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THE IMPACT OF HAVING SIBLINGS ON
EARLY FEMALE MARRIAGE:
EVIDENCE FROM MALI AND SIERRA LEONE

VLIV SOUROZENCŮ NA PŘEDČASNÉ PROVDÁVÁNÍ DÍVEK: PŘÍPAD MALI A SIERRA LEONE

Bachelor Thesis

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Prohlášení

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I hereby proclaim that I wrote the bachelor thesis on my own and that the references include all resources and literature I have used. This thesis or its fundamental parts have not been used previously for acquiring another university degree.

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Acknowledgments

The Impact of Having Siblings on Early Female Marriage: Evidence from Mali and Sierra Leone

Abstract

Early female marriage is perceived as a persisting problem of many less-developed countries, that brings various negative consequences not only for girls but also for the society as a whole. The main objective of this bachelor thesis is to contribute to the research on possible risk factors of this traditional practice. Specifically, it investigates whether and how the number of siblings affects the probability of a girl getting married or entering into cohabiting union before her 18th birthday. Parental incentives underpinning early female marriage are discussed mainly in relation to the theory of intra-household resource allocation and sibling rivalry. Special attention is paid to the impact of sibling age structure on household decision-making process about daughters' marriage timing. Consequently, an empirical test is conducted for two West African countries, Mali and Sierra Leone, using data from the latest available Demographic and Health Surveys. Based on the empirical analysis of this data, there is no evidence that the total number of siblings or their age structure has any significant impact on the probability of a girl getting married or entering into union early in the countries under study.

Vliv sourozenců na předčasné provdávání dívek: Případ Mali a Sierra Leone

Abstrakt

Předčasné provdávání dívek je vnímáno jako dlouhodobý problém mnoha méně rozvinutých států, který přináší různé negativní důsledky nejen pro dívky ale i pro společnost jako celek. Hlavním cílem této bakalářské práce je přispět k výzkumu možných rizikových faktorů této tradiční praktiky. Konkrétně zkoumá, zda a jak počet sourozenců ovlivňuje pravděpodobnost, že se dívka provdá nebo vstoupí do nesezdaného soužití před svými 18. narozeninami. Motivace rodičů vedoucí k předčasnému provdávání dívek je popsána především v souvislosti s teorií rozdělování zdrojů v domácnosti a sourozenecké rivality. Zvláštní pozornost je věnována vlivu věkové struktury sourozenců na rozhodování domácnosti o načasování vstupu dcer do svazku. Následně je proveden empirický test pro dvě země západní Afriky, Mali a Sierra Leone, za využití dat z posledních dostupných Demografických a zdravotních studií (Demographic and Health Surveys). Na základě empirické analýzy těchto dat se nepodařilo prokázat, že celkový počet sourozenců nebo jejich věková struktura má významný vliv na pravděpodobnost, že se dívka v pozorovaných státech provdá nebo vstoupí do nesezdaného soužití předčasně.

Klíčová slova: Předčasné provdávání dívek, počet sourozenců, věková struktura sourozenců, rizikové faktory, Mali, Sierra Leone

CONTENTS

ABBREVIATIONS AND ACRONYMS

AME	Average Marginal Effect
CEDAW	Committee on the Elimination of Discrimination against Women
CPS	Cellule de Planification et de Statistique du Ministère de la Santé
DHS	Demographic and Health Surveys
DNSI	Direction Nationale de la Statistique et de l'Informatique du Ministère de l'économie, de l'Industrie et du Commerce
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross domestic product
HIV	Human Immunodeficiency Virus
IMF	International Monetary Fund
Logit	Logistic regression model
MI	Macro International
MLE	Maximum likelihood estimation method
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary least squares method
PPP	Purchasing power parity
SSL	Statistics Sierra Leone
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFPA	United Nations Population Fund
UNGA	United Nations General Assembly
UNICEF	United Nations Children's Fund
UNPD-DESA	United Nations Population Division-Department for Economic and Social Affairs
USAID	United States Agency for International Development
WHO	World Health Organization

LIST OF TABLES

LIST OF FIGURES

Chapter 1

Introduction

It is generally known that a variety of human health and socio-economic outcomes in later life is influenced by early life conditions. While one cannot choose the family he or she is born to, the choice of a partner or timing of marriage belongs to the most important life decisions. Marriage and subsequent start of family is usually regarded as the transition to adulthood, and so both partners should be sufficiently mature. However, specifying the exact age of maturity is difficult because what is early for one person may be late for another. Conventionally, the term 'early marriage' refers to all kinds of formal marriages as well as to cohabiting unions[1] formed before one or both partners turned the age of 18 (UNICEF, 2005, p. 1). The determination of this age limit is based on the Convention on the Rights of the Child (UNGA, 1989) which defines children as people under the age of 18, so the terms 'early marriage' and 'child marriage' are often used interchangeably.

