ESSAYS ON EDUCATION AND EMPLOYMENT IN GHANA

by

CHRISTIAN KWEKU DARKO

A thesis submitted to

The University of Birmingham

for the degree of

DOCTOR OF PHILOSOPHY

Department of Business and Labour Economics

Birmingham Business School

University of Birmingham

April 2016

ABSTRACT

This thesis examines how family background, measured as parents education, and household access to amenities affects children's school enrolment, and how parents education affects earnings. I also examine how education and family background affects performance of unregistered urban businesses.

In the first empirical study, rural educated parents' effects on biological children's enrolment were stronger, with educated fathers' effects positive for boys and girls. Educated mothers helped boys, perhaps indicating more "traditional" values among women. Urban educated parents' effects were weaker, which is plausible, given the weaker influence of "traditional" values. For non-biological urban children, educated mothers effect were adverse, suggesting that children fulfil a servant-type role to facilitate the educated mother's market work. Poor access to amenities reduces enrolment.

In the second empirical study, while family background was important for education, there were also direct effects of family background on earnings given education for urban individuals, implying that "connections" and nepotism may be important.

The final study shows that education is important for performance of unregistered businesses without workers. Among firms with workers, education is insignificant, a result admittedly difficult to explain. Parental business ownership assists performance, an implication that parental business owners can effectively train children to business ownership.

DEDICATION

Dedicated to my sister,

Charlotte

ACKNOWLEDGMENTS

I would like to express my sincere gratitude to my supervisors, Prof. Stanley Siebert and Prof. Fiona Carmichael, for the invaluable support, guidance and mentorship they provided throughout this process.

I thank Prof. Ioannis Theodossiou and Dr. Sami Bensassi for accepting to be on my jury, and for the wonderful comments.

I am grateful to the Ghana Statistical Services (GSS) for making the Ghana Living Standards Survey (GLSS) dataset available, and Prof. Mary O'Mahony and John Metcalfe for their help in acquiring the dataset. I am also grateful for comments and suggestions from participants at the Young African Scholars session at the 17th World Congress of the International Economics Association in Amman, Jordan (2014), the Institute for the Study of International Development (ISID) at McGill University, Canada (2015), the 24th Annual International Association for Feminist Economics (IAFFE) conference in Berlin (2015), and the 2014 Midlands Regional Doctoral Colloquium at the Nottingham Business School. I gratefully acknowledge funding support from the Birmingham Business School.

I am greatly indebted to my parents Charles and Evelyn Darko, my wife Sarah Darko, my siblings, and all my friends for their unfailing love and support throughout this process.

Finally, I thank the Almighty God for giving me the strength throughout this process.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

GLSS	-	Ghana Living Standards Survey
GSS	-	Ghana Statistical Service
HDR	-	Human Development Report
IFS	-	Informal Firms Survey
ILO	-	International Labour Organization
KILM	-	Key Indicators of the Labour Market
LSMS	-	Living Standards Measurement Survey
MSE	-	Micro and Small Enterprises
OECD	-	Organization for Economic Co-operation and Development
SSA	-	sub-Saharan Africa
UN	-	United Nations
UNDP	-	United Nations Development Programme
WDI	-	World Development Indicators
WHO	-	World Health Organization

CHAPTER ONE: INTRODUCTION

"Education is a human right with immense power to transform. On its foundation rest the cornerstones of freedom, democracy and sustainable human development". (Kofi Annan, 1999)

This chapter introduces the background and aims of the research. Section 1.1 presents the motivation and background. Section 1.2 gives a by a brief introduction to education and employment options for individuals in the Ghana labour market in. Section 1.2 also highlights some key challenges to education in Ghana. The nature and composition of the labour market is presented in section 1.3, followed by the aims and objectives of the research in section 1.4. The organisation of the thesis is outlined in section 1.5.

1.1 Motivation and background

For many years, the goal of governments in most developing countries has been the need to ensure equal access to education and increased enrolment for children of school going-age. Human capital acquired through formal education is seen as an essential determinant of economic progress. It is pivotal in preparing individuals to enter the labour market by equipping them with the right skills and knowledge (Hanushek and Kimko, 2000; Krueger and Lindahl, 2001). In Ghana, education and more importantly, family background, play a major role in human development and labour market success, not only because of its direct influence on individual lifetime earnings, but also because it indirectly facilitates entry into high paid jobs (Kingdon and Söderbom, 2008). Family background also acts as an initial determinant of children's educational attainment and future economic success. However, the

schooling decisions made by parents for their children could be determined by both the financial and human capital (formal education) of parents, in addition to the endowment of the child (Checchi, 2006). Family background, measured by parents education could proxy for parental tastes (Hannum et al., 2009), for parental ability (Behrman and Rosenzweig, 2002), and also for the extent to which credit constraints (Brown and Park, 2002) bear on the household. Admittedly, children from wealthy families are more likely to be confronted with lower interest rates, an implication that wealthy parents will be able to invest more in their children's education. Family background could also be an indicator of labour market knowledge and social networks. Educated parents often in good and well-paid jobs are able to provide their children with information about the labour market, and sometimes serve as role models for their children.

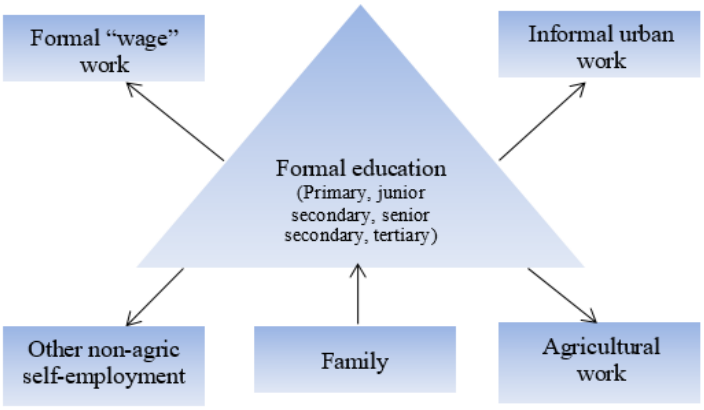
In Ghana, however, even if parents are rational investors who care about themselves as much as their own children, they may sometimes be confronted with different economic needs that includes access to basic amenities that affect their decision to invest in children's education. As the views of many Ghanaian households are sometimes influenced by the views of rural and traditional societies, there is also a general perception of pro-son bias, even on the part of mothers (Lloyd and Gage-Brandon, 1994). These bias may be rational to some extent, if it reflects the expectations of higher returns from male children (Song et al., 2006; Song, 2000) who are expected to stay with the family (whereas girls move out), and therefore parents invest in their male children with the hope of maximising their future utility. The rural-urban locality distinction and household's lack of access to basic amenities, as well as parental education, may affect the schooling enrolment decisions made by parents for

their children and could have lasting effects on children's employment outcomes and labour market success.

1.2 Education and labour market options in Ghana

The importance of education for employment in Ghana is that, a higher level of educational attainment may enhance chances of finding well-paid jobs mainly in the formal sector. Those with post-basic education (senior secondary education and tertiary education) may also prefer to allocate into the more heterogeneous self-employment category (both formal and informal). For those with lower levels of educational attainment (primary, and no education at all), the preferred sector is usually agriculture. Figure 1.1 shows the "path" to various employment options in Ghana. The arrows indicate the various pathways. It takes an average of 16 years to complete formal education (including tertiary education). At each level of education, an individual can opt out and enter the labour market. For the study on individual earnings in chapter 3 and business performance in chapter 4, only formal "wage" work and informal urban work are considered.

Figure 1. 1 Education and employment in Ghana



There are however some challenges to educational attainment in Ghana that might have implications for the study. Especially for rural, poorer, and non-biological children, access to education may be restricted. These may have further implications on their labour market success.

1.2.1 Challenges to education in Ghana

Despite the importance of education for labour market success, education in Ghana is faced with major challenges in both access and participation. Apart from supply-side challenges, there are also demand-side challenges (which is what my thesis will address) which are of equal importance when addressing some of the challenges facing school enrolment and education in developing countries. Due for instance to household financial constraints and sociocultural norms, children's education investment decisions made by their parents tend to be affected. Children from poorer households may therefore have less access to education. For this thesis, what this means it that, in households where children face financial constraints such as poor access to basic amenities, and where parents are less educated, children's schooling enrolment chances will be low. An implication, especially for the Ghana labour market is that, individuals with fewer years of education and from poorer families will have limited access to higher paid jobs.

1.2.1.1 Financial constraints

Financial constraints on education are important in a poor developing country such as Ghana, as my research on family background and school enrolment in chapter 2 will show. As reported by UN (2013), sub-Saharan Africa (SSA) alone accounts for more than half of the world's out-of-school children and the key factor for the low schooling enrolment is poverty. Children from poorer families suffer because they

engage in income-generating activities to support the family. This means that poorer children will have to divide their time between educational activities and non-educational activities, such as collecting firewood and fetching water. According to the UNDP/WHO (2009), approximately 74 percent of people in SSA had no access to electricity. In Ghana, 46 per cent of the entire population had no access to electricity, with the worst areas being those in rural areas. This thesis will show that, in households with limited access to basic amenities (light and water), children's schooling enrolment probability reduces. This may have further consequences on labour market outcomes. Particularly for girls, this means that fewer women will have higher educational qualifications, which may contribute to the disadvantages women have in the labour market. In consequence, there will be a reduced number of women in high paid jobs.

Financial constraints also mean that non-biological children compared with biological children may be disadvantaged. With the considerable degree of child fostering in Ghana, poorer parents send their children to join other relatives and non-relatives in order to benefit from, for instance, educational opportunities. However, these may sometimes not always yield the intended outcomes. Non-biological children may instead be used as additional household support, and their school enrolment chances may be affected. The study will examine this possibility by looking at how educated parents and household wealth, measured as access to basic amenities, affects the schooling enrolment of non-biological children.

1.2.1.2 Socio-cultural beliefs

Socio-cultural beliefs may also have an effect on human capital investment decisions by parents. In traditional Ghanaian societies where males are regarded as household heads and breadwinners, the practice of entrusting family wealth and assets

into the care of sons encourages parents to favour sons over daughters when making education investment decisions. In making education investment decisions, parents will generally value that part of investment in education which benefits them directly, since the returns to female education are mostly enjoyed by the in-laws (Kingdon, 2002). Parents therefore consider boys as an effective source of future financial help ('pensions') in older age.

Particularly for girls, cultural and traditional beliefs have serious implications for enrolment chances. In rural and traditional communities, girls are used in household support and income-generation activities which reduces their chances of participating in school, and 'forces' parents to remove them from school. Girls are generally preferred to boys for carrying out household chores such as fetching water, collecting firewood, cooking, taking care of the elderly and sick, and caring for younger siblings. For this thesis, an attempt will be made to identify whether in rural areas where parents are generally more traditional, the schooling enrolment of children particularly girls will suffer. The study will further examine whether in urban areas where parents are more educated and have lesser traditional beliefs, school enrolment of girls improves.

These challenges show how important family background is for children's schooling, and later labour market outcomes. Not only does family background affect enrolment of children into schools, family background also alters the preferences and expectations in relation to children's future economic success. The study will show that, in households with limited access to basic amenities (due in part to financial constraints), education of children especially girls' falls. For the labour market, the

implications of these are that access to wage jobs will be limited to individuals with higher levels of education and those with highly educated parents.

1.3 Labour market and employment composition in Ghana

The Ghana labour market consists mainly of workers in agriculture, paid employment, and self-employment.[1] Agriculture constitutes about 54.18% of the labour market. In rural areas alone, 74.79% of workers were in agriculture compared with only 15.45% in urban areas.

Non-agricultural self-employment accounts for 26.33% of the working force. Unlike rural areas that are dominated by agricultural activities, most non-agriculture self-employment activities take place in urban areas (44.52%). In rural areas, this accounted for only 16.64% in 2006. Wage employment constitute only 16.96% of the total labour force. In urban areas, 35.62% of the total labour force in 2006 were in paid employment, compared with only 7.04% in rural areas. The remaining 2.53% of the labour force were domestic workers, apprentices and in other unclassified economic activities.

This thesis will show that in wage employment where workers are generally paid higher, education and family background tend to be important for individual earnings. For the informal economy that is made up of unregistered businesses, education may be less relevant for business success. Due to circumstances of poverty, family business experience may be a more relevant factor for business success.

[1] The analysis was carried using data from Ghana Living Standards Survey (GLSS) 2006 for individuals aged 16 to 60 years. All figures are based on author's calculations.

1.4 Research aims and objectives

Education and family background could be important for future economic success. At early stages of an individual's life, the level of parents' education, in addition to household wealth could determine the schooling enrolment and educational attainment of children. The level of education an individual receives could also potentially enhance their chances of finding good jobs. In addition to education, family background is important for labour market success in Ghana. Family background effect on earnings works directly through either educated parents' "connections" and knowledge of the labour market, or indirectly through the positive effects it may have on the individual's education. Even for those unable to find wage jobs, family background through experience from parental business ownership and formal education could potentially enhance business performance. These possibilities are investigated in the three empirical chapters of the thesis. The three parallel objectives of the thesis are highlighted below.

The first empirical chapter (chapter 2) builds on the observation that children's education (schooling enrolment) in rural areas fall behind their counterparts in urban areas. The chapter investigates whether poorer, more traditional families (rural) are more boy-centred than richer and more urbanised families. The study examines in particular, how educated parents affect schooling enrolment of children aged 6 to 19 years using household data from the 2006 Ghana Living Standards Survey (GLSS). Since parents are assumed to be more altruistic (Case et al., 2000) towards their own-birth children, the preferences of parents may differ between biological and non-biological children (e.g. fostered, adopted, and other children). With child fostering being very common in parental behaviour in Ghanaian households, there is little

research on how parents' education investment decisions are affected by their relationship with the child. This chapter will therefore consider the situation for non-biological children, who generally receive different treatment because biological parents tend to be more altruistic towards their own children. The study further examines how the lack of access to basic amenities in the form of water and light affects children's schooling enrolment in both rural and urban areas. This consideration is important because children in households without good access to basic amenities are usually expected to devote a substantial amount of their time to collecting firewood and fetching water, which could mean that parents remove them from schools.

The second empirical chapter builds on the previous empirical chapter by examining the importance of education in mediating (where education influences the effects of family background on earnings) the association between family background, measured as parents' education, and labour market success for individuals aged 25 to 60 years in wage employment. This study is based on individual data from the 2006 GLSS. Considering the nature of the labour market in Ghana, education alone may not be sufficient for economic success. For instance, Pellizzari (2010) note that in labour markets with intermediaries, the effects of personal contacts on finding well-paid jobs tend to be higher. Individuals from wealthy families (educated parents) may be able to benefit from their parents' knowledge of the labour market and "connections" (Hudson and Sessions, 2011). These advantages could enhance their chances of earning higher wages in the labour market. As for those with relatively poorer parents (often the less educated ones), the effects of family background may be less important for labour market success. Such individuals may therefore allocate into lower paid jobs. The

empirical analysis for this chapter will focus on the extent to which family background is correlated with the individual's education, and given the individual's education, the impact family background may have on labour market success, measured as earnings. The estimations are carried out using a simultaneous equation model that allows me to test the direct and indirect effects (via education) of family background.

The last piece of empirical analysis (chapter 4) considers the role of education and family background in determining business success. The analysis here is based on a World Bank Survey of Informal firms (unregistered firms) in five urban areas in Ghana. Given the limited access to wage jobs, the informal sector is a sector of great interest for government policies, particularly because unregistered businesses in general constitute an undervalued contribution to national production levels. A heterogeneous group of people normally engage in informal economic activities in Ghana. These include both educated and uneducated people, and, for instance those struggling to find wage jobs. In the literature from developed countries, there is evidence indicating that education of firm owners and managers is important for firm performance (Parker and Praag, 2006; Bosma et al., 2004), and productivity (Aggrey et al., 2010). Highly educated managers in manufacturing firms are also associated with higher productivity (Goedhuys et al., 2008). However, most of these studies are on entrepreneurs that operate in the formal sector. Given the nature of the labour market and unfavourable government regulations on businesses, the positive effect of education may not always hold for a less developed country such as Ghana. At the same time, the literature also find that the likelihood of good business performance is higher among children of business owners than among children of non-business owners (Fairlie and Robb, 2007; Dunn and Holtz-Eakin, 2000; Hout and Rosen, 2000;

Chlosta et al., 2012; Colombier and Masclet, 2008). Explanations for the intergenerational transmission are that the human capital acquired through informal learning and apprenticeship-type training provides an opportunity correlated with business success (Colombier and Masclet, 2008; Lentz and Laband, 1990).

Based on these considerations, the third empirical chapter will examine the effects of firm owners' education and family background, measured as parents' education and parents' business ownership) on business performance among unregistered urban firms in Ghana. Addressing these issues are of great importance in Ghana for the simple reason that unregistered businesses are the main source of employment and incomes for most urban households. Informal economic activities and unregistered businesses in Ghana are also an entry point for the less advantaged to integrate into the more challenging urban labour market environment.

1.5 The organisation of the study

In the following chapters of this thesis, the three empirical studies outlined above will be presented and concluding comments provided. Chapter 2 focuses on schooling enrolment of biological and non-biological children, and the impact that educated parents and household's lack of access to basic amenities may have on school enrolment using the 2006 Ghana Living Standards Survey (GLSS). Chapter 3 also uses individual level data from the 2006 GLSS to examine the linkages between education, family background and labour market success for individuals aged 25 to 60 years. In the final empirical study (chapter 4), data from the 2013 World Bank Informal Firms Survey (IFS) for Ghana is used to investigate the role of firm owners' education and family background on performance of unregistered businesses in five urban cities.

Chapter 5 provides conclusions from the three empirical studies, and directions for future research.

References

Aggrey, N., Eliab, L. & Joseph, S. (2010). "Human capital and labor productivity in East African manufacturing firms". *Current research journal of economic theory,* 2**,** 48-54.

Behrman, J. R. & Rosenzweig, M. R. (2002). "Does Increasing Women's Schooling Raise the Schooling of the Next Generation?" *The American Economic Review,* 92**,** 323-334.

Bosma, N., Van Praag, M., Thurik, R. & De Wit, G. (2004). "The Value of Human and Social Capital Investments for the Business Performance of Startups". *Small Business Economics,* 23**,** 227-236.

Brown, P. H. & Park, A. (2002). "Education and poverty in rural China". *Economics of Education Review,* 21**,** 523-541.

Case, A., Lin, I. F. & Mclanahan, S. (2000). "How Hungry Is the Selfish Gene?" *The Economic Journal,* 110**,** 781-804.

Checchi, D. (2006). "*The economics of education: Human capital, family background and inequality"*, Cambridge University Press.

Chlosta, S., Patzelt, H., Klein, S. & Dormann, C. (2012). "Parental role models and the decision to become self-employed: The moderating effect of personality". *Small Business Economics,* 38**,** 121-138.

Colombier, N. & Masclet, D. (2008). "Intergenerational correlation in self employment: some further evidence from French ECHP data". *Small Business Economics,* 30**,** 423-437.

Dunn, T. & Holtz-Eakin, D. (2000). "Financial Capital, Human Capital, and the Transition to Self-Employment: Evidence from Intergenerational Links". *Journal of Labor Economics,* 18**,** 282-305.

Fairlie, R. W. & Robb, A. M. (2007). "Families, Human Capital, and Small Business: Evidence from the Characteristics of Business Owners Survey". *Industrial and Labor Relations Review,* 60**,** 225-245.

Goedhuys, M., Janz, N. & Mohnen, P. (2008). "What drives productivity in Tanzanian manufacturing firms: technology or business environment?" *European Journal of Development Research,* 20**,** 199-218.

Hannum, E., Kong, P. & Zhang, Y. (2009). "Family sources of educational gender inequality in rural China: A critical assessment". *International Journal of Educational Development,* 29**,** 474-486.

Hanushek, E. A. & Kimko, D. D. (2000). "Schooling, Labor-Force Quality, and the Growth of Nations". *American Economic Review,* 90**,** 1184-1208.

Hout, M. & Rosen, H. (2000). "Self-Employment, Family Background, and Race". *The Journal of Human Resources,* 35**,** 670-692.

Hudson, J. & Sessions, J. G. (2011). "Parental education, labor market experience and earnings: New wine in an old bottle?" *Economics Letters,* 113**,** 112-115.

Kingdon, G. G. (2002). "The Gender Gap in Educational Attainment in India: How Much Can Be Explained?" *The Journal of Development Studies,* 39**,** 25-53.

Kingdon, G. G. & Söderbom, M. (2008). "*Education, skills, and labor market outcomes: Evidence from Ghana"*, World Bank.

Krueger, A. B. & Lindahl, M. (2001). "Education for Growth: Why and for Whom?" *Journal of Economic Literature,* 39**,** 1101-1136.

Lentz, B. F. & Laband, D. N. (1990). "Entrepreneurial Success and Occupational Inheritance among Proprietors". *The Canadian Journal of Economics / Revue canadienne d'Economique,* 23**,** 563-579.

Lloyd, C. B. & Gage-Brandon, A. J. (1994). "High Fertility and Children's Schooling in Ghana: Sex Differences in Parental Contributions and Educational Outcomes". *Population Studies, 48, 293-306*

Parker, S., C. & Praag, C. M. V. (2006). "Schooling, Capital Constraints, and Entrepreneurial Performance: The Endogenous Triangle". *Journal of Business & Economic Statistics,* 24**,** 416-431.

Pellizzari, M. (2010). "Do friends and relatives really help in getting a good job?" *Industrial and Labor Relations Review,* 63**,** 494-510.

Song, L. (2000). "Gender Effects on Household Resource Allocation in Rural China". *The Chinese Economy,* 33**,** 68-95.

Song, L., Appleton, S. & Knight, J. (2006). "Why Do Girls in Rural China Have Lower School Enrollment?" *World Development,* 34**,** 1639-1653.

United Nations. (2013). "*The Millennium Development Goals Report 2013"*, 1 July 2013, ISBN 978-92-1-101284-2, available at: http://www.refworld.org/docid/51f8fff34.html [Accessed 30 November 2015]

UNDP/WHO. (2009). "The Energy Access Situation in Developing Countries, A Review Focusing on the Least Developed Countries and Sub-Saharan Africa". Available at: http://www.undp.org/energy.

CHAPTER TWO: GENDER DIFFERENCES IN EDUCATION AMONG BIOLOGICAL AND NON-BIOLOGICAL CHILDREN: EDUCATED PARENTS AND HOUSEHOLD POVERTY

2.1 Introduction

Children's education can depend on the education and circumstances of their parents, and the education of a child's mother and father is routinely included in empirical work as a determinant of education. Parental education could proxy for parental tastes (Hannum et al., 2009), for parental ability (Behrman and Rosenzweig, 2002), and also for the extent to which credit constraints bear on the household (Brown and Park, 2002). In Ghana, education plays a major role in labour market success not only because it directly increases earnings, but partly because it indirectly facilitates entry into paid employment and formal employment jobs (Kingdon and Soderbom, 2008).

In this study, an examination of how educated parents and other variables such as household access to basic amenities affect both boys' and girls' schooling enrolment in rural and urban areas is considered. The literature tends to show starting with Rosenzweig and Evenson (1977) and more recently Qian (2008) and Zhao and Glewwe (2010), that improvements in the mother's position help daughter's education, with improvements in the father's position helping sons, perhaps for cultural reasons since fathers may be more aware that sons help support the family in adulthood (whereas daughters marry out). For instance, Hannum (1998) demonstrate that in households where parents face financial difficulties, the chances of boys' enrolment into school is higher than the chances of girls' enrolment. Interestingly, Li and Lavely

(2003) also show that mothers with a culture of traditional belief are more likely to have pro-son attitude.

Using matched data on children[2] and parents from the 2006 Ghana Living Standards Survey (GLSS), the study investigate why some children do not enrol in school. This is done by examining, in addition to household's lack of access to basic amenities, how educated parents enhance children's school enrolment. The study investigates whether the poorer, more traditional educated rural parents are more boy-centred than the richer and more urbanised parents. The study further considers the situation for non-biological children. This consideration is important because although child fostering is common in most urban sub-Saharan African (SSA) households, very few studies have investigated the influence of parents' education[3] and household access to basic amenities on non-biological children's education chances. Many studies on education investment instead treat the household as consisting of only own-birth children. However, the considerable degree of child fostering (from the 2006 Ghana Living Standards Survey, about 10% of children of school-going age were in households with a non-biological parent) taking place in Ghana means it is important to consider the role of non-biological parents in human capital development. To address this gap, the study examines how educated parents and household resources affects schooling enrolment of non-biological children within households in Ghana.[4]

[2] Children refer to biological and non-biological (adopted, house helps, other relatives, and non-relatives) children of household heads.
[3] A related study is Siaens et al. (2006) who examine the probability of school enrolment for orphans as part of a study on assessing the welfare of orphans in Rwanda. Also, Shapiro and Tambashe (2001) control for the relationship of the child to the household head on children's educational attainment in Congo.
[4] Throughout this study, non-biological children are treated synonymous with foster children. Foster children in this study refer to children other than the household head's own child.

2.1.1 Background

The relatively lower rate of enrolment of children into schools across developing countries is partly due to financial constraints faced by parents. Children, in Ghana, especially girls, suffer the consequences of poverty by helping parents with household income generation activities such as farming and petty trading. The lack of financial resources implies also that parents will invest more in the education of children who they believe will cater for their long-term financial security. If parents are more altruistic and especially so towards sons because sons generally provide for parents' long-term financial needs, then educational investment in sons will be higher than daughters. In addition, the views of many Ghanaian households are often influenced by the views of rural and traditional societies of pro-son bias. Boys compared with girls are given higher education partly because boys in effect provide more financial benefits 'pensions' particularly for rural parents in their old age. Girls, on the other hand are given fewer years of schooling for the simple reason that they are expected to relocate to their in-laws. Therefore, girls' in-laws receive a greater share of the returns to education compared with own parents (Levine and Kevane, 2003). While such behaviour would be consistent with parents being rational investors, in Ghana, parents are confronted with other needs and imperatives that influence their decision to invest in children. These inter-temporal decisions may generate differential investments in children's human capital that might be unrelated to preference or bias particular to a given society (Yueh, 2006).

Parents' education investment decision in Ghana may also be influenced by the relationship with the child. As parents generally tend to be more altruistic towards their own-birth children (Becker, 1991; Case et al., 2000), investment in non-biological

children can be affected negatively. For instance, foster children can provide support in the form of labour and household chores in exchange for food, shelter, and importantly, education. The involvement of children in household support activities is therefore likely to reduce their level of participation in education activities, for example, when parents remove them from school.

Based on these considerations, the study examines whether in urban areas, educated parents advance children's schooling enrolment, in particular girls'. Since improvements in a mother's position reduces the education gender gap (Zhao and Glewwe, 2010; Qian, 2008), a further investigation of whether educated mothers increase the chances of daughters' schooling enrolment in urban households. In rural areas, the study accesses whether educated parents invest more in sons' education, possibly as a way of maximising their future financial benefits through the provision of financial security as a kind of family sourced 'pension'. The study also investigates this for the case of non-biological children. If non-biological children are disadvantaged because they make more significant contributions to household activities, then a possible negative or insignificant effects of parents' education is expected, especially maternal schooling, on foster children's enrolment probability. Lastly, the study examines how the lack of access to basic amenities (an indicator of household wealth) in the form of water and light affects children's schooling enrolment in both rural and urban areas. This consideration is important because children in households without good access to basic amenities will be expected to devote a substantial amount of their time to collecting firewood and fetching water, which could mean that parents remove them from schools.

2.1.2 Organisation of the chapter

The remainder of the chapter discusses relevant propositions and hypothesis relating to parents' education investment decision, followed by a review of the literature in section 2.2. The theoretical framework for the empirical model of educational investment is discussed in section 2.3. Section 2.4 provides a description of the data and the variables used for the empirical analysis, followed by the model specification in section 2.5. Sections 2.6 and 2.7 presents a discussion of the results and conclusions of the study respectively.

2.2 Theoretical underpinnings of investment in children's education

Many propositions have been put forward as influential in parents' investment in children's education. Economic and social motives are plausible reasons when parents are making education investment decisions for their children. One of such arguments hypothesises that, parents are more altruistic towards their own-birth children and care about their welfare (Becker, 1991). As such, investment in own-birth children's education is likely to be higher compared with investment in non-biological children's education.

Parents, by devoting most of their resources to their own-birth children implies that, children who are raised in families with non-biological parents will be disadvantaged and may receive different treatment (Becker and Tomes, 1986), and there are some reasons for this (Case et al., 2000). Some parents treat non-biological children differently because of possible ability differences. In addition, if parents have higher expectations of financial support from their own-birth children in their old age

(Plug and Vijverberg, 2003), then the investment in biological children's education will be higher.

Lillard and Willis (1994), however, believe that the investment in children's education does not necessarily depend on parental altruism. Instead, the differential returns to education is a major reason why parents may sometimes invest differently in boys and girls. The authors argue that the pattern of labour demand could influence the preferences of parental education investment decisions. A shift away from agricultural occupations such as farming and domestic services to a more industrial or service-based activities during periods of economic development can significantly alter the preferences of parents. If the claims of Lillard and Willis (1994) are valid, then the traditional pro-son argument I propose could be weakened, as parents might want to invest more in high ability children rather than solely on the grounds of traditional beliefs.

Gertler and Glewwe (1992) also suggest that irrespective of the financial benefits from education (i.e. benefits that may accrue directly to the child, and benefits that may accrue to the parents through future financial support), parents may still prefer educated children. By investing in children's education, parents are able to enhance their children's welfare. Educating children can also bring financial returns to the parents in the long term. This is important particularly for developing countries where there is a poor welfare support system and therefore parents rely more on children for financial support in their old age.

However, according to Alderman and King (1998), the expected transfers from children to parents in their old age may differ by gender, and therefore parents would prefer to invest in educating children who are likely to remit more in the future, usually

boys. Given that sons retain loyalty to their family than daughters, parents often see the investment in girls to be risky, especially when daughters relocate to join their in-laws ("virilocality") after marriage (Adam, 1947; Levine and Kevane, 2003). Parish and Willis (1993), also argue that, in the presence of financial constraints, parents are forced to favour sons' education over daughters', because sons generally provide long-term financial security for parents compared with daughters. Michelson and Parish (2000) also share this view and speculate that since women, compared with men make enormous contributions to family income, parents may therefore not be compelled to invest heavily in girls' education in the same way as they would for boys.

If daughters are allowed to leave their parents' home to join their in-laws, then the private return to the parent from girls' education investment will be lower than their private return in their sons' education. There are, however, short-term benefits of investment in daughters, mainly through monetary and non-monetary transfers to the girls' family during the process of marriage "bride-price". For instance, Mahmud and Amin (2006), argue that since the preferred outcome of investing in girls' education is marriage, parents are more willing to educate girls in the same way they invest in boys' education. Short-term benefits could therefore incentivise parents to invest in daughters' education. Garg and Morduch (1998), suggests, however that, the marriage market in Ghana is imperfect and unable to compensate parents for any investment in their daughters' education. Due to this, the return to investment in boys' rather than girls' will be more beneficial to parents in the long term. In rural China, for instance, due to traditional beliefs, parents tend to prefer a good marriage to a good job for their daughters. Parents therefore focus more on securing a good husband for daughters than

investing in girls' long-term career which remains uncertain should girls relocate to their in-laws' house (Li and Tsang, 2003).

Affecting parents education investment decision is also the resource dilution hypothesis (Blake, 1981). In households with more children, investing in the education of each child by parents' is more expensive, compared with parents with fewer children. This implies that, for credit-constrained families, investing in all children's education becomes complicated.

Regardless of how the educational investment decisions are modelled, these conflicting and yet interesting propositions suggest that parents' education investment decisions in children could be complicated. The study contributes to the literature by examining the effects of parents' education on the schooling enrolment of both biological and non-biological children in Ghana.

2.2.1 Previous empirical findings

The remainder of this section discusses empirical findings from the literature on determinants of children's education. Findings related to the effects of parental education are first discussed followed by other possible determinants, such as those relating to the resource dilution hypothesis, time-use, and those relating to differences because of parent-child relationship.

2.2.1.1 Education of parents and effects on children's education

Parents' level of education are a major determinant of the schooling of children, and could possibly explain some of the difference in parental preferences regarding children's education. Educated parents are able to assist their children at home, especially when it comes to completing school assignments. Parental education

level also determines the extent to which children may stay in school (Behrman and Rosenzweig, 2002).

A number of studies find positive relationships between the education of parents and education of children (Alderman et al., 1996; Drèze and Kingdon, 2001). Although the education of both mothers and fathers are known to positively affect enrolment chances and educational attainment of children, Lillard and Willis (1994) find that despite educated mothers having a more positive effect on girls' education than on boys' education, these positive effects may also be indicating the quality of mother's time in childbearing. A related argument is that, mothers that are more educated usually have smaller families, and are therefore able to devote time towards the upbringing of children. This is similar to Summers (1994), who argues that educated mothers are more able to control their fertility. Lillard and Willis (1994) find also that, the education of father's have a stronger positive effect on their sons' educational attainment, a possible suggestion of same-sex intergenerational effect.

Tansel (2002), find that in Turkey, schooling achievements of children increases with the level of parents' education. The author notes that the impact of both parents' level of education is larger for girls' schooling achievement than boys' schooling, except for the effect of the mother's primary education, which the author found not to have any effect on schooling. Glick and Sahn (2000), find evidence in Guinea to show that a higher level of the father's education raises the likelihood of children's school enrolment, but more importantly for sons. In addition, the authors found that mother's education only increases the chances of girl's schooling enrolment. In China, Song et al. (2006) find evidence that educated mothers have a stronger impact on enrolment at primary school level for both boys and girls compared

with fathers', but a weaker effect on post-primary enrolment on girls. Similarly, Zhao and Glewwe (2010) find that improvement in the mother's position (due to level of education) helps reduce the education gender gap, whereas an improvement in the father's position only increases the gap, possibly because fathers tend to favour sons in education investment decision. In addition, Connelly and Zheng (2003) find that the level of parents education has different effects for both boys and girls.

This evidence shows that empirical studies on the effects of parents' education on children's education is inconclusive. For Ghana, especially in rural and traditional areas where fathers generally make most of the household decisions, including children's education, the effect of educated parents especially mother's on children's school enrolment may be different. This study contributes to the literature by examining this for rural and urban children (both biological and non-biological) in Ghana.

2.2.1.2 Parents' employment effects on children's education

Related to the effects of parental education on children's education is the effect of parent's employment. Parental employment or occupation sometimes determines how rich or poor a family is, and could affect the long-term outcomes of children. However, studies examining how the employment status of parents affects the educational attainment of children is inconclusive. Ermisch and Francesconi (2000) suggests that there are short-term and long-term effects of parental employment on children's welfare. In the short-term, maternal employment negatively affects children's socioeconomic adjustment, whereas in the long term, maternal employment lowers educational attainments. Ermisch and Francesconi (2000), also suggest that these have a long lasting impact on labour market performance of children.

Interestingly, the authors find that the effects are less severe for children of mother's in better jobs. Similarly, they find that children's outcomes are positively related to father's employment. Unsurprisingly however, Lillard and Willis (1994) find that the chances of a child to enrol or continue schooling is reduced if the child's father is a farmer, with a larger effect for girls. Evidence from some developed countries show that children's educational attainments are enhanced by the employment/occupational status of their parents. (Schildberg-Hoerisch, 2011).

For this study, only father's employment status is included as an additional determinant of children's schooling enrolment chances. In Ghana and other traditional societies, mostly developing countries, father's employment or occupation is seen as the main determinant of wealth or socioeconomic status of the family. Mother's employment is not commonly used because of historically lower levels of women's participation in the labour market (Marks, 2011). For instance, only 4.7 percent of mothers are in professional jobs, compared with 21 percent of fathers. In rural areas, this represents only 1.43 percent for mothers compared with 9 percent for fathers. In urban areas, this is 14 percent and 52 percent for mothers and fathers respectively.

2.2.1.3 Resource dilution and its effects on education

Another determinant of children's education in developing countries follows from the resource dilution hypothesis (Blake, 1981). This hypothesis suggests that as the number of children available to parents' increases, the amount of material resources and parental attention available to each child decreases. This is predominant in rural and small areas where childbirth and family sizes are large. The opportunity costs and benefits of children's education are therefore likely to vary by the number of siblings in the house and the order of birth.

2.2.1.3.1 Sibship size and birth order effect

Despite the importance of children in, for instance, contributing to household activities, the total number of children available to parents can partly determine how education investment decisions are made. Sibship size, or family size effect on children's schooling enrolment and education has been well documented in the literature for developing countries. However, the evidence in support of a negative effect of family size on enrolment is not universal. These effects may be due to for instance, socioeconomic, political and cultural influences (Buchmann and Hannum, 2001; Steelman et al., 2002). Lu (2009) and Lu and Treiman (2008) argue that the availability and distribution of family resources may be affected by some of these influences. For South Africa, Cornwell et al., (2005) find that having more children of school-going age in the household increases school enrolment of other siblings. The authors relate this effect to economies of scale in schooling, and schooling culture. The economies of scale of schooling arises because as the number of children increases, the extra cost associated with enrolling one more child may be considerably lower than the cost associated with educating the first child. This is typical in African societies, where because of financial constraints and parents' resourcefulness, older siblings pass on their books, uniforms, and even accompany younger siblings to school. Older siblings also serve as 'home teachers' to the younger ones, which help reduce other associated costs of education, such as private tuition fees.

In Congo, there is evidence that girls' rather than boys' schooling enrolment suffers in households with more children (Shapiro and Tambashe, 2001). This makes sense, especially in an African country context where girls are generally disadvantaged due to cultural norms, and often burdened with household chores. As regards the larger

effect for girls, the authors associate this to resource constraints, and the 'chain of educational assistance' as the reason for boys. That is, older male siblings are able to offer educational support to younger siblings.

On the other hand, Buchmann (2000) makes no finding of a negative effect of the number of children on the probability of school enrolment in Kenya. This finding is also plausible because, in rural communities where family size is relatively large, children may have to contribute to household income generation by participating in unpaid activities. In contrast to the evidence of no or little effect of family size on children's education, Parish and Willis (1993) find family size to be negatively related to children's education in Malaysia.

As regards birth order effects, evidence suggests that the costs of having more children may be borne by older siblings who usually assist parents with household management duties. Advocates of the resource dilution hypothesis argue that birth order matters extensively in parents' educational decision. Some predict that earlier-born children are more advantaged because they tend to get greater levels of attention and engagement from parents compared with later-born children (Behrman et al., 1994; Jæger, 2009). Children born at later years of parents' life are more likely to receive greater financial support, mainly because, parents may have accumulated more wealth (Jæger, 2009; Powell and Steelman, 1995). Enrolment into schools are higher for younger siblings because they may not be required by parents to contribute to family income and household support activities in the presence of older siblings (Buchmann and Hannum, 2001). As for the gender effect, females having younger siblings and male siblings have a lower likelihood of enrolment. This arises partly

because, girls in general compared with male and younger siblings provide more household support services (Glick and Sahn, 2000; Levison and Moe, 1998).

The evidence from the literature indicates that parents' education investment decision can be a complicated one. In a country where sociocultural norms are prevalent and one where education investment decisions made by parents are influenced by economic reasons, it is expected that the effects of educated parents on school enrolment will differ between gender, location, and even relationship of child to parent. This study consider these possibilities, and while focussing on how educated parents and household resources, measured as access to basic amenities, impacts on biological and non-biological children's school enrolment in rural and urban areas, the study also accounts for any possible evidence of resource dilution by controlling for the number of children in the household.

2.2.1.4 Time-use effect and children's education

Apart from the effects of parents' education on school enrolment, time-use on other non-educational activities can play a role in school enrolment of children, and even on their labour market outcomes. For instance, Greenwood et al. (2005) show that in households with no access to electricity, labour market participation, especially among women tend to be low. Similar arguments apply to children that engage in non-educational household work. In fact, the literature on child labour and schooling tend to show a negative correlation between schooling and time spent on non-educational activities. Amin et al. (2006) examine how market work and household work affects children's education in Bangladesh. The authors find that household work significantly reduces girls' education, with no significant effect on boys' although negative. As regards the effects of market work, the authors find instead that boys rather than girls'

education reduces, with an insignificant effect on girls' education. Khanam and Ross (2011) also find that children involved in work, that is, both household work and market work, are associated with reduced schooling enrolment.

