

**THE EFFECT OF EDUCATION ATTAINMENTS ON EARLY
MARRIAGE AMONG WOMEN IN MALAWI**

MASTER OF ARTS (ECONOMICS) THESIS

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**THE EFFECT OF EDUCATION ATTAINMENTS ON EARLY MARRIAGE
AMONG WOMEN IN MALAWI**

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DECLARATION

I, the undersigned hereby declare that this thesis is my own original work which has not been submitted to any other institution for similar purposes. Where other people's work has been used, acknowledgements have been made.

Murphy Kajumi

.....

Signature

.....

Certificate of Approval

The undersigned certify that this thesis represents the student's own work and effort and has been submitted with my approval.

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Dedication

To Zindaba, Vusizwe, Sibusiso, Mandla, Anyanko and to the memory of my late father.

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ABSTRACT

This study uses consumer behavior theory to analyze the effects of educational attainments on early marriage among women in Malawi. A latent variable approach (LVA), from which a probit model is derived is used to estimate the effects of education attainments on early marriage among women. Within this framework, the study uses a conceptual model suggested by Sidibé (2005) relating to choices made by economic agents that involve two mutually exclusive decisions for welfare or utility maximization. This inter-temporal utility maximization problem involves deciding between marrying early on the one hand, and pursuing formal education on the other. The study controls for other factors such as ethnicity, religious affiliation, place of residence and district of origin that may also influence early marriages among women.

The study finds that no or low formal education attainments (Primary School Leaving Certificate of Education and below) are positively correlated with early marriage among women, while higher attainments (Junior Certificate of Education and above) are associated with a delay in the women's age at first marriage. The results are statistically significant and support both theory and empirical evidence with regard to the relationship between education attainments and early marriages. The study also finds ethnicity and religion to be factors influencing early marriage among women. The study finds that compared to women without any religious affiliation, those with a religious persuasion are likely to marry early.

The results suggest that policy measures to keep girls in school beyond Primary School Leaving Certificate should assist in curbing early marriage in the country. The current measures such as the girls' readmission policy, improving access, quality and learning environments are well informed but need to be implemented more decisively to increase the

retention of girls in school. A cross-sector approach addressing poverty, including social protection measures should also assist in keeping girls in school and reduce early marriage. Further, legislating for a higher age at marriage, with attendant enforcement mechanisms such as birth registration and monitoring should assist in curbing early marriage among women.

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LIST OF ACRONYMS AND ABBREVIATIONS

A Level	Advanced Level
AIDS	Acquired Immuno-deficiency Syndrome
BHPS	British Household Panel Survey
CSO	Civil Society Organization
D&S	Demand and Supply
FAO	Food and Agriculture Organization
GCE	General Certificate of Education
GoM	Government of Malawi
HIV	Human Immuno Virus
JCE	Junior Certificate of Education
LVA	Latent Variable Approach
MDG	Millennium Development Goal
MDPC	Ministry of Development Planning and Cooperation
MSCE	Malawi School Certificate of Education
NESP	National Education Sector Plan
NSO	National Statistical Office
OLS	Ordinary Least Squares
OSM	Optimal Sorting Models
Ph D	Doctor of Philosophy
PHC	Population and Housing Census
PSLC	Primary School Leaving Certificate

PSID	Panel Survey of Income Dynamics
UNICEF	United Nations Children's Fund
UNIMA	University of Malawi
WB	World Bank

CHAPTER ONE

INTRODUCTION

1.0 Introduction

This study analyzes the effects of education attainments on early marriage among women in Malawi. Early marriage, defined in this study as all forms of marriage where a person gets married at or below eighteen years of age, has become a social and economic development challenge. At the societal level, the cumulative effects of early marriage would be to affect the demographic tissue in ways that have implications on the development process. This is because of its links with fertility rates; heightening girls' risks to contracting HIV/AIDS given the state of gender inequalities and women disempowerment, and ultimately, its negative effects on the welfare of the population (UNIMA and FAO, 2010; Clark *et al*, 2006; Foster and Khan, 2000). Early marriage has also been acknowledged to be a challenge that disproportionately affects women or female (compared to men) agents in the economy (Otoo-Oyortey and Pobi, 2003). In the context of the Millennium Development Goals (MDGs), the prevalence of early marriages would tend to hold back progress owing to increased maternal mortality arising from child bearing risks that girls are exposed to, as well as children dropping out of school to get married (World Bank, 2010) .

However, while a number of factors influence the age at first marriage in any country, formal education has been acknowledged to be one of the most important ones. Its effect is realized via the time invested by agents in education which tends to delay the onset of the first marriage with increasing education attainment levels (Jain and Krutz, 2007; Manda and Meyer, 2004). In addition, education attainment may be used as a factor in selecting marriage

partners in the marriage market (Nosaka, 2009; Bergstrom and Bagnoli, 1993). Where agents value education as a key factor in selecting mates, this may imply an increase in the age at first marriage, or a reduction in early marriages, as agents are likely to invest time in education.

This study uses consumer behavior theory where decisions to marry early or pursue formal education are assumed to be influenced by a desire to maximize utility. The agents face an inter-temporal utility maximization problem when they choose either to marry early or remain single and pursue formal education towards higher levels of education attainments. In this sense, by choosing to marry early, the agent substitutes formal education for marriage and vice versa if she chooses to pursue education. To the extent that both early marriage and the pursuit of formal education are perceived by agents to be strategies towards welfare enhancement, and that they are largely mutually exclusive, they may be viewed as substitute goods for each other.

This chapter provides the background to and the context of the research. Sub-section 1.1 presents the background to the research which is followed by a presentation of the study context in sub-section 1.2. Sub-section 1.3 presents the statement of the problem. Sub-section 1.4 is the study motivation and significance, while sub-section 1.5 is the justification of the study. Sub-section 1.6 presents the research objectives, while sub-section 1.7 specifies the research hypotheses. Sub-section 1.8 concludes the chapter and also presents the organization of the entire study.

1.1 Background

The timing of marriage among women and men has been the subject of attention by economists (Nosaka, 2009; Bergstrom, 1995 and Becker, 1973). While in general women tend to marry earlier than men, especially in the developing world, a worrying trend is the persistent early or child marriages among women. This worry stems from the negative consequences associated with early marriage and its implications on human development. According to Otoo-Oyortey and Pobi (2003), early marriage is any form of marriage occurring before a person reaches the age of eighteen. In Malawi, it is estimated that 51% of women aged 15-49 get married before age 20, compared to 95% of their male counterparts who remain single at the same age (GoM and Macro, 2004). Recent data (GoM, 2009) show a generally low age at first marriage for women, with the median age at first marriage estimated at 18 years. Given this trend, early marriages in Malawi may represent a drag on development and poverty reduction efforts given the associated low human development outcomes as women continue to marry early.

The age at first marriage also appears to increase with education in the country, with women who have attained secondary education marrying four years later than those without education (GoM, 2009; GoM 2010). Further, according to Manda and Meyer (2004), the odds of early marriage are three times for women with no education qualification compared to those with education levels of Malawi School Certificate of Education (MSCE) or higher. This means that education is an important factor that would have the effect of raising the age at first marriage from current levels-i.e. it would contribute towards reducing early marriages.

At the global level, Malawi is listed among the 20 hotspots for early or child marriages with 46.9 percent of persons aged 20-24 years marrying before the age of 18 (Jain and Krutz, 2007), with women representing a disproportionate proportion of those that marry early compared to men.

A number of factors that influence the age at first marriage in the country can be discerned from the literature, including education, poverty, cultural practices, sex ratios and religious affiliation (FAO and UNIMA, 2009; GoM, 2010). With specific reference to education, the fact that higher levels of education attainments are associated with a rising age at first marriage generates little controversy (Bergstrom and Bagnoli, 1993; Chen, 1998). This is because marriage roles are incompatible with schooling, implying that young women that choose to invest in education would obviously postpone the timing of their first marriage. Poverty, some cultural practices and religious affiliation also tend to promote early marriage (Jain and Krutz, 2007; UNICEF, 2001). In poverty conditions, girls will see marriage as one escape route and will tend to marry early, often to men that are much older than themselves¹. Similarly, in cultures where marrying early is part of the accepted social fabric, early marriages will tend to be prevalent. Religious persuasions that have strong beliefs about marriage, and are against out of marriage sex and pregnancies will also be associated with early marriage (Lehrer, 2004). Sex ratios that are considered to be an indication of conditions in the marriage market (Gustafsson and Worku, 2006) are also said to influence the age at first marriage, depending on the availability of marriageable male and female agents in the marriage market. Where the number of marriageable female agents is greater than that of marriageable male agents, the age at first marriage for female agents will tend to rise and decrease vice versa. Hence, understanding the importance of the various factors impacting on the age at first marriage, their magnitude and importance may assist in identifying policy options to curb early marriages in Malawi. This study is a contribution in that direction.

¹ The men may not be necessarily wealthy, but will be older and perceived to be able to provide for a family. Nonetheless, the men will obviously be older since they can only demonstrate their worth as viable marriage partners when they are much older, compared to women.

1.2 Policy Context

The policy and legal framework regarding regulation of the age at first marriage has been ambivalent in Malawi. While a number of legislations, including provisions in the Malawi Constitution (GoM, 2002) that provide for ages at which children can get married with or without parental consent exist, they do not appear to be consistent. For instance the recently passed Child Care, Protection and Justice Act has put the age at which a person can get married without parental consent at 16 years, while the Malawi Constitution defines a child as any person below the age of 18.

In regard to education policy, the Government has instituted a number of policy measures through the Malawi Growth and Development Strategy (MGDS), and operationalized through the National Education Sector Plan (NESP) to improve education outcomes, especially for girls. Nonetheless, the education system in the country has remained fragile, with only a small proportion of students working their way beyond secondary school. According to World Bank (2010), education outcomes for Malawi are still among the poorest in Southern Africa. Although there have been improvements on several fronts, Malawi's progress towards the Millennium Development Goal on Universal Primary Education remains slow (*ibid*). At primary school level, available data show that although access to primary education is near universal, only 35% of pupils enrolled complete the full primary school. Low demand for education among poorer households is the primary reason for the less than satisfactory education outcomes in the country. The low demand for education itself is the result of several factors, including: early marriages, poverty, pregnancies and the need for children to assist with household chores (World Bank, 2010). In the absence of alternative sources of income, children that drop out of school, especially girls end up getting married.

1.3 Statement of the Problem

A generally low age at first marriage has social and economic consequences for the Malawi economy in general, and for women in particular. Since 2000, the median age at first marriage for women has remained at 18 years (GoM and Macro, 2005) in Malawi, suggesting that it is a near permanent feature of the marriage market in the economy. While early marriage also affects boys, it is a problem that disproportionately affects girls, with 43.6 percent of girls compared to 5.7 percent of boys marrying before the age of 18 in Malawi (Otoo-Oyortey and Pobi, 2003). Thus, apart from constituting a violation of child rights in many respects, the implication is that women as a group in Malawi are subjected to conditions that would yield less than desired outcomes such as poverty, including the possibility of cross-generational poverty, high maternal mortality rates and low labor force participation in the formal sector (Taffa and Obare, 2004; UNICEF, 2009; GoM, 2009b).