Rights related to marriage have been discussed in a large number of international declarations and conventions. For example, the right to free and full consent to a marriage was expressed as early as in 1948 in the Universal Declaration of Human Rights (UNGA, 1948, Article 16.). The Convention on the Elimination of All Forms of Discrimination against Women outlaws 'marriage of a child' and recommends establishing legal minimum age for marriage and compulsory official registration of marriage (UNGA, 1979, Article 16.2). Even though most countries have implemented the recommended laws,[2] the practice of early marriage still persists in many parts of the world, and therefore the enforcement of these laws needs to be improved. Given all the above, early marriage is regarded as violation of human rights because children are not able to give free, full and informed consent to the spouse. In fact, it forces them to accept roles in family and society for which they are neither physically nor emotionally prepared (UNFPA, 2012, p. 11).

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[1] where a couple lives together as if married

[2] In 2010 the limit of 18 or more years was recognized as the minimum legal age for marriage without parental consent or approval by a pertinent authority in 158 countries for women and in 180 countries for men. Nevertheless, girls and boys younger than 18 can marry with parental consent or approval by a pertinent authority in 146 and 105 countries, respectively (UNPD-DESA, 2011a, p. 1).

Although early marriage involves both boys and girls, this study focuses primarily on early female marriage. The main reason is that young girls get married at much higher rate[3] and that the negative consequences are more serious for girls since they have to face subsequent early childbearing and maternal health complications (Greene, Malhotra and Mathur, 2003). Accurate statistics on the prevalence of early marriage are not available, but it is estimated that in 2010, over 67 million women aged 20–24 had been married or in union before their 18th birthday in developing regions. In addition, rising trend is expected in a few next decades as a consequence of population dynamics in the most-affected areas (UNFPA, 2012, p. 22). In this context, early female marriage is an important topic that calls for further research.

Many researchers from across disciplines have recently investigated data on early marriage, concentrating on harmful consequences of this traditional practice. Early marriage is associated with girl's as well as her child's poorer health outcomes because it usually leads to early childbearing. Evidence has proven that a child born to a teen mother is twice less likely to survive the first year of age (Jain and Kurz, 2007, p. 8). Moreover, maternal mortality is the main cause of death among girls aged 15–19 in low- and middle-income countries (World Health Organization, 2012, p. 3). Literature also points out that married young girls are at higher risk of HIV transmission since they usually have no control over their partners' sexual behaviour or the power to make decisions about the use of contraceptives (Clark, 2004). Girls married during their adolescence are more likely to drop out of school, and hence, early marriage is perceived as a significant barrier to education (Greene, Malhotra and Mathur, 2003; Jensen and Thornton, 2003). Low educational attainment leads to more limitations in future life opportunities for women (such as worse-paid job offers or lower position concerning family decisions within household) and so they are often caught in a vicious circle of poverty. Thus, early female marriage affects more than one generation resulting into perpetual poverty, and a long-time waste of human capital.[4]

Early marriage is a complex problem driven by diverse reasons which may vary across cultures. However, Forum on Marriage and the Rights of Women and Girls (2000, p. 10) suggests that these causes can be divided into three main categories: cultural and religious norms, economics and poverty and sexual and reproductive health. All these three areas have one common characteristic – discrimination against women throughout their whole lives.

The objective of this bachelor thesis is to contribute to the research on potential risk and protective factors connected with early marriage already pursued for example by Jain and Kurz (2007). More specifically, it is narrowly focused on one of these risk factors – number of siblings. It is generally known that sibship size can influence child's future outcomes,[5] and so this study investigates whether there is a relationship between the number of siblings a girl has and the

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[3]The ratio of currently married women aged 15–19 compared with men in the same age group is skewed, such as for example in Mali (72 : 1) or in the United States of America (6 : 1) (Greene, Malhotra and Mathur, 2003, p. 5).

[4]In fact, the persisting practice of child marriage is strongly inconsistent with the United Nations Millennium Goals (UNFPA, 2012, p. 13).

[5]Previous studies focused mostly on the impacts of having siblings on educational attainment (Butcher and Case, 1994), child labour (Edmonds, 2005) or health outcomes (Garg and Morduch, 1998).

probability of her getting married or entering in union before the 18th birthday in less developed countries. For empirical analysis, we chose Sierra Leone and Mali since these two countries in West Africa ranked among 10 hotspot areas in the world in the last decade, concerning the prevalence of early marriage.

This bachelor thesis is structured into six chapters. Firstly, we provide information about the prevalence of early female marriage in Sierra Leone and Mali, followed by basic demographic, economic and gender-related indicators. We compare these two countries with each other and illustrate the situation and main characteristics concerning early marriage and family structure.

