate diploma or some post- secondary school training. The knowledge economy has partly contributed to this bias towards university degrees. This has been defined as a feature that is evident of non- linearity which can be captured using the earnings function. However, this measurement of ‘a degree- based variable’ as explained by Card may make it challenging in estimating the variations in the relationship between education and wage differentials (Card, 1999).

The literature has not reached a harmony on the most important factors behind the education- wage variations in most developing countries. This is important given the reason in developing countries is different from the developed regions of the world, especially in respect to gender variations. Thus, this study uses the Ugandan data to adds to these discussions presented above. It does so by examining the relationship between education and wages in the formal and informal sectors along with gender, regional and rural/urban dynamics.

2.1. Human Capital Theory

The human capital theory underpins this study. With a young population, Uganda must maximize its human capital if it must develop in the future. The spillovers that human capital development has on the whole economy make expenditure on education a key necessity (Goldin, 2016). Through his foundation, Bill Gates has urged that *‘in the long run, your human capital is your main base of competition. Your leading indicator of where you’re going to be 20 years from now is how well you are doing in your education system’*.

One of the pioneering scholars in the study of Human Capital, Claudia Goldin has expounded on the importance of the topic as being indispensable life investment that benefits an individual and their environment (Goldin, 2016). She states that, ‘there are investments in people (e.g., education, training, health) and that these investments increase an individual’s productivity’ (Goldin, 2016). From this, we can infer that it is an investment of costs and pay-offs (returns). In accordance with Goldin (2016) more scholars (Agbebi, 2019; Hanushek, 2013; Osiobe, 2019) accentuate further of how investment in educating societies especially in developing regions like Sub-Saharan Africa is not only beneficial on an individual level but also, can improve quality of life of society and boost economic growth through increased productivity. Without this investment in individuals and societies, poverty will continue to be a burgeoning challenge that will continue to hinder the process of development and globalization. Human capital investment is also essential in technological progress. Goldin (2016) argues that escaping the Malthus trap is formed based on human knowledge which is a driver for lower fertility rates and increases in technology. In her analysis, she emphasizes that knowledge is a fundamental asset that has spillover effects due to increased skills that will eventually increase income and, ‘families are induced to have fewer and more highly educated children than a greater number of lower educated children’ (Goldin, 2016).

Though we can concur with this explanation of the benefit of human capital investment, we must keep in mind at the fact that it depreciates over time and this may lead to employee discrimination on the grounds of age. In Sub-Saharan Africa, many fear retirements, especially in the public sector due to lack of benefits such as social security which is not provided and in most cases. The pension given at the end of retirement is low, and if one has a big family, they are forced to invest it in their wellbeing from other means. This may lead to poverty due to lack of an income source, especially if it is a household of more than five people and only one person works as the only breadwinner. Institutional factors such as political and cultural systems especially in developing countries may hinder this progress of human capital development if not fully committed and effective in managing the optimal distribution of resources necessary for growth, stability, and poverty alleviation. The public schools tend to be dysfunctional along with other public service provision, which undercuts human capital development. An extreme example given often is how AIDs has led to the loss of the most educated in the labor markets due to lack of adequate health provision (Easterly, 2007). Thus, works on institutions and how they work have and continue to investigate how public institutions may evolve to improve service delivery, including quality education (Acemoglu et al.,

2004; Easterly, 2007). While access has improved the quality of education in several developing regions continues to be a challenge (Goldin, 2016).

2.2. Previous Research

Because Uganda is in one of the most fertile regions of Africa along the equator, the country is heavily relied on farming. Hence, agricultural productivity is affected by education in that, the more the level of education for the farmer, the higher the productivity and quality, indicating evidence of returns to education for farm production. For a country like Uganda, the World Bank (2019) advises that Uganda must channel resources into the education sector and must adopt a 'dual priority approach' aimed at understanding and expanding schooling at all levels.

So far, scarce literature on returns to Uganda has surfaced. Liang (2002) praises Uganda as one of the few African success stories because of effective intervention and policies by the government in improving the country's economy, particularly in the education sector. As primary education has been exceptionally protuberant compared to postsecondary education due to the 1997 decision by President Yoweri Museveni to eliminate primary school fees 'for up to four children per family (Liang, 2002). However, by overlooking the post-secondary education in the country, he laments that this could affect opportunities and the ability for the young to participate in society.

Cuaresma and Ragg (2011) use two data sets from the same survey, UNHS 2002/03 and UNHS 2005/06 to highlight the variation of returns to education across subnational regions of Uganda. Their results report average returns to schoolings increased to about 10% using the UNHS 2002/03 data and 8.35% for the UNHS 2005. They also find a pattern of rapid convergence in returns to education only in urban areas and not in the rural areas which constitute much of Northern Uganda, signifying that quality of education plays a significant role in returns to education. Furthermore, they report that due to the spread of UPE across the country, 15% of employed individuals in the labor force between the ages of 14 to 24 had a completed education. However, the number increased in using the 2005/06 data to 31%.