However, despite a vast array of knowledge regarding the negative social and economic effects arising from early marriage, there appears to be little or no evidence that measures are being undertaken to effectively curb it. An ambivalent policy and legal framework, and a continuing but ultimately inconclusive debate on curbing early or child marriages in the country is evidence that girls are not being actively dissuaded from marrying early. In addition, although it is widely accepted that higher levels of educational attainment can decisively reduce early marriage, measures to improve education outcomes for girls appear to be yielding little success in Malawi (World Bank, 2010). This knowledge-action mismatch represents a perplexing situation worth investigation. This study will contribute to this knowledge by investigating the effect of education attainments and other factors on early marriage.

1.4 Motivation and Significance of the Study

This study asks whether education attainments have an effect on the women's timing of marriage in Malawi, and is motivated by two major considerations. First, marriage is an important determinant of fertility, a subject that is still of concern in Malawi given the low age at first marriage in the country (UNIMA and FAO, 2010). According to Jain and Krutz (2007), Malawi is among the top 20 child marriage hotspot countries in the world, with about 46 % of marriages considered as early or child marriages in the country. High or low fertility rates have implications on access to productive resources such as land, and hence on poverty levels. Second, marriage has implications on the formal sector labor force participation of women, and hence poverty levels for a significant section of the population. Because marriage affects decisions to continue with education, and hence their participation in the formal employment sector, an understanding of the scale of the relationship between education attainments and early marriage is important. On the academic front, the study makes a contribution to knowledge on the determinants of early marriage in the context of a specific developing country, Malawi.

1.5 Justification of the Study

A growing body of economic literature analyzing the timing of marriage of marriage exist (Manda and Meyer, 2004; Jin et al, 2003; Bergstrom and Bagnoli, 1993; Becker, 1973). Manda and Meyer (2004) specifically studied the effect of education attainments on marriage timing in Malawi, and concluded that the odds of women with no or low education to marry early were higher compared to their counterparts with higher education. The current study contributes to this assessment by including other covariates such as religious affiliation and ethnic background of women not analyzed by Manda and Meyer (2004).

A major limitation of the current empirical research analyzing factors impacting on age at first marriage is that most of the experimental models have locational average treatment effects, and therefore, not very useful for generalizing results to other settings. For instance, Powdthavee and Adireksombat (2010), analyzed the effect of mandatory schooling on the age at first marriage in Britain. Although this study established a direct link between educational attainment or an increase in schooling years with the age at first marriage, the social and economic context in Britain (a developed country) differs from that of Malawi (a less developed country). By highlighting the case of Malawi, the current study provides insights into the relevance of education in influencing the timing of marriage among women that may have both academic and policy relevance, specifically related to the Malawi context.

1.6 Research Objectives

The overall objective of the study is to determine the effect of educational attainments on early marriages among women in Malawi. The specific objectives of the study are the following:

- i. To investigate the effect of educational attainments on early marriage among women in Malawi;
- ii. To investigate the effect of ethnicity on early marriage among women in Malawi;
- iii. To investigate the effect of religious affiliation on early marriage among women in Malawi;
- iv. To investigate the effect of district poverty rates on early marriage among women in Malawi;
- v. To investigate the effect of location of residence on early marriage among women in Malawi;
- vi. To investigate the effect of sex ratios among women in Malawi, and

- vii. To investigate the effect of women's district of origin on early marriage

1.7 Study Hypotheses

The study postulates the following hypotheses:

- i. Women's educational attainments have no effect on early marriage
- ii. Ethnicity has no effect on early marriage
- iii. Religious affiliation has no effect on early marriage
- iv. District poverty has no effect on early marriage
- v. Location has no effect on early marriage
- vi. Sex ratios have no effect on early marriage
- vii. Women's district of origin has no effect on early marriage

1.8 Organization of the Study

Chapter 1 has provided a general background to the problem of a persistently low age at first marriage (or early marriage) among women in Malawi and its attendant negative social and economic consequences. It has also presented the problem statement, study motivation and research objectives. The rest of the study is organized as follows: chapter 2 presents a review of theoretical and empirical literature. It provides the basis for agents' marriage decisions as economic decisions aimed at maximizing welfare or utility. It also establishes why women will tend to marry early based on both theoretical and empirical literature. Chapter 3 presents the methodology, an analytical framework and analysis techniques used in undertaking the study. The results and interpretation of the study findings are presented in Chapter 4. Chapter 5 contains a summary of the findings, conclusions and policy implications of the study results.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The timing of marriage by agents in the marriage market has been the subject of interest for economists. Most prominent among those theorizing the timing of marriage and education are Becker (1973), Bergstrom and Bagnoli (1993), and Nosaka (2009). A number of empirical studies have also been carried out to test economic theories on marriage and the factors that affect the age at first marriage. The most recent of these include Powdthavee and Adireksombat (2010), Kumchulesi (2010), Kondo (2008), Manda and Meyer (2004). This chapter reviews the literature on age at first marriage and educational attainments. The literature review is in two parts: theoretical literature and empirical literature. The chapter first establishes economic reasons for desiring to marry by demonstrating the gains that obtain from marriage compared to remaining single. The theoretical literature extends to covering early marriages among the agents in the marriage market. Secondly, the chapter reviews empirical literature.

This chapter is organized as follows: subsection 2.1 presents the theoretical literature related to the economic rationale for people to marry and whether they would marry early or delay marriage. Sub-section 2.2 presents empirical literature related to studies on marriage in general, and the factors that influence early marriage. Sub-section 2.3 concludes and summarizes the chapter.

2.1 Theoretical Literature

The development of a theory permitting the economic analysis of marriage is due to Gary S Becker (1973). In his pioneering work, Becker explained marriage formation using two models, namely, optimal sorting models (OSM) and the simple demand and supply (D&S) model based on a general equilibrium framework.

Becker suggested that two individuals would get married if and only if, both are able to increase their utility as result of the marriage. Both the man and woman bring a set of assets to the marriage in the form of physical capital and human capital, such that the welfare of the newly-weds consists of:

$$PA_m + PA_f \text{ and } H_m + H_f \quad (2.1)$$

Where, PA_m are physical assets relating to the male spouse and PA_f to the female spouse;

H_m and H_f are human capital endowments that the man and woman possess, respectively.

It is assumed that the two individuals' welfare or utility is increased when they get married:

$$W = W(PA_m + PA_f, H_m + H_f, Z) \quad (2.2)$$

where W is welfare and Z is a set of exogenous variables that also affect utility such as beauty (e.g. skin shade, chemistry and height), spousal care and good manners that are desirable and may have an influence on utility. It is also assumed that the utility from marriage increases with physical assets and human capital, such that:

$$\frac{\partial W}{\partial PA} > 0; \frac{\partial W}{\partial H_m} > 0 \text{ and } \frac{\partial W}{\partial H_f} > 0 \quad (2.3)$$

Further, if G_{m0} and G_{f0} are outputs produced by single males and females respectively, and that m_{mf} and f_{mf} are their incomes when they get married, then a necessary marriage condition for the single male and female is:

$$m_{mf} > G_{m0}; f_{fm} > G_{fo} \quad (2.4)$$

If we assume that the marriage total income m_{mf} and f_{mf} can be identified with the marriage output, G , then a necessary condition for marriage is:

$$m_{mf} + f_{mf} \equiv G_{mf} \geq G_{mf} + G_{f0} \quad (2.5)$$

This implies that agents in the marriage market will prefer getting married to remaining single as the value of output from marriage is greater than that pertaining to remaining single. This Beckerian framework assumes equi-proportional use of factors of production and constant returns to scale. It further assumes that productivity enhancing variables such as education affect the factors in the same way.

Having established the economic rationale by agents in the marriage market to get married, we now turn to a review of the reasons for early marriage by the agents in the following sections.

2.1.1 Early Marriage

Compared to men, women invariably tend to marry earlier (Bergstrom and Bagnoli, 1993; Bergstrom and Schoeni, 1996). A number of factors influence the timing of marriage among men and women. Becker's Theory of marriage (Becker, 1973) predicts that due to positive assortative mating, persons with similar characteristics will in equilibrium marry each other. This implies that women and men with no or low levels of education as a characteristic in the marriage market will tend to marry each other and vice versa for those with higher education. It also means that men with low education attainments will not be attractive as partners to highly educated women. Hence, these men should, *ceteris paribus*, delay the timing of their first marriage. This would have the consequence of raising the general age at first marriage in a particular marriage market. Similarly, women with low

education levels should experience the same effects with highly educated men. For Malawi, if we take high education levels to be from Junior Certificate of Education (JCE) and above, this means that women below JCE levels should be experiencing a rising age at first marriage, holding all other factors constant. However, this appears not to be the case for Malawi, suggesting that other factors than education may be at play in influencing the timing of marriage. While evidence of *educational homogamy*² for Malawi is scarce, it is plausible to suspect that men with higher educational status tend to marry less educated women for their ability to fulfill household chores and childbearing. Here, exogenous factors such as women's beauty or 'chemistry' may play a key role in the marriage market in determining the desirability of women as marriage partners by educated men.

In contrast to Becker (1973), Bergstrom and Bagnoli (1993) seek to explain why men and women have differing levels of age at first marriage. They suggest that the timing of marriage is dependent on the realized potential of expectations for women and men as attractive marriage partners in the marriage market, respectively. For women, this potential is essentially the attainment of physical maturity to be able to bear children and perform household chores. Men on the other hand are judged by their ability to provide money for the family, and hence will tend to delay marriage until such a time that this potential is revealed. Hence all women in traditional societies should be expected to marry early, while men will tend to delay marriage.

This theory has two implications. The first is that a low and high age at first marriage should be observed for women and men, respectively. The second is that young men who marry early can be deemed to be less confident of their earning capabilities in future, and hence reflect a "market for lemons" in the marriage market (Bergstrom and Bagnoli, 1993).

² Tendency for educated agents to marry other educated agents- i.e. low likelihood of educated agents marrying uneducated agents

This theory appears to be consistent with the Malawi situation and may shed light on why the age at first marriage for women in the country is low compared to that for men.

Another reason suggested for early marriage among women is the shorter fertility period for women compared to men. Because women have a shorter fertility period, they will tend to marry early compared to men (Siow, 1998). This implies that the age of a woman (i.e. how old she is regarding physical maturity) influences the age at first marriage (i.e. when she gets married). When viewed from this perspective, and as suggested by Díaz-Giménez and Giolito (2008), marriage for women becomes “a rushing game”, rather than the ‘waiting game’ that Bergstrom and Bagnoli (1993) imply

Nosaka (2009) specifically analyses the effect of differing educational attainments on the timing of marriage and education homogamy. According to Nosaka (2009), the timing of marriage among male and female agents in the marriage market is affected by the productivity of the agents, as well as the existence of agents with differing levels of education. Education attainments affect the marriage market via two pathways: (a) since higher educational attainments require an investment in time, the tendency would be for women to delay marriage as they pursue education, (b) the preferences of highly educated men may affect the marriage market due to the assortative mating principle. The implication from these findings is that higher education attainments should be associated with a high age at first marriage and the reverse for low education attainments.