In the third chapter, we present the economic framework in which siblings compete for their parents' limited resources. In this context, the presence of a girl in a family may be perceived as an economic burden and marrying her off early may relieve the whole family, especially in the presence of marriage transactions.[6] Moreover, we discuss the impact of girl's birth order and sibling age structure on girl's position within the family, which may consequently affect the parental decision about her marriage. In our hypothesis, we assume that the increasing number of siblings (disregarding their sex) should affect the probability of a girl getting married or entering in union before her 18th birthday. We also expect that the relative number of younger siblings and girl's birth order should be an important factor in household decision-making process about marriage timing.

In the fourth chapter, we introduce data from the nationally representative Demographic and Health Surveys and the logistic regression model which is used for empirical testing of the hypotheses. The fifth chapter is dedicated to the examination of the datasets and to the interpretation of results derived from the regression analysis. Granted that the objective of this study is not to conduct a full-scale analysis of this issue, further research in this area is necessary. Therefore, we discuss limitations of our model and we outline some additional steps that might improve the empirical analysis in the future. In the last chapter, we summarize our findings as well as suggestions for further research in this area.

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[6]such as dowry or bride price

Chapter 2

Background Characteristics of Selected Countries

Demographic transition, together with prosperous economic conditions, have transformed many patterns of human behaviour in the society, including the attitude towards marriage. New outlooks on life have frequently been adopted instead of traditional norms, but this demographic and socio-economic change has been gradual or has not occurred in some parts of the world yet. In such cases, deep-rooted traditions may still persist in the society and affect a lot of people's life decisions.

In this chapter, we concentrate on indicators which allow us to measure the prevalence of early female marriage in regions where data are available. Then, we illustrate the situation in Sierra Leone and Mali on a basis of current statistics as well as projections of the future development. Secondly, our attention is drawn to demographic and economic background and gender-related issues in these two particular countries in order to shed light on local motivations for marrying girls off early.

2.1 Prevalence of Early Female Marriage

The adequate statistics on early female marriage are not available or of poor quality,[7] but it is possible to estimate the extent of this practice using data from household surveys.[8] For this purpose, researchers can analyse the prevalence in different ways but it is conventionally expressed as the percentage of women aged 20–24 married or in union before the age of 18 (see equation 2.1).

$$\text{\textit{prevalence of early female marriage}} = \frac{\text{\textit{number of women aged 20–24 who got married or entered in union before the age of 18}}}{\text{\textit{total number of women aged 20–24}}} \times 100 \qquad (2.1)$$

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[7]Many early marriages are unofficial or remain unregistered (UNICEF, 2001, p. 4).

[8]such as Demographic and Health Surveys (funded by USAID) or Multiple Indicator Cluster Surveys (developed by UNICEF)

Another option is to use the percentage of women aged 15–19 who got married or entered in union before the age of 18 instead of the first indicator. However, the denominator also involves single girls who are still at risk of getting married or entering in union before or during adolescence in such case, and therefore the previous indicator is generally (also in our study) preferred (UNFPA, 2012, p. 19).

Figure 2.1: Percentage of women aged 20–24 married or in union by age 18 in developing regions, 2000–2011
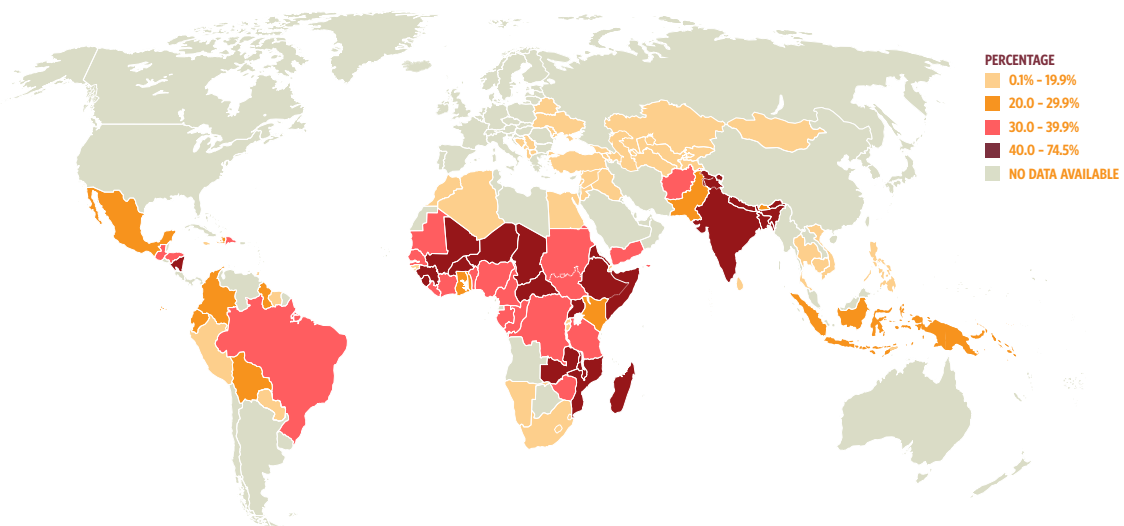
Source: UNFPA, 2012, p. 28