Lekfuangfu et al. (2012) develop their research framework by drawing from two different surveys, the Uganda National Household survey (UNHS) 2005/06 and the Uganda National Panel Survey (UNPS) 2009/10. Their results report that having a higher level in education has a positive effect and significantly raises wages in Uganda. Therefore, both data from the two surveys illustrate that

the returns to education are very significant in the country. Additionally, they find variations in educational earnings differentials connected to gender and location.

In recent existing literature by Kavuma et al. (2015) employ the Mincerian function in order to understand the relationship of returns to education between those employed in the labor market and the self- employed population who, make up a significant number of the labor force in Uganda. They found that returns are high for both the wage employed and self- employed and a wide gender gap in the employment sector compared to the self- employed. The research to be conducted aims to investigate the relationship between education and earnings in Uganda. Different variations will be explored and more focus will lie in the gender- wage distribution and the returns in the urban/rural areas and at the regional levels of the country to give a better understanding on the education- earnings variations in the country.

3. Methodology

3.1. Research Approach

In this chapter, the focus is on the empirical methodology used in estimating the relationship between wages and education is discussed. As stated, the objective of the study is to determine the relationship between education and earnings. Thus, the study will employ a quantitative method based on the Mincerian wage function.

3.2 Mincerian Earnings function

The Mincerian function defines earnings as a function of schooling and employment experience in the labour market. Therefore, it gives the average returns of an additional year of schooling. Monthly wages or earnings are used as the dependent variable. In the case of this study, we use the salary in the last month (log wage) due to the lack of data on weekly and hourly wages, which are usually used in this type of studies.

Since this study will be utilizing the earnings function, our dependent variable, which is earnings, will be expressed in logarithmic log form. This is because our investment variables (education) is recorded in terms of years in school schooling and experience. The regression to be run takes the following form;

$$\mathbf{Log Wage}_i = \alpha_i + \beta_1 \mathbf{EDUCATION} + \beta_2 \mathbf{AGE}_i + \beta_3 \mathbf{AGESQUARED}_i + \theta \mathbf{X}_i + \varepsilon_i$$

Where i is the individual, α (alpha) the intercept, β (beta) being the coefficient or parameter to be estimated. *Education* is the number of years completed by an individual. The variable *AGE* represents the age of an individual, and *agesquared* captures the effect of increased experience and schooling, which should eventually yield less and less returns in the labour market. The study expects that as a person gets older, his experience helps in earning more but this relationship changes at some point, for example, at retirement age. This is because as a person gets older, his ability declines and thus his marginal productivity, hence a decline in wage. The variable X_i represents the vector of controls used in the model. These include controls, which are mainly dummies capturing aspects such as gender, marital status, regional dummies and rural/urban dummies. The study seeks to investigate whether the area in which an individual lives in has an

effect on wages. This is captured by including a dummy variable urban, which captures whether the individual resides in urban areas or rural areas. The regional differences will also be explored in the model given that Uganda has four main regions.

The equation implies that the wages will increase for each additional year of schooling; however, the net investments in experience will decline because of falling per centage for each year of experience. Though the Mincer function has been the model utilized in explaining the returns to education, Patrinos (2016) points that limitations arise from using the equation such as the ‘assumption that returns to experience are the same at all levels of education’ (H. Patrinos, 2016). In our research, we will test to see if whether our results prove this assumption otherwise.

The paper will follow the order of a cross-sectional analysis, and the data used to model education returns is linearly specified. In her description and analysis of the cross-sectional studies, Kate Levin explains that the study is descriptive in nature and usually contains surveys and observations from population subgroups (Levin, 2006). Essentially, other than being commonly used in the medical field, cross-sectional analysis is also used in population-based surveys (Setia, 2016). Levin (2006) further states that ‘the purpose of such studies study is to find the prevalence of the outcome of interest, for the population or subgroups within the population at a given point’ Cross-sectional studies have been conducted for complex nature of cases in research, making them more reliable (Levin, 2006; Patrinos, 2016; Setia, 2016).