In this thesis, the possibility of household wealth having an effect on schooling enrolment using household's access to basic amenities, measured as access to light and water is considered. The lack of access to water and light can bear significantly on children's education, in the sense that children will be required by parents to collect firewood and fetch water for use at home. In rural areas where most households do not have easy access to good drinking water (indoor plumbing) and electricity supply, children's schooling enrolment especially girls' will suffer.

2.2.1.5 Parental characteristics and non-biological children's education

Separation from biological parents may have an impact on children's outcomes later in life. Children raised in families without the presence of both parents or biological parents are often disadvantaged, compared with children raised by biological parents (Case et al., 2000). Non-biological children could benefit from positive spillover effects of parents' education, and family environment. This is because, adoptive parents generally tend to be better at parenting (Plug and Vijverberg, 2005), possibly because of their level of education[5]. The effects of both parents' characteristics may not always have a positive impact on children's outcomes. For instance, Björklund et al. (2006) estimate the effects of parental education on children's education using data on adopted children and their biological and adoptive parents. They find largely that for both adopted and biological children, the effects of

[5] From the 2005/06 GLSS data used for this study, non-biological fathers and mothers have an average of 11.1 and 9.3 years of schooling respectively, compared with 10.1 and 8.1 years of schooling for biological fathers and mothers respectively.

father's education are significant and of equal magnitude. For mother's education, however, the authors find although positive for both children, that the effect is much larger for biological children. Plug (2004) also find similar effects. This possibly suggest that mothers, unlike fathers, may be more altruistic towards their own birth children and may care more about maintaining family genes.

In terms of how family income can affect the education of children, Sacerdote (2002) examines this effect for adopted children, as well as for biological children. Sacerdote (2002) find that income of the family significantly increases the education of adopted children, and biological children. Sacerdote (2002) interprets the result to mean that the significant effect of family income on non-biological children's education could be driven by family environment rather than along genetic lines. Plug and Vijverberg (2003) also found positive effects of family income on the education of adopted and biological children's education.

The evidence on non-biological children's education chances so far indicate mixed effects of parental characteristics. Non-biological rather than biological children are generally disadvantaged and benefit mainly from family environment rather than family genes, as biological parents tend to protect their genetic material. Due to financial constraints, non-biological children may join relatively wealthier families in order to benefit from family environment, and contribute to household activities in exchange for shelter, food, and most importantly education. This study adds to the existing literature by examining the effects of educated parents and household's lack of basic amenities on the schooling enrolment of non-biological children in rural and urban areas.

2.3 Modelling educational investment: Theoretical framework

Parents decision to invest in education of children is modelled through an adaptation of the models in Alderman and King (1998), and Brown and Park (2002). The model assumes that parents live for only two periods; they work in the first period and then retire in the second period. Household consumption in period one is parents' income less costs of educating children.

Parents have a lifetime income,Y an indicator of family wealth and is based on parents' level of education, $PAREDUC$. That is, parents' income, $Y = f(PAREDUC)$. Parents choose a certain amount to invest in the education of the child,$EDUC$. The condition for educating children is based on parental preferences which are often influenced by their level of education and gender of the child, S. Parents in urban areas will provide their children with the level of education necessary to maximise their future wealth. Urban educated parents may therefore be less reliant on their children for future financial support. Rural parents, however, may not be able to provide the wealth-maximising level of education because of financial constraints. Rural parents may therefore choose to invest more in boys because of the associated future economic benefits, in the form of pensions for parents in old age. Daughters on the other hand may receive lower investment because of virilocality[6] in traditional Ghanaian societies (hence, investment in girls' education by parents especially fathers' may only be for short-term benefits). Inherent in the virilocality argument is the assumption that the

[6] Implicit in this hypothesis according to Levine and Kevane (2003) is the idea that parents who invest in daughters' education create a positive externality, but this externality is not expected to reduce investment in daughters if the in-laws or groom can make a payment necessary to internalize the externality (bride price). Also, Garg and Murdoch (1998) suggest that in Ghana women are more likely to move out, and since the marriage markets does not work perfectly to compensate for daughters' investment, the full returns to sons is often higher than the returns to daughters'.

girl's parents are not compensated by the boy's family for any investments in the girl's education (Levine and Kevane, 2003). Parents may therefore provide daughters with the level of education necessary to improve their chances of finding a wealthy suitor.

The education of the child, $EDUC$ has both direct and indirect costs, P_e. The direct costs of education may include tuition fees, Parent Teacher Association (PTA) levies, costs of books, transportation and other stationaries. The indirect costs are the opportunity costs associated with schooling. The price of education is expected to be high for children in households with poor access to basic amenities (indicator of wealth). This is because parents consider the opportunity cost of sending children to school as the loss of children's labour activities, such as, collecting firewood and fetching water when households do not have access to basic amenities.

In period two, consumption by parents is largely dependent on the wealth or earnings of children, W. This is determined by an 'earnings production function' that relates earnings to the child's human capital investment, $EDUC$. Hence wealth of the child, $W = f(EDUC)$. The lack of a strong welfare support system in Ghana implies that parents receive a share, w in the child's future earnings, W. Parents share, w, is dependent on the gender of the child, S; and also the relationship to the child (whether biological or non-biological). This will be greater in rural areas if the child is male and less if the child is female because of virilocality; and depends on the amount of education invested, i.e. $w = f(S, EDUC)$. The share of the child's returns to education now becomes$(1 - W)EDUC$. Assuming parents do well by their sons because sons provide alternative future source of finance, then, the share of the returns accruing to sons will be less than the shares accruing to daughters i.e. $(1 - W_b) < (1 - W_g).\, b$

and g represent boys and girls respectively. Parents' consumption in the second period, C_2 becomes:

$$C_2 = \beta_1 W_b + \beta_2 W_g, \quad (1)$$

where β is the rate of transfers per unit of wealth of the child.

The model also assumes that parents are altruistic,A, but only towards their own-birth children and so care about them as much as they care about themselves. Altruism is reflected by a linear combination of parental preferences over the education of their children. Educated parents can and may wish to invest more in the education of their children than less educated parents. The degree of altruism is also assumed to depend on the gender of the child. Thus, $A = A(S, PAREDUC)$. Since the degree of altruism depends on whether or not children are biological or fostered, the education of non-biological children could suffer relative to the education of own-birth children if parents are altruistic. With these assumptions, parents' utility function (maximised over both periods) becomes:

$$U = Y - (P_e)EDUC + w(EDUC) + A(1 - w)EDUC \quad (2)$$

Parents will maximise their utility based on their income constraint,Y, cost of educating the child, P_e, their level of altruism, A and consumption from transfers from children in period two, C_2. For non-biological children and where parents are less altruistic, $A = 0$.

The reduced-form equations for boys' and girls' schooling enrolment estimated are a function of;

$$EDUC_i = f(PAREDUC, X) \quad (3)$$

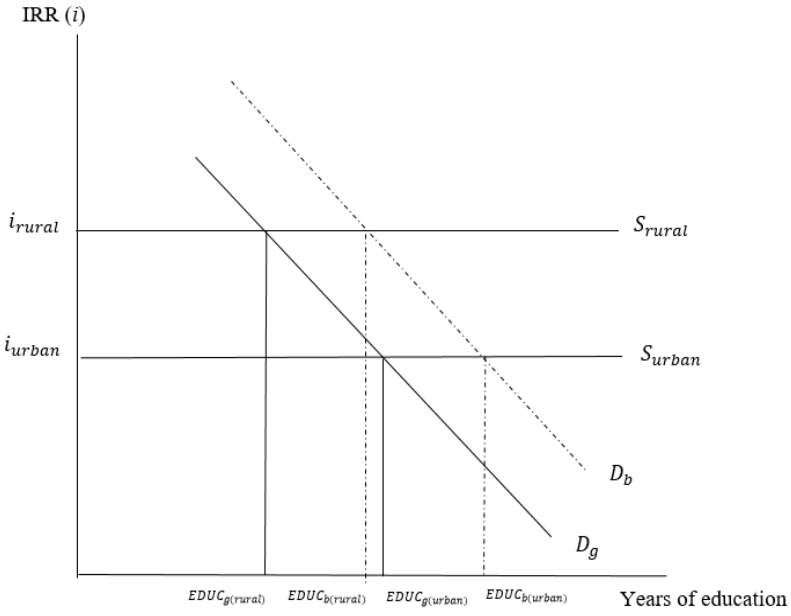
where i represents whether the individual is boy or girl. X is a vector of individual and household characteristics such as age, region, religion, access to household amenities,

and occupation of father. For children in urban areas we expect little or no gender penalty in education. In rural areas, girls' education relative to boys' education is expected to suffer because of virilocality and the benefits sons may have as a result of contribution to parents' future finances.

Priori expectations are that educated parents will invest in their children's education in both rural and urban areas. Particularly for children in rural areas, since parents have limited access to financial facilities, investment in children's schooling can serve as a means of providing financial security in old age through increased transfer payments (Lillard and Willis, 1997). Hence, educated rural parents may invest in their children's education if they expect future financial support from children. In urban areas, parents may face less financial constraints because of access to credit facilities (Becker, 1991), savings, and pensions. Hence, educated urban parents may therefore be less reliant on children as a source of future financial support compared with rural parents. The effects of educated parents on children's schooling enrolment may therefore be more important for children in rural areas compared with children in urban areas.

The effect of parental education, and rural/urban location on the schooling enrolment of non-biological children could go either way. For financial constrained parents, educating non-biological children could provide additional future financial benefits. On the other hand, non-biological children's education could also be negatively affected if parents prefer that these children simply provide additional household support. Figure 2.1 shows parents' education investment decisions in rural and urban areas.

Figure 2. 1 Differences in schooling decision in rural and urban areas



In figure 2.1, because rural parents face higher interest rates compared with urban parents, children in rural areas receive less years of education. In addition, due to rural parents being more traditional with a pro-son belief, boys' rather than girls' receive higher levels of educational investment. This is shown by D_b and D_g where the demand for boys' education is higher than the demand for girls' education, corresponding to increased years of schooling, $EDUC_{b(rural)}$ for boys. On the contrary, in urban areas where parents are wealthy (more educated) and consequently less traditional, they are faced with lower interest rates, and are therefore able to provide their children with more years of schooling, $EDUC_{b(urban)}$and $EDUC_{g(urban)}$, which is greater than the years of schooling received by rural boys and girls.

2.4 Data

The main data used is the 2006 Ghana Living Standards Survey. The survey is part of the World Bank's Living Standards Measurement Survey (LSMS). Data were

collected on core topics including education, health, and employment. For the first part of the analysis, matched data for biological children aged 6 to 19 years and their parents are used. The second part of the empirical analysis focuses on non-biological children. A household is defined as a person or group of persons who live together in the same dwelling, share the same housekeeping arrangements and are catered for as one unit.

Tables 2.1 and 2.2 present summary statistics of the main variables for both biological and non-biological children used in the analysis. Notably, school enrolment for biological children averages about 74% for both boys and girls, although between urban and rural areas, enrolment is higher for children in urban areas than in rural areas. For instance, 86% of urban girls compared with 69% of rural girls were enrolled in school. This is similar among boys, where 88% and 70% were enrolled in school in urban and rural areas respectively.

The total sample is 7,723 and 1,074 for biological and non-biological children respectively. In terms of parental education, table 2.1 shows that urban parents are more educated than rural parents, with the proportion of rural educated fathers higher than the proportion of rural educated mothers. For both boys and girls, table 2.1 shows a higher proportion of educated fathers compared with mothers. Table A2.1 in the appendix shows summary of variables used in the analysis.

Table 2. 1 Summary statistics of main variables

Variable	Rural				Urban			
	Boys		Girls		Boys		Girls	
	N	Mean	N	Mean	N	Mean	N	Mean
Panel a. Biological children								
Currently in school	3041	0.70	2510	0.69	1108	0.88	1064	0.86
Age (years)	3041	11.62	2510	11.27	1108	12.23	1064	11.92
Father: Educated	3019	0.26	2496	0.27	1095	0.67	1055	0.71
Mother: Educated	3011	0.08	2493	0.09	1093	0.4	1047	0.42
Father: Professional	2766	0.09	2273	0.09	987	0.52	966	0.53
Father: Self-employment	2766	0.06	2273	0.06	987	0.26	966	0.28
Father: Agriculture occupation	2766	0.85	2273	0.85	987	0.22	966	0.19
Panel b. Non-biological children								
	Rural				Urban			
	Boys		Girls		Boys		Girls	
Currently in school	350	0.59	325	0.60	153	0.82	246	0.68
Age (years)	350	12.89	325	12.18	153	13.28	246	13.64
Father: Educated	349	0.31	323	0.35	150	0.71	244	0.75
Mother: Educated	343	0.12	321	0.13	149	0.50	240	0.54
Father: Professional	315	0.12	295	0.13	134	0.42	226	0.53
Father: Self-employment	315	0.12	295	0.12	134	0.27	226	0.27
Father: Agriculture occupation	315	0.76	295	0.75	134	0.31	226	0.2

In panel b of table 2.1, it can be seen that compared with biological children, non-biological children have lower rates of school enrolment, with urban non-biological children having a higher school enrolment rate than their rural counterparts. Again, in terms of parental education, non-biological fathers are more educated compared with non-biological. For instance, for non-biological boys in rural areas, only 31% of foster fathers are educated, compared with 71% for non-biological boys in urban areas. This is similar for girls, where 35% of foster fathers are educated in rural areas, compared with 75% in urban areas. This seems to agree with Plug and Vijverberg (2005) that non-biological parents generally tend to be more educated. Table A2.2 in the appendix shows the distribution of biological and non-biological children.

For children to be able to participate in school, access to basic amenities can play a significant role. Table 2.2 shows summary statistics for the key household amenities variables used in this study. Most households, particularly those in rural areas rely on boreholes and wells as their main source of drinking water. Children from these households will be required to spend time making water available for use at home, implying reduced time for educational activities such as homework, and even enrolment. In urban areas however, most households have access to indoor plumbing and standpipe, implying that less time is needed for fetching water, and hence fewer constraints on school enrolment.

Table 2. 2 Summary statistics of household basic amenities

Panel a. Biological children						
	All		Rural		Urban	
Source of drinking water	N	%	N	%	N	%
Standpipe/indoor plumbing	2043	26.45	368	6.62	1675	77.12
Borehole/Well	4167	53.96	3745	67.47	422	19.43
River/rain/other	1513	19.59	1438	25.91	75	3.45
	7723		5551		2172	
Source of light						
Electricity(mains)	2726	35.3	1018	18.34	1708	78.64
Other	4997	64.7	4533	81.66	464	21.36
	7723		5551		2172	
Panel b. Non-biological children						
Source of drinking water						
Standpipe/indoor plumbing	379	35.29	53	7.85	326	81.7
Borehole/Well	511	47.58	447	66.22	64	16.04
River/rain/other	184	17.13	175	25.93	9	2.26
	1074		675		399	
Source of light						
Electricity(mains)	473	44.04	137	20.3	336	84.21
Others	601	55.96	538	79.7	63	15.79
	1074		675		399	

According to the UNDP/WHO (2009), approximately 74 per cent of people in sub-Saharan Africa had no access to electricity, and about 42 per cent of the population in developing countries used wood as their primary source of fuel for cooking and as source of light. The figures in table 2.2 shows that in relation to household access to electricity, both biological and non-biological children in urban areas tend to be more advantaged than children in rural areas. The use of electricity and good access to other basic amenities can have particularly positive impacts on female labour-force participation. For instance, Greenwood et al. (2005) find that the use of labour-saving technologies in the household accounted for more than half of the rise in female labour-force participation. Access to basic amenities, and adoption of labour-saving technologies could reduce the amount of time devoted to household chores. This tend

to disproportionately benefit females, leading to a likely increase in school enrolment rates.

2.4.1 Variables

The dependent variable is current school enrolment status. This variable takes the value of 1 if the individual is enrolled in school and 0 if otherwise. Parents' education, the key independent variable is measured using father's education and mother's education. This is defined by whether the father or mother have formal education. Another independent variable of interest is household wealth, measured as household's access to basic amenities, i.e. drinking water, and sources of light. These are categorised into good access, poor access and average access. Poor access are households that do not have access to both light and water. Households with good access to amenities are those that have light and a good source of drinking water, mainly indoor plumbing. Average households are households that have either good access to light and poor access to water, or poor access to light and good access to water. While not controlling for parental income, the use of access to amenities in this study proxies for household wealth. As Mazumdar (2005) notes, due to transitory fluctuations in earnings, using a single period of parental earnings may lead to bias estimates. To overcome this issue, earnings over a longer period were used. However, due to the unavailability of equivalent data in the GLSS, the proxy of household amenities is used. Households with good access to amenities are generally more wealthy than households with poor access to basic amenities.

In addition, the study controls for a number of demographic factors. Age dummies are used to represent the various ages of children. This is to allow for the rising opportunity costs of school with age. Household composition is included to

account for potential resource dilution. This is measured by the number of brothers and sisters of school-going age, and the number of children under 6 years. Father's occupation is also controlled for, and is measured by whether the father is in a professional job (reference group), self-employed, or in agriculture. Lastly, religion, and regional dummies are included to account for possible unobserved regional policies or conditions. Table 2.3 shows summary definitions of the main variables used in the regressions.

Table 2. 3 Summary definitions of variables

Variable	Description
Currently Enrolled	1 if child is currently enrolled in school, 0 otherwise
Father Educated	1 if father is educated, 0 otherwise
Mother Educated	1 if mother is educated, 0 otherwise
Father Self-Employed	1 if father is self-employed, 0 if professional
Father Agriculture	1 if father is in agriculture, 0 if professional
Muslim	1 if child's religion is Islam, 0 other
Christian	1 if child's religion is Christianity, 0 other
Household Amenities: Average	1 if household has either good source of light and poor access to drinking water, or good source of drinking water and poor access to light, 0 if both good access
Household Amenities: Poor	1 if household has poor access to drinking water and light, 0 if good access
Number of Brothers (6 To 19 Years)	Number of brothers in the household aged 6 to 19 years
Number of Sisters (6 To 19 Years)	Number of sisters in the household aged 6 to 19 years
Number of Children (Less Than 6 Years)	Number of siblings in the household less than 6 years
Age	Age dummies (6 to 19 years)

2.5 Empirical specification

A discrete choice logit model based on maximum-likelihood methods are used to estimate the determinants of school enrolment. The equation describing the school enrolment status of the child is given by;

$$\Pr(EDUC_i = 1) = \beta_1 PAREDUC_i + \beta_2 X_i + \upsilon_i \quad (4)$$

where current school enrolment, $EDUC_i$ is 0 if the individual is not currently enrolled in school, and 1 if enrolled in school. The probability of the child being enrolled in school is assumed to be linearly dependent on parents level of education, $PAREDUC_i$. X_i is a vector of household and individual characteristics including the indicator of household access to basic amenities, age dummies, and family size.

Unlike studies such as Glick and Sahn (2000), that control for household income using earnings of both parents or income of the household head, this study does not directly control for parents' income because parental and individual income varies along the life-cycle compared with education which remains fairly unchanged. The focus on parent's education also captures credit constraints and borrowing limits of parents. Separate regressions were estimated for boys and girls to allow for the impact of parental education to vary between boys and girls. It is also plausible to allow for the effects of educated parents and household's lack of access to basic amenities to vary by location since, for instance, lack of access to basic amenities is likely to impact differently on schooling between rural and urban areas. Sibling composition may also have different impacts on parents' education investment decisions (Connelly and Zheng 2003), and so it is necessary to control for these.

In estimating the schooling enrolment of children in rural and urban areas, there might be concerns of endogenous selection to rural and urban areas by parents. Certain

characteristics that determine the household's location may also determine the likelihood of children's schooling enrolment. Similarly, the characteristics that determine the choice of having non-biological children may also be linked to enrolment. This is recognised, however, given the information within the dataset it was impossible to find appropriate exclusion restrictions. That is, variables that determine either location or a non-biological child in the family but do not affect the schooling enrolment probability of children. With this limitation in mind, the study proceeds to estimate all regressions without controlling for selectivity into rural and urban areas.

All regressions are run separately for rural and urban areas, unless otherwise stated.

2.6 Results and interpretation

2.6.1 Results: Biological children

The initial results for boys and girls in rural and urban areas are presented in table 2.4. All regression results presented are average marginal effects. Parental education and occupational variables are first discussed, followed by a discussion of the results relating to access to amenities. Full table of results showing all variables can be seen in the appendix.

2.6.1.1 Parental effects on school enrolment

While educated fathers appear to have no effect for boys' schooling enrolment in urban areas, columns (1) and (2) of table 2.4 show that for children in rural areas, having an educated father increases boys' enrolment probability by 5.2 percentage points but raises girls' enrolment by 12.4 percentage points. In rural areas, educated fathers' may invest more in daughters' education anticipating that girls need more

education in order to earn as much as men (Carter and Wojtkiewicz, 2000). May (1983), also notes that an educated girl attracts more money (bride-price) as compensation for the money invested in her education, and to increase her value to her husband. In line with the virilocality argument (Levine and Kevane, 2003; and see section 2.2, and page 32) since girls mostly relocate to their in-laws' house, educated fathers are encouraged to enrol them in schools in order to secure a wealthy suitor, and also to secure a high bride price, as suggested by May (1983). Thus, the interpretation of the higher impact of rural educated fathers on girls' enrolment chances can be seen as a way of fathers trying to maximise both their short-term utility (bride-price) and long-term altruistic utility (due to increased earnings equating to that of boys'). In contrast, the wealth maximising level of education for boys may depend on future financial expectations in parents' retirement i.e. sons effectively pay for their parents' pensions.

As regards the effect of educated mothers in rural areas, educated mothers are associated with a higher likelihood of school enrolment by boys but not girls' enrolment (columns (1) and (2) in table 2.4). This is the opposite of the expectation that mother's education would be of greater importance to girls in line with evidence that improvements in the mother's position reduce the education gender gap (Zhao and Glewwe, 2010; Qian, 2008). The significance of educated mothers for boys' enrolment but not girls' schooling enrolment could possibly reflect pro-son attitudes of traditional women related to an expectation that boys provide for the family's long-term financial security of the parents.

Table 2. 4 Effects of educated parents and household access to basic amenities on school enrolment: biological children

DV: 1 if currently enrolled, 0 if otherwise	(1) Boys	(2) Girls	(3) Boys	(4) Girls
	Rural		Urban	
Father Educated	0.0515**	0.124***	0.0150	0.0648***
	(0.0220)	(0.0224)	(0.0254)	(0.0233)
Mother Educated	0.0882**	0.0320	0.0210	0.0485**
	(0.0372)	(0.0374)	(0.0224)	(0.0224)
Father Self-Employed	-0.0675	0.0361	0.0191	-0.0427*
	(0.0487)	(0.0558)	(0.0233)	(0.0249)
Father Agriculture	-0.0320	0.0394	-0.0704**	-0.146***
	(0.0354)	(0.0428)	(0.0314)	(0.0341)
Household Amenities: Average	-0.0844***	-0.144***	-0.0178	0.0135
	(0.0258)	(0.0255)	(0.0244)	(0.0266)
Household Amenities: Poor	-0.133***	-0.180***	-0.0801*	-0.0858**
	(0.0283)	(0.0289)	(0.0434)	(0.0389)
Number of brothers (6 To 19 Years)	0.00134	0.00581	-0.00929	0.0214**
	(0.00545)	(0.00605)	(0.00833)	(0.00989)
Number of sisters (6 To 19 Years)	0.00447	-0.0152**	0.00999	0.00867
	(0.00623)	(0.00685)	(0.00963)	(0.0105)
Number of children Less Than 6 Years	0.00376	0.000291	0.0224*	-0.0137
	(0.00660)	(0.00726)	(0.0131)	(0.0125)
Pseudo R-squared	*0.21*	*0.21*	*0.27*	*0.33*
Log pseudolikelihood	*-1299.54*	*-1084.07*	*-256.18*	*-240.78*
Observations	*2,725*	*2,249*	*965*	*888*

Robust standard errors in parentheses
**** p<0.01, ** p<0.05, * p<0.10*
All regressions include age, region, and religion dummies

In the richer urban households where parents are generally less traditional and more educated, the results in columns (3) and (4) show that, educated parents only raise the probability of schooling enrolment for girls. This supports Parish and Willis' (1993) assertion that increasing prosperity may have led to a reduction in the tough choices parents faced when confronted with deciding between sons and daughters' education. As for the significant effect of educated mothers on girls' schooling enrolment, if level of parents education partly determines how resources are allocated in the household, then resources under the control of mothers could lead to a potential increase in girls educational investment (Levy, 2007; Levy and Rodriquez, 2004)[7]. Educated mothers will have higher bargaining power and can contribute in the household decision-making process.

That the effects of educated parents on boys and girls' enrolment chances differs in rural and urban areas is interesting. As suggested by Greenhalgh (1985), educated parents in urban areas may invest more in children of higher ability rather than simply on the basis of the traditional pro-son view. These differences may be related to changes in the pattern of labour demand in developing countries. Although Ghana is still predominantly an agrarian economy, economic activities in urban areas are shifting towards modern industry and services, hence requiring more educated and skilled labour.

The statistical significance of the differences of the effects of educated fathers between rural and urban girls are compared. The results indicate a significant difference between rural and urban girls. For rural areas, although the effects of

[7] This evidence is based on the Mexican antipoverty and human resource investment programme, PROGRESSA/Oportunidades.

educated fathers is larger for girls compared with boys, the difference is not statistically significant. Table A2.4 in the appendix shows the statistical significance between estimated coefficients.

In terms of the effects of father's occupation, having a father in agricultural occupation compared with having a father in a skilled/professional occupation (reference group) reduces school enrolment of children in urban areas, and especially for girls (by 7 and 14.6 percentage points for boys and girls respectively). Having a father in self-employment has a weak negative effect for girls but no significant effect for boys. There are no significant effects of father's occupation for school enrolment in rural areas.

2.6.1.2 Effects of differential access to basic amenities on school enrolment

In table 2.4, household wealth indicators measured as access to water and light, shows that poor access to basic amenities strongly reduce enrolment probability of both boys and girls in rural areas, although the effects are stronger for girls. Children in urban areas with poor access to basic amenities are also less likely to enrol in school, with girls' education suffering the most in relatively poorer urban households. The negative impact of a lack of access to basic amenities is consistent with light and water being essentials of life and limited access potentially affecting educational development. Children need light in order to carry out educational activities such as homework and assignments in the evenings. There are also health implications of the lack of water on schooling enrolment, particularly for girls. For instance, Maimaiti and Siebert (2009) show that provision of tap water leads to a rise in school enrolment for girls after menarche. Also, Drakopoulos et al. (2011) find that individuals that grew up in unfavourable socioeconomic conditions as children were associated with frail

health in adulthood. Girls spend more time on household activities compared with boys in households with lack of good access to basic amenities[8], meaning that girls have less time for educational activities, and parents may be more likely to remove them from school. Although the effects of access to household amenities on enrolment probability are generally larger for girls in rural areas compared with boys, the differences between the estimated coefficients are not significant.

To further examine the gender differences in the effect of wealth on schooling in rural areas, the time (in hours) it takes for children to fetch water and collect firewood per week is used in place of the household wealth indicators. This is important because, children in households where there is the lack of access to basic amenities may be required to spend time collecting firewood and fetching water. This also captures the opportunity costs associated with schooling, and considered by parents as a loss of children's labour activities. Thus, time-use may compensate for lack of amenities.

The results in table 2.5 confirm that each additional hour spent by girls on collecting firewood and fetching water reduces their chances of enrolment by 1.4 percentage points. This result is interesting because it is in line with Greenwood et al. (2005) and Hannum (1998) that lack of access to certain household amenities increases time-use activity and even reduces labour market participation, particularly for women. It is also consistent with Lloyd et al. (2008) who find that school enrolment is negatively and strongly related with hours spent on non-educational activities. For boys, the results show that the effect is negative but insignificant. Amin et al. (2006)

[8] The data on the amount of time spent by children in collecting firewood shows that rural girls spend on average 159 minutes (2.6 hours) per week on fetching water and collecting firewood, compared with 44.3 minutes (0.74 hours) for girls in urban areas. For boys this is 80 (1.33 hours) and 37 minutes (0.62 hours) in rural and urban areas respectively.

find similar results for Bangladesh that an increase in household work significantly reduces rural girls' education, whereas for boys the effect is negative but insignificant.

Table 2. 5 Effects of time use on school enrolment in rural areas: Biological children

DV: 1 if currently enrolled, 0 if otherwise	(1) Boys	(2) Girls
Father Educated	0.0622***	0.128***
	(0.0225)	(0.0230)
Mother Educated	0.110***	0.000634
	(0.0389)	(0.0403)
Father Self-Employed	-0.0612	0.00283
	(0.0463)	-0.0542
Father Agriculture	-0.0482	0.00810
	(0.0340)	(0.0400)
Time-Use: Firewood And Water	-0.00263	-0.0138***
	(0.00403)	(0.00323)
Number of brothers (6 To 19 Years)	-0.00221	0.00733
	(0.00587)	(0.00652)
Number of sisters (6 To 19 Years)	0.00520	-0.0178**
	(0.00657)	(0.00720)
Number of children Less Than 6 Years	0.000141	-0.00163
	(0.00687)	(0.00795)
Pseudo R-squared	*0.22*	*0.22*
Log pseudolikelihood	*-1119.94*	*-914.08*
Observations	*2,410*	*1,931*

Robust standard errors in parentheses
**** p<0.01, ** p<0.05, * p<0.10*

2.6.1.3 Effects of household access to basic amenities on school enrolment: Educated parents vs uneducated parents

In many rural households, parents tend to have fewer or no years of education. If educated parents are more altruistic towards their children than uneducated parents are, then based on parental level of education, children in households that lack improved access to basic amenities will be disadvantaged. This is mainly because poor parents (uneducated) cannot afford altruism. To extend this analysis further, an examination of the effects of lack of access to basic amenities separately for children in households with an educated parent, and children in households with uneducated parents is considered. The analysis is conducted separately for rural and urban areas. Table 2.6 shows that lack of access to basic amenities impacts negatively on the schooling of both boys and girls in rural areas with the effect marginally higher for boys (column (2)). However, children that have uneducated parents are more disadvantaged, which is plausible. The stronger impact for children in households with uneducated parents indicates that the impact on schooling of poverty (which is captured by reduced access to basic amenities) is moderated by parental education. Among households with an educated parent, there is evidence of less pro-son bias as the effects of access to basic amenities have a more equal impact on both boys' and girls' enrolment.

Table 2. 6 Effects of household access to basic amenities on school enrolment: rural children

DV: 1 if currently enrolled, 0 if otherwise	(1) Boys	(2) Girls	(3) Boys	(4) Girls
	Educated parents		Uneducated parents	
Household Amenities: Average	-0.055**	-0.079***	-0.158***	-0.186***
	(0.0227)	(0.0249)	(0.0383)	(0.0358)
Household Amenities: Poor	-0.0714**	-0.0651**	-0.218***	-0.232***
	(0.0294)	(0.0316)	(0.0415)	(0.0400)
Number of Brothers (6 To 19 Years)	0.0142	0.00764	-0.00288	-0.00497
	(0.00907)	(0.00871)	(0.00668)	(0.00746)
Number of Sisters (6 To 19 Years)	-0.00699	-0.00699	0.00138	-0.0161*
	(0.0102)	(0.0125)	(0.00763)	(0.00844)
Number of Children Less Than 6 Years	0.00480	-0.0256	0.00757	0.00617
	(0.0133)	(0.0156)	(0.00782)	(0.00850)
Pseudo R-squared	*0.19*	*0.26*	*0.16*	*0.15*
Log pseudolikelihood	*-275.50*	*-206.35*	*-1192.50*	*-1000.20*
Observations	*900*	*697*	*2,141*	*1,761*
Robust standard errors in parentheses				
**** p<0.01, ** p<0.05, * p<0.10*				

Table 2.7 shows that evidence of a differential effect of poverty in households with educated parents and households with uneducated parents is less clear in urban areas. In households with an educated parent, poor access to basic amenities only reduces enrolment for girls. In contrast, in households with uneducated parents, the lack of access to basic amenities only affects the enrolment of boys (by almost the same magnitude).

Table 2. 7 Effects of household access to basic amenities on school enrolment: urban children

DV: 1 if currently enrolled, 0 if otherwise	(1) Boys	(2) Girls	(3) Boys	(4) Girls
	Educated parent		Uneducated parents	
Household Amenities: Average	-0.0388	-0.0004	-0.0321	-0.0431
	(0.0371)	(0.0365)	(0.0445)	(0.0647)
Household Amenities: Poor	0.0703	-0.147**	-0.155***	-0.110
	(0.0489)	(0.0662)	(0.0568)	(0.0674)
Number of Brothers (6 To 19 Years)	0.0149	0.0229	-0.0289	0.0361**
	(0.0138)	(0.0147)	(0.0186)	(0.0173)
Number of Sisters (6 To 19 Years)	0.0261	0.0188	0.0133	-0.0286
	(0.0167)	(0.0148)	(0.0178)	(0.0234)
Number of Children Less Than 6 Years	0.0226	-0.0179	0.0395*	-0.00656
	(0.0249)	(0.0230)	(0.0219)	(0.0220)
Pseudo R-squared	*0.27*	*0.30*	*0.25*	*0.30*
Log pseudolikelihood	*-163.82*	*-169.25*	*-113.74*	*-101.85*
Observations	*545*	*558*	*317*	*274*
Robust standard errors in parentheses				
**** p<0.01, ** p<0.05, * p<0.10*				

2.6.1.4 Other control variables

Full results of the regressions from table 2.4 can be seen in appendix A2.3. The age coefficients largely show that schooling enrolment probability declines with age especially at the post-basic education level (15 years and above) for both boys and girls in rural and urban areas. At basic education level (6 to 14 years) however, the results in most specifications show that there are positive insignificant effects of age on enrolment for boys and girls in urban areas. In rural areas, boys' enrolment increases more with age at the basic education level than girls' enrolment. At the post-

basic level, enrolment of both boys and girls in rural and urban areas is negative with a larger impact on girls. The decrease in school enrolment for girls notably after completion of basic education could be due to the high costs associated with investing in girls schooling at the secondary school level, and the need for girls to provide support in household income-generation.

The number of sisters reduces enrolment probability of girls by 1.5 percentage points in rural areas. The negative effect of having sisters on school enrolment shows that girls appear to be rivals in investment of household resources from parents. This is interesting, as one would expect the schooling of girls to be affected by the presence of boys of school-going age. An implication of the negative effect of having sisters could suggest that, rural parents may be forced to educate only one girl (possibly because of credit constraints), in which case girls of high ability, and more preferred by parents receive a greater investment in education. There is also a positive effect of number of brothers of school-going age on the enrolment probability of girls.

Muslims are generally less likely to enrol in school compared with Christians in rural areas[9]. The effect is even more pronounced for boys than girls in rural areas. This goes in favour of the common but hard notion that Muslim culture is inimical to schooling. I however expected this to have a more deleterious effect on girls than boys because of the issue of early marriage in many traditional Muslim communities/societies. The fact that enrolment is lower among Muslim boys and girls seems to have more to do with disadvantages such as poverty and lower levels of parental education, as noted by Drèze and Kingdon (2001). Girls of other or no religion

[9] There is a positive correlation of 0.48 and 0.19 between being Muslim and having uneducated parents in both urban and rural areas respectively.

in particular are also less likely to enrol in school compared with Christians. This may be due to the large number of religious-based schools common in many rural areas, thereby alienating children especially girls from enrolling in school. Parents may also be less likely to enrol their children in religious-based schools for fear of their children being converted to other religions. Such issues abound partly because of the state's inability to provide non-religious schools in many of these rural areas. In urban areas however, there are no significant effects of being Muslim on children's schooling enrolment, although for children (especially girls) of other religion there is a negative effect on schooling enrolment.

Lastly, most of the regional controls show that children in the three main northern regions (Upper east, Upper west, and Northern) have less chance of school enrolment, with the effect mostly larger for girls in rural areas. This is however not surprising given that these regions are predominantly poor compared with other regions. In addition, because education levels are generally lower in these three northern regions, parents tend to place little value on enrolling their children into schools.

2.6.2 Results: Non-biological children

Table 2.8 columns (1) and (2) shows results separately for school enrolment of non-biological boys and girls in rural areas. Due to the small sample size for urban areas, the study does not estimate separate regressions for boys and girls. A pooled regression that controls for gender (column (3)) is estimated. Full results of the regressions is in the appendix.

Table 2. 8 Effects of educated parents and household access to basic amenities on school enrolment: non-biological children

DV: 1 if currently enrolled, 0 otherwise	(1) Boys	(2) Girls	(3) All
	Rural		Urban
Father Educated	0.143**	0.229***	0.151**
	(0.0694)	(0.0561)	(0.0634)
Mother Educated	0.0768	0.0170	-0.115**
	(0.0931)	(0.0825)	(0.0480)
Father Self-Employed	-0.00200	-0.0803	-0.0137
	(0.126)	(0.105)	(0.0520)
Father Agriculture	-0.147	-0.106	0.0253
	(0.0946)	(0.0822)	(0.0653)
Household Amenities: Average	-0.295***	-0.0360	-0.00448
	(0.0705)	(0.0719)	(0.0708)
Household Amenities: Poor	-0.389***	-0.246***	-0.424**
	(0.0894)	(0.0899)	(0.202)
Number of brothers (6 To 19 Years)	0.0652**	-0.0349	0.0203
	(0.0317)	(0.0312)	(0.0317)
Number of sisters (6 To 19 Years)	-0.0187	-0.0232	0.0343
	(0.0399)	(0.0295)	(0.0283)
Number of children Less Than 6 Years	0.0381	-0.0395	-0.0211
	(0.0342)	(0.0340)	(0.0715)
Girls			-0.134**
			(0.0577)
Pseudo R-squared	*0.20*	*0.29*	*0.32*
Log pseudolikelihood	*-154.81*	*-137.38*	*-128.68*
Observations	*282*	*285*	*327*

Robust standard errors in parentheses
**** p<0.01, ** p<0.05, * p<0.10*
All regression include age, region, and religion dummies

2.6.2.1 Parental effects on school enrolment

Similar to the biological children's regressions in table 2.4, the results from table 2.8 show that educated fathers are important for both boys' and girls' school

enrolment in rural households. Educated mothers have no significant effect on girls' school enrolment in rural areas. However, in urban areas the effect of an educated mother is to reduce the probability of school enrolment, contrary to biological children, where the effects of educated mothers on girls schooling enrolment are found to be positive. This interesting result is explored further below.

The result that educated mothers reduce the enrolment probability of urban non-biological children by 11.5 percentage points is interesting. Plug (2004) argues that the differences between non-biological mothers and biological mothers could be due to reasons that are unrelated to maternal schooling effects. Possibly, educated mothers spend relatively more time working than raising their children,[10] since education usually raises labour market attachment. This may mean that non-biological children are not able to benefit from the household mother's education. It is traditionally mothers and not fathers time that is the primary input in raising children, and if mothers spend more time outside the home, then children's human capital development can suffer. To explore this further, the impacts of mother's occupation and income on schooling enrolment of non-biological children are considered. Table 2.9 below shows results of the effect of mother's education, occupation, and income on schooling enrolment of urban non-biological children. Although insignificant, the results show that mother's occupation and income have negative effects on non-biological children's school enrolment.

[10] Behrman and Rosenzweig (2002) find that maternal education does not have beneficial effects on the schooling of children (male and female twins). They find also that maternal schooling leads to reduced home time for mothers. Thus, the education of mothers may not always have the desired outcome of increasing children's education.