2.2 Empirical Literature

Empirical research investigating the determinants of age at first marriage shows that there are a number of factors influencing the age at first marriage in a society. Among these, higher levels of schooling tend to have a negative relationship with early marriage. This appears to confirm the theoretical prediction that more schooling tends to delay the timing of

first marriage and hence raises the age at first marriage. This means, *ceteris paribus*, that agents that choose to stay for a long time in school tend to value less the benefits of getting married early. In Malawi, the GoM (2010) suggests that education is associated with delayed age at first marriage, although other factors also play a role.

Manda and Meyer (2004) studied the determinants of transition to marriage in Malawi using data from the Malawi Knowledge, Attitudes and Practices in Health (MKAPH) survey of 1996. They adopted a Bayesian approach using a hierarchical discrete-time survival model to analyse data on the timing of marriage in Malawi. This approach is believed to provide more accurate estimates compared to maximum-likelihood based approaches that only provide point estimates. This is because of its ability to explore the behavior of parameters in any function of interest (Manda and Meyer, 2004). They found that women's education was the most significant factor that determined the age at first marriage, with educated women entering first marriage at a substantially higher age. They also found cohort differences in the timing of marriage with younger cohorts entering marriage later than older ones. Rural-urban differences regarding the timing of entry into marriage were also observed, with rural women entering earlier than their urban counterparts. Despite the differences in approach, the current study provides fresh evidence, especially with respect to early marriages among women in Malawi.

Natural experiments such as laws designed to achieve better human capital development outcomes also affect the age at first marriage (Powdthavee and Adireksombat, 2010). Powdthavee and Adireksombat (2010) used the British Household Panel Survey (BHPS) to estimate the effect of years of compulsory schooling on the age at first marriage for men and women in the United Kingdom. They found that the reduced form effects of compulsory schooling were to increase the age at first marriage by 1.385 months for women and 1.743 years for men. The instrumental variable effects were that schooling delayed

marriage for men by 3.4 years and 1.3 years for women. In terms of early marriage, this means that a law designed to enforce compulsory schooling should exert a dissuasive influence on early marriages.

Altruistic, as well as selfish behavior by parents as factors may also affect the age at which children marry (Graspart, 2007; Fafchamps and Quisumbing, 2006). This is done via forced marriages, or delaying the marriage where parents do not like the suitor or are interested in acquiring the bride price. In a study of marriage consent and age at first marriage in the Senegal River Valley, Graspart (2007) found that all early marriages were arranged, suggesting that where parents have a role in deciding when their children marry, early marriage may be encouraged. In the same study, levels of education attainment were also found to be positively correlated with the age at first marriage. Using simple correlation tables, he found that 87 percent of the sampled women consisting of those with low education attainment (primary school and less) married early compared to those with higher education attainments (13.0%). He therefore, concluded that education attainment was correlated with the age at first marriage. In Malawi, while there have been concerns about forced marriages, there has not been a coherent analysis of the extent of the problem. The marriage formation process also differs between ethnic groups (i.e. whether matrilineal or patri-lineal) in the country, and may be a factor explaining early marriages. This study will, among other factors, estimate the effect of ethnicity on early marriage and hence provide some evidence on these aspects.

A woman's own income or personal assets is another determinant of age at first marriage. In a study investigating the role of income to the marriage behavior of Japanese women, Sakai (2009) used a hazard and logit model to estimate the impact of income on the timing of marriage. The study found that as woman's own income increased, marriage tended to be delayed, resulting in a high age at first marriage. The reasons for this trend were

suggested to be an increase in the reservation utility, as well as long working hours that were incompatible with marriage roles. In the context of Malawi, with low incomes and limited labor force participation in the formal sector for women, the implication of this evidence is that the age at first marriage for women should be low due to the low reservation utility, and limited alternate welfare enhancing strategies.

Labor market conditions also affect decisions to marry early among women. When labor market conditions for women are unfavorable relative to men (i.e. discrimination or inability to work in the formal labor market), the tendency is for young women to marry early. In a study of family labor conditions and family formation, Kondo (2008), estimated the effect of female labor conditions on marriage for women in the United States of America. A hazard model was used to estimate this effect using data from the Panel Survey of Income Dynamics (PSID). Although its primary concern was to investigate the effects of female labor market conditions on decisions to marry, it implied that the effect of unfavorable formal labor market conditions for women was to quicken the age at first marriage. This point applies to Malawi and other developing countries with limited off farm employment (GoM, 2009).

Relating to the marriage market, a marriage market squeeze (unity or near unity sex ratios) reflecting the shortage of men has been found to increase the age at first marriage. Using China's 1990 and 2000 census data, Dasgupta *et al* (2010) simulated the effects of changing sex ratios in the Chinese marriage market. They found that the presence of fewer girls or what they termed 'missing girls' in the marriage market spelt low prospects for men to get married, and would consequently increase the age at first marriage. In another study analyzing the effect of armed conflict in Tajikistan on the marriage market and female reproductive behavior, (Shemiyakina, 2009) found that the age at first marriage increased with the shortage of men due to the high mortality of men arising from the conflict in the affected parts of Tajikistan.

In Malawi, the main factor driving changing sex ratios³ in the local marriage markets is the rural-urban migration (UNIMA and FAO, 2010). The higher urban sex ratios compared to those in the rural areas are suspected to be a contributing factor to the differing age at first marriage for rural and urban areas, respectively. However, the pursuit of education and other economic opportunities by women in urban areas may be other reasons explaining the higher age at first marriage compared to that for rural areas.

2.3 Summary

This chapter has reviewed the available theoretical and empirical literature relating to factors that affect the timing of marriage among agents, including education attainment. It has highlighted the fact that agents choose to get married in order to increase their utility compared to remaining single. It has also noted that higher education levels tend to increase the age at first marriage while low education levels should be associated with a low age at first marriage or early marriage. Other factors affecting the age at first marriage such as location, age, religious affiliation and sex ratios have also been highlighted. The next chapter presents the methodology of the study.

³ This sex ratio is different from the one used in this study-see details under definition of terms, chapter 3

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter presents the methodology of the study. The chapter proceeds as follows: first, a definition of terms used in the study is presented in sub-section section 3.1. This is followed by a presentation of the analytical framework for the study in sub-section 3.2. The econometric and empirical model to be estimated is presented in sub-section 3.3. Analysis techniques are highlighted in sub-section 3.4, while study limitations are presented in sub-section 3.5.

The study uses a sub-population comprised of women of marriageable age from the National Population and Housing Census data undertaken by the National Statistical Office (NSO) in 2008. Deploying the utility maximization framework via the Latent Variable Approach (LVA), the study estimates the effect of education attainments on the early timing of marriage in Malawi. To account for other factors that may also influence early marriage, a number of other variables were included in the model. These are variables known from the literature to also have a bearing on the timing of marriage, and included the women's residential location (rural/urban), religious affiliation, tribe, district of origin, district poverty rates and sex ratios, among others.

3.1 Definition of Terms

The following definitions are provided to ensure uniformity and understanding of the terms used in the study:

- **Early Marriage:** refers to the timing of marriage by women agents in the marriage market that occurs at or below 18 years of age. In empirical literature, this has connotations of child marriages, although marriage at age 18 is not regarded as early or child marriage (Otoo-Oyortey and Pobi, 2003). However, in this study early marriage includes even marriages occurring at age 18. This definition takes into account an average schooling time period to attain a higher level of education in Malawi. Assuming no repetitions and no other bottlenecks, a girl that starts school at age seven is likely to attain the Malawi School Certificate of Education (MSCE) qualification (considered to be high education attainment in this study) at age 19;
- **Educational Attainments:** refers to the qualifications that a woman agent has attained. In this study the following educational attainment variables were used: No Qualification, Primary School Leaving Certificate, Junior Certificate of education, Malawi School Certificate of Education, Advanced Level, Diploma, Degree, Masters and Doctorate (Ph D).
- **District Poverty rates:** The proportion of people whose consumption level is less than one United States dollar (US\$1) per day in a district.
- **Sex Ratios:** defined as the ratio of marriageable men to marriageable women, were calculated from the PHC data. The study used a framework of Sex ratios based on both the quantity and quality of men, calculated using the following formula suggested by Gustafson and Worku (2006).

$$SRP_i = \frac{\sum_{i=i-5}^{i+5} M_i}{\sum_{i=i-3}^{i+3} F_i} \quad (3.1)$$

$i=1, \dots, n$

Where:

SRP_i = the sex ratio for gender population i ,

M_i and F_i is the number of male and female gender of marriageable age, respectively.

The numerator in equation 1.1 represents the supply side in the marriage market-i.e. the number of marriageable men available, while the denominator represents the demand side-i.e. the number of women of marriageable age. The numerator implies that in terms of marriage search, a woman i of marriageable age, say 22 years, will be competing for male mates with other women of her age as well as those three years younger in the local marriage market. A five year age difference between men and women was assumed based on age at first marriage trends reported by the National Statistical Office where the age at first marriage for women is lower than that for men by approximately five years (GoM, 2004; GoM, 2010).

3.2 Analytical Framework

This study uses the Latent Variable approach (LVA) as an analytical framework to analyze the effect of educational attainments on early marriage among women in Malawi. The study assumes that a single female agent derives utility from early marriage but that this utility cannot be observed. However, when she decides to marry early, her age at first marriage can be observed. In the LVA formulation, the dependent variable Y_i is a binary variable taking the value of 1 if a woman chooses to marry at or before 18 years of age, and 0 otherwise.

The underlying latent variable model is, therefore, specified as follows:

$$y^* = \beta_0 + \chi\beta + e, y = 1[y \leq 18\text{years}] \quad (3.2)$$

Where y^* is the age at first marriage, χ is the set of independent variables that cause variation in early marriage, including education; $1[.]$ is an indicator function that takes the value of 1 if the age at first marriage for a female agent is 18 years or less, and zero otherwise; β is a set of parameters and β_0 is a constant. It is assumed that e , the error term is independent of the χ_s , and that e is normally distributed.

From the above LVA formulation, it is possible to derive a probit model using the utility maximization analytical framework as suggested by Sidibé (2005) to analyse the effect of education attainments and other factors on early marriages. This is in the context of the decision the female agents make on whether to marry early or to continue with education and other welfare enhancing strategies. The study assumes that decisions by single female agents to marry early are a function of a number of factors including education attainment based on varying levels of women's qualification, their place of residence or location (rural or urban), their religious affiliation and their ethnicity proxied on tribe, among others.