The prevalence of early female marriage varies strongly across countries (see Fig. 2.1) and has experienced only a little improvement worldwide in the last decade.[9] The highest rates are traditionally recorded in South Asia and West and Central Africa where two out of five girls marry or enter in union before 18th birthday (UNFPA, 2012, p. 26). The hotspot countries are summarized in Tab. 2.1, but we have to keep in mind that surveys were conducted in different years during the period 2000–2011, and hence, the comparison is rather problematic due to time discrepancies. However, it is obvious that early female marriage remains a neglected problem in both countries under study even though they both rank among most affected areas in the world.

As indicated in Tab. 2.1, about one half of women aged 20–24 lived in marriage or in union before their 18th birthday in these two countries. This prevalence was significantly higher than the regional average for developing countries which equalled 34 % (UNFPA, 2012, p. 27) during the period 2000–2010. Unfortunately, the description of local trends in the prevalence of early female marriage is a complicated task as it requires availability of data from at least two consecutive and comparable household surveys. The DHS was conducted in Sierra Leone for the first time in 2007 and so there is no possibility of comparison, but concerning Mali, data from other DHS can be observed. Even though the prevalence of early female marriage declined from 70 % in

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[9]Some countries have been able to reduce the prevalence of early marriage significantly, such as Ethiopia or Nepal (UNFPA, 2012, p. 24).

1995–6 (Coulibaly et al., 1996, p. 91) to 65 % in 2001 (CPS/DNSI et ORC Macro, 2002, p. 86), a subsequent increase up to 71 % was recorded by DHS in 2006. These findings from different DHS suggest that efforts[10] to reduce early female marriage in Mali were limited and that the country has been struggling with this problem for a long time.

Table 2.1: Percentage of women aged 20–24 married or in union by age 18 in hotspot countries, 2000–2011

Country	Percentage of women aged 20–24 married or in union by age 18
Niger	75 %
Chad	72 %
Bangladesh	66 %
Guinea	63 %
Central African Republic	61 %
Mali*)	55 %
Mozambique	52 %
Malawi	50 %
Madagascar	48 %
Sierra Leone	48 %
Burkina Faso	48 %

*)Based on DHS Mali 2006 the prevalence of early marriage was 71 % (CPS/DNSI et MI, 2007, p. 85).

Source: UNFPA, 2012, p. 23, author's adjustment

Finally, the prevalence of early female marriage does not vary only across countries, but also within the countries' regions. Even though this practice is very common in both countries under study, regional differences still exist (see Fig. 2.2). In Sierra Leone, the prevalence is highest in the Northern Area (60 %) while the lowest level was recorded in the Western Area (24 %). Similar situation is also in Mali where the prevalence is highest in the Kayes region (87 %) in contrast with the region Bamako (54 %). Early female marriage is least widespread in both capital city regions where the prevalence is more than 30 percentage points lower compared to the most affected region in each country.

2.2 Demographic Indicators

Traditionally, societies with high mortality rates inclined to marry girls off before or during adolescence as an instrument of maximizing fertility.[11] Having more children in a family was considered rather an asset than a cost in these societies because more people were able to care for the family. In addition, early marriage strengthened political, social and economic bonds between families. However, during the demographic transition mortality rates have dropped off, and consequently, populous households and alliances have lost their importance. Fertility rates have declined and

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[10]Surprisingly, only one program addressing the issue of child marriage was identified in Mali (Jain and Kurz, 2007, p. 34).

[11]Nevertheless, it is difficult to decide the direction of causality in this case, especially concerning high maternal and infant mortality.

a large number of dependent children has become an economic burden (Greene, Malhotra and Mathur, 2003, p. 4).

Figure 2.2: Regional estimates of the percentage of women aged 20–24 married or in union by age 18, Mali and Sierra Leone