Table 2. 9 Effects of mother's education, occupation, and income on children's school enrolment

DV: 1 if currently enrolled, 0 if otherwise	(1)	(2)	(3)
	Urban households		
Father Educated	0.122*	0.184**	1.029**
	(0.0623)	(0.0716)	(0.482)
Father Self-Employed	0.0359	0.00304	0.269
	(0.0545)	(0.0589)	(0.380)
Father Agriculture	0.134**	0.136**	0.988**
	(0.0519)	(0.0546)	(0.476)
Mother Self-Employed	-0.0367		0.415
	(0.0540)		(0.950)
Mother Agriculture	0.0555		-0.0537
	(0.0739)		(1.143)
Mother's Income		-0.00948	
		(0.0163)	
Mother's Emp X Mother's Education			-0.245
			(0.554)
Age	-0.0419***	-0.0440***	-0.289***
	(0.00781)	(0.00807)	(0.0709)
Girls	-0.129***	-0.162***	-0.981***
	(0.0448)	(0.0475)	(0.343)
	-0.00948		
	(0.0163)		
Constant			5.018**
			(2.155)
Pseudo R-squared	*0.19*	*0.22*	*0.19*
Log pseudolikelihood	*-120.25*	*-102.23*	*-119.69*
Observations	*278*	*239*	*274*

Robust standard errors in parentheses
**** p<0.01, ** p<0.05, * p<0.10*
Note: (3) is in log-odds unit

Regarding household access to resources in rural areas in table 2.8, lack of access to basic amenities (average and poor access to basic amenities relative to good access to basic amenities) hurts boys' schooling enrolment more than girls. This is in contrast to the findings from the regressions for biological children in table 2.4 where

girls' rather than boys' schooling enrolment are significantly and negatively affected by the lack of access to basic amenities. In households with poor access to basic amenities (relative to households with good access to basic amenities), non-biological boys' school enrolment chances are lower by almost 39 percentage points whereas for girls with the same level of access to basic amenities, enrolment is lower by only 25 percentage points. Even in households with average access to basic amenities, boys are less likely to enrol in school. This could be because poorer parents' belief that they will not receive financial support from these boys in the future because they remit instead to their own biological parents, invest less in their education. Although lack of access to basic amenities hurts girls' schooling enrolment, they may stay longer with non-biological parents and will therefore contribute for longer to the family, not only financially but also through household support services. In urban areas where access to basic amenities is less of a problem compared with rural areas, the results show instead that, children's schooling enrolment probability decreases when households have poor access to water and light. This reduces school enrolment probability by 42.4 percentage points. There are no significant effects of father's occupation and household composition on school enrolment among non-biological children in both urban and rural areas.

In column (3) of table 2.8, girls' enrolment chances are lower by 13.4 percentage points relative to boys'. Children are important for labour work in Ghana and non-biological female children are often used as additional household support in the absence of parents who are active in other labour market activities. Using children, and in this case girls, as additional labour, children are rewarded in the form of meals, cash (Gupta, 2000), and most importantly shelter. But Basu and Van (1998) associate

the use of children as additional labour by parents as not necessarily due to differences in parents' attitude, but mainly because of poverty.

2.6.2.2 Effects of differential access to basic amenities on school enrolment

Table 2.10 shows the effects of households' lack of access to basic amenities conditioned on parents' education level for foster children. Columns (1) and (2) show that for non-biological children in households with an educated parent, having poor access to basic amenities reduces schooling enrolment probability of boys' by almost 33 percentage points with no significant effect of this on the enrolment probability of girls. This could mean that foster parents are reluctant to educate boys because they perceive a risk of losing any future financial support to the child's biological parents. Since boys usually enter the labour market earlier compared with girls, because of the greater opportunities available including apprenticeships, and other menial jobs, they are more likely to move out of the home and start a new life. Thus, parents may be risk-averse when it comes to educating male children who are not their own-birth sons. In households where parents are uneducated, the results in table 2.10 indicate that both boys' and girls' enrolment are negatively affected with the effects of poor access to water and light having a higher impact.

Table 2. 10 Effects of household access to basic amenities on school enrolment: non-biological children

DV: 1 if currently enrolled, 0 if otherwise	(1) Boys	(2) Girls	(3) Boys	(4) Girls
	Educated parent		Uneducated parent	
Household Amenities: Average	-0.0736	0.111	-0.219**	-0.222***
	(0.0586)	(0.0675)	(0.0882)	(0.0743)
Household Amenities: Poor	-0.327***	-0.0291	-0.269**	-0.512***
	(0.0993)	(0.117)	(0.109)	(0.0917)
Number of brothers (6 To 19 Years)	0.0165	-0.00750	0.0612*	-0.00706
	(0.0340)	(0.0336)	(0.0336)	(0.0373)
Number of sisters (6 To 19 Years)	0.00677	-0.000277	0.0217	0.0448
	(0.0352)	(0.0350)	(0.0451)	(0.0316)
Number of children Less Than 6 Years	-0.107*	0.000025	0.0279	-0.0241
	(0.0573)	(0.0671)	(0.0369)	(0.0320)
Rural	0.0352	-0.131**	-0.172*	-0.0190
	(0.0567)	(0.0608)	(0.101)	(0.0900)
Pseudo R squared	0.28	0.25	0.18	0.33
Log pseudolikelihood	-87.17	-141.42	-143.46	-111.16
Observations	231	307	252	239

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10

2.7 Summary of main findings: Educated parents and lack of access to basic amenities

Table 2.11 shows a summary of the effects of the main variables on school enrolment probability analysed in this study. While some of the results are difficult to interpret, others are interesting and require further interpretation. The results largely indicate that the effects of educated parents and the lack of access to water and light

are moderated by urban and rural location, and by the relationship of the child to the household head (whether biological or non-biological).

Table 2. 11 Summary of main findings

	Biological children		Foster children	
	Rural		Rural	
	Boys	Girls	Boys	Girls
Father Educated	Positive	Positive*	Positive	Positive*
Mother Educated	Positive	-	-	-
Lack of Access to Basic Amenities	Negative	Negative*	Negative*	Negative
	Urban		Urban	
	Boys	Girls	All	
Father Educated	-	Positive*	Positive	-
Mother Educated	-	Positive	Negative	-
Lack of Access to Basic Amenities	Negative	Negative*	-	-

Note:" –"indicates no significant effect.

** indicates a larger effect*

Biological children: Effects of educated parents

What the results indicate for biological children is that rural educated parents may still have preference for boys' schooling enrolment simply because boys' compared with girls are more likely to provide future financial support to parents in old age (Li and Lavely, 2002; Hannum, 1998; Parish and Willis, 1993; Brown and Park, 2002). Therefore, rural educated parents' investment in boys' education may actually be for its long-term benefits. Urban educated parents on the other hand, are less traditional and may have access to, for instance, pensions and savings. They therefore do not expect financial support from children especially boys, in old age,

making girls education important in urban areas. Due also to labour markets disadvantages faced by females, urban parents may invest in girls' schooling as a possible way of ensuring that girls similar to boys, are able to enter into well-paid jobs and receive higher returns from their education.

Another interesting result is the effect of educated fathers on girls' schooling enrolment in rural areas. Rural educated fathers' investment in girls' education unlike sons' may be for short-term benefits. Since children's education decisions are made by fathers' because fathers have higher bargaining power compared with mothers' (Song et al., 2006), educated fathers may educate girls in order to receive a high bride-price as a return on his investment which are largely enjoyed by her in-laws. This supports the argument by Li and Tsang (2003) in rural China that parents invest in girls' education to enhance the chances of finding a wealthy suitor, because daughters generally marry out.

Non-biological children: Effects of educated parents

Rural educated fathers may have similar effects on the schooling enrolment of both non-biological boys and girls. Educating foster children may provide extra financial support for rural fathers in both the short-term (bride price) and long-term (financial support in old age from boys). In urban areas however, the effect of educated mothers are unclear, although initial attempts to identify the cause suggest a labour market effect where educated working mothers may be using non-biological children for household support activities, which in effect reduces their chances of enrolling in school.

Biological and non-biological children: Access to water and light

The results on the effects of access to light and water are in line with Greenwood et al. (2005) argument that the amount of time spent on household work decreases as households switch to the use of labour-saving technologies. In both rural and urban areas, the lack of access to light and water reduces education chances of biological and non-biological children (insignificant effect on urban non-biological children) with larger negative effects for girls. The larger effect on girls is mainly to do with the fact that girls rather than boys spend more time collecting firewood and fetching water. The results support Hannum (1998) that, the enrolment gap between boys and girls is exacerbated when households face financial constraints. This finding is also in line with Lloyd et al. (2008) and Khanam and Ross (2011).

2.8 Conclusions

This chapter has examined how educated parents and households' differential access to basic amenities affects school enrolment probability of biological and foster children in rural and urban areas in Ghana. The results indicate that the effects of biological educated mothers and fathers differs, and that these effects are moderated by urban and rural locality, and whether or not children are the natural offspring of the parents. The main effects of educated parents and access to basic amenities on school enrolment probability of biological and non-biological children are summarised in table 2.11. For example, the results show positive effects of biological educated mothers on sons' enrolment in rural areas (but not daughters'). One possible interpretation of this result is that educated mothers in rural areas maintain traditional values associated with generations of poverty and a "pro-son culture" that views sons

to be of higher economic benefits than daughters. As such, parents and especially mothers put greater emphasis on sons' education. A positive but insignificant effect of educated mothers was found for non-biological boys' schooling enrolment in rural areas.

Among urban educated parents who are likely to hold less traditional values, the effects of educated parents were equal for biological sons and daughters, and having educated parents' significantly enhanced schooling enrolment of girls. One possible explanation is that living in a more dynamic labour market, urban educated parents foresee higher returns from educating their own-birth daughters. Educated parents' knowledge of the labour market, and the associated earnings benefits from educating girls may therefore contribute to the positive impact on the schooling enrolment of girls in urban areas. Educated mothers may also have stronger bargaining power (Song et al., 2006) which means they are more able to control their fertility (Summers 1994), resulting in a smaller, better educated family. In addition, in urban areas where the standard of living is generally higher, parents may rely less on their sons in older-age for financial support. For all these reasons, educated urban parents may invest more in the education of girls by enrolling them into schools, anticipating that girls need higher educational attainment in order to earn as much as men.

For foster children, only educated fathers have a strong positive effect on both boys' and girls' enrolment. Perhaps, educated fathers simply do not differentiate between biological and foster children in relation to access to education. The relevant factor may therefore be family environment rather than by direct family genes. The results are however less clear in relation to the influence of maternal education among foster children in urban families. While in rural families there is a positive but

insignificant effect of educated mothers, in urban households, educated mothers have a negative effect on the schooling of non-biological children. The effect of having a mother in a relatively better occupation is also negatively (although insignificantly) related to the schooling of urban non-biological children. This suggests that in urban areas, mothers, but not fathers, may differentiate in significant ways between biological and foster children.

The negative effect of educated mothers on enrolment of non-biological children in urban families may arise because of an upbringing effect (Plug, 2004), often referred to as the 'Cinderella effect' (Case et al., 2000; Case et al., 2001), such that non-biological parents, here educated mothers, favour their own children in line with standard arguments on altruism. This could result in foster children having to perform some of the household chores if educated mothers are working. There is also the issue of heterogeneity with respect to the age foster children joined their non-biological parents (Plug, 2004), and this may be a factor. It is possible that children that moved to non-biological families late, for instance, after the start of their basic education are likely to receive fewer maternal benefits if mother's education is more influential at the pre-school stage.

The results in relation to the wealth indicators confirm that poor access to water and light (which is much more likely in rural areas) strongly reduces both biological boys' and girls' enrolment chances, although the effects are generally stronger for biological girls. This is consistent with priori expectations; that poor access to light and water reduce the time children may have for educational activities, in part because they may be required to spend time fetching water and collecting firewood. The figures also indicate that biological girls tend to spend more of their time in collecting

firewood and fetching water, particularly in rural areas. Among non-biological children the effects are generally stronger for boys in rural households.

One policy implication following from these results is that the availability of flexible work schedules, particularly for educated working mothers in professional jobs could help to increase the schooling participation of non-biological children. Currently in Ghana, there are limited opportunities for part-time professional work, which means that for educated women who want to work may need more help from their children in order to manage their homes. However, an increase in household labour by children is likely to lead to lower rates of schooling enrolment.

For households facing financial constraints, intervention policies such as cash transfer programmes could also be implemented with appropriate monitoring and evaluation. This has been shown to be effective in Mexico, in the case of PROGRESA (Levy, 2007). Improving the lives of the poor through initial provision of financial resources could potentially lead to increased school attendance and reduced time spent on non-educational activities. In addition, to address parents possible reliance on children for support in old-age which potentially influences their decision to favour the schooling of sons, particularly in rural areas, pension reforms such as a non-voluntary pensions systems can be introduced so that the poorest could have access to financial support. In South Africa and Brazil, non-voluntary pensions have been found to have significant impact on poverty reduction (HelpAge International, 2003).

References

Adam, L. (1947). "Virilocal and uxorilocal" *American Anthropologist,* 49**,** 678-678.

Alderman, H., Behrman, J. R., Ross, D. R. & Sabot, R. (1996). "The Returns to Endogenous Human Capital in Pakistan's Rural Wage Labour Market". *Oxford Bulletin of Economics and Statistics,* 58**,** 29-55.

Alderman, H. & King, E. M. (1998). "Gender differences in parental investment in education". *Structural Change and Economic Dynamics,* 9**,** 453-468.

Amin, S., Quayes, S. & Rives, J. M. (2006). "Market work and household work as deterrents to schooling in Bangladesh". *World Development,* 34**,** 1271-1286.

Basu, K. & Van, P. H. (1998). "The economics of child labor". *American economic review***,** 412-427.

Becker, G. S. (1991). A Treatise on the Family, enl. ed. *Cambridge, Mass: Harvard*.

Becker, G. S. & Tomes, N. (1976). "Child Endowments and the Quantity and Quality of Children". *Journal of Political Economy,* 84**,** S143-S162.

Becker, G. S. & Tomes, N. (1986). "Human Capital and the Rise and Fall of Families". *Journal of Labor Economics,* 4**,** S1-S39.

Behrman, J. R. & Rosenzweig, M. R. (2002). "Does Increasing Women's Schooling Raise the Schooling of the Next Generation?" *The American Economic Review,* 92**,** 323-334.

Behrman, J. R., Rosenzweig, M. R. & Taubman, P. (1994). "Endowments and the Allocation of Schooling in the Family and in the Marriage Market: The Twins Experiment". *Journal of Political Economy,* 102**,** 1131-1174.

Björklund, A., Lindahl, M. & Plug, E. (2006). "The Origins of Intergenerational Associations: Lessons from Swedish Adoption Data". *The Quarterly Journal of Economics,* 121**,** 999-1028.

Blake, J. (1981). "Family size and the quality of children". *Demography,* 18**,** 421-442.

Brown, P. H. & Park, A. (2002). "Education and poverty in rural China". *Economics of Education Review,* 21**,** 523-541.

Buchmann, C. (2000). "Family Structure, Parental Perceptions, and Child Labor in Kenya: What Factors Determine Who is Enrolled in School?" *Social Forces,* 78**,** 1349-1378.

Buchmann, C. & Hannum, E. (2001). "Education and Stratification in Developing Countries: A Review of Theories and Research". *Annual Review of Sociology,* 27**,** 77.

Carter, R. S. & Wojtkiewicz, R. A. (2000). "Parental involvement with adolescents' education: Do daughters or sons get more help?" *Adolescence,* 35**,** 29.

Case, A., Lin, I.-F. & Mclanahan, S. (2001). "Educational attainment of siblings in stepfamilies". *Evolution and human behavior,* 22**,** 269-289.

Case, A., Lin, I. F. & Mclanahan, S. (2000). "How Hungry Is the Selfish Gene?" *The Economic Journal,* 110**,** 781-804.

Connelly, R. & Zheng, Z. (2003). "Determinants of school enrollment and completion of 10 to 18 year olds in China". *Economics of Education Review,* 22**,** 379-388.

Cornwell, K., Inder, B., Maitra, P. and Rammohan, A., (2005). "Household Composition and Schooling of Rural South African Children: Sibling Synergy and Migrant Effects". 22(05). Monash University, Department of Economics.

Drakopoulos, S. A., Lakioti, E. & Theodossiou, I. (2011). "Childhood socioeconomic deprivation and later adulthood health". *International Journal of Social Economics,* 38**,** 23-38.

Drèze, J. & Kingdon, G. G. (2001). "School Participation in Rural India". *Review of Development Economics,* 5**,** 1-24.

Ermisch, J. & Francesconi, M. (2000). "The effect of parents' employment on children's educational attainment". IZA Discussion paper series.

Garg, A. & Morduch, J. (1998). "Sibling rivalry and the gender gap: Evidence from child health outcomes in Ghana". *Journal of Population Economics,* 11**,** 471-493.

Gertler, P. & Glewwe, P. (1992). "The Willingness to Pay for Education for Daughters in Contrast to Sons: Evidence from Rural Peru". *The World Bank Economic Review,* 6**,** 171-188.

Glick, P. & Sahn, D. E. (2000). "Schooling of girls and boys in a West African country: the effects of parental education, income, and household structure". *Economics of Education Review,* 19**,** 63-87.

Greenhalgh, S. (1985). "Sexual Stratification: The Other Side of "Growth with Equity" in East Asia". *Population and Development Review,* 11**,** 265-314.

Greenwood, J., Seshadri, A. & Yorukoglu, M. (2005). "Engines of Liberation". *The Review of Economic Studies,* 72**,** 109-133.

Gupta, M. R. (2000). "Wage Determination of a Child Worker: A Theoretical Analysis". *Review of Development Economics,* 4**,** 219-228.

Hannum, E., Kong, P. & Zhang, Y. (2009). "Family sources of educational gender inequality in rural China: A critical assessment". *International Journal of Educational Development,* 29**,** 474-486.

Hannum, E. (1998). "Educational inequality: Hidden consequences of the reform era in rural China". Ph.D. Dissertation, Department of Sociology, University of Michigan.

HelpAge International and IDPM. (2003). "Non-Contributory Pensions and Poverty Prevention: A Comparative Study of Brazil and South Africa", HelpAge International and Institute of Development Policy Management (IDPM), London and Manchester

Jæger, M. M. (2009). "Sibship size and educational attainment. A joint test of the Confluence Model and the Resource Dilution Hypothesis". *Research in Social Stratification and Mobility,* 27**,** 1-12.

Khanam, R. & Ross, R. (2011). "Is child work a deterrent to school attendance and school attainment? Evidence from Bangladesh". *International Journal of Social Economics,* 38**,** 692-713.

Kingdon, G. G. & Söderbom, M. (2008). "*Education, skills, and labor market outcomes: Evidence from Ghana"*, World Bank.

Levine, D. & Kevane, M. (2003). "Are Investments in Daughters Lower when Daughters Move Away? Evidence from Indonesia". *World Development,* 31**,** 1065-1084.

Levison, D. & Moe, K. S. (1998). "Household Work as a Deterrent to Schooling: An Analysis of Adolescent Girls in Peru". *The Journal of Developing Areas,* 32**,** 339-356.

Levy, S. (2007). "Progress against poverty: sustaining Mexico's Progresa-Oportunidades program", Brookings Institution Press.

Levy, S., & Rodriquez, E. (2004). "Economic Crisis, Political Transitions, and Poverty Policy Reform: Mexico's Progresa-Oportunidades Program". Policy dialogue series. Washington, DC: Inter-American Development Bank.

Li, D. & Tsang, M.C, (2003), "Household education decisions and implications for gender inequality in education in rural China", China: An International Journal, 2003, 1(2): 224-248.

Li, J. & Lavely, W. (2003). "Village Context, Women's Status, and Son Preference Among Rural Chinese Women". *Rural Sociology,* 68**,** 87-106.

Lillard, L. A. & Willis, R. J. (1994). "Intergenerational Educational Mobility: Effects of Family and State in Malaysia". *The Journal of Human Resources,* 29**,** 1126-1166.

Lillard, L. A., & Willis, R. J. (1997). Motives for interqenerational transfers: Evidence from Malaysia. *Demography*, *34*(1), 115-134.

Lloyd, C. B., Grant, M. & Ritchie, A. (2008). "Gender Differences in Time Use Among Adolescents in Developing Countries: Implications of Rising School Enrollment Rates". *Journal of Research on Adolescence,* 18**,** 99-120.

Lu, Y. (2009). "Sibship size and education in South Africa: Black–White variations". *Research in Social Stratification and Mobility,* 27**,** 110-125.

Lu, Y. & Treiman, D. J. (2008). "The Effect of Sibship Size on Educational Attainment in China: Period Variations". *American Sociological Review,* 73**,** 813-834.

Mahmud, S. & Amin, S. (2006). "Girls' Schooling and Marriage in Rural Bangladesh. *In:* Emily Hannum, B. F. (ed.) *Children's Lives and Schooling across Societies".* Emerald Group Publishing Limited.

Maimaiti, Y. & Siebert, W. S. (2009). "The Gender Education Gap in China: The Power of Water". Institute for the Study of Labour (IZA), Discussion Paper, 4108.

May, J., (1983). "Zimbabwean women in colonial and customary law". Gweru: Mambo Press.

Michelson, E., & Parish, W., (2000). "Gender differentials in economic success: rural China in 1991. In: Entwisle, B., Henderson, G. (Eds.), Re-Drawing Boundaries: Work, Households, and Gender in China". University of California Press, Berkeley.

Miller, G. (2008). "Women's suffrage, political responsiveness, and child survival in American history". *The Quarterly Journal of Economics,* 123**,** 1287.

Parish, W. L. & Willis, R. J. (1993). "Daughters, Education, and Family Budgets Taiwan Experiences". *The Journal of Human Resources,* 28**,** 863-898.

Plug, E. (2004). "Estimating the Effect of Mother's Schooling on Children's Schooling Using a Sample of Adoptees". *The American Economic Review,* 94**,** 358-368.

Plug, E. & Vijverberg, W. (2003). "Schooling, Family Background, and Adoption: Is It Nature or Is It Nurture?" *Journal of Political Economy,* 111**,** 611-641.

Plug, E. & Vijverberg, W. (2005). "Does Family Income Matter for Schooling Outcomes? Using Adoptees as a Natural Experiment". *The Economic Journal,* 115**,** 879-906.

Powell, B. & Steelman, L. C. (1995). "Feeling the Pinch: Child Spacing and Constraints on Parental Economic Investments in Children". *Social Forces,* 73**,** 1465-1486.

Qian, N. (2008). "Missing Women and the Price of Tea in China: The Effect of Sex-Specific Earnings on Sex Imbalance". *The Quarterly Journal of Economics,* 123**,** 1251-1285.

Rosenzweig, M. R. & Evenson, R. (1977). "Fertility, Schooling, and the Economic Contribution of Children of Rural India: An Econometric Analysis". *Econometrica,* 45**,** 1065-1079.

Sacerdote, B. (2002). "The Nature and Nurture of Economic Outcomes". *The American Economic Review,* 92**,** 344-348.

Schildberg-Hoerisch, H. (2011). "Does parental employment affect children's educational attainment?" *Economics of Education Review,* 30**,** 1456-1467.

Shapiro, D. & Oleko Tambashe, B. (2001). "Gender, poverty, family structure, and investments in children's education in Kinshasa, Congo". *Economics of Education Review,* 20**,** 359-375.

Siaens, C., Subbarao, K. & Wodon, Q. (2006). "Assessing the Welfare of Orphans in Rwanda: Poverty, Work, Schooling, and Health. In: Blackden, M. and Wodon, Q. (Eds), Gender, Time Use, and Poverty in sub-Saharan Africa". World Bank Working Paper, pp. 135-152.

Song, L., Appleton, S. & Knight, J. (2006). "Why Do Girls in Rural China Have Lower School Enrollment?" *World Development,* 34**,** 1639-1653.

Summers, L. H.. (1994). "Investing in all people: educating women in developing countries". EDI seminar paper no. 45. World Bank Institute (WBI). Washington, D.C.: The World Bank. http://documents.worldbank.org/curated/en/1994/04/698458/investing-all-people-educating-women-developing-countries

Steelman, L. C., Powell, B., Werum, R. & Carter, S. (2002). "Reconsidering the Effects of Sibling Configuration: Recent Advances and Challenges". *Annual Review of Sociology,* 28**,** 243-269.

Tansel, A. (2002). "Determinants of school attainment of boys and girls in Turkey: individual, household and community factors". *Economics of Education Review,* 21**,** 455-470.

UNDP/WHO. 2(009). "The Energy Access Situation in Developing Countries. A Review Focusing on the Least Developed Countries and Sub-Saharan Africa". Available from: http://www.undp.org/energy

Yueh, L. (2006). "Parental investment in children's human capital in urban China". *Applied Economics,* 38**,** 2089-2111.

Zhao, M. & Glewwe, P. (2010). "What determines basic school attainment in developing countries? Evidence from rural China". *Economics of Education Review,* 29**,** 451-460.

Appendix

Table A2.1: Summary statistics of variables

	Biological children		Non-biological children	
	Urban	Rural	Urban	Rural
Variable	Mean		Mean	
Currently enrolled	0.87	0.69	0.73	0.60
Father educated	0.69	0.27	0.74	0.33
Mother educated	0.41	0.09	0.53	0.13
Father: Professional	0.52	0.09	0.49	0.13
Father: self-employment	0.27	0.06	0.27	0.12
Father: Agriculture occupation	0.21	0.85	0.24	0.75
Household amenities: Good	0.65	0.16	0.71	0.18
Household amenities: Average	0.25	0.61	0.25	0.59
Household amenities: Poor	0.10	0.23	0.05	0.24
Christian	0.71	0.56	0.75	0.61
Muslim	0.23	0.21	0.20	0.23
Other religion	0.05	0.24	0.05	0.16
Age (in years)	12.08	11.46	13.50	12.55
Western region	0.10	0.08	0.11	0.12
Central region	0.06	0.06	0.08	0.03
Greater Accra region	0.27	0.02	0.26	0.03
Volta region	0.05	0.09	0.05	0.07
Eastern region	0.08	0.08	0.08	0.10
Ashanti region	0.20	0.14	0.17	0.12
Brong Ahafo region	0.09	0.08	0.09	0.09
Northern region	0.09	0.18	0.07	0.12
Upper east region	0.03	0.14	0.04	0.07
Upper west region	0.02	0.14	0.05	0.25
Number of brothers (6 to 19 years)	1.56	2.05	0.79	1.16
Number of sisters (6 to 19 years)	1.45	1.69	1.15	1.09
Number of children (less than 6 years)	0.68	1.15	0.10	0.30

Table A2.2 Composition of non-biological children

Relationship to Household Head	All		Boys		Girls	
	N	%	N	%	N	%
Other relative	762	70.95	360	71.57	402	70.4
Adopted	230	21.42	121	24.06	109	19.09
House help	30	2.79	4	0.8	26	4.55
Non-relative	52	4.84	18	3.58	34	5.95

Table A2.3. Determinants of school enrolment for biological children

DV: 1 if currently enrolled, 0 if otherwise	(1) Boys	(2) Girls	(3) Boys	(4) Girls
	Urban		Rural	
Father Educated	0.0150	0.0648***	0.0515**	0.124***
	(0.0254)	(0.0233)	(0.0220)	(0.0224)
Mother Educated	0.0210	0.0485**	0.0882**	0.0320
	(0.0224)	(0.0224)	(0.0372)	(0.0374)
Father Self-Employed	0.0191	-0.0427*	-0.0675	0.0361
	(0.0233)	(0.0249)	(0.0487)	(0.0558)
Father Agriculture	-0.0704**	-0.146***	-0.0320	0.0394
	(0.0314)	(0.0341)	(0.0354)	(0.0428)
Christian	0.000680	-0.00258	0.00838	0.0452**
	(0.0305)	(0.0280)	(0.0198)	(0.0219)
Muslim	-0.0853**	-0.0953*	-0.149***	-0.177***
	(0.0415)	(0.0500)	(0.0218)	(0.0244)
Household Amenities: Average	-0.0178	0.0135	-0.0844***	-0.144***
	(0.0244)	(0.0266)	(0.0258)	(0.0255)
Household Amenities: Poor	-0.0801*	-0.0858**	-0.133***	-0.180***
	(0.0434)	(0.0389)	(0.0283)	(0.0289)
7 Years	-0.0222	-0.0339	0.0793**	0.0663*
	(0.0419)	(0.0260)	(0.0369)	(0.0341)
8 Years	0.0161	0.0174	0.128***	0.0897***
	(0.0365)	(0.0190)	(0.0355)	(0.0347)
9 Years	0.0326	0.000345	0.118***	0.0556
	(0.0345)	(0.0210)	(0.0355)	(0.0369)
10 Years	0.0191	0.0000002	0.150***	0.115***
	(0.0347)	(0.0241)	(0.0347)	(0.0337)
11 Years	0.0463		0.161***	0.102***
	(0.0298)		(0.0358)	(0.0366)

12 Years	0.0438	-0.0240	0.123***	0.0649*
	(0.0319)	(0.0281)	(0.0350)	(0.0368)
13 Years	0.0357	-0.0461	0.143***	0.108***
	(0.0334)	(0.0302)	(0.0368)	(0.0378)
14 Years	-0.0221	-0.113**	0.0661*	0.0339
	(0.0409)	(0.0548)	(0.0388)	(0.0402)
15 Years	-0.0585	-0.168***	0.0732*	-0.0435
	(0.0465)	(0.0543)	(0.0390)	(0.0450)
16 Years	-0.0722	-0.216***	-0.0419	-0.105**
	(0.0519)	(0.0527)	(0.0443)	(0.0448)
17 Years	-0.229***	-0.241***	-0.0559	-0.118*
	(0.0684)	(0.0636)	(0.0503)	(0.0610)
18 Years	-0.279***	-0.449***	-0.197***	-0.227***
	(0.0654)	(0.0685)	(0.0478)	(0.0555)
19 Years	-0.437***	-0.686***	-0.215***	-0.318***
	(0.0812)	(0.0559)	(0.0578)	(0.0686)
Central Region	-0.0156	-0.0617	0.0280	0.0345
	(0.0571)	(0.0535)	(0.0347)	(0.0372)
Greater Accra	-0.0472	-0.0765*	0.0106	-0.0308
	(0.0337)	(0.0412)	(0.0550)	(0.0817)
Volta Region	-0.000589	-0.0687	-0.0707**	-0.0931***
	(0.0489)	(0.0476)	(0.0350)	(0.0356)
Eastern Region	0.0401	0.0127	-0.0415	-0.0290
	(0.0401)	(0.0354)	(0.0358)	(0.0390)
Ashanti Region	0.00227	-0.0476	-0.0152	-0.0269
	(0.0330)	(0.0371)	(0.0309)	(0.0349)
Brong Ahafo	-0.0118	0.0129	-0.0392	-0.0951**
	(0.0394)	(0.0358)	(0.0343)	(0.0393)
Northern Region	-0.00332	-0.0724	-0.312***	-0.318***
	(0.0484)	(0.0482)	(0.0346)	(0.0367)
Upper East Region	-0.00612	-0.00906	-0.217***	-0.183***
	(0.0522)	(0.0504)	(0.0376)	(0.0392)
Upper West Region	-0.0177	-0.00513	-0.283***	-0.165***
	(0.0939)	(0.0655)	(0.0390)	(0.0403)
Number of Brothers (6 To 19 Years)	-0.00929	0.0214**	0.00134	0.00581
	(0.00833)	(0.00989)	(0.00545)	(0.00605)
Number of Sisters (6 To 19 Years)	0.00999	0.00867	0.00447	-0.0152**
	(0.00963)	(0.0105)	(0.00623)	(0.00685)
Number of Children (Less Than 6 Years)	0.0224*	-0.0137	0.00376	0.000291
	(0.0131)	(0.0125)	(0.00660)	(0.00726)
Pseudo R-squared	*0.27*	*0.33*	*0.21*	*0.21*

Log pseudolikelihood	*-256.18*	*-240.78*	*-1299.54*	*-1084.07*
Observations	*965*	*888*	*2,725*	*2,249*
Robust standard errors in parentheses				
**** p<0.01, ** p<0.05, * p<0.10*				

Table A2.4: Comparing effects of educated fathers, educated mothers, and household access to amenities (based on logit regressions)

	Rural		Urban	
Variable	Difference in coefficients	P-value	Difference in coefficients	P-value
Father educated	-0.48	0.02	-0.57	0.17
Mother educated	0.40	0.28	-0.34	0.42
Household amenities: Average	0.44	0.12	-0.41	0.39
Household amenities: Poor	0.36	0.23	0.01	0.98

Table A2.5. Effects of poverty on enrolment based on parents' education level: Rural and urban biological children

DV: 1 if currently enrolled, 0 if otherwise	(1) Boys	(2) Girls	(3) Boys	(4) Girls	(5) Boys	(6) Girls	(7) Boys	(8) Girls
	Rural				Urban			
	Educated Parent		Uneducated parents		Educated Parent		Uneducated parents	
Christian	0.0149	0.0592*	-0.00260	0.0289	-0.0479	0.0779**	0.0284	-0.0668
	(0.0345)	(0.0338)	(0.0246)	(0.0276)	(0.0534)	(0.0392)	(0.0591)	(0.0547)
Muslim	-0.0536	-0.135**	-0.187***	-0.196***	-0.0708	0.0520	-0.116	-0.326***
	(0.0416)	(0.0533)	(0.0245)	(0.0268)	(0.0644)	(0.0501)	(0.0928)	(0.119)
Household Amenities: Average	-0.0555**	-0.0799***	-0.158***	-0.186***	-0.0388	-0.000423	-0.0321	-0.0431
	(0.0227)	(0.0249)	(0.0383)	(0.0358)	(0.0371)	(0.0365)	(0.0445)	(0.0647)
Household Amenities: Poor	-0.0714**	-0.0651**	-0.218***	-0.232***	0.0703	-0.147**	-0.155***	-0.110
	(0.0294)	(0.0316)	(0.0415)	(0.0400)	(0.0489)	(0.0662)	(0.0568)	(0.0674)
7 Years	0.122**	0.0928***	0.0968**	0.0635	-0.0162	0.0132	-0.0169	-0.0418
	(0.0500)	(0.0338)	(0.0456)	(0.0434)	(0.0305)	(0.0234)	(0.117)	(0.0767)
8 Years	0.164***	0.0465	0.113**	0.0813*			0.0913	0.0583
	(0.0474)	(0.0402)	(0.0449)	(0.0453)			(0.0971)	(0.0759)
9 Years	0.182***	0.0523	0.105**	0.0776*	0.000395		0.0933	0.0537
	(0.0461)	(0.0399)	(0.0438)	(0.0466)	(0.0240)		(0.0981)	(0.0702)
10 Years	0.206***	0.0895**	0.152***	0.134***			0.0821	0.0267
	(0.0436)	(0.0366)	(0.0437)	(0.0429)			(0.0975)	(0.0872)
11 Years	0.163***	0.0601	0.163***	0.132***			0.148*	-0.0102
	(0.0491)	(0.0400)	(0.0455)	(0.0478)			(0.0866)	(0.144)
12 Years	0.190***		0.0976**	0.0348		0.00967	0.134	0.00967

	(0.0450)		(0.0437)	(0.0471)		(0.0256)	(0.101)	(0.0256)
13 Years	0.167***	0.0186	0.177***	0.142***	0.00356	0.0131	0.0921	-0.119
	(0.0503)	(0.0494)	(0.0450)	(0.0483)	(0.0228)	(0.0232)	(0.113)	(0.102)
14 Years	0.104*	0.0610	0.0744	0.00867	-0.0697	-0.0712	0.112	-0.0357
	(0.0569)	(0.0451)	(0.0483)	(0.0529)	(0.0434)	(0.0479)	(0.0947)	(0.113)
15 Years	0.113**	-0.0824	0.0708	-0.0312	-0.0846**	-0.159***	0.0633	-0.171
	(0.0554)	(0.0701)	(0.0473)	(0.0523)	(0.0409)	(0.0550)	(0.122)	(0.109)
16 Years	-0.0572	-0.174**	-0.0218	-0.0953*	-0.136**	-0.178***	-0.000391	-0.313***
	(0.0705)	(0.0823)	(0.0512)	(0.0521)	(0.0614)	(0.0559)	(0.122)	(0.117)
17 Years	-0.0627	-0.305***	-0.00964	0.00508	-0.251***	-0.251***	-0.00819	-0.181
	(0.0790)	(0.0813)	(0.0590)	(0.0674)	(0.0645)	(0.0697)	(0.135)	(0.122)
18 Years	-0.110	-0.329***	-0.182***	-0.247***	-0.378***	-0.357***	-0.139	-0.571***
	(0.0916)	(0.0833)	(0.0531)	(0.0619)	(0.0699)	(0.0699)	(0.114)	(0.140)
19 Years	-0.0945	-0.507***	-0.216***	-0.112	-0.547***	-0.597***	-0.488***	-0.787***
	(0.101)	(0.0956)	(0.0607)	(0.0868)	(0.0862)	(0.0789)	(0.140)	(0.111)
Central Region	0.0441	0.0695	-0.0230	-0.0302	-0.102	-0.0279		0.0245
	(0.0321)	(0.0461)	(0.0567)	(0.0534)	(0.0809)	(0.0649)		(0.0593)
Greater Accra	0.0571	-0.0178	-0.0181	-0.00859	-0.0540	0.0107	-0.106	-0.104
	(0.0427)	(0.0780)	(0.0801)	(0.109)	(0.0432)	(0.0469)	(0.0973)	(0.0951)
Volta Region	-0.0305	0.0359	-0.104**	-0.211***	-0.124	0.0783	0.0679	-0.245***
	(0.0383)	(0.0474)	(0.0506)	(0.0488)	(0.0849)	(0.0641)	(0.107)	(0.0943)
Eastern Region	-0.102**	0.0216	-0.0153	-0.0923*	-0.0478	0.0313	0.149**	-0.0272
	(0.0413)	(0.0451)	(0.0524)	(0.0556)	(0.0617)	(0.0558)	(0.0727)	(0.0685)
Ashanti Region	-0.0170	0.0453	-0.0275	-0.108**	-0.0306	-0.0155	0.122*	-0.101
	(0.0332)	(0.0421)	(0.0462)	(0.0492)	(0.0445)	(0.0537)	(0.0710)	(0.0768)
Brong Ahafo	0.00300	-0.0380	-0.108**	-0.131**	-0.00941	0.112**	-0.0278	-0.138*
	(0.0384)	(0.0483)	(0.0508)	(0.0518)	(0.0518)	(0.0488)	(0.0806)	(0.0730)
Northern Region	-0.159*	0.0554	-0.356***	-0.410***		0.0839	-0.0543	-0.269***

	(0.0860)	(0.0699)	(0.0447)	(0.0434)		(0.0726)	(0.0922)	(0.0872)
Upper East Region	-0.138*	0.0454	-0.309***	-0.324***	-0.0675	-0.0881	0.0229	-0.0705
	(0.0806)	(0.0772)	(0.0470)	(0.0454)	(0.108)	(0.144)	(0.0945)	(0.106)
Upper West Region	-0.136*	-0.0726	-0.309***	-0.249***		-0.0967	-0.0180	0.000496
	(0.0758)	(0.0881)	(0.0471)	(0.0463)		(0.144)	(0.141)	(0.0700)
Number of Brothers (6 To 19 Years)	0.0142	0.00764	-0.00288	-0.00497	0.0149	0.0229	-0.0289	0.0361**
	(0.00907)	(0.00871)	(0.00668)	(0.00746)	(0.0138)	(0.0147)	(0.0186)	(0.0173)
Number of Sisters (6 To 19 Years)	-0.00699	-0.00699	0.00138	-0.0161*	0.0261	0.0188	0.0133	-0.0286
	(0.0102)	(0.0125)	(0.00763)	(0.00844)	(0.0167)	(0.0148)	(0.0178)	(0.0234)
Number of Children Less Than 6 Years	0.00480	-0.0256	0.00757	0.00617	0.0226	-0.0179	0.0395*	-0.00656
	(0.0133)	(0.0156)	(0.00782)	(0.00850)	(0.0249)	(0.0230)	(0.0219)	(0.0220)
Pseudo R-squared	*0.19*	*0.26*	*0.16*	*0.15*	*0.27*	*0.30*	*0.25*	*0.30*
Log pseudolikelihood	*-275.50*	*-206.35*	*-1192.50*	*-1000.20*	*-163.82*	*-169.25*	*-113.74*	*-169.25*
Observations	*900*	*697*	*2,141*	*1,761*	*545*	*558*	*317*	*558*