The study assumes that a single female agent in the marriage market responds to her situation based on a calculation of which options represent the highest utility. Hence, as noted above, faced with the inter-temporal utility maximization problem of marrying early or pursuing other welfare enhancing strategies, they will choose the option that is perceived to maximize their utility (Sidibe, 2005; Becker, 1973). Let U_{ij} represent the utility the young single female agent derives from an early timing of marriage with $j=(0,1)$ indicating marrying early or delaying marriage, and $i=\{1,2,\dots,n\}$ indexing the agent's characteristics. However, not all the characteristics are observable, although a linear relationship is assumed for the i th

young and single female agent between the utility derived from the j th welfare enhancement strategy and a vector of other covariates, including her socio-economic characteristics, X_i .

This is presented in equation 3.3 below:

$$U_{ij} = X_i \alpha_j + \varepsilon_i \quad (3.3)$$

Where $j=0,1$; and $i=\{1,2,\dots,n\}$, ε is an error term; and $\alpha > 0$

The decision for the female agent entails two mutually exclusive events- either to marry early, $j=1$ or delay marriage, $j=0$ in pursuit of other welfare enhancing strategies that include pursuing formal education. In this context, the female agent will choose the welfare enhancing strategy that gives her the largest utility. From the set of welfare enhancement strategies, j , the i th single female agent will choose to marry early if $U_{i1} > U_{i0}$. The decision to marry is indexed by Y such that when $U_{i1} \leq U_{i0}$ then $Y=0$, and when $U_{i1} \geq U_{i0}$ then $Y=1$. The probability of choosing to marry early will be given by:

$$\begin{aligned} \Pr = \Pr(Y=1) &= \Pr(U_{i1} > U_{i0}) = \Pr(X_i \alpha_1 + \varepsilon_{i1} > X_i \alpha_0 + \varepsilon_{i0}) \\ &= \Pr(\varepsilon_{i1} - \varepsilon_{i0} > X_i \alpha_0 - X_i \alpha_1) = \Pr(\varepsilon_{i1} - \varepsilon_{i0} > \alpha_0 - \alpha_1) \\ &= \Pr(\mu_i > X_i \beta) \end{aligned} \quad (3.4)$$

Where $\mu_i = (\varepsilon_{i1} - \varepsilon_{i0})$ and $H(X_i \beta)$ is the cumulative density function for μ_i . Hence the probability of the i th young female agent to marry early is the probability that the utility of early marriage is greater than the utility from education or other welfare enhancing strategies, or the cumulative density function solved at $(X_i \beta)$. If μ_i is normal, then H is the cumulative density function corresponding to the probit model.

From the foregoing, the empirical definition of the selected variables expected to determine the probability of choosing early marriage for this study will be:

$$P_i = \Pr(Y_i = 1) = H\left(\beta_0 + \sum_{j=1}^{22} \beta_j X_{ij}\right) \quad (3.5)$$

The β s are the coefficients of the independent variables, X_i , indicating the influence of these variables on the likelihood of a female agent marrying early.

3.3 Specification of the Empirical Model

Drawing from the foregoing, the empirical model that is estimated is as presented in equation (3.6) below.

$$\begin{aligned} \Pr(Y_i = 1 | x) = & \beta_0 + \beta_1(NOQUALIF_i) + \beta_2(PSLC_i) + \beta_3(JCE_i) - \beta_4(MSCE_i) - \beta_5(ALEVEL) \\ & - \beta_6(DIPLOM_i) - \beta_7(MASTERS_i) + \beta_8(PhD_i) + \beta_9(LOCAT_i) + \beta_{10}(CHEW_i) - \beta_{11}(NGONI_i) \\ & - \beta_{12}(DISTPOVRATE_i) - \beta_{13}(TUMB_i) + \beta_{14}(LOMW_i) + \beta_{15}(YAO_i) + \beta_{16}(CHRST_i) + \beta_{17}(MUSLM_i) \\ & + \beta_{18}(DISTMENQUANT_i) + \beta_{19}(DISTMENQUAL_i) + \beta_{20}(OTHERREL_i) + \beta_{21}(NOREL_i) \\ & + \beta_{22}(DISTRICTORIGIN_i) + \mu_i \end{aligned} \quad (3.6)$$

The definition of the variables included in the model and the hypothesized direction of effect are presented in Table 1 below.

Table 1: Definition of Empirical Model Variables and Hypothesized Effects on Early Marriage

Variable Name	Equation Symbol	Description	Variable Type	Expected Direction of Effect
Early Timing of Marriage by Women	EARMRG.	Dependent variable: woman age at first marriage is 18 years or less	Dummy, equal to 1 if woman's age at first marriage is 18 years or less, 0 otherwise	
No Qualification	NOQUALIF.	Independent variable: women with no qualification	Dummy, equal to 1 if woman has no qualification, 0 otherwise	Positive
Primary School Leaving Certificate	PSLC	Independent variable: women with primary school leaving certificate qualification	Dummy, equal to 1 if woman has PLSC, 0 otherwise	Positive
Junior Certificate	JCE	Independent variable: women with Junior Certificate	Dummy, equal to 1 if woman has JCE, 0	Positive

Variable Name	Equation Symbol	Description	Variable Type	Expected Direction of Effect
		certificate of education qualification	otherwise	
Malawi School Certificate of education	MSCE	Independent variable: women with Malawi School Certificate of Education qualification	Dummy, equal to 1 if woman has Malawi School Certificate of Education, 0 otherwise	Negative
Advanced Level Certificate	ALEVEL	Independent variable: women with Advanced Level certificate qualification	Dummy, equal to 1 if woman has Advanced Level certificate qualification, 0 otherwise	Negative
Diploma	DIPLOM.	Independent variable: women with diploma qualification	Dummy, equal to 1 if woman has diploma qualification, 0 otherwise	Negative
Degree	DEG.	Independent	Dummy, equal	Negative

Variable Name	Equation Symbol	Description	Variable Type	Expected Direction of Effect
		variable: women with degree qualification	to 1 if woman has degree qualification, 0 otherwise	
Masters Degree	MASTERS	Independent variable: women with Masters degree qualification	Dummy, equal to 1 if woman has Masters degree qualification, 0 otherwise	Negative
Doctor of Philosophies	PhD	Independent Variable: women with Doctor of Philosophies degree	Dummy, equal to 1 if woman has PhD qualification, 0 otherwise	Negative
Location	LOCAT.	Independent variable: depicting women's place of residence	Dummy, equal to 1 if woman resides in rural area, 0 otherwise	Positive
Tumbuka	TUMB.	Independent	Dummy, equal	

Variable Name	Equation Symbol	Description	Variable Type	Expected Direction of Effect
Tribe		variable: depicting woman's Tumbuka Tribe	to 1 if woman is Tumbuka, 0 otherwise	Unknown
Chewa Tribe	CHEW.	Independent variable: depicting woman's Chewa Tribe	Dummy, equal to 1 if woman is Chewa, 0 otherwise	Unknown
Ngoni Tribe	NGON.	Independent variable: depicting woman's Ngoni Tribe	Dummy, equal to 1 if woman is Ngoni, 0 otherwise	Unknown
Lomwe	LOMW.	Independent variable: depicting woman's Lomwe Tribe	Dummy, equal to 1 if woman is Lomwe, 0 otherwise	Unknown
Yao	YAO	Independent variable: depicting	Dummy, equal to 1 if woman is Yao, 0	Unknown

Variable Name	Equation Symbol	Description	Variable Type	Expected Direction of Effect
		woman's Yao Tribe	otherwise	
Christian Religion	CHRST.	Independent variable: depicting the woman's Christian religious affiliation	Dummy, equal to 1 if a woman has a Christian religious affiliation, zero otherwise	Unknown
Muslim Religion	MSLM.	Independent variable: depicting the woman's Muslim religious affiliation	Dummy, equal to 1 if a woman has a Muslim religious affiliation, zero otherwise	Unknown
Other Religion	OTHERREL.	Independent variable: depicting the woman's religious affiliation with	Dummy, equal to 1 if a woman has a 'Other' as her religious affiliation, zero otherwise	Unknown

Variable Name	Equation Symbol	Description	Variable Type	Expected Direction of Effect
'other' religions				
No Religion	NOREL.	Independent variable: depicting that the woman has no religious affiliation	Dummy, equal to 1 if a woman has a no religious affiliation, zero otherwise	Unknown
District	DISTRICT ORIGIN	Independent variable showing district of origin of a woman	Dummy, equal to 1 if a woman comes from a specified district, zero otherwise	Unknown
District Poverty Rate	DISTPOVRATE	Independent variable showing the poverty rate of a district where a woman originates	Continuous	Positive
District Sex Ratio men	MENQUANT.	Independent variable	Continuous	Positive

Variable Name	Equation Symbol	Description	Variable Type	Expected Direction of Effect
quantity		showing sex ratio from a woman's district of origin		
District Sex	MENQUAL	Independent variable	Continuous	Positive
Ratio men quality		showing sex ratio based on men that have attained JCE or higher in a woman's district of origin		

The dependent variable, the early timing of marriage by women (EARMRG.) is a dummy variable taking the value of 1 if the woman's age at first marriage is at or below 18 years, and zero otherwise.

Varying education attainment levels are a set of nine dummy variables that can be divided into no or low education attainments and high education attainments. The low education attainment variables are as follows: No qualification (NOQUALIF.) and primary school leaving certificate (PSLC). These are all dummy variables taking the value of 1 if a woman has a low education attainment as described above and zero otherwise. The high

education attainment levels are as follows: Junior Certificate of Education, the Malawi School Certificate of Education (MSCE), A-Level, Diploma Certificate qualification (DIPLOM), Degree qualification (DEG.), Masters Degree (MASTERS) and Doctor of Philosophies (PhD). They are all dummy variables taking the value of 1 if they possess a high qualification as described above, and zero otherwise.

Low or no education attainments were expected to be positively associated with an early timing of marriage, implying that low or no education attainments will promote early marriage, while high education attainment levels were expected to be negatively associated with early marriage (i.e. will be associated with delayed timing of marriage). The expected co-efficient signs are therefore positive and negative for low/ no education qualification and high education attainment, respectively (Kumchulesi, 2010; Nosaka, 2009; Gustafson and Worku, 2006; Smock et al, 2005; Bagnoli and Bergstrom, 1993; Momeni, 1979; Becker, 1973).

Religion is a dummy variable taking up to four possible values relating to “no religion”, “Christian”, “Muslim”, and “Other”. Its a priori expected sign is unclear, although some studies, especially in demography have suggested that religion promotes early marriage (Kalmijn, 1991, Jain and Krutz, 2007). However, for specific religious affiliations such as Christianity and Muslim, the sign was unknown before the fact.

Tribe is a proxy for ethnicity, and takes up to five possible dummy values following selected major tribes in the country: Lomwe, Yao, Chewa, Tumbuka and Ngoni. In tribes associated with the payment of *lobola* or bride price, the relationship between those tribes and marriage was expected to be negative, while for those not associated with bride prices, the relationship was expected to be positive (Kumchulesi, 2010). This is because, assuming no intermarriage between the tribes, the payment of bride prices would be a constraint on

men in the local marriage market, while it would not be in ethnic groups where the payment of a bride prices is not a factor in marriage.

