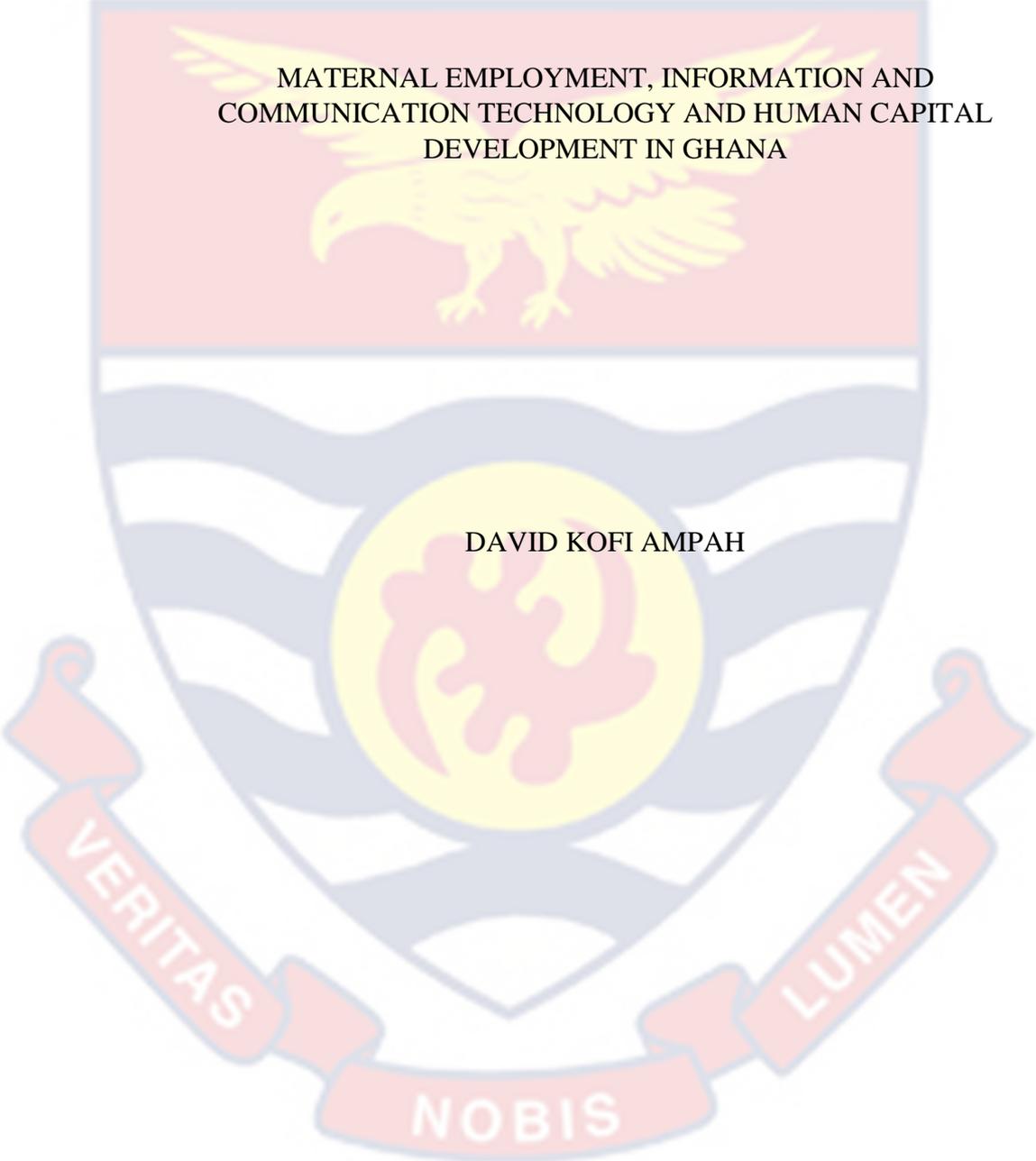UNIVERSITY OF CAPE COAST

MATERNAL EMPLOYMENT, INFORMATION AND
COMMUNICATION TECHNOLOGY AND HUMAN CAPITAL
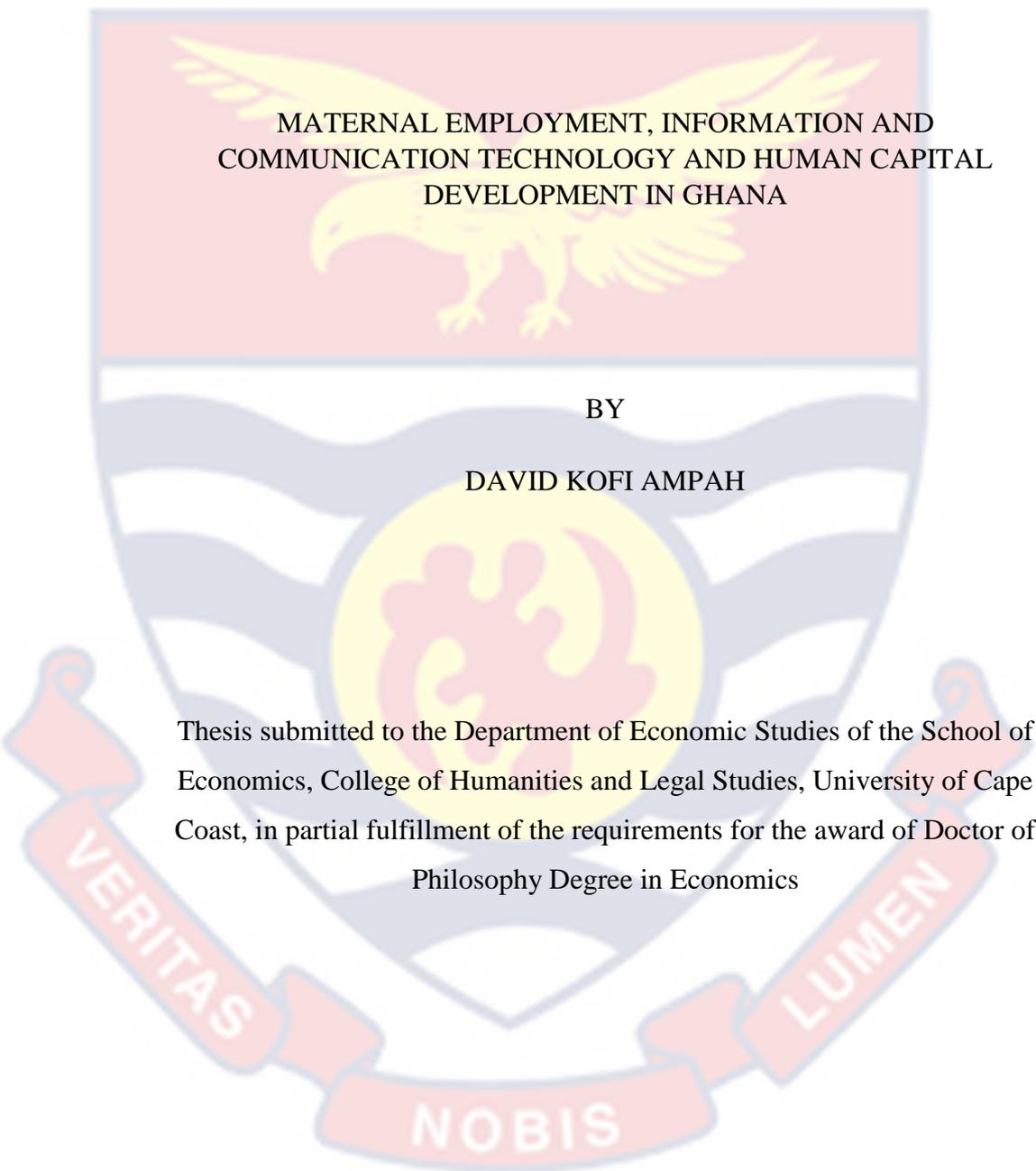DEVELOPMENT IN GHANA

DAVID KOFI AMPAH

2023

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MATERNAL EMPLOYMENT, INFORMATION AND
COMMUNICATION TECHNOLOGY AND HUMAN CAPITAL
DEVELOPMENT IN GHANA

BY

DAVID KOFI AMPAH

Thesis submitted to the Department of Economic Studies of the School of
Economics, College of Humanities and Legal Studies, University of Cape
Coast, in partial fulfillment of the requirements for the award of Doctor of
Philosophy Degree in Economics

AUGUST 2023

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original research work

and that no part of it has been presented for another degree in this University

or elsewhere.

Candidate's Signature: …………………………… Date: ………………

Name: David Kofi Ampah

Supervisors' Declaration

We hereby declare that the preparation and presentation of this thesis were

supervised in accordance with the guidelines on supervision of thesis as laid

down by the University of Cape Coast.

Principal Supervisor's Signature: ……………………. Date: ……………..

Name: Prof. Ferdinand Ahiakpor

Co-supervisor's Signature: ………………………….. Date: ……….……

Name: Dr. Francis Kwaw Andoh

ABSTRACT

This thesis examined the nexus between employment, household human capital development and information and communication technology (ICT). The motivation is to examine whether maternal employment could be encouraged without compromising human capital development. Using the Ghana Living Standards Survey round 7, the study investigated the role of ICT in the link between maternal employment and healthcare utilisation and the intention not to stay in current job and children grade progression. The effect of ICT skills on employment, and the intention not to stay in current job was examined. Probit, bivariate probit, Ordinary Least Squares, Instrumental Variable and Propensity Score Matching techniques were used to estimate the models. It was found that, mothers employment decreases healthcare utilisation and it is pronounced for rural households. Households with working mothers who use smartphones and/or have ICT skills are associated with higher utilisation. Mothers' intention to quit their current job negatively affect grade progression but ICT use and access is linked to positive grade progression for urban households. ICT skills positively influences employment for both males and female but higher for females. Literacy and financial inclusion are channels through which ICT skills affects employment. ICT skills also affects the intention to stay in a job particularly for females. The study recommends the Ministry of Communication and Digitalization to prioritize ICT education for females and promote the innovation of ICT products and services that will enhance female employment and reduce the adverse effect of mother's employment on household human capital development.

KEYWORDS

Grade progression

Healthcare utilization

Information Communication Technology

Intention not to stay in current Job

Maternal Employment

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DEDICATION

To my beloved wife Esther Nana Amonua Ocran

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LIST OF ACRONYMS

ARDL	-	Autoregressive Distributed Lag
ATET	-	Average Treatment on the Treated
FLFP	-	Female Labour Force Participation
GLSS	-	Ghana Living Standards Survey
GMM	-	Generalized Method of Moments
GoG	-	Government of Ghana
GPA	-	Grade Point Average
GSS	-	Ghana Statistical Service
HCI	-	Human Capital Index
ICT	-	Information and Communication Technology
IFC	-	International Finance Corporation
ILO	-	International Labour Organisation
IMF	-	International Monetary Fund
IRCG	-	International Country Risk Guide
IPWRA	-	Inverse Probability Weighted Regression Adjustment
IV	-	Instrumental Variable
JHS	-	Junior High School
LFPR	-	Labour Force Participation Rate
MoCD	-	Ministry of Communication and Digitalisation
MoE	-	Ministry of Education
MoELR	-	Ministry of Employment and Labour Relations
MoGCSP	-	Ministry of Gender, Children, and Social Protection
MoH	-	Ministry of Health

NASEM	-	National Academies of Sciences, Engineering, and Medicine
NHIS	-	National Health Insurance Scheme
OLS	-	Ordinary Least Squares
PSU	-	Primary Sampling Units
SDGs	-	Sustainable Development Goals
SHS	-	Senior High School
UHC	-	Universal Health Coverage
UNDP	-	United Nations Development Programme
UNESCO	-	United Nations Education Scientific and Cultural
UNICEF	-	United Nations Children Emergency Fund

CHAPTER ONE

INTRODUCTION

Maternal employment is an important welfare tool known to improve mothers', and children's quality of life (Ghanbari et al., 2017), reduce domestic violence for women (Winkler, 2016), and reduce poverty (Stier & Lewin, 2002) through resource complementation (Kuhn & Ravazzini, 2017). It also provides fiscal space for household budget, enhances nutrition and health (Sangwan & Kumar 2021), increases education expenditure (Becker & Tomes, 1979; Orkoh, 2018; Suleiman et al., 2012) and empowers women to participate in decision-making in the household (Zaky et al., 2014; Anik et al., 2021, Ahmmed, 2021).

Concerns have been raised with respect to the negative effect of maternal employment on household welfare (Johnston et al., 2018), due to time trade-off (Lele, 1986; Komatsu et al., 2018) and because the time women spend outside the home is not complemented by their male counterparts (Cawley & Liu, 2007). Besides jobs are becoming more intricate, and job responsibilities at work have become bigger and stressful to some individuals (Conte et al., 2019) which could make them dissatisfied in their jobs (Berger, 2018). Greenhaus and Beutell, (1985) suggest that this frequently cause work-family conflict in cases where work hinders, time and obligations of the towards the family.

Though the autonomy hypotheses and relative resource hypotheses predict a negative relationship among women's earnings and their participation in domestic work, gender-based theories suggest that women who earn much more or as much as their spouses could continue to be

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burdened due to non-rational influences on human behavior such as childhood socialization and gendered norms (Pyke, 1994; Evertsson & Nermo, 2004). The net effect of maternal employment on household welfare is therefore ambiguous and sometimes depend on other socioeconomic characteristics (Dervisevic et al., 2021).

This has feted the debate as to whether maternal employment is relevant for household welfare, particularly the development of household human capital in the form of health and education. In certain situations, this could lead to gender stereotyping hence increasing inequality between male and female in the access to job opportunities. The fear is that an adverse effect of maternal employment on human capital development may compromise the achievement of Sustainable development goals (SDGs) particularly 3 and 4. Similarly, gender disparity in access to job opportunities other labour outcomes may also derail the chances of achieving goal 8.

Given that ICT has been described to influence relationships among people and institutions, improve and facilitate business and personal activities, a critical question is whether ICT is able to influence the relationship between maternal and household human capital development. Likewise, whether ICT skills enhances employment and intention to stay in current job especially for females. The motivation is to seek enhancement of female employment without compromising on household human capital development.

To logically answer the question, three (3) important relationships need to be examined (a) the relationship between maternal employment and household human capital development (b) the role of ICT in the relationship between maternal employment and household human capital development and

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(c) the relationship between information and communication technology, employment and the intention to stay or quit current job.

This thesis furthers the discussion of women's economic empowerment and human capital development by examining the probable effect of maternal employment on household health (healthcare utilisation), Working mothers' intention to stay or quit their current job on child education outcome (education progression) with emphasis on the role of ICT for Ghana. The study also investigates ICT skills as a determinant of employment and the intent to stay or not stay in a job for both males and females. Our enquiry is crucial, as household human capital development and female employment are priorities for achieving the sustainable development goals (SDGs). The current public and academic interest attached to matters relating to enhancing women's contribution to household welfare and human capital development also makes the purpose of this thesis apt.

Background to the Study

Human capital development is noted widely as a pivot for the achievement of the SDGs. More so, because it has been very instrumental economic development of countries in the west and south-east Asia, some scholars are of the opinion that human capital development remains the most important vehicle to the achievement of the SDGs (Baah-Boateng, 2013). It is usually considered to involve two economic units, individuals/households and firms pursuing their self-interest which have positive spill-overs. For individuals, educational enhancement and skill acquisition are prerequisites for success in the labour market and better quality of life (Sackey, 2011).

The World Bank defines human capital as the knowledge, skills, and health that individuals invest in and accumulate throughout their lives, ultimately empowering them to be productive members of society (World Bank, 2021). Beyond individual benefits, these human capital investments generate externalities that impact households, firms, and ultimately, policymakers. The externality outcomes from the human capital investment decisions and actions of households and firms bring in public policy makers or government whose goal, among others, is to improve national competitiveness, and standards of living (Sackey, 2011).

Human capital, comprising skills, knowledge, and health, acts as the dynamic force propelling both individuals and nations forward (World Bank, 2021). As families and businesses make investments in their people, these choices resonate across society. Governments step in as architects, shaping these investments through policies aimed at strengthening national competitiveness and lifting the living standards of the entire populace (Sackey, 2011). It's a process of translating individual progress into shared prosperity, fostering the development of a healthier, more knowledgeable, and prosperous nation together.

For instance, the world Bank is championing the Human Capital Project, which is a worldwide effort that seeks among other things to enhance equity and increase economic growth by quickening more and better investment in people. About 86 counties are currently working with Work Bank Group to fashion out strategies to enable them enhance their human capital outcomes (World Bank, 2022).

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In sub-Saharan African the focus among others is on ways to empower women, enhance the use of technology, and accelerate interest in innovation (World Bank, 2022). The World Bank suggest that human capital development looks bleak for many countries especially in sub-Saharan Africa as well as the Middle East and North Africa. For example, most sub-Saharan African countries have their Human Capital Index (HCI) score below the global average of 0.57. Though the HCI score for Ghana (0.45) is higher than Africa's average of (0.4) it is still lower than the Lower than the Middle-Income countries' (LMIC) average of 0.48 and the global average of 0.57(Avitabile et al., 2020). The HCI index is generated by using statistical and econometric tools to combine demographic, health, and education dimensions (Abdelkhalek & Boccanfuso, 2022). There are worries that as a result of worldwide changes in technology, demographics, fertility, climate, and pandemics, inequality is growing in the domains of health and education.

Two important measures of human capital development that are considered in this thesis are health [through healthcare utilisation] and child education outcomes with emphasis on grade progression.

One of the widely acknowledged ways to improve the health of a nation is through healthcare, because it improves health via prevention, diagnosis, treatment, improvement or cure of health conditions (Yip et al., 2015). People benefit from healthcare if they utilise the available health services. In many cases people are not able to utilise health services and it is attributable to several factors which put them at risk of complications and even death. In recognition of the challenges that may prevent people from utilising health, global leaders subscribed to the Universal Health Coverage (UHC). It

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is an enshrined commitment in the SDGs (goal 3.8) agenda with the effect of reducing inequalities and fighting poverty worldwide (WHO, 2021). It advocates for everyone to have access to health services at any time, place, and without financial restrictions (WHO, 2013). It should include but not be limited to the consumption of healthcare services, procedures, devices, or pharmaceutical drugs with the aim of sustaining people's health and well-being (Carrasquillo, 2013). This pledge aims to provide complete financial risk protection against out-of-pocket (OOP) medical expenses and at least of 80% coverage of critical health services for all individuals, regardless of socioeconomic status.

To be able to achieve greater health for all, many countries have adopted UHC as a critical mechanism for ensuring affordability, justice, and a long-term health system. According to the WHO, many people throughout the world, mainly in poor countries, continue to be unable to access healthcare for a variety of reasons, the majority of which are connected to socioeconomic and cultural factors. Every year, it is projected that over 100 million people are forced into extreme poverty due to out-of-pocket expenditure on health services (WHO 2021). Recent studies after the COVID-19 indicate that the pandemic had impacted negatively on the utilisation of health services by all age groups (Moynihan et. al, 2021; Shanmugavadivel et al, 2021). In a systematic review by Shanmugavadivel et al., in which 81 different studies were reviewed from 20 different countries, it was found that healthcare utilisation had reduced drastically by about one-third in the first 6 months of 2020 during the pandemic (Shanmugavadivel et. al, 2021).

Subsequent to the COVID-19 pandemic, the World Bank Group has expressed that it is critical for the health systems of nations to be reinforced to make them prepared for unforeseen contingencies and ready to provide essential health services especially connected to women, children, and adolescents (WHO, 2021). Core of the strategy of the UHC is to support the efforts of countries geared towards delivering to the people a health service that is of high quality and financially within the reach of everyone regardless of socioeconomic status so as to ensure equity by 2030.

Ghana has shown some commitment to achieving UHC and this is expressed in the UHC roadmap launched by the Ministry of Health (MoH) in 2020. It is to ensure that all residents in Ghana are able to timely access high quality health service without cost being a barrier (MoH, 2020). Health policies including health insurance schemes have been implemented in Ghana to increase healthcare utilisation, especially in rural and vulnerable communities. In 2005 outpatient utilisation increased from 0.6 million to 16.9 million in Ghana due to the implementation of the National health insurance scheme (Nketiah–Amponsah & Arthur 2013). Though enrolment in the NHIS increases healthcare utilisation and reduces out-of-pocket expenditure (Akazili et al., 2014; Jehu–Appiah et al., 2011;; GSS, 2014), it is estimated that about half of the resident population have not yet enrolled unto the scheme and even for those who previously enrolled, 30% had dropped out of the scheme due to a number of reasons (Sarkodie, 2021). Utilisation of health services seems to differ for people of different ages, gender and socio-economic status and location (Abor et al., 2011; Boachie, 2017; Fenny et al., 2016; Galaa & Daare, 2008). Figure 1 shows the percentage distribution of healthcare utilisation for

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ill/injured persons by age cohort. Across all the age cohort, healthcare utilisation has reduced between 2012/2013 and 2016/2017.
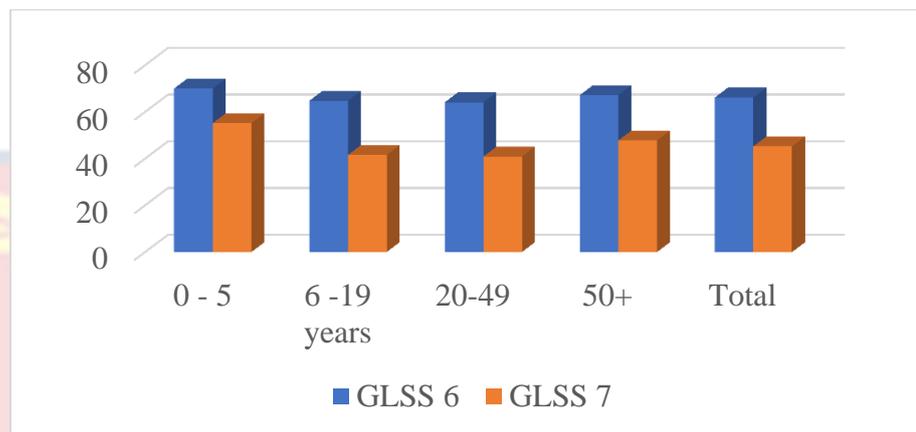
Figure 1: Percentage of ill or injured individuals that went to a health facility, age cohort, 2012/2013-2016/2018
Source: Authors' construction using GLSS 6 &7 reports (GSS, 2014, 2018)

Education has been classified as a human right issue since it has the ability to affect development, alleviate poverty, enhance health, gender parity, peace, and stability (World Bank, 2021). It generates significant, reliable income returns and is crucial for advancing equity and inclusion. Education helps people and society as a whole by creating jobs, raising incomes, reducing poverty, fostering innovation, strengthening institutions, and fostering social cohesion (OECD, 2012). The world Bank suggest that, every additional year of schooling is associated with an increase in hourly earnings by about 9% globally (World Bank, 2021).

Child educational outcomes remains yardstick for measuring human capital development in the household. It is believed that improvement in child education outcomes is an important way to bridge inequalities in the society. Core of the Goal 4 of the SDGs is the importance of a system of quality education that is inclusive, equitable and at the same time encourage lifelong learning opportunities (United Nations, 2015). There is however a global

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threat to children education as a result of the COVID-19 pandemic and other natural and social factors (World Bank, 2021). The pandemic resulted in the closure of schools and disrupted academic calendars across the world. It is estimated that the average hours of in-person learning lost is about 141 hours. It is further suggested by the World Bank that children in this current generation in total could lose up to about US$21 trillion in present value of their lifetime earnings which is comparable to about 17% of the value of current global GDP. This represents sharp increase of additional US$4 trillion loss compared to the 2021 estimates (World Bank, 2021).

The World Bank Group, International Monetary Fund (IMF) and the United Nations International Children's Emergency Fund (UNICEF) all alert that the world could be plunged into an educational crisis with visible country and gender inequalities. Even though two-thirds of kids worldwide go to school, over 600 million still can't even read or do basic math, according to UNICEF. That's like going through the motions without building the skills that truly matter. This may account for the increase in learning poverty from 57% to 70% and could be attributed to the closure of schools and the world digital divide (UNICEF, 2021a).

Available data indicates that Ghana has performed well in several education outcome measures but still has challenges in other areas such reading and numeracy skills, regional inequalities, children age-in-grade congruence and progression (UNICEF, 2021a). The enrollment and completion rates of primary school and junior secondary school significantly increased as a result of Ghana's increased educational spending over time. Its preschool net enrolment rate in 2017 was 73.2 percent, which is significantly

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higher than the comparable percentages in other lower middle-income sub-Saharan African nations (UNICEF, 2021a). Currently Ghana's primary school is completion rate is higher than the average of lower middle-income countries (LMIC), while the average secondary enrolment rate hovers around the average of LMICs (UNICEF, 2021a).

In the area of children in schools or grades which corresponds their age levels (age-in-grade congruence), the situation relative to other LMICs is not encouraging. For example, a careful analysis of children's school attendance and progression through the educational system by UNICEF reveals challenges beyond initial access to education (UNICEF, 2021a). Despite the fact that roughly 92% of children have ever attended primary school, the report shows that more than 40% of these students do not complete upper secondary school by the age they should, and that the situation has likely gotten worse as a result of the COVID-19 pandemic (UNICEF, 2021b). It is suggested that these kids either quit school, can't move on to the next level of learning, or stay in a grade that is too low for their age. Unfortunately, female children are the most victims and may as well limit their presence in the top decision-making brackets in the socio-economic environment.

Based on wealth quintile, the World Bank reports that, many kids, especially those in the bottom 20% of wealth quintile, are not enrolled in schools with the right age ranges. Children in the top 20% have a relatively higher percentage compared to the bottom 20%. For example, with children age of 7, about 85.5% and 51.2% of children in the top 20% and bottom 20% of households respectively are enrolled in primary school. About 26% of children who fall in the bottom 20% haven transitioned from preschool, and

22.6% have dropped out school. In the same way, 65.6% of children who have attained age 14 and are in the upper 20% of the wealth quintile are enrolled in junior secondary school (JSS), while only 32.1% in the bottom 20% are enrolled in JSS. About 46.4% of children in the lowest 20% are still enrolled in primary school, and over 21% have dropped out of school compared to 6.3% in the top 20%. (See Figure 2). The percentage of children not in the right grade could even be higher with an analysis of the 2nd, 3rd and 4th quintile (Tanaka, 2019).

Figure 2: Types pf Schools enrolled among children in Top 20 and bottom 20 by age
Source: Tanaka, (2019)

The influence of working women in many aspects of household welfare cannot be overemphasized. In addition to women's domestic activities such as cooking, cleaning, taking care of kids in most families are roles basically ascribed mothers (Kotila et al., 2013). Due to that, mothers often spend a greater amount of time with their kids than any other member of the family including fathers (Bianchi et al., 2006; Craig & Mullan, 2011). It is further argued that the engagement of women in economic activity has the tendency of improving their own welfare and that of their spouses and children

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(Fosu, 1999). According to Fosu (1999), the reason why married women desire to join the labour force is based on the desire to enhance the living standards of their family members.

The world is taking notice of the critical role women play in the economy, leading to a concerted effort to boost their employment opportunities (Jha et al., 2019). This is particularly true in sub-Saharan Africa, where economic necessity often drives women into the labour force (Peksen & Blanton, 2017). Since the 1960s, a global shift has seen more and more women trading family life for careers outside the home (Fox et al., 2013). Despite recent decrease in female labour force participation (FLFP) rates, a majority of countries (over 80%) still report rates above 40%, with regional and national variations persisting (Kapso et al., 2016; Yeung et al., 2018).

Data for Ghana indicate that FLFP rate for 2021 is estimated to be 64.5%, compared to MLFP rate of 72.2% (ILO, 2022). The gap between MLFP rate and FLFP rate according to the world Bank Group is lower than the world average. More women (76.7%) however are found in vulnerable employment compared to men (58.4%) as at 2019. A recent Annual Household Income and Expenditure Survey (AHIES) report for first and second quarter of 2022 indicate that unemployment rate had increased between quarter 1 (13.5%) and quarter 2 (13.9%) for persons 15 years and older (AHIES report, GSS, 2022). Unemployment is still higher in urban areas (16.7 percent) than rural areas (11.4 percent) and more than 80 percent of the available jobs in Ghana can be found in the informal sector of the economy (Government of Ghana [GoG], 2019).

In addition, women still suffer various forms of discrimination (Britt et al., 2020) including uneven distribution of resources and access to jobs that makes their expected contribution to household welfare and human capital development quite a challenge. Even though, Ghana experienced remarkable economic rates of growth, and together with comprehensive legal and policy frameworks to support gender rising inequalities would seem to suggest that a lot of decent paying jobs has not been generated (UNDP, 2021) and women find themselves in vulnerable jobs in the informal sector.

To improve the welfare of household members, participation of mothers' employment is expected to positively influence human capital development including health (healthcare utilisation) and child education outcomes such as their grade progression. However, time trade-off, stress and the level of job satisfaction and unavailability of basic amenities and resources may not guarantee the desired positive effect. Additionally, poverty, economic activities, rapid rural–urban migration patterns and education are resulting in the breakup of extended family support networks, which gave mothers some support in carrying out their household duties.

Beyond the importance of employment is the issue of intention to quit or stay in a which has usually been measured with job satisfaction (Pelly, 2023). This is because job satisfaction is considered an important ingredient to job performance, productivity and commitment in many organisations (Al Mamun & Hasan, 2017). It also influences the intention to quit or stay in a job (Rizwan et al., 2014). Al Mamun and Hansan suggest that job satisfaction ensures physical and psychological health and also improves the mentality of working individuals. In developing countries where access to job opportunities

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is noted to be very difficult, the intention of a worker to leave or stay in a job may not be due to flimsy reasons particularly in the case of women. Several reasons have been suggested to account for why people may intend to leave a job such as organisational support, coworker relationships, financial compensation and work environment (Cho et al., 2009; Jang et al. 2023; Islam & Alam, 2014; Sumathi, 2013).

Some studies indicate that for women sexual harassment is an important factor in the decision of women to leave a job (Chen et al., 2023; Merkin, 2008,). Sadly, some women do not report cases of sexual harassment and work place bullying, but simply leave the job. In some cases, it may affect them emotionally and could have replicative effect on their children and household. Besides workers who are satisfied with their jobs are most likely to stay in their current jobs (Alzayed & Murshid, 2017; Owusu, 2014,).

The global appreciation of the effect of work/job characteristics on human development have been given expression in goal 8 of the SDGs and emphasises decent work for all including vulnerable groups. The goal is designed to safeguard equity, freedom, respect for human rights etc. (Rossier, & Ouedraogo, 2021). Unfortunately, it is being reported by international organisations that decent work remains a big issue (Cooke et al., 2019; ILO, 2013) especially in low-income countries and principally for women (ILO, 2020). The report also indicates that access to paid job is not a guarantee for decent work, since the absence of income and other sources of financial support coerce people into accepting any kind of job.

The National Vision for Decent Jobs and Sustainable Livelihood in Ghana is enshrined in the vision for national development. In the framework

for Agenda 2030, the vision with regards to "Agenda for Jobs" is to create "an optimistic, self-confident and prosperous nation, through the creative exploitation of our human and natural resource, and operating within a democratic, open and fair society in which mutual trust and economic opportunities exist for all." (GoG, 2017). The policy among others seeks to increase decent employment without any gender or geographical inequalities. There are several laws that have been passed over the years to safeguard peoples' rights to ensure decent work. For instance, the 1992 Constitution of the Republic of Ghana, in Article 24, mandates the government to ensure that every person enjoys the right to work in conditions that are satisfactory, safe, and healthy. It is the desire of governments, scholars and policy makers to have an increase in maternal employment without compromising on household human capital development and household welfare. Efforts to enhance for instance healthcare utilisation remains key to achieving UHC and maternal employment may be a factor. There is however the absence of coherence in existing theoretical frameworks and empirical evidence on the relationship between maternal employment and household health (Ukwuani & Suchindran, 2003). One strand of the literature argues that maternal employment is an important welfare tool known to improve mothers' and children's quality of life (Ghanbari et al, 2017), empower women to participate in household health decision-making (Zaky et al., 2014; Anik et al., 2021, Ahmmed, 2021), reduce domestic violence for women (Winkler 2016), and reduce poverty (Stier & Lewin, 2002) through resource complementation (Kuhn & Ravazzini, 2017). It also provides fiscal space for the household budget, enhances nutrition and health (Sangwan & Kumar, 2021), increases education expenditure (Becker &

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Tomes 1979; Leibowitz, 1974; Orkoh, 2018; Tin et al, 2012;). It is further argued that resources from maternal employment may enable the utilisation of health services in the household though there could also be contrary views. For example, the augmented financial resources within households due to women's employment could empower families to acquire higher-quality food, enhance water and sanitation facilities, thereby reducing the likelihood of illness and subsequently decreasing healthcare utilisation (such as visits to health practitioners). This is especially so for developing countries where healthcare utilisation is mostly reactive.

The second strand of literature, however, argues that maternal employment may expose working mothers to more severe time trade-offs (Komatsu et al., 2018; Lele, 1986). The quest to earn more income, occasioned by the present economic circumstances may compel working mothers to spend so much time working at the expense of seeking medical care even when they are sick compared to paternal employment. Women's increased time out of the household when working may have negative effects on household healthcare utilisation especially for children (Morrill, 2011). Cawley and Liu (2007) note that the time women spend at home is not complemented by the time spent by their male counterparts, raising concerns with respect to the negative influence of maternal employment on household welfare (Mancino, 2011; Johnston et al., 2018).

While many researchers have examined maternal employment, predominantly for child outcomes (Brauner-Otto, 2019; Budu, et al., 2020; Dervisevic et al., 2021; Dias et al., 2008; Geitona et al., 2009; Guinness et al., 2018; Morrill, 2011; Saeed et al., 2012), research on the potential effects on

specific household outcomes such as healthcare utilisation is scarce. An examination of the relationship will enhance policy formulation to reduce the potential negative effect of the desired increase in maternal employment on the health of all household members.

In the interest of academic excellence for responsible adulthood, mothers play a role in their children's education either by directly or indirectly contributing to households' financial resources needed to cater for children's education expenditure (Orkoh, 2018). Resources from maternal employment are mostly used for educational expenditure and nutrition (Yoong et al., 2012). Theoretically and empirical models of maternal employment suggest however that maternal employment may have both positive and negative influence on child development outcomes. The negative effects may arise from the mother's persistent absence from home and the emotional spill-overs from work. Whether a mother is employed or not can potentially impact her emotional well-being, thereby influencing her interactions with her children, as suggested by Hoffman (1973). Again, maternal work hours may limit maternal time spent with children. The parent involvement theory suggests that, the perception of parents' available time and energy juxtaposed by demands on their time especially related to work, and other family needs influences child's education (Hoover-Dempsey & Sandler, 2005). Also, because the working mother is absent, from the home regularly and probably more often, the child will be emotionally deprived or perceive her absence as rejection and this may affect their development (Mao et al., 2020).

While close and positive parent-child relationships fostered by quality time are essential for children's well-being (Presser, 2003), emotional spillover

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from work disappointments can pose a significant threat to child development (Kene & Nishad, 2021). Many psychologists and sociologist suggest that the decisions of mothers on the use of their time and resources could be affected by their psychological and emotional status which can be influenced by their job satisfaction or otherwise. A mothers' perceived satisfaction or otherwise in her job may influence her time and resources dedicated to her children educational development. For instance, a woman who is unsatisfied with her job may use some of her limited time and resources for job hunt to the detriment of her children's development. The negative energy from their job discontent could be visited on their children, which may adversely affect the outcomes of their education.

The emergence of information and communication technology (ICT) undoubtedly, has created uncountable synergies among individuals, groups, nations, concepts, professions and activities in various fields including education, health, sports, financial inclusion and communication. For instance, the Information-Content Effect theory postulates that the utilisation of the internet as a medium for information communication has a consequential influence on user behaviour (Ma & Zheng 2022; Zhu et al., 2021). These interactions in many respects result in improvements and efficiencies. The World Bank Group advocates for the transformative potential of Information and Communication Technology (ICT) in alleviating poverty, enhancing productivity, fostering economic growth, and improving accountability and governance. However, the widespread benefits of ICT face challenges, as not everyone has equal access, contributing to a digital divide. The digital divide often exists between urban and rural dwellers, educated and uneducated

people, socioeconomic classes male and female, and, globally, developed and less developed nations.

Globally a gap exists between males and females in terms of access and usage of ICT devices and more pronounced in sub-Saharan Africa (Borgonovi et al., 2018). It is estimated that over 64% of people around the world use internet at the start of 2023, over 2.5 billion are unconnected and majority are found in southern and Eastern Asia and Africa. Majority of internet users rely on mobile phones to go online. Nonetheless, a prevalent mobile gender gap persists. In low- and middle-income countries, women are 10 percent less likely than men to possess a mobile phone, resulting in 197 million fewer women owning a mobile device than men. Despite a slowdown in mobile subscriber growth, the gender disparity in mobile ownership shows no signs of narrowing (Women, 2019).

In 2020, 62 per cent of all men were using the Internet, compared with 57 per cent of all women. For developing countries, women are 12 percentage points lower than men in the use of internet. With regards to the rural/urban divide, the urban internet penetration is twice of that of rural penetration (ITU, 2021).

Currently it is estimated that more than 5.3 billion of the world's total population use mobile phones (ITU, 2021). In the use of a mobile phone or the internet to access an account and use of the internet to pay bills or buy something online in the past year, the World Bank report that males have higher percentages than females in all the income groups. A recent study by the Ghana Statistical Service and the National Communication Authority

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(NCA) reveals that mobile phone ownership was greater (56.0%) for males than for females (52.4%) (GSS, 2020) and the gap for internet access is 6%.

ICT presents an important dimension to the discourse on the relationship between maternal employment and healthcare utilisation. On one hand, ICT can support people's everyday lives including their jobs and daily activities. It is observed to improve access to medical information and data, record keeping of medical as well as makes possible the use of telehealth/telemedicine, online health education, and health apps (Al-Shorbaji & Al-Shorbaji, 2021). It may also enhance the relationship between healthcare providers, patients, and health systems. The relationship can lead to improvement in treatment due to non-stop real-time interaction. It also enables healthcare providers to take immediate action if necessary to prevent patients' health conditions from worsening (Cilliers & Viljoen, 2018) and also reduces infant mortality (Lee et al., 2016). Aside its positive role in ensuring accurate diagnostics, ICT facilitates healthcare utilisation in a timely manner, therefore allowing working parents to save more time participating in the labour force. On the other hand, ICT skills may quicken work and hence reduce the labour time without loss in incomes and may subsequently be associated with job satisfaction. This can allow mothers and working parents to have time to seek healthcare and also support other family members to utilise health services.

It has therefore become very necessary to understand the influence of ICT on the relationship between maternal employment and household healthcare utilisation. This clarity is critical to help assign ICT its proper role in designing both maternal employment and health utilisation policies. This represents a crucial stride in advancing the objectives of Sustainable

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Development Goals (SDGs) 3 and 8. SDG 3 underscores the pursuit of healthy lives and the promotion of well-being for all at every stage, while SDG 8 advocates for full and productive employment, along with decent work for all. Hence, initiatives addressing one SDG inherently contribute to the other. This interconnectedness is evident as good health acts as a catalyst for employment, enhancing the likelihood of securing a job and enhancing overall productivity.

From digital cameras to interactive whiteboards, ICT's role in education, especially for children, has soared in importance for governments and educators alike. This growing presence in homes and classrooms offer parents and children a wealth of tools and opportunities to explore, learn, and connect. The use of ICT by both children and parents presents an opportunity to examine its role in the relationship between maternal intention to leave or stay in a job and child education (grade progression). In the case of children's education, it has been suggested that with the right content and support from teachers, ICT can help children's cognitive development by enhancing their language and literacy skills through the recognition of letters, sequencing, and sounds; listening and understanding; vocabulary; and concepts related to stories and print (McManis, & Gunnewig, 2012).

When youngsters engage with touch screen media tools, play games, use remote controls to navigate television channels, and other ICT activities, among others, their reasoning, prediction, and problem-solving skills are developed (Wardle, 2008). It also improves their socio-emotional development through their interactions with other children using ICT devices (Olowe & Kutelu, 2014). Understanding the role of ICT in the relationship between maternal intention to leave or stay in a job and children grade progression is

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novel and will provide a platform for discussing the role ICT in reducing possible negative effect of mothers to leave a job on children education progress.

ICT like many other technologies can impact the working conditions and labour markets outcomes in general in so many ways. The changes in the labour force environment occasioned by ICT are receiving more discussions because of how quickly it is expanding and the extent of its coverage (Asongu et al., 2020). ICT is well-known to create new jobs and brings flexibility, innovation, inclusiveness and transparency to the labour market (Goyal, 2011; Nikulin, 2016), job satisfaction (Sahito & Vaisanen, 2017) and improving living standards, literacy and trade (Hamilton, 2003; Melymuka, 2001; Roycroft & Anantho, 2003; Udo & Edoho, 2000). It also enhances development outcomes, such as advancement in the educational system (Madge & O'Connor, 2004; Uibu & Kikas, 2008), health outcomes (Oostveen & Braaksma 2014; Simba, 2004), literacy/numeracy (Batanero et al., 2021), and household income (Comin & Mestieri, 2013). Individuals with strong ICT skills have better labour market opportunities (Pichler & Stehrer, 2021).

Some studies have indicated the direct and indirect positive effect of ICT on labour force participation and employment (Dettling 2015; Suhaida & Nrulhuda, 2013; Nikulin, 2016; Watson et al, 2018). Many of these studies realized a positive relationship between ICT and LFP as well as employment by analysing the relationship using either an aggregate level (cross-national) (Dettling 2015; Suhaida & Nrulhuda, 2013; Nikulin, 2016; Watson et al., 2018) or using panel datasets for country-level studies (Viollaz & Winkler, 2020). Though the positive effect of ICT on labour force can be applied other

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forms of employment it is mainly applied to skilled employment. Several pathways have been indicated in the literature on how ICT may influence LFP and employment.

Utilising ICT can be a powerful tool for building human capital (Fang et al., 2023). It opens up new avenues for learning and knowledge acquisition, improves learning efficiency, and even supports informal learning (Szymkowiak et al., 2021). Moreover, ICT can bridge the educational gap by promoting diverse teaching platforms and methods, particularly benefiting rural communities (Smh et al., 2020).

Balgobin and Dubus (2022) highlight two key arguments for the positive impact of ICT on employment. Firstly, mobile phones empower farmers in rural areas to navigate weather challenges and market fluctuations (Ifeoma & Mthitwa, 2015; Krell et al., 2022; Lee & Bellemare, 2013). Timely weather forecasts allow them to optimize activities and improve yields. Secondly, mobile technology helps to equalize market disparities (Jensen, 2007). Access to price and demand information enables producers to target markets with high demand or low supply, maximizing profits by adapting to market dynamics (Andjelkovic & Imaizumi, 2012). Ultimately, this optimized allocation leads to increased earnings for producers.

It is also understood that ICT services like internet provides an interface for the connection between job seekers and job advertisers (Hjort & Tian, 2021) and may lead to increase in employment. According Balgobin and Dubus (2022), this process will be efficient only in the presence of high-speed internet. The benefits of ICT and its positive effect on employment is also explained by the availability of social network platforms (Calvo-Armengol &

Jackson, 2004; Magruder, 2010), that enhances timeous communication and sharing of information with job opportunities. In many cases friends, relatives and acquaintances share and circulate information to enhance the job search of those in need of jobs (Archambault, 2013; Cingano & Rosolia, 2012). According to Kuhn and Mansour (2014), it reduces frictional unemployment among the rural labour force and boosts their employment opportunities.

In the midst of all the studies indicating a positive relationship between ICT and employment, there are other studies that have also indicated a contrary view. For instance, Samargandi et al., 2019 in a study in Saudi Arabia concluded that ICT has a negative relationship with female employment. A similar conclusion was arrived at by (Balgobin & Dubus, 2022) for female employment.

Since both improvement in household human capital development and female employment are desirable outcomes but which may adversely affect each other, interventions to enhance both without compromising any of them will increase the chances of achieving SDGs 3, 4 and 8.

The challenge with examining the influence of ICT skills on labour outcomes is the varied channels through which ICT skills may influence employment. The effect of ICT skills on male and female employment may be direct or indirect. The direct relates to employment in an establishment that deals with digital related issues. The indirect effect of ICT skills on employment may occur through different media. Financial inclusion has become a topical factor that has been observed to influence the labour market outcomes and also has a poverty alleviating effect. In the same manner, basic job requirements have always included some level of literacy/numeracy which

is also known to be improved by ICT skills. Literature is silent on mediating role of these two factors.

Statement of the Problem

SDG 3, 4 and 8 talks about healthy lives and the promotion of well-being for all at all ages, universal primary, secondary education, affordable vocational training and access to higher education and decent work for all respectively. These goals are at the core human capital development and highly pursued by most countries across the globe especially in the global south.

Over the years, the Government of Ghana (GoG) has introduced a number of interventions aimed at improving health and education as critical part of efforts to build human capital for national development. Key among the interventions is the National Health Insurance Scheme (NHIS), Expanded Programme on Immunization (EPI) Policy, 2010, Child Health Policy 2007-2015 and National Community Health Planning and services, Free Compulsory Universal Basic Education (FCUBE), Phase out of Common Entrance and introduction of JHS/SHS, Senior High School (SHS) duration at 3 or 4 years, Free SHS.

Female employment in Ghana has seen some improvement in the past two decades though the participation gap between male and female still exists (Baah-Boateng et al., 2021). Rising female labour force participation (FLFP) and employment is expected to boost human capital development within households, as families play a key role in nurturing their children's education and skills (Mincer & Polachek, 1974).

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Mothers in particular continue to be a critical component of the human capital development industry and their activities especially in the labour force greatly influence household human capital development.

There has also been a lot of investment, improvement, proliferation and use of ICT devices and services in Ghana for the past decade. Ghana continues to be a one leading countries in the global south that has seen substantial improvement as far adoption and use of ICT and digital devices and services. It is envisaged that this will drive improvement in many aspects of the socio-economic life of people including human capital development, reducing the existent LFP gap, facilitate work and improve job satisfaction.

In spite of the interventions, improvement female participation in economic activity and progress in ICT dissemination as indicated earlier, Ghana's human capital development has not progressed as expected. The human capital index of Ghana is reported to below the world average (World Bank, 2021). Besides some of indicators and components of human capital development have not showed the desired results. For instance, with health, the Ghana Living Standards Survey (GLSS) reports that the proportion of injured/ill people who sought medical help decreased between 2012/13 and 2016/17 especially for rural dwellers (Ghana Statistical Service [GSS], 2018).

A 2018 World Bank report warned that Ghana's education system is failing its youth, potentially wasting up to 56% of the nation's human capital within 18 years. This alarming prediction stems from Ghana's education efficiency rate falling far below the global average, even lower than the average for African countries (UNICEF, 2021). The World Bank emphasises that unlocking Ghana's full economic potential hinges on nurturing its future

workforce. This requires sustained investment in human capital, ensuring every child thrives with good health, strong developmental foundations, and the skills to navigate the ever-evolving global landscape.