Robust standard errors in parentheses
**** p<0.01, ** p<0.05, * p<0.10*

Table A2.6. Determinants of school enrolment: Non-biological children

DV: 1 If currently enrolled, 0 if otherwise	(1) Rural Boys	(2) Rural Girls	(3) Urban All
Father Educated	0.143**	0.229***	0.151**
	(0.0694)	(0.0561)	(0.0634)
Mother Educated	0.0768	0.0170	-0.115**
	(0.0931)	(0.0825)	(0.0480)
Father Self-Employed	-0.00200	-0.0803	-0.0137
	(0.126)	(0.105)	(0.0520)
Father Agriculture	-0.147	-0.106	0.0253
	(0.0946)	(0.0822)	(0.0653)
Christian	0.116*	0.0855	-0.0993
	(0.0659)	(0.0652)	(0.0754)
Muslim	0.0385	-0.0523	0.0185
	(0.0793)	(0.0859)	(0.0781)
Household Amenities: Average	-0.295***	-0.0360	-0.00448
	(0.0705)	(0.0719)	(0.0708)
Household Amenities: Poor	-0.389***	-0.246***	-0.424**
	(0.0894)	(0.0899)	(0.202)
7 Years	0.205	0.101	-0.0302
	(0.154)	(0.134)	(0.0987)
8 Years	0.0465	0.212*	-0.133
	(0.138)	(0.123)	(0.127)
9 Years	0.178	0.298**	-0.172
	(0.147)	(0.140)	(0.160)
10 Years	0.205*	0.227*	
	(0.123)	(0.127)	
11 Years	0.353**	0.136	0.0228
	(0.142)	(0.131)	(0.0840)
12 Years	-0.00346	0.342***	-0.0571
	(0.139)	(0.118)	(0.0964)
13 Years	0.137	0.265**	-0.0793
	(0.146)	(0.124)	(0.0935)
14 Years	-0.0129	0.252*	-0.202**
	(0.126)	(0.136)	(0.102)
15 Years	0.249**	0.162	-0.237**
	(0.118)	(0.123)	(0.0934)
16 Years	0.0210	-0.0647	-0.0733
	(0.148)	(0.128)	(0.0901)
17 Years	-0.0646	-0.378***	-0.207**
	(0.132)	(0.126)	(0.104)
18 Years	-0.120	-0.0656	-0.630***

	(0.135)	(0.160)	(0.113)
19 Years	-0.279*	-0.353***	-0.451***
	(0.158)	(0.116)	(0.123)
Central Region			-0.0136
			(0.0766)
Greater Accra		0.228	-0.265***
		(0.161)	(0.0781)
Volta Region	0.168	0.293**	0.0292
	(0.111)	(0.127)	(0.0853)
Eastern Region	0.108	0.407***	-0.0415
	(0.102)	(0.116)	(0.123)
Ashanti Region	0.00705	0.0681	-0.210***
	(0.0930)	(0.0937)	(0.0793)
Brong Ahafo	-0.121	0.116	-0.0299
	(0.123)	(0.107)	(0.0930)
Northern Region	-0.275**	0.0773	-0.362**
	(0.114)	(0.105)	(0.145)
Upper East Region	-0.0615	0.488***	-0.199
	(0.159)	(0.0922)	(0.134)
Upper West Region	-0.118	0.237**	0.0362
	(0.102)	(0.0985)	(0.0896)
Number of Brothers (6 To 19 Years)	0.0652**	-0.0349	0.0203
	(0.0317)	(0.0312)	(0.0317)
Number of Sisters (6 To 19 Years)	-0.0187	-0.0232	0.0343
	(0.0399)	(0.0295)	(0.0283)
Number of Children Less Than 6 Years	0.0381	-0.0395	-0.0211
	(0.0342)	(0.0340)	(0.0715)
Girls			-0.134**
			(0.0577)
Pseudo R-squared	0.29	0.20	0.32
Log pseudolikelihood	-137.38	-154.81	-128.68
Observations	282	285	327

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10

Table A2.7: Comparing effects of educated fathers, educated mothers, and household access to amenities (based on logit regressions)

	Rural	
Variable	Difference in coefficients	P-value
Father educated	-0.71	0.20
Household amenities: Average	-1.57	0.03
Household amenities: Poor	-0.82	0.33

Table A2.8 Determinants of school enrolment: Non-biological children

DV: 1 if currently enrolled, 0 if otherwise	(1) Boys	(2) Girls	(3) Boys	(4) Girls
	Educated parent		Uneducated parent	
Christian	-0.0714	-0.0783	0.0700	0.0335
	(0.0988)	(0.0938)	(0.0674)	(0.0643)
Muslim	-0.0509	-0.169	-0.00492	-0.0961
	(0.0867)	(0.150)	(0.0824)	(0.0746)
Household Amenities: Average	-0.0736	0.111	-0.219**	-0.222***
	(0.0586)	(0.0675)	(0.0882)	(0.0743)
Household Amenities: Poor	-0.327***	-0.0291	-0.269**	-0.512***
	(0.0993)	(0.117)	(0.109)	(0.0917)
7 Years			0.182	0.137
			(0.178)	(0.153)
8 Years	-0.176	-0.00898	0.130	0.323**
	(0.133)	(0.173)	(0.156)	(0.138)
9 Years	0.00250	0.0471	0.240	0.139
	(0.0586)	(0.199)	(0.159)	(0.164)
10 Years	-0.0179	0.246*	0.166	0.218
	(0.0571)	(0.130)	(0.153)	(0.146)
11 Years		0.111	0.298*	0.250
		(0.141)	(0.163)	(0.156)
12 Years	-0.0822	0.210	-0.0603	0.398***
	(0.0772)	(0.134)	(0.171)	(0.142)
13 Years	0.0274	0.225	0.0555	0.151
	(0.0538)	(0.137)	(0.168)	(0.168)
14 Years	-0.167**	0.0891	-0.0652	0.0150

	(0.0841)	(0.147)	(0.174)	(0.181)
15 Years	-0.0114	-0.101	0.188	0.0413
	(0.0686)	(0.142)	(0.148)	(0.159)
16 Years	-0.132*	0.0125	0.0715	-0.155
	(0.0770)	(0.147)	(0.180)	(0.156)
17 Years	-0.384***	-0.255	-0.00379	-0.0532
	(0.104)	(0.166)	(0.153)	(0.163)
18 Years	-0.333***	-0.471***	-0.163	-0.0716
	(0.123)	(0.144)	(0.162)	(0.159)
19 Years	-0.701***	-0.327**	-0.365**	-0.289**
	(0.131)	(0.166)	(0.166)	(0.144)
Central Region	0.0885	0.0579		
	(0.0989)	(0.108)		
Greater Accra	0.0989	-0.204**	0.0387	
	(0.0768)	(0.0915)	(0.205)	
Volta Region	-0.0475	0.171*	0.0962	-0.0364
	(0.125)	(0.0887)	(0.156)	(0.118)
Eastern Region	0.0564	0.0630	0.0726	0.0911
	(0.0870)	(0.115)	(0.120)	(0.105)
Ashanti Region	-0.0101	-0.0714	-0.0730	-0.483***
	(0.0868)	(0.0863)	(0.121)	(0.115)
Brong Ahafo	-0.232*	0.0724	-0.0877	-0.314***
	(0.129)	(0.101)	(0.139)	(0.117)
Northern Region	-0.132	0.146	-0.293**	-0.493***
	(0.152)	(0.107)	(0.115)	(0.106)
Upper East Region	-0.0232	0.235**	-0.0758	-0.160
	(0.132)	(0.0996)	(0.130)	(0.140)
Upper West Region	-0.0593	0.157	-0.110	-0.302***
	(0.124)	(0.107)	(0.112)	(0.104)
Number of Brothers (6 To 19 Years)	0.0165	-0.00750	0.0612*	-0.00706
	(0.0340)	(0.0336)	(0.0336)	(0.0373)
Number of Sisters (6 To 19 Years)	0.00677	-0.000277	0.0217	0.0448
	(0.0352)	(0.0350)	(0.0451)	(0.0316)
Number of Children Less Than 6 Years	-0.107*	0.000025	0.0279	-0.0241
	(0.0573)	(0.0671)	(0.0369)	(0.0320)
Rural	0.0352	-0.131**	-0.172*	-0.0190
	(0.0567)	(0.0608)	(0.101)	(0.0900)
Pseudo R-squared	0.28	0.25	0.18	0.33
Log pseudolikelihood	-87.17	-141.42	-143.46	-111.16
Observations	231	307	252	239

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10

CHAPTER THREE: DIRECT AND INDIRECT EFFECTS OF FAMILY BACKGROUND ON EARNINGS

3.1 Introduction

In Ghana, family background especially parents' education is very important for child development for a number of reasons. Firstly, family background acts as an initial determinant of the child's educational attainment (my findings from chapter two shows that educated parents increase children's school enrolment probability). However, the schooling decisions made by parents for their children are determined by both their financial and human capital, as well as the endowment of the child (Checchi, 2006). Children from wealthy families face lower interest rates (Becker and Tomes, 1994), and parents are therefore able to invest more in children's education which potentially translates into economic success. Secondly, education is clearly an important determinant of later labour market success, and high earnings. Thirdly, however, given education, family background may also influence earnings via family connections (or the lack thereof). In particular, a wealthy family (educated parents) may be able to use its labour market and professional connections to help its children (Brown and Park, 2002). The fundamental aim of this chapter is to examine these linkages, that is, the links between education, family background and earnings.

In addition, the study will consider the role of gender and rural-urban location in determining earnings. Chapter 2 has shown that more educated parents (in particular fathers'), tend to favour their daughter's education in urban areas. This factor could help women overcome possible discrimination in the labour market. Therefore, this study will provide separate analyses for males and females. As regards the rural-urban distinction, it needs to be recognised that in Ghana, the rural areas are much poorer

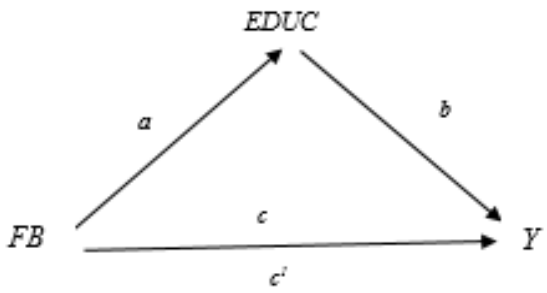
than the urban areas. Consequently, labour markets are thinner, and businesses are smaller. In such markets, education may be less important and family background and "connections", more relevant. There is also the possibility that, due to the lower levels of parental education in rural areas, parents may not have enough knowledge of the labour market, in part, because they do not have "connections". Family background may therefore be less important for labour market success in rural areas. These possibilities need to be considered, and so a separate analysis for rural and urban areas are provided. A further reason for separate analysis for rural and urban areas is that, a higher proportion of earnings is likely to be received in non-monetary forms (captured imperfectly in my data) in rural areas.

Having said this, the fact that my study is limited to wage work needs to be recognised. In particular, the study excludes self-employed, and agriculture. Taking first the self-employed in Ghana are a heterogeneous group, consisting of, for example, the very poor hawker category, and the rich business and large farm owners. Many in the self-employed group have non-market or unreported earnings, which make them unsuitable for my inquiry. As for agriculture, this group has similar analytical problems, and is simpler to exclude. However, the study in chapter 4 considers education and family background in the context of small informal businesses, so this field is not completely left out.

Data from the 2006 Ghana Living Standards Survey for this analysis. Labour market success is measured by the earnings of the individual. The study considers the extent to which family background measured by parents' education is correlated with an individual's education and the consequent impact of that individual's education (and family background) on earnings. A system of equations that is able to identify the

size of the direct and indirect effects (via education) of family background independently is used in this study. Figure 3.1 shows the path diagram for a linear structural equation model describing the process of earning higher wages. $EDUC$, and FB reflect education of the individual and family background respectively. Y s the earnings of the individual, measured in Cedis. The straight arrows leading to each variable is an indication that the variable at the beginning is a cause of the variable at the end of that arrow. So for instance, the years of education acquired by an individual is because of the individual's family background (level of parents' education). Those whose parents have more years of education are likely to have higher levels of education themselves. Path c^1 measures the direct effect of family background on earnings. That is, the earnings of an individual are determined by the level of education of his/her parents. Where the parents have higher years of education, it is expected that earnings of the individual will be higher. Path *ab* measures the indirect effect of family background on individual earnings. Path, *c*, captures the total effect of family background, which is the summation of the direct effect, c^1 and the indirect effect, *ab*. That is, $c = ab + c^1$

Figure 3. 1 Path analysis: effects of family background on labour market outcomes



3.1.1 Organisation of the chapter

The next section of the chapter provides a discussion on the allocation of individuals into wage jobs, followed by a review of the literature on education and family background on labour market success in section 3.3. Section 3.4 and 3.5 provides a brief discussion on some methodological issues, and a description of the data and variables used in the analysis respectively. This is followed by the model specification in section 3.6. Lastly, a discussion on key findings from the results is done in sections 3.7 and 3.8. Section 3.9 concludes.

3.2 Allocation into wage jobs in the Ghana labour market

Similar to labour markets in many developing countries, Ghana's labour market is highly informal, and is characterised by poor labour standards and working conditions, and low pay (Schneider et. al, 2010). The formal sector, on the other hand is smaller and difficult to access, but offers higher pay and relatively better working conditions. Most of these formal sector 'good' jobs are concentrated in urban areas, and are largely dominated by men, who generally tend to have higher educational attainments than women (HDR, 2015). In 2010, wage and salaried workers accounted for only 18.2% of the total labour force in Ghana (World Development Indicators, 2010). Due for instance, to current economic reforms (such as the public sector job freeze), entry into wage jobs is highly restricted. Nonetheless, formal sector jobs in Ghana offers higher status and pay, and is usually the preferred option for most individuals, despite its limited access. This section provides a brief discussion on how job allocation is achieved in wage employment in Ghana.

Firstly, access to wage jobs is partly dependant on the level of education of the individual, and there is empirical evidence on education and labour market outcomes in Ghana (Kingdon and Söderbom, 2008) to support this. In particular, those with post-basic education have a higher chance of finding jobs in the formal sector. This is due in part to the possibility that, given the poor labour standards, educated individuals tend to have a higher bargaining power, that can for example, allow them to have access to work-related benefits which are usually non-existent in non-wage jobs, and negotiate higher wages. Further to this, higher levels of education can facilitate progression and ensures that these individuals get higher wages. As such, an appreciable level of education can facilitate chances of finding a wage job in Ghana.

Another issue that limits entry into wage jobs in Ghana is the poor access to vacancy information. This limitation however implies that individuals in urban areas stand a better chance of hearing about jobs, simply because urban compared with rural dwellers have better access to information. Unlike most developed countries where jobs are advertised (mainly on the internet and sometimes in print media), and applications open to all qualified persons, access to job vacancies tend to be very limited in the Ghana labour market. This means that "connections", often referred to as "whom you know" in Ghana, could play an important part in obtaining information on vacancies and submitting applications for jobs. These constraints, often through family background effects could therefore play a part in allocation into wage employment, and subsequently earning higher wages. This further imply that children from wealthy families (educated parents) may have a higher chance of securing wage jobs because their parents may have "connections" and have a better knowledge of the

labour market, compared with children from less educated families who tend to struggle to match the advantages children from educated families have.

It is plausible therefore, that in a thinner labour market with intermediaries, and in an economy dominated by weak institutions, education and family background can be crucial for individual economic success. Individuals with higher levels of education, and those from families that are more educated will be more advantaged in the search for wage jobs. Based on these shortcomings in the market for wage work in Ghana, the study examines the linkages between education, family background, and labour market success, measured here as earnings.

3.3 Previous research: Education, family background and economic success

Children from poorer families receive less human capital investment mainly because of financial constraints, and the fact that poorer families face a higher interest rate (Becker and Tomes, 1976; Becker and Tomes, 1994). Since education acts as a major determinant of labour market outcomes in Ghana, any positive effects that family background may have on children's education may translate into labour market advantages. Poorer parents compared with richer parents may have relatively lower levels of education that potentially affects their level of success in the labour market (Mayer, 1997). Family background characteristics could also affect the motivation, access to career information, or the discount rate of the child (Card, 1999). In addition, educated parents tend to have better knowledge of the labour market and are able to put their children into high-paid jobs using their social and professional networks.

3.3.1 Intergenerational transmission of inequality

Empirical studies show that economic status is persistent across generations, with children brought up in high-income families earning more (Solon, 1992, Piketty, 2000; Zimmerman, 1992), and having higher educational attainment than children raised in low-income families. The general and most widely used approach when studying the relationship between family background and children's economic success is to generate an index for intergenerational correlation using socioeconomic variables such as educational attainment, earnings, or occupational status of parents and children (Blanden, 2013; Marks, 2011; Corak, 2013). The major limitation of this approach is embedded in how these variables are measured. In many instances, mobility is measured based on the traits of one single family member or parent, mainly fathers' traits (Björklund and Jäntti, 2012). However, parental background effect on children's economic success cannot be attributed to only one single measure.

Hertz et al. (2007), estimates intergenerational educational mobility and find that despite the impact of parent's education on the schooling of children, intergenerational mobility has fallen substantially over the last few years. They find an intergenerational correlation in schooling of around 0.4 for most countries in their sample. The sample of four African countries[11] have a parent-child schooling correlation of 0.36. Björklund and Jäntti (2012), also examine the importance of family background for labour-economic outcomes, such as long-run earnings of individuals and years of schooling. In estimating the sibling correlations, the authors find that factors shared by siblings, including family and environmental influences account for

[11] The four African countries considered in the study were; Egypt (0.50), Ghana (0.39), South Africa-only KwaZulu-Natal (0.44), and Rural Ethiopia (0.10). Correlations in parentheses.

about 40-60% of the inequality in outcomes. They find, compared with the estimates of siblings' correlation that use only father's traits, that by including the education of mothers, the explanatory power of the intergenerational model increased, although only marginally. Björklund and Jäntti (2012) associate the reason for a small impact on the explanatory power to positive assortative mating, that is, where educated fathers marry mothers of similar education level.

On the relationship between parent's income and children's income, there is evidence to show that economic status is persistent across generations. For instance, Solon (1992), Solon (2002), and Zimmerman (1992) find a positive correlation between fathers' and sons' permanent earnings. As regards the effect of parent's income on children's education, Shea (2000) finds a positive impact of parents income on children's human capital.

There have also been recent developments in the literature on the intergenerational correlation of wealth. Two possible pathways are associated with the underlying causes of these correlations across generations according to Black et al. (2015). The first views this correlation to be transmitted through biology, that is, through genetic inheritance of skills and attitudes. The other pathway is transmitted through the environment. In particular, because educated (wealthier) parents face lower interest rates they are able to invest more in children's human capital. Educated parents are also able to provide information about the labour market to their children, and may assist children to help them find better jobs. Richer parents, compared with poorer parents, are able to support their children financially by providing them with additional financial support to start-up businesses in cases where capital markets are imperfect (Parker, 2004). For instance, Charles and Hurst (2003) estimate a regression

of the wealth of children on parental wealth and find intergenerational wealth elasticities of 0.37 for the US. In addition, Black et al. (2015) find stronger effects of environmental factors on wealth of adopted and biological children rather than genetic factors. The authors suggest that the transmission of wealth does not necessarily mean that children from richer backgrounds have higher abilities, or more talented, but instead the role played by biological factors in the intergenerational transmission of wealth may be much smaller compared with the role of environmental factors.

In Ghana, this study will show that family background, measured as parents' education, can exert its influence on labour market success (earnings) through two channels. Firstly, it can influence the earnings of individuals directly, especially for those in urban areas where access to wage jobs are difficult. Secondly, family background can influence earnings of adult children indirectly through the positive effect of parents' education on education of adult children.

3.3.1.1 Other evidence: Family background and occupational outcomes

Di Pietro and Urwin (2003) use a household income and wealth survey for Italy to investigate intergenerational mobility and occupational status. The study used an ordered probit regression and find that the occupational status of the mother has less impact on children's occupational attainment compared with father's occupation. The authors also find that non-working mothers do not have any significant effect on the occupational status of both men and women, but instead having a non-working father positively affected the likelihood of women to be in manual work. The authors go further to investigate the occupation of offspring at current age in relation to paternal occupation at that same age. They find that individuals whose fathers are in skilled occupations (clerical, middle managers, and managers) are less likely to be in manual

work. Di Petro and Urwin (2003), also find that the probability of an individual being in a more skilled occupation is larger, the higher the occupational category of the father, although in most cases these effects are stronger for men than women.

Carmichael (2000), investigates intergenerational occupational mobility in Britain using ordered probit regression. The author finds that sons and daughters whose fathers engaged in non-manual occupations had a higher likelihood of being in in similar occupations. For sons, Carmichael (2000) notes that mothers occupation is generally insignificant, whereas the author finds that daughters whose mothers were in unskilled manual and semi-skilled manual occupations were disadvantaged compared with daughters whose mothers were in skilled and professional occupations. The author argues that daughters compared with sons are less dependent on their father's occupational status, but instead daughters are more dependent on mother's occupational status. The findings from this study clearly indicates that children's occupational attainment depends on the occupational attainment of parents. Children from well-off households are therefore more likely to enter into skilled occupations compared with those from poorer backgrounds whose parents are in unskilled and manual occupations.

Erikson and Goldthorpe (2002), argue that the reason why individuals of wealthy parents do well in the labour market is that the priority of such individuals is to avoid downward mobility. However, this claim may not be valid in all cases especially for children from poorer backgrounds. Some less educated parents, even in the presence of financial constraints may be willing to provide the required level of education for their children in order to increase their chances of securing good jobs and earning higher wages. The findings from chapter 2 suggests that despite rural

parents being less educated compared with urban parents, rural parents may still be willing to invest in their children's education.

The ongoing discussion on the empirical estimates of intergenerational correlations is a clear indication of the importance of family background on the economic outcomes of children. Some studies have found that father's traits tend to be more important in children's economic outcomes although the evidence also shows that both parent's traits are important. It is therefore plausible for Ghana, that family background could also be influential in children's human capital development and labour market outcomes. For instance, educated parents can provide support to children in many forms including acting as role models and source of funding, and where access to jobs are limited, educated parents can also provide "connections" for their children to enter into good jobs. What is missing in the literature on the role of family background, however, is the channels through which family background work to determine the labour market outcomes of children in Ghana. This study contributes to the dearth of evidence by showing how the education of the individual mediate[12] the relationship between the effects of family background and earnings in Ghana.

3.3.2 Education and labour market outcomes

Many studies have estimated the effect of education on an individual's economic success. The general findings are that education does not only enhance chances of being in a better job, but it also leads to higher earnings (Psacharopoulos and Patrinos, 2002).

[12] This refers to how education influences or absorbs the effect of family background (independent variable) on labour market success, earnings (dependent variable).

In many developing countries, the segmented nature of labour markets (Fields, 2011) makes it difficult for educated individuals to find high paid jobs. The evidence however, points to the fact that education enhances the chances of finding jobs in highly paid sectors. For instance, Glick and Sahn (1997) use multinomial logit models to estimate sectoral choice models for men and women aged 15 to 65 years in Guinea. In the study, the authors categorise wage employment into private wage work and public wage work. The authors found that having more years of education reduced the likelihood of men and women being in self-employment. This finding seems logical, because self-employment is usually considered as a 'bad job' in Ghana, partly because of the relatively lower wages, compared with wage jobs where wages are higher.[13] As regards wage employment, the authors found education to increase the likelihood of being in public sector jobs. Glick and Sahn (1997), find however, that for women more education increases their chances of being in private wage employment, whereas for men education weakly reduces their chances of entering private wage sector. The authors, however, believe that women's higher probability of entering into private wage employment is due to the types of occupations available and open to women, and also because education is not a requirement for men in most private wage jobs. If this assertion by Glick and Sahn (1997) holds, then this study expects to find a direct effect of family background on the earnings of men, and for women an indirect effect of family background on earnings.

Similarly, Vijverberg (1993) estimates participation across four occupational groups for Cote d'Ivoire. The author finds evidence showing that for both men and

[13] This is discussed further in chapter 4, when the study looks at performance of unregistered businesses in urban areas.

women, the chances of entering into wage employment is largely dependent on the level of education. Having any form of education is associated with a higher chance of non-employment (that is, not being in the labour market). The author also find that educated men and women have a lower probability of being in self-employment.

Kingdon and Söderbom (2008), investigate participation across five different occupational choices, including being out of the labour force for Ghana. The authors find that education reduces chances of entering into agriculture and raises men and women's likelihood of being in wage employment. In addition, Kingdon and Söderbom (2008) find that for women in particular, secondary education significantly reduces chances of being out of the labour market. Especially for women, what their findings seems to suggest is that given the difficulty associated with finding high-paid jobs because of the disadvantages women face in the labour market, higher educational attainment can ensure that women are able to find high-paid jobs.

The above evidence shows the importance of education in finding high-paid jobs and earnings. In Ghana, the small size of the formal sector has made access to wage jobs difficult. Despite the difficulty in finding high-paid jobs, education, and labour market connections through the positive impact of family background can facilitate allocation into these jobs. This study will show whether family background, given education can facilitate higher earnings. In the next section, evidence from the literature on the direct and indirect effects (via education) of family background on earnings is discussed.

3.3.3 Direct and indirect effects of family background on labour market outcomes

On the mediating effect of education, Kuha and Goldthorpe (2010) examine how educational attainment of an individual affects the effect of the relationship between parental social class (mainly father's) and the individual's social class, using British data for men and women. The authors classify social class into three groups, namely; salariat and employees, intermediate class, and working class. They find, firstly, a positive correlation between parental class and the individual's class. For the direct and indirect effects estimated using multinomial logit, the authors found that the direct effect of parental class on women's social class is considerably lower compared with men. As regards the indirect effect (via education) of parental class, this was generally larger for women than for men. Although an implication of their findings is that the mediating effect of education on the effect of class mobility could differ from one social class to another, their finding also suggest that parental background helps women more via parent's investment in the education of women. Men's socioeconomic status is found to be influenced more by the direct effects of their parent's socioeconomic status.

Other studies, notably Raitano and Vona (2015) on eight European countries[14], find that the influence of parental background on the earnings of children in Nordic countries (Finland, Denmark) and Germany is largely indirect (via the effects of education). Although the authors find no direct parental background effect on the earnings of children, they argue that this may be due to the strong welfare system,

[14] The eight countries considered in the study were: Germany, France, Spain, Italy, UK, Ireland, Denmark, and Finland

regulated wage setting, and an effective education system that offers equal chances to all in these countries. For the remaining countries, the authors find positive parental background effects, and they suggest that the positive effects may reflect the unobservable quality of the education system and family networks.

Similarly, Mazzonna (2014) investigate the relationship between socio-economic background and later outcomes such as health and income of adults in Europe. Their study shows considerable differences in the outcomes of adults who had different socio-economic backgrounds during childhood. They note that although education largely mediates how family background and later adulthood outcomes are related, differences in institutional and cultural environment may explain some of these differences across countries.

In contrast to evidence of the indirect effects of family background on the socioeconomic outcomes of children, Hudson and Sessions (2011) find evidence of direct parental influence on children's earnings. They argue that the direct effect of parental background is mainly because educated parents tend to have better connections and are therefore able to assist their children in finding good jobs. Pellizzari (2010) also note that in labour markets with intermediaries, the wage effects of finding jobs through personal contacts tend be higher. For Italy, Raitano and Vona (2015b), find evidence that parental background exerts a significant influence on sons' earnings even after conditioning on observable and unobservable characteristics of sons. The authors also find a large effect of parental background on the earnings of children even after controlling for the education of sons after twenty years of work experience. This implies that in some areas, the effects of family background on labour market success is still important.

The above evidence show mixed results of the effects of family background on earnings. These differences may be due to the nature of the labour market, and the education system of these countries. In labour markets with frictions and intermediaries, it is possible that personal contacts and social networks will be a key factor in finding good jobs. This possibility is examined for the case of Ghana by looking at the links between education of the individual, family background, and labour market success (earnings).

3.4 Methodological issues: estimating intergenerational correlations

If the economic success of children transmits from the economic status of their parents, then the association between the incomes of parents, y_p and the adult child's income, y_c is important in studies of intergenerational mobility. This relationship can be summarised as below;

$$lny_{ci} = \alpha + \beta lny_{pi} + u_i \qquad (5)$$

where β measures the elasticity of an individual's income given the income of the individual's parent. Should β be zero, then this means the incomes of the adult child's parents do not matter and there is complete mobility. In the case where β is 1, then there is evidence that the earnings of the adult child are reflected by the earnings of his/her parent.

A major concern of estimating intergenerational mobility using this approach, and more relevant for developing countries is that information on parent's income are hardly available in most surveys. For developed countries where this is less of an issue, economic mobility is captured by the elasticity of the adult child's (mostly sons') earnings given the father's earnings. Another issue associated with the use of earnings

is that, since most data covers only a very short period, earnings measures might be prone to error, which could lead to bias and inconsistent estimates of the β parameter (Checchi, 2006). Attempts have however been made to overcome this caveat. For instance, Mazumder (2005), argues that even averaging the earnings of the father over a period will still not be adequate to fully address any potential measurement errors. The author associate this to the fact that the closeness of observations to each other is not representative of the father's lifetime income. A possible reason as argued by Haider and Solon (2006) is how the differences in permanent income and current income are related in the course of one's life. For instance, at younger ages, incomes are generally low for most individuals, but this increases at older ages. The authors argue further that the direction of bias due to measurement error is linked to the age at which earnings of the individual is observed. A proposed solution to this problem has been to use the method of instrumental variable. However, this technique has its own challenges since most variables correlated with parent's income may have independent effect on the status of the child.

Another common but more traditional approach of measuring mobility across generations is to use the occupational or employment status of parents and children (Blanden, 2013; Marks, 2011). Sociologists mostly adopt this approach and it works by generating a socio-economic index that ranks occupations of both parents and adult children. The index is then matched to the occupations of fathers and sons, and correlated across generations. Contrary to the approach that uses income of parents, the requirements for this intergenerational mobility approach are less demanding. Data on parents' occupation is easy to come by and is readily available in most surveys. In addition, since occupation varies less over an individual's life-cycle, age-related biases

associated with the use of income/earnings is less of a problem (Blanden, 2013). This makes the use of occupational status or social class a more desirable and reliable measure. The only difficulty that arises with this measure is the quality of information, although this seems more relevant for cross-country studies.

The last measure of intergenerational mobility considers the correlation between the education of parents and children's education, which is similar to the approach used in chapter 2. Intergenerational education mobility can then be estimated from a regression of the form;

$$Educ_{ci} = \alpha + \beta Educ_{pi} + u_i \qquad (6)$$

where $Educ_{ci}$ is the education of the individual, and $Educ_{pi}$ is parent's education. A major shortfall in using this approach, however, is that, only one parents' characteristic (usually fathers') is mostly used in estimating intergenerational educational mobility. However, family background effect on children's education cannot be determined by only one single trait, usually fathers' (Björklund and Jäntti, 2012). Though fathers generally tend to be household heads, and often have stronger bargaining power in the house, mother's role in child development is equally important as it has benefits that go beyond just economic success of the individual (Chen and Li, 2009; Miller, 2008). In addition to using only one single variable as a measure of family background, there is also the problem of how education is measured. A common approach has been the use of years of schooling or educational attainment. This becomes a problem of major concern particularly for cross-country studies, because of the differences in education system and the differences across age cohorts. Nevertheless, an advantage of this approach similar to the approach that uses social class or occupations, and income/earnings is that, information on parental education and children's education

are easy to acquire and available in most surveys. Similarly, educational attainment compared with occupation, and income, remain fairly unchanged over the lifecycle (Marks, 2011). To overcome this problem, this study considers the education of both parents, by using the average years of parents' education, measured in schooling years completed. The study also generates an index as an alternative measure of family background based on parents' education and occupation.

The alternative measures of intergenerational correlation discussed so far suggests that regardless of how intergenerational correlation is measured, there is the tendency to be confronted with estimation and measurement issues. These issues are however aggravated depending on the nature of the study. Cross-country studies will be compounded with more difficulties because of the differences in measurement and definition (Corak, 2006; Blanden, 2013) of variables. As the data does not provide information on the earnings of the individual's parents (it is not possible to match data on parents and children in the sample used for this study. These adults have completed schooling and are active in the labour market, and most not living at home with parents), parental earnings are not used as a measure of family background. Instead, the average years of parents' education is used, since the data provides information on parents' highest level of education completed. As an alternative measure of family background, the study generates an index for family background using parents' education and occupation. The results from these regressions are comparable with my preferred family background measure, that is, average years of parents education.

3.5 Data

The data used is the 2006 Ghana Living Standards Survey. The survey provides rich information on demographic characteristics such as place of birth, educational attainment and marital status. The survey has detailed information on labour market characteristics such as employment status, employment conditions, hours of work, earnings, and other characteristics. The sample is restricted to individuals aged 25 to 60 years in rural and urban areas. Individuals in this age group will be in the prime of their working lives (OECD, 2016), and not likely to be participating in any schooling activities, making them suitable for this study which is focussed on people who are strongly engaged with the labour market. The age range is also limited to 60 years because the official retirement age in Ghana is 60 years.

3.5.1 Descriptive statistics

Table 3.1 shows descriptive statistics of the main variables used in my analysis. Men make up 75.35% of the total sample. As shown in table 3.1, there is not much difference in years of schooling between rural and urban individuals, although table 3.2 shows that in urban areas individuals have higher post-basic educational attainment compared with rural individuals. This seems to suggest that in rural areas, individuals are not able to continue schooling after basic education level, possibly as a result of the high indirect costs of education such as boarding fees, transportation costs, and the time associated with participating in schooling activities.

Table 3. 1 Summary statistics of main variables

	Urban				Rural			
	Men		Women		Men		Women	
Variable	N	Mean	N	Mean	N	Mean	N	Mean
Weekly earnings (in '0000 Cedis)	1054	125.56	400	102.00	410	82.92	79	58.41
Years of schooling	997	12.9	639	13.5	367	11.6	67	12.3
Parents years of schooling	996	8.8	357	10.3	376	5.5	73	5.1
Father years of schooling	1015	11.1	380	13.0	389	7.3	76	7.8
Mothers years of schooling	1007	6.7	360	8.0	379	3.7	73	2.7
Father: no education	431	45.5	125	35.6	240	65.0	45	62.5
Father: educated	517	54.5	226	64.4	139	35.0	27	37.5
Mother: no education	646	66.5	209	59.9	307	81.7	63	86.3
Mother: educated	326	33.5	140	40.1	69	18.4	10	13.7

For instance, 21% and 24.1% of men and women have secondary educational attainment in urban areas compared with 12% and 14.9% for men and women respectively in rural areas. At post-secondary level, the figures also show a higher attainment for both men and women in urban areas than for men and women in rural areas. Overall, there is a higher rate of no educational attainment among rural men and women than among urban men and women. This could be explained by financial constraints faced by rural households, which then affects parents' ability to invest in children's education. The composition of educational attainment of men and women in rural and urban areas can be seen table 3.2.

Table 3. 2 Educational attainment of men and women in wage employment

Educational attainment	Urban				Rural			
	Men		Women		Men		Women	
	N	Mean	N	Mean	N	Mean	N	Mean
None	99	9.9	38	10.3	75	20.4	17	25.4
Basic	406	40.7	114	30.9	157	42.8	22	23.8
Secondary	209	21.0	89	24.1	44	12.0	10	14.9
Post-secondary	283	28.4	128	34.7	91	24.8	18	26.9

In terms of earnings, table 3.1 shows that the average earnings of urban men and women are higher than the average earnings of their rural counterparts, which is expected because of the nature of the labour market in rural areas. For instance, among women, those in urban areas earn almost two times more than that of their rural counterparts (102 compared with 58.41 Cedis). Men in general earn more on average than women in both rural and urban areas. This could explain why parents (in particular urban parents as found in chapter 2) may prefer sons' education since sons' compared with daughters are more likely to provide financial support for parents in old age. Table A3.9 in the appendix shows correlation between the main variables. The correlation shows a positive relationship between the individual's education and earnings, and between family background variables and individual earnings.

As the educational attainment of adult children is often the result of parental education investment decisions, it is plausible to find a higher level of schooling for adult children with respect to parental education and occupation. In table 3.3, at lower levels of parental educational attainment, adult children tend to have fewer years of schooling, a partial indication that less educated parents are less able to provide their children with more years of schooling compared with parents with increased years of schooling. For instance, whereas individuals whose parents have no educational

attainment have almost 12 years of schooling (comparable with completion of secondary education), those whose parents have post-basic education have an average of 16 years of schooling (which is equivalent to completion of tertiary/university education).

Table 3. 3 Family background and adult child's years of schooling

Father's educational attainment	Individual's years of schooling	Mother's educational attainment	Individual's years of schooling
No education	12.1	No education	12.1
Basic education	12.7	Basic education	13.3
Post-basic education	15.6	Post-basic education	17.0
Father's occupation		Mother's occupation	
Agriculture	11.9	Agriculture	12.0
Production/Other	11.9	Production/Other	14.6
Sales/Services	12.9	Sales/Services	12.6
Professional	15.0	Professional	16.1

If parents level of education serves as a measure of family wealth, then this partly suggests that individuals from wealthy families will be able to acquire more years of schooling. In terms of parental occupation, there is also evidence to suggest that adult children from families where parents are in relatively better occupations tend to be associated with increased educational investment. For instance, the average years of schooling for workers whose fathers are in professional occupations is 15, whereas this is only 11.9 years for those whose fathers are in agricultural occupations. For mothers, the findings are similar. Individuals whose mothers' are in agricultural occupations have an average of 12 years of schooling compared with 16 years of schooling for those in professional occupations. Table 3.3 shows details of parents' education, occupation, and completed years of schooling of adult children.

There is also evidence suggesting a relationship between earnings of adult children and parental education and occupation as seen in table 3.4. The table shows that individuals whose parents have higher educational attainment earn more on average compared with those whose parents are in, for instance, agricultural occupations. Specifically, individuals whose parents have no educational attainment earn less than 100 Cedis per week, compared with those whose parents have post-basic education that earn almost twice this amount. This is similar for parental occupation, where it is seen that adult children whose parents are in agricultural jobs earn considerably less than those whose parents are in professional occupations.

Table 3. 4 Family background and adult child's weekly earnings

Father's educational attainment	Individual's weekly earnings (in '0000 Cedis)	Mother's educational attainment	Individual's weekly earnings (in '0000 Cedis)
No education	95.63	No education	98.68
Basic education	114.88	Basic education	122.23
Post-basic education	168.66	Post-basic education	217.27
Father's occupation		Mother's occupation	
Agriculture	96.86	Agriculture	104.04
Production/Other	112.31	Production/Other	112.35
Sales/Services	109.36	Sales/Services	109.92
Professional	150.97	Professional	185.30

The above descriptive statistics clearly shows that parental background and education could be important for success in the Ghana labour market. Coming from a family with educated parents could potentially enhance earnings, as well as the individuals own education. These possibilities are examined by gender, and rural-urban location.

3.5.2 Variables

The dependent variable used in this study is log of weekly earnings in Cedis. This is derived from the weekly earnings as reported by respondents. In contrast to developed countries where income is less precarious and there is a welfare state, in Ghana weekly earnings gives a better indication of earned income than the hourly wage. Other studies on earnings differentials have also used weekly earnings (Bargain et al, 2009; Devereux and Hart, 2010). There is also the possibility of reporting error in regard to the number of hours worked as individuals may be involved in more than one job, making the calculation of hourly wages subject to measurement errors. The use of reported weekly earnings for this study rather than hourly earnings was therefore preferred. The key independent variable is family background, measured as the average years of parents' education. Individuals from educated families are more likely to benefit from the positive effect of parents' labour market knowledge and "connections". These individuals again benefit from information about the labour market from their parents, hence allowing them to find good jobs with high wages.

An alternative variable for family background based on parents' education and occupation is generated. As this constructed measure of family background is comprised from four different variables, namely; father's education, mother's education, father's occupation, and mother's occupation, a single index that is able to summarize the information provided by these proxies is constructed. This index is expected to generate an accurate measure of family background, rather than controlling for each individual family background variable separately. Due to the relatively fewer number of family background variables, only one factor is generated from the factor estimation. Post-estimation results confirm that this generated factor can be used as a

measure of family background. Full results from this estimation and post-estimation is in the appendix.