Location is a dummy variable that takes the value of 1 if location is urban, and zero otherwise. Its expected sign was expected to be negative if the woman resided in the urban area and positive if place of residence is rural area (Hirschman, 1979).

Other Variables: the study also looked at other variables that may influence on early marriages, namely Sex Ratios, district poverty rates and district of origin for women. Data on poverty rates and age at first marriage were obtained from National Statistical Office sources (GoM, 2005), while sex ratios were calculated using the 2008 Population and Housing Census (GoM, 2009).

3.4 Analysis Techniques

A probit model was run using the above empirical model in order to estimate the coefficients. The main interest in the LVA formulation was to determine the effect of each independent variable x_i on y^* . However, there are limitations to interpretation as the β s do not have well defined measurements such that the magnitudes of the β s may not be useful in themselves regarding interpretation of results (Woolridge, 2006). To overcome the limitation of interpreting the coefficients as if they followed a linear probability model, use was made of the partial effects of the independent variables. Consequently, after the probit estimation, partial effects were estimated from STATA using the command “Mfx” to obtain the marginal effects. The marginal effects were interpreted as the probability that the age at first marriage would increase or decrease compared to baselines for dummy variables based on the direction of the sign. Further, due to the presence of heteroscedasticity in data, robust standard errors were calculated as a way of addressing this challenge.

3.5 Study Limitations

The study uses census data from the latest census undertaken by the National Statistical Office (2008). A select number of variables were obtained from the census data. There are a number of limitations with the data. Firstly, while the census data are comprehensive and current, they were relatively general. Consequently, some variables that are likely to have a decisive influence on early marriages were not available. Hence, biases may occur due to unobservables such as the influence of parents' education (Jin et al, 2003), personality traits and social trends that may also cause variation in the age at first marriage in the country, but not included in the estimated model. Secondly, the study uses cross- section data to analyze the effects of education attainments on early marriage. This poses challenges in gauging causality between education and early marriage since reverse causality is also a possibility, and consequently, the effects can only be conceived as tendencies. Thirdly this study was essentially a desk study owing to resource constraints. The findings would have been complemented by a qualitative survey of women of marriageable age to gain an understanding of why certain decisions are made in regard to early marriage. The results of the study should, therefore, be interpreted within the context of these limitations.

CHAPTER FOUR

RESULTS AND INTERPRETATION

4.0 Introduction

This chapter presents the empirical results of the study. It first presents the summary statistics relating to the sub-population studied comprising of women aged 10 to 53 years that were married at age 18 years or below, constituting early marriages. This is presented in sub-section 4.1. A presentation of the empirical results from the estimated probit regression model used in the study follows in section 4.2. The presentation of the empirical results has been organized around the effects of education attainments and other control variables on early marriages included in the empirical model, namely, location, religion and ethnicity (proxied on tribe), district poverty rates, district of origin and sex ratios. Sub-section 4.3 is a summary that concludes the chapter.

4.1 Sub-population Summary Statistics

The sub-population was composed of women (female agents) of ages between 10 and 53. The median age at first marriage for the sub-population was found to be 18 years. This means that the bulk of the women in the country are married at about eighteen years old. The proportions of women marrying early by district are given in Appendix 1.

An analysis of the age cohorts showed that the majority of women were between age 10 and 35 years, accounting for close to 80 percent of the sub-population-Table 2.

Table 2 : Women Early Marriage By Age Cohort

Age Group	% of Women in Sub- sample	% Women Married at or below 18 Years
12 to 17	24.70 %	3.5%
18 to 23	22.20 %	28.4%
24 to 29	18.40 %	23.4%
30 to 35	13.60 %	18.0%
36 to 41	8.70 %	11.3%
42 to 47	6.70 %	8.7%
48 to 53	5.70 %	6.7%

Source: Own calculation from 2008 PHC data

As can be noted from Table 2 above, early marriages appeared to be common among younger cohorts, with approximately 70 percent of early marriages occurring among women aged between 18-35 years.

In regard to ethnicity, the Chewa constituted the bulk of the sub-population accounting for 47.2 percent of the women. The second largest sub-group was the Lomwe, accounting for 18.9 percent of the sub-population, followed by the Yao (14.0%). The Ngoni accounted for 9.2 percent, and constituted the fourth largest group, while the Nyanja accounted for 6.2 percent of the studied sub-population.

The rest of the sub-population was taken up by other tribes-Table 3.

Table 3: Tribe and Religious Affiliation

#	Tribe	Percentage Representation in Sub-sample	Married at age 18 or Below (%)
1	Chewa	47.2%	33.3
2	Nyanja	6.2%	1.2
3	Yao	14%	15.6
4	Tumbuka	0.4%	10.4
5	Lomwe	18.9%	20.6
6	Ngonde	0.1%	1.1
7	Ngoni	9.2%	11.5
8	Sena	3.7%	4.0
9	Tonga	0.2%	2.2

Source: Own calculation using 2008 PHC data

As can be noted from Table 4 below, Christianity accounted for the bulk of women in the sub-sample (82.6%), followed by those of the Muslim persuasion (13.2%). Those that reported having no religious attachment accounted for 2.4 percent, while other religions accounted for close to 2 percent.

Table 4: Religious Affiliation and Early Marriage

	Religion	Women in Sample (%)	Women That Married Early (%)
1	Christian	82.6%	81.7
2	Muslim	13.2%	14.2
3	Other	1.8%	2.0
4	No Religion	2.4%	2.1

Source: Own calculation using 2008 PHC data

Christian women accounted for 81.7 percent of those that married early, while Muslim women accounted for 14.2 percent of people marrying early. Those belonging to other religions accounted for 2.0 percent of the early marriages, while those without any religious affiliation accounted for 2.1 percent of the women that were married at or below 18 years of age.

In regard to tribes, the Chewa women accounted for the highest percentage of women that married early of the total that married early at 33.3%, followed by the Lomwe women (20.6%). Yao women that married early accounted for 15.6 percent of the total number of women that married early, while Ngoni and Tumbuka women that married early was 11.4 and 10.4 percent, respectively. The rest of the women that married early in the sub-population by tribe were as follows: Sena (4.0%), Tonga (2.2%), Nyanja (1.2% and Ngonde (1.1%).

Concerning education attainments and early marriage among women, it was observed that women with no formal educational qualification, followed by those with primary school leaving certificate accounted for the highest proportion of women that married early. Those without any qualification accounted for close to 84 percent of women that married early, while those with a PSLC accounted for about 10 percent. Critically, the proportion of women

married early tended to drop significantly with higher qualifications, reaching almost zero at Masters and Ph D degree levels. This trend is presented in Table 5 below.

Table 5: Early Marriage By Educational Attainment

Education Attainment	Women that married at or below 18 years (%)
No qualification	83.97%
PSLC	10.22%
JCE	4.47%
MSCE/GCE	1.15%
A Level	0.06%
Diploma	0.08%
Degree	0.03%
Masters	0.01%
Ph D	0.01%

Source: Own Calculation using GoM (2008) Census Data

4.2 Empirical Results and Discussion

Table 6 reports the empirical results of the estimated probit model for the study. The effects of education attainments are discussed first, followed by those relating to the other covariates explaining variation in early marriage included in the model. The regression output is annexed as Appendix 2.

Table 6: Regression Results of a Probit Model on the Effects of Education Attainments on Early Marriage among Women in Malawi

EARMRG.	Coef.	Robust Std. Err.	Significance	Marginal Effect
PSLC	0.016	0.003	0.000*	0.003
JCE	-0.321	0.004	0.000*	-0.053
MSCE	-0.744	0.006	0.000*	-0.095
Alevel	-0.731	0.026	0.000*	-0.090
Diploma	-1.003	0.021	0.000*	-0.104
Bachelors degree	-1.100	0.035	0.000*	-0.107
Masters degree	-0.895	0.063	0.000*	-0.099
PhD	-0.254	0.080	0.001**	-0.043
Chewa	-0.020	0.004	0.000*	-0.004
Ngoni	-0.037	0.004	0.000*	-0.007
Lomwe	-0.015	0.003	0.000*	-0.003
Yao	-0.058	0.004	0.000*	-0.011
Location	0.000	0.000	0.855	-9.050
Christian	0.171	0.005	0.000*	0.031
Muslim	0.186	0.006	0.000*	0.040
Other religion+				
District men quantity	6.986	1.017	0.000*	1.376
District men quality	0.033	0.008	0.000*	0.006
Chitipa	-1.873	0.477	0.000*	-0.126
Karonga	-1.780	0.473	0.000*	-129
Nkhata Bay	-1.791	0.470	0.000*	-0.240

EARMRG.	Coef.	Robust Std. Err.	Significance	Marginal Effect
Mzimba	669.608	92.947	0.000*	1.000
Mzuzu city	-0.861	0.126	0.000*	-0.170
Karonga	-0.777	0.115	0.000*	-0.153
Nkhotakota	-0.608	0.075	0.000*	-0.120
Ntchisi	-0.501	0.065	0.000*	-0.099
Dowa	-0.656	0.085	0.000*	-0.129
Salima	-0.426	0.055	0.000*	-0.838
Lilongwe district	-0.479	0.066	0.000*	-0.094
Mchinji	-0.710	0.095	0.000*	-0.140
Ntcheu	0.289	0.039	0.000*	0.057
Lilongwe city	-1.422	0.197	0.000*	-0.280
Dedza	-0.088	0.010	0.000*	-0.017
Mangochi	0.106	0.020	0.000*	0.021
Machinga	-0.001	0.000	0.000*	0.000
Zomba district	0.206	0.020	0.000*	0.041
Chiradzulu	0.507	0.069	0.000*	0.100
Mwanza	-0.047	0.014	0.001**	-0.009
Thyolo	0.165	0.020	0.000*	0.033
Mulanje	0.418	0.049	0.000*	0.082
Phalombe	0.083	0.011	0.000*	0.016
Chikwawa	-0.630	0.075	0.000*	-0.124
Zomba city	-1.085	0.147	0.000*	-0.214
Blantyre city	-1.186	0.167	0.000*	-0.122
Blantyre district	0.019	0.010	0.07***	-0.004
Balaka	0.290	0.039	0.000*	0.057

EARMRG.	Coef.	Robust Std. Err.	Significance	Marginal Effect
Nsanje	-0.168	0.012	0.000*	-0.033
District poverty rate+				
_Cons	-6.495	0.761		

*, **, *** indicates results significant at 1%, 5% and 10% respectively; += variable omitted

due to collinearity.

Number of observations=3,706,025

LR Chi² (40)=48110.73

Prob Chi²=0.000

Log Likelihood=1361128.2

Pseudo R²=0.0174

4.2.1 Correction for Heteroscedasticity

A key challenge related to cross-section data, is the presence of heteroscedasticity. This is largely due to the existence of outliers or the exclusion of key regressors that should have been included in a model, among the many reasons that may give rise to heteroscedasticity. Gujarat (2003) suggests that with cross-sectional data, heteroscedasticity should be considered “the rule rather than the exception”. Critically, the presence of heteroscedasticity causes the estimated standard errors via ordinary least squares estimation (OLS) to be biased, and may lead to statistically invalid inferences about the estimated parameters. This is because the assumption of homoscedasticity of the variance no longer holds.