This has sparked a debate on the societal role of women, particularly their involvement in paid economic activities, leading to significant controversy (Charles & Cech, 2010; Jacob & Kühhirt, 2021). Critics argue that extensive female participation across all economic sectors jeopardizes their ability to invest in personal and family development (human capital building). Others have argued that a woman can better play the role of helping build human capital through increased participation which empowers them economically. The natural question that emerges therefore is, does household welfare particularly health and child education suffer due to the double burden on women? Again, what is the role of ICT in the relationship between maternal employment and human capital development. Moreover, it is not clear, whether, and to what extent, ICT would increase women's access to employment, influence their decision to stay in a job or otherwise, improve mothers' productivity and allow them to save time to improve healthcare utilisation and children's education.

Despite its importance, the linkages among employment, ICT, and health and education, the issue has received little attention in the literature.

For example, in the area of health, existing studies relating maternal employment and health have focused on child health and health expenditure, nutrition and breast feeding (Brauner-Otto, 2019; Budu, et al., 2020; Dervisevic et al., 2021; Dias et al., 2008; Geitona et al., 2009; Guinness et al., 2018; Morrill, 2011; Saeed et. al., 2012). Dervisevic et al., 2021 studied the

causal impact of maternal employment on child development outcomes (health and education) in Indonesia with a sample of 32,214 children from age 6 to 18 years and concluded that maternal employment positively affects child health and education. Brauner-Otto et al., (2019) also examined the relationship between women employment, job characteristics (wage, salary, or own business), timing of work and child health and concluded that participation reduce the time women have for their children, particularly for low-paying jobs and it is associated with worse child health.

Most of these studies limit the discussion of the effect of mothers' employment on the health of mothers themselves and their children but no other household members or better still the totality of the household. Also, these studies did not account for the fact the proliferation and access to ICT devices and skills may influence the effect of mothers' employment on healthcare utilisation. This is because access and use of ICT enables people to work faster and smarter and may reduce the time and energy allocated to work outside the home, and could increase the time and energy to attend to household responsibilities.

For the second objective which examines the link between mothers' intention to stay or not stay in their current job and children grade progression, existent literature has concentrated on the effect of maternal employment and job characteristics on child education expenditure and cognitive behaviors (Bernal & Keane, 2011; Verropoulou & Joshi 2009; Waldfogel et al., 2002). Even though mothers' decision regarding their future in their job could influence child educational outcomes, studies in this area are limited.

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Importantly, previous studies did not consider the influence of ICT in this relationship.

While several recent studies have explored the link between ICT and female employment globally (Kaur et al., 2021; Ngoa & Song, 2021; Samargandi et al., 2019; Viollaz & Winkler, 2020;), their broad focus provides limited insights for specific policy development in countries like Ghana. Moreover, relying primarily on access and use of basic ICT tools like phones and computers (Bagchi & Udo, 2010; Nikulin, 2016; Watson et al., 2018) overlooks the nuanced impact of advanced skills on employment. While Balgobin and Dubus (2022) addressed mobile technology's influence on Ugandan employment, a critical gap remains: understanding the differential effect of ICT skills on male and female employment in Ghana, along with the underlying mechanisms driving these effects.

Studies on the effect of ICT skills on intention to leave a job have largely been overlooked in the extant literature (Cho et al., 2009; Silva et al., 2023). The few known studies related to ICT skills intention to leave or stay in a job have focused ICT skills and job satisfaction or dissatisfaction on teachers and education workers, but the findings are mixed in terms of direction of relationship (Barba- Sánchez et al., 2022; Sahito & Vaisanen, 20117)

Addressing the relationship between employment, ICT and human capital development is critical because it will deepen understanding on whether maternal employment could be encouraged without compromising household hold human capital development and whether ICT is relevant. This is essential for the country's effort towards the achievement of the SDGs 3, 4 and 8.

Purpose of the Study

The main purpose of this study is to investigate the role of information communication technology (ICT) in the relationship maternal employment and human capital development.

Objectives of the study

The study will specifically seek to achieve the following objectives.

1. Examine the role of ICT in the relationship between maternal employment and household healthcare utilisation.

2. Examine the influence of ICT in the relationship between mothers' intention to stay or not to stay in their current job and children grade progression.

3. Investigate the differential effect of ICT skills on employment-based gender and location.

4. Examine the differential effect of ICT skills on the decision to stay or not stay in current job by males and females.

Hypotheses of the Study

In line with the above specified objectives, the following null hypotheses are modeled

   i.   Maternal employment does not affect household healthcare utilisation.

  ii.   ICT use has no effect on the relationship between maternal employment and healthcare utilisation.

 iii.   ICT skills has no effect on the relationship between maternal employment and healthcare utilisation.

  iv.   Working mothers' decision to stay or not stay in their current job does not affect their children grade progression.

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v.   Household ICT devices does not influence the relationship between working mothers' decision to stay or not stay in their current job and their children grade progression.

vi.   Use of smartphone has no effect on the relationship between working mothers' decision to stay or not stay in their current job and their children grade progression.

vii.   ICT skills does not affect male and female employment differently.

viii.   ICT skills does not affect rural and urban wage employment differently.

ix.   ICT skills does not affect male and female intention to leave or stay in a job differently.

Significance of the Study

The study is motivated by the limited presence of economic literature exploring the connection between maternal employment and household human capital development, particularly with the inclusion of ICT as a moderating variable. Moderation, in this context, refers to the scenario where the impact of an independent variable on a dependent variable varies based on the level of a third variable, known as a moderator variable. This moderator variable interacts with the independent variable and plays a directing or influencing role in the overall relationship between the two variables (Edwards and Lambert, 2007). A moderating variable has the capacity to either reinforce the relationship between variables (enhancing effect) or diminish the strength of the relationship (buffering effect). It can even reverse the effect of the predictor on the outcome (antagonistic effect).

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From an academic standpoint, this research aims to enhance the current body of empirical knowledge concerning maternal employment and household human capital development, with a specific focus on the influence of ICT.

It will serve as a valuable reference for policymakers in health, labour, and education, including key ministries such as the Ministries of Health, Education, Employment & Labour Relations, and the Ministry of Gender and Social Protection.

Delimitation of the Study

In this section, the boundaries adopted for the study are specified and the motivation for the choices made. Data and variables employed are directly linked to the geographical boundary and the existent relevant literature relating to labour force participation, employment, healthcare utilisation, child education outcomes information, and communication technology and decision to stay or not stay in a current job.

The study has both elements of individual and household analysis. A household for the avoidance of any doubt is defined as a group of people who share the same house keeping arrangements. The first two empirical chapters are analysed with the household as the unit, whilst for the third and fourth empirical chapters, the analysis is based on the individual. All of the objectives are analysed using a nationally representative data from the Ghana Statistical Service's seventh round of the Ghana Living Standards Survey (GLSS7), making the findings extremely generalizable.

The measure of healthcare utilisation is based on the definition of prevailing literature (i.e., visits to a health practitioner), employment is based on whether the individual is working or not working outside the home

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(Adhikari 2011). If the individual is working, then the person described to be employed. ICT skills is captured by individual having ICT skills or otherwise.

The variable for children grade progression is proxied by age-in-grade congruence which is formulated using the child's current grade represented by the formal age for being in that grade divided by his/her present age in years. A figure less than 1, indicate that the child is in a lower grade.

Contribution of the study

This thesis investigated issues of maternal employment, household human capital development (healthcare utilisation and education outcomes) and ICT as a leverage. The motivation of these thesis is the desire to enhance maternal employment without compromising on household human capital development.

Some studies have identified determinants of healthcare utilisation (Budu, et a.l, 2020; Dias et al., 2008; Geitona et. al, 2009; Guinness et al., 2018; ; Masiye & Kaonga 2016; Saeed et al., 2012; Sarkodie, 2021), including female employment, but mothers' employment has not received much emphasis. The role of ICT in the relationship between maternal employment and healthcare utilisation is also scarce in the literature.

Studies also abound on the link between maternal employment and child outcomes with concentration in developed countries (Bernal, 2008; Bernal & Keane, 2011; Ruhm, 2008; Verropoulou & Joshi, 2009; Waldfogel et al., 2002) and a few in developing countries (Dervisevic et al., 2021). Little is heard of the link between maternal intention not to stay in a job and children grade progression and the role of ICT in this relationship.

Analysis of the effect of ICT on employment has often been carried out by distinguishing between the effect of various ICT components such as mainline telephone, mobile telephone and Personal Computers (PC), internet services (Bagchi & Udo, 2010; Nikulin 2016; Nsabimana & Funjika, 2019; Watson et. al, 2018). Different datasets have also been used in different jurisdictions to investigate the issue. While a number of the studies undertook cross country studies (Efobi et al., 2018; Ngoa & Song, 2021), others used individual country cross-section, time series and available panel datasets (Balgobin & Dubus 2022; Samargandi et. al., 2019; Viollaz & Winkler, 2020) to provide evidence of the relationship between ICT and labour force participation. The concentration of these rightly so, has been on female employment with a few comparing differences for male and female (Viollaz & Winkler, 2020). A careful review of the literature points out that (a) many recent studies on the matter are cross country studies and may not suffice for tailored policy for individual counties considering socio-cultural and locational heterogeneities (b) studies that have explored gender differences relatively scarce (c) studies on the relationship between ICT skills and decision to stay or not stay in current job are also scarce and (d) findings are mixed in the direction of influence.

This thesis is based on the identified gaps and therefore contributes to the body of academic research and policy analysis in two (2) ways: (1) the incorporation of ICT in the relationship between maternal employment and healthcare utilisation, working mothers' decision and children grade progression and (2) examine the effect of ICT skills on employment and

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decision to stay or not stay in current job for males and females and exploring their transmission channels.

Limitation of the study

Even though the study succeeds in weaving ICT usage and skills into the relationship between employment particularly for women and household human capital development the thesis is limited in the following ways;

The adopted methodologies including design, data and estimation technique are far away from being sacrosanct, considering their documented limitations.

Additionally, the study is limited because multinomial variable for maternal employment specified as 1-paid employment, 2-self-employment, 3-other employment, and 4-unemployment could have been used in the regression to capture the entire labour force. Again, for chapters three and four the study was limited to only paid employment which limits the results as far as the entire labour force in Ghana is concerned.

The study could have been better if other equally important datasets such as the labour survey 2015 and other waves of the Ghana Living standard Surveys were included in the analysis.

Finally, the use of cross-sectional data limits the discussion on the dynamic effect of maternal employment on healthcare utilisation and children grade progression. All the limitations of the study are also influenced by time and resource constraint.

Organisation of the study

This study proceeds in nine chapters. This first chapter provides an introduction to the study. The second chapter gives an overview of child

education, healthcare utilisation and employment in Ghana. Chapter three offers a theoretical and empirical review of related literature. Chapter four discusses research methodology whilst chapters five, six, seven and eight presents four empirical chapters. Chapter five provides evidence on the effect of maternal employment on healthcare utilisation, Chapter six is on the effect of working mothers' intention to stay or not stay in their current job on children grade progression, Chapter seven is on the effect of ICT skills on employment and chapter eight is on the effect of ICT skills on decision to stay or not stay in a current job. Chapter nine provides the findings, conclusion and recommendations.
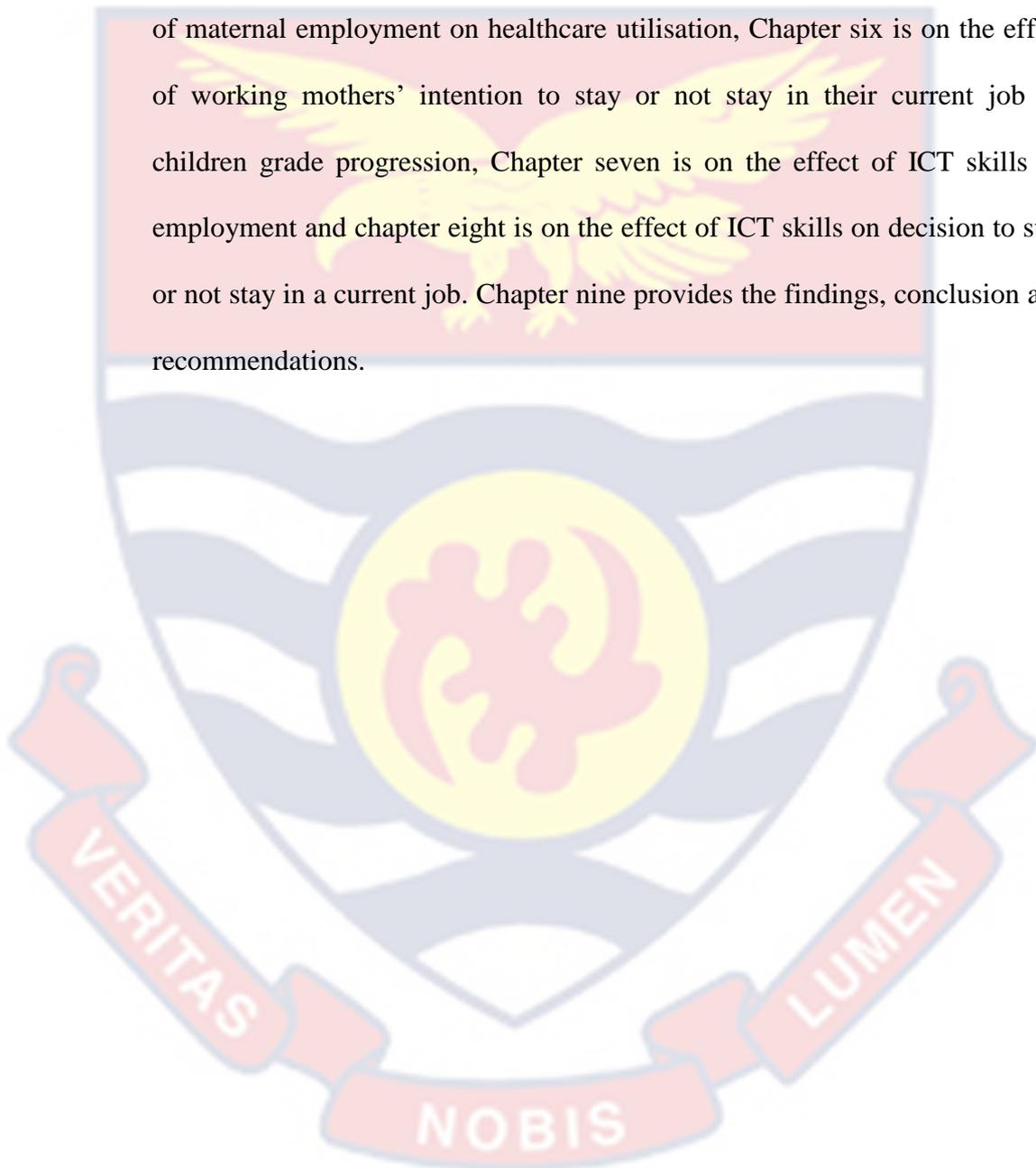
CHAPTER TWO

OVERVIEW OF HEALTHCARE UTILISATION, EMPLOYMENT,

CHILD EDUCATION AND ICT GHANA

Introduction

In Ghana it has been understood that human capital development through improvement in education, health and nutrition remains the catalyst for alleviating poverty, deprivation, hunger and inequality which are captured as the 1st and 2nd goals of the sustainable development goals (SDGs). Although several efforts have been made over the years to improve the health of citizens and enhance the education particularly child education, several hurdles still remain to be surmounted. It is believed that the employment status of mothers has an influence on household healthcare utilisation and child education outcomes and this influence could also be affected by their usage of ICT devices and the ICT skills they possess. This chapter provides the definition of concepts, an overview of healthcare utilisation, child education outcomes with emphasis on children grade progression, employment with interest in maternal employment and ICT skills in Ghana.

The Concept of Healthcare Utilisation

Healthcare utilisation is defined as a measure of the relationship between service capacity and service output, expressed as the ratio between output and capacity (Stekenlenburg, 2004). According to Philip, (1990) it is the process by which the patients make a decision about the use of a health facility and subsequently makes use of the facility. This implies that the trend in the use of health care services reflects not only the need for care but also several reasons. These factors could include, but are not limited to, population

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features, biological and environmental variations, accessibility to wholesome foods and decent housing, and education linked to efficient use of healthcare. Others are related to differences in access, such as health insurance coverage or income needed to obtain services, ease of obtaining services, and discriminatory practices of providers and policy makers. Two key sets of factors influence the quality of health and healthcare delivery: demand-side factors like population characteristics and living environment, and supply-side factors like healthcare facilities and services offered. The interplay between these factors ultimately determines the health outcomes of a population.

In the literature, healthcare utilisation has been variedly defined. Donabedian (1973) defines it as the outcome of interaction between health professionals and patients. According to Carrasquillo (2013), it can alternatively be described as the proportion of people who use a certain service compared to those who are eligible for it over the course of a given time (for example, the past three years) or as an overall figure without a denomination. On a macro level, it is the ratio of the total amount of health services used over a certain period of time and the population (for example, per 1000 people) (Carrasquillo, 2013). Traditionally, healthcare utilisation measures have commonly been articulated by outcomes and volume of services (Da Silva et al., 2011), such as number of hospitalizations per year or number of visits (Andersen & Newman, 2005). In other definitions, aggregate indicators are used to represent health service use. For instance, Arcury et al., (2005) based their description on the total number of visits made to practitioners and health facilities during the preceding year. This could be done separately for chronic care visits and routine check-up care. Several studies in the extant literature

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have relied on the number of medical visits to carry out services utilisation analyses with multivariate regression (Andersen & Newman 2005; Bíró, 2009; Bukari & Koomson, 2020; Koomson et al., 2023; Lourenço et al., 2006).

In line with the prevailing literature (Andersen & Newman 2005; Bíró, 2009; Bukari & Koomson, 2020; Koomson et al., 2023; Lourenço et al., 2006), healthcare utilisation is defined in this study as whether a member of a household consulted a health practitioner or visited a health facility. Since the urgency of the utilisation of healthcare services can be different for being ill/injured and not ill/injured, separate analysis is done for only households with ill/injured members.

The Concept of Labour Force Participation/Employment

Labour force refers to the sum of the number of persons employed and the number of persons unemployed but searching for job. Labour force participation rate is used to indicate the number of persons in the labour force as a percentage of the working-age population. Conceptually Labour force participation has been used in economic literature to represent the issue of the working-age population in a country or jurisdiction differentiated in the lines of those working and those not working but open to job opportunities. This implies that labour force participation is used to refer to individuals who are employed and those who are unemployed but are seeking for job. If the individual is working, then the person described to be employed. In official statistics labour force participation data are usually segregated to capture existent inequalities particularly for gender. Commonly depicted as a percentage, the female labour force captures the extent of women's participation in the workforce. It encompasses individuals aged 15 and above

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who contribute to the production of goods and services within a defined time frame. Pimkina and Flor (2020) refer to female labour force participation (FLFP) as the decision of women whether to work or not. In this thesis labour force participation comprises of people who are working and those not working. Those working are considered as employed and those not working are referred to as unemployed. The decision to work or not is indicated in the literature to be influenced by several factors including education, age, location, marital status, fertility, number of children. Grigoli et al., (2020) suggest that labour market policies, structural transformation and gains in educational attainment affect employment.

Maternal employment refers to the labour force affiliation of mothers with children 0 to 18 years and includes those in full time job, part-time, contracting and working outside the home (Anafarta, 2011; Lerner, 2001). Temitope (2015) defines working mothers as married or unmarried women who have children. In most studies, maternal employment is indicated by employment status, that whether a mother is working or not working. The level of pay, the contrast between market and reservation wages, the degree of education, technology, leisure time, and skill-sets are typically some of the characteristics that define mothers' job status. (Borjas, 2016). Other factors may include financial condition of husband (Duflo, 2011), desire to improve the standard of living of the families and main their career (Heilman & Okimoto, 2008). Mendolia, (2014) also suggest that the desire of mothers to improve social life and networking also affects their decision to work or otherwise. In recent times most women have understood the importance of financial freedom in both household and outside household decision making

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and therefore aspire to be independent financially. This may influence their decisions regarding employment (Hasanah et al., 2017).

The Concept of Intention to Leave a Job

Intention to stay in a job reflects an employee's commitment and desire to continue working in their current organisation (Hansen et al., 2003; Presbitero & Teng-Calleja, 2020; Ryu et al., 2021). As Jang et al., (2023) define it, it's essentially the opposite of turnover intentions (Kim et al., 1996). Think of it as an employee saying, "I'm happy here and want to stay." Intention to leave, on the other hand, indicates an employee's plan to exit their current position and seek new employment opportunities. This can be driven by various factors, such as dissatisfaction with the current job, a desire for career advancement, or a better offer elsewhere. As Mowday et al., (1982) put it, intention to leave signifies an employee actively looking to "depart from their current job." Both intentions to stay and intention to leave are complex concepts with multiple facets. For instance, intention to stay may involve strong feelings of loyalty, connection to colleagues, and satisfaction with the working environment. Intention to leave may be triggered by specific concerns like inadequate salary, lack of growth opportunities, or a toxic work culture.

Dissatisfaction can be a powerful predictor of whether an employee stays or goes. Research shows that employees unhappy with their pay (Tyler & Cushway, 1992; Tzeng, 2002), work-life balance (Arshad & Puteh, 2015), or lack of career opportunities (Worku et al., 2019) are more likely to seek new jobs. Even factors like unfair performance evaluations or low overall staff commitment can fuel the urge to leave.

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The Concept of Grade Progression

The definition and measure of education outcomes especially for children continue to evolve. Popular measures and indicators of child education outcomes include cognitive development, gross enrolment and net enrolment rates. These indicators are however unable to provide accurate information on over aged and under age situations in the education system (Hossain, 2010). Age-in-grade is an indicator of children education progression which has not seen quite prominent (Brown & Forcheh, 2014). It is able to capture the issues of under age and over aged students. Age-in-grade congruence essentially deals with children who are in the right grade based on their age or not. According to Hossain, (2014) two groups of children can be identified. Children who are in the right grade based on their age as required. For example, a six (6) year old child in grade 1 or a seven (7) year child in grade 2. The second group is made of children who are not in the right grade.

Brown and Forcheh (2014), indicate that this group can be divided into two (2) over aged children, meaning children older than their grade and under age children also meaning children younger their grade. In many cases, issues of under aged children has not been considered a problem, but for overaged children since studies have suggested its negative impact on an individual's life time income. Over age children may be caused by late enrolment or repetitions. Late enrolment according to Hossain is a complex issue, because it may involve people's perception of education, health and nutrition, illiteracy and poverty and education policies on enrolment and repetition.

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The concept of Information and Communication Technology

The concept of Information and communication technology (ICT) is an umbrella term referring to digital communication links replacing analog communication links and the demand for professionals who have the knowledge and skills to manage the convergence of this skills. Therefore, the concept has two broad areas: the technologies and the human interface. Some dimensions of the link between the technologies and humans include, access, adoption, usage, diffusion, training and literacy.

Information and communication technologies (ICT) encompass a vast and ever-evolving landscape of tools and resources. From the familiar confines of computers and the internet to the dynamic world of social media and mobile communication, ICT allows us to transmit, store, create, share, and exchange information in countless ways. United Nations Conference on Trade and Development (2009) aptly defines this diverse ecosystem as the engine driving our increasingly interconnected world. When measuring the reach and impact of ICT, researchers often focus on key indicators like mobile access, internet connectivity, and digital literacy, highlighting the critical role these factors play in bridging the digital divide and unlocking the full potential of this transformative technology.

Healthcare utilisation (health service use) in Ghana

The Government and stakeholders have in the past couple of decades engineered several means to increase healthcare utilisation in Ghana. The major policy that is known to have significantly increased the use of health services in Ghana is the National Health Insurance Scheme (NHIS) introduced in the year 2003. Since 2004, household utilisation of health services has

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increased as a result of the implementation of NHIS. The scheme is a social intervention program aimed at providing financial access to quality health care for residents in Ghana.

In Ghana, the National Health Insurance Scheme (NHIS) has acted as a catalyst for a healthcare utilisation (Ameyaw et al., 2017; Budu et al., 2020; Nketiah–Amponsah & Arthur 2013; Sekyi et al., 2022). For example, Nketiah–Amponsah and Arthur (2013) indicated that in 2005 outpatient utilisation increased from 0.6 million to 16.9 million in Ghana due to the implementation of the National health insurance scheme. Though enrolment in the NHIS increases healthcare utilisation and reduces out-of-pocket expenditure (Akazili et al., 2014; GSS, 2014; Jehu–Appiah et al., 2011;), it is estimated that about 48% of the population are still not enrolled and for those who were enrolled on the scheme, 30% of those who have dropped out due to several reasons (Sarkodie, 2021).

Issues have been raised about the efficiency and sustainability of the NHIS due to varied complaints from patients and service providers. Some patients suggest that the service provided does not meet their health needs, since they usually buy most of the prescribed drugs. Apart from the challenges of the NHIS that may be leading to reduction in healthcare utilisation, other reasons could also be ascribed.

Several factors contribute including personal characteristics like biology and environment, lifestyle choices including access to healthy food and housing, and healthcare knowledge influenced by education contribute to health disparities. Additionally, systemic barriers including financial costs, accessibility of services, and even discriminatory practices within the

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healthcare system further exacerbate these disparities. These factors could be categorized into the demand side factors which are mainly population characteristics and environmental the factors.

The supply side factors are the facilities and services that the health sector makes available for patients to make it attractive for them to visit the facility. The interaction between the demand and supply factors determines the quality of health of the people and the quality-of-care delivery. Some supply side factors in Ghana are National Health Insurance Scheme (NHIS), implementation of CHPS, availability of human resource, and investment in health infrastructure (MOH, 2021). According to the Ministry of Health (2021), the quality of healthcare delivery is realized in the outcome of health indicators such as OPD per capita, Proportion of mothers who made at least four ANC visits, 'proportion of newborns (mothers) receiving postnatal care (PNC) within 48 hours from birth, proportion of deliveries attended by trained health workers and acceptance of family Planning'. Outpatient service utilisation, as measured by the 'number of outpatient department (OPD) visits per person per year', is one of the recommended core indicators of health service delivery (WHO, 2018).

The World Health Organisation (WHO) in 2018 less frequent outpatient visits may suggest restricted accessibility or below average service quality. An investigation conducted across 130 countries in 2016 revealed a global age-standardized utilisation rate for outpatient services at 5.4 visits per individual annually (Mark et al., 2019). Though data trends show OPD utilisation improvement in Ghana over the years and across health facilities

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however, the values are relatively less than 1.2 visits as shown in Figure 3 below.
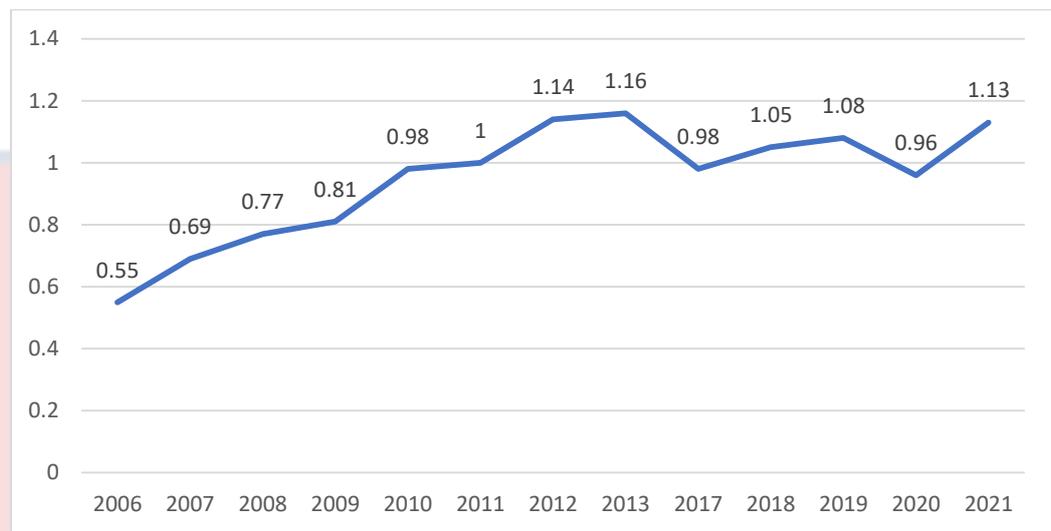
Figure 3: OPD visits per person per year
Source: Authors' construct using data from Ministry of Health (2018, 2021, 2022)

In terms of gender differences, a study by Fenny et.al (2016), shows that women accessed formal healthcare services more than men due to the fact that few men are enrolled in the NHIS. In addition, the economic circumstance can make men who were not able to pay the premiums of all members of the household (women and children) not to be insured. A study by Boachie (2017) also showed that females make use of health facilities than males. The study also showed that out of a population of 332 elderly persons suffering from hypertension in Ghana about 78.61% utilised outpatient healthcare services.

The proportion of expectant mothers aged 15-49 who undergo at least one antenatal care (ANC) visit annually falls below the revised guidelines set by the World Health Organisation (WHO) in 2016. The guidelines recommend a minimum of eight contacts with ANC services for comprehensive preparation for delivery and complication prevention. Disparities in rural-urban and regional service delivery and utilisation were highlighted in a study

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by Abor et al., (2011). The research found that rural residents face challenges accessing ANC services compared to their urban counterparts.

Conversely, Dixon et al., (2014) argued that socio-economic and demographic factors are not barriers for pregnant women enrolled in the National Insurance Scheme (NHIS) to access ANC services. The study revealed that pregnant women with formal education, residing in urban areas, and possessing considerable wealth are more likely to have more ANC visits than those without formal education. Additionally, Galaa and Daare (2008) suggested that, despite high health facility delivery rates in the northern region, supervised normal health delivery care is mainly patronised by affluent, non-literate urban women and the educated. The study highlighted that social and physical access constraints lead to supervised health delivery being considered an option for pregnant women experiencing complications associated with pregnancy or labour.

According to Buor (2004), the utilisation of health services is influenced more by the quality of service, health status, cost of service, and education for males than females. Conversely, factors like distance and wealth have a more substantial impact on female usage. The 2014 Ghana Demographic and Health Survey (GDHS) revealed that nearly 74% of mothers residing in rural areas were less likely to receive early postnatal check-ups compared to other subgroups. In a study by Dotse-Gborgbortsi et al., (2020), it was noted that women in rural areas of Ghana experienced a travel time to reach the hospital that was 4 km longer than that of their urban counterparts. The same research indicated that an increase in distance significantly reduces maternal healthcare utilisation. Additionally, the distribution of health

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facilities in Ghana is reported to be skewed in favor of urban centers (Dickinson & O'Flynn, 2016). This imbalance suggests that women in rural communities may face disadvantages in terms of accessing prenatal care.

Child Education in Ghana

At the center of most educational policies is the greater emphasis on children education and particular attention on girl child education especially in the global south. A specific and an effective assessment of educational progress is by outlining attainment in net enrolment ratio in primary school, proportion of pupils starting grade one who reach grade 5; and the literacy rate of 15–24-year-olds. The general trend in the enrolment rate of primary schools in the global south have increased from 83% in 2000 to 91% in 2015 (Ki-Moon, 2015).

With regards to the number of out-of-school children of primary school age, there has been a significant improvement worldwide from an estimated 100 million in the 2000 to about 157 million in 2015. This means that there was about 43% improvement in the completion rate of students from 2000 to 2015. The trend analysis of the global completion rate shows a gradual increase in the last twenty years from 81.95% in 2000 to 90.14% in 2020 as shown in Figure 4.
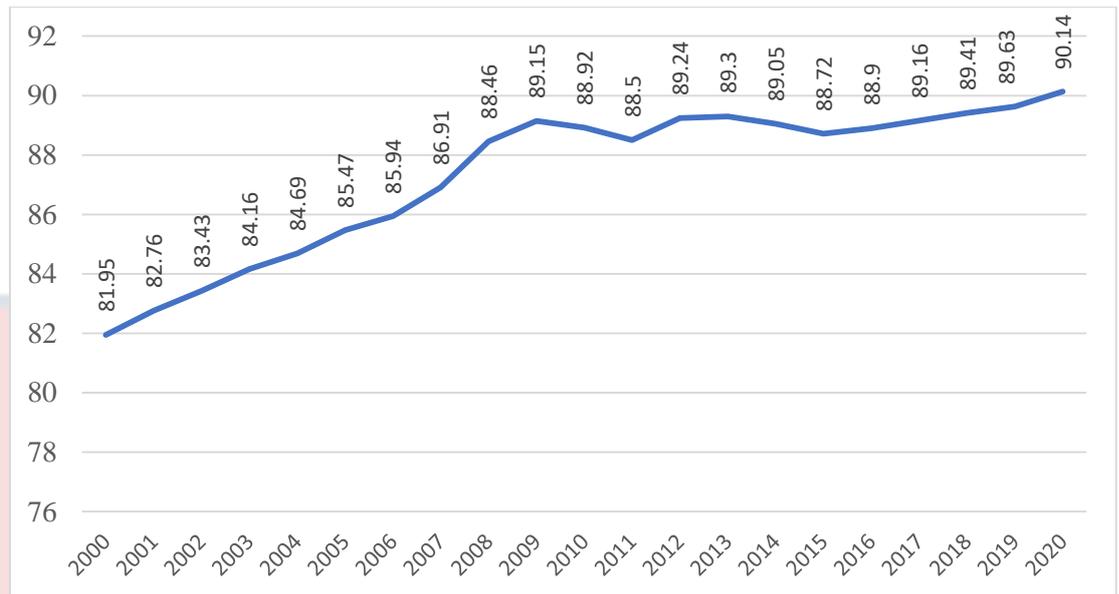
Figure 4: Global completion rate
Source: Author's construct (2023) using data from UNESCO, 2019

Data from UNESCO in 2019 shows that Ghana's primary completion rate has increased steadily over the years from 69.1.4 percent in 2000 to 93.8 percent (Figure 5). The lowest completion rate over the period was in 2001(65.4%) while the highest rate of primary completion was 2015 (98.8%). The increase in the primary completion rate is partly because of the significant interest in the education of all children in Ghana by successive governments. Most of such interest has been expressed in the various educational policies implemented over the years is to guarantee that all children in Ghana have access to a primary education. Examples of such polices are the Free Compulsory Universal Basic Education (FCUBE) policy of 1996; School Feeding Program of 2005); and the Capitation Grant of 2004 (Ofori-Birikorang et al., 2020).

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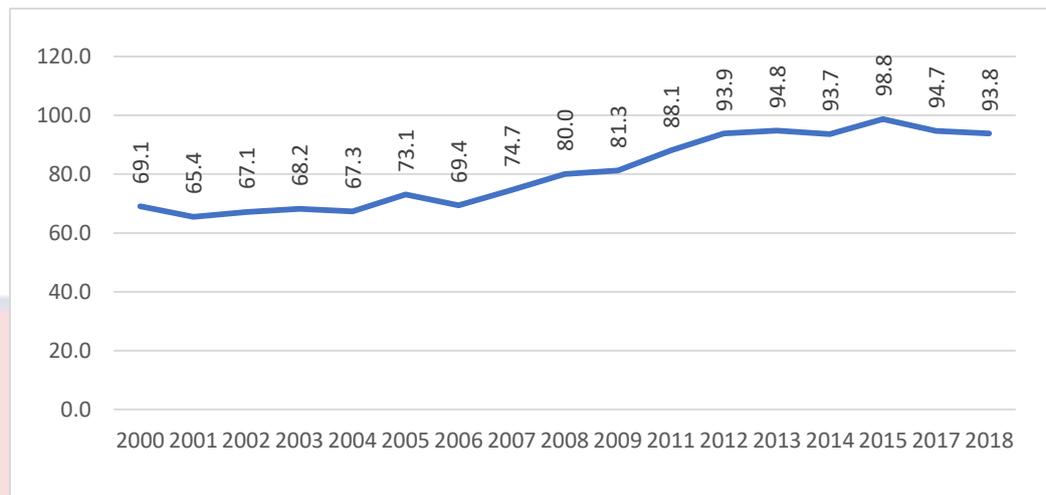
Figure 5: Primary completion rate, total (% of relevant age group)
Source: Author's construct using data from UNESCO, 2019

Despite the gradual increase in primary completion rate, there exist disparities in gender (male and female) as shown in Figure 6 below. The female primary completion rate is generally low compared to the males. However, in 2012 it was observed that female completion rate was higher than the male completion rate. High completion rates at the elementary and secondary levels of education, according to Acheampong (2010), are crucial for Ghana to build a skilled workforce and reach its goal of middle-income status. As young Ghanaians move from primary to secondary education, the benefits of education more than triple (Ackah et al., 2014). Furthermore, Ghanaians with educations beyond JHS make 80% more money than individuals with only JHS education (Ackah, et al., 2014).

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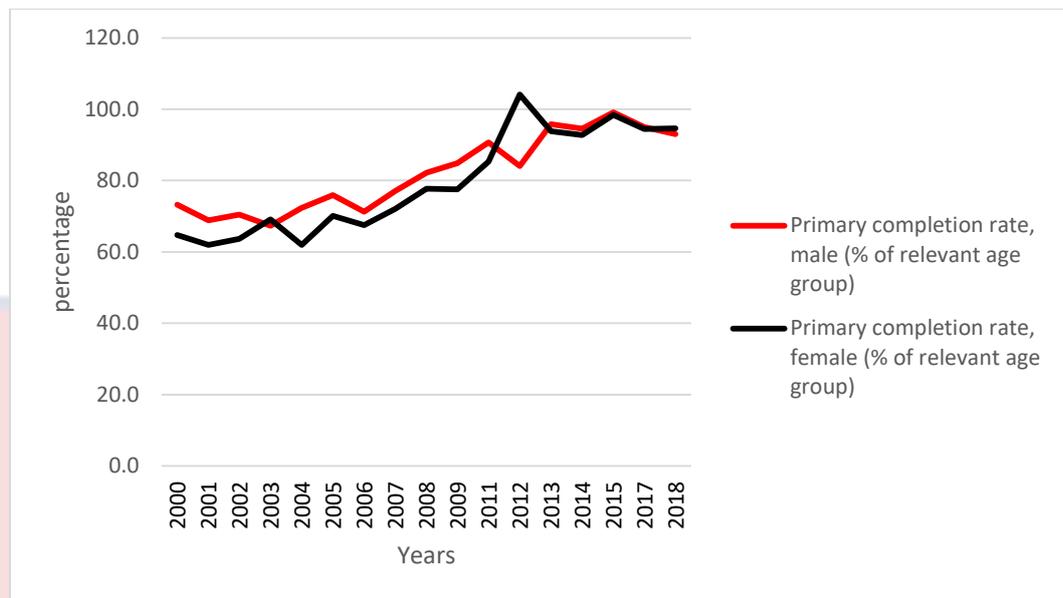
Figure 6: Primary completion rate by gender
Source: Author's construct using data from UNESCO, 2019

Moreover, the United Nations Development Program (UNDP) reports an increase in student enrollment and completion rates. However, the report highlights a challenge in the transition or progression of Junior High School (JHS) students to Senior High School (SHS) (UNDP, 2015). Although the percentage of students enrolling in primary and junior high schools remains high (94.9% in primary schools and 80.6% in junior high schools), the transition to senior high school is notably low at 33.9% (World Bank, 2011). This discrepancy suggests an issue in the seamless progression of students from elementary to higher levels of education. Additional barriers to advancement are evident in a Gross Enrollment Rate of 79.5% compared to a JHS Completion Rate of 66% for the Academic Year 2009-2010. A study by Sabates et al., (2010) on education dropout rates reveals that the period between junior high school (JHS) two and three is critical for students in basic school, with many leaving during this time. Furthermore, students who drop

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out of JHS face challenges in moving to senior high school or tertiary education.

The general progression rate of students to secondary schools in Ghana as shown below in Figure 7 has not been stable and predictable. It increased from 90.6 % in 1971to 96.9% in 1999 then there was a fall (85.3%) in 2000 while 2002 saw an increase to 96.9. the highest recorded over the period was in 2007(99.9) while the lowest in 2000 (85.3).
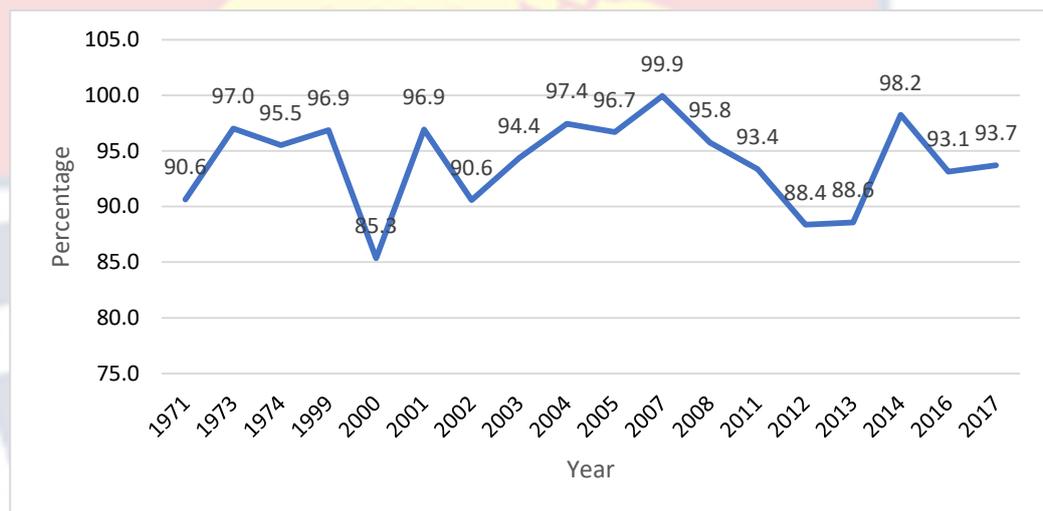
Figure 7: Progressive rate to secondary school
Source: Author's construct using data from UNESCO

The trend, as indicated by Darvas and Balwanz (2014), reveals disparities based on location and gender in Junior High School (JHS) completion rates. For instance, during the 2008-2009 academic year, there was a 4.2% gender gap in the Primary School Gross Enrollment Rate (GER) (male = 97%; female = 92.8%) compared to a wider gap of 6.9% at the Senior High School (SHS) level (male = 36.7%; female = 30.8%) (World Bank, 2011). These gender-based disparities suggest that a higher proportion of female students drop out by the time they transition from junior high to senior high (World Bank, 2011). UNESCO (2019) data indicates that spatial inequality is more pronounced than gender gaps. For instance, the JHS completion rate

disparity between rural and urban areas fluctuated between 20% and 32% from 1993 to 2011. Similarly, the difference in completion rates between the top-performing and bottom-performing regions during the same period varied between 46% and 54%.

Employment in Ghana

Out of 17.3 million persons of ages 15 years and above recorded in 2016/2017, approximately 80% were considered economically active of which 87% were employed. The data shows that 48% of the employed are males and 52 % are females, while for the unemployed, 43% and 57% are males and females respectively (GSS, 2018).

Table 1 below presents a disaggregation of employed population 15 years and older by sector of employment and locality. The data shows that the informal sector accounts for 70.3 %   of the employed, majority of whom are found in rural areas. In terms of sex, 27.2% of males and 31.7% of females are found in the formal sector and it is higher in the urban compared to the rural location.

Table1: Employed population 15 years and older by sector of employment, locality and sex (in percentages)

Status	Ghana			Urban			Rural		
	Male	Female	Both Sexes	Male	Female	Both Sexes	Male	Female	Both Sexes
Formal	27.2	31.7	28.7	29.7	33.6	31.0	21.3	26.7	22.9
Informal	72.8	68.3	70.3	70.3	66.4	69.0	78.7	73.3	77.1
Total	100	100	100	100	100	100	100	100	100

Source: GSS, 2018

Figure 8, shows the labour force participation rate (LFPR) trend for Ghana from 1990 to 2019. LFPR is one of the useful indicators used to monitor progress towards national and international development targets such

as the Sustainable Development Goals (SDGs). It shows the proportion of the country's working-age population that engages actively in the labour market, either by working or looking for work. The data shows that, LFPR and male LFPR have been declining since 1990 from 75.85 to 68.95 and 78.87 to 72.84 respectively. For the last five years both have plateaued. Female LFPR however increased from 1990 to 2000 and declined to 2015 then increased marginally to 2018 and again dropped in 2019 to 63.51.
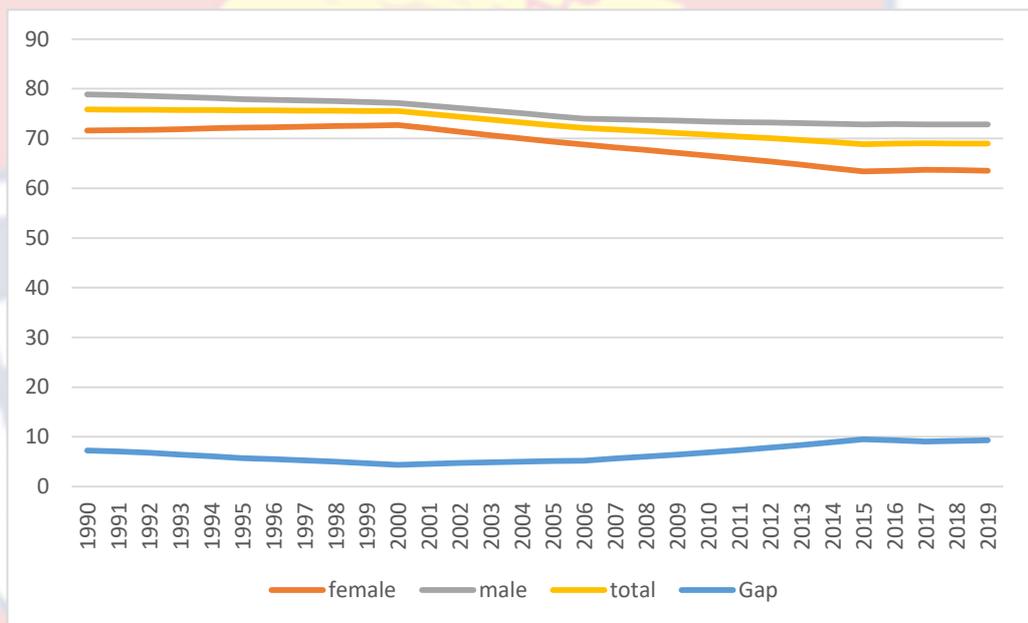
Figure 8: Labour force participation rate (male / female) and gap)
Source: Author's construct (2023) using data from International Labour Organisation

A comparison of reports of GLSS 6 and 7 shows that, employment into wage employment had increased from 2012/2013 when the GLSS 6 was conducted and 2016/2017 when the GLSS 7 was also conducted as shown in Figure 9 below (GSS 2014 & 2018). The figure indicates an increase in total (both sexes) wage employment from about 20% to 33% and appreciable increases in female (11.7% to 14.5%) and rural (8.3% to 12.3%) wage employment.