(a) Mali
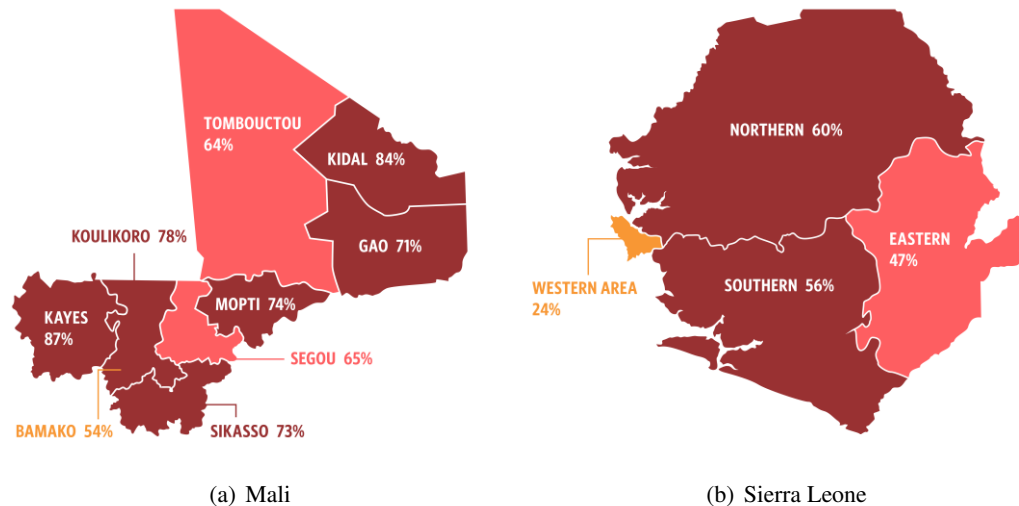
(b) Sierra Leone

Note: Source of data for regional estimates: DHS Mali 2006 and DHS Sierra Leone 2008

Source: UNFPA, 2012, pp. 66 and 70

The population change in Sierra Leone and Mali is primarily characterized by persisting high levels of fertility. As indicated in Fig. 2.3, the total fertility rate[12] has been over five children per woman in Sierra Leone and even over six children per woman in Mali since 1950. When comparing the development of this demographic indicator in these two countries, a slight decrease is observed in Sierra Leone in the 1970s but it was disrupted during 1985–2000 in the period of political instability and consequent civil war. After this temporary increase, the total fertility rate started to decline slowly again. In Mali the upward trend increasing to over seven births per woman was recorded until 1990 and since then the total fertility rate has gradually dropped off.

Another difference can be discovered when comparing the development of the total fertility rate in both countries within the whole region of West Africa (see again Fig. 2.3). The total fertility rate in Sierra Leone remains lower than the West African average while the Malian total fertility rate exceeds this average during the whole time period. Moreover, this difference is expected to be sustained until 2050 according to the United Nations projections. On the other hand, the number of children per woman is higher in both countries than the average of the whole Africa since 1990.

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[12]The total fertility rate is defined as 'the average number of children a hypothetical cohort of women would have at the end of their reproductive period if they were subject during their whole lives to the fertility rates of a given period and if they were not subject to mortality' (UNPD-DESA, 2011b).

Figure 2.3: Total fertility rate, Mali and Sierra Leone, period 1950–2050
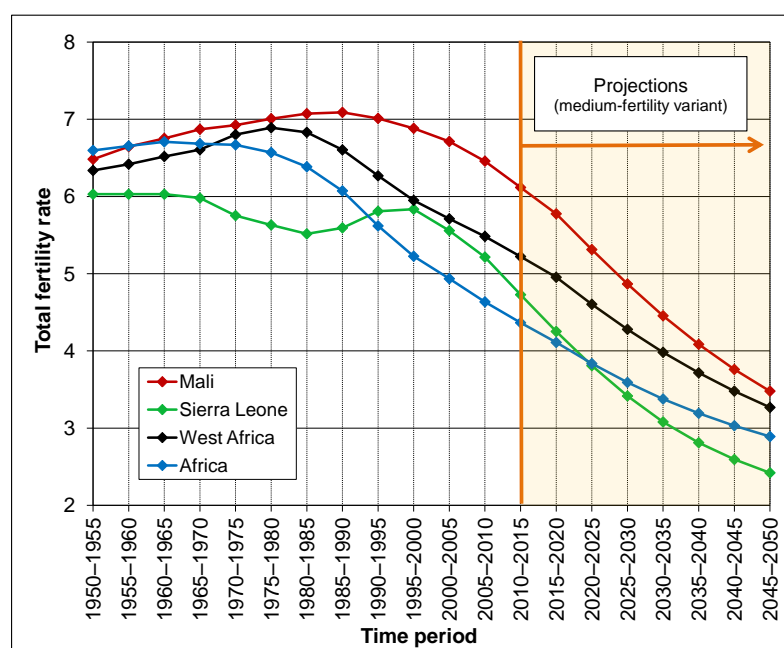
Source: UNPD-DESA, 2011b, author's adjustment

Early female marriage helps to maintain high levels of fertility since the frequency of sexual activity is higher for adolescent girls in a marriage or in a union. As a result of limited contraceptive use, the earlier start of female sexual activity means longer reproductive period, and consequently more children (WHO, 2012, p. 1). The unmet need for family planning[13] is 28 % in Sierra Leone and 31 % in Mali and most of these married women want to use some methods of contraception in order to space births (SSL and ICF Macro, 2009, p. 99; CPS/DNSI et MI, 2007, p. 101). However, early teenage pregnancies are related to higher risk of health complications for both young mother and her child (WHO, 2012, p. 3). Estimated infant and under-five mortality rates as well as maternal mortality ratio remain at high levels in both countries and the situation is even worse for children born to young mothers below the age of 20 (see Tab. 2.2).