4.Data

4.1 Data sources and description

The data of the study is derived from the Uganda National Panel Survey (UNPS) 2015/16 under the Uganda Bureau of Statistics and sourced from the World Bank Database (The World Bank, 2018). Since we will be doing a cross-section study, the UNPS is a diverse compilation of measurements on household survey and is ideal in assessing the correlation between education and earnings in the country. The 2015/16 data is a current survey that joins the list of previous other data collections such as the 2010/11, 2011/12 and 2013/14, respectively. The survey is conducted in what is called a wave which is essentially over twelve months and consists of six questionnaires: household, gender, agriculture and household, community, and the market questionnaires. In this case, the surveys are recorded at the national, rural-urban and regional levels of the country. This allows this study to delve into its core aims of investigating the relationship between education and earnings focusing on gender, regional and rural-urban dynamics. The primary investigators (UBOS) are affiliated with the Ministry of Finance, Planning and Economic Development. The Ministry worked in hand with the World Bank to do the surveys. In collecting the data, a series of interviews were conducted during the sampling procedure, which was done in a manner that ensured a nationally representative dataset. In all the sample areas, teams consisting of enumerators and were dispatched to collect the data and questionnaires were used encompassing different survey instruments.

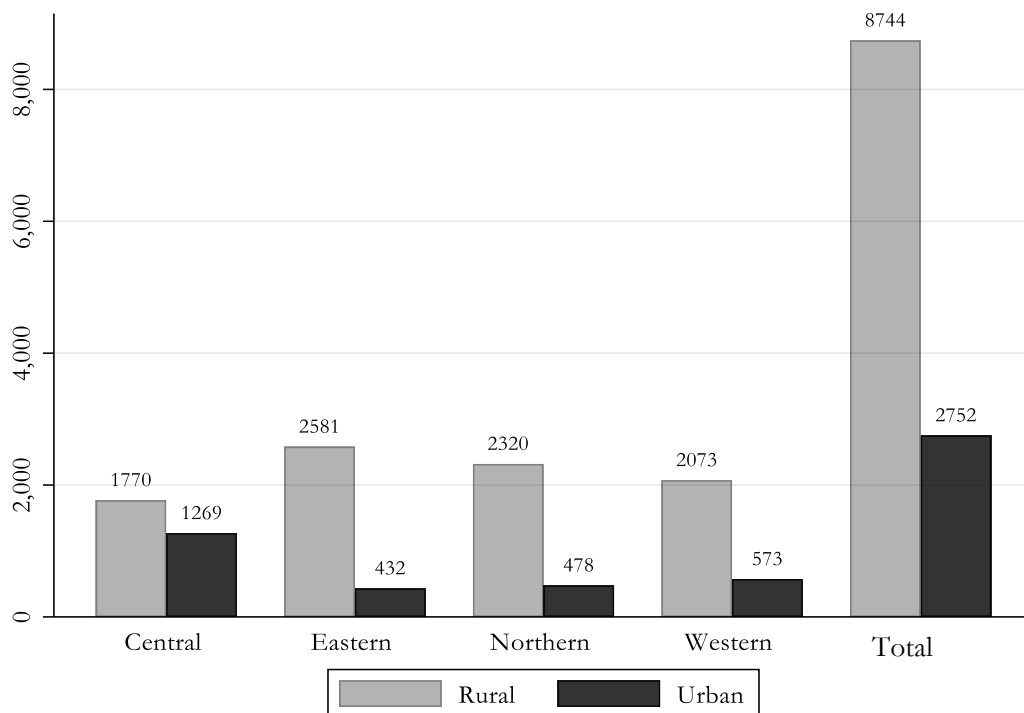
Our interest lies in the household questionnaire that consists of various variables at the individual level. The study utilizes the general information on household members (education, labour-force status, health, marital status, age, household assets, availability of resources, geographical location such as national and sub-regional and, residence (rural or urban). Since we restricted our data to the variables we will be using for the research, our subsample consists of people who are employed formally and those who are self-employed. The main variables are described in table 4.1 below.

Table 4.1: List of Variables descriptions

| Variable | Variable Description |
|--------------|---|
| Education | Years an individual was in school |
| LogWage | Log of reported monthly income |
| Urban (1/0) | Rural/urban dummy |
| Age | Age in years |
| Agesquared | The squared Age variable to capture diminishing returns on income as a person approaches retirement |
| Female(1/0) | Dummy indicator with value one if female and 0 otherwise. |
| Region (1-4) | The four Ugandan administrative regions |
| Female(1/0) | Dummy indicator with value one if female and 0 otherwise |
| | |

Source: Uganda Bureau of Statistics (2018): LSMS data National Panel Survey 2015-2016. World Bank