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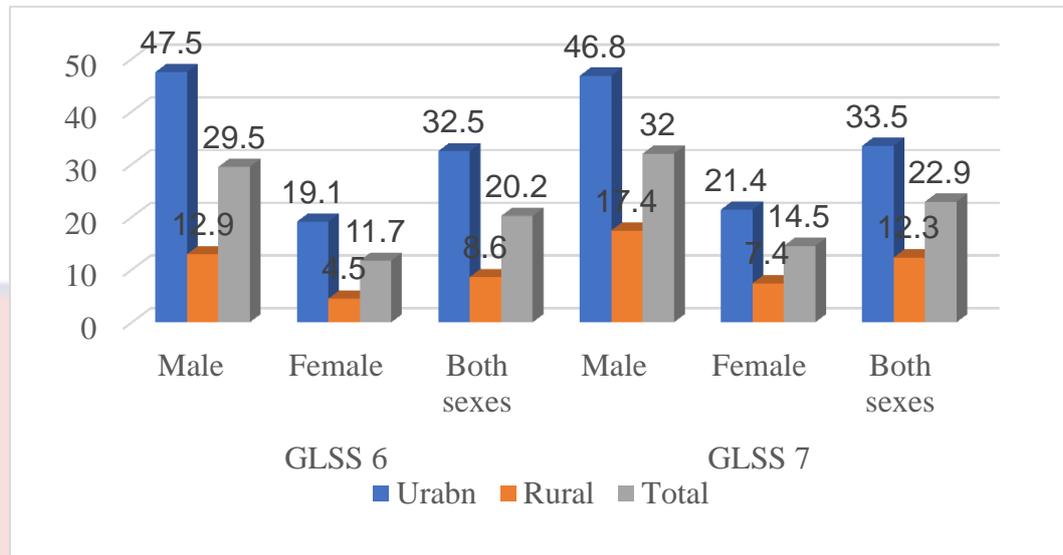
Figure 9: Paid employment 15+ by gender and location
Source: Author's construct based on GLSS 6 and GLSS 7 reports

Womens' employment in Ghana has long presented a significant policy concern. Women's entry to the labour market is hampered in Ghana and elsewhere in Africa by low educational levels, traditional responsibilities, and occupational segregation by gender (Atieno, 2006; Baah-Boateng et al., 2013). Due to this, disproportionately more women than males work in vulnerable employment to support their families. Data from GSS (2016) indicate that 80% of women compared to 65.4% of men work in vulnerable employment.

Most Ghanaian mothers in employment are usually found in informal sector (Waterhouse et al., 2017). Those who find themselves in the formal sector of employment are those who have some appreciable level of access to education (Ghana Statistical Service, 2005). According to Kabeer (2012), education does not only provide the opportunity for mothers to have employment in the formal sector but also enhances their chances of securing decent jobs as well as provide them the prospect to progress in their jobs.

Marriage remains a very important institution in the Ghanaian traditional set-up (Oheneba-Sakyi & Takyi, 2006) in which an obvious

outcome is to give birth to complete the new family (Burke, 1988). In Ghana, where around 71% of the population are Christians, religious beliefs heavily influence gender roles within families (Addo, 2019). The dominant Christian view often portrays wives as "helpers" to their husbands, expected to fulfill traditional caregiving duties while also contributing to household income (Annor, 2014; Addo, 2019). This ties into the broader understanding of motherhood within some Christian communities, where economic participation is seen as an essential part of nurturing and providing for children (Waterhouse et al., 2017). According to Clark (1999) a woman fulfils social expectation by combining her wifely role with an income generating activity.

Ghanaian mothers frequently find themselves navigating the challenging balance between domestic responsibilities and demanding professional careers. Unfavorable social structures, such as the absence of paternity leave and inflexible work environments (Addo, 2019), compound this struggle, compelling many to make difficult choices between family commitments and career advancement (Stockdell-Giesler & Ingalls, 2007). A study by Annor (2014) highlighted the ongoing conflicts experienced by working mothers at the University of Ghana, who grappled with childcare responsibilities and expressed concerns about disruptions caused by child sickness. These systemic challenges contribute to a cycle of guilt and stress for mothers in their attempt to meet societal expectations.

Working mothers in Ghana combine family and career in a landscape devoid of most family-friendly policies like flexible work schedules or employer-supported childcare. They navigate this challenge by forming a support network from both formal (maternity leave) and informal sources

within the workplace (Annor, 2014; Mapedzahama, 2014; Mokomane, 2013; Öun et al., 2005). While legislation like the three-month paid maternity leave offers a safety net (Government of Ghana, 2003), it falls short of adequately supporting the long-term needs of working mothers in carrying out their responsibilities (Annor, 2014).

In many developing nations like Ghana, the promise of women significantly impacting human capital development remains largely unfulfilled. Societal and cultural norms dictate a gendered division of labour, with women expected to take primary responsibility for household and domestic duties, while men traditionally fulfill the role of breadwinners through paid work (Britt et al., 2020; Boahen & Opoku, 2021). This inequality is starkly evident in Ghana's higher male labour force participation rate and the fact that nearly twice as many men as women hold paid jobs (Boahen & Opoku, 2021). For women who do participate in the formal workforce, this disparity translates to a double burden. Even when contributing financially, they typically continue to shoulder the majority of household responsibilities. Ghanaian women spend, on average, four times as much time on domestic work and childcare compared to their male partners (Owoo et al., 2021).

This unequal distribution of labour not only impedes women's ability to fully contribute to human capital development but also perpetuates negative social and economic consequences for both genders and the nation as a whole. Addressing these underlying gender norms and implementing policies that promote a more equitable distribution of domestic and professional responsibilities is crucial for unlocking the full potential of women.

Information Communication Technology in Ghana

In 1994, Ghana set the stage for an ICT revolution with its first five-year Accelerated Development Plan (ADP). Recognizing the transformative power of technology, the plan aimed to dramatically increase phone accessibility. The target was to increase phone penetration from 0.31% to 1.5-2.5% through public and private pay phones, expanded mobile coverage, and a push for Ghanaian ownership. To keep the reins on this rapidly growing sector, a single regulatory agency was established, ensuring both progress and public control (Frempong et al., 2005).

In 2003, Ghana formulated its ICT for Accelerated Development (ICT4AD) policy statement, officially adopted in 2004 with an operational lifespan of 15 to 20 years (Kabuga et al., 2021). The ICT4AD policy aligned with Ghana's Vision 2020 Socio-Economic Development Framework, the Ghana Poverty Reduction Strategy (2002–2004), and the Coordinated Programme for Economic and Social Development of Ghana (2003–2012). Developed by the National ICT Policy and Plan Development Committee established by the Government, ICT4AD aimed to create an ICT-led socio-economic development policy. The program's primary objective was to enhance universal access and service while improving the quality of service (QoS). Consequently, the policy sought to enhance an ICT-led socio-economic development process, envisioning Ghana as a middle-income, information-rich, knowledge-based, and technologically advanced economy and society (Republic of Ghana, 2003).

As noted by Frempong et al. (2005), the policy resulted in increased government expenditure on ICT infrastructure and capacity building.

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Initiatives like phone booths, community information centers, and the One Laptop Per Child program expanded connectivity, particularly in rural areas. Additionally, measures such as the liberalization of the ICT space to allow multinational participation and the construction of fiber optic lines were undertaken.

As Ghana embraces the transformative power of information and communication technology (ICT), efforts have been directed at consciously introducing it into the nation's key economic sectors. Some notable examples include, recognizing the crucial role of ICT in preparing future generations for a technology-driven world, the 2007 educational reform marked a turning point. For the first time, science, technology, and ICT were not just incorporated but emphasised, laying the foundation technology knowledge-based workforce. The Ghana–India Kofi Annan Centre of Excellence in ICT (AITI-KACE) was also built to foster a vibrant ecosystem for cutting-edge ideas and practical applications. This collaborative effort between Ghana and India provides a dynamic platform for teaching, learning, and research, driving ICT-for-development (ICT4D) initiatives across Africa. The Ministry of Health, in 2007 also included "Health Information for policy" in its annual programme of work (MOH, 2007) and published the Ghana e-health strategy 2010 as part of ICT4AD strategies (Afagbedzi et al., 2013).

Mobile Telephony

Many Ghanaians both educated and uneducated have become so used to technology that, smartphones have become necessities (Okae, 2018). In fact, by the end of 2019, mobile phone adoption was about 55%, higher than the sub-regional average of 44.8% indicative of huge interest in technology.

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The government has based on this to offer and rolled out national policies including the deployment of a digital addressing system termed as the Ghana Digital Property Address System. Table 2 below indicates the progress of ICT diffusion from 2002 to 2019. Fixed-line penetration has increased from 13 per 1,000 persons before 2002 to 935 per 1000 by the end of 2019. For mobile phones use it was 7 mobile phones per 10,000 people in 2002 and has increased to 120 mobile phones per 100 people in 2019 (Hootsuite and We Are Social, 2019).

Table 2: Ghana's ICT Growth

	2002 estimate	2019 estimate
	US$42.5bn	US$67.077
Fixed telephone lines per 1000	13	935
Mobile phone per 1000	0.7	1,367.9
Internet users per 1000	0.1	480

Sources: We Are Social (2019)

For the country to fully benefit from the use of mobile phones, it should be equally accessible to rich and poor, males and females, northern and southern inhabitants, and rural and urban dwellers. A survey conducted by the Ghana Statistical Service (GSS) on behalf of the National Communication (NCA) in the year 2020 suggest that at the national level, 54.1% of individuals aged 5 years and older own a mobile phone. In terms of location (rural/urban), individual who own mobile phones is about 63.2% and 44.8% for urban and rural dwellers respectively. The survey also indicates that more males (56.0%) than females (52.4%) five years and older own mobile phones. Regional disaggregation also show that individual ownership of mobile phones is highest (73.7%) in the Greater Accra region and lowest (36.3%) in the Upper

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West region. Ten (10) out of the sixteen (16) have individual percentage ownership less the national average of 54.1%.

The type of phones used by individuals differ based on level of education. The ownership of smartphones increases with higher level of education. As shown in Figure 10, about 20% of individuals tertiary education own a basic phone type of phone and 96% own smart phones. For those with no education, about 80% own basic phones and 12% own smartphones. The study also indicate that ownership of smartphones is higher for males than for females and for urban dwellers than rural dwellers. Majority of individual mobile phones is mainly for personal use. Only 0.5% of individuals use it solely for business.
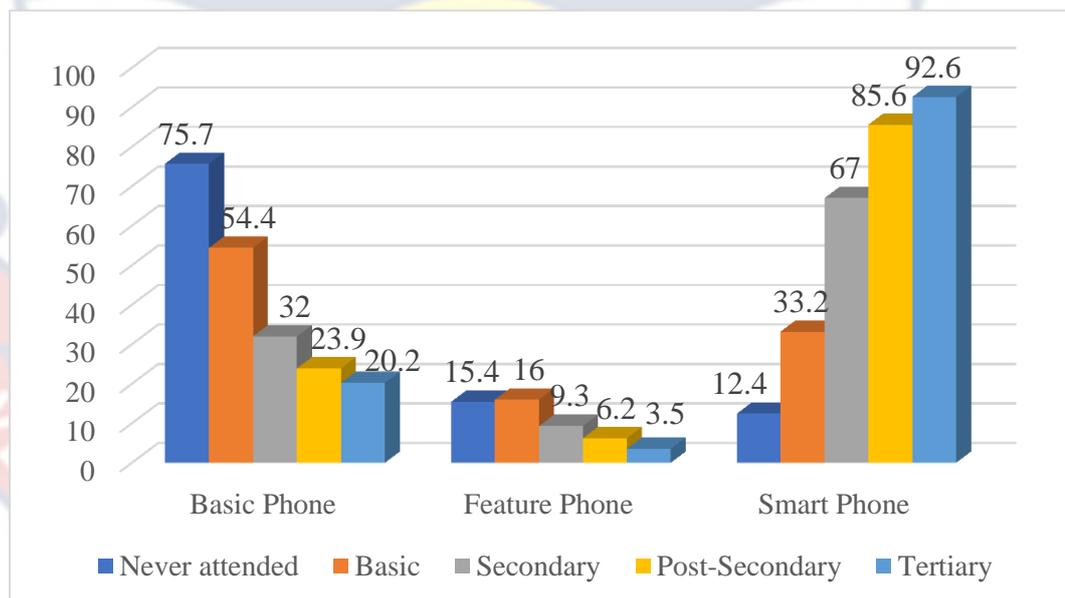
Figure 10: Type of mobile phone owned by educational attainment
(individuals 5 years and older)
Source: NCA, 2020

Internet Usage

Internet accessibility and usage is gaining momentum all over the world especially in developing countries. In the case of Ghana, efforts have been made through investment infrastructure development to increase internet

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penetration. As at 2020 with a population of 31,072,940, the recorded number of internet users in December 2019 was 11,737,818 thus 37.8% of the population, per internet use. Fixed broadband Internet subscribers in Ghana was reported at 62,320 in 2018 (World Bank, 2018). Although these interventions have occasioned substantial improvement, quite a number of challenges still persist. Though not surprising, there is still a wide gap between rural and urban dwellers as well as males and females. The percentage usage of internet for three (3) months based on the household survey on ICT in Ghana is 63.2% and 40.8% for urban and rural inhabitants respectively. Internet use for the rural area is lower than the nationwide average of 55.6%. Again, more males (60%) use the internet compared to 50.2% for females. Another thorny issue is the cost of internet data as well as ICT gadgets such as modems, laptops and smartphones.

As Ghana's digital landscape continues to thrive, the demand for new skills is projected to reach nearly nine million people by 2030 which translates to about 20 million training opportunities (IFC, 2019). However, the training requirements extend beyond newcomers, encompassing the need for ongoing upskilling among the existing four million digitally adept workers. This dynamic necessitates a substantial 19 million digital training experiences by 2030 – five million for those entering the workforce and four million for enhancing the skills of current employees (IFC, 2019).

Household ICT products and services

Household ownership of ICT products and service provides access to information, opportunity to communicate, educate, entertain and also work from home. Household ICT products and services may include internet access,

television, radio, desktop/laptop and accessories, DVD/VCD/cassette player and satellite. Household ownership of these products and services unfortunately differs in terms of location of household, household wealth and sometimes characteristics of household head. Nationwide ownership of radio according to the household ICT survey is 70.1%. Close to 72% of urban dwellers own a radio set while 68% of households in rural localities own radio sets. The nationwide percentage household ownership is slightly lower for ownership of a television when compared to ownership of a radio set. It is however higher for households in urban areas (82.4%) and lower for rural localities (51.7%). The study also indicates that access to internet is higher for urban households than rural households.

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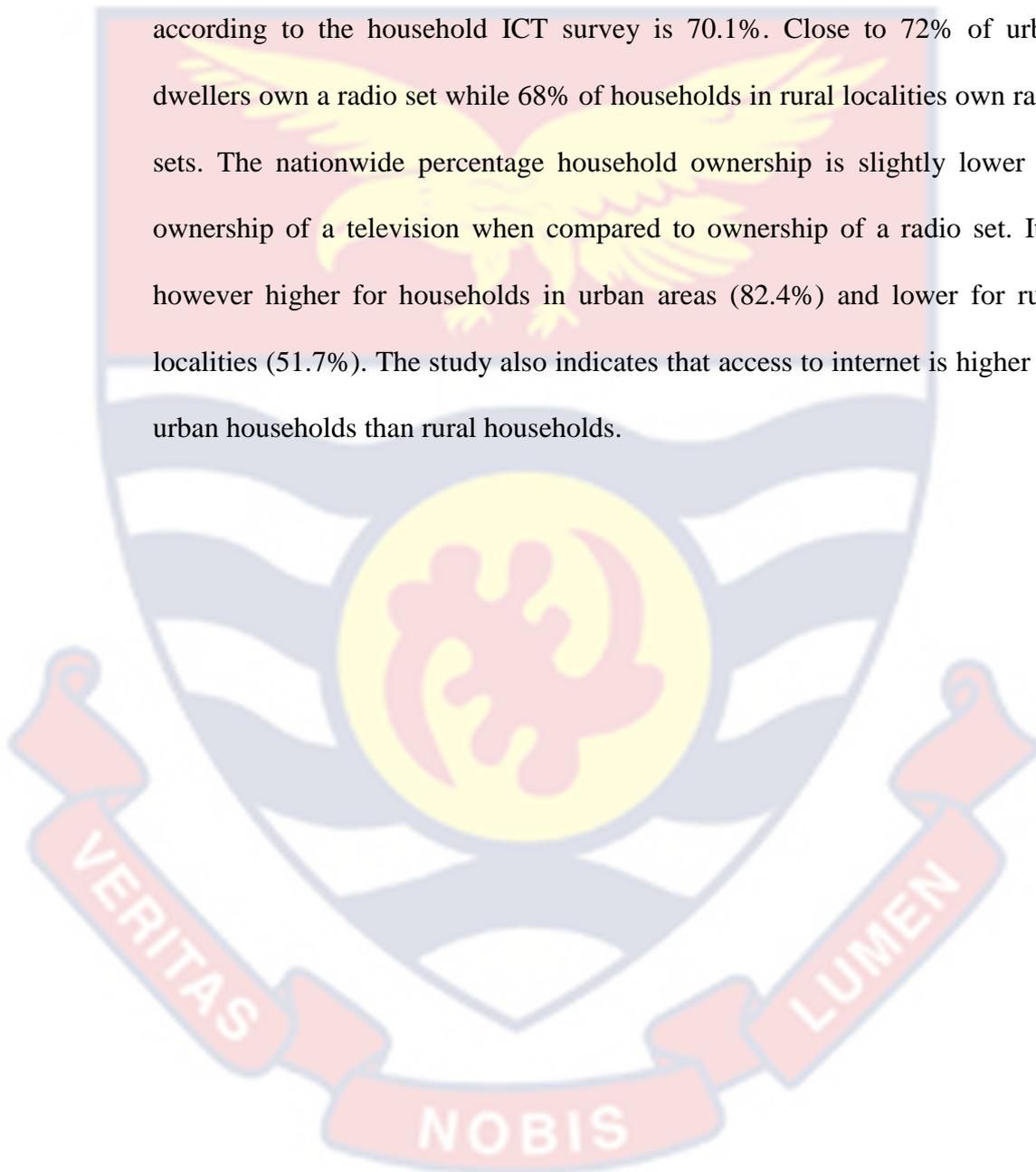
CHAPTER THREE

REVIEW OF RELATED LITERATURE

Introduction

This chapter is used to explore theoretical perspectives of the study and empirical literature on human capital development including education and health, as well as employment, and information and communication technology. Its purpose is to establish a solid foundation for the study and contextualise it effectively. The chapter is organised into two main sections. The first part offers a review of theoretical literature, providing the conceptual framework for the study. The second part synthesises existing empirical research, contributing to the differentiation and uniqueness of this study within the current body of knowledge.

Theoretical Review

There are quite a number of theories that are used to contextualise issues relating to human capital development, LFP, maternal employment, healthcare utilisation and ICT. The theoretical basis for this work is outlined as below.

Human capital theory

The human capital theory serves as model to underpin this work. The earliest trace of human capital theory is mostly linked to Schultz and Becker in the 1960s and has received alterations over the years. In Becker's view human capital is referred to "investment in education, training, skills, health, and other values that cannot be separated from the individual" and that investing in human capital means "all activities that influence future real income through the embedding of resources in people". Other scholars including Schultz

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(1990) see it as an investment in education and training of individuals. To some it is the abilities and skills of human resources Okojie (1995) and for some it remains a process geared towards enhancing among others the skills and abilities of employees. According to Becker's theory of human capital, education, medical expenses, and lectures on the need of punctuality and honesty are all forms of capital (Alika & Aibieyi, 2014). In terms of households, it essentially comprises of anything that can help increase returns of household members. In the field of labour economics, the conventional perspective regards human capital as a collection of skills and characteristics that enhance a worker's productivity. The many definitions of the human capital provide various dimensions and extensions in many areas including education, health, and nutrition. In the context of this study, Becker's of human capital that indicates investment in education, training, skills and health provides the best template for this study. The model will enable linkages of other human capital models that relate to health and education.

Models of household health

The study of household health has been approached diversely due to its significance and multifaceted nature (Anderson, 1973; Hershey et al., 1975; Muller, 1986). According to the WHO, health refers to a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity (WHO, 1946). Health is considered by health economists as a durable good or a form of capital that provides services. Human capital theory underscores the importance of health, as poor health constrains the ability to develop or employ one's skills. Improvement in health enhances participation in the labour force and economic output (Holt, 2010). Moreover, being unwell

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restricts the quantity of hours worked or impairs productivity while at work, leading to further production loss. The economic cost of ill health encompasses the expenses incurred for treating poor health and the value of the loss in output due to the inability to work (Holt, 2010). The analysis of health demand, grounded in the human capital framework, originates from the formalisation by Grossman (1972) and has seen subsequent extensions and modifications.

Extended Grossman theory of health demand

The connection between maternal employment and household healthcare utilisation is supported by several theoretical frameworks, with the Grossman theory of healthcare demand being a key contributor. This theory, developed by Grossman (1972; 2000), underscores health as an asset that individuals accumulate, with individuals investing their time and utilising transportation services to seek health maintenance care. Grossman incorporated Berker's (1964) model, treating the 'investment' in health as a type of human capital through a health production function that views the individual as an isolated health producer. Jacobson (2000) and Bolin et al., (2001) extended the Grossman model, shifting the focus from individual health production to the family as a producer of good health. In this model, each family member is concerned with their own health and that of other family members (Jacobson, 2000). Bolin et al., (2001) introduced a fundamental dynamic model to indicate the demand of the commodity "good health," conceptualising the household as the producer of "good health," where resources for production are negotiated among spouses.

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In this context, a mother's engagement in economic activities not only contributes resources that complement household expenditures but also empowers the mother to participate in household health decision-making. Unfortunately, the demand for health within households comes with a positive cost, as highlighted by Wagstaff (1986), and consumers are subject to budget constraints due to limited resources.

Andersen's behavioral model

Healthcare utilisation of an individual or household is influenced by enabling, predisposing (including occupation) and need factors (Anderson 1995). To explain the why (and how) of healthcare service use, Andersen developed the behavioral model of health service use. According to the concept, factors such as predisposing factors that affect acute healthcare service usage, enabling factors that enable or hinder use, and subsequently perceived healthcare requirements all affect how often people utilise these services. Empirical studies submit that the determinants of healthcare utilisation include socioeconomic status (e.g., age, income, gender, region) need factors (illness severity and health status) and membership to mutual health insurance (Kim & Lee, 2016; Leach et al., 2022; Lee et al., 2016).

Rational choice model

The rational choice theory explains that people usually take into consideration the costs and benefits of making a choice in decision making. One's own personal preferences may have an impact on how much something costs, risks, and benefits them. Resources accruing are expected to be used to supplement household expenditure to improve welfare in the household for children, with the majority of the household resources typically going toward

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education and health (Klasen & Pieters, 2015), assuming the return to maternal employment is higher outside the home than inside (Duflo, 2012).

The possible channels through which this may have an impact on healthcare use and spending include (i) a direct income effect, in which case more money is made available for using health services as well as for purchasing a more varied food basket (Blumberg, 1988; Gummerson & Schneider 2013; Maity, 2020; Quisumbing & Maluccio, 2000; Tucker & Sanjur, 1988), (ii) when participation in paid work increases, it creates income for the household but it could also reduce the time for unpaid activities that provides goods for self-consumption (Grosch et al., 2006). This is because engaging in paid or unpaid activities affects how much time is available for carrying out duties around the house (Grossman, 1972). (iii) An empowering impact that gives women the power to influence the use of prenatal and maternity healthcare (Ahmmed, 2021; Anik et al., 2021; Zaky et al., 2014). Additionally, a rise in mothers' earnings participating in the labour force and their asset holdings greatly enhances their children's health and educational outcomes (Luke & Munshi, 2011; Menon et al., 2014; Qian, 2008; van der Meulen & Kassens, 2018).

Models for household education outcomes

According to the Human Capital Theory, schooling for example enables individuals to gain better skills and knowledge needed to access employment, thus improving productivity and positively impacting economic growth (Becker, 1965; Mincer, 1970; Schultz, 1961). This promotes the implementation and adaptation of new technologies, which are developed continuously (Nelson & Phelps, 1966). Several theories have been used over

the years to explain child development such as maturation, behaviourist, psychoanalytic, constructivist and ecological theories. The ecological theory presents a stronger basis to analyse the effect maternal intention to leave a job on educational development.

Bronfenbrenner's ecological systems theory

Bronfenbrenner's ecological systems theory (1979), also referred to as "bioecological systems theory," offers a framework for examining the connection between maternal employment, maternal job characteristics, and children's educational outcomes. This theory contextualises issues related to a child's development within a system of relationships that shape their environment. According to Bronfenbrenner's theory, the environment consists of multiple layers with each influencing a child's development (Bronfenbrenner & Morris, 2006). The theory emphasises that a child's primary environment fostering development is their own biology, and development occurs through the interaction of the child's evolving biology, the immediate family or community environment, and the broader societal structure. Consequently, changes or conflicts in one layer can have cascading effects across other layers.

The theory delineates four intricate layers impacting a child's development: microsystem, exosystem, mesosystem, and chronosystem. Of particular relevance to this study is the exosystem, which explains the interaction between parents and their workplace, along with work-related issues that subsequently influence the child. Although the child may not directly participate in the events and situations in their parents' work, these factors can indirectly impact the child. For instance, a mother's job satisfaction

or dissatisfaction may release positive or negative forces that indirectly influence the child (Berk, 2000).

The work-family spillover theory

The Work-Family spillover model, crucial to the second chapter of this thesis, proposes a dynamic interplay between work and family spheres. It argues that boundaries do not truly exist, with attitudes, behaviors, and emotions like work stress or job satisfaction readily spilling over and influencing homes and lives. According to Zedeck and Mosier (1990), individuals often carry their attitudes, behaviors, and emotions from one aspect of life to another. For example, experiencing fulfillment at work can contribute to a sense of fulfillment at home (Zedeck & Mosier, 1990). The spillover concept proposes that, within the dynamics of role interaction between work and home, various aspects such as attitudes, behaviors, psychological mood, job overload, and burnout can transfer or extend from one domain to the other (Leiter & Durup, 1996).This interplay can be positive, with workplace fulfillment boosting personal fulfillment. However, it can also be negative, as burnout or psychological strain from work can leak into family dynamics. Belsky's model of parenting determinants underscores this connection, suggesting that parent's occupations indirectly impact child development through the quality of parenting provided (Belsky, 1984). Examining work-family spillover thus unveils four distinct potential experiences namely negative and positive spillover from both work to family and family to work (Grzywacz & Marks, 2000).

Positive work-family spillover pertains to individuals who exhibit enthusiasm for their responsibilities in one domain of life and generate

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positive outcomes that aid them in fulfilling their responsibilities in the other domain (Wayne et al., 2006). Since maternal intension to leave a job is assumed to bring forth negative spillovers to the family especially children, the concentration will be on the negative work-family spillover.

The role-stress theory is frequently employed to explain the negative work-family spillover, positing that conflict arises due to interference and overload (Voydanoff, 2002). Overload occurs when the total time and effort required for all roles become excessively high, while interference results from conflicts among multiple responsibilities, making it challenging to meet role requirements. This typically occurs when demands in multiple roles necessitate simultaneous attention, defined as a type of inter-role conflict in which role constraints from the job and family domains are mutually contradictory in some respect (Greenhaus & Beutell, 1985).

A bidirectional negative work-family spillover affects both the family and the workplace (Carlson et al., 2000; Voydanoff, 2005). A negative work-to-family spillover occurs when a person's workplace roles hinder their ability to fulfill responsibilities at home (Frone et al., 1992). This conflict arises when work expectations are overly demanding and interfere with fulfilling family obligations. Conversely, negative family-to-work spillover involves conflicts or interference where family responsibilities impede the performance of work-related duties (Voydanoff, 2005). This conflict centers on how fulfilling home obligations may hinder meeting work responsibilities. In this study, the focus is on work-to-family spillover, where maternal intention to leave a job is likely to influence children's grade progression through time and resource allocation, as well as their decision-making ability.

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Theories of labour supply

The labour supply model has often been used as the theoretical basis for explaining labour force engagement and employment in most economic studies. This model primarily deals with labour market decisions by individuals and also extended to households. The decision to enter the labour market is made by the individual in the context of their health, ability to take advantage of these possibilities, and the significance or worth of the income they will receive as a result of doing so.

Work- leisure hoice

The theory of work-leisure choice addresses the central question in labour economics which is the decision whether to work or not. It is most essential time-allocation decision in economics. Each person must determine how best to divide up their free time between various tasks like paid work, education, domestic chores, and leisure (Conlisk, 1968). Time spent on each activity rest on the comparison of benefit and opportunity cost (Borland, 2003).

The decision essentially involves dividing the entire amount of time (T) between two competing uses, the time spent engaging in market activity (H) and the time spent engaging in leisure activities (L) (Rassuli, 2005). Essentially the individual chooses the amount of time to offer for work. Apart from the budget constraint that the individual faces, the choice as to participate in the labour force or otherwise is based on whether the individual's prefers leisure to consumption goods or otherwise (Myck & Reed, 2005). The individual decides first of all whether to work or not. The individual then chooses how many hours to work, with the mathematical conclusion that the

total number of hours worked depends on the wage rate, the cost of consumables, and the quantity of nonwage money at their disposal (Leonesio, 1996). This model indicates that, whenever there is an increase in income in a period, it leads to two effects. First, it suggests that more leisure time should be spent (when leisure is considered a normal good), but second, it makes leisure considerably more expensive. The net effect is rather ambiguous. The theory has several limits when it comes to understanding the factors influencing FLFP and the factors determining the gender division of labour in the family or household, despite being useful for describing many labour supply circumstances (Blau, 2001).

Female participation found expression in earlier works of Becker and Mincer (1960) and was formalised for married women LFP in the pivotal study of Mincer (1962). The "theory of allocation of time" of Becker (1965), which addressed the household production model and female time allocation, was one of numerous ideas that were put forth in an effort to re-explain the non-dynamic analysis of labour supply.   These theories sought to find variables linked to women's decisions on how to participate in the labour market. Since women roles have changed significantly from primary responsibilities for childcare and housework to participation in the labour force, time allocation decisions raise conflicts between husband and wife and has consequences for family unity (Ferber & Birnbaum, 1977). Some of these concerns have been addressed by the growing use of bargaining models to discuss family decision-making spear-headed by Manser and Brown (1980). These models make it possible to associate labour force participation decisions

in the household outcomes including health, education and nutrition. A few of the household production models are discussed below.

The theory of bargaining models

The first is the unitary household framework known to be developed by Becker (1981) and explicitly presented by Ellis (1993) which emphasizes a pure income effect, that predicts that any expansion in the household budget set would increase spending on children's education, health and nutrition. regardless of who earns that extra income. For instance, child educational expenditure is expected to increase, if an increase in female labour supply raises total household earnings. This channel is plausible in settings where childcare costs are low and under the assumption that children's education is a normal good. The model assumes a joint decision-making strategy to maximize an agreed objective (Ellis, 1998). If for example, the agreed objective is to get all children in the household to complete tertiary education, all members provide time and resources which is pooled together to achieve the goal. The model is bedeviled with operational challenges based on its definition especially the question of which members decision is regarded as right (Mattila-Wiro, 1999). In most cases it assumed that the head of the household makes the decisions on behave of all the other household members (Becker, 1974; Park, 2007). Given that males in some traditions are automatically heads of household, the preferences of spouses are subsumed into that of males. Extensions of the model among others include household decision making on labour supply, education, and health care utilisation (Alderman et al., 1995).

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The second is based on the collective bargaining model such as discussed by Doepke and Tertilt (2019). The development of the model is attributed to Chiappori (1988) and it is predicated on the idea that, given each spouse's outside options, households operate efficiently, meaning there is no misallocation or waste of household resources. It is seen as an extension of the unitary household model but with different assumptions. As opposed to the unitary household model, the model of collective model of intra-household bargaining could yield differential predictions for the impact of an increase in the labour supply of fathers as against mothers. Its' tenets are built upon the weaknesses of the unitary model as emphasised by many scholars. Alderman et al. (1995) for example question the silence of the unitary model on how resources are distributed in the household. According to Doepke and Tertilt (2019), the identity of transfer recipients matters if men and women value children's education differently. It might predict that, independently from any income effect, higher maternal employment can raise education expenditure by increasing mothers' relative earnings - and therefore their bargaining power - if they derive more utility from children's education than fathers. The collective bargaining model actually incorporates certain factors not included in the unitary model. For instance, in what way will the increase in income of a household member affect the enhancement of education of another member (Mattila-Wiro, 1999). According to Phipps and Burton (1995), the collective bargaining model allows for analysing the influence of external factors. The model is analysed based on the assumption of eccentricity of household members. Decisions are not taking jointly on an agreed objective as in the case of the unitary model. Hence health decisions and education decisions of the

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household could be taken individually regardless of the preferences of other household members.

The third framework is the household production model of Becker (1965). According to Mattila-Wiro (1995), the theory makes use of some aspects of the theory of the firm such as comparative advantage and specialization. In essence, the family is viewed as a production unit that uses labour, capital goods, and raw materials to produce various valuable commodities such as food, cleaning, and reproduction (Becker, 1965). In essence time together with market goods and services forms the basis for the production basic commodities such as health and education. Based on their children's economic capabilities and success, parents are driven to spend their money in their children's education, health, and other qualifications (Becker & Tomes, 1986). The family is supposed to maximize a twice-differentiable utility function according to its production functions, budget, and time constraints, in accordance with the quality-quantity trade-off models (Iddrisu et al., 2017). Within such a framework, maternal employment may raise the opportunity cost of children and, as such, induce women to reduce their fertility in favour of increased educational investments in each child. Children's quantity, quality, leisure, and consumption of market items are all included in the utility function. These variables are all influenced by household and community influences, some of which are unobservable (Iddrisu et al., 2017). Tansel (1997) argues that since education raises children's quality, it is possible to conceptualise the production of child quality as a function of both the amount of time kids spend in school and the amount of money parents spend on their children's education.

Theories of Intention to Leave a job

According to Cohen and Golan (2007), intention to leave has often been theorised as indicator and predictor of real turnover, since behavioral intention according to planned behavior theory generally predicts an actual action (Ajzen, 1991). Due to the difficulty in observing turnover intentions, intention to leave has usually been used as a proxy.

According Halawi (2014), the factors that influence intention to leave can be categorised into individual, organisational, and external factors. The individual factors include stress (Bedeian & Armenakis, 1981) because it causes job dissatisfaction which eventually results in the intention to leave (Halawi, 2014). Demographic characteristics such as gender, tenure, and education level of employees have also been examined to be associated with the intention to leave (Lambert, 2006). Another indicated individual factor is work-family conflict because sometimes work conditions may affect family life by hindering family duties, responsibilities and obligations (Frone, 2003). Some of the organisational factors indicated by Halawi include role ambiguity and role conflict, Career anchors, human resource practices and organisational culture and social support and perceived organisational support. The external factors also include family structure, perceived community support, implications of intention to leave the organisation and others (Halawi, 2014).

According to Halawi, there is an intrinsic relationship between job satisfaction and organisational commitment, both of which closely correlate with the intention to leave the organisation and the profession. Therefore, the framework of job demands-resources (JD-R) which is associated with job satisfaction to contextualise ICT skills in the issue of intention to quit a job.

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According to the Job Demands-Resources (JD-R) hypothesis, employees may influence their own working conditions as well as how their employers treat them (Bakker & Demerouti, 2018; Demerouti et al., 2001). It looks at both the resources an employee brings from home and the resources they use at work (Xanthopoulou et al., 2007). Researchers have observed that people frequently limit their involvement in either their job or their home lives in order to meet the expectations of the other since a person's work and family lives can occasionally have competing demands (Bakker & Demerouti, 2018).

One of the most important propositions of the theory, relevant to this study is that, employees' personal resources such as a home, time and money, knowledge (Hobfoll, 1989) can influence the acquisition important personal and social resources which affect people psychologically. Due to technological advancements that have increased options for job tasks to be accomplished at home, these competing needs are more common (Kinnunen et al., 2016). In fact, studies show that employees are juggling job duties with greater leisure and family time (Sonnentag & Binnewies, 2013). In this study we argue that ICT skills has a positive influence on job satisfaction and their intention to stay in a job, since the skills will allow individual to be able to multi-tax, communicate better and also reduce stress.

Empirical Literature

The extant literature has some studies on labour force participation, employment, healthcare utilisation and information and communication technology. A number of available studies are reviewed in this section in other to contemporise this work. The review is done based on a thematic approach which focuses on four main themes of the thesis: (1) maternal employment

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and household healthcare utilisation , (2) Working mothers' decision to stay or otherwise in current job and children grade progression (3) ICT skills and labour force participation and employment (4) ICT skills and decision to stay or quit a current job.

Maternal employment and household healthcare utilisation

In the discourse of healthcare utilisation, a plethora of factors have been suggested to influence the utilisation of health services by individuals and households. Typically, the regressors used to estimate the health care use equation may be divided into four categories: socioeconomic, health status (need), demographic, and insurance-related factors. Most researchers have used sociodemographic factors and health status (need) variables to explain variations in healthcare utilisation. (Hargreaves et al., 2019 ; Kim & Lee 2016; Mojumdar 2018; Mukherjee et al., 2011; Okunade et al., 2010). However, studies on the relationship between maternal employment and healthcare utilisation are scarce in the literature. A few of the studies that relate to maternal employment and healthcare utilisation are discussed below.

Yadav et al., (2020) leveraged the National Family Health Survey-4 (2015-2016) to analyse the impact of "4Es" – education, employment, economic status, and empowerment – on Indian mothers' utilisation of maternal healthcare services. Using separate logistic regression models for key service indicators like antenatal care visits, skilled birth attendance, and postnatal care, they revealed a strong link between increased education and engagement with healthcare. However, the study's focus solely on mothers and overlooks potential influences within the household dynamics (other family members). It also fails to acknowledge the potential role of Information and

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Communication Technologies (ICT) in facilitating or hindering healthcare access and utilisation.

Brauner-Otto et al., (2019) investigated the complex relationship between mothers' participation in the labour force (FLFP) and child health in Nepal. This study, with data from 860 children and 793 mothers, examined both the type of work (wage, salary, or own business) and its timing across the child's first five years. Using a regression model based on the Chitwan Valley Family Study, they found that mothers' work, particularly low-paying jobs, can negatively impact child health through reduced time spent with children. In effect, the rarity of time may have adverse implications on household health (Gjerdingen et al., 2013). The paper also asserts that the negative relationship has more to do with the wage received in participation. Low paying and low quality of work are associated with poor child health. This could be as a result of reduction in time allocated for the preparation of food by women when they work full time (Mancino, 2011).

The study however overlooked the potential role of Information and Communication Technologies (ICT) in mitigating the time constraints associated with maternal employment. This is because ICT adoption could potentially facilitate communication and childcare coordination, even when mothers are employed. The study also ignored the potential impact of employment on the health of other family members. Maternal employment may affect the health of fathers, siblings, grandparents, contributing to overall family well-being. These limitations highlight the need for further research that explores the nuanced relationship between FLFP, child health, and family well-being, taking into account the evolving role of ICT.

In a study conducted by Macassa et al., (2014), the researchers explored variations in healthcare utilisation based on employment status during a peak economic recession. The data for this investigation were drawn from the "Health in Equal Terms" cross-sectional survey conducted in Gävleborg County in 2010, encompassing 4,245 individuals aged between 16 and 65. Descriptive and logistic regression analyses were employed to assess how individuals' patterns of seeking medical treatment varied based on their employment status. The study revealed a statistically significant relationship between healthcare usage and employment status. In the bivariate analysis, those who were unemployed had odds ratios 1.62 times higher than those employed for utilising healthcare. However, after controlling for other variables in Models II to IV, the statistical significance disappeared, reducing the odds to 0.44. The study indicated that individuals without jobs tended to use health services more frequently than their employed counterparts during the peak of the recent economic downturn.

Various factors, including demographics, socioeconomic status, and health-related factors, contributed to the observed variations in healthcare utilisation. Notably, the study focused on individual employment status and its association with healthcare service use, excluding consideration of the health of other family/household members. Additionally, the study did not explore the impact of Information and Communication Technology (ICT) on the relationship between employment status and health service use, despite the integral role that ICT plays in our contemporary socioeconomic environment.

Ahmmed (2012) examined the connection between women's empowerment and their use of maternity healthcare in Bangladesh, uncovering

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a compelling link. The study's foundation lay in four key measures of empowerment: women's participation in the workforce (LFP), decision-making autonomy, attitudes towards partner violence, and general knowledge level. Antenatal visits, facility deliveries, and postnatal checkups served as markers of healthcare utilisation. Data from the 2011 and 2014 Bangladesh Demographic and Health Surveys was used for the analysis. Chi-square tests revealed initial relationships, while a three-level logistic regression model indicated the effect of relationship between empowerment facets and healthcare use. A positive association between overall empowerment and maternal healthcare utilisation was found. While empowerment was found to be positively linked to postnatal checkups, however it showed a negative association with facility deliveries. This suggests deeper exploration is needed to understand the complexities at play.

The study focused solely on women's maternity healthcare use, overlooking the potential impact of their empowerment on healthcare access for other household members. This wider influence on family well-being warrants further investigation.

Anik et al., (2021) reported a comparable outcome in their study, utilising cross-sectional demographic and health survey data from 2017-2018 across Afghanistan, Bangladesh, India, Nepal, and Pakistan. Employing multilevel regression models, the study aimed to establish the connection between women's empowerment and antenatal care (ANC). By constructing a women empowerment score, the research revealed that women with low empowerment status, those residing in impoverished households, rural dwellers were more likely to have insufficient utilisation of ANC services.

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However, it is worth noting that the study did not account for the relevance of Information and Communication Technology (ICT) in the association between empowerment of women and the utilisation of ANC services. Furthermore, the study had limitations in not considering the impact of women's empowerment on the healthcare utilisation of all other household members.

Zaky et al., (2014), examined the correlation between women's empowerment and the utilisation of maternal healthcare, specifically addressing the issue of endogeneity. Two model specifications were tested in this study. The first assumed no correlation between empowerment and antenatal care, while the second allowed for a correlation. Data for the study were extracted from the Egypt Demographic and Health Survey 2008. Both univariate and recursive bivariate probit models were employed to assess the relationships. The study revealed that women's empowerment and receiving regular antenatal care are determined simultaneously, and women's empowerment significantly has a positive relationship with receiving regular antenatal care. Notably, the empowerment variable used for analysis was constructed without considering the employment status of the women. Moreover, the study focused solely on maternal healthcare utilisation and did not consider the influence of Information and Communication Technology (ICT) in the relationship between women's empowerment and maternal healthcare utilisation.

Heinrich (2014) argues that parental employment, especially for females, may not always align with the best interests of their children. While working parents can serve as positive role models and the income, they generate can enhance their children's lives in various ways, there exists a

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potential downside. The strain of long working hours or unconventional shifts, such as nights and weekends, can adversely impact the evolving relationship between parents and young children. The stress experienced by parents in their workplaces can compromise their ability to be effective caregivers, disrupt the family dynamic, and introduce stress into the lives of their children. Parents with lower incomes were found to be more likely to be employed in demanding, vulnerable professions characterized by inadequate compensation, limited autonomy, inflexible hours, and minimal or no benefits. Consequently, children from low-income families with working parents are more prone to substandard childcare arrangements or lack of supervision. Heinrich proposes two primary recommendations to maximise the benefits and minimise the drawbacks of parental employment. The first is increasing workplace flexibility, especially by mandating sufficient paid leave for mothers to breastfeed and foster strong bonds with their infants. The second is providing support for parents to secure high-quality childcare. Additionally, supporting low-income parents in their endeavors to secure and maintain well-paying jobs with benefits is crucial. A study by Ruhm (2002) supports this, noting the positive impact of parental leave on child health development.

Akowuah et al., (2018) undertook a study aimed at identifying the factors influencing the utilisation of antenatal healthcare by pregnant women in their trimester in peri-urban Ghana. Employing a two-stage sampling technique, the authors selected a sample of 200 pregnant women based on information obtained from the District Health Information Management System software. Utilising both descriptive analysis and a binary logit regression model, the study revealed that employment status, among other

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socioeconomic factors, played a significant role in influencing the utilisation of antenatal healthcare.

The above review presents a cross-section of related literature on the determinants of household healthcare utilisation. It reveals that studies on the relationship between maternal employment and household healthcare utilisation is scarce and for Ghana in particular. Also, the role of ICT in the relationship between maternal employment and healthcare utilisation has received little attention. Being employed was found to positively influence antenatal healthcare utilisation among pregnant women in peri-urban Ghana.

Intention to stay or not stay in current job and children grade progression

The body literature on child education outcomes is quite diverse and encompassing. Many researches on child education outcomes have been conducted in different parts of the globe. Most of these researches have been conducted mainly in developing countries and the indicators include cognitive development of children, measured through performance on standardised tests (Baum, 2003; Bernal, 2008; Bernal & Keane 2010; Del Boca et al., 2014; Gregg et al., 2005; Verropoulou & Joshi, 2009; Waldfogel et al., 2002), the probability of achieving at least A-levels (Ermisch & Francesconi, 2013), secondary track attendance (Schildberg-Hoerisch, 2011), graduating from a University (Mosca et al., 2017) or school tests (Ruhm, 2008).

Existing empirical research has linked the demand for education in households to various characteristics (Iddrisu et al., 2017). These characteristics include household income (Jayachandran, 2002; Huy, 2012; Ogundari & Abdulai, 2014), parental education (Glick & Sahn, 2000), sex of the household head (Lloyd & Blanc, 1996), and locality (Connelly & Zheng,

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2003). The consensus from most of these studies is that urban households, characterized by higher household income, larger size, and higher parental education, are expected to allocate more spending to education compared to their rural counterparts. Additionally, female-headed households are inclined to invest more in the education of household members and healthcare services (Iddrisu et al., 2017). Furthermore, some researchers highlight the relevance of Information and Communication Technology (ICT) in child educational outcomes (Karakara & Osabuohien, 2019; Ryu, 2014; Skvarc et al., 2021). However, Agasisti et al., (2020) caution against the widespread use of digital innovations at home due to the potential negative effects on students' achievements.

Research studies examining the association between maternal employment and child education outcomes present varying perspectives, suggesting either a positive impact (Dervisevic et al., 2021; Waldfogel et al., 2002), negative impacts (Bernal, 2008; Bernal & Keane, 2011), or even no statistically significant relationship (Verropoulou & Joshi, 2009). Working mothers may derive non-cash rewards from their relationships and successful networks, in addition to the financial benefits they accrue from their job responsibilities. Through these connections, working mothers may acquire valuable information that proves beneficial in raising children. Socioeconomic status is frequently intertwined with child outcomes. However, as noted by Currie (2009), having a lower socioeconomic standing is also a reflection of what one can achieve and decides to do with the available resources. It is plausible that a mother's employment not only influences the family's financial capabilities (due to increased income) but also shapes their choices and

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decisions (owing to exposure to a broader range of information and larger social networks).