Table 2.2: Estimated child and maternal mortality according to Demographic and Health Surveys, Mali and Sierra Leone

Indicator name	Mali	Sierra Leone
Infant mortality rate (per 1,000 live births)	96	89
Infant mortality rate of children born to a mother under 20 years	143	146
Under-five mortality rate (per 1,000 live births)	191	140
Under-five mortality rate of children born to a mother under 20 years	249	208
Maternal mortality ratio (per 100,000 live births)	464	857

Source: SSL and ICF Macro, 2009, pp. 106, 110 and 272; CPS/DNSI et MI, 2007, pp. 185,190 and 199, author's adjustment

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[13]Women with unmet need for family planning are those who are fecund, sexually active and are not using any contraceptives but want to delay their next birth by two or more years or do not want to have more children (SSL and ICF Macro, 2009, p. 98).

Finally, the population dynamics in both countries has resulted in a progressive population pyramid with a broad base and a narrowing top. In other words, there is a large number of young people living in a population while only a few people attain advanced age. Theoretically, populous cohorts of already born girls promise a further increase in numbers of child spouses or partners (see Fig. 2.4). Assuming no change in recorded levels of early marriage in 2010, the numbers of child brides will rise up to 209,000 in Sierra Leone and 700,000 in Mali in 2030 which represents more than a 60% and a 85% increase compared to situation in 2010. Generally, the projections of future development are not optimistic either for developing regions. In the period 2011–2020, 142 million girls might be married before or during adolescence (UNFPA, 2012, p. 4).

Figure 2.4: Projected number of child brides until 2030 assuming no change in the prevalence of early marriage (recorded in 2010), Mali and Sierra Leone

(a) Projected absolute change   (b) Projected relative change
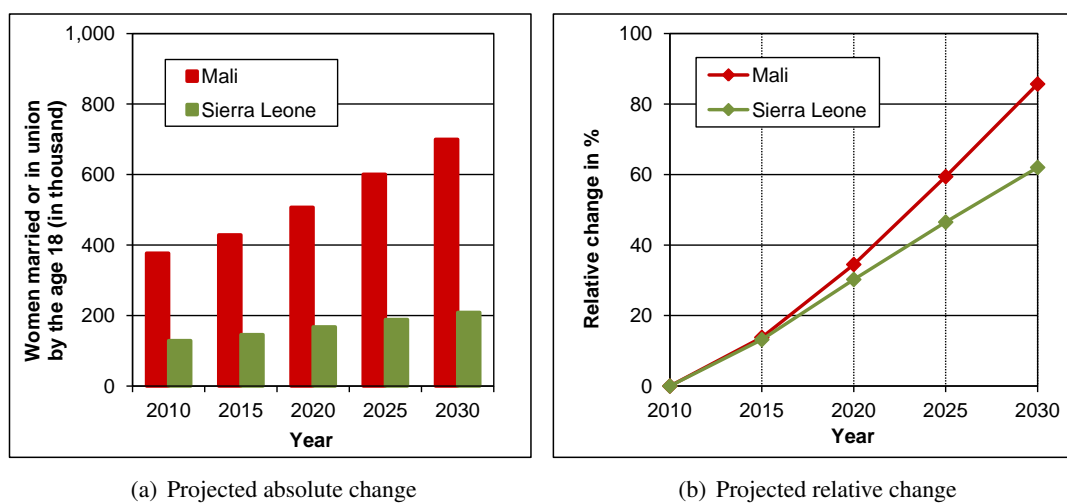
Note: Relative change is calculated as the absolute difference of the value in 2010 and the value in each corresponding year, divided by the value in 2010.

Source: UNFPA, 2012, pp. 66 and 70 and author's calculations

2.3   Gender Roles and Stereotypes

Even though constitutions of both countries prohibit discrimination based on sex (CEDAW, 2004, p. 23; CEDAW, 2006, p. 17), a strongly patriarchal society limits a lot of women's rights. In addition, the prevailing traditional attitudes toward gender roles keep early female marriage in practice. While men are believed to be responsible for financial support of the family, women's most important role is childbearing and domestic work. As a result of this expectation, women have little option but to marry and be a good wife and mother (Greene, Malhotra and Mathur, 2003, p 4). Since our study uses retrospective approach to early female marriage, gender issues are analysed in accordance with legislation applicable at the corresponding time. However, some changes in legislative framework have occurred in recent years in order to observe international conventions and reinforce women's rights, including legal age for marriage.