Figure 4.1 The regional distribution of the sample used



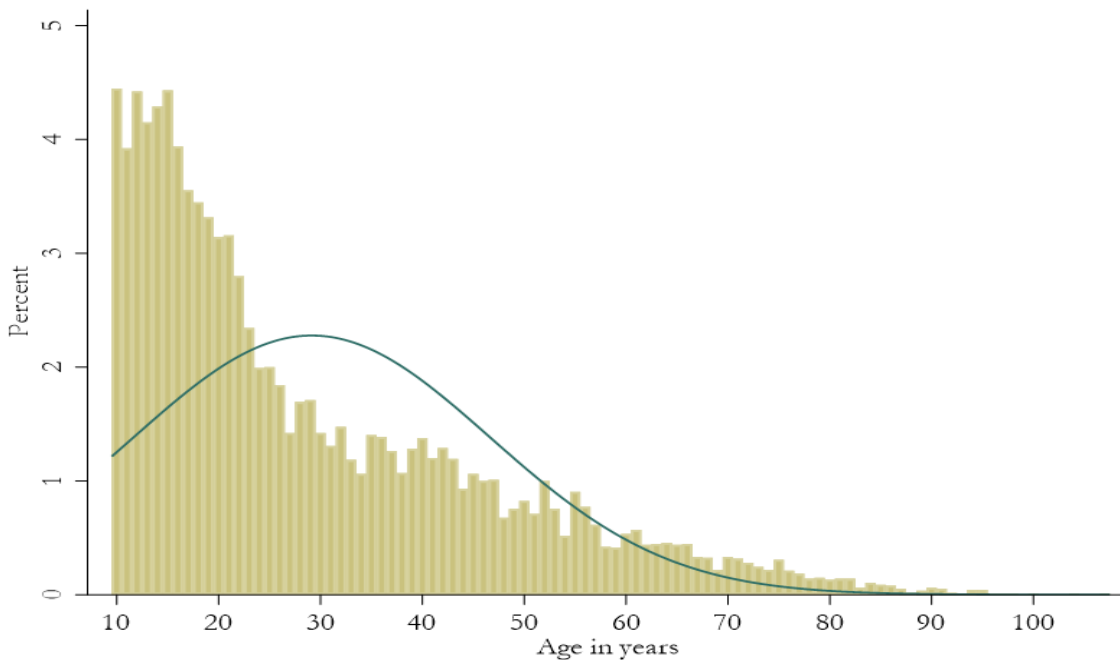
Source: Uganda Bureau of Statistics (2018)

Figure 4.1 shows that the sample used from the survey mirrors Ugandan population dynamics within the rural-urban areas in the four regions. As previously discussed above, 70% of Uganda’s population lives in rural areas. It is clear from Figure 4.1 that the picture is true for most regions except for the Central region, where the rural-urban divide is not very big. This is to be expected since this is where Kampala, the capital, is based. Table 4.2 below shows the schooling variable we are interested in, tabulated across the different regions of Uganda. It is also clear that for the people we are interested in, the working population, the central region has the biggest number.

Table 4.1: school attendance by region

| Has [name] ever attended any formal school? | Region | | | | Total |
|---|--------------|--------------|--------------|--------------|---------------|
| | Central | Eastern | Northern | Western | |
| Never attended | 131 | 203 | 433 | 225 | 992 |
| Attended school in the past | 1,804 | 1,544 | 1,478 | 1,490 | 6,316 |
| Currently attending school | 1,103 | 1,263 | 886 | 921 | 4,173 |
| Total | 3,038 | 3,010 | 2,797 | 2,636 | 11,481 |

Figure 4.2 Uganda age distribution



Source: Data from the Uganda Bureau of Statistics (2018)

Figure 4.2 shows the distribution of the Ugandan population. The table shows that the young population between the age of 10 and 25 make up most of the national population. This gives more urgency to the question of education and its role in the future of this young population. Above 25, the population starts to decrease and further declines after 60 years. The table may also be explained in terms of education and experience. However, since the percentage of the population is high between the age of 10 and 16, the individuals at ten years are most likely in primary education; thus, they cannot be counted into the labour market as wage earners since they are either in primary or secondary school. As one gets older, the distribution of the population reveals an active labour force, especially between the age of 19 and 50 years, emphasizing the high concentration of human capital among the youth group. The figure will thus assist in explaining the returns to education at different levels of education in one of our models.

4.2. Estimations

In this research, our main variables are education (years in schooling), wage earnings, experience, gender, and urban location. Age and age squared will be used as a proxy for experience and will be interpreted together. Since the objective is to determine if education has an impact on earnings, we modelled schooling with the log of wages and other control variables. Thus, we estimate education returns with age, gender, urban, and age squared as a proxy for experience.

5. Results

The section analyses the interpretations of the OLS results. Table 1 below summarizes the main relationship between education and earnings. This baseline model seeks to establish a general relationship together with the rural-urban divide.