Heteroscedasticity is said to be an even more serious problem in very large samples. Since this study used a large data set from the Malawi National Population and Housing Census, it was plausible to suspect that the data used for the study were susceptible to the

problem of heteroscedasticity. Hence, the study tested for heteroscedasticity using the Breusch-Pagan / Cook-Weisberg test for heteroscedasticity, testing the null hypothesis that the errors have constant variance. The results of the test revealed a large χ^2 value, indicating heteroscedasticity was a problem. Following this confirmation, White's heteroscedasticity corrected standard errors or robust standard errors were calculated (see Appendix 2) and are reported for the study in order to ameliorate the problem of errors that are not independent and identically distributed. The robust standard errors are said to be more reliable than the standard errors that are not corrected for heteroscedasticity because of the relaxation of some of the OLS assumptions regarding the characteristics of the errors.

4.2.2 Education Attainment Effects

The education attainment variables were: no qualification (NOQUALIF.), the Malawi Primary School Leaving Certificate (PSLC), Junior Certificate of Education (JCE), Malawi School Certificate of Education or General Certificate of Education (MSCE/GCE), Advanced Level certificate (ALEVEL), diploma (DIPLOM.), undergraduate degree (DEG.), and post graduate degrees of masters (MASTERS) and Doctor of Philosophy (PhD). No educational qualification was used as a benchmark.

Overall, with regard to educational attainments which is the primary concern of this study, results show a positive relationship between early marriage and low education attainments on the one hand and a negative relationship between higher education attainments and early marriage on the other. The direction of effect was positive as hypothesized for low education (PSLC and below) attainments, suggesting a positive relationship between early marriage and low education attainments. From JCE qualification onwards, a negative association is observed and results are significant at 1 percent ($p=0.000$). Except for PhD qualification ($p=0.001$), the rest of the results for higher education attainments were

significant at 1 percent ($p=0.000$). The results are consistent with the hypothesized expected sign.

For education attainments, the marginal effects also show that compared to a woman with no formal educational qualification, the probability that a woman with a PSLC would marry early increases, although it is negligible (0.3%). Compared to women with no qualification, the probability of women with a JCE qualification getting married early decreases by 5.3 percent. That for women with an MSCE marrying early decreases by 9.5 percent, while the probability of women with an A Level qualification getting married early decreases by 9 percent compared to women with no formal education. Further, compared to women with no formal educational qualification, the probability of women with a diploma certificate getting married early decreases by 10.4 percent, while that for women with a Bachelors Degree and Masters Qualification decreases by 10.7 percent and 10.1 percent, respectively. That for women with Ph D qualification decreased by 4.3 percent.

The results on educational attainments are consistent with the prediction of theory that educated women will tend to post-pone marriage, as the utility from early marriage is less than when the woman remains single and pursues education (Becker, 1973; Bergstrom and Bagnoli, 1993; Danziger and Neuman, 1999; Gould, 2008). However, this is not surprising for two main reasons. First, since the woman's quality improves through education, as well as the fact that women with higher education are likely to increase their earning capabilities, they are also likely to raise their reservation expectations of potential marriage partners. This means they will not get married to men who are not educated or who are poor. Second, since pursuing higher education implies an investment in time, a delayed age at first marriage should be expected (Podthavee and Adireksobat 2010). These results support evidence by Loughran and Zissimopoulos (2004), as well as Manda and Meyer (2004).

On the basis of the findings on education, we fail to accept the no effect hypothesis of education attainments on early marriage, but instead conclude that low or no education tend to be positively correlated with early marriage, while higher education attainments tend be negatively associated with early marriage. The implication of this finding is that any factor that encourages girls to stay in school beyond PSLC is likely to contribute to a reduction in early marriage in Malawi.

4.2.3 Ethnicity and Early Marriage

The study also sought to assess the effect of ethnicity on early marriages in Malawi as one of the control variables. Ethnicity was included in the model because of certain practices among different ethnic groups that may have economic implications on decisions to marry early or not e.g. the payment of a bride price, and hence influence the timing of marriage among women in the country. The study included five dummy variables based on selected major ethnic groups in the country, namely, Chewa, Tumbuka, Yao, Lomwe and Ngoni. Tumbuka was used as the baseline ethnic group against which outcomes for the rest of the tribes were compared.

The results of the empirical analysis showed a negative relationship between women that belonged to the Chewa, Lomwe, Ngoni and Yao tribes, suggesting that there should be relatively low association between these tribes and early marriage. The results on the tribes included in the model were significant at 1 percent ($p=0.000$).

Compared to Tumbuka women, the probability of early marriage among Chewa and Ngoni women decreased by 0.4 and 0.7 percent, respectively, as shown by the marginal effects. Further, the probability that Yao women would marry early compared to Tumbuka women decreased by 1.1 percent. That among the Lomwe decreased by 0.3 percent compared to Tumbuka women. As can be noted from the marginal effects, the probability that

women from the major tribes of Chewa, Lomwe, Ngoni and Yao would marry early compared to Tumbuka women was negligible, suggesting that chances of women from these tribes marrying early decreased only marginally compared to Tumbuka women. The differences between the Tumbuka tribe and the other tribes may be partly due to the fact that the payment of lobola or bride price, which is predominant among the Tumbuka and less so among the Chewa and Lomwe⁴. This result supports evidence by Kumchulesi (2010) and Anderson and Bidner (2010). This means that early marriage among the Chewa, Lomwe, Ngoni and Yao should be less prevalent compared to the benchmark tribe (Tumbuka) in this model. On the basis of the above results, we fail to accept the no relation hypothesis between ethnicity and early marriage.

4.2.4 Religion and Early Marriage

Religion is a key component of the cultural practices that may also have a decisive influence on marriage decisions (Kalmijn, 1991). The study sought to analyze the effect of religious affiliation on early marriage among women. It used 'no religion', as a benchmark i.e. women in the sub-sample not affiliated to any religion.

The results showed a positive correlation between religious affiliation to the major religious groups in the country and early marriage. The variable 'Other Religions' was dropped from the analysis due to collinearity problems. The relationship between Christianity and early marriage was positive, as was that between the Moslem persuasion and early marriage. These results were significant at 1 percent ($p=0.000$). The results suggest that belonging to the Christian and Muslim religious persuasion should be associated with early marriage among women in Malawi. The results also showed that compared to women with no religious affiliation, the probability of marrying early among Christian and Moslem women

⁴ In a practice called Chitengwa where, as opposed to a matri-local arrangement, the man chooses to pay a bride price and takes the woman to his own village

increased by 3.1 percent and 4.0 percent, respectively. This means that women with a Christian religious affiliation in Malawi were more likely to marry early compared to women without any religious persuasion. In the same connection, women of the Muslim persuasion were likely to marry early than those without any religious affiliation.

The results support findings by Jain and Kurtz (2007), who, in a global analysis of child marriages and initiatives to curb the child marriages found that religious affiliation was among the top five factors influencing child marriages. It also supports evidence by (Lehrer, 2004). Religion is likely to promote early marriage mainly due to pressure from parents who fear the possibility of pregnancy outside wedlock, which is regarded as being inconsistent with their faith. This fear may be driven by the need to retain parents' good standing in society in line with their religious beliefs. Based on the results, we fail to accept the no effect hypothesis and early marriage as shown by the positive direction of effect for the religious groups included in the model. The study instead concluded that religious affiliation had the effect of increasing the likelihood of early marriage among women in Malawi. The implication for curbing early marriage due to religious affiliation is that campaigns with parents and religious leaders to encourage girls not to marry early should help in delaying the age at first marriage.

4.2.5 Location and Early Marriage

The study also sought to test the relationship between early marriages and place of residence-i.e. rural or urban. The urban areas were all the locations designated by the National Statistical Office as being urban, and included Blantyre City, Lilongwe City, Zomba City and Mzuzu City. The rest were regarded as rural areas. The results revealed a positive relationship between early marriage and residing in the rural areas among women in Malawi and were consistent with the study hypothesized direction of effect. This suggests that single

women residing in the rural areas in Malawi were likely to marry early compared to their urban counterparts, although the results were insignificant ($p=0.855$). Based on the marginal effects, the probability of women residing in urban areas marrying early decreased by 9.05 percent compared to women in the rural areas. This result supports UNIMA et al. (2009) and GoM, (2010). One reason for this difference in the timing of marriage may be the fact that women living in the urban centers are likely to be pursuing school or careers, and hence tend to delay marriage compared to their rural counterparts.

On the basis of the study results, the study concluded that place of residence in terms of rural and urban differences was a covariate that influenced early marriage and therefore, the no effect hypothesis was rejected. The implication for this finding is that measures to create opportunities for higher formal education and careers in rural locations should assist in curbing early marriages in the country.

4.2.6 District Poverty Levels and Early Marriage

In the absence of household level poverty or well-being data in the sub-sample, the study used district poverty rates from the 2005 Integrated Household Survey (GoM, 2006). The poverty rate for each district was linked with women in a particular district. However, this variable was dropped in the model due to collinearity problems, and hence not analyzed. However, empirical evidence related to other developing countries indicates that household poverty promotes early marriage. In a global study conducted by UNICEF (2005), results showed that child marriages were most common in the poorest 20 percent of the population. Bajracharya and Amin (2010) found that household poverty during childhood is associated with a high likelihood of early marriage or joining the labor force at a very young age.

4.2.7 Sex Ratios and Early Marriage

The availability of marriageable men and women in the marriage market is a key determinant of the age at first marriage in any local marriage market. As noted above, sex ratios are an indication of the marriage market conditions regarding the supply of marriageable agents. A low sex ratio suggests that there are fewer men than women in the marriage market. The implication on early marriages is that low sex ratios should be associated with a high age at first marriage as marriageable women looking for mates (demand) are more than the available marriageable men (supply). This scenario would represent a marriage squeeze. Similarly, high sex ratios should mean better prospects for marriage for women and should be associated with a low age at marriage-i.e. early marriages. However, with high sex ratios, and assuming women are investing time to be able to participate in the labor market, such as through continuing education, it is expected that women would experience better welfare outcomes (Angrist, 2001).

Using the Gustafson and Worku (2006) framework, the study calculated sex ratios based on the quantity of men (i.e. without considering quality) and quality of men. The quality of men index was calculated based educational attainments, with men that had attained JCE and higher regarded as high quality men and those with lower qualifications than JCE or none as low quality men. The results showed a positive relationship between district sex ratios based on both the quantity and quality of men and early marriages, and were significant at 1 percent ($p=0.000$). This suggests the existence of high sex ratios when all men are considered regardless of quality in terms of education attainment, and hence a high likelihood for women to marry early given these marriage market conditions. Further, the results suggest that where there are large numbers of men that have qualifications higher than JCE, early marriage should be observed. These results are consistent with theory and empirical evidence relating sex ratios and age at marriage (Kumchulesi, 2010; Angrist, 2001).