Mali ratified the Convention on the Elimination of All Forms of Discrimination against Women on September 10, 1985 and committed itself to eliminating discrimination based on sex as it is stated in this convention. However, most spheres of society are still dominated by men and gender differences can be found in many aspects of life. Households are usually headed by a man[14] and a woman is legally obliged to obey him, including decisions such as a choice of a place where family lives. Former Marriage and Guardianship Code protected women's rights within family insufficiently. The legal minimum age for marriage was 15 years for girls and 18 years for boys and civil registrars could be punished by imprisonment for celebrating marriage between persons under this required age limit. Nevertheless, most marriages have been conducted under customary or religious law, and thus statistically invisible for the government (CEDAW, 2004).

Women's rights concerning marriage, but also inheritance, property and parenthood should have been improved by the new Family Code. Its first draft that proposed the increase of the legal minimum age for marriage for women up to 18 years[15] was adopted in 2009. However, President Amadou Toumani Touré decided not to sign it after protests of Muslim groups and returned it to the Parliament for revision. The law was finally enacted in 2012 but its modified version is criticized for being insufficient or even going against the principles of gender equality. According to this new Family Code, a woman must still obey her husband and a man is considered to be the head of the family. The legal age for marriage is fixed to 16 years for girls maintaining inequality between men and women concerning the entrance into marriage (Diarra, 2012).

Sierra Leone ratified the Convention on the Elimination of All Forms of Discrimination against Women on November 11, 1988 but the fulfilment of its commitments was impaired during and after the civil war in 1991–2002 since this period of political instability influenced social and economic life in the country. Under the Matrimonial Act of 1960, marriages could be conducted under civil, religious, or customary law. Under the customary law, there was no minimum age for marriage until 2007 and both parents' approval was needed.[16] Furthermore, under the Christian Marriage Act, marriage of a person under the age of 21 required father's consent. In Sierra Leone, women are traditionally responsible for all domestic work in the household and many daughters are being prepared for these generally accepted roles in a secret society called Bondo which covers also other ritual practices such as female circumcision. On the other hand, the Constitution does not exactly specify who is the head of the household, but according to customs and religious beliefs a husband is still expected to take over this role (CEDAW, 2006).

A legislative reform of 2007 has provided better protection against discrimination of women in areas such as marriage, divorce and inheritance. For example, the Child Rights Act 2007 outlaws marriages of a child under the age of 18 in accordance with the international definition of a child (Sierra Leone, Act No. 43 of 2007, Article 34). Moreover, the Registration of Customary Marriage

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[14]In 2006, only 12.3 % of households were headed by a woman (CPS/DNSI et MI, 2007, p. 16).

[15]the same legal minimum age as for boys

[16]If one of them disagreed, it would be father who would decide. In fact, this made mother's opinion unimportant, which indicates another discrimination against women (CEDAW, 2006).

and Divorce Act of 2009 requires consent of both partners in marriages conducted under customary law and has introduced compulsory registration of these marriages (Sierra Leone, Act No. 1 of 2009, Part II and III).

Another indicator of gender equality in a relationship is the age gap between partners that may influence the wife's status and position in the household. In general, women who marry early and a much older man tend to be more submissive, vulnerable and easily controllable as a result of their immaturity. The lack of decision-making power and less autonomy of young girls make male partners superior in relationships, which some of them may prefer and choose young partners with this in mind (Jensen and Thornton, 2003, pp. 10, 14). In fact, evidence suggests that women more than four years younger than their partners are significantly more likely to have been married early compared to women whose partner's age was closer (UNICEF, 2005, p. 26).

Figure 2.5: Percentage of currently married women in polygynous unions by age groups according to Demographic and Health Surveys, Mali and Sierra Leone
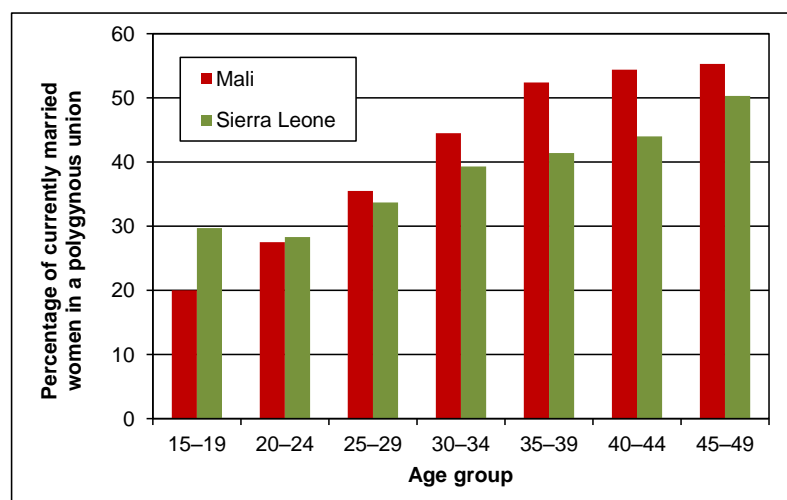
Source: SSL and ICF Macro, 2009, p. 85; CPS/DNSI et MI, 2007, p. 83, author's adjustment