Table 4.1. The relationship between education and wage outcomes, with the urban-rural divide.

| VARIABLES | (Whole sample) | (Urban) | (Rural) |
|--------------|---------------------------|--------------------------|---------------------------|
| | lwage | lwage | lwage |
| Education | 0.169*** (0.00734) | 0.170*** (0.0122) | 0.158*** (0.00985) |
| Age | 0.113*** (0.0174) | 0.0951*** (0.0331) | 0.109*** (0.0203) |
| Agesquared | -0.00104*** (0.000217) | -0.000740* (0.000418) | -0.00101*** (0.000251) |
| Female (1/0) | -0.101 (0.0896) | -0.00202 (0.123) | -0.279** (0.136) |
| Constant | 6.767*** (0.305) | 7.084*** (0.570) | 6.913*** (0.359) |
| Observations | 1,073 | 477 | 596 |
| R-squared | 0.412 | 0.403 | 0.366 |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Given the results from table 4.1, the differences in the returns to education between the three columns is very small. In column 2 (whole sample), an additional year in schooling yields about a 17 per cent increase in wages in Uganda. Additionally, the wage- gap for rural-urban employees in

the labour force is large. The results also indicate that age significantly impacts wages in all columns. In terms of age, as one grows older, their skills and experience increase, allowing them to earn more. The OLS model reveals that experience (which, is proxied by $agesquared$) is a very significant determinant of wages in Uganda. The older an individual gets; their wages increases but this relationship is not permanent as the variable $agesquared$ shows a negative sign. At some point, the ability of individuals starts to decline as their productivity also falls. As people get closer to the retirement age, the relationship changes since returns to education start to diminish. The less returns to education over time is due to the depreciation in human capital. This is consistent with the Mincerian function's fundamental arguments from Mincer (1975) and subsequent studies (Crespo Cuaresma & Raggl, 2016; Foltz & Gajigo, 2012b; Kavuma et al., 2015). The OLS results further reveal a small difference in returns for the $agesquared$ among the three models. $agesquared$ shows that as one gets older, additional education yields less and Urban areas (column 3) yield returns at (17%) slightly different from the rural areas, which yield 16%. As expected from theory, urban centres have more competition and more opportunities, making the returns to education higher, compared to the rural areas because of factors such as literacy rates and lack of proper educational facilities (Depken et al., 2019). The majority of the paying jobs are in urban areas, and this attracts the most able people to migrate. Given the results of the OLS model, a conclusion can be reached that returns are high in both the urban and rural areas of Uganda and that having an additional year of schooling yields high returns in both the urban and rural area. In terms of gender, the table reveals that rural females are worse off by earning approximately 28% less than their male counterparts emphasizing the presence of a gender- wage gap consistent with the result findings by Kavuma et al., (2015) in their analysis of returns to education in Uganda.

Table 4.2 below explores the returns to education at regional differences. The OLS estimate on the returns to education are positive and very significant and reveal that a one per cent increase in the years of schooling in the sub-regions of Uganda yield over 15 per cent in all four major regions. Like table 4.1, wages rise with age but at a decreasing rate ($AGESQUARED$). Females are still worse off with the lowest reported earnings in the Western region, where they earn approximately 15 per cent less than men. However, the variable is not significant in this model compared to table 1, with the highest wage inequality reported in rural areas.

Table 4.2. Regional differences

| | (Central) | (Eastern) | (Northern) | (Western) |
|---------------|----------------------------|--------------------------|---------------------------|---------------------------|
| VARIABLES | lwage | lwage | lwage | lwage |
| Yearsinschool | 0.176*** (0.0116) | 0.167*** (0.0193) | 0.177*** (0.0194) | 0.158*** (0.0139) |
| age | 0.102*** (0.0212) | 0.138*** (0.0465) | 0.127*** (0.0398) | 0.0952*** (0.0365) |
| agesquared | -0.000789*** (0.000247) | -0.00136** (0.000568) | -0.00128*** (0.000477) | -0.000935** (0.000460) |
| Female | -0.0918 (0.133) | -0.0717 (0.223) | -0.0887 (0.233) | -0.153 (0.184) |
| Constant | 6.761*** (0.388) | 6.123*** (0.779) | 6.473*** (0.697) | 7.512*** (0.661) |
| Observations | 440 | 218 | 149 | 266 |
| R-squared | 0.448 | 0.384 | 0.467 | 0.362 |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4.3 below reports the returns to education at different schooling levels using the same set of variables in the Mincerian function. This is one of the key results as it traces what the implications of completing or not completing primary school, secondary schooling and other stages up to university level are. The table shows that returns to education for individuals with completed and uncompleted primary are insignificant despite showing that even a completed primary level begins to show better coefficient (0.03) compared to 0.003 which corresponds to unfinished primary schooling. The results also indicate that investments in education are rewarding at all levels of education, including those with an uncompleted primary education. According to Kavuma et al., (2015), more benefits accrue to an individual as they move up the ladder of educational attainment, but the lower levels may only help in basic literacy. As the individual completes a level of schooling, their returns begin to rise. This is in line with the results reported by Patrinos and