Maternal employment introduces a trade-off by impacting the time allocated to children which is a crucial factor influencing their development. While a mother's employment can supply resources for enhancing child outcomes, it may simultaneously diminish the time available for household activities that contribute to improved child education outcomes. This creates a theoretically ambiguous net effect. Additionally, maternal employment, with its accompanying exposure to broader social networks and enhanced bargaining power, may also influence how the family utilises its income.

In a study conducted by Azizah et al., (2022), the researchers assessed the influence of employment status of mothers on the education outcome of children in both the short-term and long-term across 24 Indonesian provinces. The study utilised data from the Indonesian Family Survey, incorporating three waves that included information on children aged 0-7 years, 7-14 years, and 14-21 years in the years 2000, 2007, and 2014, respectively. The researchers used ordinary least square estimation (OLS) to provide initial estimates and instrumental variables (IV) to deal with the suspected endogeneity problem between maternal employment and children's education. The authors argued that there exists a reciprocal relationship between children education and mothers' employment decisions. Mothers may choose to work to finance their children's education, and conversely, children may extend their education in response to the additional support gained from their mother's participation in the labour force.

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For comparative purposes, some waves were modeled based on a cross-sectional design and estimated separately. The primary conclusion drawn from the study suggests that, both in the short and long terms, a mother's employment had a positive impact on her children's schooling. The instrumental variable (IV) estimate highlighted the significance of decision-making as a robust instrument, reinforcing the idea that mothers' decisions regarding their children's engagement with the workforce played a pivotal role in influencing outcomes.

Dervisevic et al., (2021) conducted a study investigating the causal impact of maternal employment on child development outcomes, specifically health and education, in Indonesia. The study concluded that maternal employment has a positive effect on both child health and education. The authors compiled a dataset comprising over 32,000 observations of children aged 6 to 18, utilising data from various sources. Employing a two-stage least squares strategy that leveraged exogenous changes in tariffs on female-intensive sectors, the study provided insights into the nuanced effects of maternal employment. The overall findings of the study, while including some negative aspects, exhibited variations based on factors such as outcome measures, socio-economic status, age groups, types of maternal work, and alternative care arrangements that replace maternal care.

Waterhouse (2014) utilised multilevel models to explore the association between teenagers' completion of basic education, attendance at secondary schools, and their mothers' employment status in urban Ghana. The data sample for the study was derived from the 2010 Ghanaian Population and Housing Census. Mothers were grouped by their employment status,

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unemployed, formally or informally employed, self-employed (without or with employees) outside agriculture, family worker, or other (mostly self-employed in agriculture).The findings revealed that adolescents whose mothers worked in the non-agricultural sector, whether in a formal role or as sole proprietors with employees, demonstrated greater academic development compared to adolescents whose mothers did not work. However, the study did not delve into whether other job characteristics or factors within the employed group could influence child education outcomes differently. Additionally, the role of ICT in potentially affecting the relationship between maternal employment and child education outcomes was not considered in the study.

Dunifon et al., (2013) used a Danish dataset tracking 135,000 Danish children from birth through 9th grade was employed to investigate the impact of maternal employment during a child's first three and first 15 years on the child's grade point average in 9th grade. Recognising the challenge of endogeneity associated with employment decisions, the authors adopted several strategies. Firstly, they incorporated a set of rich control variables, such as whether a child was born prematurely, had low birth weight, or a chronic health condition, which could influence both child academic performance and maternal decisions. Secondly, they used gender and education-specific local employment rates as instruments for maternal employment. The rationale behind this was that the local unemployment rate affects a child's subsequent grade point average (GPA) by influencing the mother's employment choices exclusively and does not directly impact GPA through factors like school funding levels. Lastly, maternal fixed effects were utilised to exploit differences in maternal employment between siblings within

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the same family. The study revealed a positive relationship between maternal employment and children's academic performance, especially when mothers were part-time workers.

While family income significantly impacts children's cognitive development by age five, as shown by Brooks-Gunn et al., (1996), its influence extends beyond test scores. Research suggests higher income families nurture college aspirations (Corcoran, 1995), while low-income children may face challenges like low self-confidence, negative peer relations, and academic struggles (Conger et al., 1992). Mothers play a crucial role in supporting education, directly or indirectly contributing to household resources (Orkoh, 2018; Suleiman et al., 2012). However, in families with unemployed mothers, the financial burden of education often falls solely on fathers, particularly in low-income countries (Orkoh, 2018). This highlights the multifaceted impact of income on children's educational trajectory and the importance of considering parental roles and economic realities within diverse family structures.

Waldfogel et al., (2002) explored the link between early maternal employment and children's cognitive development. Analysing data on 1,872 children through age 7 to 8 years, they found mixed effects for non-Hispanic white children. The first year of maternal employment had some negative impacts on cognitive outcomes, while subsequent years were associated with positive gains. However, these patterns did not hold for African American or Hispanic children. Particularly, these effects persisted even after accounting for factors like family characteristics, breastfeeding, and childcare, suggesting a causal relationship. Controlling for family fixed effects slightly weakened

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the association between early maternal employment and some cognitive outcomes, leaving room for further investigation.

The parent involvement theory suggests that, the perception of parents' available time and energy juxtaposed by demands on their time especially related to work, and other family needs influence participation in the child's education (Hoover-Dempsey et al., 2005). According to Hoover-Dempsey et al., working-class families headed by mothers who work full-time are less likely to be involved in their children's education. This is because the regular absence of working mothers from the home will provide less personal supervision of her child than the non-working mother. Again, because the working mother is absent, from the home regularly and probably more often, the child will be emotionally deprived or perceive her absence as rejection and this may affect their confidence.

According to Bettinger et al., (2014), children's foundational character education may be compromised due to their mothers' busy schedules resulting from their involvement in the labour market, subsequently affecting the initial nine years of their schooling. Working women tend to allocate less time to caring for their children. The authors leveraged a Norwegian government program introduced in 1998, which significantly increased incentives for parents to stay home with children under the age of 3 It served as an exogenous source of variation in female labour force participation (FLFP) and income to assess the impacts of these variables on students' long-term outcomes.

Using comprehensive administrative data, they employed a difference-in-differences model, capitalising on variations in older siblings' exposure to

the program. The instrumental variable (IV) results from the analysis suggest that the mother's labour force participation had an effect on students' GPA outcomes. The IV estimates reveal that children whose mothers did not work at age 10 due to the Cash-for-Care program, on average, experienced a 1.2-point increase in their grade point average.

Researchers such as Dunifon et al., (2013) contend that maternal hours of work were critical in the educational advancement of children. The study examined the relationship between mothers' night work and children behavoir, when compared to children whose mothers quit working when they were more than 10 years old. It was found that those whose mothers stopped working since the age of four with an average of 30 hours per week have inferior academic achievement. The study used a total sample of 2,367 mothers of children ages 3–5 years sourced from the Fragile Families and Child Wellbeing Survey for some cities in the United States of America. Three empirical estimation techniques were employed to provide the bases for passing judgement on the hypothesis. Ordinary least squares, individual fixed effects (or first-difference) change models and revisualised change models. The revisualised change model was added because it is an improvement of the fixed effects model in that it is useful in cases where there are time omitted variables.

Hoque et al., (2017) examined the impact of working and non-working mothers on the educational performance of school-going children. Primary data were gathered through a random sample survey of students attending two schools in the Chittagong University campus in Bangladesh. The findings indicated that one of the factors affecting children's education and academic

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achievements was the employment status of the mother. Notably, the study revealed a negative correlation between the mother's employment status and the academic grades of children, except in cases where mothers were engaged in the teaching profession.

Beyond maternal employment itself, however, the characteristics and quality of mothers' jobs play an important role in maternal and child well-being (Dunifon & Gill, 2013). The characteristics and quality of job may influence working mothers psychologically and emotionally and subsequently affect whether a working mother is content or discontent with the job. The end result is that frustration, stress and dissatisfaction may be visited on the family especially children. Majority of studies have discovered that job satisfaction declines when work-family conflict rises (Kossek & Ozeki, 1998).

Anderson (2006) examined the relationships among work stress, parental self-efficacy, ineffective parenting behavior, and youth problem behaviors. The study's findings suggested that parental self-efficacy was decreased and ineffective parenting behaviors were increased as a result of work stress, which included mothers' work-family conflict and fathers' job dissatisfaction. These factors were then linked to higher levels of youth internalizing and externalizing problem behavior.

Orellana et al. (2022) emphasized the importance job satisfaction as a transmission channel between family-to-work conflict and family satisfaction. The authors used a non-random sample of 430 parents who were considered as dual-earners and had adolescent children. The online questionnaire intended to measure family-to- work conflict, job satisfaction and family life satisfaction was responded to by the recruited mothers and fathers in Nicaragua. Data was

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analysed using the "Actor-Partner Interdependence Model" with structural equation modelling. The study found that there was lower satisfaction for persons with higher family-to-work conflict. They also observed a direct relationship between job satisfaction and family life satisfaction. Additionally, the authors suggest that both mother and father experienced a twin adverse effect due the family to work conflict from themselves and from their spouses.

Studies on relationship between working mother's decision about the future of their current job and child education outcome are rather scarce especially mother's intention to stay or not stay in their current job and children grade progression. However, in the literature, it has been suggested that there is a near perfect correlation between job satisfaction and intention to leave or stay in a job. The second empirical of this study is used to fill the empirical gap by examining the effect of mother's intention on their future in their current job on children grade progression. More importantly, the relevance of ICT in the relationship is examined.

Information communication technology and employability

There are a lot of studies on the relationship between ICT and labour force participation (LFP) but few on employment more so because LFP includes the employed and the unemployed. The findings of ICT on especially Female labour force participation (FLFP) are not in unison (Ngoa & Song, 2021; Viollaz & Winkler, 2020). According to Rubery and Grimshaw (2001), ICT could have varied effect on employment and these effects are either pessimistically or optimistically inclined. Besides ICTs could either destroy work (automation and rationalisation) or create work (develop new markets and human capital), reduce pay (downgrade skills and weaken workers'

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collective bargaining power or increase pay (augment skills), downgrade skills and competence to single-task machine tending or upgrade skills and competence, multi-tasking, creativity (Rubery & Grimshaw, 2001). Despite the potential benefits of ICT, concerns have been raised that the benefits of ICT are not being shared equally by women; that women face higher barriers to participation in the digital economy compared to men. Literature examining the differences in male and female employment as a result of ICT skills is scarce.

In recent times, two main strands of literature have emerged on the effect to ICT and labour force participation (LFP). The first is the research investigating the effect of ICT access on job search and the second stream investigates the relationship between ICT skills and LFP (Desjardins et al., 2013; Green et al., 2013). Analysis of the effect of ICT on employment has largely been carried out by distinguishing between the effect of various ICT components on labour force participation. A number of previous studies have employed access and use of mainline telephone, mobile telephone and Personal Computers (PC), internet services (Bagchi & Udo, 2010; Nikulin, 2016; Watson et al., 2018).

Analysis of the relationship between ICT and LFP may be far-fetched for example when access and usage of ICT services are used for the analysis. Individuals with strong ICT skills may secure jobs or be self-employed compared to mere ownership or use of mobile phone or the internet. Some of these studies undertook cross country or time series analysis to provide evidence of the relationship between ICT diffusion/access/use and employment. While these studies provide robust results, they fail to capture

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the possible socio-economic and socio-cultural channels in the individual countries for specific policy interventions (Bagchi & Udo, 2010; Nikulin, 2016; Watson et al., 2018). The few studies that conducted cross-sectional analyses concentrated did not test the statistical differences for gender (male and female) as well as location (rural and urban).

Fang et al., (2023) studied the association between ICT adoption and off-farm employment among rural labourers in China, utilising data from the China family panel studies. To mitigate endogeneity concerns, the authors employed an instrumental variable technique, using mobile and computer utilisation rates as instruments. They argued that these rates did not directly impact off-farm employment, meeting the exclusion restriction criterion. The model included controls such as gender, age, marital status, health, family size, and education, with adjustments for year and province-specific effects. The findings revealed a positive association between ICT usage and off-farm employment. Furthermore, rural workers exhibiting stronger learning abilities, active learning habits, and increased learning and social frequency of Internet use were more likely to secure employment. While the study focused on rural workers, it did not explore gender heterogeneities.

Balgobin and Dubus (2022) conducted an analysis on the correlation between mobile phone use, specifically mobile Internet, and employment, self-employment, and job regularity in Uganda. Due to concerns about endogeneity, the authors utilised three distinct instruments (Distance to nearest mobile money agent, Poverty Probability Index (PPI) cut-off, and having electricity) to estimate a bivariate marginal effect probit model. The study did not find evidence supporting the idea that mobile internet use positively

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influences employment or job quality. The authors suggested the possibility that respondents might not be utilising mobile phone internet for job searches or as a job-related tool, or alternatively, these uses may be unproductive. However, they observed that individuals using basic mobile phones were more likely to be employed. The study is limited in its scope, particularly in its omission of locational differences and socioeconomic mediators in the transmission mechanisms.

Ngoa and Song (2021) investigated the impact of ICT on Female Labour Force Participation (FLFP) across 48 African countries. Employing linear regression and dynamic panel data models with fixed effects (FE) and system generalized method of moments (SYS-GMM) estimation from 2001 to 2017, the authors concluded that the use of ICT, including mobile phones and the internet, significantly and positively affects FLFP in Africa. They noted that this effect was enhanced by financial development and female education, with the strongest influence observed in the industrial sector. The study utilised macroeconomic data from various sources, and despite controlling for social, cultural, and institutional variables, the generalisability of the findings to specific country policies may be limited due to diverse cultural arrangements. Notably, the study did not explore differences in male and female employment concerning ICT, nor did it consider the influence of ICT skills on labour force participation and employment.

Gómez et al., (2014) examined the employment opportunities associated with education and ICT usage, emphasizing gender differences in Spain. The analysis was conducted on two levels. First of all, based on the sector of employment, investigating how capital investment and ICT affect

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male and female employment in both the service and industrial sectors. The study found that ICT investment had a negative effect on male workers but a positive effect on female workers. This was attributed to the alignment of ICT systems with traditional female roles. Secondly, from the standpoint of labour supply, the authors employed the Heckman two-stage model to analyse the probability of finding a job for those participating in the labour market. Education and basic ICT skills were identified as factors increasing the probability of securing a job. The study suggested that women benefited more from ICT use in terms of job opportunities. The study suggested that ICT-related jobs involved coordination and communication rather than physical strength, traditionally associated with female activities. While different coefficients were relied on for men and women, the study did not statistically test the differences in separate models for men and women.

Viollaz and Winkler (2020) investigated the impact of the internet on reducing gender gaps in Jordan. Specifically, the study examined the relationship between digital technologies and labour outcomes using panel data. To address potential endogeneity issues, the proximity to the nearest 3G tower was employed as an instrument and a proxy for pre-roll-out costs of internet access. It was found that internet adoption significantly boosts female labour force participation, while having no such effect on males. This suggests the possibility of the internet empowering women to seek employment through online platforms. Notably, the study specified that increased employment due to internet access was primarily observed among older and skilled women. However, it also revealed that while internet adoption may encourage women

to enter the workforce, securing paid employment remained a challenge for some.

Samargandi et al., (2019) utilised annual time-series data from various sources, including the World Development Indicators (WDI), Saudi Arabian Monetary Agency (SAMA), International Labour Organization (ILO), Department of Statistics and Information (Ministry of Economy and Planning Wing), UNDP, and International Country Risk Guide (IRCG), covering the period from 1985 to 2014 to examine the determinants of employment in Saudi Arabia. Employing the autoregressive distributed lag (ARDL) bounds test, the study presented findings suggesting that the diffusion of information communication technology (ICT) negatively affects female employment. However, the authors highlighted that the adverse impact of ICT diffusion on female employment could be mitigated by financial inclusion.

Watson et al., (2018) also investigated the impact of digitalisation on female labour force participation in the Indo-Pacific region using a cross-country dataset spanning from 2000 to 2016. Employing panel regression techniques with controls for time and country fixed effects, as well as other relevant correlates, the study arrived at conclusions aligning with Viollaz and Winkler (2020). Despite adjusting for country effects, time trends, and control variables, the study found a robust and statistically significant correlation between internet use and maternal employment. Conservative results suggested that the growth in internet use accounted for nearly four-fifths of the increased participation of women in the labour force in the Indo-Pacific between 2000 and 2016. Instrumental variables estimation strengthened the positive association between women's workforce participation and

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exogenously determined internet use. However, the study highlighted persistent barriers preventing women from fully benefiting from the digital economy.

Using data for 48 African countries from 1990 to 2014, Efobi et al., (2018) examined how ICT influence women's participation in the formal economy. Employing various methods, including ordinary least squares, fixed effects, and generalized method of moments regressions, they revealed a positive association between ICT penetration and female economic participation. Their findings further suggest a hierarchy of impact, with mobile phone penetration leading the way, followed by internet penetration, and lastly, fixed broadband subscriptions. This implies that mobile phones might be the most impactful ICT tool for boosting women's formal economic engagement in Africa. The study highlights the potential of ICT to empower women economically and offers valuable insights for policymakers seeking to promote gender equality and female workforce participation in the region.

Alam and Mamun (2017) examined the causal effect of household access to broadband Internet on individuals' labour market outcomes in an Australian rural and regional context. The research utilised survey data from 391 randomly selected households in the Western Downs Region of Queensland, Australia, and applied the propensity score matching technique to draw causal inferences. The study accounted for selection bias and concluded that the causal effect of household access to broadband Internet on individuals' labour force outcomes was not statistically significant.

Dettling (2017) in a study in the United States finds that high-speed internet use actually increased LFP for married women with children, but had

no impacts on single women and men. The study employed an instrumental variable technique since the key independent variable was considered to be endogenous. It was argued that the increase in participation is strongly associated to the use of internet to telework and saving time in home production. The authors employed measures of internet intensity of business activity as instrument for high-speed internet use together with an array of variables including the proportion of multi-dimensional dwellings in the state; time and state fixed effects. Additionally, a variety of control variables including state level income per capita, wages, population density, housing prices and unemployment.

Beard et al., (2012) examined the influence of three types of internet connections – public, dial-up, and broadband – on job searching and subsequent labour market participation, employing labour market data from the United States. The study utilised multinomial logit regression analysis augmented with the pairwise matching technique. Notably, broadband access, either home or public, reduced the chance of unemployed individuals giving up by 50% compared to those without internet. This emphasizes the multifaceted impact of internet availability on labour market participation.

Blanco and López Bóo (2010) conducted a randomized experiment to assess the impact of acquiring ICT skills on the labour market in two Latin-American cities (Buenos Aires and Bogota). Using cross-sectional data comprising approximately 11,000 fictitious Curricula Vitae (CVs) submitted for real job vacancies posted daily on the main job search engines in both cities, the authors recorded callbacks. Employing a binary choice model, the study aimed to identify existing heterogeneities in callbacks based on ICT

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skills. The overall findings revealed a positive association between possessing ICT skills and labour market participation. The authors also observed variations in the impact of ICT skills across different markets, suggesting that ICT could have diverse effects depending on the characteristics of the labor market.

In a study aiming to discern the intricacies in the connection between ICT skills and the likelihood of employment, Walton et al., (2009) utilised data from the Central Asian nation of Kazakhstan as a case study. The researchers employed multiple logistic regression to predict employability, controlling for variables such as age, gender, schooling, location, and language (Russian/English). Their findings led to the conclusion that while ICT skills were positively correlated with employability and linked to better outcomes, the expected level of ICT skills required for these jobs in Kazakhstan was relatively low. The study did not explicitly consider variations in terms of gender and location, and it did not delve into the mechanisms through which ICT skills are transmitted and influence employment.

Several cultural and socioeconomic variables are suggested to influence labour force participation. For example, Contreras and Plaza (2010) as well as Srivastava and Srivastava (2010) find cultural factors and education are key determinants of women's workforce participation in Chile and in rural India.

The impact of education on female LFP is multifaceted. In a study conducted by Jaumotte (2003), education, along with factors such as cultural beliefs, attitudes, labour market conditions, and policies related to taxation and transfers, was identified as a factor affecting the extent of FLFP. Additionally,

Thévenon (2013) underscored the significance of educational attainment, decreasing fertility rates, cyclical labour market conditions, growth in services employment, and the rise in part-time employment as pivotal contributors to the upward trend in women's workforce participation in Organisation for European Economic Co-operation (OECD) countries.

Drawing from the literature discussed, several observations emerge: (a) a significant portion of recent studies is cross-country in nature, potentially limiting the applicability of their findings to specific countries due to socio-cultural and locational variations; (b) the predominant focus of research has been on ICT diffusion, access, and utilisation as primary factors influencing the theorized relationship; (c) studies delving into gender differences are relatively scarce; (d) investigations exploring mediation channels are also limited; and (e) the direction of effects in the findings remains mixed.

To the best of my knowledge, there exists no study utilising a cross-sectional dataset to examine the impact of ICT skills on LFP, with a specific focus on gender and locational (rural/urban) distinctions, and a comprehensive exploration of potential transmission channels, particularly within the context of Ghana. This research endeavors to address the identified gap in the existing empirical literature.

ICT skills and intention to stay or not stay in current job

While digital tools have infiltrated every corner of life, including work and its demands, research on how their influence affects employee commitment and turnover remains minimal. Despite extensive study of factors like job stress, organisational engagement, and coworker relationships, the specific impact of ICT skills on the decision to stay or leave a job has been

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largely overlooked (Cho et al., 2009; Silva et al., 2023). Yet, these skills undoubtedly shape both work performance and family balance, potentially influencing career longevity. To illuminate this crucial link, I explore existing research on turnover intentions and delve into the understudied role of ICT skills in shaping an employee's choice to stay or leave.

Silva et al., (2023) explored the factors influencing employee retention across generations in Lisbon, Portugal. Analysing data from Generations X, Y, and Z, the researchers found a consistent positive link between organisational commitment and the desire to stay, regardless of age. Similarly, strong connections emerged between feeling like a good fit within the company (person-organisation fit) and both commitment and retention. Interestingly, person-organization fit also indirectly promoted work-life balance, further strengthening its impact on employee loyalty. Additionally, a positive influence of organisational culture on both commitment and staying intentions was observed, alongside a direct link between fitting in and wanting to stay. While this study effectively examined how various factors affect career longevity, it didn't consider individual skillsets, particularly ICT proficiency. Given the vital role of ICT skills in today's job market, this omission potentially limits the study's contemporary relevance and calls for further research into their specific influence on employee retention decisions.

Jang et al., (2023) highlighted the importance of positive coworker relationships in boosting employee retention. Their analysis of 233 low-cost airline employees using structural equation modeling revealed a clear link between strong coworker connections and the desire to stay. The study also found that financial and non-financial compensation, along with procedural

fairness, all positively impacted employee attitudes. However, one crucial factor that is ICT skills was unexplored. Jang et al.'s model didn't consider how diverse skillsets might influence work experience and, consequently, career longevity. This gap leaves room for further research into the specific link between employee skills, particularly ICT skills and the intention to stay or leave a job.

Islam and Alam's 2014 study in Bangladesh identified a multitude of factors influencing employee retention, spanning job satisfaction and environment, organisational support and empowerment, job nature and training, fulfilled expectations and company image, sound administration and personal development, and even competitive pay and a pleasant work environment. Data was qualitatively collected and analysis using descriptive statistics. By crafting a work experience that prioritises these factors, organisations can nurture employee loyalty and foster a thriving workforce. All the factors were found to positively influence the decision of an employee to stay in a job.

Sumathi (2013) like Islam and Alam's, explored the pull of organisational factors on employee retention. Surveying 650 mid- and lower-level employees in Tamilnadu's surface transport companies, the study used a descriptive approach to uncover a crucial link between employees' perception of organisational practices directly influenced their overall satisfaction and, presumably, their decision to stay or leave. This suggests that fostering positive employee perceptions through effective policies and practices is key to keeping talent on board.

Cho et al., (2009) examined whether factors causing employees to leave also influence them to stay using a sample of 416. The results to the study were provided based on analysis using structural equation modelling. Focusing on hospital employees in the US, they analysed how perceived organisational support (POS), supervisor support, and organisational commitment affected both intentions to leave and stay. While POS and commitment reduced the desire to leave, only POS significantly boosted the desire to stay. Notably, the study didn't account for individual characteristics like ICT skills, which may also influence career decisions.

While research linking ICT skills to employee retention is limited, a few studies hint at its potential impact. A prime example comes from Cavapozzi et al., (2015) study, which explored the connection between computer use, computer literacy, and job satisfaction among 5,600 respondents in OECD countries. The study used the limited probability model (LPM) to provide the evidence of the relationship since the dependent variables were binary. The dependent variable was overall job satisfaction (being highly satisfied with own job) and the desire to retire as soon as possible respectively. Separate models were run for men and women. Their research found that white-collar workers with higher computer use and proficiency were less likely to retire early, and those with strong skills in computer-dependent jobs were more satisfied and less likely to leave.

Interestingly, even women with computer skills beyond their job's needs reported higher job satisfaction and lower desire for early retirement. These findings suggest that ICT skills have the potential to boost employee engagement, satisfaction, and ultimately, retention across different

demographics and job types. Further research is needed to solidify these connections, but the existing evidence shows a promising picture for investing in employee ICT skills as a way to cultivate a loyal and thriving workforce.

Tomomowo-Ayodele and Omoike (2020) shed light on a crucial factor in librarians' well-being and career progress in Nigeria for possessing vital digital literacy skills in ICT. Their study, analysing academic library staff across eight institutions in South-West Nigeria, revealed a clear link between strong ICT skills and both job satisfaction and career advancement. Using surveys, interviews, and direct observations, the researchers confirmed that librarians equipped with these skills enjoyed greater professional fulfillment and career advancement. This suggests that investing in ICT training for library staff can be a powerful tool for fostering a satisfied and effective workforce.

Barba-Sánchez et al., (2022) adds a nuanced layer to the discussion of ICT skills and teacher well-being. While they confirm that strong ICT skills improve primary school teachers' efficiency, the direct impact on intention to stay or leave a job remained absent. This aligns with earlier findings by Murphy and Adams (2005), suggesting that ICT skills might not be a direct route to satisfaction, but rather a stepping stone towards long-term indirect benefits. This raises intriguing questions about what factors mediate this relationship – could effective classroom integration of ICT, supportive school environments, or adequate training play a role in transforming increased efficiency into greater job satisfaction for teachers? Further research exploring these potential mediators could help unlock the full potential of ICT skills in fostering a thriving and fulfilled teaching workforce.

Nsabimana and Funjika (2019) established that access to mobile phone has a heterogenous effect on the labour markets. The data consisting of individual and farm household information was extracted from the LSMS-ISA Tanzania National Panel Survey. It was found that progressive increase in the mobile phone use resulted in the movement of labour share from agriculture into non-farming sectors. The study also found that access to mobile phone mobile significantly reduces the intensity of work by household members on the farm and is instead associated with an increase in hired farm workers. The results were based both on OLS and IV estimation techniques using the intensity of average mobile phones in the community as the instrument. This suggests that understanding the specific context and how individuals utilise mobile technology is crucial in assessing its overall impact on rural communities.

Flaherty (1994) conducted a study on Montana Extension agents, exploring the connections between computer skills, job performance, and job satisfaction. The study showed that computer skills played a crucial role in job satisfaction, particularly using spreadsheets, email, and online information sources. Additionally, agents' own assessment of their computer skills significantly impacted their satisfaction, suggesting confidence plays a key role in reaping the benefits of technology. Two multiple regression models (all data multiple regression and stepwise model) were used to provide evidence

The reviewed literature indicated that studies on the influence of ICT skills on intention to leave or a job is rather scarce. In Ghana no known study has been sighted on the relationship ICT skills and intention to stay or not stay in a job.

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Conceptual Framework

The conceptual framework presented in Figure 11 elucidates the interconnectedness of employment, ICT, and human capital development. Drawing upon insights from both theoretical and empirical literature, there is the indication that maternal employment impacts household human capital development through resource complementation (Kuhn & Ravazzini, 2017) and enhanced decision-making influence (Ahmmed 2021; Anik et al., 2021; Zaky et al., 2014). Resources derived from maternal employment are typically allocated to health and education expenditures (Becker & Tomes, 1979; Orkoh, 2018; Suleiman et al., 2012). Meanwhile, health and education issues of the household also affect the mother's engagement in economic activity (Baah-Boateng et al., 2021) reflecting a bi-causal relationship between employment and human capital. Moreover, ICT plays a pivotal role in shaping this relationship, as working mothers leveraging ICT smartphones and possessing ICT skills can streamline their work processes, allowing more time for addressing human capital issues within the household. The use of smartphones facilitates effective communication with family members and healthcare professionals, contributing to the management of household health concerns. Simultaneously, ICT has reshaped the labour market by expediting job searches, enhancing communication with potential employers, and fostering entrepreneurship. ICT skills, whether directly applied in digital-centric positions or indirectly through improved numeracy/literacy and financial inclusion, significantly influence employment outcomes, illustrating the multifaceted impact of ICT on the nexus of employment and human capital development.
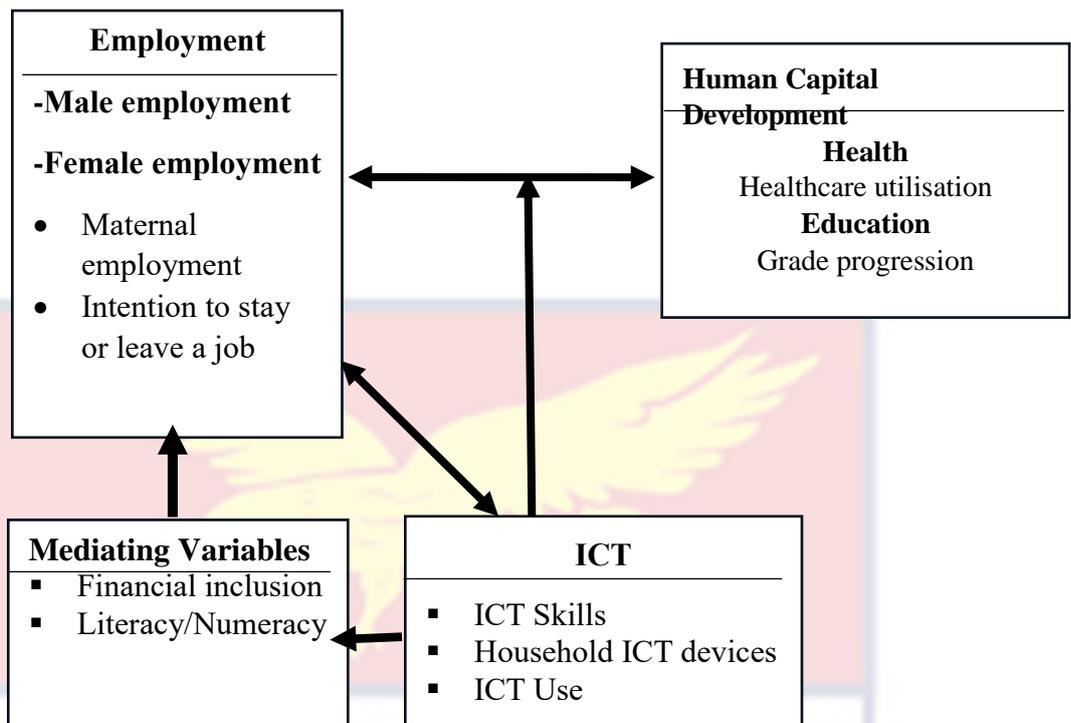
Figure 11: Conceptual framework
Source: Author's construct, 2023

Chapter summary

The importance attached to maternal employment and human capital development underscores the myriad of studies undertaken in the area. To put this thesis into proper perspective, the chapter was used to summarize the existing related literature to the itemized objectives. Firstly, the theoretical bases for the thesis were provided in the context of human capital development, healthcare utilisation and employment. Some of the theories include health demand, Andersen's behavioral theory, bargaining models, and work-leisure model were reviewed. Secondly, empirical review of related literature was done based on the stated objectives such as maternal employment and healthcare utilisation, maternal employment and children education outcomes and ICT skills and labour force participation, ICT skills and intention to stay or not stay in a job.

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CHAPTER FOUR

RESEARCH METHODS

Introduction

This study explores the impact of maternal employment on household human capital development, focusing on health and child education in the context of widespread ICT use. Additionally, it investigates the correlation between ICT skills and employment. The research is structured around four main objectives: (a) maternal employment and household healthcare utilisation in Ghana; (b) maternal intention to remain or leave a job and children's grade progression; (c) ICT skills and employment; and (d) ICT skills and intention to stay or leave a job in Ghana. The chapter outlines the research methods, starting with a discussion of the philosophical foundations and research design. Strengths and weaknesses of the positivist philosophy are examined, justifying its selection. Data sources, hypotheses, analytical models, estimation techniques, variable measurement, and a chapter summary are also presented.

Research Paradigm

The chosen paradigm significantly influences how knowledge is approached and interpreted in research, defining the purpose, motivation, and expectations (Mertens, 2005). For this study, the positivist paradigm is deemed appropriate due to the preference for quantitative methods in the analysis. The positivist paradigm, associated with the functional or quantitative mode of inquiry, operates under the assumption that social reality possesses an objective and logical structure, with individuals responding to this objective environment (Morgan & Smircich, 1980). Quantitative research within this paradigm involves the quantification and measurement of events,

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coupled with statistical analysis of numerical data (Eyles & Smith, 1988). The positivist paradigm presupposes the existence of an objective truth in the world that can be scientifically measured and explained. Within this framework, the primary concerns of quantitative research include ensuring the reliability, validity, and generalizability of measurements for clear predictions of cause and effect (Cassell & Symon, 1994).

Research Design

The research design outlines the established structures within which the study is conducted. For this research, a cross-sectional design was employed. Cross-sectional studies, also known as one-shot or status studies, are widely utilised in the social sciences (Alexander et al., 2015). In these studies, data is collected from a sample of individuals, households, firms, cities, states, countries, or other units at a specific point in time (Bethlehem, 1999). Cross-sectional studies provide a snapshot of the subject under investigation at the time of the study. Although the data for all units in cross-sectional studies may not correspond precisely to the same time period, minor timing differences are typically overlooked in pure cross-section analysis (Wooldridge, 2010). The cross-sectional design is particularly valuable for testing microeconomic hypotheses and evaluating economic policies when examining data on individuals, households, firms, or cities at a given moment in time. Given that the data for this thesis is derived from a cross-sectional dataset, the cross-sectional design was considered appropriate for all four empirical chapters of this thesis.

Description of Data Sources

The data source utilised for this study aligns with the research objectives. The study relies on micro-level data extracted from the seventh rounds of the Ghana Living Standards Survey conducted by the Ghana Statistical Service (GSS). The Ghana Living Standards Survey round seven (GLSS 7) constitutes nationally representative cross-sectional surveys that adopted a probability sampling approach (two-stage). The surveys systematically gathered detailed information on various variables, encompassing demographic details of households, health and health-related expenses, labour force participation, incomes, assets, and the living conditions of households. The surveys encompassed 14,009 households selected from 15,000 sampled households across multiple enumeration locations (clusters) distributed across Ghana's ten regions at the time of the survey.

Sampling Procedure

The actual field data collection for the GLSS7 which lasted 12 months was started in October 2016 under the auspices of the Ghana Statistical Service (GSS). The sample for the survey was determined using a two-stage stratified sampling design. In the first stage 1,000 enumeration areas were selected to form the primary sampling units (PSUs) and allocated into 10 administrative on a probability proportional basis. The EAs were then divided into localities of residence (rural/urban). A household listing operation was carried out in all the enumeration areas (EAs) ear-marked for the survey that comprised of recording the addresses and names of the heads of households with the aid of computer assisted personal interview (CAPI). From the listed households in the EAs, 15 households were selected from each of the EAs

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using a systematic sampling method, resulting in targeted total household sample of 15,000. Due to issues of non-response a total of 14,009 households were interviewed from the selected EAs across the country. The information contained in the GLSS 7 provides the opportunity to be able to achieve all the objectives of the four empirical chapters in this thesis (GSS, 2018).

Data Validity and Reliability

The Ghana Statistical Service (GSS) is a statutory body that is mandated to provide official statistics for Ghana based on international standards. The service has provided varied national data including data on living standards since 1987. Prior to the provision of the GLSS7, the service has provided data on GLSS1 to GLSS6.

Rigorously designed according to international best practices, this survey's data holds strong validity for nationwide analysis. To guarantee its suitability for our research, I implemented a meticulous validation process. Each relevant variable was individually scrutinised and confirmed against the codebook descriptions. Further, key variables were recoded to align with the study's specific needs and to ensure both accuracy and succinctness. Additionally, exhaustive cross-examination eliminated potential outliers and safeguarded against biased findings.

Data Analysis Procedures

Building on the established frameworks in the literature review, this study delves into household human capital development through four thematic investigations. The first two chapters analyse this topic at the household level, considering it as a unit composed of people living together with a shared head, housekeeping, and cooking arrangements. My definition aligns with existing

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research and ensures consistency in our analysis. For the following two empirical chapters, I shift focus to the individual level, allowing for a more nuanced understanding of human capital development within households. Each of the four investigations follows a rigorous structure. First, hypothesis formulation that clearly outlines the theoretical relationships being explored. Second, model specification that is choosing the appropriate statistical framework to test my hypotheses effectively. Third, estimation technique that is utilising robust econometric methods for reliable analysis. Detailed variable definitions, measurements, and our a-priori expectations for each variable are provided in the Appendix. For all analyses, I relied on the Stata econometric software package, ensuring transparency and reproducibility of our findings.

Maternal employment and household healthcare utilisation

The study is interested in evaluating the effect of maternal employment on household healthcare utilisation using secondary cross-sectional data. The designed empirical analysis tested three main hypotheses. The null hypotheses are:

1. Maternal employment has no effect on healthcare utilisation

2. ICT use has no effect on the relationship between maternal employment and healthcare utilisation.

3. ICT skills has no effect on the relationship between maternal employment and healthcare utilisation.

Model specification

For the first empirical chapter of this work, I follow Jacobson & Lindgren (2001), Biro (2009) and Mwabu (2007) who show that households maximize their expected future lifetime utility, which depends on consumption

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(C) and health (H) and is subject to a budget constraint (Wagstaff, 1986b). From that postulation and following Kimani et al., (2016) and also consistent with demand theory I modelled the health demand function as given in equation 1.

$$H = H(M, Y, P_m, P_c, H_0, W) \tag{1}$$

where, H is health status after seeking medical care, M is maternal employment, Y is exogenous income, H_0 is the initial health endowment or status and P_m and P_c are the prices of medical care and consumption of non-medical goods, respectively. W is vector of mothers' characteristics which include access and usage of ICT devices. The health demand function is anchored on the exogeneity of all the regressors. H is optimal for a given number of visits. Thus, assuming a one-to-one mapping between visits and H, it is probable to represent the dependent variable with the number of visits to the health facility (rather than by health status) (Kimani et. al, 2016). Household healthcare utilisation is hence modeled as:

$$HU = (ME, X) \tag{2}$$

Where HU represents household healthcare utilisation, ME maternal employment and X is vector of explanatory variables that include household size, income, area of residence, illness/injury, education level of the woman, health insurance cover, marital status, remittances, mothers' usage of ICT devices and ICT skills.

Econometric model

The equation for estimating healthcare utilisation is modeled as equation (3)

$$HU_{ij} = \alpha + \beta' ME_i + \delta' X_{ij} + \varepsilon_{ij} \tag{3}$$

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where HU_{ij} is the number of household members who utilised health services and i and j denote individual and household, respectively; *ME* is a binary variable for maternal employment; *X* is a vector of other explanatory variables identified in the literature as potential determinants of healthcare utilisation. $\delta \; and \; \beta$ are parameters to be determined, α is the constant term and ε_j is an independent and identically distributed (IDD.) error term.

Maternal employment is a dummy measuring whether or not the mother in the household is engaged in wage employment outside the home. In most cases, people utilise health services when they are ill or injured. Ill/injured is measured as the number of household members who fell ill or got injured. The level of education (Primary, secondary and tertiary) of the mother is noted to influence their decisions regarding their health and that of other household members. Marital status (Never married, married, divorced/widowed) of the mother is also established in the literature to have an effect on the household outcomes including health. Remittances to a household increase the resource outlay of a household and may be used to demand health. Health insurance coverage has been found to greatly increase healthcare utilisation, since it provides the opportunity to access health services in times of the unavailability of resources to procure health. It is measured as having a valid NHIS card or not.

Smartphone use and ICT skills

In order to test the second hypothesis, mothers use of smartphones is employed to represent ICT use. This is because of the upsurge of the use of smartphones, which has become a must have, even among low-income earners (Okae 2018). Mobile phones and appllications allow patients to become more

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active in looking after their health and allows communication with health professionals. It also reduces stress and the time one has to travel to submit a medical form or document. The WHO (2018) reports that popularity of mobile devices has given rise to the use of mobile devices for healthcare. In the wake of the COVID 19 pandemic, reports indicate the important role smartphones/ mobile phones played in healthcare across the globe.

Alternatively, ICT skills was also used to analyse the influence of ICT on the relationship between maternal employment and healthcare utilisation. This adds another dimension of how the skills in ICT can improve the efficiency of mothers in their jobs and social engagements and hence reduce their stress and time spent outside the home and afford them the possibility of appropriately attending to household health issues.

Estimation Procedure

The effect of maternal employment on household healthcare utilisation is evaluated using a secondary cross-sectional data. First the ordinary least square (OLS) estimation technique is used to provide baseline results for the model since the dependent variable is continuous. A challenge however, with the use of cross-sectional data is the absence of randomness. A quasi-experimental design is therefore used to estimate the model. Since maternal employment is not randomly assigned, an issue of sample selection bias may arise. The Inverse probability weighted regression-adjustment (IPWRA) is used to estimate the model due to its ability to achieve robustness to misspecification in the parametric models (Wooldridge 2010). It is a combination of the propensity score weighting method with regression adjustments (parameter or linear regression model) and makes it possible to

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consistently estimate the treatment effect parameters as far as there is correct specification of only one of the two models (either the outcome or treatment).

The average treatment effect on the treated (ATET) is computed using the propensity score matching (PSM) technique that controls for observables. The matching process mimics a randomized experiment setting by statistically creating treatment (working) and comparison groups (not working) that are similar in observed covariates. A sizeable overlap between the density distribution of propensity scores for working and non-working justifies the use of the IPWRA. The PSM method is premised on matching observations of working and non-working mothers to the predicted propensity of working (Rosebaum & Rubin, 1983: Heckman et al., 1998; Smith & Todd, 2005; Wooldridge, 2005). The ATET is formally expressed following Takahashi and Barrett (2014) as:

$$ATET \equiv E\{H_{iT} - H_{iNT}|G_i = 1\} = E(H_{iT}|G_i = 1) - E(H_{iNT}|G_i = 1) \tag{4}$$

where H_{iT} is the potential outcome of healthcare utilisation for household i *with working mothers*, H_{iNT} is the potential outcome of healthcare care utilisation for household i, without a working mother, $E\{\cdot\}$ is the expectation operator, and G_i is the treatment indicator (maternal employment) equal to 1 if the household i has a working mother and 0 otherwise. Estimating equation (4) will lead to a biased estimate given that the counterfactual $E(H_{iNT}|G_i = 1)$ is not observed (Takahashi & Barrett, 2014). The biased estimation of Eq. (4) is solved using the IPWRA estimation method (Wooldridge 2010). According to Rosenbaum and Rubin (1983), the probability of receiving treatment is specified as:

$$P(X) = \Pr(G_i = 1|X) = F\{h(X)\} = E(G_i X|) \tag{5}$$

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where X is a vector of observed characteristics that includes socio-demographic and geographic controls and $F\{\cdot\}$ is a cumulative distribution function. Based on the approach of Manda et al. (2018), households with working mothers are assigned simple inverse weights equal to 1 for households with working mothers and $\dfrac{P(x)}{1-P(x)}$ for households without working mothers, therefore the propensity weights are formally defined as:

$$\text{m}\,\tau_i = G_i + (1-G_i)\frac{P(x)}{1-P(x)} \tag{6}$$

where $\hat{P}(X)$ are the estimated propensity scores. Following Manda et al. (2018) the ATET for the regression adjustment model is specified as:

$$ATET_{RA} = \frac{1}{n_T}\sum_{i=1}^{n} G_i\left[r_T(X,\delta_T) - r_{NT}(X,\delta_T)\right] \tag{7}$$

Combining Eqs. (6) and (7) produce the IPWRA estimator which is specified as:

$$ATET_{RA} = \frac{1}{n_T}\sum_{i=1}^{n} G_i\left[r_T^{*}(X,\delta_T^{*}) - r_{NT}^{*}(X,\delta_{NT}^{*})\right] \tag{8}$$

Basically, three assumptions are needed to ensure that the estimation of equation (15) does not give biased estimates of ATET. First, is the conditional independence (CI) assumption, which restricts the dependence between the treatment model and the potential outcomes (Takahashi & Barrett, 2014). Second, a substantial overlap in covariates between the working and non-working, such that households being compared have a common probability of mother working and mother not working, and that $0 \leq P(X) \leq 1$ (Takahashi & Barrett, 2014; Winters et al., 2010). Third, the independent-and-identically-distributed (IID) sampling assumption ensures that the potential outcomes and

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treatment status of each individual are unrelated to the potential outcomes and treatment statuses of all the other individuals in the population.

Maternal employment, is potentially correlated (endogenous) with household healthcare utilisation, arising from unobserved heterogeneities among household mothers and household characteristics that can affect maternal employment and bi-causality between maternal employment and household healthcare utilisation and may affect the identification. Decisions of health production and labour supply are taken complementary which makes them endogenous (Grossman 1972). Mothers engage in the labour force for reasons including the ability to demand healthcare and to invest in their health hoping to improve and maintain their health status (Chirikos, 1993). Conversely, the advent of health difficulties at the household level has the possibility of changing the satisfaction derived from income and leisure even though it might not have any direct effect on her productivity (Chirikos, 1993).

Since the IPWRA is unable to deal with the endogeneity arising from unobserved variables, Lewbel 2SLS is used to address the potential endogeneity problem and to examine the sensitivity of our IPWRA estimation of maternal employment on healthcare utilisation. The choice of the Lewbel 2SLS is due to the unavailability of an appropriate external instrument as required for the traditional instrumental variable 2SLS. The identification technique of this method comes from a heteroscedastic covariance restriction which is a feature of many models of endogeneity or mismeasurement (Lewbel, 2012).

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Maternal intention to leave a job and age in grade congruence

For the second empirical chapter, the study sort to examine the relationship between maternal intention to leave a job and children grade progression and the role of ICT in the relationship. The null hypotheses that are tested here include

(a) Maternal intention to leave a job is adversely related to children grade progression.