As with regressions that use family background measured as parents' education, family background based on the constructed index give similar effects on education and earnings, although the magnitudes tend to be larger for the index variable (this could be because the index variable also captures the influence of parental occupation). All regression results presented in section 3.6 uses family background that is measured by parents' education.

The other independent variable (which is also the mediating variable) is education of the individual, measured as the years of schooling. This is based on the highest grade completed by the individual. As already explained, individuals from wealthy families (mainly educated parents) are more likely to receive more years of schooling compared with those from poorer families.

In addition to the two independent variables, a number of demographic factors including age of the individual are included as control variables. Marital status and location of the individual are added to the list of regressors. Location of the individual is based on whether the individual resides in the urban or rural area. Lastly, a gender dummy is included to capture evidence of gender differences in earnings, and education, in estimations that do not run separate regressions for men and women. In the presence of equal opportunity, and in the absence of possible labour market discrimination, there should be no significant gender difference in earnings especially among individuals in urban areas.

3.6 Empirical specification

The main outcome investigated, earnings, Y, indicates the log of weekly earnings of the individual. The estimation uses three separate regressions as proposed by Baron and Kenny (1986) when determining evidence of possible mediation, that is, whether the individual's education absorbs some of the effects of family background on earnings (this is path *ab* in the path diagram in figure 3.1). The separate estimable equations are of the form;

$$EDUC_i = \beta_1 FB_i + \beta_2 Z_i + \varepsilon_i \quad (7)$$

$$Y_i = \alpha_1 FB_i + \alpha_2 Z_i + \varepsilon_i \quad (8)$$

$$Y_i = \theta_1 EDUC_i + \theta_2 FB_i + \theta_3 Z_i + \varepsilon_i \quad (9)$$

where all equations are estimated using OLS. Equation (7) is the schooling equation, similar to enrolment regressions estimated in chapter 2, and equations (8) and (9) are the equations for individual earnings. Earnings, Y_i, is assumed to be linearly dependent on the individual's years of schooling, $EDUC_i$, a measure also of individual productivity. FB_i measures the individual's family background and is measured by the average years of education of both parents. This is included to capture the influence of family wealth on labour market success, measured by earnings. Z_i consists of control variables such as marital status, age, gender and location. The main specification of interest is equation (9) which controls for the individual's own education as well as family background, FB_i. Regressions are firstly estimated by gender, and then location.

In performing the mediation analyses, and as proposed by Baron and Kenny (1986), four key steps must be followed in order to establish that education is a mediator variable. First, that family background, FB which is also the causal variable

is correlated with earnings, Y_i. This is implied by the specification in equation (8) which is estimated to establish whether there is an effect of family background that could be mediated by the individual's education. The effect of family background in this specification would have to be significant. Secondly, family background should be correlated with the individual's education, $EDUC$, the mediator variable as specified in equation (7). Thirdly, when controlling for the effect of family background on earnings (equation (9)), the effect of the individual's education should be significant. Finally, while controlling for family background in the earnings equation (9), the effect of family background should be reduced to near zero (or zero for complete mediation), and insignificant. Once these steps are established, then it is enough to conclude that the individual's education mediates the effect of family background on earnings (and has no direct effect). The only issue with Baron and Kenny's (1986) estimation approach is that it assumes equations (7) to (9) are independent. The study therefore uses a more appropriate estimation technique that estimates all equations simultaneously rather than assuming that the three equations are independent.

The main interest is to establish the direct and indirect effects, as well as the total effects of family background on earnings. The study therefore uses the Sobel-Goodman mediation command (*sgmediation* in Stata) to identify these effects. This estimation technique is similar to estimating a simultaneous equation model using the *sem* command in Stata. These test whether education transmit the influence of family background to individual labour market success, earnings. Considering both direct and indirect effects enables a better understanding of the causal process, mainly because

the direct and indirect effects work differently. Failure to identify these effects separately could lead to wrong interpretation (Sobel, 1987).

3.7 Results and discussion

3.7.1 Effects of family background and education for men and women

Table 3.5 shows results of the estimates of family background and education on earnings. As parental preferences differ in the human capital investment decision of children, the effects of family background may have different effects on men and women separately. Columns (1) and (2), and columns (4) and (5) shows the impact of family background on earnings and education respectively for men and women in the sample. The results show that that family background measured as the average years of parents' education increases both earnings and education of adult children, with the effects of family background on women's earnings and education almost 2 percentage points higher than the effects for men. What this suggests is that family background is important for the individual's economic success since it acts as a potential source of social network and labour market connections that then enables individuals to find better jobs and earn higher wages.

Table 3. 5 Effects of family background and education by gender

	(1)	(2)	(3)	(4)	(5)	(6)
	Path *c* (TE): log of weekly earnings	Path *a*: Education	Part *b* and c^1 (DE):log of weekly earnings	Path *c* (TE):log of weekly earnings	Path *a*: Education	Part *b* and c^1 (DE):log of weekly earnings
	Men			Women		
Family background	0.0184***	0.1169***	0.0052	0.026***	0.1359***	0.0028
	(0.004)	(0.0167)	(0.0039)	(0.0086)	(0.0324)	(0.0067)
Education			0.112***			0.1707***
			(0.0064)			(0.0104)
Age	0.0255***	0.120***	0.0119***	0.0304***	0.0322	0.0249***
	(0.0037)	(0.0145)	(0.0034)	(0.007)	(0.0277)	(0.006***)
Married	0.3547***	0.51061	0.2975***	0.2338*	1.9456***	-0.098
	(0.0849)	(0.334)	(0.0764)	(0.1374)	(0.5185)	(0.1072)
Urban	0.4323***	0.9045***	0.3308***	0.6185***	0.3312	0.5619***
	(0.0750)	(0.2949)	(0.0676)	(0.1878)	(0.7086)	(0.14395)
Constant	11.5815***	5.6003***	10.953***	11.047***	9.0529***	9.5017***
	(0. 1639)	(0.6443)	(0.1515)	(0.356)	(0.1343)	(0.2885)
Indirect effect (IE) of family background			0.0132***			0.0232***
			(0.0020)			(0.0057)

Direct effect (DE) of family background			0.0052			0.0028
			(0.0039)			(0.0067)
Total effect (TE) of family background			0.0184***			0.0260***
			(0.0042)			(0.0086)
R-Squared	*0.10*	*0.09*	*0.27*	*0.10*	*0.08*	*0.47*
Observations	*1283*	*1283*	*1283*	*389*	*389*	*389*

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10.*
TE "Total Effect", DE "Direct Effect", IE "Indirect Effect"

While the association between family background and earnings is informative, ideally the interest is to measure this association allowing for the individual's human capital, measured here as education. In columns (3) and (6), while controlling for the individual's education, the results show that although family background positively increases earnings for both men and women, this effect is substantially reduced to near zero and no longer significant. This suggests that education is mediating the relationship between family background and earnings. In other words, education is absorbing the influence of family background on earnings. The effect of education for women is larger compared with men. Specifically, education increases the earnings of women by 17 percentage points, whereas for men education increases earnings by 11 percentage points.

For the estimated indirect (*ab* in the path diagram) and direct effects (path c^1), the differences between men and women are in the same direction, with stronger indirect effects for women. Particularly for women, the relatively larger indirect effect of family background originates from earlier parental investment in the education of girls, possibly because educating girls could enhance their later chances of succeeding in the labour market, that is, earning higher wages. This effect of family background is seen in column (5), where there is a larger effect of family background on women's education compared with the effects for men.

While family background transmits advantages directly to children, it appears that most of this transmission is indirect, arising from the fact that family background affects how much parents can invest in children's education, which then determines the success of children later in the labour market. An indication of this finding is that despite the importance of family background in child development, the effects of

family background are stronger in the early years of the individual's life where parents are expected to make significant investments in children's human capital. This is seen by the significant effects of family background on the adult child's education in columns (2) and (4), which I also find in chapter 2.

On the effects of other variables on earnings, similar to the evidence of Zuo (2013), the results show that being in an urban area increases individual earnings. In Ghana, most high-paid jobs are in urban areas and big towns, which shows how disadvantaged individuals in rural areas and small towns might be in terms of finding high-paid jobs. The increase in earnings associated with urban dwellers could be related to the thinner labour markets in rural areas. Age also improves earnings of both men and women, which could of course be due to seniority wage. There are positive and significant earnings effects for being married, but only for men.

Tables A3.10 to A3.12 in the appendix shows results that uses the index variable as a measure of family background, generated through factor analysis. The results for education and family background have similar effects to the ones discussed earlier in this section. The magnitudes are however larger for the effect of family background on education and earnings, a reason associated with how family background is measured. That is, this measure takes into account parental occupation.

3.7.2 Location-specific effects of family background and education

Since many of the high-paid wage jobs tend to be concentrated in urban areas, it is plausible to examine the effects of family background and education separately for individuals in urban and rural areas. In table 3.6, the results show that family background effects on education is positively significant for both urban and rural adult children, with a larger effect for urban individuals. As regards the effects on earnings,

family background only significantly increases earnings in urban areas. The effect on earnings is insignificant for individuals in rural areas. This can be explained by the fact that most high-paid jobs are in urban areas, making the influence of family background in urban areas more useful. Although rural dwellers could have educated parents in relatively good jobs, the lack of opportunities and job openings in rural areas makes them less important for adult children's labour market success. In column (3), the results that family background and education are both significant for labour market success (earnings) could suggest that in a labour market with intermediaries, education alone may not be sufficient for labour market success. Improvement in parents' economic status via their professional connections and labour market knowledge becomes important for adult children's economic success.

In terms of the gender differences, the results show that women are more disadvantaged in paid employment. In columns (3) and (6), it is seen that women are associated with lesser earnings. Rural women's earnings reduce by 51.6 percent whereas their urban counterparts are associated with 23.1 percent decrease in earnings. This could be explained by the fact that women in rural areas tend to have less years of education than urban women, and are therefore unable to occupy higher-paid positions. In addition, since urban individuals face higher costs of living than individuals in rural areas, it is only reasonable to see the earnings of women in urban areas surpassing that of rural women. It could also be that rural labour markets for wage employment generally disadvantages women, which is plausible, given that rural women compared with urban women spend more time on non-labour market activities.

Table 3. 6 Effects of family background and education by location

	(1) Path *c* (TE): Log of weekly earnings	(2) Path *a*: Education	(3) Part *b* and c^1 (DE): Log of weekly earnings	(4) Path *c* (TE): Log of weekly earnings	(5) Path *a*: Education	(6) Part *b* and c^1 (DE):log of weekly earnings
		Urban			Rural	
Family background	0.0229***	0.1239***	0.0075***	0.0095	0.1057***	-0.004
	(0.0041)	(0.0165)	(0.0036)	(0.0097)	(0.0346)	(0.0088)
Education			0.125***			0.1281***
			(0.006)			(0.0127)
Age	0. 028***	0. 090***	0. 017***	0.0241***	0.1122***	0.0097
	(0.0036)	(0.0147)	(0.0032)	(0.0074)	(0.0263)	(0.0068)
Married	0. 287***	1.161***	0.142***	0.3836***	0.827***	0.2776*
	(0.077)	(0.313)	(0.067)	(0.1736)	(0.6792)	(0.1553)
Females	-0.165***	0.527*	-0.231***	-0.384***	1.031	-0.516***
	(0.0302)	(0.302)	(0.064)	(0.1913)	(0.677)	(0.1712)
Constant	11.929***	7.216 ***	11.028***	11.669***	5.8005***	10.926***
	(0.1585)	(0.643)	(0.1434)	(0.351)	(1.2424)	(0.3218)
Indirect effect of family background			0.0155***			0.0135***
			(0.0022)			(0.005)

Direct effect of family background			0.0075***			-0.004
			(0.0036)			(0.0088)
Total effect of family background			0.0230***			0.0095
			(0.0041)			(0.0098)
R-Squared	*0.08*	*0.08*	*0.32*	*0.06*	*0.06*	*0.25*
Observations	*1271*	*1271*	*1271*	*401*	*401*	*401*

Standard errors in parentheses

**** p<0.01, ** p<0.05, * p<0.10*

As regards the decomposed effects of family background, there is a significant positive indirect effect of family background on earnings for both rural and urban individuals, although the effects are slightly larger for urban individuals compared with rural individuals. The results shows interestingly that in urban areas, education does not mediate the relationship between family background and earnings. Instead, family background given the individual's education has direct effects on labour market success. The direct influence of family background on earnings in urban areas may occur through social networks and parents knowledge of the labour market, and could be explained by the difficulty associated with finding wage jobs in urban areas. This is similar to the argument by Hudson and Sessions (2011) that educated parents may have better connections and will therefore be able to assist their children in securing good jobs with a higher chance of progression, and higher wages. Pellizzari (2010), also argues that, the presence of intermediaries in labour markets makes the wage effects of personal contacts and connections higher. There are no significant direct effects of family background in rural areas.

One interpretation of the difference between the direct effects of family background on earnings is that, the wage labour market in rural areas might be less desirable and easy to gain access into compared with urban labour markets, and so individuals in rural areas might require less parental influence to secure wage jobs. Rural individuals may therefore only require an appreciable level of education in order to find wage jobs. The effects of the control variables are similar to the earlier results from table 3.5. Earnings of both men and women increase with age. There is also a significant positive effect of being married on earnings for men but not for women.

There is however the possibility of internal migration having an effect on earnings of individuals. For instance, an individual born or raised in the rural area may have relocated to the urban area at some point and this can have an effect not only on education, but also on the earnings. This possibility has been considered, but from the data only 5 percent of individuals have moved from rural to urban areas at the time of the survey. 15.9 percent of individuals have moved from one rural area to another rural area. The relatively low proportion of internal migration means that this issue may not be relevant for the current study.

3.7.3 Gender effects of family background and education for urban individuals

This section examines the effects of education and family background on earnings separately for men and women in urban areas. This is not done for rural areas because there are no significant direct effects of family background. The decision particularly of women to participate in the labour market may be non-random and could therefore lead to sample selection. However, the estimation techniques adopted in this section do not allow for selectivity (Heckman, 1979) to be taken into account. This is because the estimation is conducted jointly using mediation analysis. Even when selectivity has been taken into account using Heckman correction, Kingdon and Soderbom (2002) find this to be largely insignificant for the case of Ghana.

The results in table 3.7 show the effects of family background on education and earnings among men and women in urban areas.

Table 3. 7 Gender effects of family background and education among adult urban children

	(1)	(2)	(3)	(4)	(5)	(6)
	Path *c* (TE): log of weekly earnings	Path *a*: Education	Part *b* and c^1(DE): log of weekly earnings	Path *c* (TE): log of weekly earnings	Path *a*: Education	Part *b* and c^1(DE): log of weekly earnings
		Urban men			Urban women	
Family background	0.0217***	0.12098***	0.0081*	0.02673***	0.13457***	0.0051
	(0.00456)	(0.0187)	(0.00414)	(0.0088)	(0.03419)	(0.0071)
Education			0.112***			0.1607***
			(0.00707)			(0.0112)
Age	0.02871***	0.1206***	0.0151***	0.02505***	0.02944	0.0203***
	(0.00417)	(0.0171)	(0.00380)	(0.0076)	(0.0297)	(0.0059)
Married	0.2948***	0.4392	0.245***	0.2532*	2.16098***	-0.09412
	(0.0940)	(0.3855)	(0.0835)	(0.1425)	(0.5532)	(0.1141)
Constant	11.903***	6.578***	11.164***	11.856***	9.3697***	10.351***
	(0.1747)	(0.7164)	(0.16194)	(0.3532)	(1.3718)	(0.2957)
Indirect effect of family background			0.0136***			0.021623***
			(0.00227)			(0.005696)
Direct effect of family background			0.0081*			0.0051

			(0.00414)			(0.00705)
Total effect of family background			0.0217***			0.02673***
			(0.00456)			(0.00880)
R-Squared	*0.09*	*0.09*	*0.28*	*0.06*	*0.09*	*0.42*
Observations	*943*	*943*	*943*	*328*	*328*	*328*

Standard errors in parentheses
**** p<0.01, ** p<0.05, * p<0.10*

As with earlier findings from table 3.5, including education of the individual reduces the effects of family background on earnings in columns (3) and (6). Interestingly, and as seen from earlier results in table 3.6, even after controlling for education in the earnings regressions, family background is significant for men's labour market success, although this is insignificant for women. A possible interpretation of this is that, due to the over representation of men in wage jobs in urban areas, entry into high-paid jobs may be more difficult for them than women. As such, men may benefit more from positive family background effects in addition to their own level of education. Women on the other hand, despite their labour market disadvantages can succeed in the labour market if they have more years of schooling, and this is seen by the larger positive effects of education on earnings. This is evident in the indirect effects of family background on women's education, which is seen to be almost 1 percentage point higher compared with the effects for men.

The larger effects of family background on women's education is in line with my earlier finding from chapter 2, where the results indicate that educated urban parents have a higher likelihood of enrolling girls in schools. This seems to suggest that, women's education is increasingly becoming important, particularly in urban areas. Urban educated parents are willing to invest more in their daughter's education, perhaps, to enable them find high-paid jobs that can allow them to earn as much as their male counterparts who face less disadvantages in the labour market. Again, the total effects of family background on earnings is larger for women than it is for men, despite the insignificant indirect effect for women.

3.8 Summary of findings: Effects of family background

Table 3.8 shows summary of the effects of family background on individual earnings. Overall, the results suggest that family background effects, measured as parents' education (and family background measured using an index variable) are important for labour market success in Ghana. For the whole sample, there are indirect effects of family background on labour market success, with the effects larger for women compared with men. This larger effect of 2.3 percent compared with 1.3 percent for men is mainly through parents' investment in women's education. Among urban adult children, there is a direct positive effect of family background on earnings, an indication that in urban wage employment, education is less able to influence the effect of family background, partly because of the nature of the labour market and the importance of "connections".

Table 3. 8 Summary of family background effects on earnings

	Indirect effect (via education)	Direct effect	Total effect
Men	0.013***	0.0052	0.0184***
Women	0.0232***	0.0028	0.0260***
Urban areas	0.0155***	0.0075***	0.023***
Rural areas	0.0135***	-0.004	0.0095
Urban men	0.0136***	0.0081*	0.0217***
Urban women	0.021623***	0.0051	0.02673***

**** p<0.01, ** p<0.05, * p<0.10*

In rural areas, family background only had an indirect effect (through education) on earnings, which is plausible. This result is a possible indication that, since there are fewer intermediaries in rural wage employment, the direct effect of family background on earnings are less relevant. For urban men and women, there are indirect effects of family background on earnings with a larger effect for women.

Unlike men, there are no direct effects of family background for women in urban areas, which can be interpreted as due to the lower concentration of women in wage jobs in urban areas.

3.9 Conclusions

Evidence to date suggests that parental income and family wealth are strong predictors of the likely economic status of the next generation. However, most previous studies of the relationship between parents' socio-economic background, educational attainment and occupational outcomes have focussed on occupational status more generally. There are limited evidence on the linkages between education, family background, and labour market success particularly for developing countries. The main aim of this study has been to examine these linkages by estimating a structural equation model, which allowed me to separate the direct and indirect effects of family background on earnings.

In most part of the analysis, the results indicate that while family background transmits advantages directly to children, it appears that most of these transmissions are indirect, arising from the fact that family background affects how much parents invest in their children's education, which then determines their success in the labour market, based on earnings from wage jobs. In rural areas where labour markets are thinner, businesses smaller, and individuals generally more disadvantaged, the results indicate a lower indirect effect and no direct effect of family background compared with adult children in urban areas. This finding of no direct effect shows that education may completely mediate the relationship between the effects of family background and earnings in rural areas. A possible interpretation of no direct effect of family

background among rural adult children is that, rural parents generally invest less in their children's education because of financial constraints, and are by themselves less educated, therefore, the effects of family background on labour market success are negligible. More generally, rural parents may not have enough influence in the labour market to support their children into high-paid jobs, which are usually found in urban areas. As for urban areas where access to wage jobs are more difficult, and where a larger proportion of individuals are highly educated compared with rural areas, the influence of family background is important for the individual's labour market success.

Interestingly, the results indicate that the indirect effects of family background are larger for women than men. What this may suggest is that in the face of general labour market disadvantages, educated parents, by investing more in their daughter's education can enable them to find better, higher paid jobs and potentially earn as much as their male counterparts who face fewer disadvantages in the labour market. While looking at the results separately for urban men and women, it was found that even after controlling for the individual's education, family background is significant for men's labour market success but not for women's. One possible interpretation of this result is that, due to over representation of men in wage jobs (which my data shows), entry into high-paid jobs may be more difficult for men than women, and so men rather than women tend to benefit more from positive family background effects, in addition to their own level of education. Women on the other hand, despite their labour market disadvantages require less family background support (possibly because fewer women tend to have wage jobs), and can succeed in the labour market if they have more years of schooling. This could possibly explain the larger indirect effect of family background for women.

The evidence of nepotism (generally referred to as "whom you know" in Ghana) in urban wage jobs is less surprising. Wage jobs are usually the preferred option for most individuals mainly because of the higher wages offered compared with wages in other sectors. In labour markets with frictions and intermediaries, it is plausible that family networks through the level of parent's education could provide an important source of information on job vacancies to adult children. Prospective employers and job seekers would learn and know about each other from personal sources, as these information may sometimes be more reliable (Granovetter, 2005). This partly suggest that word-of-mouth may be key for labour market success in urban Ghana. The evidence of a positive impact of family background on earnings is consistent with the literature, especially for Southern European countries. For a Ghana labour market dominated by intermediaries, my finding is in line with Pellizzari (2010) and Hudson and Sessions (2011) that access to good jobs and higher wages are associated with those individuals that found jobs through connections and personal contacts. This might partly explain why educated parents are willing to support their children into well-paid jobs in Ghana. In addition, the finding of direct effect of family background on the earnings of men in urban areas is consistent with Raitano and Vona (2015b), that parental background exerts a significant influence on sons' earnings.

One key implication of the results is that, although family background affects individuals early in life by influencing years of schooling, family background can also form a strong foundation for future economic success. Most notably, individuals from poorer families will be affected by the potential positive effects of family background on labour market success, as shown by the findings for individuals in rural areas. As such, policies that aim at removing household financial constraints and improving

educational attainment can be used to reduce inequality in the Ghana labour market. An important consideration is the need for a strong emphasis on educational policies aimed not only at providing individuals with basic skills and literacy but also at ensuring the necessary level of education to secure higher earnings in the labour market. As suggested by Bratsberg et al. (2007), one possible way to offset the effect of family background on human capital development and economic success is the provision of a good education system that can create a homogenous educational qualifications floor for all individuals. For Ghana, achieving this may not be easy and may require support from the international community.

To further mitigate the direct influence of "whom you know" and social networks via family background effect in the Ghana labour market, labour standards and employers hiring process must be aligned to reflect equal access and opportunity for all. Currently, the process of hiring in the formal sector is less standardized, and favours individuals who have "connections" or whose parents have good knowledge of the labour market and know people in high standings. Where the influence of family background and nepotism persist, it is evident that access to wage jobs and higher wages in Ghana will be a privilege for only a selected few.

References

Bargain, O., Bhaumik, S. K., Chakrabarty, M., & Zhao, Z. (2009). Earnings differences between Chinese and Indian wage earners, 1987–2004. *Review of Income and Wealth*, *55*(s1), 562-587

Baron, R. M. & Kenny, D. A. (1986). "The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations". *Journal of personality and social psychology,* 51**,** 1173.

Becker, G. S. & Tomes, N. (1976). "Child Endowments and the Quantity and Quality of Children". *Journal of Political Economy,* 84**,** S143-S162.

Becker, G. S. & Tomes, N. (1994). "Human capital and the rise and fall of families. *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education" (3rd Edition).* The University of Chicago Press.

Björklund, A. & Jäntti, M. (2012). "How important is family background for labor-economic outcomes?" *Labour Economics,* 19**,** 465-474.

Black, S.E., Devereux, D.J., Lundborg, P. & Majlesi, K. (2015). "Poor little rich kids? The determinants of the intergenerational transmission of wealth". National Bureau of Economic Research Working Paper Series, No. 21409.

Black, S. E., Devereux, P. J. & Salvanes, K. G. (2005). "The More the Merrier? The Effect of Family Size and Birth Order on Children's Education". *The Quarterly Journal of Economics,* 120**,** 669-700.

Blanden, J. (2013). "Cross-country rankings in intergenerational mobility: A comparision of approaches from economics and sociology". *Journal of Economic Surveys,* 27**,** 38-73.

Bratsberg, B., Røed, K., Raaum, O., Naylor, R., Jantti, M., Eriksson, T. & Osterbacka, E. (2007). "Nonlinearities in Intergenerational Earnings Mobility: Consequences for Cross-Country Comparisons". *The Economic Journal,* 117**,** C72-C92.

Brown, P. H. & Park, A. (2002). "Education and poverty in rural China". *Economics of Education Review,* 21**,** 523-541.

Card, D. (1999). "The causal effect of education on earnings". *Handbook of labor economics,* 3**,** 1801-1863.

Carmichael, F. (2000). "Intergenerational mobility and occupational status in Britain". *Applied Economics Letters,* 7**,** 391-396.

Charles, K. K. & Hurst, E. (2003). "The Correlation of Wealth across Generations". *Journal of Political Economy,* 111**,** 1155-1182.

Checchi, D. (2006). "*The economics of education: Human capital, family background and inequality",* Cambridge University Press.

Chen, Y. & Li, H. (2009). "Mother's education and child health: Is there a nurturing effect?" *Journal of Health Economics,* 28**,** 413-426.

Corak, M. (2006). "Do Poor Children Become Poor Adults? Lessons from a Cross-Country Comparison of Generational Earnings Mobility". *Dynamics of Inequality and Poverty*.

Corak, M. (2013). "Income inequality, equality of opportunity, and intergenerational mobility". *The Journal of Economic Perspectives*, 27**,** 79-102.

Devereux, P. J., & Hart, R. A. (2010). Forced to be Rich? Returns to Compulsory Schooling in Britain*. *The Economic Journal*, *120*(549), 1345-1364.

Di Pietro, G. & Urwin, P. (2003). "Intergenerational mobility and occupational status in Italy". *Applied Economics Letters,* 10**,** 793-797.

Erikson, R. & Goldthorpe, J. H. (2002). "Intergenerational inequality: A sociological perspective". *Journal of Economic Perspectives***,** 31-44.

Fields, G. S. (2011). "Labor market analysis for developing countries". *Labour Economics*, 18, Supplement 1**,** S16-S22.

Glick, P. & Sahn, D. E. (1997). "Gender and Education Impacts on Employment and Earnings in West Africa: Evidence from Guinea". *Economic Development and Cultural Change,* 45**,** 793-823.

Granovetter, M. (2005). "The Impact of Social Structure on Economic Outcomes". *The Journal of Economic Perspectives,* 19**,** 33-50.

Haider, S. & Solon, G. (2006). "Life-cycle variation in the association between current and lifetime earnings". National Bureau of Economic Research.

Heckman, J. 1979. Sample selection bias as a specification error. Econometrica 47: 153–161.

Hertz, T., Jayasundera, T., Piraino, P., Selcuk, S., Smith, N. & Verashchagina, A. (2007). "The inheritance of educational inequality: International comparisons and fifty-year trends". *The BE Journal of Economic Analysis & Policy,* 7.

Hudson, J. & Sessions, J. G. (2011). "Parental education, labor market experience and earnings: New wine in an old bottle?" *Economics Letters,* 113**,** 112-115.

Human Development Report (2015). Available from: http://hdr.undp.org/en/countries/profiles/GHA [Accessed: 24 February 2015]

Kaiser, H. F. (1974). "An index of factor simplicity". *Psychometrika* 39, 31–36.

Kingdon, G. G. & Söderbom, M. (2008). "*Education, skills, and labor market outcomes: Evidence from Ghana"*, World Bank.

Kuha, J. & Goldthorpe, J. H. (2010). "Path analysis for discrete variables: the role of education in social mobility". *Journal of the Royal Statistical Society: Series A (Statistics in Society),* 173**,** 351-369.

Marks, G. N. (2011). "Issues in the Conceptualisation and Measurement of Socioeconomic Background: Do Different Measures Generate Different Conclusions?" *Social Indicators Research,* 104**,** 225-251.

Mayer, S. E. (1997). "*What money can't buy: Family income and children's life chances"*, Harvard University Press.

Mazumder, B. (2005). "Fortunate Sons: New Estimates of Intergenerational Mobility in the United States Using Social Security Earnings Data". *Review of Economics and Statistics,* 87**,** 235-255.

Mazzonna, F. (2014). "The long-lasting effects of family background: A European cross-country comparison". *Economics of Education Review,* 40**,** 25-42.

Miller, G. (2008). "Women's suffrage, political responsiveness, and child survival in American history". *The Quarterly Journal of Economics,* 123**,** 1287.

OECD (2016). Employment rate by age group (indicator). [online] doi: 10.1787/084f32c7-en [Accessed on 22 May 2016]

Parker, S. C. (2004). "*The economics of self-employment and entrepreneurship"*, Cambridge University Press.

Pellizzari, M. (2010). "Do friends and relatives really help in getting a good job?" *Industrial and Labor Relations Review,* 63**,** 494-510.

Piketty, T. (2000). "Theories of persistent inequality and integenerational mobility". *Handbooks in Economics,* 16**,** 429-476.

Psacharopoulos, G. & Patrinos, H. A. (2002). "*Returns to investment in education : a further update",* Washington, D.C., World Bank, Education Sector Unit.

Raitano, M. & Vona, F. (2015). "Direct and Indirect Influences of Parental Background on Children's Earnings: a Comparison across Countries and Genders". *The Manchester School,* 83**,** 423-450.

Raitano, M. & Vona, F. (2015b). "From the cradle to the grave: the effect of family background on the career path of Italian men". OFCE Working paper

Schneider, F., Buehn, A., & Montenegro, C. E. (2010). New estimates for the shadow economies all over the world. *International Economic Journal*, *24*(4), 443-461

Shea, J. (2000). "Does parents' money matter?" *Journal of Public Economics,* 77**,** 155-184.

Sobel, M. E. (1987). "Direct and indirect effects in linear structural equation models". *Sociological Methods & Research,* 16**,** 155-176.

Solon, G. (1992). "Intergenerational income mobility in the United States". *The American Economic Review***,** 393-408.

Solon, G. (2002). "Cross-Country Differences in Intergenerational Earnings Mobility". *The Journal of Economic Perspectives,* 16**,** 59-66.

Vijverberg, W. P. M. (1993). "Educational Investments and Returns for Women and Men in Côte d'Ivoire". *The Journal of Human Resources,* 28**,** 933-974.

Zimmerman, D. J. (1992). "Regression toward mediocrity in economic stature". *The American Economic Review***,** 409-429.

Zuo, H. (2013). "Formal and Informal Employment in China: Probability of Employment and Determinants of Monthly Wages". *Australian Economic Review,* 46**,** 405-423.

Appendix

Generating composite variable for family background

The tables below show the process of constructing an index that is able to summarize the information provided by the family background variables. The four main family background variables are; father's education, mother's education, father's occupation, and mother's occupation (education levels were categorised as; no education, basic education, and post-basic education. Occupational status was categorised as; agriculture, production/other, sales/services, and professional occupations). The polychoric correlation matrix, which shows the correlation among the four variables in table A3.1, indicates a positive correlation among all variables, with the strongest correlation being the relationship between father's education and mother's education (72%), and between father's education and father's occupation. The high correlations between these variables is a possible suggestion of assortative mating, where highly educated fathers, and fathers in highly paid jobs are married to educated and working mothers.

Table A3.1. Correlation matrix

	Father's education	Mother's education	Father's occupation	Mother's occupation
Father's education	1.000			
Mother's education	0.724	1.000		
Father's occupation	0.691	0.514	1.000	
Mother's occupation	0.438	0.468	0.589	1.000

Table A3.2 also shows principal factor analysis correlation. The eigenvalues illustrate the variances of the factors. The percentage of common variance explained

by the first factor is almost 100%, and since the eigenvalue of the first factor is more than one, based on the Kaiser criterion only one factor can be retained.

Table A3.2. Factor analysis/correlation: Method-Principal Factors

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	2.287	2.141	1.040	1.040
Factor2	0.146	0.164	0.066	1.106
Factor3	-0.018	0.197	-0.008	1.098
Factor4	-0.215		-0.098	1.000

LR test: Independent vs. saturated: chi2(6)=8718.86, Prob>chi2=0.000

The results from the squared multiple correlations in table A3.3 seem large, and hence justifying the use of a factor. In table A3.4, the KMO measuring sampling accuracy has an overall value of 0.69, and suggests that these variables have enough common factors to warrant an EFA (Kaiser, 1974).

Table A3.3. Squared multiple correlation

Variable	*SMC*
Father's education	0.6666
Mother's education	0.5559
Father's occupation	0.5838
Mother's occupation	0.3935

Table A3.4. Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy

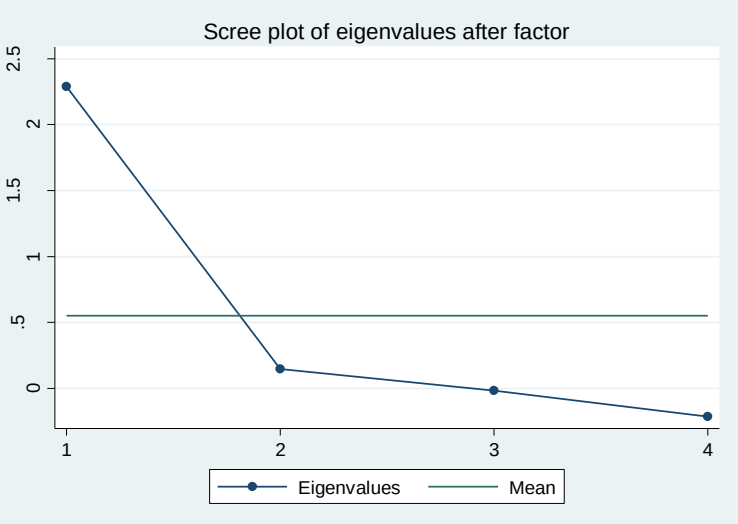
Variable	KMO
Father's education	0.6457
Mother's education	0.6984
Father's occupation	0.6892
Mother's occupation	0.7287
Overall	0.6848

Table A3.5. Factor loadings and unique variances

Variable	Factor 1	Factor 2	Uniqueness
Father's education	0.8413	-0.1682	0.2639
Mother's education	0.7546	-0.1859	0.396
Father's occupation	0.7862	0.1768	0.3507
Mother's occupation	0.6261	0.228	0.5561

Table A3.5 shows the weights and correlations between each variable and the factor, that is, the factor loadings. All four variables define the first factor considerably well, with father's characteristics explaining an average of 81%, and 69% for mother's characteristics. The scree plot in figure A3.1 that plots the eigenvalues against the factor number indicates that only one factor can be retained. This is seen from the flattening of the line after the first factor, indicating that each successive factor is accounting for smaller amounts of the total variance.

Figure A3.1. Scree plot



Rotations

Tables A3.6 to A3.8 below are results from the orthogonal varimax rotation. This shows that the percentage of common variance explained by the first factor is 70%. It can also be seen in table A3.8 that the first factor is mostly defined by fathers and mothers education (77% and 72% respectively).

Table A3.6. Orthogonal factors

Factor	Variance	Difference	Proportion	Cumulative
Factor1	1.518	0.603	0.690	0.690
Factor2	0.915	.	0.416	1.106

LR test: Independent vs. saturated: chi2(6)=8718.86, Prob>chi2=0.000

Table A3.7. Factor rotation matrix

Factor	Factor1	Factor2
Factor1	0.801	0.599
Factor2	-0.599	0.801

Table A3.8. Factor loadings: Rotated and Unrotated

	Rotated				Unrotated		
Variable	Factor 1	Factor 2	Uniqueness	Variable	Factor 1	Factor 2	Uniqueness
Father's education	0.7742	0.3697	0.2639	Father's education	0.8413	-0.1682	0.2639
Mother's education	0.7155	0.3035	0.396	Mother's education	0.7546	-0.1859	0.396
Father's occupation	0.5233	0.6128	0.3507	Father's occupation	0.7862	0.1768	0.3507
Mother's occupation	0.3645	0.5578	0.5561	Mother's occupation	0.6261	0.228	0.5561

As shown by the post-estimation results above, one factor is retained and the score generated from this is used as an alternative measure of family background. The correlation coefficient for both measures of family background with the main variables used in the study is seen in table A3.9. For both measures of family background, there is a positive correlation with the adult child's education and earnings. The higher coefficient for the index measure is attributed to the fact that this measure accounts also for parent's occupation. This might also explain the larger coefficients in the regression results that uses the index as measure of family background.