Psacharopoulos (2018) whose studies reveal lower returns at primary level and explain this finding because of primary education being reached in many countries. Similarly, our study reasons that, with the UPE being able to reach significant levels of the population, investments are starting to shift to the other levels that have lower education attainment. The table further shows this increase returns from secondary (5 per cent), high school (9.4 per cent) and post-secondary training (15 per cent) and university degree yielding the highest (27.4 per cent). Earnings still increase with age at all levels of education with a sharper and noticeable rise after completing a secondary school level. The results are also telling for the females who appear to be worse off at lower levels of education. This is unfortunate, given that the enrolment rate is higher among females. This also points to gender wage gaps in Uganda, as observed in other parts of the African continent (Crespo Cuaresma & Raggl, 2016; Foltz & Gajigo, 2012a). The problem must partly deal with societal and cultural norms which bring barriers and different forms of discrimination. The urban dummy is significant even at lower levels of education. Residing in an urban area also increases earnings regardless of whether an individual has completed their primary education or not. The urban dummy is not significant only for those with university degrees given that earnings standards tend to be similar, and those who take rural jobs may likely get similar or even higher earnings through different allowances.

Table 4.3 Different levels of education and corresponding returns

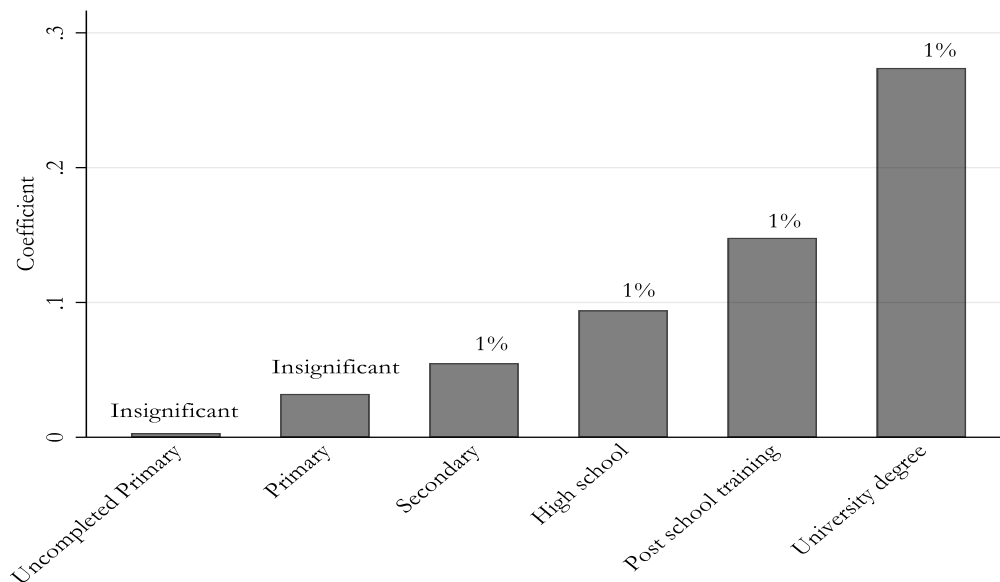
| VARIABLES | (Uncompleted Primary) | (Completed Primary) | (Secondary) | (High School) | (Post S. training) | (Uni Degree) |
|-------------|---------------------------|---------------------------|----------------------------|----------------------------|----------------------------|---------------------------|
| | lwage | lwage | lwage | lwage | lwage | lwage |
| Education | 0.00315 (0.0456) | 0.0322 (0.0339) | 0.0550*** (0.0178) | 0.0942*** (0.0126) | 0.148*** (0.00842) | 0.274*** (0.0460) |
| age | 0.0871*** (0.0280) | 0.0788*** (0.0237) | 0.0796*** (0.0206) | 0.0892*** (0.0208) | 0.109*** (0.0177) | 0.151*** (0.0388) |
| agesquared | -0.000921** (0.000376) | -0.000752** (0.000312) | -0.000722*** (0.000264) | -0.000825*** (0.000268) | -0.000995*** (0.000222) | -0.00151*** (0.000457) |
| Female(1/0) | -0.309* (0.186) | -0.341** (0.158) | -0.311** (0.142) | -0.252** (0.128) | -0.109 (0.0983) | -0.143 (0.127) |

| | | | | | | |
|--------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Urban(1/0) | 0.432** (0.182) | 0.381** (0.150) | 0.383*** (0.130) | 0.350*** (0.117) | 0.213** (0.0938) | 0.0484 (0.148) |
| Constant | 8.261*** (0.509) | 8.245*** (0.430) | 8.075*** (0.373) | 7.670*** (0.362) | 6.931*** (0.311) | 4.503*** (1.178) |
| Observations | 320 | 451 | 574 | 727 | 980 | 259 |
| R-squared | 0.065 | 0.073 | 0.097 | 0.155 | 0.338 | 0.229 |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Figure 4.3 Coefficient plot of returns to education by levels completed