(b) Household ICT devices does not influence the relationship between intention to leave a job and children grade progression

(c) Working mothers use of smartphones does not influence the relationship between intention to leave a job and children grade progression

Model specification

The second empirical chapter of this work is therefore modeled beginning with the standard Becker model (1965), parents are decision-making agents in the household regarded as a productive entity. Parents invest their resources including time in the child's development as a good (Desai et al., 1989). Following the work of James-Burdumy (2005), a mother's intention to leave her job subject to the child education outcome, a budget constraint, and time constraints of the mother and child is modeled as

$$\max U(E, X, L, z_1, z_2, ..., z_J) \tag{9}$$

$$E = E(G, F, S, M...) \tag{10}$$

The mother's utility function in equation (9) indicates that, the child's education outcome (E), her own desired market goods (X) and leisure (L) generates satisfaction. The z_j, $j=1, \dots , J$, represents other conditions that can

influence preferences. The education outcome of the child is function of several variables including the child's own desired market goods (G), association with friends and other relatives (F), the quantity and quality of school care (S), and the quantity of maternal time with the child (M) as captured in equation (10). Maternal time provided for the child may be influenced by hours of work, travel time to work, work characteristics and work satisfaction among others. For instance, mothers who are have issues with their jobs may spend time and resources looking for extra or new jobs. They may also be burdened psychologically which may also reduce the time and quality of time given to their children.

Total maternal time (T_{mom}) is therefore given by the summation of time for market work (H), time for leisure (L) and time with child (F), whilst the child's time is given as the summation of time with mother (F), quantity and quality of time in school (S) and time with relative/friends (M) as shown in equations (11) and (12) respectively.

$$T_{mom} = H + L + F \tag{11}$$

$$T_{child} = F + S + M \tag{12}$$

$$wH + V = P_F F + P_S S + P_M M + P_x X \tag{13}$$

The budget constraint shows that maternal wage earnings (which is the wage, w, times the quantity of time the mother spends working, H) and non-labour income (V) can be used to purchase parental market goods at prices P_x, market goods for the child at prices P_G, school care P_S, association with relatives and friends P_F. As in Ribar (1992), a shadow cost approach for the price of nonmarket care (since the actual, out-of-pocket cost of nonmarket care

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is often zero) is utilised. Variable *PF* captures the indirect costs of nonmarket care, such as costs associated with interaction with friends and other relatives. Through its impact on the amount of maternal time spent with children and the resources made available for educational investment, the model illustrates how maternal work influences a child's educational outcome. These are only two of the ways that a mother's work might influence how well her child does in school.

Essentially the child education function can be modeled as equation (14) where the mothers maternal employment enters the production function of the child.

$$E = E(G, (F = T - H - L), S, M...) \tag{14}$$

Econometric model

The model for the estimation of grade progression is given as

$$AGG_{ij} = \alpha + \beta' ITQ_i + \delta' X_{ij} + \varepsilon_{ij} \tag{15}$$

where AGG_{ij} is a proxy which indicates the number of children in the household who are in the right grade per their age and *i* and *j* denote individual and household, respectively. $ITQi$ is a binary variable that represent a mother's intention to quit job and X_{ij} is a vector of other covariates such as age of mother, educational level of mother, marital status, religion, location, household size etc. δ *and* β are parameters to be determined and α is the constant term and ε_{ij} is an independent and identically distributed (i.i.d.) error term.

The AGG_{ij} variable is constructed as the current grade of the child divided by the present age of the child. The current grades are coded with the

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formal required age to be in that grade as shown in Table 3. "P" represents primary; therefore P.1 means primary 1, P.2 means primary 2 and so on.

A child whose present age is less or equal to the grade age is associated with a quotient greater or equal to 1.

Estimation procedure

The cross sectional GLSS 7 data commissioned by the GSS is used to analysis the effect of maternal job dissatisfaction on children grade progression. Evidence of the relationship is provided by OLS and propensity score matching (PSM). The OLS is used because the dependent variable is the number of children in a household who are in the right grade based on their age. A notable challenge is the non-random nature of cross-sectional data as indicated earlier. The variable of interest maternal intention to leave a job is a binary variable indicating whether a working mother has the intention to leave her current job. This variable was generated by using the desire to change one's job or get an additional job as a proxy for intention to leave a current job. Since this variable was not randomly assigned raises the issue of sample selection bias. In such cases Rosenbaum and Rubin (1983) proposes the propensity score (PSM) as way to secure causal inference. This is based on the ability to design a model that is near to a randomized trial. The main difference between this kind of design and the complete randomized experiments is that the probabilities of treatment assignment are allowed to depend on covariates, and so can vary from unit to unit.

Propensity score matching involves utilising the average outcomes of comparable subjects who receive a different treatment level to estimate the missing potential outcome for each subject. In Stata, the 'teffects psmatch'

command determines the proximity between subjects by employing estimated treatment probabilities, commonly referred to as propensity scores. This matching technique is specifically known as propensity-score matching (PSM). PSM, which matches on a single continuous covariate, does not necessitate bias correction. By default, each subject is matched to at least one other subject in the dataset. Opting for more distant neighbors in the matching process may reduce estimator variance but comes at the expense of increased bias.

The design has two main features (a) the design is unconfounded

$$\Pr[W \mid X, Y(1), Y(0)] = \Pr(W \mid X) \tag{16}$$

and (b) the individual assigned possibilities as a function of unit i's value of the covariates, $p_i = \Pr(W_i \mid X_i)$, are strictly between zero and one, $0 < p_i < 1$

The assignment of probabilities, p_i, are called propensity scores (Rosenbaum & Rubin, 1983).

The causal estimands of interest are usually average treatment effects on the whole population or on subpopulations. The parameter to estimate depends on the specific evaluation context and the specific question asked. Two main parameters can be estimated namely the (a) average treatment effect (ATE) and (b) average treatment effect on the treated (ATET or ATT)

The average treatment effect is useful to evaluate the expected effect on the outcome if individuals in the population were randomly assigned to treatment.

$$ATE = E\big[Y(1) - Y(0)\big] \tag{17}$$

The average treatment effect (ATE) is computed by taking the difference average outcomes between individuals assigned to the treatment and those assigned to control.

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The average treatment effect on the treated (ATET) expressed as

$$ATET \;=\; E\left[Y\left(1\right) \;-\; Y\left(0\right) \mid W \;=\; 1\right] \tag{18}$$

is useful to explicitly evaluate the effects on those for whom the programme is actually intended. According to Heckman (1997), the ATE might not be of relevance to policy makers because it includes the effect on persons for whom the programme was never intended.

In this study we rely on the ATET estimates, as it is the most used parameter for evaluation studies. The PSM aims to directly estimate the ATET —it does not compare one group to the other (at group), instead, it compares a unit in treatment group to a similar unit in control group (at individual or micro level).

In the case of this study, let treatment dummy W = 1 for treatment group (intention to leave a job), and W = 0 for control group. Let g_i be the observed (actual) outcome for i-th unit. By definition we have

$$g_i \;\equiv\; g_{1i}W \;+\; g_{0i}\left(1-W\right) \tag{19}$$

Only one potential outcome is realized, and the other is missing (unobserved) The difference in average actual outcomes between treatment and control groups is

$$E\left(g_i \mid W \;=\; 1\right) - E\left(g_i \mid W \;=\; 0\right) \tag{20}$$

which can be obtained from the two-sample t-test, or regressing y onto treatment dummy. The ATET in this case becomes

$$ATET \;\equiv\; E\left(g_{1i} \mid W \;=\; 1\right) - E\left(g_{0i} \mid W \;=\; 1\right) \tag{21}$$

Since the treated units, g_{1i} is observed, but g_{0i} is unobserved. The focus of PSM is estimating g_{0i} using the outcome of similar unit(s) in the control

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group. Intuitively, PSM is finding a child who is not in the right grade but whose mother intends to leave a job, and using that child to provide the counterfactual $g_{0i.}$

The PSM assumes the degree of being of a child being in the right grade is determined by observable covariates x such as age of mother, marital status, education level etc. Two children whose mother have similar covariates are assumed to be comparable.

The propensity score (ps) for the i-th observation is just

$$ps_i = Pr\left(W_i = 1\right) = \frac{e^{\hat{\beta}xi}}{1+e^{\hat{\beta}xi}} \tag{22}$$

where $\hat{\beta}$ is from the estimated logit model. Once we have comparable age in grade congruence, it is safe to conclude that the difference in outcome is due to treatment (Mothers job dissatisfaction).

Next, propensity score is used for matching a unit in treatment group to the most similar unit in the control group (which can provide g_{0i}). The matching process for the i-th unit in treatment group is finding the most similar unit in the control group by solving

$$\min_{j\in\, control\ group} \left|ps_i - ps_j\right| \tag{23}$$

This is called simple nearest neighbor matching (only one neighbor is found) or we can find multiple similar control units, or have a pre-determined bandwidth (caliper). Then the potential outcome without treatment is estimated as $g_{0i} = g_j$, where g_j is the outcome of the matched unit in control group. The individual treatment effect is estimated as

$$g_{1i} - g_{0i} = g_i - g_j \tag{24}$$

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The process is repeated for all units in the treatment group. Finally, ATET is just the average of the individual treatment effect for units in treatment group. Two main assumptions are considered very important in considering the PSM approach.

(a) The conditional-independence (CI) assumption (unconfoundedness) means once we control for all observable variables, the potential outcomes are independent of treatment assignment. This assumption effectively rules out that treatment depends on unobserved confounders. In other words, controlling for observed covariates can remove all selection bias.

(b) More formally, the overlap assumption states that each individual has a positive probability of receiving treatment. In the context of matching estimators, overlap essentially means that we can actually match treated subjects with similar nontreated subjects.

Table 3: Construct for age-in-grade congruence

Grade	P. 1	P. 2	P. 3	P. 4	P. 5	P. 6	JHS 1	JHS 2	……
Grade age	6	7	8	9	10	11	12	13	…..
Child age	6	7	8	9	10	11	12	13	…..

Source: Authors' construct

For example, a child whose present age is 6 and currently in primary 1, will have quotient of 1 (6/6=1), if the child is in primary and present age is 5, then the quotient will be 1.2 (6/5=1.2). In this regard, any child with quotient greater or equal to 1 is considered to be in the right grade and assigned 1 and 0 otherwise.

The maternal intention to leave a job variable is a proxy constructed from the intentions of mothers regarding their jobs. Working mothers

answered the question as to whether they wanted to change job, get additional jobs or interested in some changes in their current job. Mothers who answered in the affirmative that they wanted to change jobs are classified to have the intention to leave the job and a dichotomous variable created for the analysis.

Welch t-test

In order to test the difference in the means of the dependent age in grade congruence and the other covariates based on the main variable of interest (maternal intention not to stay in job), the Welch t-test was employed. The Welch's Test also known as Welch t-test for unequal variances is an adjustment of student's t-test which is used to ascertain if two sample means are significantly different. The degrees of freedom employed in the t-test is modified to make it sensitive to samples with unequal variances. The test is based on the null hypothesis that the means are equal and the alternative that the means are not equal. Both the Welch's t-test and the student's t-test rely on the assumption of normality. The difference between the Welch's t-test and the student's t-test is the Welch's t-test does not have the assumption of equal variance. The Welch's t-test performs better when the variances of the two groups are different. In the event that the two groups have equal means, the Welch's t-test and the student's t-test produce the same results.

Household ICT devices and smartphone use

To test the moderating role of ICT usage in the relationship between mothers' intention to leave a job and children grade progression, index of household ICT devices and smartphone usage are used to represent ICT use. The index of household ICT devices was constructed by using principal component analysis (PCA) to create an index from household ICT devices

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including (radio, television, mobile phone CD player tablet, desktop/laptop printer, camera, cassette/VCD/DVD player). Index of household devices is used because of the known influence of household ICT devices on children's education outcomes.

Mother use of smartphones also helps mothers to search for information to help their children to do their assignments. It helps reduce stress of mothers (Jang & Lee, 2022) and helps to communicate with efficiently with the teachers of their wards.

Information and Communication Technology and Employment

The third empirical analysis test the hypothesis that ICT skills has a positive effect on employment, and that differences exist in the effect of ICT on employment for males and females. The differential effect of ICT skills on wage employment for rural and urban dwellers is also analysed. Additionally, financial inclusion and literacy/numeracy are also tested as transmission mechanisms through which ICT skills affects employment.

Model specification

Consistent with existing literature employment status is modeled at the extensive margin defined as an individual who participated in a paid job during the reference period of the study. Equation (25) captures the employment model at the extensive margin of an individual i at time t.

$$\Pr(EMP_i = 1) = \beta_0 + \beta_1 ICTSKILLS_i + \beta_2 X_i + \varepsilon_i \qquad (25)$$

In equation (25) EMPi is the probability of an individual i in employment. EMPi is a dummy variable and it takes the value of 1 if an individual is employed and 0 otherwise. Xi is a vector of explanatory variables to control for individual preferences and include age, gender, religion, marital status,

location, level of education, father and mother's level of education and financial inclusion) which have been observed in the literature to influence employment status. ICT_i represents whether an individual has ICT skills which is the variable of interest, and ε_i is an independent and identically distributed error term.

Estimation procedure

First of all, the probit model was used to provide results for analysis because the dependent variable employment status is dichotomous. Employment represents whether an individual is employed in a paid job or otherwise.

The probit regression model satisfies these conditions:

1. $0 \leq Pr\left(EMP_i = 1 \mid X\right) \leq 1$ for all X

2. $Pr\left(EMP_i = 1 \mid X\right)$ to be increasing in X (for $\beta_1 > 0$)

It models the probability that $EMP = 1$ using the cumulative standard normal distribution function, evaluated at $Z = \beta_0 + \beta_1 ICT + \beta_2 X$:

$$Pr\left(EMP = 1 \mid X\right) = \Phi(\beta_0 + \beta_1 ICT + \beta_2 X) \qquad (26)$$

Where Φ is the cumulative normal distribution function.

- $z = \beta_0 + \beta_1 ICT + \beta_2 X$ is the "*z*-value" or "*z*-index" of the probit model.

Endogeneity

Since the interest is to estimate the effect of ICT on the outcome (employment), an endogeneity issue may arise due to simultaneity. Beyond the issue of endogeneity is the dichotomous nature of both our dependent variable and the variable of interest (ICT). Primarily, two common approaches have often been suggested for the estimation of causal effects in such models

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(Chiburis et al., 2012). The first is the linear instrumental variable (IV) approach which instead of considering the dichotomous structure of the outcome variable and treatment variables, presents linear instrumental variables (IV) estimates of the treatment effect.

The second approach; bivariate probit (BP) model computes maximum-likelihood estimates, and assumes that the outcome and treatment are each determined by latent linear index models with jointly normal error terms. In empirical situations of this type, the available literature gives inconsistent advice on the appropriate course of action (Chiburis et al., 2012). For instance, Angrist (1991, 2001) emphasizes causal effects rather than structural characteristics, arguing for the robustness of the simpler linear IV estimator to the distribution of the error terms. Bhattacharya et al. (2006) however suggest that the bivariate probit model is marginally more robust than linear IV to non-normality of the error terms.

Bivariate probit

Given the binomial nature of both the outcome variable and the variable of interest, ICT (ICT skills), a simultaneous equation bivariate probit, referred to as biprobit (BP), is employed. This choice is justified by its suitability in accommodating the interdependence of choices. The BP model serves as an extension of the univariate probit model, comprising a system of simultaneous equations. The assessment of the probit model likelihood function necessitates the computation of normal probability distribution functions. In this system, the simultaneous equations are presumed to have correlated disturbances.

The bivariate probit model is a joint model for two binary outcomes. These outcomes may be correlated, with correlation ρ. If the correlation turns

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out insignificant, then the models can be estimated separately by probit models, otherwise they are best estimated by bivariate probit model (Greene, 1998).

The response variables are *employment and ICT skills* and where the two variables are formed from unobserved variables ICT^* and EMP^* so the equations for the two variables following the derivations of Kassouf and Hoffmann (2006) our unobserved latent variables are presented as:

$$ICT_i^* = \delta'w + \varepsilon_1$$
ICT=1 if $ICT_i^* > 0$ and ICT=0 otherwise
$$(27)$$

$$EMP_i^* = \beta'x_i + \alpha ICT_i + \varepsilon_2$$
EMP = 1 if $EMP^* > 0$ and $EMP^* = 0$ otherwise
$$(28)$$

where *x* and *w* are column vectors of exogenous variables in which includes instruments.

$$E(\varepsilon_1) = E(\varepsilon_2) = 0$$

$$\mathrm{var}(\varepsilon_1) = \mathrm{var}(\varepsilon_2) = 1$$

$$\mathrm{cov}(\varepsilon_1, \varepsilon_2) = \rho$$

Error of each model follows a normal distribution. There are two random variables that follow the normal distribution so that a normal bivariate distribution is produced.

As outlined by Maddala (1983) and Greene (1998), this represents a distinct instance of the bivariate probit model, characterized by Greene (2003) as a recursive model of simultaneous equations. In this outline, the endogenous variable ICT is featured on the right-hand side of the second equation, while the other endogenous variable EMP does not appear on the right-hand side of any equation.

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The model comprises primary and auxiliary equations. In the primary equation, a treatment variable dummy is regressed on all control variables and one or more instruments. In the auxiliary equation, an outcome variable dummy is regressed on all control variables and the estimated value of the endogenous variable from the first stage. Notably, the instruments are omitted from the auxiliary equation. This statistical specification is estimated using the bivariate probit command in Stata software.

In this study, ICT skills = 1 was specifically considered when an individual has ICT skills and ICT = 0 otherwise. Similarly, EMP = 1 for an individual engaging in a paid employment, and EMP= 0 otherwise.

Using BVN to indicate the distribution function of the bivariate standard normal distribution with correlation ρ, the four basic probabilities of this bivariate probit model are:

$$\Pr ob[EMP = 1, ICT = 1] = BVN(\delta'w,\ \beta'x + \alpha,\ \rho)$$
$$\Pr ob[EMP = 1, ICT = 0] = BVN(-\delta'w,\ \beta'x - \alpha,\ -\rho)$$
$$\Pr ob[EMP = 0, ICT = 1] = BVN(\delta'w,\ -\beta'x - \alpha,\ -\rho)$$
$$\Pr ob[EMP = 0, ICT = 0] = BVN(-\delta'w,\ -\beta'x,\ -\rho)$$

Thus, the expected value for y, given the vectors w and x, is

$$E(LFP | w,x) = Prob[ICT = 1]E[EMP | ICT = 1, w, x] + \Pr ob[ICT = 0]E[EMP | ICT = 0, w, x] \quad (29)$$

Marginal effects

Since Φ(·) is the distribution function of the standard normal distribution, the probability of having ICT skills or the probability of ICT = 1 is obtained from the marginal distribution and is as follows:

$$Prob\ (ICT = 1)\ =\ \Phi\ (\delta'w) \tag{30}$$

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The effect of having ICT skills can be evaluated by the difference between the conditional probabilities of labour force participation when ICT skills or not. Therefore, this effect denoted by G is:

$$G(ICT) = \Pr ob(EMP = 1 | w, x, ICT = 1) - \Pr ob(EMP = 1 | w, x, z = 0) \qquad (31)$$

$$= \frac{BVN(\delta'w, \beta'x + \alpha, \rho)}{\Phi(\delta'w)} - \frac{BVN(-\delta'w, \beta x, -\rho)}{1 - \Phi(\delta'w)}$$

Next, the marginal effect of an exogenous variable X_i on the probability of labour force participation is analysed and denoted by $H(X_i)$. According Kassouf and Hoffmann (2006), the effect for a binary exogenous variable and continuous exogenous variable will be different. Let w0 and x0 be the vectors in which this binary variable assumes value 0 and let W_1 and X_1 be the vectors in which this variable has value 1, keeping the other variables at their mean value

$$H(x_i) = E(EMP | w_1, x_1) - E(EMP | w_0, x_0)$$

$$= BVN(\delta'w_1, \beta'x_1 + \alpha, \rho) + BVN(-\delta w_1, \beta'x_1, -\rho)$$

$$- BVN(\delta'w_0, \beta'x_0 + \alpha, \rho) - BVN(-\delta w_0, \beta'x_0, -\rho) \qquad (32)$$

The first part corresponds to the effect of the binary variable x_i on the probability of being employed for individuals who have ICT skills whereas the second part is the effect on the probability of employment for individuals without ICT skills.

For a continuous exogenous variable the effect becomes a the partial derivative of E(EMP |w, x) in relation the continuous variable. Assuming φ (·) as the value of the density function of the standard normal distribution, the effect of x_h is given by

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$$H(x_h) = \frac{\partial E(LFP \mid w, x)}{\partial x_h} = H_1(x_h) + H2(x_h)$$

$$H_1(x_h) = \phi(\delta'w)\Phi\left(\beta'x + \alpha - \frac{\rho\delta'w}{\sqrt{1-\rho^2}}\right)\delta_h + \phi(\beta'x + \alpha)\Phi\left[\delta'w - \frac{\rho(\beta'x + \alpha)}{\sqrt{1-\rho^2}}\right]\beta_h \qquad 33)$$

and

$$H_2(x_h) = -\phi(\delta'w)\Phi\left(\beta'x - \frac{\rho\delta'w}{\sqrt{1-\rho^2}}\right)\delta_h + \phi(\beta'x + \alpha)\Phi - \left[\delta'w - \frac{\rho(\beta'x)}{\sqrt{1-\rho^2}}\right]\beta_h \qquad (34)$$

Instrument

In other to satisfy the requirement of an instrument in the first stage, the leave-one- out mean approach is used to generate a worthy instrument. The instrument is based on the number or individuals in a cluster who have ICT skills. The average of all those who have ICT skills is calculated living out the individual in question. The instrument is expected to be strongly correlated with ICT skills because people tend to adopt to the situation around them, hence the number of people in a cluster who have ICT skills will influence others in the cluster. However, the variable is not expected to have a direct effect on the outcome variable (EMP).

Likelihood Ratio Chow Test

To test the difference in the effect of ICT skills on male and female employment, the Chow test is used. A Chow test is a straightforward examination to determine whether the coefficients estimated for one group of data are equal to the coefficients estimated for another group (Chow, 1960). The likelihood-ratio Chow test is obtained by fitting our model for male and female and then comparing them with the full model, since the full model included a dummy for gender. Similar test is conducted to test the difference

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in effect for rural and urban models. The null hypothesis suggest that the estimated coefficients are equal, against the alternative hypothesis which states otherwise.

Mediation Channels

In a mediation analysis, the degree to which a treatment indirectly influences the outcome through a mediator and the degree to which it directly affects the outcome through other routes is evaluated (Zhang & Ding, 2022). A variable that explains the association between a predictor variable and an outcome variable is known as a mediator MacKinnon et al., 2007). A popular approach of mediation analysis in the literature is the Baron-Kenny approach. The approach estimates the indirect and direct effects of the treatment on the outcome based on linear structural equation models (Zhang & Ding, 2022). This study employed a two-step method used by (Koomson & Churchill, 2021; Koomson & Danquah, 2021) similar to the Baron-Kenny approach to analyse the mediations.

The approach is based on the conditions that (a) the predictor variable significantly influence the outcome variable in a first regression equation (b) the mediator significantly influence the outcome variable in the second equation where the independent variable and the mediator are entered as covariates. (Baron & Kenny 1986). In the event that the effect of the predictor variable is reduced when the mediator is introduced, then there is partial mediation.

The study explored possible channels via which ICT skills may affect EMP. The importance of ICT skills in enhancing development in literacy and numeracy is documented in the literature (Batanero et al., 2021; Cassany,

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2011; Magadan, 2014), likewise the positive effect of literacy and numeracy on labour force participation and earnings (Chapple & Maré, 2000; Dougherty, 2003; Shomos, 2010). ICT is also known to improve financial inclusion (see Chatterjee & Anand 2017), whilst financial inclusion also influences employment particularly among females (Morsy 2020; Ajide, 2021). The expectation is that financial inclusion and literacy/numeracy will serve as channels through which ICT may affect EMP.

A multidimensional measure of FI similar to that used by Churchill et al., 2020; Churchill and Marisetty, (2019), Koomson et al., (2020a), Koomson et al., (2020b) as well as Zhang and Posso, (2017) is used for the analysis. Four dimensions are considered for the FI measure (ownership of bank or mobile money account; ownership of insurance; access to credit/loan; and receipt of financial remittance from bank or through mobile money) just as Koomson and Danquah (2021). A household financial deprivation score is generated by equally weighting each dimension, assigning a weight of 0.25 to each dimension.

Previous studies (Churchill et al., 2020b; Churchill & Marisetty, 2019; Zhang and Posso, 2017) used a cut-off of 0.5 as reference to indicate deprivation or otherwise. This study also uses a cut-off of 0.5 assign the value 1 to an individual whose financial deprivation score is greater or equal to 0.5 and 0 otherwise.

Literacy/numeracy is an index generated using principal component analysis. The questions that related to literacy and numeracy in the data included whether an individual could do a written calculation, read a phrase or sentence in English and French, write a phrase or sentence in English and

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French, read a phrase or sentence in a Ghanaian language and write a sentence in a Ghanaian language.

Robustness check

In order to test the robustness of our models, standard instrumental variable and instrumental variable Lewbel are employed. Though both the explanatory and outcomes variables of our models are dichotomous and hence justifies the use of the bivariate probit, some scholars extol the use of instrumental variable 2SLS in which case the dependent variable is treated as a continuous variable (limited probability model). There is a disagreement in the literature as to the appropriateness of the leave-one-out variable as an instrument. Results of Lewbel 2SLS is therefore presented to test the sensitivity of the biprobit estimates.

An alternative measure of ICT skills is also used to confirm the results. ICT usage is generated using principal component analysis with variables internet use, use of computer and use of a smartphone. The variable is used to analyse the effect of ICT skills on labour force participation to also test the robustness of the results. Definition of the variables are captured on Table A3 in the appendix.

ICT skills and intention to leave a job

In the last empirical chapter of this thesis, the null hypothesis that ICT skills does not influence the intention of an individual not to stay in a job is tested. Gender heterogeneities in terms of the effect of ICT skills on intention to leave a job is also tested.

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Model specification

Following the standard approach used in the economics literature (Clark & Oswald, 1996; Pelly 2023; Shields & Ward, 2001), the intention to leave a job is modeled as a function of personal characteristics and work characteristics. Equation 35 is modeled to isolate the effect of ICT skills in intention to leave.

$$ITQ_i = \beta_0 + \beta_1'ICT_i + \beta_2'X_i + \varepsilon_i \qquad (35)$$

Where ITQi, represent the intention of the individual to quit his/her job, ICT denote whether the individual has ICT skills or otherwise and X is a vector of other covariates including age, gender, religion, level of education, marital status, location, mother and fathers' education. The parameters to be determined are β_0, β_1 and β_2 and ε_i is an independent and identically distributed (IID) error term.

Estimation Procedure

In this last empirical chapter, expression is found for the relationship between ICT skills and intention to stay or not stay in a job for both males and females. Given that the outcome variable is binary, probit model is used to provide the initial estimates for the relationship.

Several PSM techniques (nearest to neighbour (NN), radius and kernel) are also employed as robustness check and also to address the issue of non-randomization associated with observational data. Our treatment variable 'ICT skills' is binary indicating whether an individual has ICT skills or otherwise. Since this variable was not randomly assigned raises the issue of sample selection bias. In instances like this Rosenbaum and Rubin (1983) proposes the propensity score (PSM) as way to secure causal inference. This is based on

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the ability to design a model that is near to a randomized trial. The main difference between this kind of design and the complete randomized experiments is that the probabilities of treatment assignment are allowed to depend on covariates, and so can vary from unit to unit.

Based on Rosenbaum and Rubin (1983) and following Austin (2011), we specify two possible treatments; active treatment (having ICT skills) and control treatment (without ICT skills) and an outcome. Each individual has a paired outcome of job dissatisfaction Y_i (1) for having ICT skills or otherwise Y_i (0) for not having ICT skills. Using Z as an indicator variable for the treatment (Z=1 for 'having ICT skills' versus Z= 0 for 'without ICT skills'), the only observed outcome for each individual under the actual treatment received is given as

$$Y_i(Y_i = Z_i Y_i(1) + (1 - Z_i)Y_i(O)) \tag{36}$$

The effect of treatment for each subject known as the average treatment effect is defined as

$$ATE = E\big[Y\,(1) - Y\,(0)\big] \tag{37}$$

It represents the average effect at the population level, of moving an entire population from untreated to treated.

Another measure is the average treatment effect (ATE) which is computed by taking the difference average outcomes between individuals assigned to the treatment and those assigned to control and defined as

$$ATET = E\big[Y\,(1) - Y\,(0) \mid W = 1\big] \tag{38}$$

According to Heckman (1997), the ATE might not be of relevance to policy makers because it includes the effect on persons for whom the programme was never intended. Propensity score matching estimates the

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effect of a treatment by comparing treated individuals to similar untreated individuals based on their predicted probability of receiving the treatment. This score, according to Rosenbaum and Rubin (1983), helps account for differences between the groups that might otherwise obscure the true treatment effect $p_i = \Pr(Z_i = 1 \mid X_i)$.

The propensity score acts as a balancing force, ensuring that treated and untreated groups are comparable in terms of their observed baseline characteristics. This means that within a group of individuals sharing the same propensity score, the distribution of these characteristics will be similar, regardless of treatment status. This balancing property eliminates the need for bias correction in PSM, as it effectively matches individuals based on a single continuous covariate—the propensity score itself. By default, PSM matches each subject to at least one similar counterpart in the dataset. However, there's a trade-off to consider: While matching with more distant neighbors can reduce the variability of the estimates, it simultaneously increases the risk of bias creeping in.

Rosenbaum and Rubin (1983) defined treatment assignment to be strongly ignorable if the following two conditions hold (a) $\Pr[W \mid X, Y(1), Y(0)] = \Pr(W \mid X)$ (b) the individual assigned possibilities as a function of unit i's value of the covariates, $p_i = \Pr(W_i \mid X_i)$, are strictly between zero and one, $0 < p_i < 1$

(c) The first condition for accurate propensity score matching is known as conditional independence (CI). It states that once we account for all observable baseline characteristics, the potential outcomes (whether an individual receives treatment or not) become independent of the actual

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treatment assignment. This assumption is crucial because it ensures that hidden factors, known as unobserved confounders, aren't influencing the treatment decision and potentially biasing the results. In simpler terms, if CI holds true, we can effectively eliminate selection bias by carefully controlling for the observed variables.

(d) The second condition (the overlap assumption) says that every subject has a nonzero probability to receive either treatment. Which indicated that each individual has a positive probability of receiving treatment. Overlap in the context of matching estimators basically indicates that we are able to pair treated subjects with comparable nontreated subjects

These two conditions are very critical and must be met before causal inference can be made.

All matching estimators compare a treated person's outcome to the outcomes of the individuals in the comparison group. The neighborhood for each treated individual is specified differently in PSM estimators, as is how the common support problem is addressed. Weights given to these neighbors also vary between PSM estimators. The nearest neighbor (one-to-one), nearest neighbor (one-to-five), radius, and kernel approaches are used in this study. The nearest neighbor (NN) matching technique basically compares a selected subject from the control group to the subject that is treated who is closest to that subject in terms of propensity score (Caliendo, & Kopeinig, 2008). NN matching can be done with replacement or without replacement among others. An individual who is considered as not treated can be matched more than once in the first scenario, but only once in the second. There is usually an issue of

trade-off between bias and variance when considering matching with replacement.

Some scholars suggest that the use of more than one nearest neighbour ('oversampling') such as matching one individual in the treated group to five in the control group. The NN (one-to-five) matching technique also involves a trade-off between variance and bias. Here, it trades reduced variance for increased bias arising from poor matches, since more information is used to construct the counterfactual for each individual (Smith, 1997).

The radius matching technique is usually used to address the risk of bad matches associated with NN matching form particularly when if the closes neighbour is far away (Caliendo & Kopeinig, 2008). In this form of matching, a maximum propensity score distance is imposed. In this case bad matches are significantly reduced. The major challenge with this form matching identifying the reasonable propensity range (Smith & Todd, 2005).

Another method applied in this study is Kernel Matching (KM), which serves as a non-parametric matching estimator. KM utilises weighted averages of all individuals in the control group to construct the counterfactual outcome, leveraging extensive information and thereby achieving lower variance. The difference between the KM technique and the already discussed forms is that for the NN and radius methods, only a few observations from the comparison group are used to construct the counterfactual outcome of a treated individual. According to Baser (2006) all the different techniques have disadvantages and none is seen as empirically superior. In order to get correct standard errors, bootstrap was done for all the techniques.

An alternative measure (usage of ICT) is used in place of ICT skills to check the sensitivity of the results. The variable is a constructed index from four binary variables the use of smartphone, use of internet, use of computer and use of e-commerce (1= yes and 0 = no).

Post-estimation test interpretations

To ensure a model fit, researchers use various "specification tests." Common examples include the Wald, Likelihood Ratio, Lagrange Multiplier, Hosmer-Lemeshow, and Link tests. (Stock & Watson, 2007; Cameron & Trivedi, 2010; Long & Freese, 2014; Wooldridge, 2010).

For threshold crossing models such probit and logit, several tests are available to ascertain the fit of the model including the log likelihood and the likelihood ratio test, Hosmer-Lemeshow and Pseudo-R^2. The likelihood ratio test is practically a test of joint significance of all the regressors. A significant *p-value* is understood to mean that all the regressors in the model are jointly significant.

The linktest is based on the notion that no new independent variables should be significant above chance if a regression equation is properly defined. A particular kind of specification problem called a link error is what the link test searches for. For a dependent variable to appropriately connect to an independent variable, transformation is required. The link test adds the squared independent variable to the model and tests for significance versus the non-squared model. A model without a link error will have a nonsignificant t-test versus the unsquared version.

For non-linear models, the McFadden's R2 (or pseudo-R2) provides an alternative to the usual R2 for assessing model fit. While useful for binary

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outcome models, it's noted that it doesn't directly translate to the R^2 of a linear model and doesn't represent the explained variance in the same way (Long & Freese, 2014). Similar to R^2 in cross-sectional studies, McFadden R^2 values tend to be lower.

To further evaluate model fit, the Hosmer-Lemeshow test provides a way to check for model specification. A non-significant p-value suggests the model is well-specified (Cameron & Trivedi, 2010). However, relying solely on this test has limitations: it uses predicted probabilities based on an arbitrary choice of the number of subgroups used in the test (usually 10) (Cameron & Trivedi, 2010; Long & Freese, 2014). Therefore, this study employs a combination of specification tests for a more comprehensive assessment of model fit.

The main goal of post-estimation tests for instrumental variables is to establish model identification based on the generation of the instruments. The tests cover exogeneity of the instruments, over- and under-identification, and the strength or weakness of the instrument being used, among other things. The Sargan–Hansen test, often referred to as Sargan's J test, is a statistical tool designed to assess whether a model has too many identifying restrictions, potentially compromising its validity. The test starts by assuming that the model's parameters are correctly identified based on pre-established restrictions on the coefficients. It then examines whether there are any additional, unnecessary restrictions that could hinder identification. The null hypothesis states that the model is under-identified, meaning it lacks enough information to uniquely determine its parameters. If the test produces a significant p-value, we reject the null hypothesis, suggesting that the model is

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precisely identified—no excess restrictions are present. However, a non-significant p-value raises concerns about over-identification, casting doubt on the validity of the instruments used in the model. Weak instruments, those only weakly correlated with endogenous regressors, can lead to biased and unreliable estimates. To ensure robust identification, excluded instruments must not only be correlated with endogenous regressors but also exhibit a strong correlation. The Cragg-Donald F-statistic (1993) helps detect weak instruments. A first-stage F-statistic below 10 signals a weak instrument problem (Stock & Yogo, 2005).

Exogenous hypothesis testing for biprobit is based on value ρ, which is the correlation between unobserved variables in two equations. If $\rho = 0$ then $\varepsilon 1i$ and $\varepsilon 2i$ is not correlated which means that there is exogeneity. Conversely, if $\rho \neq 0$ then there is an endogenous problem in model. Testing the hypothesis to test exogeneity can be done with the Lagrange Multiplier Test with the following hypothesis. $H_0 : \rho = 0$ and $H_1 : \rho \neq 0$. The test follows a chi-square distribution.

Chapter summary

In this chapter, the procedure by which the various empirical chapters are going to be analysed are presented sequentially for each of the four (4) empirical chapters. This included the hypotheses tested and analytical models and the estimation techniques for the various objectives, post estimation techniques and measurement of variables.

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CHAPTER FIVE

MATERNAL EMPLOYMENT AND HOUSEHOLD HEALTHCARE

UTILISATION: THE ROLE OF ICT

Introduction

This chapter presents the results and discussion on the first empirical analysis which investigates issues of maternal employment and household healthcare utilisation. Results are also presented on the role of ICT in the relationship between maternal employment and household healthcare utilisation. Specifically, two (2) hypotheses are tested; - (a) maternal employment negatively affects household healthcare utilisation (b) ICT usage moderates the effect of maternal employment on household healthcare utilisation.

Evidence of the effect of maternal employment on household healthcare utilisation is provided by OLS, Poisson regression and inverse probability weighted regression adjustment (IPWRA). The endogenous treatment effect estimation is also used to test whether there was an issue of endogeneity arising from unobservable variables. The next section of this chapter provides the descriptive statistics of the variables used in the estimation, followed by the discussions of the results from the estimations. The final section offers a summary of the chapter.

Descriptive Statistics

Table 4, provides the summary statistics of the variables used in the analysis. It has been done for all the households in the sample and for a sub-sample of only households that recorded ill/injured member(s) and households without ill/injured member(s). The outcome variable is the number of

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members in who utilised healthcare services and the explanatory variable of interest is maternal employment which represents whether a mother is economically engaged outside the home or otherwise. Description of the other variables are captured in Table A1 in the appendix. Overall, healthcare utilisation is 32% for the full sample. It is higher for households with ill/injured member(s) 85% (0.835) than households without ill/injured member(s) 5% (0.045). It indicates that the utilisation of health services is reactive than proactive. About 8 out of every 10 mothers are employed. The average age of mothers is 41 years. Households with at least an ill/injured member are 35% and an average of 2 members in a household have valid NHIS cards but higher for households with ill/injured household member(s).

Table 4: Summary statistics of variables included in the model

Variable	All Households		Households with ill/injured member(s)		Households without ill/injured member(s)	
	Mean	SD	Mean	SD	Mean	SD
Healthcare utilisation	0.323	0.706	0.835	0.956	0.045	0.227
Maternal employment	0.767	0.423	0.791	0.407	0.755	0.430
Age (years)	40.839	12.705	42.32	12.524	40.033	12.731
Age squared/100	18.292	11.143	19.478	11.159	17.647	11.082
Level of education						
No education	0.363	0.481	0.400	0.490	0.343	0.475
Basic	0.503	0.500	0.503	0.500	0.502	0.500
Secondary	0.082	0.274	0.064	0.245	0.091	0.288
Tertiary	0.053	0.223	0.032	0.176	0.064	0.244
Household size	4.901	2.783	5.448	3.079	4.603	2.559
Marital status						
Never married	0.050	0.217	0.034	0.180	0.059	0.235
Married	0.756	0.429	0.762	0.426	0.754	0.431
Divorced/widowed	0.194	0.395	0.205	0.404	0.188	0.391
QUINTILE						
1st quintile	0.252	0.434	0.268	0.443	0.244	0.429
2nd quintile	0.197	0.398	0.226	0.419	0.181	0.385
3rd quintile	0.174	0.380	0.178	0.382	0.173	0.378
4th quintile	0.179	0.383	0.168	0.374	0.184	0.388
5th quintile	0.197	0.398	0.159	0.366	0.218	0.413

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Table 4 Cont'D

Religion						
No religion	0.083	0.276	0.098	0.298	0.075	0.263
Christian	0.725	0.447	0.705	0.456	0.736	0.441
Moslem	0.191	0.393	0.196	0.397	0.188	0.391
Traditionalist	0.001	0.034	0.001	0.033	0.001	0.034
Location (rural = 1)	0.586	0.493	0.661	0.474	0.545	0.498
Ill/Injured	0.352	0.478				
Average number of valid card holders	1.967	2.136	2.191	2.312	1.845	2.024
N=10,588						

Source: Authors' computation using Ghana Living Standard Survey (GLSS 7)

Figure 10, presents average maternal hours of work (orange) and household healthcare utilisation (blue) distributed regionally. Except for the Upper West region which has a small average hour of work with a small household healthcare utilisation and the Volta region which has a bigger 'average hours or work' yet a bigger healthcare utilisation, overall regions with high average hours of work are associated with lower household healthcare utilisation. For instance, Ashanti, Greater Accra, Brong Ahafo, and Eastern regions have average hours of work per week of 30.62, 29.98, 27.67 and 26.6 are associated with 13.87%, 15.92%, 20.19%, and 24.6% household healthcare utilisation respectively. Coincidentally, these regions are also the most populated regions of the country.

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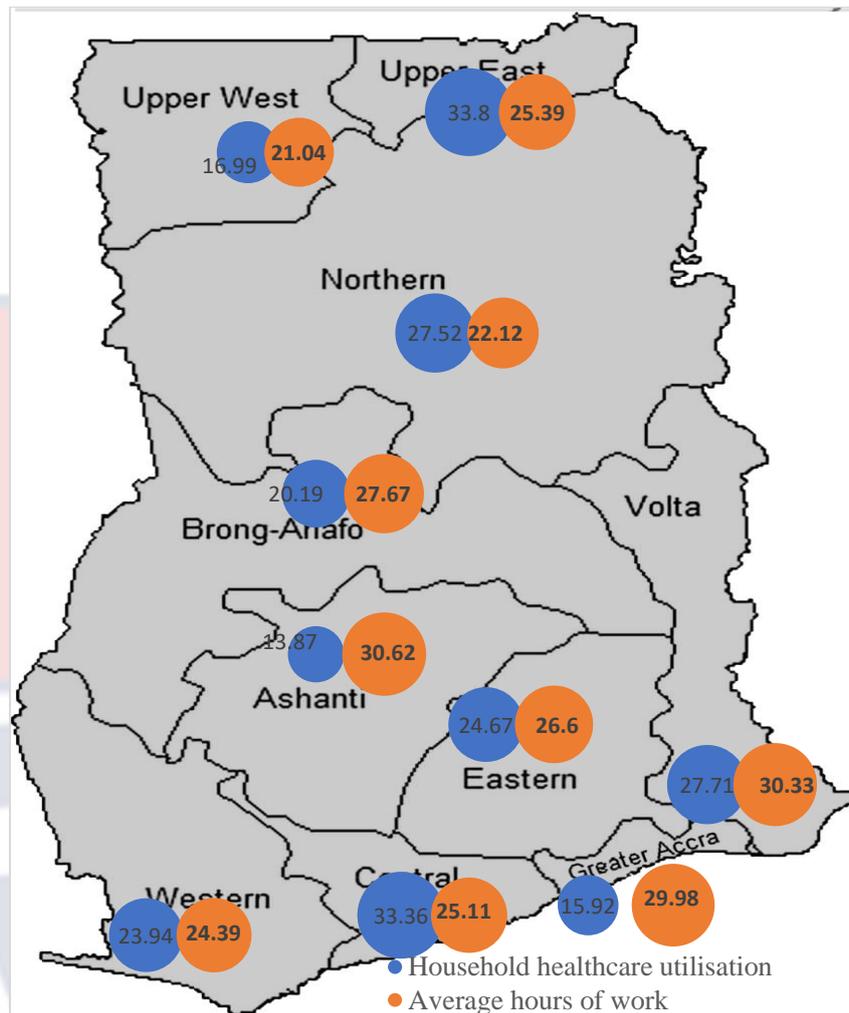
Figure 12: Household healthcare utilisation and average hours of work by regions
Source: Author's construct, 2023

Maternal Employment and Household Healthcare Utilisation

The OLS estimates for the effect of maternal employment on household healthcare utilisation (All households, households with ill/injured member(s) and households without ill/injured member(s) including locational sub-samples) are presented in Tables 5. Variance inflation factor (VIF) of less than 10 for all the models indicate that the models do not suffer from multicollinearity. The results generally indicate a negative relationship between maternal employment and household healthcare utilisation. For easy interpretation, the standard values in square brackets are interpreted.

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Households with working mothers are likely to have a lower number of household members who utilise health. A standard deviation increase in maternal employment is associated with a 0.025 standard deviation decrease in healthcare utilisation for the total sample, 0.035 and 0.041 standard deviation decrease for households with ill/injured member(s) and without injured member(s) respectively. The results also show that for the households with ill/injured member(s), rural dwellers a standard deviation increase in maternal employment is linked to a 0.049 standard deviation decrease in healthcare utilisation. In the case of households without ill/injured members, household healthcare utilisation decreases by 0.036 and 0.046 standard deviation with a standard deviation increase in maternal employment for rural and urban areas respectively.

The results also confirm the importance of health insurance to healthcare utilisation. The estimates show that possessing valid national insurance card is positively related to household healthcare utilisation for the full sample and all the subsamples (gender and location). Poisson results are also presented in Appendix C1 in the appendices section. The estimates are generally consistent with the OLS results. Based on the marginal effects in square, estimates show a negative relationship between maternal employment and healthcare utilisation.