Table A3.9. Correlation among variables

	Log of weekly earnings	Education	Family background (index)	Family background	Urban	Married	Females	Age
Log of weekly earnings	1.00							
Education	0.521***	1.00						
Family background (index)	0.169***	0.232***	1.00					
Family background	0.125***	0.157***	0.792***	1.00				
Urban	0.156***	0.12***	0.251***	0.19***	1.00			
Married	0.131***	0.089***	-0.11***	-0.12***	-0.047**	1.00		
Females	-0.095***	0.068***	0.124***	0.079***	0.114***	-0.137***	1.00	
Age	0.207***	0.145***	-0.23***	-0.26***	-0.002	0.302***	-0.05**	1.00

**** p<0.01, ** p<0.05, * p<0.10*

Table A3.10. Effects of family background and education by gender

	(1)	(2)	(3)	(4)	(5)	(6)
	Path c (TE): log of weekly earnings	Path a: Education	Part b and c^1 (DE): log of weekly earnings	Path c (TE): log of weekly earnings	Path a: Education	Part b and c^1 (DE): log of weekly earnings
	Men			Women		
Family background	0.2399***	1.6336***	0.0609	0.43897***	2.31756***	0. 0485
	(0.05023)	(0.1978)	(0.0466)	(0.0942)	(0.36055)	(0.07633)
Education			0.10962***			0.16849***
			(0.00669)			(0.0108)
Age	0.0243***	0.1112***	0.1209***	0.02597***	0.02192	0.0223***
	(0.0038)	(0.0149)	(0.0035)	(0.0073)	(0.02798)	(0.0056)
Married	0.2888***	0.48637	0.2355***	0.22686	1.84552***	-0.08408
	(0.0886)	(0.34877)	(0.0799)	(0.14215)	(0.54403)	(0.11062)
Urban	0.3898***	0.6028**	0.32374***	0.45653***	-0.31503	0.50961***
	(0.07797)	(0.3071)	(0.0705)	(0.18898)	(0.72325)	(0.14469)
Constant	11.416***	4.1786***	10.958***	10.7184***	6.5351***	9.61736***
	(0.1981)	(0.7804)	(0.18098)	(0.40396)	(1.54602)	(0.31716)
Indirect effect (IE) of family background			0.17897***			0.39047***

			(0.0243)			(0.065701)
Direct effect (DE) of family background			0.0609			0.0485
			(0.04663)			(0.07633)
Total effect (TE) of family background			0.2399***			0.43897***
			(0.05023)			(0.09421)
R-Squared	*0.0907*	*0.097*	*0.260*	*0.119*	*0.131*	*0.485*
Observations	*1175*	*1175*	*1175*	*348*	*348*	*348*

Standard errors in parentheses

**** p<0.01, ** p<0.05, * p<0.10*

Table A3.11. Effects of family background and education by location

	(1)	(2)	(3)	(4)	(5)	(6)
	Path c (TE): log of weekly earnings	Path a: Education	Part b and c^1 (DE): log of weekly earnings	Path c (TE): log of weekly earnings	Path a: Education	Part b and c^1 (DE): log of weekly earnings
	Urban			Rural		
Family background	0.33699***	1.9177***	0.1050***	0.11967	1.2768***	-0.0444
	(0.04728)	(0.19333)	(0.04285)	(0.11045)	(0.39477)	(0.09962)
Education			0.1209***			0.129***
			(0.0063)			(0.01290)
Age	0. 02737 ***	0.08544***	0.0170***	0.01917***	0.08999***	0.0076
	(0.00369)	(0.0151)	(0.00326)	(0.00735)	(0.02626)	(0.00664)
Married	0.23318***	1.0945***	0.10077	0.3574***	0.69589	0.26796*
	(0.08023)	(0.32803)	(0.0701)	(0.17861)	(0.63835)	(0.1591)
Females	-0.1818***	0.3547	-0.225***	-0.3264*	0. 9522	-0.449***
	(0.07704)	(0.3149)	(0.06703)	(0.19628)	(0.70152)	(0.17502)
Constant	11.528	4.761***	10.952***	11.767	5.455***	11.07***
	(0.19627)	(0.80246)	(0.17326)	(0.40562)	(1.44969)	(0.36759)
Indirect effect of family background			0.23199***			0.16408***
			(0.02632)			(0.05334)

Direct effect of family background			0.1050***			-0.0444
			(0.04285)			(0.09962)
Total effect of family background			0.33699***			0.11967
			(0.04728)			(0.11045)
R-Squared	*0.089*	*0.104*	*0.313*	*0.044*	*0.054*	*0.245*
Observations	*1146*	*1146*	*1146*	*377*	*377*	*377*

Standard errors in parentheses
**** p<0.01, ** p<0.05, * p<0.10*

Table A3.12. Gender effects of family background and education by location and gender

	(1)	(2)	(3)	(4)	(5)	(6)
	Path c (TE): log of weekly earnings	Path a: Education	Part b and c^1 (DE): log of weekly earnings	Path c (TE): log of weekly earnings	Path a: Education	Part b and c^1 (DE): log of weekly earnings
	Urban men			Urban women		
Family background	0.2858***	1.7680***	0.0936*	0.4849***	2.3783***	0.11413
	(0.05385)	(0.2215)	(0.04996)	(0.09783)	(0.38759)	(0.08197)
Education			0.1087***			0.1559***
			(0.00746)			(0.01174)
Age	0.0287***	0.1518***	0.01617***	0.02267***	0.02212	0.0192***
	(0.0043)	(0.01771)	(0.00395)	(0.00759)	(0.03005)	(0.00598)
Married	0.23164***	0. 4378	0.18404***	0. 19947	1.9752***	-0.10844
	(0.09788)	(0.40265)	(0.08766)	(0.14632)	(0.57968)	(0.11759)
Constant	11.5803***	4.3833***	11.1038***	11.2193***	5.9890***	10.2858***
	(0.22087)	(0.90858)	(0.20035)	(0.42353)	(1.67795)	(0.34101)
Indirect effect of family background			0.1922***			0.37074***
			(0.027456)			(0.066557)

Direct effect of family background			0.0936*			0.114139
			(0.04996)			(0.081978)
Total effect of family background			0.2858***			0.48487***
			(0.05385)			(0.09783)
R-Squared	*0.087*	*0.101*	*0.270*	*0.096*	*0.144*	*0.441*
Observations	*855*	*855*	*855*	*291*	*291*	*291*

Standard errors in parentheses

**** p<0.01, ** p<0.05, * p<0.10*

CHAPTER FOUR: EDUCATION, FAMILY BACKGROUND, AND PERFORMANCE OF UNREGISTERED URBAN FIRMS

4.1 Introduction

Across many developing countries, a sizeable share of all economic activities take place in the informal sector. The share and contribution of unregistered business activities to livelihood in these countries is sizeable and considerable research have examined the causes of the size and growth of the informal economy (Maloney, 2004; Fajnzylber et al., 2006). Nevertheless, the economic contribution of the informal sector and reasons for variability in performance are difficult to quantify.

In particular, few studies have examined the effects of owner characteristics such as education and family background on performance of firms in the informal sector in developing countries. An exception is Pasquier-Doumer (2013) who examined the role of family background on performance of informal entrepreneurs. The limited evidence available shows that, despite the lower productivity of small firms compared with larger firms, performance of small firms in the formal sector is enhanced by the educational attainment of the owner (Sluis et al., 2005; Van Praag et al., 2013). This is consistent with theoretical models of human capital (Becker, 1962) which are built around the hypothesis that the knowledge and skills embodied in humans directly raises productivity (Jones, 2001) and earnings (Psacharopoulos and Patrinos, 2002). While it is reasonable to expect that firms with well-educated owners should be more efficient (Goedhuys et al., 2008), productivity and profitability in small unregistered firms can be determined by a complex set of other influences. These may include family background, and other external factors that can make the importance of

education for business performance less relevant, especially in firms that employ additional labour.

There is also strong evidence for developed countries of the importance of family background on business outcomes (Fairlie and Robb, 2007a; Chlosta et al., 2012) and intergenerational transmission of self-employment (Dunn and Holtz-Eakin, 2000). In particular, growing up in an entrepreneurial family offers the individual the opportunity to acquire general and specific business human capital (Fairlie and Robb, 2007a; Fairlie and Robb, 2007b) which can then be used to improve the performance of the business. It also gives the individual a realistic view of business ownership and management practices. Previous research show that growing up in a family with self-employed parents may lead to children becoming self-employed themselves (Dunn and Holtz-Eakin, 2000; Kim et al., 2006; White et al., 2007). There are plausible reasons in Ghana why coming from a family of self-employed parents could increase participation in self-employed or entrepreneurial activities. Parents with business ownership experience, registered or unregistered, could offer their children exposure to running and maintaining a business. These individuals may then be motivated, perhaps due to their experience to become entrepreneurs themselves, especially if they expect to inherit the family business.

To exploit these possibilities, this study uses the 2013 World Bank's Informal Firms Survey (IFS) to examine among other factors, the effect of owner's education and family background on the performance of unregistered urban firms in Ghana. This study does not consider the case of registered firms because the 2013 World Bank survey of registered firms does not have information on the education of the owner. The study focuses only on unregistered firms because the private informal sector

constitutes about 41.9% of total employment in Ghana (GSS, 2015), making this segment of the labour market of greater importance. If education is essential for putting specific knowledge to use, and the skills acquired by individuals during formal education are necessary for the success of businesses (Lazear, 2004), being an educated owner should lead to increased firm performance. However, in an environment where government regulations on businesses are tough, and in circumstances of poverty, firm owner's education may not be enough for performance of unregistered businesses. The study examines this proposition by including education in a production function framework (measured by monthly sales) and in a profits equation. In addition to owner's education, the study addresses the impact of family background, measured as parents' education and parents' business ownership on sales and profitability of the firm, and examine whether growing up in an entrepreneurial family gives the individual better management and entrepreneurial skills to succeed in business. Lastly, it is assumed that the decision to remain unregistered depends on the costs and benefits associated with operating an unregistered business. In this context, a discrete choice model based on maximum likelihood estimation is used to examine the factors that determine unregistered businesses' intention to register, with a particular focus on the firm owner's education and family background.

These issues are of particular importance in many developing countries since informal firms constitute a large share of employment opportunities and make significant contributions to GDP. In Ghana, unregistered businesses are the main source of employment and incomes for many urban dwellers who find it difficult to access wage jobs. This is largely because of government regulations on doing business

in the formal sector, and the associated corruption "nepotism" in formal sector jobs (which the results from chapter 3 seems to suggest for urban wage workers). In addition, the interest in informal economic activities and unregistered businesses are that, unregistered and informal businesses serve as a common entry and starting point for the less advantaged to gain access into a challenging urban labour market.

4.1.1 Organisation of the chapter

The remainder of the study is organised as follow. First, a brief background to the informal economy in Ghana will be provided followed by a discussion on the reasons for the large share of informal economic activities. A discussion on how the informal economy is conceptualized is carried out in section 4.2. Section 4.3 provides a review of the literature, followed by data description and empirical specifications in sections 4.4 and 4.5 respectively. Key findings from the regression results in section 4.6 are discussed. The last section, section 4.7 concludes.

4.2 Background to the informal economy in Ghana

Since the early 1970's research on the informal sector has constituted a growing part of the literature in developing countries (Hart, 1973). These small and often unregistered firms are of great concern for government policies, and the interest in the informal sector in Ghana is mainly because most households derive employment (61.5% in urban areas and 23.3% in rural areas, GSS, 2015) and earnings opportunities from informal economic activities. Especially for those unable to access the small but highly paid formal sector, running informal businesses elevates them from extreme poverty and economic hardships.

The informal non-agricultural sector in Ghana is predominantly urban (61.5% employed in urban areas and 23.3% in rural areas (GSS, 2015), with earnings from these activities often higher than earnings from agricultural activities which are mainly concentrated in rural areas. However, the risk of poverty in informal activities compared with formal sector jobs is high. The informal sector in Ghana, similar to other developing countries, sometimes acts as a haven for skill development, particularly for those coming from rural areas to urban and bigger towns (including the educated) to acquire skills that can enable them to thrive in a more challenging urban labour market (Bigsten et al., 2004). These individuals often relocate to urban areas due to the lack of wage jobs, and other labour market opportunities in rural areas. The concentration of informal economic activities in urban areas can also be associated with the limited employment prospects in wage employment which accounted for only 16.4% of total employment of persons aged 15 to 64 years in 2006 (GSS, 2008).

While the informal sector may be thought of as a sector dominated by people with lower levels of education, Ghana's informal sector attracts skilled and educated[15] individuals, who for one reason or the other may have lost their jobs in the formal sector, are struggling to gain access to formal sector jobs, or are new to self-employment. The proportion of skilled and unskilled individuals engaging in non-farm enterprises (informal) is 69.33% and 30.67% respectively (GSS, 2008). Some of these individuals engaging in informal economic activities may have obtained their skills while working in the formal sector. They therefore take advantage of the ease of entry into informal economic activities to further enhance their skills, while for instance,

[15] From the 2013 World Bank Informal firm survey for Ghana, 12.5% of informal entrepreneurs have not completed any educational qualification compared with 49.6%, 33.2%, and 4.7% that have completed basic, secondary, and university education respectively.

waiting to reinter into wage employment. For those that are educated but struggling to find jobs in the formal sector, informal economic activity is a transition period for them while waiting to find a wage job, e.g. in the public sector, or to be hired by a formal private organisation where wages are relatively higher. Bennett and Estrin (2007) refer to this stage as a 'stepping-stone'. Therefore, informal entrepreneurial activities in Ghana generally start as a very small unregistered enterprise with fewer or no employees. For those who want to go into self-employment, this phase allows them to make a choice whether to remain informal or register with the hope of expanding.

The informal sector in Ghana also makes indirect contributions to national output by supplying inputs (at relatively cheaper costs) to larger firms. Because informal entrepreneurs tend to be more flexible in terms of payments, and are able to build good customer relationships, some formal registered enterprises go into 'contract' with informal entrepreneurs to make products and purchase of raw materials, and pay back at a later date or through an alternative payment arrangement. The importance of informal firms in this regard agrees with the assertion of Porta and Shleifer (2008) that the informal sector could be productive, but their growth may sometimes be hindered by government regulations, and business conditions.

Lastly, entrepreneurial activities, formal or informal run by families (Parker, 2004) in Ghana. The literature on self-employment find that children from families where parents are business owners tend to have a higher probability of being self-employed themselves (Dunn and Holtz-Eakin, 2000; Hout and Rosen, 2000). There are plausible reasons in Ghana why coming from a family of self-employed parents could increase participation in self-employed or entrepreneurial activities. Parents with business ownership experience, registered or unregistered, could offer their children

exposure to running and maintaining a business, as well as informal training on-the-job. For instance, with businesses that operate in the compounds of the owner's home (and for businesses that operate in business districts, such as the regional capitals), children sometimes provide after-school business support services to their parents. Through these activities, children may then be motivated, because of their experience, to become entrepreneurs themselves especially if they expect to inherit the family business.

The discussion from the above shows how important informal economic activities are in Ghana. Through its employment creation and income-generating advantages, the informal economy is able to provide a source of livelihood for individuals who due to some reasons are unable to gain access into the higher paid formal sector. This study will show how family business experience and education are related with business success among unregistered firms in five urban areas.

4.2.1 Accounting for the larger share of unregistered businesses in Ghana

The percentage of people working in the rural and urban non-farm informal sector in sub Saharan Africa is almost 70% (ILO, 2002). In Ghana, the private informal sector accounts for about 41.9% of total employment (GSS, 2015). Most of these activities take place within households and temporary stalls. In some instances, informal businesses operate in open space, either by the roadside or at a desirable location where owners believe they can attract customers. Figures 4.1 and 4.2 show examples of the type and nature of informal economic activities taking place in Ghana.

Figure 4. 1 Informal economic activity in Suame Magazine, Ashanti region

Source: District life http://district.life/2015/06/24/celebrating-the-informal-sector/

Figure 4.1 shows a shop that deals in 'spare' car parts in Suame Magazine, a well-known area in Kumasi noted for car repairs and metal works. The business has the contact details on display, just like one will expect to find on business units in developed countries. As can be seen, this business owner is operating in an open space under a tree, which is where you normally find some unregistered businesses particularly those operating in the service sector. These kind of businesses normally operate in connection with the sunrise and sunset. Business usually opens around 6am and closes around 6pm. Due to the high cost of electricity bills, and because of the recent power crisis (Daily Graphic, 2015), these informal businesses try to avoid operating at night. A unique feature of some of these informal businesses is that, they are sometimes able to supply services and goods to formal businesses at relatively lower prices. This enables them to maintain a good customer relationship and as a way of increasing their client base. Services are usually the drop-in type and it is based on a first-come-first-serve basis, although in some instances "connections" can enable a client to receive a fast service.

Figure 4.2 also shows a picture of a convenience store in the national capital, Accra. The business is located on the roadside and easily accessible by all. Unlike figure 4.1 that usually operates until around 6pm each day, convenience stores in Ghana are open until late, sometimes midnight, depending on owners' availability. Businesses open as early as 6am, and are operated by family or hired workers who normally run shifts. Relative to other informal businesses in the manufacturing sector that rely heavily on electricity, convenience shops tend to have alternative sources of electricity. Most of these businesses use candles, rechargeable lamps, and lanterns in the evenings when there is blackout (commonly referred to as "dumsor" in Ghana). Convenience stores such as these are usually individually owned or family-owned, with occasional support from owner's children, normally after-school hours, or with additional help from relatives and non-relatives.

Figure 4. 2 Typical convenience store in Accra

Source: http://volunteering-ghana.blogspot.co.uk/

These examples of informal businesses in urban areas show how important the informal sector can be for some urban dwellers. Informal businesses provide employment opportunities and a source of likelihood for those unable to access the

formal sector. The participation of individuals in formal and informal activities is often because of stiffer government regulations and the associated costs and benefits of working in either registered or unregistered firms. The remainder of this section addresses some of the reasons for the rise in unregistered businesses in Ghana.

One major reason for the size and preference for informal economic activities in Ghana is the ease of doing business. Currently, Ghana ranks 114 out of 189 countries on the ease of doing business (World Bank, 2016), with a regional average of 128. In terms of starting a business, Ghana ranks low at a current position of 102, having dropped places from 97th in 2015. There are a number of reasons for the decrease in the country's current performance in registered business start-ups and operations. Firstly, given a low GDP per capita of $1,590, potential entrepreneurs are required to pay-in a minimum of 2.4% of income per capita before registration. This figure is considerably higher considering the extent of poverty and difficulty in assessing credit facilities. Based on this, potential entrepreneurs may find it more beneficial to operate unregistered businesses. In addition, firms are also required to pay 33.3% of their total profits in taxes, which is also too high given that current economic conditions in Ghana are unfavourable. Added to these, the total number of procedures required to register a business sometimes serve as a deterrent, as in many cases this requires payment of fees and other services, in addition to the minimum capital deposit. Currently, it takes an average of 14 days to go through formal registration process, compared with 8.3 days in OECD countries.

Another explanation for the larger share of unregistered business activities in the Ghana labour market is poor labour standards. The World Bank (1995), note for instance that in Latin America, the development of the informal sector was because of

high labour policies in the formal sector. In Ghana, workers in formal registered firms sometimes work strict and longer hours, often without overtime allowance. The poor labour standards and working conditions sometimes encourages individuals to go into self-employment and unregistered business activities since it offers more flexibility (e.g. no strict opening and closing times) and greater independence. Contrary to formal businesses, informal businesses are not required to adhere to working hour regulations, and they may find it easier to control hired labour.

Poor macro-economic conditions are also a contributory factor for the larger size of urban informal businesses. Looney (2006) and Wallace and Latcheva (2006), argue that a higher incidence of informality is associated with countries that experience regular economic downturns. During such periods, informal economic activities function as a 'safety net' for households and individuals, by providing them with alternative source of employment opportunities (Loayza and Rigolini, 2011). For instance, with the current economic reforms in Ghana, such as the public sector employment freeze, many individuals who are unable to find jobs in the highly paid public sector have ended up in unregistered business activities in order to earn some income. In addition, the recent power crisis in Ghana has led to decreased productivity and poor business performance (Daily Graphic, 2015). Businesses have responded to this by laying off workers, and those operating at a loss have had to shut down. These and other reasons may encourage those struggling to find jobs to start operating unregistered businesses.

Entrepreneurs also generally prefer to start unregistered businesses when there are high fixed entry costs to registered businesses. This relates in particular to the financial costs of registration and the time it takes to register a business, as well as the

poor access to credit facilities (Straub, 2005; De Soto, 2002; Djankov et al., 2002). According to World Bank (2016), Ghana moved from 36th to 42nd position in terms of access to credit. The World Economic Forum's Global Competitiveness Index (2016) report that the most problematic factor for doing business in Ghana is access to finance. As I discuss later in subsequent sections, there is evidence to suggest that unregistered firms mostly associate the lack of access to credit facilities as a major obstacle to registering their businesses.

For these and similar reasons, Bigsten et al. (2004) suggests that the incentive to operate in the formal economy is weak. Enterprises will find no potential benefits from running formal businesses. If the associated costs of registering businesses outweigh the benefits, then it is plausible that the share of unregistered and informal activities will remain relatively large. While serving as a buffer for the formal sector (Fields, 1990), the ease of entry and exit in this segment of the labour market makes it a natural safety net (Cunningham and Gomez, 2004) for those who are unable to participate fully in wage and formal employment. Informal and unregistered economic activities may persist and serve as an important alternative source of employment and livelihood in Ghana. Table 4.1 shows a comparable statistic of business and employment conditions/ regulations for Ghana and other regions.

Table 4. 1 Summary of comparable business and employment conditions

Measure	Year	Ghana	Sub-Saharan Africa	OECD (or other)	Notes and Sources
GDP per capita	2014	$1,590[1]	$1,638[1]	$39,223.3[2]	[1] Source: The World Bank, World Development Indicators [2] Source: OECD.stat
Wage and salaried workers (% of total employment)	2010	18.2[3]	26.6[4]	87.6[4] (Western Europe only)	[3] Source: World Development Indicators [4] Key Indicators of the Labour Market (KILM), ILO
Share of vulnerable employment (% of total employment)		76.8[5] (2010)	70.9[6] (2013)	7.7[6] (2013, Western Europe only)	Note: Vulnerable employment is unpaid family workers and own-account workers as a percentage of total employment [5] Source: World Development Indicators [6] Source: KILM, ILO
Ease of doing business	2015[7]	114	143	25	[7] Source: World Bank, 2016
Starting a business	2015[7]	102	128	45	[7] Source: World Bank, 2016 Note: Figures shown are rankings

Compared with Western Europe, the share of individuals in wage and salaried work in Ghana in 2010 was considerably low (87.6% as against 18.2%), and even lower than the sub Saharan Africa regional average of 26.6%. Looking at the share of

people in vulnerable employment, 76.8% (in 2010) of workers were in unpaid family work and own account jobs, compared with only 7.7% for Western Europe in 2013. These figures show undoubtedly how deprived some individuals in Ghana are, and how informal economic activities through its employment creation potential, is able to elevate people from poverty and give them a source of livelihood.

4.2.1.1 Other reasons for the size of the informal economy

Theories on the informal sector (Azuma and Grossman, 2008; Marcouiller and Young, 1995; Loayza, 1996) assume that, despite the benefits of better access to, for instance, credit facilities, operating a formal business or firm imposes burdens on firms through high taxes, compliance with regulations, and high labour standards. The decision to register one's business may therefore depend partly on the trade-off between the benefits and costs associated with becoming formal or remaining informal. The empirical literature relates the size of the informal economy to a host of factors including; tax rates, entry costs, institutional quality, and labour standards.

Ulyssea (2010) study the regulation of entry and the informal sector for Brazil. The author notes that, although an effective way of reducing the size of the informal sector is by increasing the enforcement of labour regulations, Ulyssea (2010), found that enforcement of labour regulations potentially increased unemployment. This finding implies that formalising economic activities can have adverse effects on economic welfare, due to corresponding job losses and high unemployment rates. An interesting and more plausible finding was that, lowering the costs of entry into the formal sector improved employment composition. The author therefore suggests that a better approach to reduce the size of the informal economy, and improve economic welfare in countries of high informality is instead to reduce the costs associated with

registering or operating formally, rather than imposing penalties on businesses that are already struggling to raise sufficient funds to register or stay in business.

Similar to Ulyssea (2010), Auriol and Warlters (2005), also argue that a key reason why micro and small businesses prefer to remain informal in developing countries is due to the large fixed costs associated with operating formally. However, the authors also note that high costs are sometimes part of government's deliberate attempt to raise tax revenue. By increasing entry cost by 1%, the authors found the informal sector to increase by 14% in developing countries. Similar to Ulyssea (2005), Auriol and Warlters (2005) suggest that in order for governments to increase the tax base, a policy of reducing costs of entry into the formal sector would be more appropriate.

In a related study on determinants of the informal sector, Friedman et al. (2000) do not find evidence in support of the fact that higher taxes induces informal economic activities. What the authors found interestingly however, is that, informal activities were associated with countries that have weaker legal environment, higher levels of corruption, and countries with higher levels of bureaucracy. Thus, countries with lower regulations on businesses have lower informal economic activity rates. The findings from this study suggests that when faced with tougher government regulations and market inefficiencies, such as corruption, those operating in the informal economy will be compelled to hide their activities from government officials in order to avoid paying the high costs associated with operating formal enterprises.

These findings are partly in line for the case of Ghana, and many other developing countries, where due to government regulations and ineffective

institutions, entrepreneurs prefer instead to operate informally, regardless of the disadvantages.

4.2.2 Informal employment: Regional estimates in developing economies

In most regions of the world, informal economic activities serve as the main source of livelihood and income. This arises partly because of government regulations on businesses and macroeconomic conditions, as well as labour standards. Regional estimates across developing economies show that non-agricultural informal employment comprises of over half of total employment. Apart from South Asia that had a total informal sector employment rate of 82%, from 2004 to 2012, as shown in table 4.2, SSA had the largest share of informal employment as a percent of non-agricultural employment. 66 percent of men and women were operating in the informal economy from 2004 to 2012. Urban China had the lowest share of workers in informal employment during this period. Across most regions, a larger proportion of informal workers were women. For example, in SSA, the share of women in informal employment was 74% compared with 61% for men. The only region where the proportion of women in informal employment was lower than men is the Middle East and North Africa.

Table 4. 2 Informal employment as percentage of non-agricultural employment: 2004-2010

Region	Women (%)	Men (%)	Total (%)
South Asia	83	82	82
SSA	74	61	66
Latin America and the Caribbean	54	48	51
Urban China*	36	30	33
East and Southeast Asia (excluding China)	64	65	65
Middle east and North Africa	35	47	45

* China based on six cities: Fuzhou, Guangzhou, Shanghai, Shenyang, Wuhan, and Xi-an
Source: Based on Vanek et al. (2014: 11, Table 1)

Even in terms of wage and self-employment, the regional estimates indicate that SSA had the lowest share of workers in informal wage employment. Across all regions however, the rate of workers in informal wage employment was below 50%. In SSA, 67% of informal workers were self-employed. It is interesting also to note that, a larger proportion of men were in informal wage employment, compared with women who were disproportionately in informal self-employment. This is a possible indication that women may prefer to sort into occupations that allows them flexibility and time to manage household production, whereas men are simply interested in salaried jobs. Table 4.3 shows a breakdown of the share of men and women in informal wage and self-employment.

Table 4. 3 Informal wage and self-employment as percentage of non-agricultural informal employment

Panel a. Informal wage employment			
Region	Women (%)	Men (%)	Total (%)
South Asia	42	49	47
Sub Saharan Africa	24	42	33
Latin America and the Caribbean	49	48	48

Urban China*	52	47	49
East and Southeast Asia (excluding China)	39	56	49
Panel b. Informal self-employment			
South Asia	58	51	53
Sub Saharan Africa	76	58	67
Latin America and the Caribbean	51	52	52
Urban China*	48	53	51
East and Southeast Asia (excluding China)	61	44	51

* China based on six cities: Fuzhou, Guangzhou, Shanghai, Shenyang, Wuhan, and Xi-an
Source: Based on Vanek et al. (2014: 11, Table 4)

4.2.3 Conceptualizing the informal economy

Since its inception in the early 1970's by Hart (1973), the concept of the informal economy has received considerable attention among researchers and policy makers, although no consensus has been reached regarding its conceptualisation. The literature on the informal economy continues to remain vague with some authors associating it with illegal activities (Maloney, 2004; Schneider and Enste, 2000). One of the dominant notions of informal economic activities is that it offers a solution to poverty and unemployment in regions where there is high incidence of informality. Divergent views have led to the categorization of the informal economy according to three main schools of thought; the structuralist, dualist and the legalist schools. This section provides an overview of these schools of thought. It also includes an alternative view, the voluntarist school.

4.2.3.1 Dualist Approach

The dualistic school of thought stems from the work of Lewis (1954), Harris and Todaro (1970), and Hart (1973). This school of thought views the informal economy as an inferior segment of the labour market with no direct link to the formal economy. Bacchetta et al. (2009) argue that the informal sector is a residual that arises

mainly from the transformation process in a developing economy. According to the dualist view, the informal economy exists, in part because, the formal sector (often regarded as the sector that provides 'good jobs' and higher wages) is not able to offer employment opportunities to all individuals. The formal sector therefore offers employment opportunities for those with higher education, since these individuals tend to be more productive, compared with informal workers who are often assumed to have lesser education and are less productive (Porta and Shleifer, 2008).

4.2.3.2 Structuralist Approach

This school of thought views the informal economy as comprising of small firms and unregistered workers subordinated to large capitalist firms (Castells, 1989, Chen, 2012). It emphasises interdependence between formal and the informal sectors, with firms in the informal economy supplying cheap labour and inputs to larger firms, thus improving the competitiveness of larger firms. Growth according to the structuralist view has minimum impact on eliminating informal production because of the interdependence from large formal firms (Castells, 1989). As such, the structuralist school of thought views the informal economy as a productive part of the economy because of the direct linkage with larger firms and ability to supply inputs at lower costs.

4.2.3.3 Legalist Approach

Contrary to the dualist and structuralist views, the legalist school of thought views the informal economy as a sector characterised by micro-entrepreneurs who operate informal enterprises in order to avoid the large costs associated with running formal establishments (de Soto, 2000). This school of thought clearly articulates some of the reasons associated with firms' decision to remain informal in many developing

countries. For this reason, workers in the informal economy are considered a hindrance to economic development. By operating micro and small enterprises, firm owners are able to avoid detection by government officials, and according to Farrell (2004), the cost advantage in terms of tax avoidance and government regulation usually tend to outweigh the small scale and productivity of informal businesses. This may therefore encourage them to remain informal.

4.2.3.4 Voluntarist school

This school of thought views the informal economy as made up of firms that deliberately engage in informal activities in order to avoid government regulations and taxes (Maloney, 2004). The voluntarists are similar to the legalists but unlike the legalist, the voluntarists do not necessarily blame the cost associated with registering to operate formally for their decision not to register. This school of thought therefore suggest that, business owners in the informal economy may choose to register their businesses willingly, bearing in mind that the benefits from not registering may outweigh the costs of registering.

These different perspectives suggest that informal entrepreneurs sometimes choose, or volunteer to work in the informal economy. As per Chen (2012), informal and unregistered business activities grow during periods of economic downturn, and as in many developing countries such as Ghana, the surge in the number of people engaging in informal economic activities may be attributed to government regulations on businesses, macroeconomic conditions, and in part, a result of market inefficiencies.

4.3 Previous research: Education, family background, and entrepreneurship

Since the work of Mincer (1974) two main factors; education and experience, have been found to have positive impact on individual earnings (Psacharopoulos, 1993). As the model applies more to wage employees, it centres on measurable returns such as income, but education may also benefit the entrepreneurs' performance in other ways, such as, the growth of the enterprise, firm productivity, and profitability of the enterprise. Human capital theory suggests that knowledge acquired from education provide individuals with greater abilities that could affect firm performance by making entrepreneurs more productive and efficient. Educational attainment should therefore affect the performance of enterprises, measured by, for example, the growth of the enterprise, productivity, and profitability.

In addition, because individuals aim to maximize their economic benefits given their level of human capital, highly educated individuals may in effect choose not to become entrepreneurs, simply because, being self-employed could potentially lead to reduced income compared with being in wage employment. On the other hand, entrepreneurs that have invested more in human capital will be willing to stay in business and grow their enterprises to achieve higher profits, compared with those that have invested less in their human capital (Cassar, 2006). However, this decision can be influenced by a host of factors, such as the nature of the business environment, access to credit facilities, and government regulations.

Although economic theory suggests that education enhances earnings and productivity, in circumstances of poverty, running a successful business in urban Ghana could depend less on education. The poor macroeconomic conditions and unfavourable business environment could make it less lucrative and difficult for

businesses to survive. Educated and well-connected individuals may instead seek jobs in the highly paid formal sector, or through their connections and support of parents, be able to access credit facilities that can help them to grow their businesses. This means that those with limited opportunities are left to operate informal businesses. The level of corruption (currently Ghana ranks 56 out of 168 countries according to Corruption Perception Index, Transparency International, (2016)) implies further that individuals with less "connections" and limited access to, for instance credit facilities will operate in the informal economy. What might therefore be an engine of business success among unregistered firms is the experience and exposure to business skills acquired because of growing up in a family with parental business ownership. Family background through parents' business ownership may therefore be a vital factor.

The remainder of the section discusses evidence from the literature on education and firm performance. Most of the available evidence are related to developed countries and the formal sector (manufacturing firms), with very few studies examining this for developing countries.

4.3.1 Education, entrepreneurship and firm performance

It is often argued that firm owners and employees in Micro and Small Enterprises (MSEs) in less developed countries have fewer years of education than their developed country counterparts, mainly because well-educated individuals tend to place themselves in larger firms where they receive higher wages (Nichter and Goldmark, 2009; Sluis et al., 2005). In a study on seven West African countries, Pasquier-Doumer (2013) examine intergenerational transmission of self-employment, and find interestingly that the effect of owner's education on sales is negative and insignificant. The author however does not provide any reason for this negative effect.

Although not addressing the informal sector, Alvarez and Crespi (2003) examined the differences in technical efficiency among Chilean MSE manufacturing firms. Interestingly, the authors also find that highly educated firm owner's do not induce higher efficiency of the firm. They attempt to explain this negative relationship by assuming that control activities are the result of knowledge, effort and time monitoring of the workers. They suggest that due to higher opportunity costs of monitoring, highly educated firm owners focus less efforts in monitoring activities.

On the other hand, there are compelling evidence of the importance of education for firm performance for developed countries (Parker and Praag; 2006, Bosma et al., 2004). Other studies by Sluis et al. (2005) and Van Praag et al. (2013), show how schooling raises firm performance. Davidsson and Honig (2003), find that human capital, in the form of education is important for nascent entrepreneurs in Sweden. The authors also found that, as businesses moved away from start-up phase, the effect of education became less important. For instance, the authors found no significant effect of education of the owner on making sales or on business profitability. Possible explanations given by the authors, although speculative are that, as the entrepreneur move from start-up to exploitation, they may be confronted with other activities that require different forms of human capital, possibly experience, and not necessarily education, similar to the reason given by Alvarez and Crespi (2003). The authors further suggest that success of businesses may be facilitated by education in addition to the effects of family and individual connections, a reason that is plausible, and might be more applicable in labour markets with intermediaries. In developing countries, there are also evidence of positive effects of owner's education

on firm productivity, but mainly in the formal sector and among manufacturing firms (Aggrey et al., 2010; Goedhuys et al., 2008).

In a similarly related literature on informal entrepreneurship and education, Jiménez et al. (2015) find that tertiary education leads to an increase in formal entrepreneurship, whereas for informal entrepreneurship, tertiary education reduces the rate of informal entrepreneurship. A suggested reason according to the authors is that, entrepreneurs with higher educational attainments may be more aware of some of the negative implications of engaging in informal activities, such as detection by government authorities leading to fines, reduced access to credit facilities, and limited scope for expansion.

This evidence show that the effects of education on enterprise performance are mixed. The effects may vary by, for instance, economic conditions (developed vs developing countries) and type of employment sector (formal vs informal). Typically, individuals that are more educated will be in wage employment rather than self-employment, which tend to have lower and uncertain incomes. Educated owners could therefore underperform when operating informal businesses, due to the perceived negative consequences of operating informal and unregistered businesses. The study pursues this possibility and adds to the dearth of evidence for developing countries by examining the effects of owner's education on performance of unregistered businesses, and on the intention to register.

4.3.2 Family background and entrepreneurship

The literature on self-employment shows that children of business owners have a higher likelihood of becoming self-employed themselves compared with children from non-business ownership backgrounds (Fairlie and Robb, 2007a; Dunn and Holtz-

Eakin, 2000; Hout and Rosen, 2000; Chlosta et al., 2012; Colombier and Masclet, 2008). Some explanations for the intergenerational transmission are that, the human capital acquired through informal learning and apprenticeship-type training provides an opportunity correlated with business success (Colombier and Masclet, 2008; Lentz and Laband, 1990). Key business skills necessary for firm performance can also be obtained through exposure to, and experience in an entrepreneurial environment, a suggestion that individuals from families that own a business might have an advantage (Kim et al., 2006). For instance, Fairlie and Robb (2007a) find that previous experience in a family-owned business improves the outcomes of small businesses. They also find business outcomes to improve for those with previous experience in businesses that deal in similar goods. Dunn and Holtz-Eakin (2000) find that the probability of being self-employed are higher among those whose fathers were involved in self-employed activities. This suggests, according to Fairlie and Robb (2007a), that this relationship might occur due to the ability of self-employed parents to transmit business skills to their offspring, rather than simply based on the similarities in the desire to be self-employed.

Another explanation of the intergenerational correlation is that self-employed parents are able to provide moral and financial support to potential entrepreneurs (Steier and Greenwood, 2000) than individuals from families with no business ownership. Wealthy families may act as a source of funding where for instance, capital needs are modest (Parker, 2004), and where it is difficult to raise large amounts of money to start a business (Bertrand and Schoar, 2006), a reason that can be associated with Ghana and other developing countries. Evidence also show that family members in self-employment are able to transfer resources in the form of credit facilities, and

knowledge to other members of the family (Dunn and Holtz-Eakin, 2000). Particularly in Ghana where access to finance is limited for businesses (Global Competitiveness Index, 2016), extended family members usually help raise funds for potential entrepreneurs to start businesses, often with the hope that these businesses will become successful and serve as a means of employment for other family members in the future. In addition, family members can avail themselves for use as additional input in the business process, either as paid or unpaid labour, a practice common among many developing countries, where access to paid jobs are restricted.

Despite Hout and Rosen (2000) finding that the employment status of fathers are a major determinant of children's likelihood of becoming self-employed, the authors also find interestingly that, men who were raised in households with neither parents were less likely to become self-employed, compared with men that grew up in households with both parents. This finding suggest that the presence of both parents could be important for children's employment outcomes. Parents could therefore serve as role models (Bosma et al., 2012), and could provide children with business management skills. Chlosta et al. (2012), find evidence in support of this, that in households where parents usually serve as role models for their offspring, these individuals are often associated with a higher likelihood of becoming self-employed.

Although evidence support intergenerational mobility of business ownership, there is limited empirical evidence on the effect of family business background on business outcomes. Among the very few studies for developed countries, Fairlie and Robb (2007a) found that family business background is important for firm profits in the US (although they also find a negative insignificant effect on sales). The authors however note that, the main effect of family background was through the informal

learning that occurred when individuals worked in a family business, rather than simply as a result of having self-employed parents (Lentz and Laband, 1990). In a similarly related literature on nascent entrepreneurship, Davidsson and Honig (2003), showed that individuals having parents in business increased the odds of nascent entrepreneurship. However, the authors found that as the business progressed, the effect of having parents in business became less important. Other forms of social capital, such as individual contacts via friends/neighbours and membership in business networks were found to be more important for obtaining sales and making profits.

For developing countries, there are not many studies that specifically address the impact of family background on informal business outcomes. An exception is Pasquier-Doumer (2013) who addresses the impact of parental self-employment status (only fathers') on business outcomes (measured by value added and sales) for seven West African countries. The author finds in contrast to developed countries that, those with self-employed fathers do not significantly affect the performance of firms. Pasquier-Doumer (2013) argues that, because of the poor access to valuable human, physical, and social capital, self-employed fathers are unable to make significant effects on their children's businesses, compared with informal entrepreneurs without a self-employed father. A similarly related study by Fafchamps and Minten (2002) for Madagascar investigates whether social networks in the form of relatives enhanced firm productivity among agricultural traders or not. The authors note that those whose relatives were engaged in agricultural activities did not benefit from a positive effect on productivity. What the authors found instead was that, higher productivity was associated with individuals that had no informal training from relatives. In contrast to

these, family socioeconomic background, measured by parent's occupation was found to increase the incomes of informal entrepreneurs in Jamaica (Honig, 1998).

The review so far shows that evidence on the effects of family background on informal business outcomes is scarce and inconclusive for developing countries. In an environment where government regulations on business start-ups are tough and costly, labour market connections through parents' business knowledge and social networks, and informal learning experience from having parents with business ownership could be more valuable for business performance. By assuming that growing up in a family where parents owned/own a business could confer on the individual better endowments and managerial skills, this chapter examines in addition to education of firm owners, whether family background is important for the performance of unregistered businesses.

4.4 Data

The data used are from the 2013 World Bank Informal Enterprise Survey (IFS) for Ghana. The survey collected data on non-registered businesses across five urban cities in four regions of Ghana: Greater Accra (Accra and Tema), Western (Takoradi), and Northern and Ashanti regions (Tamale and Kumasi). Each urban city was divided into zones based on regional considerations and the concentration of informal business. Overall, 180 zones were identified, and a minimum of four interviews were conducted per identified zone. An informal enterprise is defined by the study as a business not registered with the Registrar's General Department. Illegal activities (e.g., prostitution or drug trafficking), as well as domestic helpers are excluded from informal activities.

The survey has 729 firms across the service and manufacturing sectors. The sample is restricted to unregistered firms where the majority owner is also the main decision maker. This eliminates some of the possible measurement and reporting errors associated with, for example, quoting monetary values such as sales revenue that might affect the reliability of the results if the respondent is not the main decision maker. There are very few non-decision making owners and therefore their exclusion does not lead to sample truncation. This leaves a sub-sample of 707 firms of which 54.1% have workers, and the remaining 45.9% having no workers (defined as micro firms). The relatively fewer number of informal firm owners who are also not the main

4.4.1 Summary descriptive

Table 4.4 shows summary statistics for the variables used in the study. Average years of education is 9.2 years for both firms with workers and firms without workers. This is equivalent to completing basic education. The average number of workers is 2.3. 63 percent of all firms are female-owned with the remaining 37% being male-owned. While there are more female than male owners in the sample, female owners are disproportionately represented among smaller, micro firms. One reason for the stronger representation of female owners in the sample may be that women may engage in self-employment because it offers them flexibility by allowing them to balance their need to complement family income with their responsibilities for taking care of their children and other family members (Arias and Bendini, 2006). Looking at the descriptive by firm size, the average years of education are 9.1 and 9.3 for firms with employees and firms without employees (micro firms) respectively. In terms of performance, measured as sales and profits, there are higher sales and profits per month for firms with workers compared with firms without workers. Specifically,

firms with no workers make an average profit of 817.9 Cedis (equivalent to £146.04) per month, and 1,115.95 Cedis for firms with workers (equivalent to £199.3).[16]

Table A4.1 and A4.2 in the appendix also shows correlation matrix of the main variables for firms without workers and firms with workers. There is a significant positive correlation between owner's education and firm performance for firms with no workers. There is no significant correlation between education and performance for firms with workers. From the correlation matrix, there is also a positive correlation between education and parents' education for both firms with workers and firms without workers. There is a positive correlation between education and parents with business ownership. For female owners in both firms with workers and firms without workers, there is a negative correlation with firm performance.