Source: Data from the Uganda Bureau of Statistics (2018)

The summary statistics results in figure 4.3 above represent the coefficient plot of returns to education by levels completed as in table 4.3. The figure gives a more vivid picture and reveals that completing primary education only does not help much in terms of returns. Only secondary school begins to count in Uganda. This is very evident in other sub-Saharan African countries where having a university degree in the labour force is much more coveted by the employer and raises a person's earnings since it is assumed that the individual has more skills(Crespo Cuaresma & Raggl, 2016; Foltz & Gajigo, 2012a). Table 4.4 shows returns to education for the self-employed

people. A clear picture from this is that education still matters even for self-employment. The urban dummy is also significantly higher. The female dummy is not significant.

Table 4.4 Education returns to self-employment

| VARIABLES | (Whole sample) lwage(self) | (Central) lwage(self) | (Eastern) lwage(self) | (Northern) lwage(self) | (Western) lwage(self) |
|---------------|-------------------------------|--------------------------|--------------------------|---------------------------|--------------------------|
| Yearsinschool | 0.0929*** (0.0134) | 0.0869*** (0.0179) | 0.105*** (0.0360) | 0.114*** (0.0375) | 0.0837*** (0.0235) |
| age | 0.0366 (0.0390) | 0.00386 (0.0720) | 0.0291 (0.0742) | 0.00233 (0.0945) | 0.0283 (0.0839) |
| agesquared | -9.96e-05 (0.000499) | 0.000516 (0.000983) | -3.19e-05 (0.000926) | 0.000437 (0.00128) | -0.000165 (0.00100) |
| Female | | 0.0627 (0.236) | 0.148 (0.361) | 0.134 (0.433) | -0.384 (0.255) |
| urban | 0.706*** (0.154) | 0.418 (0.263) | 1.143*** (0.329) | 0.754 (0.499) | 0.365 (0.308) |
| Constant | 7.787*** (0.685) | 8.531*** (1.245) | 7.019*** (1.204) | 7.655*** (1.560) | 8.993*** (1.584) |
| Observations | 386 | 122 | 91 | 64 | 109 |
| R-squared | 0.244 | 0.294 | 0.298 | 0.253 | 0.168 |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4.4 estimation results also tally with observations from Kavuma et al., (2015) who observed similar patterns for Uganda other African countries.

The tables A1 to A3 in the appendix deals with post estimation and some robustness testing. The study shows that the relationship of interests, education and wages, is still significant to the inclusion of additional variables such as the availability of treated mosquito net (trtnet) and time spent on domestic work (domesticwork). Thus, degree holders have a higher wage than at any level of schooling in all regions and urban-rural locations of the country despite reporting significance at all levels, including those with an uncompleted primary education. Being female in the workforce still makes one worse off in terms of earnings relative to the males. Having a treated mosquito net is also important in the Eastern region, which, maybe prone to malaria and thus, affect productivity and overall earnings due to health issues.

It is important to acknowledge the limitations of the estimations done in the study. With OLS, endogeneity remains a potential issue. This does not necessarily mean an instrumental variable would yield different relationships but the magnitude of the percentage increases in wages (Trostel, 2005). The second limitation is that the data used does not have hourly wages, which are ideal in this kind of study. (Trostel, 2005). The other issues are with regards omitted variables in that other factors might explain the relationship between education and earnings that may not be included, such as ability or wealth (Ramcharan, 2020). This data could not be found for the study. The available father's education and mother's education suffer from missing values. The study could not include parental income or household wealth. Notwithstanding these issues, the study has managed to address its aim of understanding education and wages through the dimensions of gender, rural-urban and regional differences in Uganda.

6. Conclusion

This study aimed to investigate the returns to education in Uganda using the Mincerian ordinary least squares (OLS) function. Sub aims were mainly to explore this relationship along with gender, urban/rural, and regional dimensions. The main finding of the study reveal that education returns are positive and very significant in Uganda and that, the differences in returns to schooling between sub- regions and rural/urban are generally quite small. Having an uncompleted primary education yields positive returns as all other levels of education and returns increase for individuals who possess additional education completion. The females are consistently worse off in comparison to their male counterparts. The wage gap is more prevalent for all years in schooling and training, but it is insignificant for those with university degrees.

The rural-urban differences imply that those in urban areas fare better than their rural counterparts. This phenomenon also justifies the tendency for rural to urban migration observed across Africa. Development cannot be achieved if only one side (the majority) of the population do not have access to educational resources that can further alleviate poverty and improve living standards. Furthermore, as mentioned earlier, Uganda aims to reach middle-income status by 2020. This can only be reached if most of the population (who live in rural areas) have access to all opportunities that will stimulate human capital. Self-employed people's wages also reveal the same relationship

in returns, proving education is still relevant for entrepreneurship in Uganda and not only restricted to wage employment.