Table 5: OLS estimates of maternal employment on household healthcare utilisation by location (rural/urban)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	ALL Households			Households with ill/injured member(s)			Households without ill/injured member (s)		
	ALL	RURAL	URBAN	ALL	RURAL	URBAN	ALL	RURAL	URBAN
Maternal employment	-0.035***	-0.012**	-0.027*	-0.081**	-0.136***	0.018	-0.022***	-0.016*	-0.027**
	(0.012)	(0.005)	(0.015)	(0.039)	(0.053)	(0.055)	(0.007)	(0.009)	(0.012)
	[-0.025]	[-0.031]	[-0.014]	[-0.035]	[-0.049]	[0.003]	[-0.041]	[-0.036]	[-0.046]
Age (years)	-0.005	-0.003	-0.006	0.000	0.000	0.002	-0.000	0.002	-0.003
	(0.003)	(0.004)	(0.005)	(0.008)	(0.009)	(0.013)	(0.001)	(0.002)	(0.003)
Age squared/100	0.007*	0.004	0.010*	0.002	-0.000	0.004	0.001	-0.001	0.005
	(0.003)	(0.004)	(0.006)	(0.009)	(0.011)	(0.015)	(0.002)	(0.002)	(0.003)
Level of education									
Basic	0.014	0.020	0.008	0.027	0.054	-0.040	0.018***	0.011	0.029**
	(0.015)	(0.020)	(0.023)	(0.038)	(0.047)	(0.064)	(0.007)	(0.008)	(0.014)
Secondary	0.031	0.043	0.023	0.074	0.070	0.037	0.021*	0.026	0.026
	(0.025)	(0.050)	(0.027)	(0.073)	(0.135)	(0.086)	(0.011)	(0.020)	(0.016)
Tertiary	0.010	0.036	-0.001	-0.008	0.070	-0.102	0.024*	0.040	0.027
	(0.023)	(0.043)	(0.029)	(0.076)	(0.111)	(0.105)	(0.014)	(0.033)	(0.018)
Household size	0.031***	0.036***	0.015**	0.062***	0.068***	0.038**	0.000	0.002	-0.003
	(0.005)	(0.006)	(0.006)	(0.011)	(0.013)	(0.016)	(0.001)	(0.002)	(0.003)
Marital status									
Married	-0.019	0.022	-0.016	0.035	0.098	0.006	0.014	0.012	0.014
	(0.021)	(0.045)	(0.022)	(0.071)	(0.121)	(0.084)	(0.010)	(0.019)	(0.012)
Divorced/widowed	-0.007	0.031	-0.015	0.039	0.111	-0.018	0.011	-0.003	0.022
	(0.024)	(0.047)	(0.029)	(0.075)	(0.125)	(0.097)	(0.012)	(0.020)	(0.017)
Ill/injured	0.760***	0.752***	0.769***						
	(0.014)	(0.018)	(0.023)						
Wealth Quintile									
2nd quintile	0.102***	0.116***	0.052	0.223***	0.231***	0.177	0.013	0.017*	-0.019

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Table 5 Cont'D

	(0.019)	(0.023)	(0.041)	(0.046)	(0.051)	(0.113)	(0.008)	(0.010)	(0.023)
3rd quintile	0.156***	0.186***	0.084**	0.348***	0.378***	0.257**	0.019**	0.023**	-0.015
	(0.023)	(0.030)	(0.042)	(0.055)	(0.066)	(0.114)	(0.009)	(0.011)	(0.024)
4th quintile	0.157***	0.169***	0.093**	0.322***	0.320***	0.258**	0.028***	0.035***	-0.008
	(0.022)	(0.029)	(0.040)	(0.053)	(0.067)	(0.108)	(0.010)	(0.013)	(0.023)
5th quintile	0.195***	0.233***	0.104**	0.388***	0.433***	0.278**	0.035***	0.048***	-0.006
	(0.024)	(0.032)	(0.042)	(0.057)	(0.073)	(0.114)	(0.011)	(0.017)	(0.024)
Region (no religion=1)									
Christian	-0.018	-0.038	0.109**	-0.036	-0.073	0.254	-0.009	-0.013	0.031*
	(0.028)	(0.031)	(0.052)	(0.066)	(0.072)	(0.158)	(0.009)	(0.011)	(0.016)
Moslem	0.004	-0.010	0.129**	-0.016	-0.031	0.235	0.004	-0.012	0.055***
	(0.031)	(0.037)	(0.054)	(0.074)	(0.085)	(0.162)	(0.011)	(0.012)	(0.021)
Traditionalist	-0.068	-0.244	0.153**	-0.019	-0.254	0.461***	-0.063***	-0.093***	-0.008
	(0.088)	(0.179)	(0.061)	(0.275)	(0.493)	(0.169)	(0.015)	(0.023)	(0.021)
Location (rural=1)	0.026**			0.056			0.002		
	(0.013)			(0.035)			(0.007)		
Valid NHIS card holder	0.032***	0.035***	0.030***	0.066***	0.067***	0.070***	0.007***	0.005**	0.010***
	(0.004)	(0.006)	(0.005)	(0.010)	(0.012)	(0.015)	(0.002)	(0.002)	(0.002)
Constant	-0.170***	-0.218**	-0.168*	0.080	0.115	-0.134	-0.002	-0.034	0.038
	(0.064)	(0.086)	(0.097)	(0.178)	(0.226)	(0.287)	(0.031)	(0.037)	(0.055)
Diagnostic test									
Mean VIF	7	7.20	8.79	7.54	7.97	9.04	7.39	7.30	9.12
Observations	10,588	6,203	4,385	3,731	2,465	1,266	6,857	3,738	3,119
R-squared	0.317	0.296	0.365	0.191	0.120	0.081	0.012	0.013	0.016

Robust standard errors in parentheses *** $p<0.01$, ** $p<0.05$, * $p<0.1$
Source: Author's computation 2023

IPWRA estimates of Maternal Employment on Healthcare Utilisation

IPWRA estimates are presented in Tables 6 and it shows that the results are similar to the OLS results but the IPWRA have higher coefficients indicating that the OLS results are downward biased. Therefore, the IPWRA results are preferred to the OLS. Figure 11 shows the common support region which is the IPWRA intersection condition for households with working and non-working mothers. Households that fell outside the common support region were dropped. Again, we fail to reject the null hypothesis that covariates are balanced based on overidentification test for covariate balance (Chi2(10) =16.9 and Prob> Chi2= 0.1398). Appendix A2 justifies the appropriateness of the use of the IPWRA, since the weighted variables are balanced (means≈0, variances≈1).

The IPWRA results in Table 6 indicate a coefficient of -0.047, -0.049 and -0.024 for maternal employment for all households, households with ill/injured member(s) and households without ill/injured member(s). This suggests that a household with a working mother is likely to have a 5%, 5% and 3% decrease in the number of household members who utilise health services. This reveals that the decrease in healthcare utilisation as a result of mothers' engagement in economic activity is higher for households with ill/injured household member(s). The results of the locational sub-samples also show a negative relationship and the coefficient is higher for the urban sub-sample. For example, with regards to the overall sample and households without ill/injured members, the urban subsamples have higher coefficients than the rural subsamples, except for the households with ill/injured that the urban subsample is not significant. Households with working mothers in urban

and rural households have a 5% (-0.045) and 4% (0.042) decrease in healthcare utilisation respectively and for households without ill/injured member(s), it is 3% (-0.033) for urban households and 2% (-0.018) for rural households.

The results show that households with working mothers are likely to have less time available for domestic production and most likely reduce healthcare utilisation compared to households with non-working mothers. Since maternal employment is expected to influence healthcare utilisation through time and resources from participation, the results suggest that working reduces the time allocated to caring for the health needs of the household, similar to the conclusion of Brauner-Otto et al. (2020) when they investigated the effect of female labour force participation on children health status. It is also in line with the conclusion of Kraut et al (2000) that unemployment is associated with higher healthcare utilisation suggesting that participation decreases healthcare utilisation.

In Ghana, the negative relation between maternal employment and household healthcare utilisation may be the case because of low incomes. People with low incomes work longer hours and in stressful conditions (Heinrich, 2014). Many women enter the labour market under duress and work longer hours to be able to complement household incomes. Particularly for single mothers, the livelihood of the household depends on the returns from participation in the labour without which feeding might be difficult. In light of this, many working mothers put premium on the wages from their participation and therefore devote much time to their work with little or no room to attend to their health needs. It is also possible that some mothers are

overburdened with household duties even after work and may not have the energy to respond to all the health needs of the household especially when there is no help from their spouses. In certain institutions/companies, it is suggested that working mothers are not given the needed support to attend to verifiable household health concerns by authorities and management leading to their inability to encourage utilisation in their household. The situation has the ability to hinder the achievement of Universal Health Coverage as enshrined in the SDGs.

In urban areas where mothers are engaged in economic activities, traffic congestions, longer hours of work and job stress can result in decrease in time spent by working mothers in attending to healthcare issues in the household.
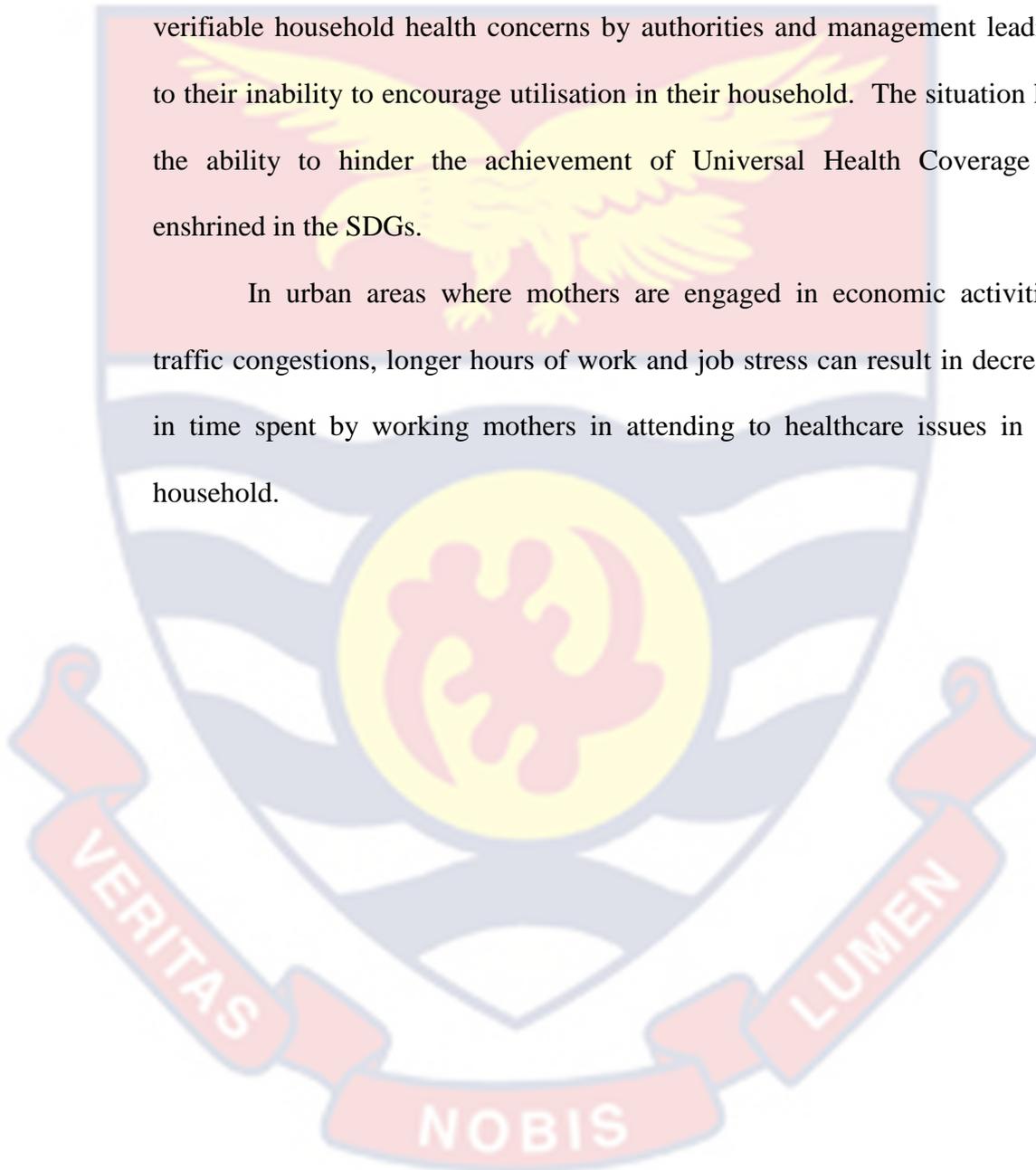
Table 6: IPWRA Estimates of Maternal Employment on Household Healthcare Utilisation by Location (rural/urban)

VARIABLES	(1) ALL	(2) RURAL	(3) URBAN	(4) ALL	(5) RURAL	(6) URBAN	(7) ALL	(8) RURAL	(9) URBAN
	All households			Households with ill/injured member(s)			Households without ill/injured member (s)		
Maternal employment	-0.047***	-0.042**	-0.045**	-0.049*	-0.041***	-0.021	-0.024***	-0.018*	-0.033***
	(0.015)	(0.021)	(0.019)	(0.040)	(0.012)	(0.056)	(0.007)	(0.010)	(0.012)
Level of education									
Basic	0.049	0.107***	-0.062	0.030	0.052	-0.009	0.066	0.150***	-0.076
	(0.033)	(0.040)	(0.059)	(0.056)	(0.066)	(0.108)	(0.041)	(0.051)	(0.071)
Secondary	0.112*	0.268***	0.097	0.158	0.435***	0.005	0.087	0.189*	0.125
	(0.057)	(0.091)	(0.079)	(0.106)	(0.156)	(0.153)	(0.068)	(0.112)	(0.093)
Tertiary	0.067	0.138	-0.020	-0.048	-0.004	-0.045	0.108	0.233	-0.020
	(0.072)	(0.140)	(0.092)	(0.145)	(0.245)	(0.196)	(0.083)	(0.171)	(0.106)
Marital status									
Married	-0.050	0.238**	-0.227***	0.049	0.238	-0.146	-0.083	0.229	-0.250***
	(0.068)	(0.117)	(0.083)	(0.136)	(0.207)	(0.183)	(0.078)	(0.143)	(0.093)
Divorced/widowed	-0.067	0.146	-0.151*	-0.010	0.083	-0.042	-0.075	0.185	-0.186*
	(0.072)	(0.122)	(0.091)	(0.143)	(0.214)	(0.195)	(0.084)	(0.149)	(0.103)
Location (rural=1)	0.152***			0.108*			0.173***		
	(0.032)			(0.057)			(0.040)		
Ill/injured	0.116***	0.105***	0.115**						
	(0.029)	(0.037)	(0.047)						
Valid NHIS card holder	0.009	0.005*	0.037***	0.010*	0.007*	0.025*	0.008*	0.012*	0.045***
	(0.006)	(0.008)	(0.011)	(0.010)	(0.012)	(0.020)	(0.008)	(0.011)	(0.013)

Table 6 Cont'D

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Religion (no religion)									
Christian	0.199***	0.193***	0.066	0.107	0.132	-0.210	0.259***	0.240***	0.151
	(0.050)	(0.055)	(0.143)	(0.083)	(0.088)	(0.282)	(0.064)	(0.070)	(0.169)
Moslem	0.085	0.219***	-0.225	-0.040	0.074	-0.501*	0.166**	0.317***	-0.134
	(0.055)	(0.064)	(0.146)	(0.090)	(0.101)	(0.288)	(0.070)	(0.083)	(0.173)
Traditionalist	-0.153	0.122	-0.474	0.004	4.325***	-0.981	-0.201	-0.297	-0.287
	(0.379)	(0.651)	(0.514)	(0.667)	(0.220)	(0.923)	(0.470)	(0.771)	(0.631)
Wealth quintile									
2nd quintile	0.192***	0.242***	-0.013	0.201***	0.214***	0.280	0.185***	0.255***	-0.165
	(0.041)	(0.047)	(0.106)	(0.067)	(0.074)	(0.181)	(0.053)	(0.062)	(0.131)
3rd quintile	0.261***	0.285***	0.114	0.351***	0.329***	0.487***	0.212***	0.246***	-0.065
	(0.046)	(0.056)	(0.104)	(0.077)	(0.089)	(0.180)	(0.057)	(0.072)	(0.128)
4th quintile	0.171***	0.234***	0.015	0.210***	0.314***	0.251	0.147**	0.179**	-0.111
	(0.047)	(0.062)	(0.102)	(0.079)	(0.103)	(0.173)	(0.058)	(0.078)	(0.127)
5th quintile	0.261***	0.264***	0.114	0.218**	0.120	0.351**	0.271***	0.337***	-0.016
	(0.051)	(0.077)	(0.103)	(0.088)	(0.124)	(0.174)	(0.063)	(0.098)	(0.128)
Constant	0.298***	0.150	0.773***	0.440***	0.347	0.809**	0.254**	0.095	0.846***
	(0.088)	(0.129)	(0.176)	(0.166)	(0.223)	(0.331)	(0.105)	(0.157)	(0.211)
Observations	10,588	6,203	4,385	3,731	2,465	1,266	6,857	3,738	3,119

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1
Source: Author's construct, 2023

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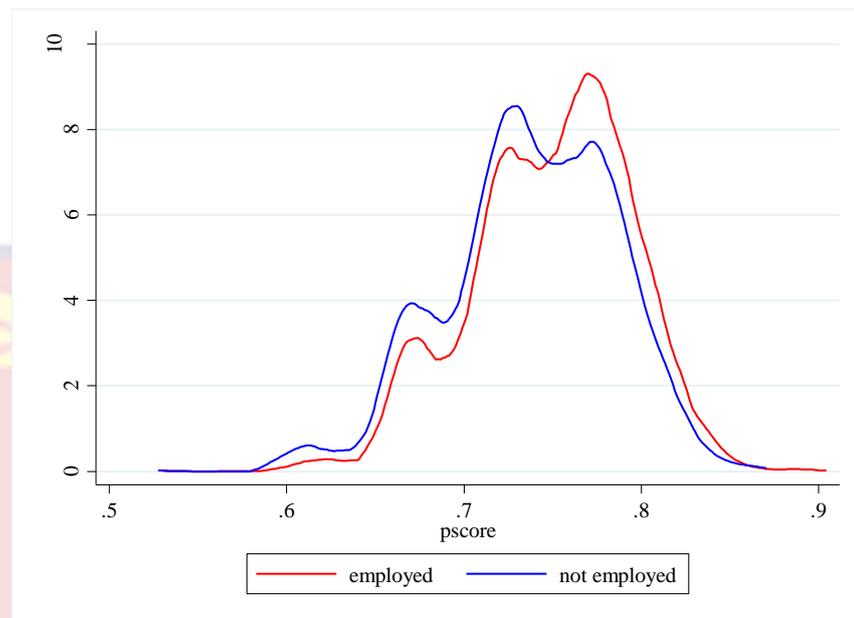
Figure 13: Common support region for employed=1 and unemployed=0
Source: Author's construct (2023)

Test of endogeneity

In order to rule out the issue of endogeneity arising from unobservable characteristics, the ETEE was use to run the model, after which a Wald test to determine whether the estimated correlations between the treatment-assignment and potential-outcome models are different from zero was conducted. Based on the statistical insignificance of the estimate (see below), the null hypothesis could not be rejected, which indicates that endogeneity rising from omitted variables is not a problem. This rules-out a potential bias with the IPWRA results.

Ho: treatment and outcome unobservables are uncorrelated

chi2(2) =   4.43

Prob > chi2 =   0.1092

The role of ICT

In Table 7, OLS results of the interaction between maternal employment and smartphone use as well as ICT skills are presented. The OLS

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is used for easy appreciation of interpretation, and also because the results do not differ significantly from the results of our main estimation technique (IPWRA). The results of which are also presented on Tables 8 and 9. Margins plots are also presented in Figures 14 and 15 and used to show the predictive margins of the interactions.

Smartphone Use

The results of the interaction of maternal employment and smartphone use show that the coefficients after the interaction are positive when compared to the effect of maternal employment on healthcare utilisation. Again, the net effects in square brackets also indicate positive relationship for almost all the sub-samples. After the interaction of maternal employment and mothers use of smartphones, the results indicate a positive net effect of 0.010 signifying an increase in healthcare utilisation for working mothers who use smartphones as against those who do not use smartphones. The coefficient is even higher (0.138) for households with ill/injured member(s). This indicates that mothers use of smartphones makes the otherwise negative effect of maternal employment on household healthcare utilisation positive and also means that households with working mothers who use smartphones are likely to have an increase in healthcare utilisation compared to households with working mothers who do not use smartphones. The results for urban households are not statistically significant but indicate a positive relationship. Rural households with working mothers who use smartphones are likely to have an increase in household healthcare utilisation.

The margins plot showing the predictive margins of the interaction of maternal employment and mothers use of smartphones indicate that the

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margins change between a mother without smartphone (smartphone=0) and a working mother with smartphone (smartphone=1) (Figure 14). This means that on a whole smartphone use influences the relationship between maternal employment and healthcare utilisation by reducing the negative effect of maternal employment on healthcare utilisation.

The results indicate the importance of working mothers' use of smartphones because it enables them to be able to work outside the home and also take care of healthcare utilisation issues in the home. Working mothers can leverage smartphones to access a plethora of health information, including reliable websites, health apps, and online forums. This access empowers mothers to make informed decisions about their family's healthcare. Smartphones also facilitate setting up reminders for medical appointments, vaccinations, and routine check-ups, helping manage family healthcare needs efficiently. The communication features of smartphones enable easy interaction with healthcare providers through email, messaging apps, or video calls, offering flexibility for busy schedules. Additionally, the emergence of telehealth services accessible via smartphones provides working mothers with a convenient option for remote healthcare consultations, particularly beneficial for minor health concerns and reducing the need for physical visits to healthcare facilities.

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Table 7: Estimates of the Interaction of Maternal Employment and ICT (smartphone use) on Healthcare Utilisation

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	All households			Households with ill/injured member(s)			Households without ill/injured member(s)		
	ALL	RURAL	URBAN	ALL	RURAL	URBAN	ALL	RURAL	URBAN
Maternal employment	-0.043***	-0.062***	-0.015	-0.085**	-0.133**	0.005	-0.022***	-0.019**	-0.024*
	(0.015)	(0.021)	(0.020)	(0.041)	(0.054)	(0.060)	(0.007)	(0.009)	(0.013)
ME*Smartphones	0.053*	0.121*	0.014	0.223*	0.278*	0.138	0.002	0.078*	0.014
	(0.032)	(0.067)	(0.037)	(0.117)	(0.191)	(0.148)	(0.022)	(0.043)	(0.027)
Net effect	[0.010]	[0.059]	[-0.001]	[0.138]	[0.145]	[0.133]	[-0.02]	[0.059]	[-0.01]
Other covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,588	6,203	4,385	3,731	2,465	1,266	6,857	3,738	3,119
R-squared	0.316	0.295	0.365	0.087	0.096	0.080	0.012	0.014	0.016

Standard errors in parentheses. Significance at 10%, 5%, and 1% are indicated by *, ** and *** respectively.

ME: Maternal employment

Source: Authors' computation using Ghana Living Standard Survey 7
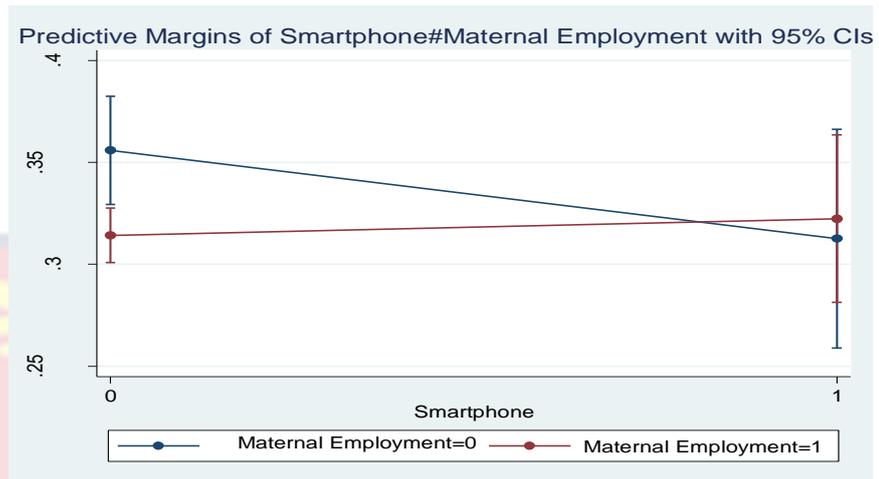
A - All Households
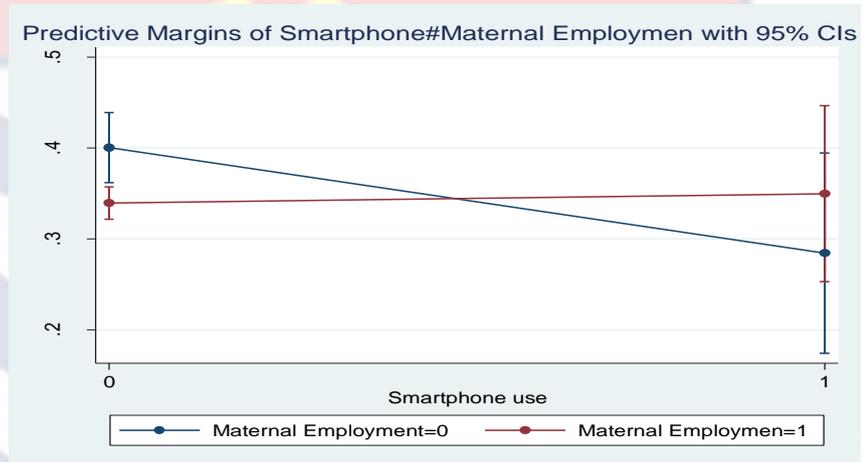
B - Rural
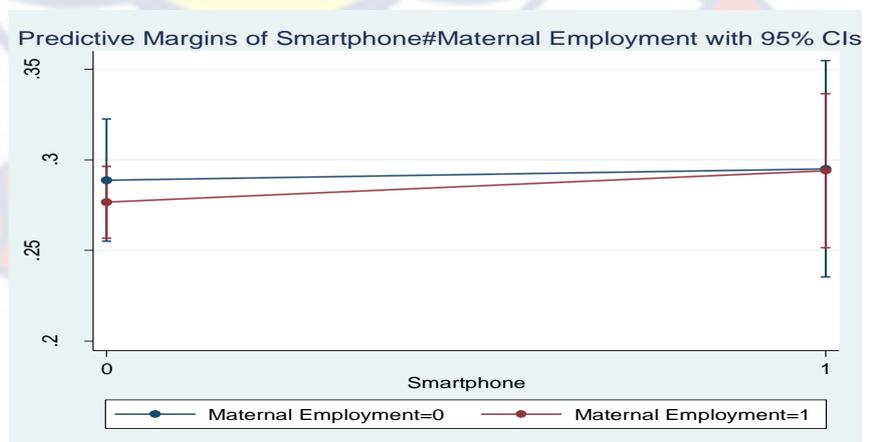
C - Urban

Figure 14: Margins plot for interaction of smartphone and maternal employment

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ICT Skills

The results of interaction of maternal employment and ICT skills as reported on Table 8 show that, having ICT skills positively influence the relationship between maternal employment and healthcare utilisation. The influence of ICT skills is particularly important in urban households. For rural households the relationship is not statistically significant. Household Healthcare utilisation is increased 4% for households with working mothers who have ICT skills. That for urban households alone is 5% (0.072). With regards to households with ill/injured members the percentages are high especially for urban households (37%) where the working mother is proficient in ICT. The margins plot showing the predictive margins of the interaction of maternal employment and ICT skills generally indicate changes in the margins between mothers without ICT skills (ICT skills=0) to working mothers who have ICT skills as shown in Figure 15.

Working mothers with ICT skills can efficiently navigate digital platforms and access reliable health websites and apps to gather relevant health information for themselves and their families. These skills enable them to engage with online health education resources, such as webinars and courses, enhancing their understanding of various health topics and promoting a proactive healthcare approach. Additionally, ICT proficiency allows mothers to schedule and manage healthcare appointments using calendar applications, reminders, and healthcare-specific apps. They can also maintain digital health records, storing information about medications, allergies, and medical history for easy accessibility.

Table 8: Estimates of the Interaction of Maternal Employment and ICT (skills) on Healthcare Utilisation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	All households			Households with ill/injured member(s)			Households without ill/injured member (s)		
VARIABLES	ALL	RURAL	URBAN	ALL	RURAL	URBAN	ALL	RURAL	URBAN
Maternal employment	-0.044***	-0.059***	-0.021	-0.086**	-0.126**	-0.010	-0.023***	-0.018*	-0.027**
	(0.015)	(0.021)	(0.019)	(0.041)	(0.054)	(0.059)	(0.007)	(0.009)	(0.013)
ME*ICT skills	0.085**	0.062	0.072*	0.300**	0.054	0.381**	0.011	0.065	0.002
	(0.037)	(0.082)	(0.042)	(0.132)	(0.197)	(0.176)	(0.023)	(0.061)	(0.026)
Net effect	[0.041]	[0.011]	[0.051]	[0.024]	[-0.072]	[0.371]	[-0.012]	[0.047]	[-0.025]
Other covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,588	6,203	4,385	3,731	2,465	1,266	6,857	3,738	3,119
R-squared	0.316	0.295	0.365	0.087	0.096	0.083	0.012	0.014	0.017

Robust standard errors in parentheses. Significance at 10%, 5%, and 1% are indicated by *, ** and *** respectively.

ME: Maternal employment

Source: Authors' computation using Ghana Living Standard Survey 7
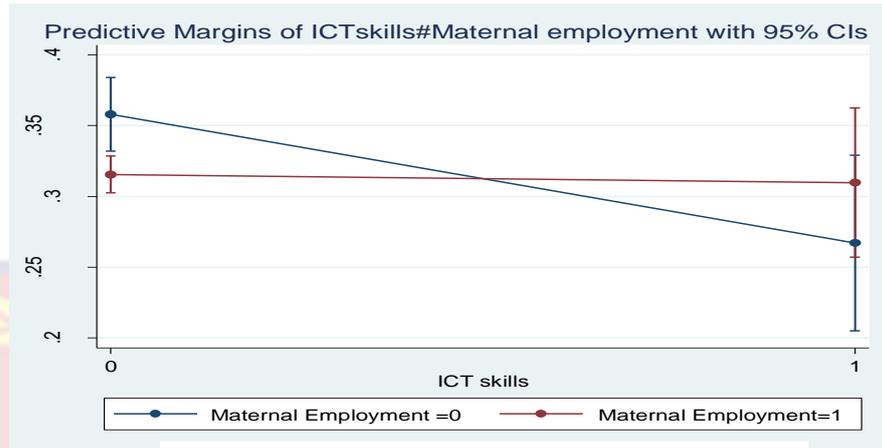
Panel A - All Households
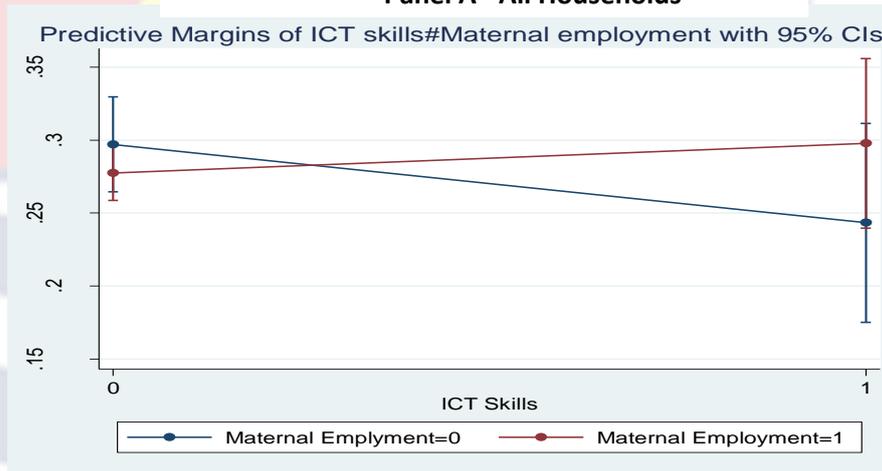
Panel B - Rural
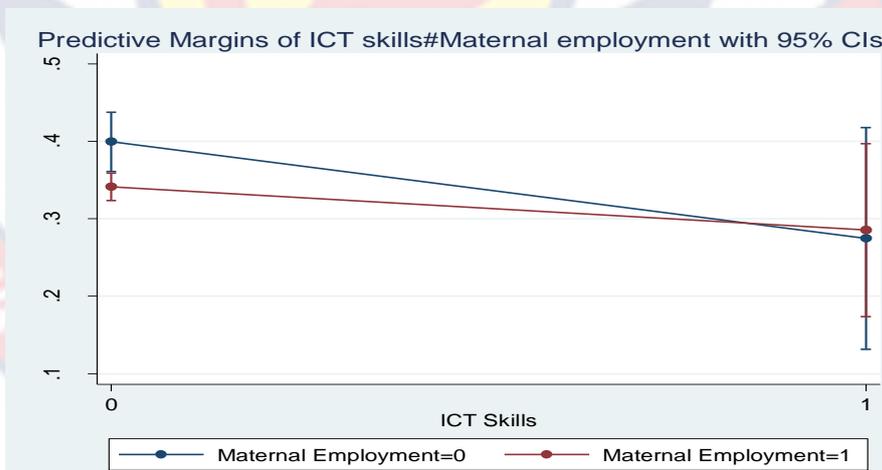
Panel C - Urban

Figure 15: Margins plot for interaction of ICT skills and maternal employment

Source: Author's construct (2023)

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With ICT skills, working mothers can take advantage of telehealth services, using video conferencing tools for remote consultations with healthcare providers. This facilitates timely access to medical advice without the need for physical visits. Health monitoring apps, which track vital signs, symptoms, and trends, can be effectively utilised, with the data shared during appointments for more informed and personalized care. Moreover, ICT skills enable seamless communication with healthcare providers through email, secure messaging, or patient portals, allowing mothers to seek advice, ask questions, and receive updates conveniently. Overall, these skills empower working mothers to manage healthcare efficiently and stay engaged in their family's well-being.

In rural households, working mothers use of ICT devices is enough to engineer a statistically positive relationship between maternal employment and healthcare utilisation. For urban households, mothers need to have ICT skills to be able to affect a positive relationship. This may be attributed to the complex nature of work in the urban areas compared to rural areas. Again, traffic situations, service provisions (banks, hospitals, transport services etc.,) in urban areas require ICT skills for effective use. Generally, the results indicate the ability of smartphone use and ICT skills to reduce the negative effect of maternal employment on household healthcare utilisation. This means that ICT is an antagonistic moderating variable since it is able to change the otherwise negative effect between maternal employment and healthcare utilisation.

Chapter Summary

Though the benefits of maternal employment in the empowerment of mothers and improvement of welfare in households is prominently registered in literature, its specific effect on household healthcare utilisation for all household members has not been studied. This paper contributes to the literature by using the seventh round of the Ghana Living Standard Survey to examine the effect of maternal employment on household healthcare utilisation. Ordinary least squares (OLS) and Inverse probability weighted regression adjustment techniques were used to provide evidence of the effect of maternal employment on healthcare utilisation. The endogenous treatment effect estimation (ETEE) was used to check the potential endogeneity arising from omitted variables, and the indication was that endogeneity form unobservable characteristics was not an issue.

The findings are that there is a negative relationship between maternal employment and household healthcare utilisation. All things being equal, mothers' engagement in economic activity outside the home is associated with a decrease in household healthcare utilisation.

Secondly, in rural households, the decrease in healthcare utilisation for working mothers may be linked to ignorance, inadequate resources, and longer hours of work to support the family reduce their ability to appropriately respond to household welfare issues.

The results also record that increase in ICT use is one of the main ways by which maternal employment can improve healthcare utilisation. The use of ICT devices is able to speed up work and may free up time for mothers to attend to other personal issues including the needs of the household. It will

also afford mothers the opportunity to work from home and keep them close to their household members. Again, use of ICT devices will improve communication between mothers, their household members, and health providers/systems and make it easier for frequent consultation of health practitioners and health institutions.

Finally, the findings also confirm the importance of health insurance to healthcare utilisation in Ghana as established in literature.

On the whole, the results give an indication that merely encouraging maternal employment may not be enough to promote household healthcare utilisation. Promoting the use of ICT devices with relevant software and supporting digital devices will be significant in increasing household healthcare utilisation.

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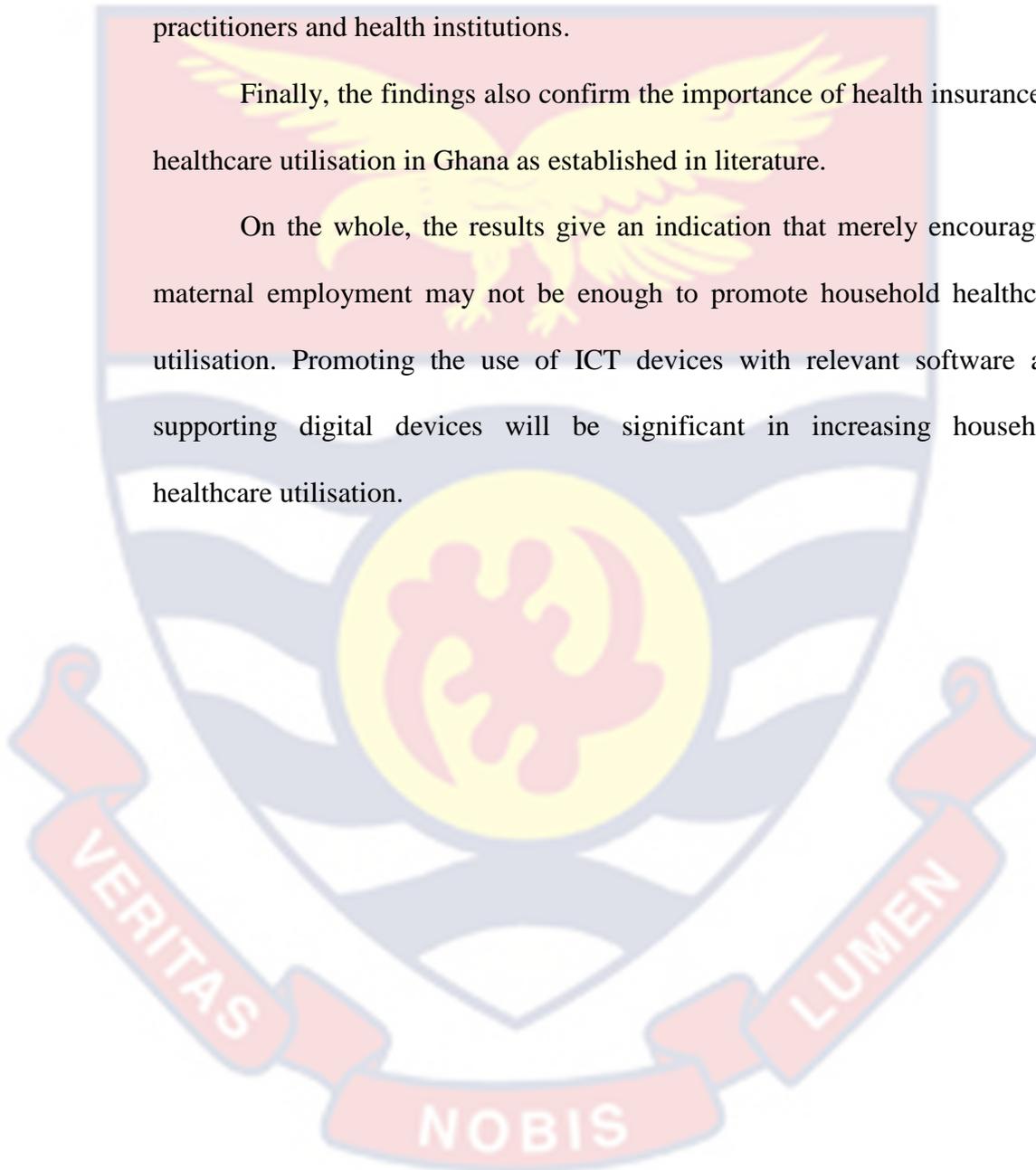
CHAPTER SIX

MOTHERS' INTENTION TO LEAVE CURRENT JOB AND

CHILDREN GRADE PROGRESSION, DOES ICT MATTER?

Introduction

This chapter is used to provide evidence of the relationship between maternal job dissatisfaction and children grade progression. The specific objectives here are to examine (a) mothers' intention to leave current job on children grade progression and (b) the role of ICT in the relationship between intention to leave job and grade progression. To achieve the objective of the study, OLS and PSM techniques are used to test the hypothesis.

The section that follows, provides the descriptive statistics of the variables that were used for the OLS and PSM analysis. After the descriptive statistics, the results from the OLS and PSM are discussed. The chapter ends with a summary.

Descriptive statistics

Table 9 shows the difference in the means of children grade progression and the explanatory variables used in the estimations based on intention to leave current job. The result shows that the groups are balanced based on the *p values* computed using the Welch t-tests. The difference in mean of children grade progression based on whether a mother intends to quit job or not (mean intention stay (0) minus mean of intention not to stay (1)) indicate that, mothers who intend to stay have a bigger mean grade progression. This means that mothers who intend to quit their jobs have a higher number of children who are overaged. Household with mothers who

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intend to quit their jobs are younger in age, less educated, reside in rural areas

and are on a lower wealth quintile.

Table 9: Summary statistics by maternal intention to leave a job

Variable	Mean	Std. Dev.	Difference	Min	Max
Children grade progression	0.467	0.746	0.084***	0	6
Age of mother	39.89	9.216	2.774***	18	60
Age of mother squared/100	16.76	7.990	2.441***	3.24	64
Level of education	0.849	0.467	0.135***	0	3
Location (1= rural)	0.643	0.479	-0.086***	0	1
Ratio of children (0-17 years)	0.516	0.168	-0.010*	0.067	1.5
Marital status (base = never married)	1.132	0.405	-0.009	0	2
Religion (base = no religion)	1.120	0.581	-0.066***	0	9
Wealth quintile	2.590	1.388	2.844***	1	5
Household size	5.842	2.776	-0.115*	1	28
Household size squared/100	0.418	0.509	-0.017	0.01	7.84

Source: Author's construct (2023)

Effect of mothers' intention not to stay in job on children grade

progression

This section presents the discussion of the results of the first objective:

the effect of mother's intention not to stay in current job on children grade

progression. In Table 10, OLS results are presented for mothers' intention to

leave and indicators of intention to leave, whilst the ATET results from PSM

are captured in Table 11. The dependent variable children grade progression is

the number of children in a household who are in the right grade based on the

defined ages for the various grades in the Ghanaian educational system. The

educational structure provides that a child enters primary one (1) at six (6)

years and probably below, primary two (2) at seven (7) years, primary three

(3) at eight (8) years in that order. In this study any child that enters a grade

with a year or more in age than the official age for the grade is considered not

to be in the right grade. In the household, higher the children grade

progression is associated with a higher number of children in the household

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who are in the right grade. The variable of interest, intention to leave is based on a proxy that represents mothers who were willing to change their jobs and also seek extra jobs. The variable is calibrated as a dummy variable (1= intention to leave, 0 = intention to stay).

The OLS results in Table 10 shows intention not to stay in job is negatively associated with children grade progression for all the samples. Out of the five (5) samples and sub-samples, only the total sample, urban sub-sample and female sub-sample are statistically significant. The results show that intention not to stay in job is associated with a 5% (-0.052), 10% (-0.097%) and 7% (-0.066) decrease in the number of children of a household who are in the right grade for the total sample, the urban sub-sample and female sub-sample respectively.

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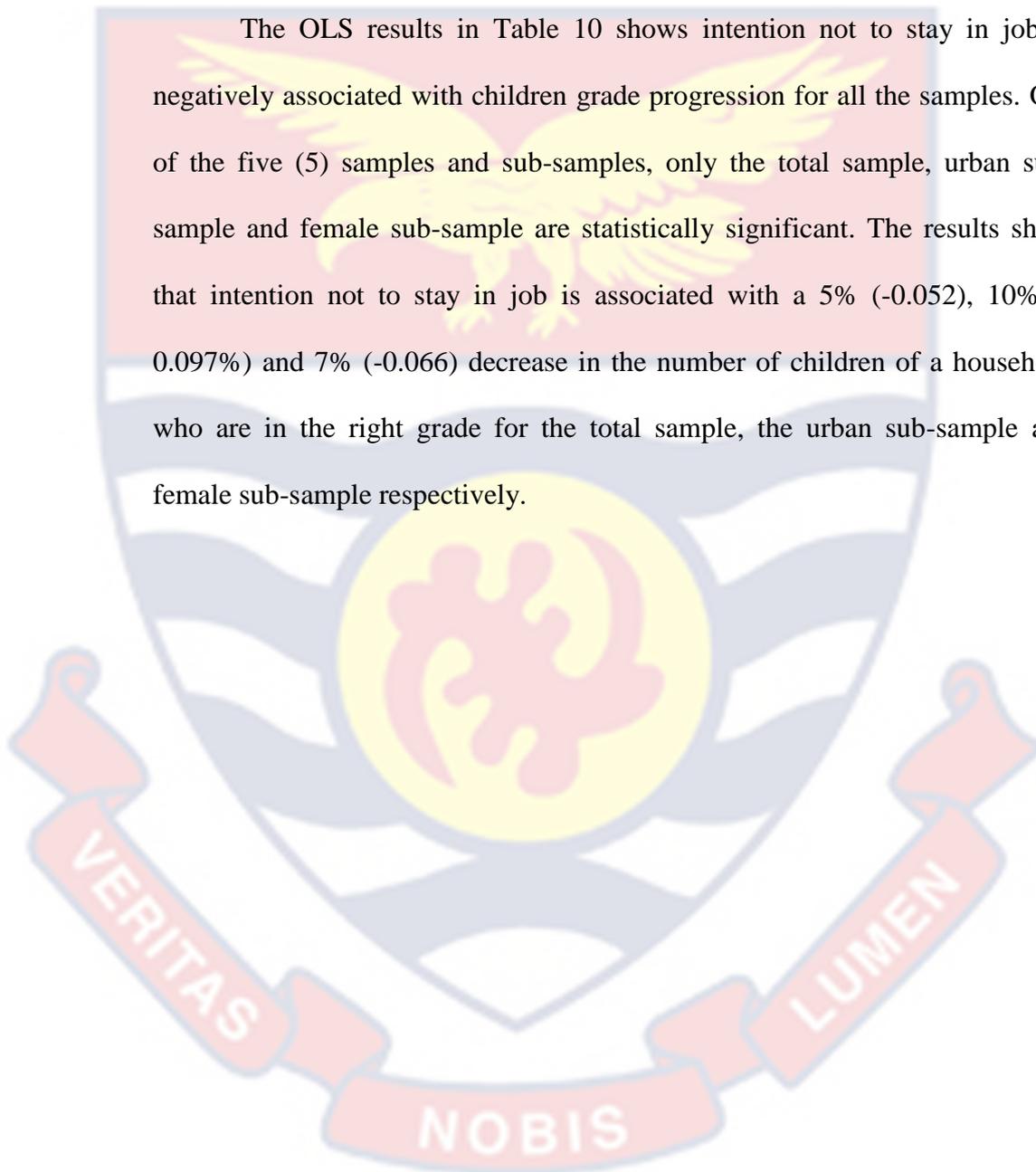
Table 10: OLS estimates for Intention to Leave a job and Children Grade Progression

VARIABLES	(1) ALL	(2) RURAL	(3) URBAN	(4) MALE CHILDREN	(5) FEMALE CHILDREN
Intention to leave job	-0.052**	-0.034	-0.097**	-0.038	-0.066**
	(0.024)	(0.027)	(0.045)	(0.033)	(0.034)
Mother' age in years	0.005	-0.001	0.023	0.000	0.012
	(0.008)	(0.008)	(0.023)	(0.011)	(0.011)
Mother's age squared/100	-0.009	-0.004	-0.026	-0.002	-0.017
	(0.009)	(0.009)	(0.028)	(0.013)	(0.012)
Mother's level of education					
Basic	0.338***	0.318***	0.362***	0.341***	0.337***
	(0.023)	(0.026)	(0.049)	(0.031)	(0.035)
Secondary	0.688***	0.645***	0.717***	0.824***	0.582***
	(0.075)	(0.102)	(0.107)	(0.115)	(0.098)
Tertiary	1.496***		1.438***	1.470***	
	(0.063)		(0.124)	(0.089)	
Location (1= rural)	-0.204***			-0.229***	-0.174***
	(0.030)			(0.044)	(0.041)
Ratio of children (0-17 years)	0.721***	0.376***	1.334***	0.738***	0.687***
	(0.076)	(0.081)	(0.159)	(0.110)	(0.106)
Marital status (1 = never married)					
Married	0.066	-0.004	0.014	0.057	0.068
	(0.062)	(0.081)	(0.088)	(0.088)	(0.086)
Widowed/divorced	0.019	-0.045	-0.018	0.004	0.029
	(0.066)	(0.085)	(0.096)	(0.096)	(0.091)

Table 10 Cont'D

Religion (1= no religion)					
Christian	0.124***	0.099**	0.245**	0.102**	0.146***
	(0.037)	(0.038)	(0.124)	(0.051)	(0.054)
Moslem	0.036	0.047	0.083	-0.054	0.130**
	(0.042)	(0.046)	(0.128)	(0.059)	(0.061)
Traditionalist	0.629	0.734	0.597***	1.532***	0.240
	(0.390)	(0.517)	(0.152)	(0.078)	(0.222)
Wealth quintile (1= 1st quintile)					
2nd Quintile	0.047	0.065**	-0.086	0.047	0.056
	(0.031)	(0.033)	(0.100)	(0.043)	(0.045)
3rd Quintile	0.127***	0.073**	0.143	0.086*	0.179***
	(0.035)	(0.037)	(0.102)	(0.048)	(0.052)
4th Quintile	0.236***	0.241***	0.203**	0.164***	0.312***
	(0.043)	(0.056)	(0.100)	(0.058)	(0.063)
5th Quintile	0.295***	0.218***	0.308***	0.270***	0.347***
	(0.049)	(0.069)	(0.106)	(0.073)	(0.069)
Household size	0.077***	0.041**	0.157***	0.080***	0.080***
	(0.016)	(0.018)	(0.043)	(0.019)	(0.024)
Household size squared/100	-0.093	0.053	-0.393	-0.130	-0.092
	(0.096)	(0.104)	(0.353)	(0.110)	(0.139)
Constant	-0.778***	-0.362*	-1.834***	-0.634***	-0.970***
	(0.174)	(0.190)	(0.457)	(0.238)	(0.261)
Observations	3,530	2,271	1,259	1,798	1,732
R-squared	0.155	0.114	0.189	0.157	0.161

Robust standard errors in parentheses. Significance at 10%, 5%, and 1% are indicated by *, ** and *** respectively.