Table 4. 4 Summary statistics of variables

	Firms with no workers	Firms with workers	
	Mean	Mean	T-value
Log of monthly sales	6.28	6.77	-5.11
Log of monthly profit	5.82	6.16	-2.63
Average monthly sales (in Cedis)	1096.11	1752.11	-2.9
Average monthly profits (in Cedis)	817.85	1115.95	-1.4
Number of workers		3.41	
Hours operated per week	62.61	60.55	1.03
Education of owner (years)	9.06	9.27	-0.65
Experience in the sector (years)	8.18	10.99	-4.22
Age of owner	38.45	40.63	-2.41
Own funds	85.76%	85.38%	0.14
Electricity	49.82%	63.44%	-3.39
Cell phones	70.86%	82.90%	-3.68

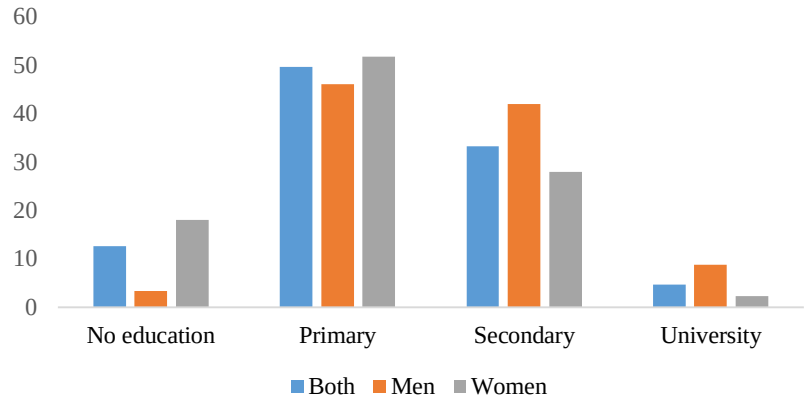
[16] Conversion rate used is from the Bank of Ghana interbank FX rate (£1=GHS5.6)

Parents: no business ownership	54.36%	53.37%	0.25
Parents: post basic education	29.06%	21.59%	2.05
Female owner	68.87%	57.39%	3.03
Inclined to register	40.41%	59.57%	-4.83

Source: Author's own calculation from IFS 2013

Figure 4.3 shows that most firm owners have completed primary education, with only 4.65% having completed university. 12.56 percent of firm owners have no education. It also shows that a high proportion of firm owners have completed secondary education (33.18%). Male-managed firms tend to have a high post-primary education completion rate than female-managed firms. 41.91 percent of male firm owners have competed secondary education compared with 27.97% of female-managed firms. Firm owners with post-basic education have less experience in sector of operation (8.7 years compared with 10.3 years) than those with no post-basic education. This could possibly be because more educated firm owners are in informal activities while waiting to find jobs in the formal and public sector, a phenomenon that Bennett and Estrin (2007) refer to as a 'stepping-stone'.

Figure 4. 3 Education level of firm owners



In terms of firm performance, sales are higher for firm owners with university education. For example, firm owners with university education are associated with an

average of 1,812.6 Cedis a month. Owners with no education have an average of 1,564 Cedis a month. Looking at this by firm size, owners with no education in firms that have workers have higher sales per month compared with those with a university qualification, as well as those with basic and secondary education. For firms with no workers however, informal entrepreneurs with an educational qualification have higher average sales per month compared with those without any educational attainment. In terms of profit, firms with no workers whose owners have an educational attainment are associated with higher profits. This is in contrast to firms with workers, where owners with no education are associated with higher profits. These of course can be traced to the fact that in firms with workers, owners without education have lower costs compared with owners with university education, whose costs are noted to be almost 200 Cedis higher. Table A4.3 in the appendix shows a summary of performance of firms by firm owner's level of education.

Since family business experience acts as a channel of informal training, it is plausible to examine performance based on whether owners with family business experience have higher performance than those without family business experience. For both sales and profit that owners whose parents have business ownership tend to perform better. For instance, in firms with no workers, owners with no family business experience have an average monthly sale of 963.5 Cedis compared with 1249.4 Cedis for those with family business experience. Looking at this for firms with workers, owners with family business experience have average monthly sales of 2149.4 Cedis compared with 1359.9 Cedis for owners with no family business ownership. These are similar when compared with profits. Owners with family business experience have higher profits per month compared with owners with no family business experience.

This seems to suggest that, informal learning experience through parents' business ownership may be an important source of success for informal entrepreneurs in the five urban cities of Ghana, as my earlier discussion of the literature suggests. Table 4.5 shows performance of firms based on parents' business ownership.

Table 4. 5 Performance by parents' business ownership

Panel a. Monthly sales		
	Parents have no business ownership (in Cedis)	Parents have business ownership (in Cedis)
Firms with no workers	963.47	1249.44
Firms with workers	1359.86	2149.38
Panel b. Monthly profits		
Firms with no workers	676.00	979.40
Firms with workers	755.58	1418.70

Moving away from education and family background, an important feature of businesses in developing countries is the use of cell phones, and reliance on electricity in the production process. Since most companies do not have internet access or landline telephones, cell phones are particularly useful for placing orders, and communicating with customers. As regards electricity, securing access to the national grid can be a tedious exercise; it takes on average 79 days to secure access (World Bank, 2016). 77.9% and 59.3% of firms in the sample use cell phones and electricity respectively. I find that the use of cell phones and electricity increases with the level of education. For instance, 55.6% (86.7%) and 31.4% (88.9%) of firm owners with no education (with university education) reported using cell phones and electricity respectively, whereas 86.7% and 88.9% of firm owners with university education

reported using cell phones and electricity respectively. Figures 4.4 and 4.5 shows a detailed breakdown of education level of firm owners and use of cell phones and electricity.

Figure 4. 4 Education of owner and use of cell phones

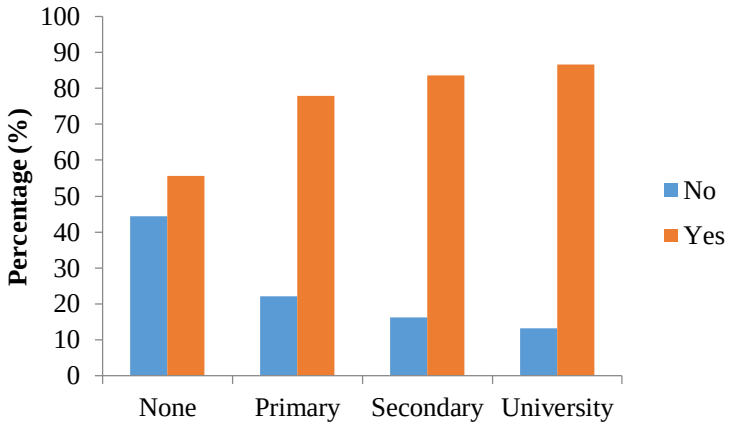
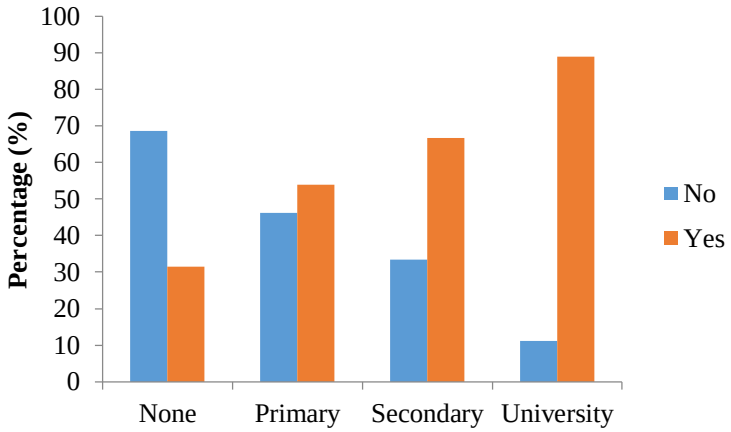


Figure 4. 5 Education of owner and use of electricity



The reason for remaining unregistered is usually associated with the costs and benefits of registering businesses, which I discuss in the next section. Where the costs associated with registering outweighs the benefits, firm owners will prefer to remain informal. However, the motivation and inclination to register a business could be related to owners' level of education. Table 4.6 shows that the intention to register

increases with the level of education. 35.1% of owners with no education reported that they were willing to register their business, compared with 63.4% of those that have completed secondary education. This is similar to Amin (2011) that more educated individuals show a greater willingness to register in Latin America's informal economy. There is also a positive correlation between firm owner's intention to register and firm performance. There are positive correlations between these variables as seen in the correlation coefficients in appendix A4.1 and A4.2.

Table 4. 6 Education of owners and intention to register

	Intention to register		
Level of education	No	Yes	T-value
None	64.94	35.06	3.00
Primary	56.39	43.61	3.55
Secondary	36.59	63.41	-4.31
University	29.63	70.37	-2.05

4.4.1.1 Obstacles to registering and doing business

As discussed in section 4.2.1, the reasons associated with operating informal businesses in Ghana is partly due to government regulations and business conditions. These are examined further by looking at the descriptive on some of the obstacles to registering and doing business. Figure 4.6 shows the perceived obstacles to registering businesses. In general, when firm owners were asked whether they would like to register their business, 51.2% indicated they would be willing to register. Despite almost half of firms' willingness to register, these firms face obstacles that potentially affect their ability to register. For instance, time, fees, and paper work associated with the registration process were among some of the reasons firms gave in support of their decision to remain informal. 42.57 percent of firms also indicate that payment of taxes was one of the main obstacle to registering their businesses with the Registrar General.

18.95% and 18.67% are of the opinion that inspections and meetings with government officials, and bribes paid out to officials when businesses are registered were some of the obstacles to registering businesses. In addition, 33.8% of firms were of the view that there were no benefits from registering their businesses.

Despite the obstacles to registering, firm owners believed that, there were some associated benefits from registering. In figure 4.7 51.06% of firm owners were of the view that registering will give them better access to finance and loans. 37.06 percent of firm owners also believed that by registering their businesses, they were more likely to have better access to raw materials, infrastructure and government services. For both firms with workers and firms without workers, limited access to finance or loans, and problems associated with electricity supply were the two biggest obstacles faced by firms.

Figure 4. 6 Obstacles to registering business

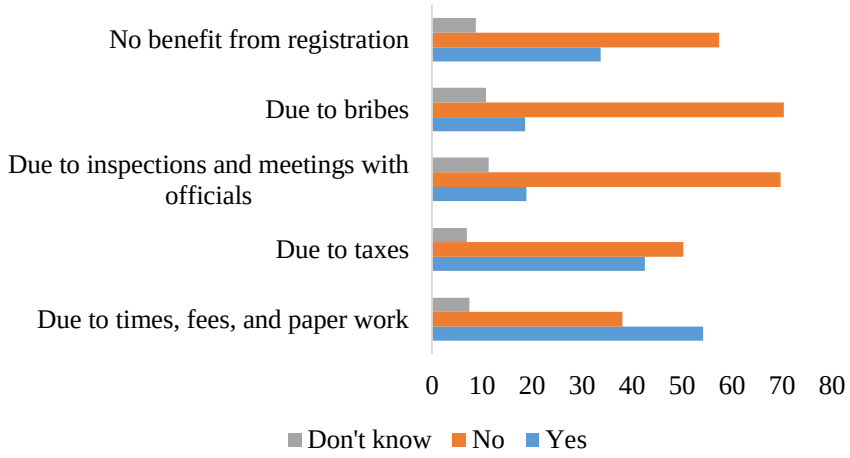
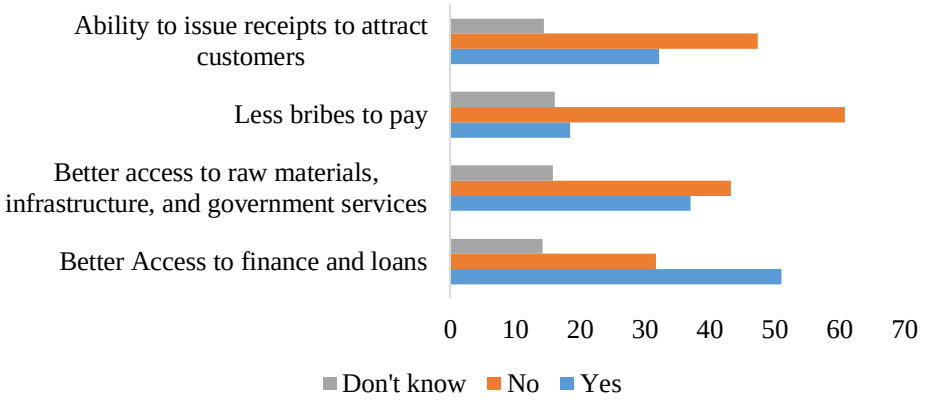


Figure 4. 7 Benefits from registering business



Examining the obstacles faced by businesses based on firm size, both firms with workers and firms without workers indicate that the biggest obstacle is the limited access to finance or loans. This is followed by the limited access to land and infrastructure. Table 4.7 shows summary of the biggest obstacles faced by firms.

Table 4. 7 Biggest obstacle faced by the business

	Firms with no workers	Firms with workers
Limited access to finance or loans	39.63	34.47
Limited access to land	16.1	12.11
Corruption	0.62	0.53
Crime	0.62	3.16
Problems with electricity supply	26.01	33.42
Problems with water supply	8.05	10.26
Limited access to technology	0.93	2.37
Inadequately educated workforce (including owner)	1.24	0.26
Don't know	6.81	3.42

4.4.2 Variables used in the analysis

Performance is measured in two ways; sales from the previous month in Cedis, and total profit per month in Cedis. Profit is calculated as the value of sales per month less costs (costs of electricity, transportation, raw materials, and the total amount paid to workers). An advantage of using total profit as an additional measure of performance is that it facilitates a comparison of the returns to education. Most previous research for paid employees calculate these using earnings as the dependent variable, and profits can be interpreted as residual income for the unregistered firm owner.

Education is measured in years of completed schooling for the firm owner with a maximum of 16 indicating completion of a university education. Education is also included as a categorical variable in the regressions presented in the appendix in order to identify the true effects of the returns to various educational qualification attainments. In addition to formal education, experience of the firm owner in sector of operation as an additional measure of human capital in the regressions. Family background is measured as parents' education and parents' employment status as reported by respondents. Parents' education is defined by whether parents have post-basic education or no post-basic education.[17] Similarly, parents' employment is defined by whether or not parents own/owned a business. Having a parent with business ownership may increase the opportunities available to the individual to accumulate human capital (through informal education on the job, and experience) which then becomes valuable to the individual through its effects on performance.

[17] The education data does not specifically indicate the level of father's and mother's education separately, hence the term parents' education

A series of control variables that in the wider labour economics literature are known to affect income are included in the regressions. These include a dummy variable to control for gender, and the number of hours that the business operates per week. Other variables capture firm specific characteristics and include the number of workers used in the business, and intermediate inputs defined by the source of funds, use of cell phones, and use of electricity. I use these imperfect measures of physical capital because of the difficulty in obtaining direct measures of physical capital. Geographic location is also included to account for regional variations in firms' activities and the business environment. Table 4.8 shows a summary definition of the variables used in the empirical analysis.

Table 4. 8 Summary definition of variables

Variable	Definition
Log of monthly sales	Log of monthly sales (Cedis)
Log of monthly profit	Log of monthly profits (Cedis)
Intention to register	Whether firm owner would like to register the business in the future
Education (in years)	Highest level of formal education completed by owner
Experience (in years)	Experience of owner in the sector
Own funds	1 if firm uses internal source of funds, 0 if otherwise
Use electricity	1 if firm uses electricity for the business, 0 if otherwise
Workers	Number of workers
City	City of the business. Reference group: Accra
Use cell phones	1 if firm uses cell phones, 0 if otherwise
Parents: No business ownership	Parents do not own a business
Parents: Post-basic education	Parents have Post-basic education
Hours per week	Number of hours business is operated per week
Female owner	If the owner is female
Age (in years)	Age of the owner

4.5 Empirical specifications

4.5.1 Unregistered firm's production function: Sales per month

Firstly, the study estimates the firm's production function (measured by monthly sales) in which inputs include human and physical capital, and labour. Human capital is measured by the years of completed schooling and experience of the enterprise owner. An additional variable included in the production function framework is family background measured by parents' education and parents' business ownership. Family background is assumed to be a potential source of informal learning for firm owners which could then improve performance of firms. The augmented production (measured as sales per month) function I estimate is:

$$lnSALES_i = \alpha_0 + \alpha_1 EDUC_i + \alpha_2 EXP_i + \alpha_3 FB_i + \alpha_4 K_i + \alpha_5 L_i + \alpha_6 X_i + \alpha_7 R + \varepsilon_i \quad (10)$$

where $lnSALES$ is the log of monthly sales for each firm; $EDUC$ and EXP are the years of education and experience of the owner in the sector respectively. FB is family background measured as parents' level of education and business ownership. K is a vector of capital inputs capturing whether the firm uses electricity or not, outside sources for funds, and use of cell phones; L is the number of workers; X is a vector of firm and owner characteristics; R and ε are regional dummies and a random error term respectively. All regressions are estimated separately for firms without workers and firms with workers.

4.5.2 The profits equation

Secondly, I estimate a profit equation of the form;

$$lnPROFIT_i = \beta_0 + \beta_1 EDUC_i + \beta_2 EXP_i + \beta_3 FB_i + \beta_4 K_i + \beta_5 L_i + \beta_6 X_i + \beta_7 R_i + \varepsilon_i \quad (11)$$

where $lnPROFIT$ is log of total profit per month. All regressions are estimated for firms without workers and firms with workers.

In considering the effect of owner's education on profits and sales, there are at least two possible sources of bias when OLS is used to estimate the relationship. Firstly, as in standard earnings regressions, the schooling decision is likely to be endogenous because individuals are likely to base their schooling decision in part on the future expected returns. Secondly, there may be unobserved individual characteristics such as ability that may affect schooling and subsequently business performance. The omission of these variables is likely to bias the OLS estimates. However, the survey data do not include a good instrument for education, therefore, making it impossible for me to use an instrumental variable technique in this study. In particular, the only candidate instrumental variable, family background is associated with mixed results when used as instrumental variable (see for instance Ashenfelter and Zimmerman, 1997), and is one of my variables of interest. More pertinently, family background can affect both owner's education and business outcomes.

While disaggregating into two groups - informal entrepreneurs with workers and informal entrepreneurs without workers, it is possible that better performing firms will have certain characteristics that lead to a relatively larger firm size. To try to address this issue, I experimented by using the experience of the informal entrepreneur as an exclusion restriction. This was in part because it was insignificant in the sales regression, and also because more experienced entrepreneurs are more likely to have larger firm size compared with entrepreneurs with less experience. However, the correction term is insignificant in the outcome equation although it is significant in the selection equation. As such, it was considered preferable to include experience as an

additional regressor because of the expected indirect effect on performance outcomes, and OLS is used.

4.5.3 Intention to register: Predicting registration

Lastly, the study examines possible factors that impact on the likelihood of registering using a binary outcome model of the form;

$$\Pr(REG_i = 1) = \gamma_1 EDUC_i + \gamma_2 FB_i + \gamma_3 LnPROFIT_i + \gamma_4 X_i + \upsilon_i \quad (12)$$

where the outcome variable, REG is the firm owner's intention to register, and is captured by a variable that takes the value of 1 when the firm owner indicates that they intend to register the business, and 0 otherwise. A major limitation of the dependent variable is that it does not necessarily imply that the firm owners will register even if they intend to do so - it is only a measure of intention. Nevertheless, the responses should accurately reflect the intention of the firm owners since they have no particular incentive to lie, knowing that a possible benefit of registering is gain access to finance. The consistency of this measure are examined by comparing individual owner's intentions with responses to questions on the main obstacles to business development and the expected benefits from registration. The responses to these questions are in line with stated intentions to register or not in the future.[18]

4.6 Results and discussion

4.6.1 Effects of education and family background on firm sales

Table 4.9 presents results from the OLS regression estimates that uses log of firm's monthly sales as measure of firm productivity. It is important to look at sales figures and not only rely on profits, as these may be more accurate. Sales figures are

[18] Examples of biggest obstacles are limited access to finance or loans and problems with electricity supply. Full details of obstacles to business can be seen in section 4.4.

also easy to track by firm managers compared with profits that require careful calculations. All regressions are estimated separately for firms without workers and firms with workers. This is to allow for the possibility of economies of scale generating a sales gap which arise between firms with and without employees, in part because firms may adopt similar if not the same production techniques and production function. In addition, due to differences in the stock of knowledge available to unregistered business owners, and motivations, unregistered firms may use different combinations of inputs, leading to possible differences in the relationship between inputs and sales. In particular, the relationship between education of the owner and firm type could affect how additional labour and other inputs are used (Baptista et al., 2013).

Table 4. 9 Regression results: Effects of education and family background on firm sales

	(1)	(2)	(3)
DV: Log of monthly sales	All firms	Firms with no workers	Firms with workers
Education	0.0231	0.0761***	-0.0257
	(0.0187)	(0.0211)	(0.0251)
Parents: Post-basic education	-0.205	-0.136	-0.192
	(0.130)	(0.159)	(0.214)
Parents: No business ownership	-0.306***	-0.276**	-0.248*
	(0.101)	(0.139)	(0.138)
Experience in business sector	0.0108	0.0157	0.00347
	(0.00706)	(0.00963)	(0.00960)
Own funds	-0.369**	-0.574***	-0.218
	(0.149)	(0.207)	(0.204)
Use electricity	-0.275**	-0.268*	-0.281*
	(0.113)	(0.149)	(0.162)
Use cell phone	0.511***	0.521***	0.278
	(0.127)	(0.159)	(0.198)

Age of owner	0.00424	0.00529	-0.000834
	(0.00512)	(0.00612)	(0.00731)
Female Owner	-0.229*	0.0873	-0.409**
	(0.133)	(0.174)	(0.188)
Hours of operation per week	0.00176	-0.000608	0.00448
	(0.00227)	(0.00306)	(0.00317)
Number of workers			0.120***
			(0.0292)
Constant	6.448***	5.696***	7.073***
	(0.372)	(0.476)	(0.527)
Observations	*450*	*214*	*236*
R-squared	*0.137*	*0.203*	*0.201*

Robust standard errors in parentheses
**** p<0.01, ** p<0.05, * p<0.10*

Note: All regressions include city dummies

In column (1) of table 4.9, there are no significant effects of education on firm sales, although positive. The insignificant effect of owner's education for all firms may be driven by the insignificant effect of education on sales of firms with workers. Family background variables, measured by parents' education and parents' business ownership show a negative effect on sales. The strong negative significant effect of owners whose parents have no business ownership suggests that family business experience can transmit skills (Kim et al., 2006) to individuals that can make their own businesses successful. There is also a significant negative effect on sales for firms relying on their own source of funds and firms that use electricity. Regarding the effect of cell phones, this increases sales by 36.9% for all firms. While the gender dummy has a negative effect on sales, this effect is only significant at 10%, and may be driven by the positive effect on sales for firms with no workers. All other variables are insignificant.

Columns (2) and (3) shows estimates of the sales regression for firms without workers and firms with workers. In column (2), there is a positive effect of owner's education on sales in firms without workers. A possible interpretation of the significant positive effect of education for firms with no workers is that, the smallest firm owners may be relying more on their own ability, reflecting their acquired years of schooling to succeed, rather than relying on inputs from others. There are no significant effects of owner's experience on firm sales for both type of firms. The insignificant effect of owner's education among firms with employees in column (3) is contrary to expectations based on assumptions that educated firm owners would have better managerial skills and ability, and that this would be associated with larger firm size. If education is an indicator of managerial ability, then education should be linked to firm size. As Lucas (1978) infers, better managed firms would be larger and have the resources and incentives to employ better management[19] to further enhance firm performance. However, the insignificant effect of education among firms with workers is admittedly difficult to explain. Alvarez and Crespi (2003) find similar results for manufacturing firms in Chile, but the authors assume that the insignificance of education could be because highly educated owners sometimes fail to pay attention to monitoring performance of the business, because other activities such as, identifying and exploiting opportunities distract them. Educated firm owners may therefore be relying more on the skills of hired workers to improve firm performance rather than their own education and skill set. Thus, educated entrepreneurs hire workers to leverage their skills (Baptista et al., 2013). The insignificant effect of owner's

[19] For instance, Bloom and Van Reenen (2010) find that better management practices (measured across 18 different categories including attracting and retaining human capital) leads to improved firm performance. They also find that apart from a strong correlation of education with management quality and that management quality increases with firm size.

education is also consistent with Pasquier-Doumer (2013) who found an insignificant effect of owner's education on firm sales and value added, although the author provided no interpretation of the insignificant effect. The implication of the insignificant effect of education is that in circumstances of poverty, running a successful business depends more upon other factors such as family connections, rather than formal education, which is plausible. In regressions that use a categorical variable as measure of education (reported in appendix A4.4), the results show that for firms without workers sales increases with educational attainment. For instance, owners with basic education qualification compared with owners with no education are associated with 65% increase in monthly sales. As for those firms with workers, although insignificant, each level of educational attainment is associated with a decrease in sales compared with owners with no educational qualification.

For firms with workers, there is a strong positive effect of the number of workers on sales. This is expected as the number of workers proxies for firm size. However, the education of the owner could be working indirectly on sales through the number of workers employed, since the education of the firm owner and the number of workers employed is positively related. There is evidence of this in a separate regression reported in table 4.10, that education of the owner increases the number of workers, although this is significant at the 10% level. Looking further into this, results show that mainly owners with university education drive the positive effect of education on the number of workers. This suggest to me that, at higher levels of education, owners may have better managerial skills compared with owners with no education.

The intercept terms in table 4.9 also show that sales revenue is higher for firms with workers than the smallest firms without workers.

Table 4. 10 Effects of owner's education on firm size

	(1)	(2)
DV: Number of workers	Firms with workers	
Education	0.0726*	
	(0.0380)	
Basic education		0.312
		(0.390)
Secondary education		0.406
		(0.395)
University education		2.320*
		(1.251)
Own funds	-0.557	-0.460
	(0.459)	(0.468)
Hours of operation per week	-0.00908	-0.00847
	(0.00856)	(0.00831)
Experience in business sector	0.0541**	0.0504*
	(0.0271)	(0.0277)
Female owner	-0.486	-0.436
	(0.314)	(0.301)
Constant	3.383***	3.540***
	(0.612)	(0.653)
Observations	*330*	*330*
R-squared	*0.075*	*0.093*
Robust standard errors in parentheses		
**** p<0.01, ** p<0.05, * p<0.10*		

Regarding the effects of family background, sales are lower for firms whose owner's parents have no business ownership, as expected, whereas the effect of parents' education on sales is negative and insignificant. This is seen in columns (2) and (3). The power of parental business ownership to raise sales is consistent with family business background acting as a channel for the transmission of business

knowledge and skills to future entrepreneurs (Dunn and Holtz-Eakin, 2000; Fairlie and Robb, 2007a), and in contrast to the insignificant effect of father's self-employment status on the sales of firms found by Pasquier-Doumer (2013). A possible inference from this is that, unregistered firms whose owners have parents involved in self-employed activities benefit from an advantage of informal learning and business management experience that translates to increased firm sales compared with firms whose owners have parents without business ownership.

Firms without workers that rely on their own sources for funds have 57.4% lower sales. The size of this effect is substantial, but this should come as no surprise since 85% of the firms in the sample finance the business using their own funds. Nevertheless, the result is worrying since when owners face financial constraints the economic benefits (associated with higher employment and improved standards of living) from realising new opportunities e.g. by entering new markets (Parker and Praag, 2006), may not be realised. There are no significant effects on sales of reliance on own funds among firms with workers.

The results also show that the use of cell phones leads to 52.1% higher sales for micro firms. In Ghana, the use of cell phones for bank transactions and payments has become more widespread not only for personal reasons but also among businesses. Because of the limited access to internet, businesses use cell phones to place orders from suppliers and to keep contact with customers. On the other hand, another apparently important input into production, electricity, has a significant negative effect on sales of firms with and without workers. The costs involved in the use of electricity, which includes monthly payment of bills, and the power crisis that hit the country at the end of 2012 could help explain this negative effect. As well as the power crisis

having an effect on growth prospects (Financial Times, 2015; Reuters, 2015), the power crisis has also made businesses less productive (Daily Graphic, 2015) and costly to run. For instance, the Centre for Policy Analysis (CEPA, 2007) claims that the power crisis of 2007 resulted in increased business costs. Lastly, I find that among businesses that employ workers, female owners are associated with lower sales revenue.

4.6.2 Effects of education and family background on firm profits

Table 4.11 shows the estimation results for the effect of education and family background on firm profits from specification (14). There are a number of reasons for examining firm profitability in addition to sales revenue. First, profits rather than sales are the measure of most importance to firm owners when deciding, for instance, whether to register or remain unregistered. Second, since a large share of the firm's profits becomes income for the owner, profit may be more relevant when considering for instance, how to elevate people from poverty.

Table 4. 11 Regression results: Effects of education and family background on firm profits

	(1)	(2)	(3)
DV: Log of monthly profits	All firms	Firms with no workers	Firms with workers
Education	0.0506**	0.107***	-0.00728
	(0.0240)	(0.0282)	(0.0321)
Parents: Post-basic education	-0.255	-0.249	-0.172
	(0.174)	(0.222)	(0.278)
Parents: No business ownership	-0.436***	-0.341*	-0.431**
	(0.135)	(0.194)	(0.186)
Experience in business sector	0.00763	0.0169	-0.00151

	(0.00954)	(0.0144)	(0.0125)
Own funds	-0.504***	-0.623**	-0.401*
	(0.191)	(0.284)	(0.239)
Use electricity	-0.397***	-0.370*	-0.391*
	(0.148)	(0.201)	(0.221)
Use cell phone	0.526***	0.607***	0.263
	(0.156)	(0.203)	(0.244)
Age of owner	0.00752	0.00762	0.00216
	(0.00651)	(0.00788)	(0.00957)
Female Owner	-0.0570	0.158	-0.152
	(0.168)	(0.245)	(0.232)
Hours of operation per week	0.00345	-0.000441	0.00784*
	(0.00305)	(0.00411)	(0.00426)
Number of workers			0.148***
			(0.0343)
Constant	5.694***	5.085***	6.095***
	(0.488)	(0.680)	(0.665)
Observations	*380*	*179*	*201*
R-squared	*0.146*	*0.204*	*0.209*
Robust standard errors in parentheses			
**** p<0.01, ** p<0.05, * p<0.10*			

Note: All regressions include city dummies

The results in table 4.11 shows the effects of owner's education and family background on profits. The results are generally similar to the sales regressions. However, in contrast to the sales regressions, owner's education in column (1) increases profits. The results also show that, education of the owner increases profits by 10.7% (in line with the results for sales revenue) for firms without workers. For the smallest firms without workers, owner's education appears to have the potential to improve the owner's ability to perform generic entrepreneurial tasks such as identifying and exploiting opportunities, and being able to allocate resources efficiently and this impact positively on profits as well as sales. As in the sales regression, there is no significant effect of education on profits for firms with workers. In a separate regression reported in the appendix (A4.5), the results show that for firms with workers, the negative effect of education is driven by owners with primary and

secondary education qualifications. Owners with university education although insignificant, have a positive effect on firm profits.

Regarding the effects of family background, the results are similar to the sales regression. Owners whose parents have no business ownership are associated with lower profits. The effects are larger for firms with workers. Lack of such experience reduces profits by 34.1% and 43.1% for firms with workers and firms without workers respectively. This appears to confirm that owners whose parents owned/own a business are given an early introduction to entrepreneurship, which pay off in their own businesses, not just in sales revenue but also in profit. Of course, there is also the possibility that owners with entrepreneurial parents may help their children through the labour market connections they have made. Similar to the sales regression, there is a negative insignificant effect of parents' education on profits for firms with workers. The number of workers has a positive influence (increasing profits by 14.8%) and experience of the owner in the business is negative. However, in contrast to the sales regression, while the gender dummy variable takes a negative sign, female owners do not appear to impact significantly on profitability. Hours of business operation in contrast to the sales regression has a positive effect on profits for firms with workers although only at the 10% level. There are no significant effects of owner's age on firm profits in all three regressions.

Overall, this evidence suggest that owner's education is important but only for the smallest unregistered firms without workers. The finding of the importance of family business experience in this chapter echoes the results on the importance of family background for urban wage workers in Chapter 3. In an economy characterised by high transaction costs, poor institutions and tougher government business

regulations, it is plausible to conclude that, family background effect through exposure to parents' business ownership experience could be a viable factor for performance of unregistered urban firms.

4.6.3 Intention to register: Effects of education and family background

Firms will generally weigh up the benefits and costs associated with remaining unregistered when deciding whether to register. While there may be potential benefits of registering due to an increase in sales and profitability, it is important to understand how owner's education, firm size, and other individual and firm characteristics affects the intention to register. Firm and owner characteristics are important in the decision to register, not only through their effect on future firm success (material benefits). Owner characteristics may affect decision-making through how they influence perceptions of the moral and psychic benefits (World Bank, 2009). Owner characteristics can also affect how credit constraints bind, which is particularly important in Ghana given the high financial costs associated with registering to operate formally.

The owner characteristics included in the estimation are education, experience, gender, age, and family background. Experienced and older firm owners should in particular have better knowledge of the business environment and therefore in a better position to decide between registering and remaining unregistered. Among firm characteristics, firm size is included, as this is likely to affect both the costs and benefits of not registering. Firms without workers may choose to remain relatively small in order to reduce chances of detection by tax authorities, while firms with employees that have higher profits will be more inclined to register even if only to have better access to credit facilities. In any case, it is increasingly difficult to remain

undetected by the authorities as firm size increases and so registration may become a legal imperative. Profits are also included as a determinant of the intention to register, simply because businesses that are more profitable can pay the taxes and start-up fees, which was found earlier to be one of the obstacles to registration.

The major drawback from this estimation is that responses are only predictions that do not confirm that firm owners actually registered. There is however, ample evidence from the descriptive support in section 4.4 that firms with an interest to register have more educated owners, an indication that partially allows me to draw conclusions about the accuracy of these responses. Table 4.12 shows the results from estimating the logit regression modelling intention to register. Appendix 4.6 shows results that measures education using a categorical variable. Results from these are similar to the ones presented in this section.

Table 4. 12 Logit estimates of the intention to register: Average marginal effects

DV: Intention to register	All firms	Firms with no workers	Firms with workers
Education	0.0234***	0.0339***	0.0130
	(0.00673)	(0.0111)	(0.00919)
Log of monthly profit	0.0289	0.00494	0.0320
	(0.0177)	(0.0229)	(0.0268)
Parents: No business ownership	0.0249	0.131*	-0.0742
	(0.0469)	(0.0698)	(0.0624)
Parents: Post-basic education	0.0846	0.104	0.0782
	(0.0595)	(0.0805)	(0.0902)
Experience in business sector	0.00209	0.00830*	-0.000241
	(0.00322)	(0.00435)	(0.00436)
Age of owner	-0.00128	-0.000480	-0.00455
	(0.00228)	(0.00375)	(0.00326)
Female Owner	-0.00001	-0.0122	0.0348

	(0.0488)	(0.0674)	(0.0703)
Business sector: Services	-0.00251	0.0992	-0.0736
	(0.0485)	(0.0699)	(0.0648)
Own funds	-0.114	-0.0617	-0.168*
	(0.0730)	(0.0978)	(0.0927)
Not married	0.0344	0.0259	0.0256
	(0.0570)	(0.0807)	(0.0838)
Firm size: Firms with employees	0.159***		
	(0.0459)		
Number of workers			0.0341**
			(0.0171)
Log pseudolikelihood	*-217.97*	*-99.67*	*-106.02*
R-squared	*0.19*	*0.24*	*0.22*
Observations	*389*	*191*	*198*
Standard errors in parentheses			
**** p<0.01, ** p<0.05, * p<0.10*			

Note: All regressions include city dummies

In column (1), there is a strong positive effect of education on the intention to register for all firms (but not firms with employees in column (3)). Each extra level of education increases the intention to register by 2.3 percentage points. In the regressions in appendix A4.6 that uses a categorical variable for education, the results show that the effects of education on intention to register are significant at secondary and university education levels, with no significant effects for owners with primary education. This suggests that education may have the potential to promote greater awareness of the benefits of formality. This interpretation is in line with Babbitt et al. (2015) who find that education increases formalization in Indonesia because it gives informal entrepreneurs security to operate their businesses. The results also show that it is owner's whose parents have no business ownership that are more likely to register rather than parents' education in firms with no workers. This effect is only significant at 10% level. A possible explanation to this is that since these firm owners do not benefit from parents' business ownership advantage, intending to register may be a

viable option for them to grow their business. While it is expected that profitable firms will be able to pay taxes, fees and other costs associated with registration, all three specifications show that profits although positive do not have any significant effect on intention to register.

Experienced owners are more likely to register in firms without workers although this is only significant at the 10% level. This suggest that experienced owners in the smallest firms may have accrued enough capital to register and grow their business. In direct contrast, age of the owner decreases the likelihood of registration but this is insignificant. Business sector and marital status of the owner are insignificant. The value of the dummy variable recording whether or not the firm has employees in columns (1) and the variable recording the number of workers in column (3) are both positively significant. These results indicate that larger firms with workers have a higher chance of registering and among firms with workers, employing more workers raises owner's intention to register. This may be in part because firms with workers are easier to detect and are therefore subject to more inspections by government officials. Interestingly, gender is insignificant, suggesting that women in general are no more likely to prefer operating in the informal sector even if it provides greater flexibility in terms of working hours, thus allowing them to fulfil their household responsibilities.

The result that education of the owner is only significant for firms without employees is in line with the earlier results for firm sales and profits. One interpretation may be that since, in firms with no workers, owner's education is linked to both sales and profits, more successful firms without workers that view registration as a

necessary step in firm growth have more educated owners who are willing to benefit from other advantages associated with registration.

4.7 Conclusion

As with many other developing countries, Ghana is characterised by a historically large informal sector and low human capital investment. The formal sector has a greater proportion of workers with higher levels of education and relatively higher wages compared with the informal sector where incomes are lower. Despite the importance of education on labour market returns, studies have tended to ignore the potentially positive role education may have in the informal sector. One explanation for this neglect is that education is assumed to make little contribution to improving productivity and profitability in informal economic activities, largely because these activities are traditionally manual and low skilled. However, the private informal sector in Ghana is important and this study has examined the determinants of performance among unregistered i.e. informal urban firms with particular focus on the role of the owner's education and their family background measured as parents' education and parents' business experience.

One of the main findings is that despite education being an important determinant of productivity, measured here by sales revenue and profitability, the importance is only relevant for the smallest unregistered firms without workers. A possible interpretation is that, for firms without workers, owner's education is directly important because owners have to rely on their own ability and skills in the daily operation of the business. In contrast, in firms with workers, the education of owners is less directly important, a result admittedly difficult to explain. Regarding the

positive effect of education for firms without workers, these indicate that, analogous to the labour market returns to schooling for wage employees, there are positive effects of owner's education on productivity and profits in the informal sector. In other words, education is important for the smallest firms without workers, even in areas where wage work opportunities are limited. For the finding on the insignificance of owner's education in determining business performance, other studies of small businesses in poor developing countries (Pasquier-Doumer, 2013) have also made such a finding. Although difficult to explain, the implication is that in circumstances of poverty, and in a challenging urban environment, running a successful business depends more upon family connections and experience, than formal education, which is plausible. The finding of the importance of parents' business ownership in this chapter echoes the results on the importance of parental influence for individuals in urban wage employment in Chapter 3.