Given our results, having an uncompleted or completed education, is very important in developing countries of Sub-Saharan Africa such as Uganda. Policy implications can be drawn from this study. The Ugandan government needs to continue meeting the needs for human capital investment not at the lower levels of education but more importantly, at the higher levels where returns are higher. Furthermore, poverty cannot be eliminated if education programs and subsidies are not fully extended to rural community areas. This is relevant, especially for the females who seem to bear the burdens of lower returns at lower levels of educational attainment. These differences are attributed to the gender wage gap that we have observed among employees. This is consistent with the findings after estimating returns to education for the self-employed in the main regions of the country. Although returns are high for those who are self-employed, female entrepreneurs still earn less than self-employed men despite the females having completed some level of education. Future studies need to be conducted in this area of research, especially in focusing more on the factors that are increasing the wage gap in Uganda despite the high returns to schooling. The policy also needs to address gender wage discrimination in the workforce by increasing female opportunities in the labour market and empowerment programs that will allow them to complete all levels of education.

Overall, the results presented in this paper report positive returns to education in Uganda and that having any level of education pays off later in an individual's life for those who have invested in a Ugandan education. Given the rapid rise of technological innovations and economic growth in the country key policy should be implemented that will increase the investment of human capital especially in the rural areas.

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Appendix

Table A1. Further controls with the urban-rural divide

| VARIABLES | (Whole Sample) | (Urban) | (Rural) |
|---------------|---------------------------|-------------------------|---------------------------|
| | lwage | lwage | lwage |
| Yearsinschool | 0.170*** (0.00757) | 0.171*** (0.0127) | 0.160*** (0.00994) |
| age | 0.117*** (0.0187) | 0.0931*** (0.0346) | 0.114*** (0.0220) |
| agesquared | -0.00109*** (0.000230) | -0.000710 (0.000433) | -0.00107*** (0.000266) |
| Female | -0.0885 (0.106) | -0.0780 (0.136) | -0.147 (0.168) |
| trtnet | 0.287 (0.247) | -0.173 (0.602) | 0.388 (0.252) |
| domesticwork | -0.000730 (0.00506) | 0.00742 (0.00580) | -0.0128 (0.00812) |
| Constant | 6.670*** (0.337) | 7.065*** (0.608) | 6.790*** (0.403) |
| Observations | 1,073 | 477 | 596 |
| R-squared | 0.412 | 0.405 | 0.369 |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A2 Regional differences with more controls

| VARIABLES | (Central) lwage | (Eastern) lwage | (Northern) lwage | (Western) lwage |
|---------------|----------------------------|--------------------------|---------------------------|--------------------------|
| Yearsinschool | 0.176*** (0.0120) | 0.171*** (0.0199) | 0.179*** (0.0194) | 0.155*** (0.0145) |
| age | 0.105*** (0.0223) | 0.144*** (0.0487) | 0.137*** (0.0435) | 0.0950** (0.0382) |
| agesquared | -0.000819*** (0.000258) | -0.00141** (0.000591) | -0.00140*** (0.000507) | -0.000916* (0.000475) |
| Female | -0.151 (0.157) | 0.0508 (0.269) | 0.0342 (0.301) | -0.172 (0.204) |
| trtnet | 0.227 (0.399) | 1.102* (0.627) | 0.353 (0.457) | -0.300 (0.296) |
| Agrictime | -0.00301 (0.0103) | 0.0127 (0.0153) | 0.0182 (0.0282) | -0.00630 (0.00821) |
| domesticwork | 0.00649 (0.00702) | -0.0125 (0.0137) | -0.00815 (0.0164) | 0.00306 (0.0117) |
| Constant | 6.655*** (0.421) | 5.950*** (0.831) | 6.248*** (0.820) | 7.543*** (0.704) |
| Observations | 440 | 218 | 149 | 266 |
| R-squared | 0.450 | 0.392 | 0.472 | 0.364 |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Post Estimation Results

To determine the adequacy, reliability and consistency of the models, several estimation tests pre and post, our analysis were conducted to determine if the base satisfies all the assumptions of the OLS model. The tests conducted and their results are illustrated in the table below.

Table A3 Test Results

| TEST FOR | P - VALUES | RESULTS |
|--|------------|------------------|
| White's test for homoskedasticity: HO: constant variance | 0.2781 | Homoskedasticity |
| | | |

| | | |
|---|---------|---|
| Model specification: Ramsey RESET test, HO: Model correctly specified | 0.2656 | Model correctly specified |
| | | |
| Shapiro- Wilk W test for normal data | 0.00005 | Normality is met: Error term normally distributed |