Source: Authors' computation using Ghana Living Standard Survey

In Table 11 are the ATET results based on PSM. The Propensity-score matching (PSM) determines "nearest" using the estimated treatment probabilities, which are known as the propensity scores. There is a choice to use probit, logit or heteroscedastic probit. For easy interpretation probit is preferred for the matching. We specify to consider a pair of observations a match if the absolute difference in the propensity scores is less than 0.08. This is to allow matches when dealing with location and gender sub-samples which may have larger differences in propensity scores.

Figure 16. shows the common support region which is the PSM overlap condition for households with mothers who intend not to stay in job and mothers who intend to stay in current job. Appendix A4 justifies the use of the PSM estimator, since the weighted variables are balanced with means and variance approximately equal to 0 and 1.
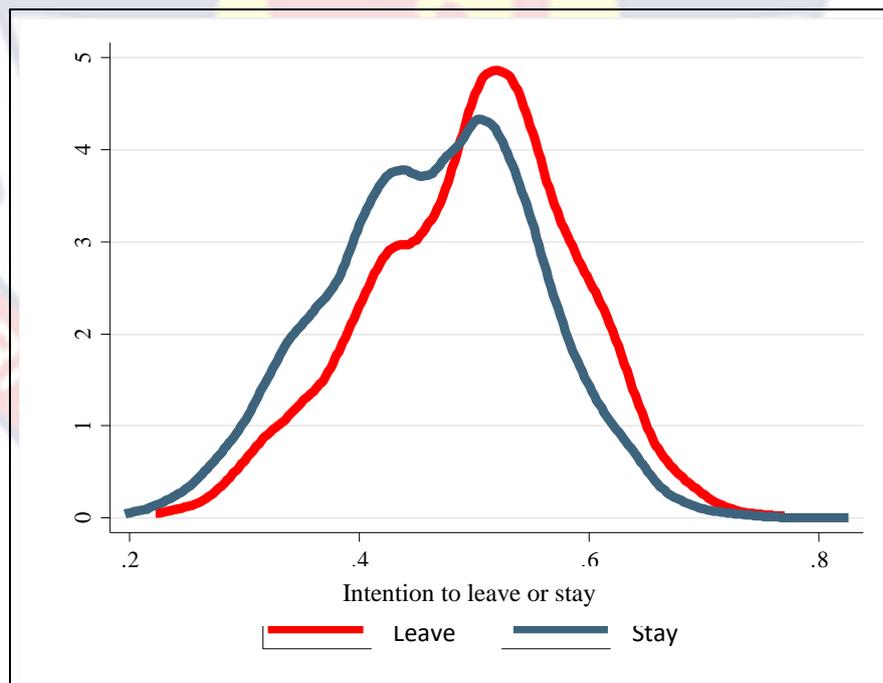
Figure 16: Common support region for intention to leave=1 and stay =0

On a whole the results of the PSM are in line with the OLS results. Mothers' intention to quit job is negatively related children grade progression just like the OLS results in Table 10.

With reference to the total sample, it shows that Mothers' intention to quit their job is associated with a reduction in the number of children in household who are in the right grade by 5% (-0.053). The percentage is higher for urban households, where the percentage decrease in the number of children being in the right grade as a result of mother's intention to quit their current job is about 12% (-0.115). In terms of gender, the results indicate that for female children, mothers' intention to quit their current job is linked to a reduction in the number of female children who are in the right grade by 7% (-0.072). The results support the argument that psychological and emotional challenges from work influences the attitude and behavoir of the mother in dealing with household issues including the education development of the child.

In the study by Anderson (2006), job stress was found to reduce job satisfaction and increases ineffective behavoir parenting which negatively affected the behavoir of the youth in the household. Frone (2003) suggest that mothers to leave their influenced by work-family conflict. In a reverse the intention to leave a job could also have a negative effect mothers' activity at home, because the period of contemplation could also be a period where job dissatisfaction as heightened. The negative effect of maternal job discontent on the grade progression may be as a result of mothers' inability to have quality time for their children because they are either stressed out or engrossed

in searching for new and extra jobs, emotional disconnect between mother and children because the mother might not be in the right frame of mind.

The results also highlight the relevance of education of mothers to the educational progression of their children. For instance, the estimates for level of education show a strong positive relationship between level of education and children age-in-grade congruence. The estimates indicate that, higher educational levels of mothers were associated with higher number of children in a household who have progressed satisfactorily. For instance, the estimates for the full sample show that compared to mothers with no education, having basic education, secondary education and tertiary education increases children's age-in-grade progression by 0.338, 0.688 and 1.496 respectively.

Table 11: PSM results for intention to leave a job and children grade progression

VARIABLES	(1) ALL	(2) LOCATION RURAL	(3) URBAN	(4) GENDER MALE CHILDREN	(5) FEMALE CHILDREN
Not stay in job	-0.053*	-0.051*	-0.115**	-0.049	-0.079*
	(0.028)	(0.031)	(0.055)	(0.042)	(0.042)
Observations	3,530	2,271	1,259	1,798	1,732

Robust standard errors in parentheses. Significance at 10%, 5%, and 1% are indicated by *, ** and *** respectively.
Source: Authors' computation using Ghana Living Standard Survey 7

ICT as a moderating variable

The second objective of this chapter is to examine the role of ICT in the relationship between maternal decision not to stay in current job and grade progression. The interaction of maternal decision not to stay in job and two (2) indicators of ICT are used: index of household ICT devices and mother's use of smartphones are used. The net effect after the interaction is presented. In

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the case if smartphone which is a factor variable margins plots are also presented to indicate the prediction of the margins.

On Table 12, results of the interaction between decision not to stay in job and index of household ICT devices are presented. The results indicate that after the interaction, the coefficients become either positive or if negative and the magnitude is smaller for the indirect effect. For instance, the interaction term for the urban sub-sample is positive (0.075). This means that greater availability of household ICT devices in a household is associated with an 8% increase in the number of children who are in the right grade given their current age. The net effect of -0.044 indicates that for a working mother using a smartphone, the negative effect of the decision of a mother not to stay in her current decreases. This result aligns with the findings of Karakara and Osabuohien (2018) that child learning especially at home is enhanced by ICT and also reduce the likelihood of being educationally disadvantaged.

The results of the interaction of mothers' decision not to stay in current job and maternal use of smartphone is reported on Table 13. The results indicate that only the urban sub-sample is statistically significant. The total sample and the male sub-sample show that there is a positive relationship, while the rural and the female sub-samples indicate a negative relationship between mothers' decision not to stay in current job and children grade progression. In urban household's mothers who are not happy in their jobs but use smartphones are about 20% more likely to have their children in the right grade. All the other samples show a reduction in the magnitude of the coefficient although the they are not statistically significant. This is made clearer by the margins plot on Figure 17 which indicates changes in the

predicative margins of the interaction. This suggest that the effect of the interaction term on grade progression shows that working mothers use of smartphones decreases the negative adverse effect of the intention to leave a current job on children grade progression.

Working mothers overcome job-related challenges by utilising smartphones to augment their children's education. These devices provide access to a plethora of educational resources, including apps, online courses, and digital content, positively impacting academic success. Smartphones enable remote communication for supporting homework and projects through video calls and messaging applications. Calendar applications aid in organising academic activities, ensuring adherence to school events and deadlines. Online tutoring services and educational apps on smartphones offer homework assistance and connect children with virtual tutors. Communication with teachers is streamlined through email and virtual meetings. Applications tracking academic progress allow real-time monitoring of grades and attendance, facilitating timely intervention. Moreover, smartphones deliver motivational and educational content, fostering a positive learning attitude. In parallel, household ICT devices like computers and tablets serve as crucial tools for enriching a child's education. Granting access to diverse educational resources, these devices support homework, offer virtual tutoring, and enhance communication between mothers and children.

Table 12: Estimates of the Interaction of Intention to Leave a Job and Index of Household ICT Devices and Children Grade progression

VARIABLES	(1) ALL	(2) RURAL	(3) URBAN	(4) MALE CHILDREN	(5) FEMALE CHILDREN
Intension to leave a job	-0.053**	-0.045	-0.119***	-0.028	-0.037
	(0.024)	(0.030)	(0.044)	(0.033)	(0.034)
Index of household ICT devices	0.024*	0.028	0.015*	0.021	0.026
	(0.014)	(0.020)	(0.018)	(0.019)	(0.017)
MJD*I household CT devices	0.008	0.025	0.075**	0.007	0.020
	(0.018)	(0.023)	(0.030)	(0.027)	(0.027)
Net effect	[-0.045]	[-0.020]	[-0.044]	[-0.021]	[-0.017]
Other covariates	Yes	Yes	Yes	Yes	Yes
Observations	3,530	2,271	1,259	1,798	1,732
R-squared	0.155	0.116	0.205	0.091	0.101

Robust standard errors in parentheses. Significance at 10%, 5%, and 1% are indicated by *, ** and *** respectively.

ITLJ: Intention to leave a job

Source: Authors' computation using Ghana Living Standard Survey 7

Table 13: Estimates of the Interaction of Intention to Leave a Job and Smartphone on Children Grade Progression

VARIABLES	(1) ALL	(2) RURAL	(3) URBAN	(4) MALE CHILDREN	(5) FEMALE CHILDREN
Intension to leave a job	-0.052**	-0.024	-0.127***	-0.034	0.009
	(0.024)	(0.028)	(0.049)	(0.034)	(0.036)
Internet access	0.196***	0.324**	0.163**	0.083	0.152*
	(0.062)	(0.130)	(0.072)	(0.078)	(0.078)
ITLJ*I household CT devices	0.045	-0.017	0.195*	0.132	-0.044
	(0.095)	(0.180)	(0.112)	(0.123)	(0.125)
	[-0.007]	[-0.041]	[0.068]	[0.098]	[-0.035]
Observations	3,530	2,271	1,259	1,798	1,732
R-squared	0.158	0.119	0.208	0.092	0.102

Robust standard errors in parentheses. Significance at 10%, 5%, and 1% are indicated by *, ** and *** respectively.

ITLJ: Intention to leave a job

Source: Authors' computation using Ghana Living Standard Survey 7
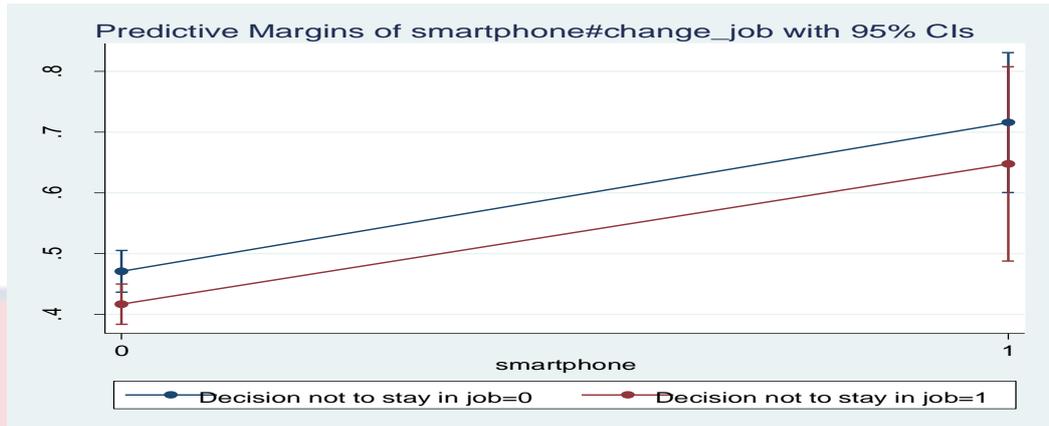
Panel A - All Households
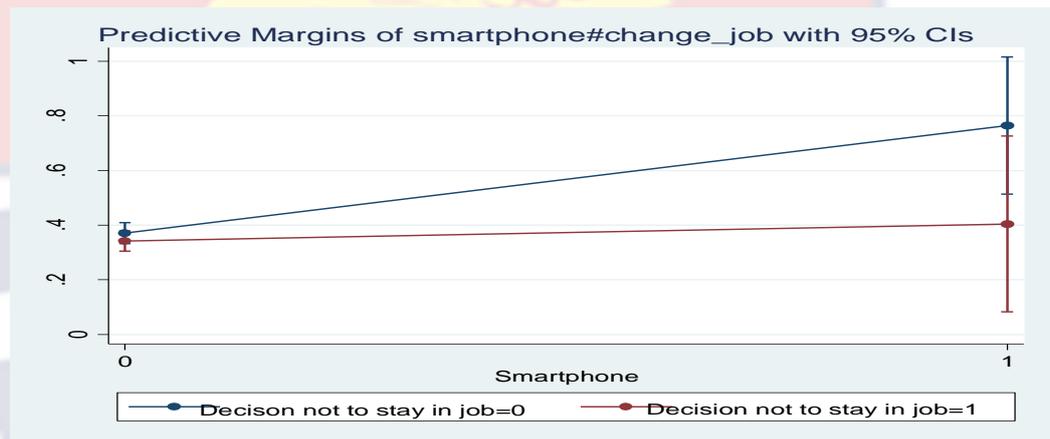
Panel B - Rural
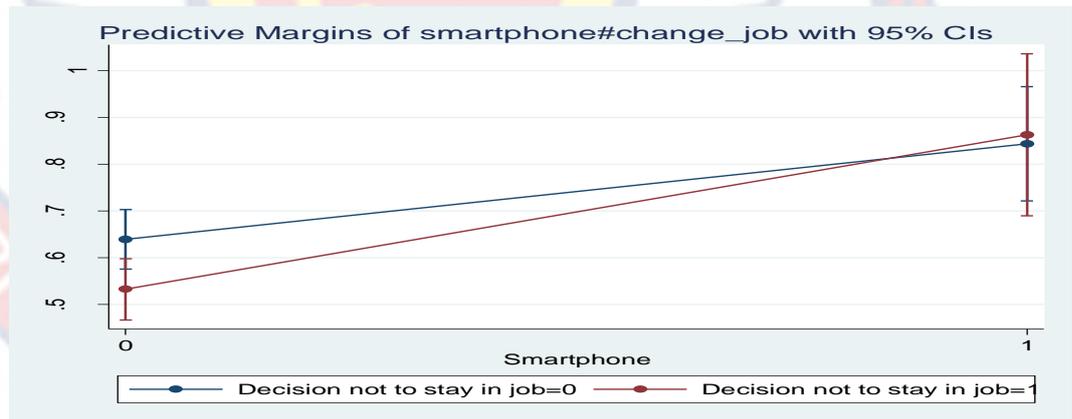
Panel C - Urban

Figure 17: Margins plot for interaction of intention not to stay in a job and smartphones

Source: Author's construct (2023)

Chapter Summary

Though a lot of studies abound on the relationship between mothers' decision not to stay in job and child education outcomes including cognitive abilities, same cannot be said for children grade. Again, little information is available for the relationship between maternal job satisfaction and age-in-grade congruence. This chapter presents the empirical evidence of the effect of maternal job dissatisfaction on children age-in-grade congruence. The two hypothesis that were tested are (a) maternal job dissatisfaction has a negative effect on children age-in-grade congruence and (b) access to ICT products and services reduces the negative effect of maternal job dissatisfaction on children age-in-grade congruence.

Estimates from ordinary least squares and average treatment effect of the treated from propensity score matching served as the bases for testing the hypothesis.

First of all, this study concludes that there is an inverse relationship, maternal job dissatisfaction and age-in-grade congruence. Children are deprived of mothers' commitment that have the capability to enhance children education progression. For working mothers who are dissatisfied with their jobs, the search for new jobs and their frustration could affect the time and positive energy that mothers that are expected to provide for their children. Secondly, access to household ICT products and services as well mothers' access to the internet are found relevant in reducing the negative effect of maternal job dissatisfaction on age-in-grade congruence.

It was also found that, higher levels of education were associated with better progression for children as far their age and current grade is concern

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Based on the findings of this study, it is recommended that, in addition to providing employment avenues and creating the conducive environment for mothers to engage in economic activities, conscious efforts should be made to reduce the factors that make women discontent in their job. These efforts should include but not limited to measures to regulate employer-employee relationship, commensurate wages and salaries, equal opportunities for progression and flexible working conditions for women to be able to combine work and household responsibilities. Again, efforts to improve the accessibility of ICT devices to mothers and to households should be vigorously pursued particularly for rural households. This will not only help mothers to undertake their activities quicker and efficiently and avail time for their kids, but also provide children with products that can help them in their studies and development.

Lastly, promotion of girl child education should be scaled up so as to increase their levels of education since it positively influences the education progression of their children.

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CHAPTER SEVEN

EMPLOYMENT AND ICT SKILLS: A GENDER AND LOCATIONAL

ANALYSIS

Introduction

There have been several commentaries and efforts over the years on bridging the employment gap between males and females. Unfortunately, socio-cultural and pollical factors still pose critical barriers to the achievement of this goal. Though ICT is noted as an important factor in enhancing labour force. It is not clear whether and to what extent ICT skills differently affect males and females. This chapter examines the differences in the effects of ICT skills for males and females labour force participation. Specifically, the study tested the following hypotheses (a) ICT skills has a positive effect on labour force participation (b) the effect of ICT skills on employability is significantly different for males and females. (c) Financial inclusion and literacy are channels through which ICT skills affect employment.

This chapter, therefore, presents results and discussions on ICT skills and employment, assesses the differences for male and female employment and exploit the interaction of ICT skills, literacy and financial inclusion. ICT skills and ICT skills are used interchangeable to represent whether an individual has ICT skills or otherwise. In other to achieve the objectives, a nationally representative dataset (GLSS 7) is used for the analyses.

The study employed multiple estimation techniques (Probit and Bivariate Probit) to investigate the matters under consideration and the likelihood ratio chow test was used to test the difference in coefficients for gender and locational models. A sensitivity analysis is conducted using

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Lewbel 2SLS. Additionally, an alternative variable (ICT usage) is used as the variable of interest to check the consistency of the results. The next section of this chapter provides the descriptive statistics of the variables used in the estimation, followed by the discussion of the results from the estimations. The final section provides a summary of the chapter.

Descriptive statistics

Table 14 presents the summary statistics of the variables considered in the analysis which includes persons 18 years to 64 years. Employment is captured by whether a person is engaged in a paid job or otherwise. ICT skills is represented by having ICT skills or otherwise. Level of education is coded as (0-no education, 1-basic education, 2- secondary education and 3-tertiary education) as the highest education attained by an individual. Marital status is categorized into never married, married and widowed/divorced. The household head status indicates whether the household head is a male or female. The full definition of variables is presented on Table A3 in the appendix.

The considered variables show that 21% of the total sample who are 18 years to 64 years are engaged paid employment. More than 70% either had no education or only basic education. Close to 18% of those in jobs have ICT skills. Majority are females (52%), 45% are household heads and 60% are married. The average age stands at 35years and 61 out every hundred people reside in rural areas.

Table 14: Summary statistics of variables used in analyses

Variable	Mean	Std. Dev.	Min	Max
Employment (1/0)	0.210	0.407	0	1
ICT skills (1/0)	0.178	0.382	0	1
Gender (female=1)	0.516	0.500	0	1
Age (years)	34.956	11.947	18	60
Age squared/100	13.648	8.982	3.24	36
Household head status (1/0)	0.445	0.497	0	1
Level of education				
No education	0.254	0.435	0	1
Basic	0.467	0.499	0	1
Secondary	0.184	0.388	0	1
Tertiary	0.095	0.293	0	1
Religion				
No religion	0.046	0.21	0	1
Christian	0.684	0.465	0	1
Moslem	0.208	0.406	0	1
Traditionalist	0.061	0.24	0	1
Marital status				
Never married	0.306	0.461	0	1
Married	0.596	0.491	0	1
Divorced/Widowed	0.097	0.297	0	1
Disability (1/0)	0.013	0.111	0	1
Location (rural=1)	0.614	0.487	0	1
Fathers level of education				
No education	0.657	0.475	0	1
Basic	0.230	0.421	0	1
Secondary	0.029	0.167	0	1
Tertiary	0.084	0.278	0	1
Mothers level of education				
No education	0.806	0.396	0	1
Basic	0.15	0.357	0	1
Secondary	0.009	0.097	0	1
Tertiary	0.035	0.183	0	1
N=23,457				

Source: Author's construct (2023)

Figure 18 shows that twice more males (25%) have ICT skills compared to females (12%).
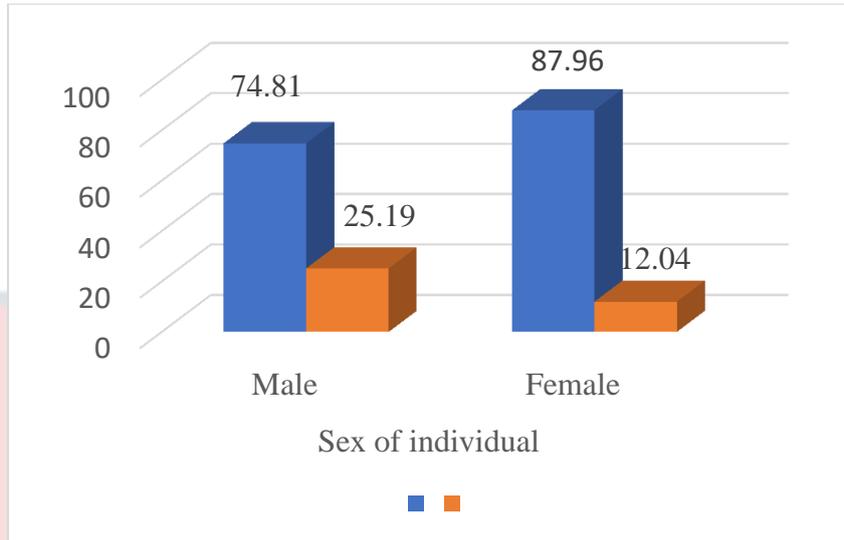
Figure 18: ICT skills, by gender
Source: Author's construct (2023)

Close to 3 out of every 10 urban residents have ICT skills while 1 out of every

10 rural residents have ICT skills as shown in Figure 19.
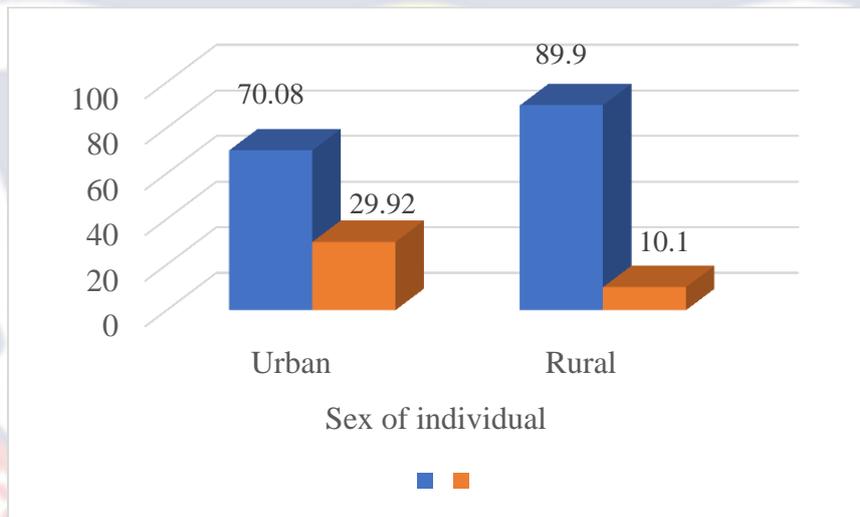
Figure 19: ICT skills by location (rural/urban)
Source: Author's construct (2023)

Figure 20 shows the percentage of male and female employed or

unemployed. The figure shows that more male (29%) have jobs compared to

female (13%).

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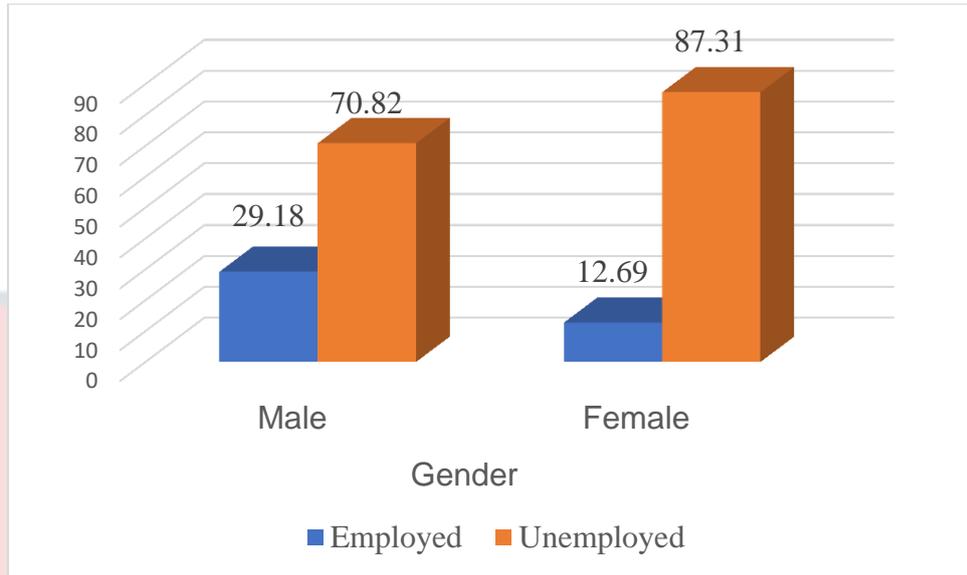
Figure 20: Jobholding by gender
Source: Author's construct (2023)

Figure 21. presents information on the percentage of respondents with or without ICT skills and their job status. The graph shows that, for those with ICT skills about 48% are working. About 85% of those without ICT skills are not working.
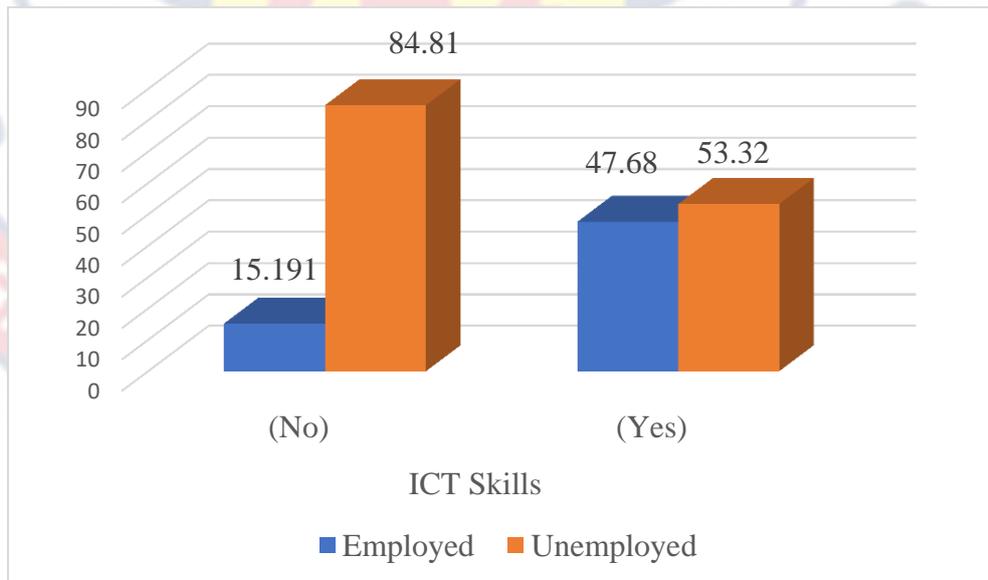
Figure 21: ICT skills and jobholding
Source: Author's construct, 2023

In Figure 22, ICT skills (blue bubbles) and labour force participation jobholding (orange bubbles) by regions are presented. It indicates ICT skills is

highest for Greater Accra, followed by Ashanti, then Central. The three (3) regions with the least average ICT skills are Northern, Upper West and Upper East. The figure also reveals the regions with high average ICT proficiency corresponds with regions with high average employment.
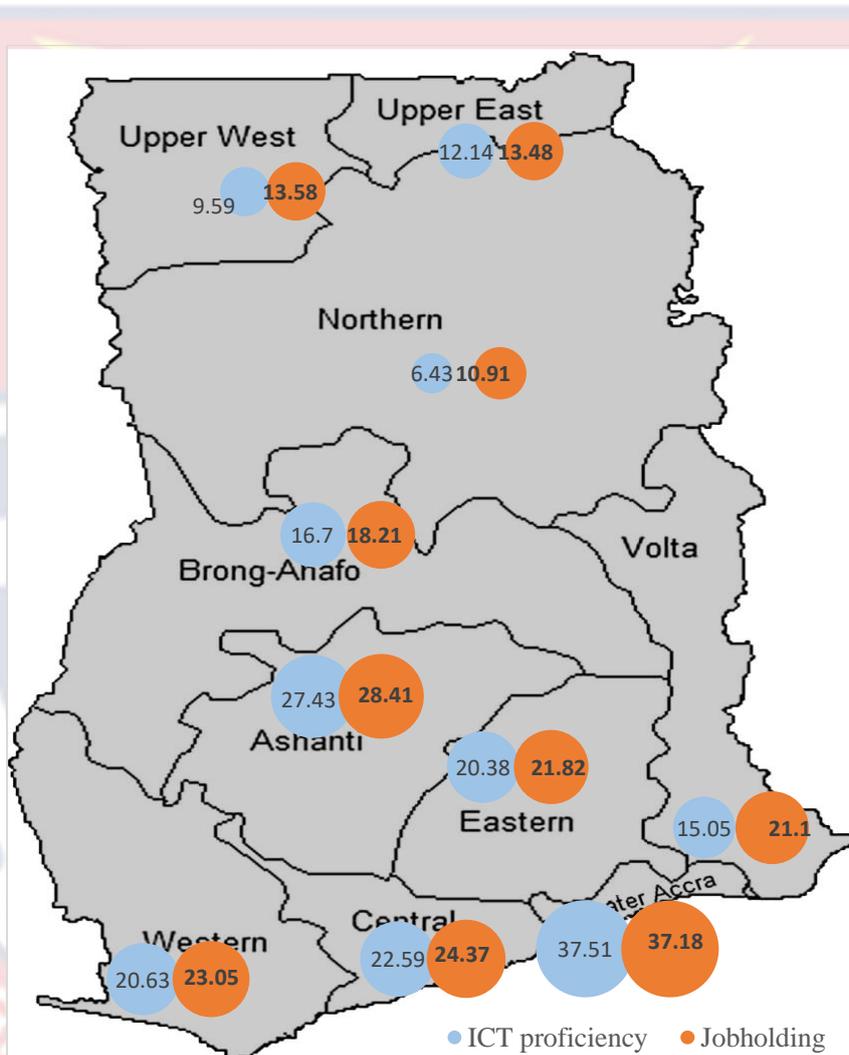
Figure 22: ICT skills and employment
Source: Author's construct (2023)

ICT skills and Employment in Ghana

This section discusses the overall effect of ICT skills on employment in Ghana. In testing the hypothesis that ICT skills positively affect employment, two levels of analysis are conducted.

First of all, analysis is done for only paid employment specified as 1-working and 0 otherwise. The probit estimation is used since the outcome variable employment is dichotomous. The bivariate probit model is used to deal with the suspected endogeneity using average number of ICT proficient people in a cluster excluding the individual as instrument.

On the third level, results for locational and gender differences are provided based on both the probit and bivariate probit model for only paid employment is provided. The probit and biprobit results for the full sample are presented on Table 15 and 16. Marginal effects for the variable of interest are presented in square brackets with their robust standard errors in curved brackets. For easy interpretation of the result, the marginal effects are interpreted.

Table 15 also reports postestimation test results for both the probit and biprobit models. Hosmer- Lemeshow (H-L) test of goodness of fit indicate that the probit model is well fit because we fail to reject the null hypothesis that the model is not well specified. The coefficients of the variable of interest are statistically significant at 1%. The results indicate a positive relationship between ICT skills and labour force participation. Estimate for the full sample indicate that individuals with ICT skills are 8% (0.075) likely to be have jobs compared to individuals without ICT skills.

The biprobit estimate suggest that the error terms of the two equations are correlated and therefore should be estimated simultaneously, since the rho of the wald test for all the models are different from zero. Expectedly the first stage regression estimate reveal that an individual is likely to have ICT skills if the average number of ICT proficient people in the cluster is higher. This

means that the instrument satisfies the relevance condition. The biprobit estimates are directionally in line with the estimates of probit model, except the that of the biprobit models are greater than the probit results showing that the probit estimates are downward biased as result of the problem of endogeneity. Therefore, results of the Biprobit are deemed superior and therefore preferred to the probit. For the full sample, the indication is that ICT skills is associated with a 13% (0.133) increase in employment. Since the estimates of the probit model may be misleading because of endogeneity, the remaining analyses are done using the Biprobit model.

Table 15: Probit and Biprobit Estimates of ICT Skills on Employment

	(1)	(2)
VARIABLES	Probit	Biprobit
ICT skills	0.332***	0.606***
	(0.032)	(0.073)
	[0.075***]	[0.133***]
	(0.007)	(0.015)
female	-0.380***	-0.378***
	(0.026)	(0.026)
Highest education qualification (Base = no education)		
Basic	0.279***	0.275***
	(0.034)	(0.034)
Secondary	0.587***	0.582***
	(0.042)	(0.042)
Tertiary	1.078***	1.067***
	(0.048)	(0.048)
Religion (Base=no religion)		
Christian	-0.195***	-0.198***
	(0.048)	(0.047)
Moslem	-0.264***	-0.255***
	(0.052)	(0.052)
Traditionalist	-0.437***	-0.431***
	(0.071)	(0.071)
Marital status (Base=never married)		
Married	0.028	0.026
	(0.034)	(0.034)
Widowed/divorced	0.009	0.005
	(0.052)	(0.052)
Age (years)	0.077***	0.075***
	(0.006)	(0.007)
Age squared/100	-0.102***	-0.100***

Table 16 Cont'D

	(0.009)	(0.009)
Disability (1/0)	-0.255**	-0.254**
	(0.100)	(0.100)
Location (rural=1)	-0.484***	-0.447***
	(0.023)	(0.025)
Household head status (yes=1)	0.371***	0.378***
	(0.029)	(0.029)
Fathers level of education (Base= no education)		
Basic	0.181***	0.178***
	(0.029)	(0.029)
Secondary	0.140**	0.134**
	(0.060)	(0.060)
Tertiary	0.150***	0.146***
	(0.040)	(0.040)
Fathers level of education (Base= no education)		
Basic	0.120***	0.114***
	(0.031)	(0.030)
Secondary	0.129	0.117
	(0.100)	(0.100)
Tertiary	0.177***	0.172***
	(0.055)	(0.055)
Constant	-2.241***	-2.273***
	(0.141)	(0.140)
Diagnostic test		
First stage		
AIPC	0.083***	
Wald test rho	17.14***	
H-L goodness of fit	11424***	5546***
Pseudo R^2	0.2150	
Observations	23,457	23,457

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1
AIPC: Average ICT skills per cluster
Source: Author's construct, 2023

Table 16 reports the biprobit estimates for both gender and locational heterogeneities. A female with ICT skills is 12% (0.122) likely to be engaged in a paid job while a male with ICT skills is 14% (0.136). The result suggests that males with ICT skills are more likely to be employed in paid employment compared to females. This is confirmed by a significant *p-value* of the likelihood ratio chow test [Prob > chi2 = 0.0000], because we reject the null hypothesis that the coefficients for the male and female models are equal. This means that the effect of ICT skills on whether an individual is employed or not

employed in a paid job is not the same for males and females. These results are in line with the general observation in the literature that ICTs influence employability (Blanco & Lopez, 2010; Fang et al., 2023; Gomez et al., 2014; Ngoa & Song, 2021; Walton et al., 2009).

Rural and urban residents with ICT skills are 20% (0.203) and 16% (0.160) likely to be in paid employment respectively. The estimate for the rural subsample is higher than the urban subsample. The likelihood ratio chow test was also used to test the difference in coefficients for rural and urban models and it indicates that there is a difference in the coefficient for the rural and urban models [Prob > chi2 = 0.0000].

Also, the results indicate and confirm that education is very important for assessing paid jobs in Ghana. The full results are presented Table C2 in the appendix.

Table 16: Biprobit Results for ICT Skills on Employment by Gender and Location

	(1)	(2)	(3)	(4)
	Gender		Location	
VARIABLES	Female	Male	Rural	Urban
ICT skills	0.749***	0.499***	1.275***	0.530***
	(0.132)	(0.084)	(0.140)	(0.115)
	[0.122***]	[0.136**]	[0.203***]	[0.160***]
	(0.020)	(0.022)	(0.020)	(0.032)
Other covariates	Yes	Yes	Yes	Yes
First Stage				
AIPC	0.081***	0.091***	0.095***	0.057***
	(0.002)	(0.002)	(0.003)	(0.002)
Wald test rho	62.95***	36.03***	38.93***	64.06***
P value of equality of effects	(1) = (2): 0. 00 ***		(3) = (4): 0.000***	
Observations	12,103	11,354	14,399	9,058

Robust standard errors in parentheses   *** p<0.01, ** p<0.05, * p<0.1
Source: Author's construct, 2023

In order to whether females benefit more from ICT skills compared their male counterparts or otherwise, the ICT skills and gender (male/female)

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variable are interacted. Same is done for ICT skills and location (rural/urban) for comparison and the results presented on Table 17. The estimates indicate that females are 32% more likely to secure paid employment compared to their male counterparts. This finding which indicates that women benefit more from ICT skills than men in terms of securing employment are in line with the findings of Gomez et al., (2014) and explained that employment that require use of ICTs favour the tradition activities of women. However, the study by Samargandi et al. (2014) does not support this finding because ICT was found to be negatively associated with the employment of women although the study used ICT diffusion for a macro-level analysis.

For the rural and urban comparison, Rural dwellers 30% more likely to gain paid employment compare to urban dwellers. Though Fang et al., (2023) found a statistically positive relationship between ICT use and rural off-farm employment, there was no comparison with any urban sample. I argue that this may be because the percentage of people in the rural areas are few compared to those in the urban areas, therefore in the event of job opening in the rural area, the few with ICT skills are able to secure the jobs. Again, unemployment rate is quite high in urban areas due to the influx of the youth to seek non-existent jobs. In many cases therefore the many individuals with ICT skills are unable to secure jobs.

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Table 17: Estimates for gender and locational differences

VARIABLES	(1) Wage employment	(2) Wage employment
ICT skills	0.215***	0.224***
	(0.036)	(0.037)
ICT skills*gender (ICT skills =1 and female=1)	0.352***	
	(0.050)	
ICT skills*location (ICT skills =1 and rural=1)		0.289***
		(0.049)
Observations	23,453	23,453

Exploring potential channels

In this section, the potential role of financial inclusion and literacy/numeracy as channels through which ICT skills can influence employment are examined. The study employed a two-step method used by (Alesina & Zhuravskaya, 2011; Koomson & Churchill, 2021; Koomson & Danquah, 2021) to analyse the mediations. As expected, the first stage results presented in Table 18 indicate that ICT skills is significantly and positively related to financial inclusion and literacy. ICT skills increases financial inclusion by 8% (0.080) and literacy by 76%

Table 18: ICT Skills and Financial Inclusion and Literacy/Numeracy

	(1) Financial inclusion	(6) Literacy/numeracy
	Probit	OLS
VARIABLES	Full	Full
ICT skills	0.393***	0.759***
	(0.036)	(0.052)
	[0.080]	
	(0.007)	
Observations	23,457	23,457

In the second step, financial inclusion and literacy/numeracy are separately included as covariates in the employment model. The estimates are

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presented in Table 19. Table 19 is segmented into panel A for the model including financial inclusion and literacy, whilst Panel B reports the model without financial inclusion for the purpose of comparison. Financial inclusion and literacy/numeracy are only acknowledged as mediators if their inclusion causes the previously estimated coefficient of ICT skills to diminish in size or become statistically insignificant (Koomson & Danquah, 2021). The results in Panel A show that the estimates of all the models have reduced in magnitude compared to the initial estimates in Panel B. For instance, the full sample the coefficient for ICT skills has reduced from 13% (0.0.133) to 12% (0.120) i.e., from the initial sample without financial inclusion to the sample that includes financial inclusion.

Same is indicated for literacy/numeracy as the reduction is from 13% (0.133) to 24% (0.121). This suggest financial inclusion and literacy are important conduits by which ICT skills influences employment. ICT skills enables the understanding and use of financial products on the market. People who have skills in ICT have a greater chance of improving their literacy and subsequently improve their employability and the prospect of starting their own businesses due the confidence their might have gained. According Ngoa & Song (2021), the presence financial development and female education were observed to be important mediating variables for ICT use and female labour force participation.

Table 19: Financial Inclusion and Literacy as Mediating Variables

VARIABLES	(1) Financial Inclusion Full	(2) Literacy/numeracy Full
Panel A: results for mechanism		
ICT skills (1/0)	0.549***	0.564***
	(0.073)	(0.074)
	[0.120***]	[0.121***]
	(0.015)	(0.015)
Financial Inclusion (1/0)	0.423***	
	(0.028)	
Literacy		0.057***
		(0.005)
Other covariates	Yes	Yes
Observations	23,457	23,457
Panel B: initial results for comparison		
ICT skills	0.606***	0.606***
	(0.073)	(0.073)
	[0.133***]	[0.133***]
	(0.015)	(0.015)
Other covariates	Yes	Yes
Observations	23,457	23,457
Robust standard errors in parentheses	*** p<0.01, ** p<0.05, * p<0.1	

AIPC: *Average ICT skills in a cluster*

Source: Author's construct, 2023

Robustness check (Lewbel 2SLS and alternative measure of ICT skills)

To test the robustness of the biprobit estimates, Lewbel 2SLS internal instrument only) is employed and results reported in Table C3 in the appendix. The Lewbel 2SLS employs heteroskedasticity to generate internal instruments used to address endogeneity problem. Consistent with the estimates of the biprobit estimation, ICT skills is found to positively influence jobholding for all the samples, except that the female sub-sample is not significant.

In other to also check the relevance and sensitivity of the ICT skills, ICT usage is employed as an alternative to ICT skills. ICT usage is a PCA constructed index based on the use of smartphone, computer and e-commerce

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for three (3) months preceding the survey. The estimates of ICT usage on labour force participation are presented in Table C3 in the appendix. The results show a positive relationship between ICT use and labour force participation. Results for the overall sample in terms of the Lewbel 2SLS provide that ICT use leads to an increase in job holding by 3%. The coefficients for the female sample and rural sub-sample are higher than the male and urban sub-samples respectively, similar results of the probit and biprobit models presented earlier (see Table D3 in the appendix).

In addition to confirming existing research that ICT skills has appositive influence on labour force participation (Lane & Conlon, 2016; Alao & Brink, 2022), this study reveals that, females benefit much in terms of being employed when they have ICT skills compared to their male counterparts. Again, there is a difference in the likelihood of employment for rural and urban dwellers who have skills in ICT. In the summary statistics, average employment of males was found to be higher for males than for females, our results reveal that with ICT skills females gain the advantage of being engaged in the labur force compared to females (see Table D4 in the appendix).

Chapter summary

This chapter presents the results of the relationship between Information Communication Technology and employment with emphasis on the differences for males and females. Probit and biprobit were used as estimation techniques to test the hypotheses (a) ICT skills has a positive effect on both male and female employment (b) there is a difference between the effect of ICT skills on male and female employment (c) there is a difference between the effect of ICT skills on rural and urban employment and (d)

financial inclusion and literacy/numeracy mediates between ICT and employment. Other covariates including level of education, age, gender, mother and fathers' levels of education, religion, and locational variables were used in the estimation as control variables. The bivariate probit model was used to deal with the issue of suspected endogeneity arising from reverse causality between the independent variable and outcome variable. It was preferred because the dependent variable and endogenous explanatory variable are both categorical, which makes instrumental variable probit and other linear models inappropriate. In order to test the sensitivity of the results, the Lewbel 2SLS was employed to run the models. Additionally, ICT usage was used in place of ICT skills as an alternative measure of ICT skills and the result in terms of direction were the same except for the magnitude of the coefficients. Based on evidence from probit and bivariate probit models, the study arrived at the following findings;

The findings indicate that ICT skills is relevant in employment particularly for both males and females. The effect of ICT skills on male and female employment varies. Females with ICT skills are more likely to be employed compared to males who have ICT skills. Rural residents benefit more from ICT skills in terms of jobholding than urban residents.

Level of education was also found to positively influence access to paid job which is not surprising.