Hence, the study failed to accept the no relationship hypothesis between sex ratios and age at marriage, but instead concluded that there was a positive relationship between early marriage and sex ratios in the country.

4.2.8 Women's District of Origin

In order to account for district unobservables that may also influence early marriages, the study included dummy variables for the 30 districts⁵ in the country. Rumphi was used as the baseline district for the district of origin variables.

The results were mixed, with some districts showing a positive relationship between early marriage and district of origin for women, while others showed a negative relationship. Among the districts with a positive association with early marriage were: Mzimba, Ntcheu, Mangochi, Zomba, Chiradzulu, Thyolo, Mulanje, Phalombe, Blantyre and Balaka. Except for Blantyre district ($p=0.07$), the results for the rest of the districts positively associated with early marriage were significant at 1 percent ($p=0.000$). On the other hand, the results showed the following districts to be negatively associated with early marriage: Chitipa, Karonga, Ntchisi, Dowa, Salima, Lilongwe, Dedza, Nkhata Bay, Mzuzu City, Mchinji, Lilongwe City, Machinga, Mwanza, Chikwawa, Zomba City, Blantyre City and Nsanje. Except for Mwanza district that was significant at 10 percent, the results for rest of the districts that recorded a negative association with early marriage were significant at 1 percent ($p=0.000$). This suggests that these districts are less likely to be associated with early marriage.

Compared to women from Rumphi district, the probability that women from districts associated with early marriage would marry early increased as follows: Mzimba district (100 %), suggesting that chances of women whose origin is Mzimba district were the same as those from Rumphi; Ntcheu (5.7%), Mangochi district (2.1%), Zomba district (4.1%).

⁵ Includes the urban districts of Blantyre, Lilongwe, Mzuzu and Zomba

Chiradzulu (10%), Thyolo district (3.3%), Mulanje district (8.2%), Phalombe (1.6%), Blantyre district (0.4%), and Balaka district (5.7%). On the other hand, compared to women from Rumphi district, the probability that women from districts that showed a negative correlation with early marriage decreased as follows: Chitipa district (12.6%), Karonga district (15.3%), Ntchisi district (9.9%), Dowa district (12.9%), Salima district (83.8%), Lilongwe District (9.4%), Dedza district (1.7%), Nkhata Bay district (24.0 %), Mzuzu City (17.0%), Mchinji district (14.0%), Lilongwe City (28.0%), Machinga district (0.00), Chikwawa district (12.4%), Blantyre City (12.2%), Zomba City (21.4%) and Nsanje district (3.3%).

As can be noted from the results above, the study found that in slightly over 30 percent of the districts in Malawi, women were likely to marry early compared to Rumphi district, the baseline district. This may be indicative of a widespread challenge related to early marriage in the country, with the attendant negative health and human development effects that accompany early marriage among women. Of note was that the “urban districts” of Mzuzu city, Lilongwe city, Zomba City and Blantyre city were all negatively associated with early marriage, implying that women residing in urban areas were less likely to marry early. This finding is consistent with that related to location. It is also consistent with GoM (2006) and UNIMA and GoM (2009). On the basis of these results, the study concluded that the district of origin of a woman had a bearing on early marriage in the country. The no relationship hypothesis between district of origin and early marriage is therefore, not accepted.

4.3 Summary

This chapter has presented the empirical results of the study. It set out to test the hypothesis that education attainments do not have any effect on early marriages. It also tested hypotheses related to other covariates such as location, ethnicity (tribe), sex ratios, poverty rates, religious affiliation and district of origin that are likely to cause variation in the age at first marriage among women in the country. The results show that early marriage is associated with low or no education attainment, while high educational attainments are associated with a delay in the age at first marriage. The marginal effects from each level of education attainment showed that the probability to marry early among women decreased with increasing education levels. The evidence supports the theoretical predictions that women who invest time to attain higher education attainments are likely to delay marriage, and hence reduce early marriage among women.

Other variables such as location and religion were also found to be important in influencing early marriage. Critically, a positive association was found to exist between residing in the rural areas compared to urban areas. Having a religious attachment compared to having no religious persuasion was also found to be positively associated with early marriage. Hence the results suggest that residing in a rural location and being affiliated to a religion were likely to increase the chance of a woman marrying early compared to residing in the urban areas and having no religious affiliation, respectively.

Regarding ethnicity, the results showed that compared to Tumbuka women (benchmark in the model), the probability of women marrying early decreased for Yao, Lomwe, Ngoni and Chewa decreased. This suggests that the belonging to the Tumbuka tribe should be associated with early marriage among women compared to women its comparator tribes.

The study also found that the district of origin of women was an important predictor of early marriage, with nearly a third of the districts in the country positively associated with early marriage.

CHAPTER FIVE

SUMMARY AND CONCLUSION

5.0 Introduction

There is no doubt that the timing of marriage by agents in the marriage market has both social and economic significance in an economy. Its effect on both the socio-economic and demographic structure via the fertility and the trade-off between marrying early and getting formal education is both a social and development challenge. These issues continue to receive attention from policy makers at the national and global level. Consequently, the relationship between education and the timing of marriage in country should provide the basis for future research and policy formulation.

This chapter summarizes the findings of the study and highlights the attendant policy implications. It also suggests future areas of research. In sub-section 5.1, an overview of results is presented. In sub-section 5.2 the policy implications of the study are presented. In sub-section 5.3, some pointers towards future research directions related to the effect education attainments on early marriage are offered.

5.1 Summary of Results

This study sought to analyze the effects of education attainments on early marriages, as well as the effect of other variables such as religion, sex ratios, location, district of origin and ethnicity (tribe) that may also influence early marriages. Using probit regression analysis, the results confirm education attainment to be an important predictor of early marriages among women in the country. Critically, it has found that low education attainments (PLSCE

and below) were positively correlated with early marriage, suggesting that women with low or no formal education qualification were likely to marry early. On the other hand, a negative relationship between high education attainment (JCE and above) and early marriage was observed, suggesting that women with higher education qualifications were unlikely to marry early. This result is likely to be due to the time investment that is required to attain higher education qualification. This result implies that any policy measures that would succeed in keeping girls in school beyond form two (JCE qualification) should assist in rising the age at first marriage for girls in the country.

The results are consistent with theory predictions (Becker, 1973; Bergstrom and Bagnoli 1993, Nosaka, 2009). They are also empirically consistent with and support evidence from other studies analyzing age at first marriage and education attainments (Kumchulesi, 2010; Manda and Meyer, 2004). On the basis of these results, the hypothesis that education attainments have no effect on early marriage was not accepted, and the study concluded that education attainment is a key determinant of early marriage.

Location was found to be another determinant of early marriage, with women in the rural areas more likely to get married early compared to their urban counterparts. The results support (GoM, 2004 and GoM, 2006) who found that women in rural areas were more likely to marry early compared to those in the urban areas. This has partly been attributed to the fact that women in urban areas are more likely to pursue education and careers before getting married, effectively raising the age at first marriage, compared to those in the rural areas.

Ethnic differences as observed from different tribes were also found to influence early marriages in the country. A negative association was observed for main tribes included in the model. The results show that compared to Tumbuka women, the probability that Yao, Lomwe, Ngoni and Chewa women would marry early declined. On the basis of these results,

the conclusion is that belonging to a particular tribe for women has an effect on early marriages. The no effect hypothesis was therefore, not accepted.

The results also show a positive association between religion and early marriage, suggesting, that women with a religious affiliation were likely to marry early compared to those that did not have any. Notably, for the two main religions in the country, Christianity and Muslim, compared to women without any religious attachment, Christian and Moslem women were more likely to marry early. The results support Jain and Krutz (2007), Lehrer (2004) and Kalmijn (1991). The no effect hypothesis of religion on early marriage was, therefore, not accepted on the strength of this finding. The study concluded instead that the effect of religious affiliation was to increase the likelihood of early marriage.

The study found that the quantity of marriageable men in a district as measured by sex ratios was positively associated with early marriage among women. Similarly, the quality of men as measured through their education attainments was positively related with early marriage among women. Hence, the results suggest that higher sex ratios on the basis of both the quality and quantity of marriageable men should be associated with early marriage among women. Viewed from another perspective, this suggests that women are marrying largely based on the attainment of physical maturity as the main criterion for being attractive marriage partners in the marriage market. This would be due to the slackening of the marriage market conditions as the sex ratio rises, and vice versa for declining magnitudes of sex ratios. This result supports evidence by Angrist (2001). On the basis of these results, we fail to accept the no effect hypothesis between sex ratios and early marriage. The study concluded instead that sex ratios were positively associated with early marriage in the country.

5.2 Policy Implications

The results of this study have a number of policy implications on the role that education can play in reducing early marriages in Malawi. First, they suggest that measures that encourage girls to stay in school beyond the Primary School Leaving Certificate of Education may be key to reducing the incidence of early marriages in the country. In general, the implementation of measures to address various aspects of poverty as embodied in the Malawi Growth and Development Strategy in the country are commendable, but need to be targeted at building human capital, through strengthening the education system. More specifically, the implementation of National Education Strategic Plan (NESP) and other initiatives that among others seek to promote the retention of girls in school is key. Further, addressing quality aspects of education, including improving teacher-pupil ratios, provision of improved classrooms and sanitation facilities should be key considerations in promoting girls' education in the country.

Another somewhat radical but effective measure would be to have a mandatory requirement to have every child complete a certain level of education that will ensure every person in the economy does not drop out of school and get married (e.g. completion of MSCE), but this would imply that the state should provide free secondary education as school fees and other requirements may hamstring efforts for children from poorer families, especially in the rural areas. Nonetheless, given the density of the challenge of early marriages among women in the country, such efforts may actually represent huge long term developmental gains.

Measures to address poverty such as targeted social protection initiatives to poor households may also assist in improving demand for education among the poor. These measures should include short term ones such as supporting girls in secondary school with fees, clothes and other basic necessities for girls attending school and their poor households.

In addition, and in view of the finding that a large number of districts in the country are associated with early marriages, targeted education and advocacy work would be useful. Districts with extremely low girls education attainments and high rates of child marriages should be particularly targeted.

Policy at the highest levels such as the constitution and laws that regulate marriages need to be amended in a manner that does not promote child or early marriage. The Child Care, Protection and Justice Act should be reviewed in this connection. Contradictions in the policies and legal frameworks, especially those relating to determination of who is a child and that of permissible marriage age at first marriage should be reconciled. This also implies the strengthening of the legal and enforcement framework by legislating against early or child marriages, including birth registration to facilitate monitoring and enforcement.

5.3 Proposed Future Research

Future research may include focusing on examination of dynamic trends of the effect of education on early marriages, and family formation in general in the country. In addition, the influence of the various covariates on early marriage may be a subject of future research. In particular, quantifying the loss in human capital development due to early marriages and implications on development for Malawi may be of particular relevance. Assessing the effect of other important covariates such as the education of parents on early marriage may also be an important improvement to the current study. This suggests that national level data need to be collected consistently on marriage variables to permit analysis given the important economic role family formation plays in the economy.