The finding that parental business ownership assists business performance in informal firms in Ghana is in line with the literature and consistent with intergenerational transmission of skills. Parents' business ownership effect on firm sales and profit finding suggests that whatever the environment, be it developed or less developed, formal or informal, mentoring of an individual in business management by his/her parent is important. An early introduction to entrepreneurship from working in a family business or simply seeing how a family business is operated is enough for individuals to learn basic business skills.

The study also examined whether owner's education and family background have any significant effect on the registration of a business given their earlier importance for performance in firms without workers. The results indicate a positive

effect of owner's education on the intention to register among firms without workers. This suggests that educated owners in the smallest unregistered firms without workers might be in a better position to grow their business, since formalizing could be considered a necessary part of this process.

The findings from this analysis have important policy implications for Ghana. Formal education and informal education through learning and 'apprenticeship-type' training from family businesses that provides an opportunity correlated with business success can potentially enhance the process of poverty alleviation by improving the skill set of micro unregistered firm owners. A key consideration will be to formalise these informal learning processes by encouraging apprenticeship training at the national level for individuals with entrepreneurial prospects, and those unable to continue higher education because of poverty. This can help reduce the growing unemployment rate in urban areas, and could potentially lead to an increase in private sector activities to complement the high demand for public sector jobs, as well as an improvement in the skill content of the labour force.

References

Aggrey, N., Eliab, L. & Joseph, S. (2010). "Human capital and labor productivity in East African manufacturing firms". *Current research journal of economic theory,* 2**,** 48-54.

Alvarez, R. & Crespi, G. (2003). "Determinants of Technical Efficiency in Small Firms". *Small Business Economics,* 20**,** 233-244.

Amin, M. (2011). "*Education and the structure of informal firms in Latin America"*. Enterprise surveys country note series ; no. 24. Informality. Washington, DC: World Bank. http://documents.worldbank.org/curated/en/2011/01/14767669/education-structure-informal-firms-latin-america

Arias, O. S. & Bendini, M. (2006). "Bolivia poverty assessment: establishing the basis for pro-poor growth".

Auriol, E. & Warlters, M. (2005). "Taxation base in developing countries". *Journal of Public Economics,* 89**,** 625-646.

Ashenfelter, O. & Zimmerman, D. J. (1997). "Estimates of the Returns to Schooling from Sibling Data: Fathers, Sons, and Brothers". *The Review of Economics and Statistics,* 79**,** 1-9.

Azuma, Y. & Grossman, H. I. (2008). "A theory of the informal sector". *Economics & Politics,* 20**,** 62-79.

Babbitt, L. G., Brown, D. & Mazaheri, N. (2015). "Gender, Entrepreneurship, and the Formal–Informal Dilemma: Evidence from Indonesia". *World Development,* 72**,** 163-174.

Bacchetta, M., Ernst, E. & Bustamante, J. P. (2009). "*Globalization and informal jobs in developing countries"*, International Labour Organization Geneva.

Baptista, R., Lima, F. & Preto, M. (2013). "Entrepreneurial skills and workers' wages in small firms". *Small Business Economics,* 40**,** 309-323.

Becker, G. S. (1962). "Investment in Human Capital: A Theoretical Analysis". *Journal of Political Economy,* 70**,** 9-49.

Bennett, J., & Estrin, S. (2007). "Informality as a stepping stone: Entrepreneurial entry in developing economies". IZA Discussion paper No. 2950

Bertrand, M. & Schoar, A. (2006). "The Role of Family in Family Firms". *The Journal of Economic Perspectives,* 20**,** 73-96.

Bigsten, A., Kimuyu, P. & Lundvall, K. (2004). "What to Do with the Informal Sector?" *Development Policy Review,* 22**,** 701-715.

Bloom, N. & Van Reenen, J. (2010). "Why do management practices differ across firms and countries?" *The Journal of Economic Perspectives***,** 203-224

Bosma, N., Hessels, J., Schutjens, V., Praag, M. V. & Verheul, I. (2012). "Entrepreneurship and role models". *Journal of Economic Psychology,* 33**,** 410-424.

Bosma, N., Van Praag, M., Thurik, R. & De Wit, G. (2004). "The Value of Human and Social Capital Investments for the Business Performance of Startups". *Small Business Economics,* 23**,** 227-236.

Cassar, G. (2006). "Entrepreneur opportunity costs and intended venture growth". *Journal of Business Venturing,* 21**,** 610-632.

Castells, M. (1989). "World underneath: The origins, dynamics, and effects of the informal economy. In: The informal economy: Studies in advanced and less developed countries, ed. A. Portes, M. Castells, and LA Benton", 11-40. Baltimore: John Hopkins University Press. Castells11The informal economy: Studies in advanced and less developed countries1989.

Centre For Policy Analysis. (2007). "The Energy Crisis and Growth Performance of the Economy of Ghana – Selected Economic Issues". CEPA Issue Paper No. 15.

Chen, M. A. (2012). "The informal economy: Definitions, theories and policies". *Women in informal economy globalizing and organizing: WIEGO Working Paper*.

Chlosta, S., Patzelt, H., Klein, S. & Dormann, C. (2012). "Parental role models and the decision to become self-employed: The moderating effect of personality". *Small Business Economics,* 38**,** 121-138.

Colombier, N. & Masclet, D. (2008). "Intergenerational correlation in self employment: some further evidence from French ECHP data". *Small Business Economics,* 30**,** 423-437.

Cunningham, W. V. & Gomez, C. R. (2004). "*The home as factory floor: employment and remuneration of home-based workers"*, World Bank Publications.

Daily Graphic. (2015). "Energy crisis having heavy toll on productivity - Business community" [online]. Available from:http://graphic.com.gh/news/general-news/38057-energy-crisis-having-heavy-toll-on-productivity-business-community.html [Accessed 2 November 2015]

Davidsson, P. & Honig, B. (2003). "The role of social and human capital among nascent entrepreneurs". *Journal of business venturing,* 18**,** 301-331.

De Soto, H. (2000). "*The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else"*, Basic Books.

De Soto, H. (2002). "*The other path: The economic answer to terrorism"*, Basic Books.

Djankov, S., Porta, R. L., Lopez-De-Silanes, F. & Shleifer, A. (2002). "The Regulation of Entry". *The Quarterly Journal of Economics,* 117**,** 1-37.

Dunn, T. & Holtz-Eakin, D. (2000). "Financial Capital, Human Capital, and the Transition to Self-Employment: Evidence from Intergenerational Links". *Journal of Labor Economics,* 18**,** 282-305.

Fafchamps, M. & Minten, B. (2002). "Returns to Social Network Capital among Traders". *Oxford Economic Papers,* 54**,** 173-206.

Fairlie, R. W. & Robb, A. M. (2007a). "Families, Human Capital, and Small Business: Evidence from the Characteristics of Business Owners Survey". *Industrial and Labor Relations Review,* 60**,** 225-245.

Fairlie, R. W. & Robb, A. M. (2007b). "Why Are Black-Owned Businesses Less Successful than White-Owned Businesses? The Role of Families, Inheritances, and Business Human Capital". *Journal of Labor Economics,* 25**,** 289-323.

Fajnzylber, P., Maloney, W. & Rojas, G. M. (2006). "Microenterprise Dynamics in Developing Countries: How Similar Are They to Those in the Industrialized World? Evidence from Mexico". *The World Bank Economic Review,* 20**,** 389-419.

Farrell, D. (2004). “The Hidden Dangers of the Informal Economy.” *McKinsey Quarterly* 2004, no. 3: 26–37.

Fields, G. S. (1990). "Labour market modelling and the urban informal sector: theory and evidence".

Financial Times. (2015). "Power shortages cut growth prospects in Ghana" [online]. Available from: http://www.ft.com/cms/s/0/fa56bb02-2481-11e5-bd83-71cb60e8f08c.html#axzz3qMSrAQMz [Accessed 2 November 2015]

Friedman, E., Johnson, S., Kaufmann, D. & Zoido-Lobaton, P. (2000). "Dodging the grabbing hand: the determinants of unofficial activity in 69 countries". *Journal of Public Economics,* 76**,** 459-493.

Ghana Statistical Service (GSS). (2008). "Ghana Living Standards Survey report of the fifth report"

Ghana Statistical Service (GSS). (2015). "Ghana Living Standards Survey round 6. Main report"

Goedhuys, M., Janz, N. & Mohnen, P. (2008). "What drives productivity in Tanzanian manufacturing firms: technology or business environment?" *European Journal of Development Research,* 20**,** 199-218.

Harris, J. R. & Todaro, M. P. (1970). "Migration, Unemployment and Development: A Two-Sector Analysis" *The American Economic Review,* 60**,** 126-142.

Hart, K. (1973). "Informal Income Opportunities and Urban Employment in Ghana". *The Journal of Modern African Studies,* 11**,** 61-89.

Honig, B. (1998). "What determines success? examining the human, financial, and social capital of jamaican microentrepreneurs". *Journal of Business Venturing,* 13**,** 371-394.

Hout, M. & Rosen, H. (2000). "Self-Employment, Family Background, and Race". *The Journal of Human Resources,* 35**,** 670-692.

International Labour Organization (ILO). (2002). "Women and Men in the Informal Economy: A Statistical Picture". Geneva: International Labour Office

Jiménez, A., Palmero-Cámara, C., González-Santos, M. J., González-Bernal, J. & Jiménez-Eguizábal, J. A. (2015). "The impact of educational levels on formal and informal entrepreneurship". *BRQ Business Research Quarterly,* 18**,** 204-212.

Jones, P. (2001). "Are educated workers really more productive?" *Journal of Development Economics,* 64**,** 57-79.

Kim, P. H., Aldrich, H. E. & Keister, L. A. (2006). "Access (Not) Denied: The Impact of Financial, Human, and Cultural Capital on Entrepreneurial Entry in the United States". *Small Business Economics,* 27**,** 5-22.

Lazear, E. P. (2004). "Balanced Skills and Entrepreneurship". *American Economic Review,* 94**,** 208-211.

Lentz, B. F. & Laband, D. N. (1990). "Entrepreneurial Success and Occupational Inheritance among Proprietors". *The Canadian Journal of Economics / Revue canadienne d'Economique,* 23**,** 563-579.

Lewis, W. A. (1954). "Economic Development with Unlimited Supplies of Labour". *The Manchester School,* 22**,** 139-191.

Loayza, N. V. (1996). "The economics of the informal sector: a simple model and some empirical evidence from Latin America". *Carnegie-Rochester Conference Series on Public Policy,* 45**,** 129-162.

Loayza, N. V. & Rigolini, J. (2011). "Informal Employment: Safety Net or Growth Engine?" *World Development,* 39**,** 1503-1515.

Looney, R. (2006). "Economic Consequences of Conflict: The Rise of Iraq's Informal Economy". *Journal of Economic Issues,* 40**,** 991-1007.

Lucas, R. E. (1978). "On the size distribution of business firms". *The Bell Journal of Economics***,** 508-523.

Maloney, W. F. (2004). "Informality Revisited". *World Development,* 32**,** 1159-1178.

Marcouiller, D. & Young, L. (1995). "The Black Hole of Graft: The Predatory State and the Informal Economy". *The American Economic Review,* 85**,** 630-646.

Mincer, J. (1974). "Schooling, Experience, and Earnings". *Human Behavior & Social Institutions,* No. 2.

Nichter, S. & Goldmark, L. (2009). "Small Firm Growth in Developing Countries". *World Development,* 37**,** 1453-1464.

Parker, S., C. & Praag, C. M. V. (2006). "Schooling, Capital Constraints, and Entrepreneurial Performance: The Endogenous Triangle". *Journal of Business & Economic Statistics,* 24**,** 416-431.

Parker, S. C. (2004). "*The economics of self-employment and entrepreneurship",* Cambridge University Press.

Pasquier-Doumer, L. (2013). "Intergenerational Transmission of Self-Employed Status in the Informal Sector: A Constrained Choice or Better Income Prospects? Evidence from Seven West African Countries". *Journal of African Economies,* 22**,** 73-111.

Porta, R. L. & Shleifer, A. (2008). "The unofficial economy and economic development". National Bureau of Economic Research.

Psacharopoulos, G. (1993). "*Returns to investment in education : a global update",* Washington, D.C., World Bank.

Psacharopoulos, G. & Patrinos, H. A. (2002). "*Returns to investment in education : a further update",* Washington, D.C., World Bank, Education Sector Unit.

Reuters. (2015). "Ghana power blackouts add to nation's economic woes" [online]. Available from: http://www.reuters.com/article/2015/05/13/ghana-power-idUSL3N0Y26JX20150513 [Accessed 2 November 2015]

Schneider, F. & Enste, D. H. (2000). "Shadow Economies: Size, Causes, and Consequences". *Journal of Economic Literature,* 38**,** 77-114.

Sluis, J. V. D., Praag, M. V. & Vijverberg, W. (2005). "Entrepreneurship Selection and Performance: A Meta-Analysis of the Impact of Education in Developing Economies". *The World Bank Economic Review,* 19**,** 225-261.

Steier, L. & Greenwood, R. (2000). "Entrepreneurship and the Evolution of Angel Financial Networks". *Organization Studies,* 21**,** 163-192.

Straub, S. (2005). "Informal sector: The credit market channel". *Journal of Development Economics,* 78**,** 299-321.

Ulyssea, G. (2010). "Regulation of entry, labor market institutions and the informal sector". *Journal of Development Economics,* 91**,** 87-99.

Van Praag, M., Van Witteloostuijn, A. & Van Der Sluis, J. (2013). "The higher returns to formal education for entrepreneurs versus employees". *Small Business Economics,* 40**,** 375-396.

Vanek, J., Chen, M. A., Carre, F., Heintz, J. & Hussmanns, R. (2014). "Statistics on the informal economy: Definitions, regional estimates and challenges", WIEGO Working Paper, No. 2

Wallace, C. & Latcheva, R. (2006). "Economic Transformation outside the Law: Corruption, Trust in Public Institutions and the Informal Economy in

Transition Countries of Central and Eastern Europe". *Europe-Asia Studies,* 58**,** 81-102.

White, R. E., Thornhill, S. & Hampson, E. (2007). "A Biosocial Model of Entrepreneurship: The Combined Effects of Nurture and Nature". *Journal of Organizational Behavior,* 28**,** 451-466.

World Bank. (2016). "*Doing Business 2016: Measuring Regulatory Quality and Efficiency"*. Washington, DC: World Bank. DOI: 10.1596/978-1-4648-0667-4. License: Creative Commons Attribution CC BY 3.0 IGO

World Bank. (2009). "Increasing Formality and Productivity of Bolivian Firms". The World Bank: Washington, DC.

World Bank. (1995). "Labor and economic reforms in Latin American and the Caribbean". The World Bank: Washington, DC.

Appendix

Table A4.1. Correlation among main variables: Firms without workers

	Log of monthly sales	Log of monthly profits	Education	Experience	Parents no business ownership	Parents Post-basic education	Female owner	Intention to register
Log of monthly sales	1.00							
Log of monthly profits	0.892***	1.00						
Education	0.191***	0.173***	1.00					
Experience	0.091	0.058	0.006	1.00				
Parents no business ownership	-0.132**	-0.110	-0.11*	0.1096*	1.00			
Parents Post-basic education	-0.0001	0.008	0.312***	0.0294	-0.143**	1.00		
Female owner	-0.087	-0.013	-0.206***	-0.160***	0.051	-0.018	1.00	
Intention to register	0.117*	0.065	0.217***	0.0791	0.062	0.175***	-0.096	1.00

**** p<0.01, ** p<0.05, * p<0.10*

Table A4.2. Correlation among main variables: Firms with workers

	Log of monthly sales	Log of monthly profits	Education	Experience	Parents no business ownership	Parents Post-basic education	Female owner	Intention to register	Number of workers
Log of monthly sales	1.00								
Log of monthly profits	0.866***	1.00							
Education	0.041	0.0498	1.00						
Experience	0.091	0.056	-0.081	1.00					
Parents no business ownership	-0.158***	-0.186***	-0.097*	0.085	1.00				
Parents Post-basic education	-0.112*	-0.093	0.1895***	-0.036	-0.056	1.00			
Female owner	-0.154***	0.002	-0.322***	-0.042	0.021	0.007	1.00		
Intention to register	0.222***	0.176***	0.153***	0.016	-0.077	0.098*	-0.155***	1.00	
Number of workers	0.198***	0.125**	0.102*	0.214***	-0.045	0.101*	-0.107**	0.153***	1.00

**** p<0.01, ** p<0.05, * p<0.10*

Table A4.3 Firm performance by level of owner's education

	Firms with no workers	Firms with workers
Panel a. Monthly sales (in Cedis)		
No education	659.58	2421.97
Primary education	1192.44	1513.92
Secondary education	1040.59	1817.55
University education	1636.67	1925.71
Panel b. Monthly costs (in Cedis)		
No education	286.89	653.24
Primary education	300.08	655.37
Secondary education	303.11	669.66
University education	203.78	867.00
Panel c. Monthly profit (in Cedis)		
No education	396.09	2021.67
Primary education	924.82	897.19
Secondary education	746.32	1157.00
University education	1285.00	843.14

Table A4.4. Effects of owner's education and family background on firm sales

	(1)	(2)	(3)
DV: Log of monthly sales	All firms	Firms with no workers	Firms with workers
Basic education	0.0770	0.653***	-0.364
	(0.210)	(0.228)	(0.279)
Secondary education	0.196	0.867***	-0.374
	(0.236)	(0.258)	(0.321)
University education	0.607	1.429**	-0.216
	(0.376)	(0.585)	(0.473)
Parents: Post-basic education	-0.238*	-0.154	-0.223
	(0.132)	(0.165)	(0.217)
Parents: No business ownership	-0.287***	-0.266*	-0.229*
	(0.102)	(0.140)	(0.138)
Experience in business sector	0.0114	0.0166*	0.00362
	(0.00707)	(0.00994)	(0.00963)
Own funds	-0.352**	-0.571***	-0.198
	(0.149)	(0.209)	(0.201)

Use electricity	-0.282**	-0.271*	-0.295*
	(0.113)	(0.150)	(0.164)
Use cell phone	0.521***	0.518***	0.300
	(0.127)	(0.161)	(0.201)
Age of owner	0.00286	0.00482	-0.00250
	(0.00527)	(0.00632)	(0.00766)
Female Owner	-0.219	0.0927	-0.401**
	(0.133)	(0.175)	(0.190)
Hours of operation per week	0.00186	-0.000542	0.00456
	(0.00225)	(0.00308)	(0.00319)
Number of workers			0.114***
			(0.0312)
Constant	6.556***	5.727***	7.203***
	(0.387)	(0.489)	(0.561)
Observations	*450*	*214*	*236*
R-squared	*0.141*	*0.205*	*0.205*
Robust standard errors in parentheses			
**** p<0.01, ** p<0.05, * p<0.10*			

Note: All regressions include city dummies
Ref group for education: no education

Table A4.5. Effects of owner's education and family background on firm profits

	(1)	(2)	(3)
DV: Log of monthly profits	All firms	Firms with no workers	Firms with workers
Basic education	0.257	0.807**	-0.247
	(0.283)	(0.319)	(0.378)
Secondary education	0.494	1.255***	-0.219
	(0.307)	(0.345)	(0.409)
University education	1.149**	1.851**	0.259
	(0.449)	(0.798)	(0.532)
Parents: Post-basic education	-0.317*	-0.304	-0.225
	(0.174)	(0.228)	(0.280)
Parents: No business ownership	-0.408***	-0.323	-0.407**
	(0.136)	(0.195)	(0.185)
Experience in business sector	0.00865	0.0181	-0.00141
	(0.00951)	(0.0150)	(0.0126)

Own funds	-0.479**	-0.638**	-0.358
	(0.192)	(0.290)	(0.233)
Use electricity	-0.409***	-0.392*	-0.398*
	(0.147)	(0.202)	(0.221)
Use cell phone	0.542***	0.620***	0.297
	(0.157)	(0.205)	(0.247)
Age of owner	0.00535	0.00704	-0.000416
	(0.00676)	(0.00823)	(0.00998)
Female Owner	-0.0422	0.162	-0.144
	(0.168)	(0.245)	(0.233)
Hours of operation per week	0.00364	-0.000407	0.00811*
	(0.00303)	(0.00415)	(0.00427)
Number of workers			0.136***
			(0.0371)
Constant	5.859***	5.207***	6.279***
	(0.509)	(0.691)	(0.711)
Observations	*380*	*179*	*201*
R-squared	*0.153*	*0.207*	*0.215*
Robust standard errors in parentheses			
**** p<0.01, ** p<0.05, * p<0.10*			

Note: All regressions include city dummies
Ref group for education: no education

Table A4.6. Logit estimates of the intention to register: Average marginal effects

	(1)	(2)	(3)
DV: Intention to register	All firms	Firms with no workers	Firms with workers
Basic education	0.0990	0.136	0.0405
	(0.0753)	(0.0923)	(0.111)
Secondary education	0.280***	0.375***	0.164
	(0.0803)	(0.102)	(0.121)
University education	0.396***	0.572***	0.221
	(0.129)	(0.147)	(0.188)
Log of monthly profit	0.0283	0.00346	0.0326
	(0.0172)	(0.0226)	(0.0267)
Parents: No business ownership	0.0301	0.140**	-0.0710
	(0.0466)	(0.0675)	(0.0620)
Parents: Post-basic education	0.0471	0.0542	0.0539
	(0.0610)	(0.0806)	(0.0913)

Experience in business sector	0.00281	0.00961**	0.000318
	(0.00313)	(0.00414)	(0.00431)
Age of owner	-0.00195	-0.000935	-0.00513
	(0.00229)	(0.00352)	(0.00333)
Female Owner	0.00278	-0.0122	0.0448
	(0.0497)	(0.0698)	(0.0707)
Business sector: Services	-0.00480	0.0981	-0.0784
	(0.0493)	(0.0701)	(0.0651)
Own funds	-0.114	-0.0794	-0.161*
	(0.0735)	(0.0971)	(0.0974)
Not married	0.0359	0.0247	0.0271
	(0.0571)	(0.0805)	(0.0837)
Firm size: Firms with employees	0.161***		
	(0.0457)		
Number of workers			0.0336*
			(0.0177)
Log pseudolikelihood	*-215.12*	*-97.53*	*-105.15*
R-squared	*0.20*	*0.25*	*0.22*
Observations	*389*	*191*	*198*

Standard errors in parentheses
**** p<0.01, ** p<0.05, * p<0.10*

CHAPTER FIVE: CONCLUSIONS

5.1 Summary of studies and findings

This thesis first set out to examine the effects of family background (educated parents, and household's lack of access to basic amenities) on school enrolment of biological and non-biological children in rural and urban areas. The thesis also examined how family background (again parents' education) enhances both education and then earnings of individuals in wage employment. Lastly, the thesis examined the importance of an informal entrepreneur's education and family background for his/her firm's performance among unregistered urban businesses. This section provides a summary of the main findings from these three inquiries. Table 5.1 shows summary results on the effects of education and family background.

5.1.1 Conclusions on chapter 2: Gender differences in education among biological and non-biological children: educated parents and household poverty

In the first empirical study, household data on parents and children from the 2006 GLSS was used to determine how educated parents and household resources (measured as access to basic amenities) were related to children's schooling enrolment probability in rural and urban areas. Family background, as measured by parental education, proved to be strongest in rural areas. In particular, the study found the effects of educated fathers to be more important than educated mothers for both boys' and girls' schooling enrolment. Educated mothers only helped boys, perhaps indicating more "traditional" values among women, who emphasise sons' education, given that, sons traditionally support their parents in old age. In urban areas, the effects of educated parents were weaker, which is plausible given the weaker influence of traditional family ties. Here, if anything, parental education – particularly of the

mother – helped girls' education (rather than boys), again indicating the weakening of traditional pro-son ties. Interestingly, however, for non-biological urban children, the (step) mother's education is seen to be actually adverse, suggesting that these children fulfil a servant-type role to facilitate the educated mother's market work.

These results on the effects of both educated mothers and fathers on biological and non-biological boys' schooling enrolment in rural areas, thus, indicate that rural parents may still have a preference for boys' education, simply because boys' compared with girls are more likely to provide future financial support 'pensions' to parents in old age. Urban educated parents on the other hand, are less traditional and may have access to, for instance, pensions and savings. They therefore do not expect financial support from children especially boys, in old age, promoting more investment by parents in their daughter's schooling in urban areas.

The access to basic amenities variables, for its part, showed that poor access to water and light strongly reduced both boys' and girls' school enrolment probability, as expected, although the effects were again generally stronger for girls. The larger effect on girls can be related to the fact that in Ghana's rural areas it is the girls rather than the boys who traditionally spend more time collecting firewood and fetching water.

The general findings from this chapter are that girls schooling enrolment are better in urban areas possibly because the expectations of old-age care through financial support from children may be less relevant for educated urban parents. Boys' schooling enrolment, on the other hand, are important in rural areas because rural parents are more traditional and may rely on boys to provide old-age financial support. These are in line with the literature (Li and Lavely, 2002; Hannum, 1998; Parish and Willis, 1993; Brown and Park, 2002) that because boys, compared with girls are more

likely to provide future financial support to parents in old age, parents are more willing to invest in their education. The finding also that children's school enrolment probability reduces in households with limited access to basic amenities is supported by evidence from the literature (Lloyd et al., 2008; Hannum, 1998) that the enrolment gap between boys and girls is exacerbated when households face financial constraints. The results from further examination on the effect of household lack of access to basic amenities using the number of hours spent on household activities (from table 2.5) is also consistent with Amin et al. (2006) for Bangladesh that an increase in time spent on household work reduces girls' education.

Table 5. 1 Summary of findings on the effects of education and family background

Panel a. Effects of family background on education (schooling enrolment)				
	Biological children		Foster children	
	Rural		Rural	
	Boys	Girls	Boys	Girls
Father educated	0.0515**	0.124***	0.143**	0.229***
Mother educated	0.0882**	0.032	0.0768	0.017
	Urban		Urban	
	Boys	Girls	All	
Father educated	0.015	0.0648***	0.151**	
Mother educated	0.021	0.0485**	-0.115**	
Panel b. Effects of family background (parents education) on earnings				
	Indirect effect (via education)	Direct effect	Total effect	
Men	0.013***	0.0052	0.0184***	
Women	0.0232***	0.0028	0.0260***	
Urban areas	0.0155***	0.0075***	0.023***	
Rural areas	0.0135***	-0.004	-0.0095	
Urban men	0.0136***	0.0081*	0.0217***	
Urban women	0.0216***	0.0051	0.0267***	
Panel c. Effects of education and family background on informal business performance				
	Firms with no workers		Firms with workers	
	Sales	Profits	Sales	Profits

Owner's education	0.0761***	0.107***	-0.0257	-0.0073
Parents: Post-basic education	-0.136	-0.249	-0.192	-0.172
Parents: No business ownership	-0.276**	-0.341*	-0.248*	-0.431**

**** p<0.01, ** p<0.05, * p<0.10*

Sources: Panel a: Table 2.5 and table 2.8; Panel b: Tables 3.5, 3.6, and 3.7; Panel c: Tables 4.9 and 4.11

5.1.2 Conclusions on chapter 3: Direct and indirect effects of family background on earnings

In the second empirical study, individual data from the 2006 GLSS was used to examine the linkages between family background, education, and earnings of adults aged 25 to 60 years in wage employment. A simultaneous equation model was estimated to determine the effect of family background on earnings both with and without a control for the individual's education. If family background determines education, but not earnings given education, the implication is that connections and nepotism are not important in the Ghana labour market.

In fact, the study found some evidence of direct effects of family background on earnings given education for adults in urban areas, and in particular men. However, in rural areas there were no evidence of such direct effects. This finding makes sense, because in rural areas labour markets are thinner and businesses smaller, so there is less room for connections and nepotism to have an effect. In addition, rural parents, due to their lower levels of education may not have enough influence in the labour market to support their children into wage jobs. In urban areas where labour market activities are more vibrant and challenging, with relatively higher unemployment rates (6.3% in urban areas, 8.9% in Accra, compared with 1.6% for rural areas, (GSS, 2008)), access to wage jobs may be more difficult. Family background (parents' education) through parents' "connections" could therefore be a viable option to gain

quicker access into wage jobs. For men, due to the larger proportion in wage jobs (which the descriptive statistics from chapter 3 suggests), entry into high-paid jobs may be more difficult compared with women. As a result, men rather than women are more likely to benefit from positive family background effects, in addition to their own level of education.

This evidence of nepotism in urban wage jobs is less surprising. In a labour market where notices of job vacancies are difficult to access, personal referrals and contacts become a feasible option for employers. Despite Ghana having an adult literacy rate of 71.5% in 2010, mean years of schooling (7.5 years) falls below the expected years of schooling of 11.5 (HDR, 2015), equivalent to completion of senior secondary school. With the relatively lower mean years of schooling, it is plausible that family background and other networking effects may complement success in the labour market. At the moment, the process of hiring in the formal sector is less standardised, and tend to favour individuals who have "connections", what is commonly referred to as "whom you know", or individuals whose parents have good knowledge of the labour market, and know people of higher standings in society. Some employers also still rely on word-of-mouth referral in the hiring process, which again goes to suggest that children of wealthy parents (educated parents) may benefit more from this advantage. Where the influence of family background and nepotism persist, then it is possible that access to wage jobs will remain a privilege of a fortunate few.

Bratsberg et al. (2007), however, suggest that one possible way to reduce the positive effect of family background on human development and economic success in the labour market is the provision of a system of education that is able to create a homogenous educational qualifications floor for all individuals.

The evidence of nepotism in urban wage jobs is consistent with the literature. For instance, Pellizzari (2010) argue that in labour markets with intermediaries, the effects on wages of finding jobs through personal contacts is generally higher, which is similar for the case of Ghana. In support of the effect of family background on earnings, Hudson and Sessions (2011) argue that the positive effect arises because educated parents are well-connected than less educated parents, and as such they are able to secure good jobs for their children. My finding is also in line with Raitano and Vona (2015), who find for Italy that parental background exerts a significant influence on the earnings of sons.

5.1.3 Conclusions on chapter 4: Education, family background, and performance of unregistered urban firms

The final empirical study examined the effect of the firm owner's level of education and family background on business performance (sales and profits) among informal (unregistered) firms in five urban areas using data from the 2013 World Bank Ghana Informal Firm Survey. By considering the informal economy that is more disadvantaged due for instance, to government regulations on business start-ups, the study indirectly considered the heterogeneous self-employment group that was not covered in the second empirical study on formal wage work (which are best, in the Ghana context). Disaggregating by firm size, the study found owner's education to be important for only unregistered businesses without workers. For businesses with workers, there was no finding of a significant effect of education, a result that was admittedly difficult to explain, although other studies of small businesses in poor developing countries (Pasquier-Doumer, 2013) have also made such a finding. In general, for owners of informal businesses, parental education was unimportant. What

was important for all business owners, however, was having parents who operated or still operate a business. A possible interpretation is that, in circumstances of poverty, running a successful business depends more upon family connections and experience, rather than formal education, which is plausible. In fact, my finding that firm owners with family business experience have higher sales and profits is exactly in line with the literature. The implication of this finding is that whatever the environment, be it developed or less developed, formal or informal, mentoring of an individual in business management by his/her parents is important. Firm owners with an introduction to business management through working in family businesses at an early age have higher chances of performing better in their own businesses.

The results also showed a positive effect of owner's education on the intention to formally register for firms with no workers. The implication here is that the educated self-employed who may be preparing to take on workers, are more likely to take the formal route when growing their business. The finding that profits are not important in firm owners' intention to register suggest that it may not necessarily be the costs associated with registering a business that is the issue. There are likely to be other unidentified obstacles. More research is therefore needed to address this issue.

The finding of parental business ownership to raise sales and profits in both businesses with and without workers is consistent with the literature that family business background act as a channel for the transmission of business knowledge and skills to future entrepreneurs (Dunn and Holtz-Eakin, 2000; Fairlie and Robb, 2007; Kim et al., 2006). Unregistered urban business owners will therefore benefit from advantages of informal learning and business management experience from their parents, which could then translate to increased sales and profit. With the importance

of the informal sector in Ghana by way of generating employment opportunities and incomes for individuals, it is plausible that formalising some of these informal learning activities can be important for performance and skill development of unregistered business owners. For instance, encouraging apprenticeship training at the national level for individuals with entrepreneurial prospects could be an initial step towards improving the human capital level of those unable to enter into the formal wage sector. This would help reduce the unemployment rate (in the formal sector), and could potentially lead to an increase in private sector activities which can then complement the high demand for public sector wage jobs.

Throughout this thesis, two consistent messages have emerged; firstly, that family background, in the form of educated parents is important for child development. Family background directly enhances the schooling enrolment chances of children, both biological and non-biological, and facilitates higher earnings for adults in wage jobs through its direct and indirect effects. However, the parental education component of family background is less important as regards the performance of unregistered urban businesses, whereas having parents with experience in running businesses is the vital factor. Secondly, that education plays a key role in economic success by mediating the positive effects of family background on individual earnings, and enhances performance of the smallest informal businesses without workers.

5.2 Implications of findings and future research

In Ghana, there are still some areas where school enrolment is low, especially in rural areas, partly because of financial constraints faced by such households. For example, the rate of educational attainment at secondary and tertiary levels is generally

low as found from the descriptive statistics in chapter 3. Compared with lower levels of education, secondary and post-secondary education should ideally have a much larger impact on children's outcomes, such as long-term earnings. An area for further research will be for me to use a longitudinal study (with support and funding from international development and donor organisations) to track the education and enrolment of individuals at the secondary and post-secondary levels, and their employment outcomes. To establish causal effects, intervention programmes such as cash transfers can be implemented and evaluated to determine whether the availability of finance can significantly increase educational attainment of children from households that face financial constraints. It is also important to examine the relationship between educational outcomes and labour market outcomes (e.g. in terms of earnings) of such individuals.

As regards parents' possible reliance on children, especially boys, in rural areas for old-age financial support 'pensions', an important consideration for future research is to investigate whether providing poorer parents with a non-voluntary pension system can increase school enrolment and educational attainment of children, particularly those in rural areas. Currently in Ghana, only 7.6% of adults who are above the statutory pensionable age receive an old-age pension[20] (HDR, 2015). Compared with Brazil and South Africa where non-voluntary pensions have been introduced and noted to have a significant impact on poverty reduction (HelpAge International and IDPM, 2003), the rate of adults above the statutory pensionable age in receipt of an old-age pension in the two countries are 86.3 and 92.6% respectively (HDR, 2015). With evidence for South Africa and Brazil that introduction of a non-voluntary pensions

[20] This is expressed as a percentage of the eligible population.

systems led to a reduction in poverty, there is however no evidence to show that introduction and provision of a non-contributory pension systems could lead to an improvement in school enrolment and educational attainment of children in rural/poorer households. If the reasons for low or non enrolment in rural areas is as a result of poverty, then this can be a first step towards addressing the issue. But of course, such an investigation can only be possible after the introduction of a non-voluntary pensions systems in Ghana. An intital approach to address this issue will be to implement an intervention programme similar to PROGRESA (Levy, 2007), for a sample of regions, that identifies poorer households as recipients of "pensions". Where the programme proves successful, then this can be implemented to cover the entire country. There might, of course, be concerns regarding administering this system, especially given the lower tax bases in Ghana. However, Willmore (2007) find that in some developing countries, basic social pensions account for only a small percent of GDP. This means that an introduction of this system could be possible for Ghana.

An investigation of the impact of time-use on women's non-agriculture wage work is also on my list of future research considerations. According to the Ghana Time Use Survey 2009 (GSS, 2012), 59% of women compared with only 12% of men were involved in activities such as fetching water for use by the household each week. Similarly, 71% of adult women compared with 15% of adult men collected firewood for use as fuel at home. Women were also likely to engage in other unpaid time-use activities such as taking care of the elderly. When individuals, mainly women devote time to both wage work and non-wage work, then, it is important to know how the associated trade-offs and constraints impact on their non-agricultural wage work

participation, especially in Ghana and other sub-Saharan African countries where many households have limited access to basic amenities.

Lastly, an important consideration for future work on enterprises in Ghana is to extend the current study to registered firms. An interesting area of investigation is to examine the skill component of workers (based on their level of education) and whether or not educated workers complement the skills of the firm owner, as well as examining their importance for firm performance. If entrepreneurs that are more skilled are able to run larger firms because of their managerial ability, which is due in part to their level of education, they can perhaps also attract highly educated workers. This complementarity could be associated with higher productivity in large firms and higher wages for workers (as a reward for the higher productivity and compensation for their human capital investments).

In conclusion, this thesis has highlighted the complementary roles of education and parental influence on schooling and labour market success in Ghana. The constraints of poverty measured by household access to basic amenities have also been highlighted, as have differences in the situations faced by those living in rural and urban parts of Ghana. Overall, the evidence from this study suggests that there is plenty of scope for policy interventions to improve future opportunities for Ghana's children and those involved in labour market activities.

References

Amin, S., Quayes, S. & Rives, J. M. 2(006). "Market work and household work as deterrents to schooling in Bangladesh". *World Development,* 34**,** 1271-1286.

Bratsberg, B., Røed, K., Raaum, O., Naylor, R., Jantti, M., Eriksson, T. & Osterbacka, E. (2007). "Nonlinearities in Intergenerational Earnings Mobility: Consequences for Cross-Country Comparisons". *The Economic Journal,* 117**,** C72-C92.

Brown, P. H. & Park, A. (2002). "Education and poverty in rural China". *Economics of Education Review,* 21**,** 523-541.

Dunn, T. & Holtz-Eakin, D. (2000). "Financial Capital, Human Capital, and the Transition to Self-Employment: Evidence from Intergenerational Links". *Journal of Labor Economics,* 18**,** 282-305.

Fairlie, R. W. & Robb, A. M. (2007). "Families, Human Capital, and Small Business: Evidence from the Characteristics of Business Owners Survey". *Industrial and Labor Relations Review,* 60**,** 225-245.

Ghana Statistical Service (GSS) (2012). "Ghana Time-Use Survey 2009 report: How Ghanaian women and men spend their time"

Ghana Statistical Service (GSS) (2008). "Ghana Living Standards Survey report of the fifth report"

Hannum, E. (1998). "Educational inequality: Hidden consequences of the reform era in rural China". Ph.D. Dissertation, Department of Sociology, University of Michigan

HelpAge International and IDPM, (2003). "Non-Contributory Pensions and Poverty Prevention: A Comparative Study of Brazil and South Africa", HelpAge International and Institute of Development Policy Management (IDPM), London and Manchester

Hudson, J. & Sessions, J. G. (2011). "Parental education, labor market experience and earnings: New wine in an old bottle?" *Economics Letters,* 113**,** 112-115.

Human Development Report (2015). Available from: http://hdr.undp.org/en/countries/profiles/GHA [Accessed: 24 February 2015]

Kim, P. H., Aldrich, H. E. & Keister, L. A. (2006). "Access (Not) Denied: The Impact of Financial, Human, and Cultural Capital on Entrepreneurial Entry in the United States". *Small Business Economics,* 27**,** 5-22.

Levy, S. (2007). "Progress against poverty: sustaining Mexico's Progresa-Oportunidades program", Brookings Institution Press.

Li, J. & Lavely, W. (2003). "Village Context, Women's Status, and Son Preference Among Rural Chinese Women". *Rural Sociology,* 68**,** 87-106.

Lloyd, C. B., Grant, M. & Ritchie, A. (2008). "Gender Differences in Time Use Among Adolescents in Developing Countries: Implications of Rising School Enrollment Rates". *Journal of Research on Adolescence,* 18**,** 99-120.

Parish, W. L. & Willis, R. J. (1993). "Daughters, Education, and Family Budgets Taiwan Experiences". *The Journal of Human Resources,* 28**,** 863-898.

Pasquier-Doumer, L. (2013). "Intergenerational Transmission of Self-Employed Status in the Informal Sector: A Constrained Choice or Better Income Prospects? Evidence from Seven West African Countries". *Journal of African Economies,* 22**,** 73-111.

Pellizzari, M. (2010). "Do friends and relatives really help in getting a good job?" *Industrial and Labor Relations Review,* 63**,** 494-510.

Raitano, M. & Vona, F. (2015). "From the cradle to the grave: the effect of family background on the career path of Italian men". OFCE Working paper

Willmore, L. (2007). "Universal Pensions for Developing Countries". *World Development,* 35**,** 24-51.