The results also suggest that literacy and financial inclusion are very important channels or mechanisms through which ICT affects male and female employment. Improvement in ICT skills increases the chance for individuals to get financially included and also enhance their literacy and numeracy status

through reading, enrolling into online programmes and learning from others. This will improve their employability and ability to be self-employed.

It is therefore recommended that efforts to provide ICT skills for especially females should be vigorously pursued and encouraged so as to increase employment prospects especially for females. As well efforts to increase and improve levels of formal education should be scaled up particularly for females in order to reduce the gap between male and female in terms of access to paid employment.
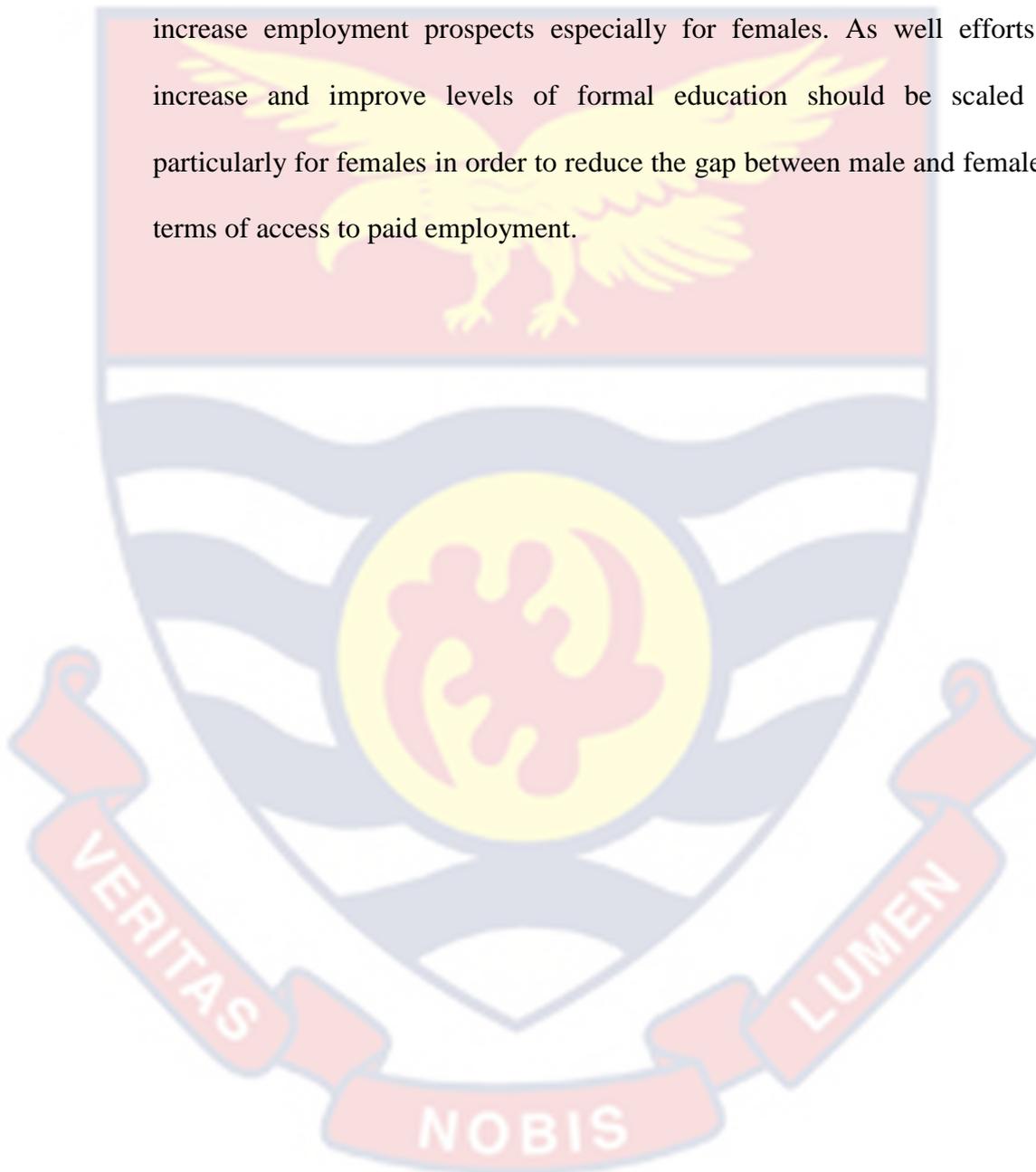
CHAPTER EIGHT

ICT SKILLS AND INTENTION TO LEAVE OR STAY IN A JOB

Introduction

Intention to leave a job has a negative influence on the attitude and output of workers in an organisation as established in literature. It also has the potential of affecting the relationship between workers and their families. This could inadvertently affect the welfare and human capital development in the household. The intention to make workers satisfied, remain in a job and hence offer their best in terms of output is not new in the framework of human resource management. The challenge is that, workers have different indicators for their intention to stay or not stay in a job which makes it difficult for management or authorities to synchronize policies to enhance their commitment to the job. In this chapter the relationship between ICT skills and intention to stay or not stay in a job is sort to provide evidence of the role of ICT in reducing individuals' intention to leave a job.

Descriptive statistics

Variables in the model include intention to quit a job, which is a binary variable that takes 1 if the individual has the intention to quit a current job and 0 otherwise. The variable of interest is ICT skills which represent whether the individual has ICT skills (1) or otherwise (0). Control variables in the model include level of education, marital status, location, age, sex, religion and financial inclusion. The variables are defined in Table A4 in the appendix.

The summary statistics in Table 20 shows that about 58% of the sample are have the intention to quit their jobs, which means that 42% are had no intention to quit their current job. With regards to ICT skills, 24% have ICT

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skills, 57% are household heads. About 68% do not have formal education or have only basic education. Majority are Christians and 7 out of every 10 are married. About 75% are in the private sector and 38% are rural residents.

Table 20: Summary statistics of variables included in the model

Variable	Mean	Std. Dev.	Min	Max
Not stay in job (1/0)	0.583	0.493	0	1
ICT skills (1/0)	0.243	0.429	0	1
Gender (female=1)	0.528	0.499	0	1
Age (years)	36.697	10.563	18	64
Age square/100	14.583	8.229	3.24	36
Household head status	0.570	0.495	0	1
Level of education				
No education	0.384	0.486	0	1
Basic	0.303	0.459	0	1
Secondary	0.155	0.362	0	1
Tertiary	0.159	0.366	0	1
Religion				
No religion	0.038	0.191	0	1
Christian	0.750	0.433	0	1
Moslem	0.185	0.389	0	1
Traditionalist	0.026	0.161	0	1
Marital status				
Never married	0.231	0.421	0	1
Married	0.65	0.477	0	1
Divorced/ Widowed	0.119	0.324	0	1
Location (rural = 1)	0.376	0.484	0	1
Disability (1/0)	0.011	0.103	0	1
Sector (Public = 1)	0.144	0.351	0	1
N=4,916				

Source: Author's construct (2023)

ICT and Job intention to leave a job

This section is used to present results of the relationship between ICT skills and intention not stay in job. Two estimation procedures (probit and PSM) are used for the analysis in this section. The probit model is used because the outcome variable job satisfaction is dichotomous whilst the PSM is employed due to the non-random nature of the data generation process linking the explanatory variable to the outcome variable. The probit results are presented on Table 21. The estimates in square brackets are the marginal

effects. Results for the main sample shows that working individuals with ICT skills are 5% (-0.051) less likely to want to leave their jobs compared to their counterparts without ICT skills based on the probit estimation. The gender subsamples indicate that females and males with ICT skills both have a 5% (female -0.054, male (0.050) chance not to want to leave their current jobs. Female workers with ICT skills are however slightly less likely to want to quit their jobs compared to their male counterparts.

The chow test of equality of coefficients indicates that there is a significant difference between the coefficients for the male and female as well as rural and urban models.

The results also indicate that education was positively related to the intention to stay in a job. Individuals with higher levels of education are more likely to have the intention stay in their jobs compared to those in lower levels of education.

Again, the estimates for the sector of employment suggests that, individuals who worked in the public sector are more likely to want to stay in their job than their counterparts in the private sector of Ghana's economy.

Table 21: Probit estimates for ICT Skills and intention leave a job

VARIABLES	(1) All	(2) Gender Female	(3) Male	(4) Location Rural	(5) Urban
ICT skills	-0.136***	-0.149*	-0.134**	-0.140*	-0.133**
	(0.049)	(0.090)	(0.059)	(0.085)	(0.060)
	[-0.051*]**	**[-0.054*]**	**[-0.050**]**	**[-0.053]**	**[-0.050**]**
	(0.018)	**(0.032)**	**(0.019)**	**(0.033)**	**(0.021)**
Gender (female =1)	0.011			0.072	-0.020
	(0.046)			(0.077)	(0.058)
Age in years	-0.007	0.024	-0.021	0.008	-0.019
	(0.013)	(0.023)	(0.017)	(0.022)	(0.017)
Age squared/100	-0.010	-0.054*	0.008	-0.030	0.004
	(0.017)	(0.030)	(0.021)	(0.029)	(0.021)
Level of education (Base= no education)					
Basic	-0.176***	-0.310***	-0.079	-0.177**	-0.174**
	(0.054)	(0.102)	(0.064)	(0.084)	(0.071)
Secondary	-0.122**	-0.352***	0.014	-0.040	-0.168**
	(0.061)	(0.111)	(0.075)	(0.101)	(0.078)
Tertiary	-0.281***	-0.571***	-0.112	-0.202*	-0.300***
	(0.069)	(0.124)	(0.085)	(0.121)	(0.087)
Religion (Base= no religion)					
Christian	-0.028	-0.048	-0.018	0.085	-0.067
	(0.050)	(0.089)	(0.064)	(0.084)	(0.063)
Moslem	0.219**	0.166	0.237*	0.493***	0.079
	(0.086)	(0.129)	(0.121)	(0.144)	(0.108)
Traditionalist	-0.028	-0.048	-0.018	0.085	-0.067
	(0.050)	(0.089)	(0.064)	(0.084)	(0.063)
Marital status (Base = never married)					
Married	-0.018	0.003	-0.014	0.099	-0.056
	(0.050)	(0.091)	(0.064)	(0.085)	(0.063)
Divorced/widowed	0.223***	0.185	0.239**	0.512***	0.086
	(0.086)	(0.129)	(0.122)	(0.144)	(0.108)
Location (rural=1)	0.082**	0.222***	0.018		
	(0.040)	(0.072)	(0.048)		
Household head status	0.042	0.079	0.034	-0.117	0.122**
	(0.047)	(0.080)	(0.066)	(0.078)	(0.060)
Sector of employment	-0.169***	-0.183**	-0.161***	-0.172**	-0.175***
(public=1)	(0.048)	(0.083)	(0.059)	(0.084)	(0.059)
Constant	0.333	0.135	0.510*	-0.010	0.669**
	(0.248)	(0.450)	(0.306)	(0.388)	(0.319)
Observations	4,916	1,569	3,347	1,778	3,138

Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

Source: Author's construct, 2023

Table 22 reports the average treatment of the treated (ATET) from propensity score matching of the relationship between ICT skills and job satisfaction using several matching techniques (i.e., nearest neighbour for one-to-one matching and one-to-five matching, radius and kernel). The two main requirements for the use of the model are satisfied i.e. the participation is independent of outcome (intention not to stay in job) condition on the treatment (ICT skills) and the common support region (Table A5 and Figure B3 in the appendix). The results in Appendix B3 indicate that the weighted variables are balanced since the means, and variances of the weighted covariates are close to zero and one, respectively.

Both the probit and the PSM results are statistically significant and indicate a negative relationship between ICT skills and job dissatisfaction. However, the PSM results are robust to issues of enogeneity from observed variables and is preferred to the probit model. All the results from the different PSM estimators indicate that there is an inverse relationship between ICT skills and job dissatisfaction. For the nearest to neighbour method, except the rural subsamples, the rest models are statistically significant. The nearest to neighbour (one-to-five matching) method also reveals that only the main and male subsamples are statistically significant. ICT skills leads to a decrease in the intention not to stay in a job by 7% (-0.068) for the main sample. For the radius method, estimates show that all the models are statistically significant and produce the highest coefficients. ICT skills is associated with a 10% (-0.099) in intention to quit a current job for the full sample. For the gender subsamples ICT skills intention not to stay in current job by 18% (-0.183) and 6% (-0.060) for females and male respectively. ICT skills is linked to a

decrease in individual intention to leave a job by 10% (-0.100) and 9% (-0.087) for the rural and urban subsample respectively. Finally, the estimates for the kernel method show that except the main and male subsamples, the other subsamples are statistically insignificant. ICT skills is associated with a decrease in the intention not to stay in a job by 5% (-0.058).

Having ICT skills increases work output, reduces time spent on work, reduces travel time and may reduce stress and job dissatisfaction jobs (Carapozzi et al., 2015; Sahito & Vaisanen 2017; Tomomowo-Ayodele & Omoike, 2020). ICT skills is able reduce the intention to leave because it reduces stress which causes job dissatisfaction and subsequently leads to the intention to leave (Frone, 2003).

Table 22: PSM estimates for ICT skills and intention to leave a job

VARIABLES	(1) ALL	(2) FEMALE	(3) MALE	(4) RURAL	(5) URBAN
ICT skills					
1-Neighbour	-0.068**	-0.091**	-0.049*	-0.040	-0.029
(one-to-one)	(0.033)	(0.052)	(0.036)	(0.028)	(0.037)
Equality of effects	[LR chi2(2) =16.67, Prob > chi2 = 0.0000]				
5-Neighbour	-0.050**	-0.041	-0.054**	-0.0298	-0.012
(one-to-five)	(0.023)	(0.026)	(0.028)	(0.035)	(0.023)
Radius	-0.099***	-0.183***	-0.060***	-0.102***	-0.087***
	(0.013)	(0.048)	(0.015)	(0.021)	(0.018)
Kernel	-0.048*	-0.032	-0.044*	-0.028	-0.042
	(0.032)	(0.039)	(0.027)	(0.039)	(0.031)
Observations	4,916	1,569	3,347	1,778	3,138

Bootstrapped standard errors in parentheses   *** p<0.01, ** p<0.05, * p<0.1
Number of replications (50)
Source: Author's construct, 2023

Interaction of ICT skills and gender

The difference for male and female is tested using the chow test. Our findings indicate that there are differences in the effect of ICT skills on job dissatisfaction for males and females. This is confirmed by a significant *p-value* of the likelihood ratio chow test [LR chi2(2) =16.67, Prob > chi2 =

0.0000], because we reject the null hypothesis that the coefficients for male and female models are equal. The difference for rural and urban is not tested because the samples are not significant for the (NN, one-to-one) method which was used for the chow test. Based on the results of the chow test, it is safe to conclude that ICT skills decreases job dissatisfaction among males than females. Women with ICT skills are able to network properly for better job opportunities and are fairly able work-life balance and will most likely stay in the job. This the case for women because the ICTs favour women because it aligns with the kind of traditional activities they perform (Gomez et al., 2014) and therefore enhances the performances of those activities in their job.

Table 23: Estimates for interaction of ICT skills and gender

	(1)
VARIABLES	Job Satisfaction
ICT skills	0.215***
	(0.036)
ICT skills*gender (ICT skills =1 and female=1)	0.260***
	(0.081)
Observations	4,916

Source: Author's construct, 2023

Robustness Check

The estimates of the sensitivity test, that is by replacing ICT skills with the use of ICT devices in the model is presented in Appendix C. The results indicate that use of ICT devices has an inverse relationship with intention not to stay in a job. Averagely, the use of ICT devices reduces intention not to stay in a job by 2% for the full sample and all the subsamples, with the female subsample having the highest coefficient (-0.026).

Chapter summary

The chapter was used to provide evidence of the effect of ICT skills on the intention to quit or stay in a job. Two (2) estimation techniques namely Probit model and propensity score matching (PSM) was used to estimate the models. An alternative measure of ICT skills in the form of a PCA constructed index which is based on the use of smartphone, computer and e-commerce was also used in place of ICT skills as the variable of interest to check the robustness of our results.

The study found that having ICT skills enhances workers intention to stay in a job especially for female workers. Both the probit and PSM results are the bases for the conclusion. Similarly, higher levels of education are associated higher levels of intention to stay in job and lower levels of intention not to stay in a job. It was also found that working in the public sector increases chances 0f people staying in a particular job compared to working in the private sector.

In line with the findings, it is recommended that the Ministry of Communication and Digitalization and Ministry of Education should scale up efforts to increase ICT skills especially among young females. Employers should also create the environment for workers to enhance their knowledge in information and communication technology.

CHAPTER NINE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

Human capital development is an integral part of the sustainable development goals, being pursued by many countries across the globe including Ghana. Although, there have many initiatives by government and stake holders in especially education and health, there are still numerous challenges in healthcare utilisation and child education outcomes. The household is the basic cell, whose actions directly or indirectly affects human capital development. Women are usually closely linked to household healthcare and child education, but in their effort to compliment household resources through their employment, time for carrying household duties is reduced and have consequences on the welfare of the household and its members. The negative effect of maternal employment becomes even worse if mothers have issues with the future of the jobs, they are engaged in.

Given that maternal employment is important for household welfare, the natural question is how to encourage maternal employment without compromising on household healthcare utilisation and child education. This question together with the relevance of information communication technology, uneven development between rural and urban areas provided the motivation for this work.

This chapter provides the summary, conclusions, and recommendations from the study as well as suggestions for future research.

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Summary

In line with the motivation, this thesis sought to (a) investigate the effect of maternal employment on household health care utilisation and the role of ICT in the relationship between maternal employment and household healthcare utilisation (b) examine the effect of mothers' intention to leave their jobs on children grade progression and the role of ICT in the relationship between mothers' intention to leave their jobs and children grade progression and (c) investigate the difference in the effect of Information Communication technology skills on male and female employment and intention to quit or stay in a job. The study relied on quantitative approaches and methods and used a nationally representative survey: Ghana Living Standards Survey round seven (GLSS 7) to provide evidence for all the three (3) empirical chapters.

The first empirical chapter was used to test the hypothesis that (a) maternal employment has a negative effect on household healthcare utilisation and (b) ICT reduces the negative effect of maternal employment on household healthcare utilisation. A total sample of 11,299 households were used from the GLSS 7 for the analyses. Ordinary least squares (OLS) and IPWRA estimation models were used.

Our findings from the OLS and IPWRA models indicate that there is an inverse relationship between maternal employment and household healthcare utilisation. Mothers' engagement in economic activity outside the home is most likely to lead to a reduction in household healthcare utilisation all other things being equal. It was also realized that availability of household ICT devices and mothers' usage of smartphones are capable of changing the negative effect of maternal employment on household healthcare utilisation.

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Possession of valid health insurance card was found to increase the use healthcare services.

The second empirical chapter was used to provide empirical evidence on the relationship between mother's intention not to stay in their job and children grade progression. Two propositions were tested: (a) mothers' intention to quit their job is negatively linked to the number of children in a household who are in the right grade and (b) information communication technology moderates the relationship between intention not to stay in job and children grade progression. The study used a sample size of 3,530 from the Ghana Living Standards Survey seven (GLSS 7). The estimation was conducted by Ordinary Least Squares (OLS) and Propensity Score Matching (PSM). The Average Treatment Effect on Treated (ATET) was chosen over the Average Treatment Effect (ATE). Before the OLS and PSM, the Welch's t-test was used to show the difference in means of the dependent variable and other covariates based on the main variable of interest (intention to leave a job).

The Welch's t-test, OLS and ATET from PSM point to a negative relationship between mothers' intention not to stay in a job and children grade progression. In households where working mothers' intended to leave their jobs, the percentage of children in the household who are in the right grade is less compared to working mothers who did not want to leave their work. For the second hypothesis it was found that, with reference to households with working mothers, households with more household ICT devices are more likely to have more children in the right grade compared to households with less household ICT devices. Working mothers who have access to the internet

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are also more likely to have children in their households being in the right grade compared to mothers without access to ICT devices. Again, mothers' level of education was also found to improve child education progression.

For the third empirical chapter, the study focused on investigating the varying effect of ICT on employment for both males and females. The idea was to first of all establish whether there was a difference in the benefits males and females derive from their skills in ICT in terms of opportunities and avenues for engaging in economic activity. Locational (rural/urban) heterogeneities were examined for male and female employment. The findings from this chapter revealed that ICT skills was positively related to employment for both males and females. Females with ICT skills are more likely to be working compared to males who have ICT skills especially for those who reside in the rural areas. It was also found that level of education increases access to paid jobs for male and female.

The fourth and final empirical chapter was used to demonstrate the relevance of ICT skills in encouraging individuals to stay in their job for both male and female workers. In terms of estimation technique, probit model and varied propensity score matching techniques were used for the analysis. The findings suggest that ICT skills is positively associated with the intention to stay in job and more relevant for females. Level of education increases chances of people remaining in their job and working in the public sector was also associated with higher chances of remaining in current job.

Conclusion

The findings of this study provide bases for another level of discussion on the relevance of Information Communication Technology as a tool to

increase female employment and at the same time, a means to reduce any possible negative impact of maternal employment on human capital development in the household. The study highlighted the effect of maternal employment on two aspects of human capital development in the household: health (healthcare utilisation) and education (children grade progression).

The findings of the first empirical chapter suggest that, the relationship between maternal employment and household healthcare utilisation is negative for Ghana based on analyses of the GLSS 7 data provided by the Ghana Statistical Service (GSS). However, for working mothers who use smartphones the influence of maternal employment is positively related to household healthcare utilisation.

Findings of the second empirical chapter indicate that mothers' intention not to stay in their current job is inversely related to children's grade progression. The findings also suggest that ICT is relevant in reducing the otherwise negative effect of maternal intention not to remain in their current job on the number of children are who are in the right grade in as far as their current age is concerned.

The findings of the third empirical chapter reignite the discussion on bridging the gap in relation to the benefits of ICT skills in providing employment avenues for males and females. The indication is that females benefit more from ICT skills than their male counterparts in terms of labour market outcomes.

Findings of the fourth and final empirical chapter suggest that, ICT skills reduces the intentions of workers to quit their jobs especially for females.

Recommendations

The following recommendations are based on the findings and conclusions of the first, second, third and fourth empirical chapters. The recommendations are made to engineer further discussion and for consideration by the following Ministries in their policy formulations, Ministry of Health, Ministry of Education, Ministry of Employment and Labour Relations, Ministry for Gender, Children and Social Protection, and Ministry of Communication and Digitalization. The findings of this study will also be helpful to international development partners such as the United Nations Children and Education Fund and the International Labour Organisation in appropriately targeting their interventions. UNICEF is involved in matters relating to the development children and women in the area of health and education whilst ILO focuses on issues regarding advancement of social and economic justice by setting international labour standards. The following are the recommendations that emanate from the findings;

1. The Ministry of Communication and Digitalisation should advance efforts to increase access, use (both at home and work) and level of skills in ICT especially for females and working mothers. It will help those who are working to communicate well, work faster and smarter, increase household healthcare utilisation and also provide their children at home with the opportunity to use ICT tools to enhance their education.

2. The Ministry of Employment and Labour Relations should take interest in quit intentions, and encourage and provide a better

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environment for mothers to get ICT skills so that they able to deal well with work place issues that may affect children education progression.

3. Reference to the third empirical chapter that examines the relationship between ICT skills and employment, it is recommended that more opportunities (including scholarships) for individuals (especially women) to improve their levels of education and ICT skills should be provided by the Ministry of Education in partnership with other stake holders. This will help increase the opportunities of access to paid jobs for females and rural dwellers.

4. Lastly, it is recommended that, in order to reduce Quit intentions among workers, the Ministry of Communication and Digitalization, Ministry of Employment and Labour Relations) and Ministry of Education, should collaborate and initiate interventions that will promote and encourage ICT skills training for workers in all organisations in the country. Interventions in this area will enable workers to work smarter and faster, reduce stress and hours of work and improve communication and subsequently increase job satisfactions.

Suggestions for future research

Though the study has benefited from a variety of suggestions from other researchers, colleagues and departmental seminars of the problem, however, it might not have addressed all difficulties due to time constraints and budget limitations, hence the following recommendations are made for further study:

First empirical analysis

- Examine the influence of traffic congestions as a channel between maternal employment and household healthcare utilisation.

- Explore the effect of parental employment on household healthcare utilisation especially in the case where both parents are working outside the home.

- Examine the effect of maternal employment on health insurance coverage

Second empirical analysis

- Investigate the effect of maternal job dissatisfaction on children's school progression using a primary data or panel data that will provide enough information for analysing the phenomenon.

- Examine how fathers job dissatisfaction will affect children's age-in-grade congruence and school progression.

- Explore the influence of on-line learning platforms and educational apps on children school progression for households where parents are working.

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APPENDICES

Appendix A1: Covariate balance summary for IPWRA

		Raw	**Weighted**
Number of observations	=	10,588	10,588.0
Treated observation	=	8,125	5,295.5
Control observation	=	2,463	5,292.5

	Standardized	differences	Variance	ratio
	Raw	Weighted	Raw	Weighted
Mother education				
Basic	0.072	0.001	1.119	1.002
Secondary	-0.003	0.001	0.968	1.008
Tertiary	0.055	-0.003	1.895	0.967
Marital status				
Married	0.104	-0.001	0.905	1.001
Divorced/widowed	-0.127	0.002	0.856	1.003
Location (1=rural)	0.045	-0.001	0.985	1.001
Religion				
Christian	0.125	0.000	0.891	1.000
Moslem	-0.075	-0.000	0.891	1.000
Traditionalist	-0.022	-0.000	0.545	0.996
Wealth Quintile				
2nd Quintile	0.045	0.001	1.072	1.002
3rd Quintile	0.073	0.001	1.139	1.002
4th Quintile	-0.004	-0.001	0.992	0.998
5th Quintile	0.037	0.001	1.059	1.002
Ill/injured	0.085	-0.003	1.218	0.965
Valid NHIS card	0.025	0.005	1.211	1.162

Appendix A2. Covariate balance summary for PSM (2)

	Raw	Matched
Number of observations =	3,530	3,372
Treated observations =	1,686	1,686
Control observations =	1,844	1,686

	Standardized differences		Variance Ratio	
	Raw	Matched	Raw	Matched
Mothers age	-0.183	0.059	0.866	0.979
Religion				
Christian	-0.066	-0.043	1.060	1.037
Moslem	0.117	-0.008	1.186	0.989
Traditionalist	0.022	0.020	2.186	1.999
Mothers' education				
Basic	-0.101	0.017	1.021	1.038
Secondary	-0.098	0.017	0.976	1.045
Tertiary				
Location	0.199	0.056	0.886	0.958
Marital status				
Married	-0.120	-0.009	1.220	1.013
	0.107	0.036	1.225	1.066
Divorced/widowed				
QUINTILE				
2nd Quintile	0.054	0.021	1.073	1.027
3rd Quintile	-0.015	0.019	0.976	1.031
4th Quintile	-0.058	-0.016	0.898	0.969
5th Quintile	-0.166	-0.027	0.683	0.931
Household size	0.079	0.050	1.105	1.065

Table A3: Covariate balance summary for PSM (4)

		Raw	Matched
Number of observations =		4,916	3,978
Treated observations =		1,989	1,989
Control observations =		2,927	1,989

	Standardized differences		Variance ratio	
	Raw	Matched	Raw	Matched
Gender	-0.556	0.031	0.909	1.025
Level of education				
Basic	-0.447	0.012	0.589	1.023
Secondary	0.571	-0.068	2.456	0.994
Tertiary	1.118	0.062	4.854	1.007
Religion				
Christian	0.337	-0.014	0.615	1.028
Moslem	-0.236	0.002	0.643	1.006
Traditionalist	-0.223	0.020	0.119	1.027
Marital status				
Married	-0.300	0.020	1.149	0.997
Divorced/Widowed	-0.393	0.052	0.291	1.037
Age (years)	-0.567	0.041	0.712	1.008
Location	-0.312	0.038	0.806	1.043
Sector	0.732	0.062	3.301	1.041

Table A4: Dimensions, indicators and weights for multidimensional FI

Dimension (weight)	Details
Bank account (1/4)	Individual has a bank account (bank account includes savings, current, fixed deposit or microfinance account) or mobile money account
Loan/Credit (1/4)	Individual has access to loan/credit from bank, microfinance institution or other formal institution
Insurance (1/4)	Individual has access to medical, life, property, unemployment/income or family insurance
Financial remittance (1/4)	individual receives financial remittance from the bank, money transfer service provider or through mobile money

Table B1: Definition of variables for Empirical chapter (1)

Variables	Definition and Measurement	Apriori
Healthcare utilisation	Number of Household members who utilised health services	
Maternal employment	Whether working or not working (Dummy 1= working, 0 = not working)	-
Index of household ICT products	Index of ICT products constructed using PCA (continuous)	+
Access to internet	Dummy variable (1 = access, 0 = no access)	+
Household Size	Number of household members (continuous)	+/-
Ill/injured	Number of household members who are ill/injured (continuous)	+
Valid NHIS card holder	Number of household members with valid NHIS card (continuous)	+
Age	Age of mother (Continuous)	+
Age squared/100	Age of mother squared/100 (continuous)	-
Mother's level of education	Education level of individual Polychotomous (0 = No education, 1 = Basic education, 2 = Secondary education, 3= tertiary education)	+/-
Religion	Religious affiliation of individual (Polychotomous: 0 = No religion, 1 = Christian, 2 = Moslem, 3 = Traditionalist)	+/-
Marital status	Marital status of individual (Trichotomous: 0 = Never married, 1 = Married, 2 = Divorced/widowed)	+/-
Location	Residential location of individual (dummy 1 = Rural, 0 = Urban)	+/-
Wealth Quintile	Sample divide to 5 groups by wealth (Polychotomous: 1 =1st quintile, 2= 2nd quintile, 3= 3rd quintile, 4= 4th quintile, 5= 5th quintile	+/-

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Table B2: Definition of variables for Empirical chapter (2)

Variables	Definition and Measurement	Apriori
Age-in-grade congruence	Number of children in the right grade	
Maternal job dissatisfaction	Whether satisfied with current jo or otherwise (Dummy 1= dissatisfied, 0 = satisfied)	
Index of household ICT products	Index of ICT products constructed using PCA (continuous)	+
Access to internet	Dummy variable (1 = access, 0 = no access)	+/-
Household Size	Number of household members (continuous)	+/-
Ratio of children	Number of children/household size	+/-
Age	Age of mother (Continuous)	+
Age squared/100	Age of mother squared/100 (continuous)	-
Level of education	Education level of individual Polychotomous (0 = No education, 1 = Basic education, 2 = Secondary education, 3= tertiary education)	+/-
Religion	Religious affiliation of individual (Polychotomous: 0 = No religion, 1 = Christian, 2 = Moslem, 3 = Traditionalist)	+/-
Marital status	Marital status of individual (Trichotomous: 0 = Never married, 1 = Married, 2 = Divorced/widowed)	+/-
Location	Residential location of individual (dummy 1 = Rural, 0 = Urban)	+/-
Wealth Quintile	Sample divide to 5 groups by wealth (Polychotomous: 1 =1st quintile, 2= 2nd quintile, 3= 3rd quintile, 4= 4th quintile, 5= 5th quintile	+/-

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Table B3: Definition of variables for Empirical chapter (3)

Variables	Definition and Measurement	Apriori
Employment	Whether engaged on in wage economic activity (Dummy 1= working, 0 = not working)	+/-
ICT skills	Whether have ICT skills or otherwise (Dummy 1 = proficient, 0 = not proficient)	+/-
Gender	Dummy variable (1= Female, 0 = Male	+/-
Age	Age of individual in years (Continuous)	+
Age squared	Age of the individual squared	-
Level of education	Education level of individual Polychotomous (0 = No education, 1 = Basic education, 2 = Secondary education, 3= tertiary education)	+/-
Disability	Whether disabled or otherwise (Dummy 1 = disabled, 0 = not disabled)	
Religion	Religious affiliation of individual (Polychotomous: 0 = No religion, 1 = Christian, 2 = Moslem, 3 = Traditionalist)	+/-
Marital status	Marital status of individual (Trichotomous: 0 = Never married, 1 = Married, 2 = Divorced/widowed)	+/-
Location	Residential location of individual (dummy 1 = Rural, 0 = Urban)	+/-
Fathers level of education	Education level of individual individuals' father Polychotomous (0 = No education, 1 = Basic education, 2 = Secondary education, 3= tertiary education)	+/-
Mothers level of education	Education level of individual individuals' father Polychotomous (0 = No education, 1 = Basic education, 2 = Secondary education, 3= tertiary education)	+/-

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Table B4: Definition of variables for Empirical chapter (4)

Variables	Definition and Measurement	Apriori
Intention to leave a job	Whether has an intention to leave a job or otherwise (Dummy 1= satisfied, 0 = not satisfied)	+/-
ICT skills	Whether have ICT skills or otherwise (Dummy 1 = proficient, 0 = not proficient)	+/-
Gender	Dummy variable (1= Female, 0 = Male	+/-
Age	Age of individual in years (Continuous)	+
Age squared	Age of the individual squared	-
Level of education	Education level of individual Polychotomous (0 = No education, 1 = Basic education, 2 = Secondary education, 3= tertiary education)	+/-
Religion	Religious affiliation of individual (Polychotomous: 0 = No religion, 1 = Christian, 2 = Moslem, 3 = Traditionalist)	+/-
Marital status	Marital status of individual (Trichotomous: 0 = Never married, 1 = Married, 2 = Divorced/widowed)	+/-
Location	Residential location of individual (dummy 1 = Rural, 0 = Urban)	+/-
Disability	Whether disabled or otherwise (Dummy 1 = disabled, 0 = not disabled)	+/-
Sector	Sector of employment (Dummy: 1= public sector, 0 = private sector)	+/-

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Table C1: Poisson estimates of maternal employment on household healthcare utilisation

VARIABLES	(1) ALL	(2) RURAL	(3) URBAN	(4) ALL	(5) RURAL	(6) URBAN	(7) ALL	(8) RURAL	(9) URBAN
ME	-0.131***	-0.179***	-0.052	-0.094**	-0.163***	0.028	-0.457***	-0.427**	-0.465***
	(0.042)	(0.053)	(0.070)	(0.045)	(0.055)	(0.077)	(0.127)	(0.194)	(0.172)
	[-0.042***]	[-0.063***]	[-0.015]	[-0.078**]	[-0.135***]	[0.024]	[-0.020***]	[-0.016**]	[-0.025***]
	(0.014)	(0.021)	(0.018)	(0.039)	(0.051)	(0.056)	(0.006)	(0.008)	(0.010)
Valid NHIS	0.064***	0.064***	0.082***	0.061***	0.061***	0.070***	0.141***	0.108***	0.204***
card holders	(0.007)	(0.009)	(0.016)	(0.008)	(0.009)	(0.017)	(0.031)	(0.039)	(0.052)
Observations	10,588	6,203	4,385	3,731	2,465	1,266	6,857	3,738	3,119
H-L Prob > chi2 =	1.000	1.000	0.6923	0.9992	0.2067	1.000	1.000	1.000	
Linktest									
_hat: P > |z| =	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.013	0.012
_hatsq: P > |z| =	0.180	0.160	0.155	0.015	0.011	0.237	0.363	0.888	0.023

Robust standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
ME-Maternal Employment

Table C2: Biprobit estimates for ICT skills and employment

	(1)	(2)	(3)	(4)	(5)
		Gender		Location	
VARIABLES	Full	Female	Male	Rural	Urban
ICT skills	0.606***	0.749***	0.499***	1.275***	0.530***
	(0.073)	(0.132)	(0.084)	(0.140)	(0.115)
Gender (female = 1)	-0.378***			-0.279***	-0.458***
	(0.026)			(0.038)	(0.035)
Level of education (Base = no education)					
Basic	0.275***	0.086*	0.441***	0.244***	0.171***
	(0.034)	(0.049)	(0.047)	(0.042)	(0.058)
Secondary	0.582***	0.602***	0.610***	0.511***	0.502***
	(0.042)	(0.064)	(0.056)	(0.057)	(0.065)
Tertiary	1.067***	1.237***	0.995***	1.123***	0.895***
	(0.048)	(0.076)	(0.064)	(0.070)	(0.072)
Religion (Base = no religion)					
Christian	-0.198***	-0.106	-0.182***	-0.187***	-0.265***
	(0.047)	(0.102)	(0.055)	(0.060)	(0.080)
Moslem	-0.255***	-0.182*	-0.238***	-0.246***	-0.358***
	(0.052)	(0.108)	(0.061)	(0.067)	(0.084)
Traditionalist	-0.431***	-0.312**	-0.429***	-0.365***	-0.309*
	(0.071)	(0.137)	(0.084)	(0.081)	(0.173)
Marital status (Base = never married)					
Married	0.026	0.053	-0.022	-0.018	0.037
	(0.034)	(0.056)	(0.047)	(0.050)	(0.045)
Divorced/Widowed	0.005	0.098	0.043	0.087	-0.120*
	(0.052)	(0.072)	(0.080)	(0.076)	(0.069)
Age in years	0.075***	0.055***	0.096***	0.059***	0.096***

Table C2 cont'D

	(1)	(2)	(3)	(4)	(5)
	(0.007)	(0.012)	(0.010)	(0.011)	(0.010)
Age squared/100	-0.100***	-0.076***	-0.125***	-0.087***	-0.120***
	(0.009)	(0.015)	(0.013)	(0.014)	(0.013)
Disability (1/0)	-0.254**	-0.730***	-0.123	-0.444***	-0.092
	(0.100)	(0.252)	(0.119)	(0.155)	(0.142)
Location (rural=1)	-0.447***	-0.329***	-0.536***		
	(0.025)	(0.038)	(0.033)		
Household head	0.378***	0.296***	0.397***	0.409***	0.360***
	(0.029)	(0.045)	(0.049)	(0.042)	(0.038)
Fathers level of education (Base = no education)					
Basic	0.178***	0.169***	0.187***	0.270***	0.069*
	(0.029)	(0.045)	(0.038)	(0.042)	(0.039)
Secondary	0.134**	0.200**	0.064	0.459***	-0.040
	(0.060)	(0.089)	(0.079)	(0.101)	(0.070)
Tertiary	0.146***	0.111*	0.180***	0.317***	0.009
	(0.040)	(0.060)	(0.056)	(0.062)	(0.050)
Mothers level of education (Base = no education)					

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Basic	0.114***	0.052	0.175***	0.130***	0.102***
	(0.030)	(0.046)	(0.042)	(0.046)	(0.039)
Secondary	0.117	0.122	0.176	0.468**	0.055
	(0.100)	(0.150)	(0.132)	(0.199)	(0.108)
Tertiary	0.172***	0.161**	0.168**	0.289***	0.116*
	(0.055)	(0.081)	(0.075)	(0.091)	(0.065)
Average	0.083***	0.081***	0.091***	0.096***	0.058***
	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)
Constant	-2.273***	-2.328***	-2.699***	-2.457***	-2.433***
	(0.140)	(0.227)	(0.187)	(0.191)	(0.199)
Observations	23,457	12,103	11,354	14,399	9,058

Average ICT skills in a cluster

Table C3: Lewbel 2SLS (internal instruments only) results for ICT skills and employment

	(1)	(2)	(3)	(4)	(5)
		Gender		Location	
VARIABLES	All	Female	Male	Rural	Urban
ICT skills	0.089***	0.140***	0.089***	0.134***	0.070***
	(0.012)	(0.018)	(0.019)	(0.015)	(0.025)
female	-0.086***			-0.039***	-0.157***
	(0.006)			(0.007)	(0.011)
Education	0.100***	0.101***	0.092***	0.079***	0.118***
	(0.005)	(0.006)	(0.007)	(0.005)	(0.009)
Religion	-0.016***	0.001	-0.032***	-0.010***	-0.033***
	(0.003)	(0.004)	(0.005)	(0.003)	(0.010)
Marital status	0.002	0.008	0.000	0.008	-0.013
	(0.006)	(0.007)	(0.011)	(0.007)	(0.011)
Age in years	0.023***	0.016***	0.026***	0.014***	0.036***
	(0.001)	(0.002)	(0.003)	(0.001)	(0.003)
Age squared/100	-0.029***	-0.020***	-0.034***	-0.019***	-0.044***
	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)
Disability (1/0)	-0.049***	-0.065***	-0.029	-0.060***	-0.029
	(0.017)	(0.014)	(0.028)	(0.016)	(0.041)
Location (rural = 1)	-0.119***	-0.057***	-0.183***		
	(0.006)	(0.007)	(0.010)		
Household head status	0.087***	0.048***	0.127***	0.076***	0.112***
	(0.007)	(0.008)	(0.014)	(0.008)	(0.012)
Father's education	0.013***	0.006	0.024***	0.029***	-0.001
	(0.004)	(0.004)	(0.006)	(0.005)	(0.005)
Mother's education	0.030***	0.017***	0.037***	0.037***	0.021***
	(0.005)	(0.006)	(0.008)	(0.008)	(0.007)
Constant	-0.224***	-0.255***	-0.210***	-0.208***	-0.397***
	(0.026)	(0.033)	(0.046)	(0.028)	(0.053)
Observations	23,457	12,103	11,354	14,399	9,058
R-squared	0.308	0.302	0.323	0.137	0.280

Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

AIPC: Average ICT skills in a cluster

Table C4: Lewbel 2SLS estimates for ICT usage and employment

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VARIABLES	(1) Full	(2) Gender Female	(3) Male	(4) Location Rural	(5) Urban
ICT usage	0.026***	0.051***	0.020***	0.050***	0.013*
	(0.004)	(0.006)	(0.006)	(0.005)	(0.007)
Gender (female =1)	-0.086***			-0.039***	-0.159***
	(0.006)			(0.007)	(0.011)
Education	0.101***	0.095***	0.097***	0.075***	0.125***
	(0.005)	(0.006)	(0.007)	(0.005)	(0.009)
Religion	-0.016***	0.001	-0.032***	-0.010***	-0.034***
	(0.003)	(0.004)	(0.005)	(0.003)	(0.010)
Marital status	0.003	0.010	0.001	0.011	-0.013
	(0.006)	(0.007)	(0.011)	(0.007)	(0.011)
Age in years	0.022***	0.014***	0.025***	0.013***	0.034***
	(0.001)	(0.002)	(0.003)	(0.001)	(0.003)
Age squared/100	-0.028***	-0.017***	-0.033***	-0.017***	-0.043***
	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)
Disability (1/0)	-0.048***	-0.061***	-0.029	-0.059***	-0.029
	(0.017)	(0.014)	(0.028)	(0.016)	(0.042)
Table C4 Cont'D					
rural	-0.118***	-0.054***	-0.184***		
	(0.006)	(0.007)	(0.010)		
Household head status	0.087***	0.049***	0.128***	0.075***	0.113***
	(0.007)	(0.008)	(0.014)	(0.008)	(0.012)
Education of father	0.012***	0.005	0.023***	0.028***	-0.002
	(0.004)	(0.004)	(0.006)	(0.005)	(0.005)
Education of mother	0.030***	0.017***	0.038***	0.037***	0.021***
	(0.005)	(0.006)	(0.008)	(0.007)	(0.007)
Constant	-0.188***	-0.194***	-0.177***	-0.151***	-0.368***
	(0.027)	(0.034)	(0.046)	(0.028)	(0.054)
Observations	23,457	12,103	11,354	14,399	9,058
R-squared	0.309	0.302	0.324	0.141	0.283

Robust standard errors in parentheses (*** $p<0.01$, ** $p<0.05$, * $p<0.1$)

Table C5: OLS estimates for ICT usage an intention to leave a job

	(1)	(2)	(3)	(4)	(5)
		Gender		Location	
VARIABLES	Full	Female	Male	Rural	Urban
ICT usage	0.024***	0.026**	0.024***	0.024**	0.025***
	(0.005)	(0.010)	(0.006)	(0.009)	(0.006)
Gender (female =1)	0.001			-0.018	0.013
	(0.018)			(0.030)	(0.022)
Level of education (Base = no education)					
Basic	0.068***	0.114***	0.033	0.071**	0.066**
	(0.021)	(0.039)	(0.025)	(0.033)	(0.028)
Secondary	0.050**	0.138***	-0.003	0.025	0.063**
	(0.023)	(0.041)	(0.029)	(0.038)	(0.030)
Tertiary	0.120***	0.215***	0.057*	0.106***	0.119***
	(0.024)	(0.043)	(0.030)	(0.041)	(0.031)
Religion (Base = no religion)					
Christian	-0.009	0.052	-0.001	-0.070	0.042
	(0.033)	(0.088)	(0.035)	(0.050)	(0.043)
Moslem	-0.021	0.016	-0.006	-0.046	0.013
	(0.036)	(0.093)	(0.039)	(0.057)	(0.047)
Traditionalist	-0.055	0.122	-0.104	-0.105	-0.025
	(0.058)	(0.137)	(0.066)	(0.073)	(0.112)
Marital status (Base = never married)					
Married	0.011	0.007	0.010	-0.038	0.029
	(0.019)	(0.033)	(0.025)	(0.033)	(0.024)
Divorced/Widowed	-0.083**	-0.060	-0.092*	-0.199***	-0.027
	(0.033)	(0.047)	(0.047)	(0.055)	(0.041)
Age squared/100	0.004	-0.008	0.009	-0.002	0.007
	(0.005)	(0.008)	(0.006)	(0.008)	(0.006)
Disability (1/0)	0.004	0.019*	-0.003	0.010	-0.001
	(0.006)	(0.010)	(0.008)	(0.011)	(0.008)
rural	-0.021	-0.063**	0.000		
	(0.015)	(0.027)	(0.018)		
Household head status	-0.021	-0.042	-0.013	0.046	-0.049**
	(0.018)	(0.030)	(0.027)	(0.031)	(0.023)
Fathers level of education (Base = no education)					
Basic	0.023	0.037	0.012	-0.007	0.033
	(0.019)	(0.033)	(0.023)	(0.031)	(0.023)
Secondary	-0.041	-0.039	-0.049	0.028	-0.060
	(0.034)	(0.058)	(0.042)	(0.065)	(0.040)
Tertiary	0.030	0.063	0.011	-0.012	0.044
	(0.025)	(0.041)	(0.031)	(0.046)	(0.030)
Mothers level of education (Base = no education)					
Basic	0.003	0.052	-0.017	0.011	-0.002
	(0.019)	(0.033)	(0.023)	(0.034)	(0.023)
Secondary	-0.043	-0.032	-0.039	-0.223**	-0.003
	(0.049)	(0.086)	(0.059)	(0.113)	(0.053)
Tertiary	0.027	0.061	0.011	0.066	0.022
	(0.031)	(0.050)	(0.039)	(0.063)	(0.036)
Constant	0.346***	0.407**	0.286**	0.490***	0.229*
	(0.093)	(0.162)	(0.117)	(0.148)	(0.119)
Observations	4,916	1,569	3,347	1,778	3,138
R-squared	0.045	0.098	0.032	0.046	0.048