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APPENDIXES

Appendix 1: Early Marriage by District

#	DISTRICT	Women Married at or Before 18 yrs of Total Married (%)
1	Chitipa	11.2
2	Karonga	11.4
3	Nkhatabay	10.8
4	Rumphi	10.6
5	Mzimba	12.0
6	Likoma	6.4
7	Mzuzu city	7.2
8	Kasungu	9.7
9	Nkhotakota	8.4
10	Ntchisi	9.0
11	Dowa	9.0
12	Salima	9.7
13	Lilongwe district	9.8
14	Lilongwe city	6.8
15	Mchinji	9.2
16	Dedza	10.1
17	Ntcheu	10.2
18	Mangochi	11.2
19	Machinga	11.5

20	Zomba district	11.1
21	Chiradzulu	10.3
22	Blantyre district	6.8
23	Blantyre city	10.0
24	Thyolo	44.0
25	Mulanje	10.8
26	Phalombe	7.8
27	Chikwawa	13.7
28	Nsanje	6.3
29	Balaka	10.3
30	Neno	9.9
31	Zomba city	6.3

Source: Own calculation from NSO Population and Housing Census (2008)

Appendix 2: Outputs- Test for heteroskedasticity, Estimation of Robust Standard Errors and Marginal Effects for probit model- Effects of Education Attainment on Early Marriage among Women in Malawi

Schedule 1: Test for Heteroscedasticity

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of earmrg_dummy

$\chi^2(1) = 118935.56$

Prob > χ^2 = 0.000

Schedule 2: Estimation Of Robust Errors Post Probit Regression

note: Other_religion_dummy omitted because of collinearity

note: DISTRICTPOVRATE omitted because of collinearity

Iteration 0: log pseudolikelihood = -1385183.6

Iteration 1: log pseudolikelihood = -1361719.9

Iteration 2: log pseudolikelihood = -1361054.3

Iteration 3: log pseudolikelihood = -1361049.8

Iteration 4: log pseudolikelihood = -1361049.8

Earmrg.	Coef.	Robust	Z	P> z 	95% Conf. Interval	
		Standard				
		Errors				
PSLC	0.0158432	0.0028607	5.54	0.000*	0.0102362	0.0214501
JC	-0.3205414	0.0037273	-85.99	0.000*	-0.3278194	-0.3132086
MSCE	-0.7443714	0.0061309	-121.41	0.000*	-0.7563878	-0.732355
Alevel	-0.7313285	0.0260308	-28.09	0.000*	-0.7823479	-0.680309
Diploma	-1.002873	0.209206	-47.94	0.000*	-1.043877	-0.9618698
Degree	-1.099755	0.0352733	-31.18	0.000*	-1.16889	-1.030621
Masters	-0.8953727	0.0624103	-14.35	0.000*	-1.017695	-0.7730508
PhD	-0.2537233	0.0789767	-3.21	0.001**	-0.4085148	-0.0989318
Chewa	-0.0195269	0.0038417	-5.08	0.000*	-0.0270565	-0.0119974
Ngoni	-0.0373256	0.0036957	-10.1	0.000*	-0.0445691	-0.0300821
Lomwe	-0.0145268	0.0033279	-4.37	0.000*	-0.0210494	0.0080043
Yao	-0.058067	0.0044787	-12.97	0.000*	-0.0668452	-0.0492889
Location	-0.0000459	0.0002508	-0.18	0.855	-0.0005373	0.0004456
Christian	0.1708314	0.0051011	33.49	0.000*	0.1608334	0.1808294
Muslim	0.1864597	0.0065738	28.36	0.000*	0.1735754	0.199344
Other Religions	(omitted)					
District Men	6.986457	1.017329	6.7	0.000*	4.99253	8.980385
quantity						
District Men	0.0326975	0.00762001	4.29	0.000*	0.0177623	0.0476327
Quality						
Chitipa	-1.873159	0.4758816	-3.94	0.000*	-2.80587	-0.9404479
Karonga	-1.779946	0.4724097	-3.77	0.000*	-2.705852	-0.8540404
Mzimba	669.608	92.97815	7.2	0.000*	487.3742	851.8418
Mzuzu	-0.8607556	0.1264161	-6.81	0.000*	-1.108527	-0.6129846

Kasungu	-0.7773355	0.1151744	-6.75	0.000*	-1.003073	-0.5515977
Nkhotakota	-0.6077505	0.0749466	-8.11	0.000*	-0.7546432	-0.4608578
Ntchisi	-0.5010871	0.0645192	-7.77	0.000*	-0.6275424	-0.3746318
Dowa	-0.6559573	0.0850662	-7.71	0.000*	-0.822684	-0.4892305
Salima	-0.4792073	0.0546432	-7.79	0.000*	-0.5327151	-0.3185178
Lilongwe	-0.4792073	0.0656714	-7.3	0.000*	-0.6079209	-0.3504937
Mchinji	-0.7096881	0.0947777	-7.49	0.000*	-0.8954489	-0.5239273
Ntcheu	0.2887928	0.0393389	7.34	0.000*	0.21169	0.3658956
Lilongwe City	-1.422179	0.1971771	-7.21	0.000*	-1.808639	-1.035719
Dedza	-0.0878012	0.0103118	-8.51	0.000*	-0.1080121	-0.675904
Mangochi	0.1058151	0.0203222	5.21	0.000*	0.0659843	0.1456458
Machinga	-0.0007628	0.0001367	-5.58	0.000*	-0.0010306	-0.0004949
Zomba district	0.2057584	0.0200088	10.28	0.000*	0.1665418	0.244975
Chiradzulu	0.5072449	0.069118	7.34	0.000*	0.3717761	0.6427137
Mwanza	-0.046675	0.0138411	-3.37	0.001**	-0.0738031	0.019547
Thyolo	0.1652022	0.0201133	8.21	0.000*	0.1257808	0.2046236
Mulanje	0.4177754	0.0491138	8.51	0.000*	0.3215141	0.5140368
Phalombe	0.0829296	0.0108921	7.61	0.000*	0.0615814	0.1042777
Chikwawa	-0.6300041	0.0748507	-8.42	0.000*	-0.7767088	-0.4832994
Zomba City	-1.084622	0.1465992	-7.4	0.000*	-1.371951	-0.7972928
Blantyre City	-1.186436	0.1667823	-7.11	0.000*	-1.513323	-0.8595483
Blantyre District	0.0189311	0.0104663	1.81	0.07****	-0.0015825	0.0394446
Balaka	0.2897028	0.0393542	7.36	0.000*	0.21257	0.3668356
Nsanje	-0.1677423	0.0119729	-14.01	0.000*	-0.1912087	-0.144276
District Poverty	(omitted)					
Rate						
_cons	-6.494718	0.7606929	-8.54	0.000	-7.985649	-5.003788

Probit regression

Number of obs= 3706025

Wald Chi2 (46) = 36058.30

Prob > chi 2 = 0.0000

Log pseudolikelihood = - 1361049.8

Pseudo R2 =0.0174

Schedule 3: Marginal Effects After Probit Estimation

Variable	dy/dx	Std. Err.	Z	P> z	[95% C.I.]	
X						
PSLC	0.003	0.001	5.480	0.000	.0020	0.091
JCE	-0.053	0.001	-103.980	0.000	-0.107	0.071
MSCE	-0.095	0.000	-217.070	0.000	-0.190	0.044
Alevel	-0.090	0.001	-132.450	0.000	-0.180	0.002
Diploma	-0.104	0.001	-132.450	0.000	-0.208	0.006
Bachelors degree	-0.107	0.001	-101.760	0.000	-0.214	0.003
Masters degree	-0.099	0.003	-34.440	0.000	-0.198	0.001
PhD	-0.043	0.011	-3.780	0.000	-0.085	0.000
Chewa	-0.004	0.001	-5.060	0.000	-0.008	0.354
Ngoni	-0.007	0.001	-10.210	0.000	-0.014	0.138
Lomwe	-0.003	0.001	-4.340	0.000	-0.006	0.485
Yao	-0.011	0.001	-13.640	0.000	-0.022	0.099
Location	-9.050	0.000	-0.180	0.855	0.000	8.239
Christian	0.031	0.001	36.310	0.000	0.029	0.874
Other religion	0.040	0.002	26.490	0.000	0.037	0.088
District Men quantity sex ratio	1.376	0.200	6.870	0.000	0.983	0.791
District men quality sex ratio	0.006	0.002	4.280	0.000	0.003	5.736
Chitipa	-0.126	0.005	-27.160	0.000	-0.252	0.027
Karonga	-129.000	0.006	-20.000	0.000	-0.258	0.037
Nkhata bay	-0.240	0.006	-26.530	0.000	-0.248	0.023
Mzimba	1.000	0.000	0.000	0.000	1 1	0.076
Mzuzu city	-0.170	0.025	-6.810	0.000	-0.339	8.015
Kasungu	-0.153	0.227	-6.750	0.000	-0.306	8.073

Variable	dy/dx	Std. Err.	Z	P> z	[95% C.I.]	X
Nkhotakota	-0.120	0.015	-8.110	0.000	-0.239	8.044
Ntchisi	-0.099	0.013	-7.770	0.000	-0.197	8.043
Dowa	-0.129	0.017	-7.710	0.000	-0.258	8.079
Salima	-0.838	0.011	-7.790	0.000	-0.168	8.052
Lilongwe district	-0.094	0.013	-7.300	0.000	-0.189	8.111
Mchinji	-0.140	0.019	-7.490	0.000	-0.280	8.032
Ntcheu	0.057	0.008	7.340	0.000	0.042	8.074
Lilongwe city	-0.280	0.039	-7.210	0.000	-0.560	8.077
Dedza	-0.017	0.002	-8.520	0.000	-0.035	8.061
Mangochi	0.021	0.004	5.200	0.000	0.013	8.067
Machinga	0.000	0.000	-5.580	0.000	0.000	13.320
Zomba district	0.041	0.004	10.270	0.000	0.033	8.058
Chiradzulu	0.100	0.014	7.340	0.000	0.073	8.033
Mwanza	-0.009	0.003	-3.370	0.001	-0.018	8.026
Thyolo	0.033	0.004	8.200	0.000	0.025	8.046
Mulanje	0.082	0.010	8.500	0.000	0.063	8.044
Phalombe	0.016	0.002	7.610	0.000	0.012	8.022
Chikwawa	-0.124	0.015	-8.420	0.000	-0.248	8.046
Zomba city	-0.214	0.029	-7.400	0.000	-0.427	8.029
Blantyre city	-0.122	0.007	-18.430	0.000	-0.243	0.061
Blantyre district	-0.004	0.002	1.810	0.071	0.000	8.042
Balaka district	0.057	0.008	7.360	0.000	0.042	8.015
Nsanje	-0.033	0.002	-14.020	0.000	-0.066	8.035

(*) dy/dx is for discrete variable from 0 to 1