The age gap issue is strongly associated with polygynous unions in which the husband has more than one wife. For girls aged 15–19 the probability of being in a polygynous union increases with larger age difference between partners (UNICEF, 2005, pp. 19, 21–22). In Mali, polygyny was legally permitted by the Marriage and Guardianship Code allowing the husband to marry up to four wives. Although wife's consent was officially required when converting a monogamous marriage into a polygynous one, it is often reached through abuse and threats (CEDAW, 2004, p. 63). In Sierra Leone, polygynous unions were recognized under the customary law but the number of wives was not limited and so in this case a man could marry as many women as he wished (CEDAW, 2007, p. 17).

Even though monogamous unions prevail in both observed countries, polygamy is also widespread, especially in rural areas. Overall, 37 % of currently married women aged 15–49 in Sierra Leone and 39 % in Mali live in polygynous unions. Moreover, prevalence of these unions increases with higher age with the exception of age group 15–19 in Sierra Leone. As indicated in Fig. 2.5, almost one third of women aged 20–24 has one or more co-wives in both countries. Similar trends

can also be tracked when comparing this proportion in the context of educational attainment because the prevalence of polygynous unions declines with increasing level of completed education (SSL and ICF Macro, 2009, pp. 84–85; CPS/DNSI et MI, 2007, pp. 82–84).

2.4 Socio-Economic Indicators

Although economic reasons underlying early marriage will be discussed separately and looked into in more depth in the following chapter, the most important economic indicators are provided in this section in order to briefly illustrate economic background in both countries under study. The second part is focused on education as an important factor related to the timing of marriage.

Living in poverty is a daily reality for a vast majority of population. For better illustration, the poverty headcount ratio[17] was equal to 94 % in Mali in 1994 and to 75 % in Sierra Leone in 1990. Currently available data indicate that around three quarters of Sierra Leonean as well as Malian population still live below this poverty line in spite of recent positive growth performance (World Bank, 2012).

Figure 2.6: Gross domestic product (PPP) per capita, Mali and Sierra Leone, period 1980–2010
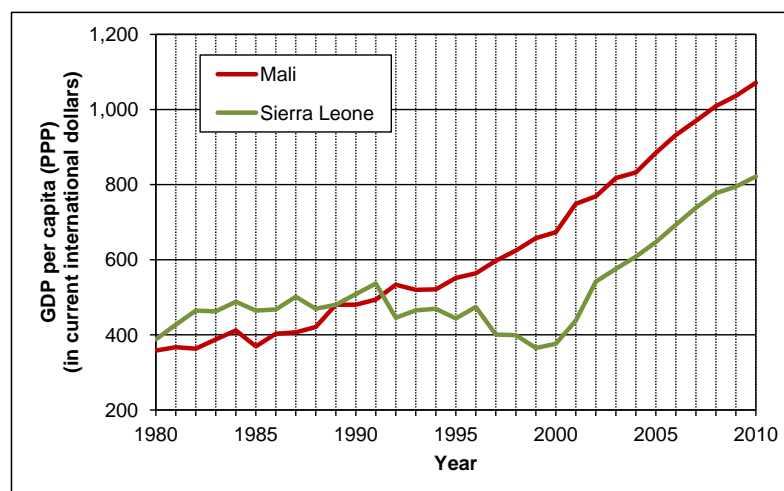
Source: World Bank, 2012, author's adjustment

The development of gross domestic product (GDP) per capita based on purchasing power parity (PPP)[18] is summarized in Fig. 2.6. Similar trends can be observed in both countries with the exception of the 1990s when brutal civil war in Sierra Leone devastated most of country's economic infrastructure (CEDAW, 2006, p. 12). After this war, the economic growth has been restarted, however, the gross domestic product per capita still remains lower compared to Mali. Moreover, Sierra Leone has been recently struggling with much higher annual inflation rates than Mali has been (World Bank, 2012). Nevertheless, both these indicators might get closer in the

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[17]percentage of population that lived on less than $2 a day at 2005 international prices (World Bank, 2012)

[18]According to the World Bank definition, GDP based on PPP is 'gross domestic product converted to international dollars using purchasing power parity rates' (World Bank, 2012).

future because the current political instability and military conflict in Mali may influence its future economic development as it happened in Sierra Leone.

In the 1990s, economies of Mali and Sierra Leone were dominated mainly by agricultural production that contributed on average almost 50% to GDP in both countries (see the figure 2.7). However, the productive potential of this sector was limited by small-scale traditional farming since most people worked in subsistence agriculture (FAO, 2005, p. 2; OECD, 2012, p. 5).

Figure 2.7: Sectors of the economy by value added (% of GDP), Mali and Sierra Leone, 1990s

(a) Mali   (b) Sierra Leone
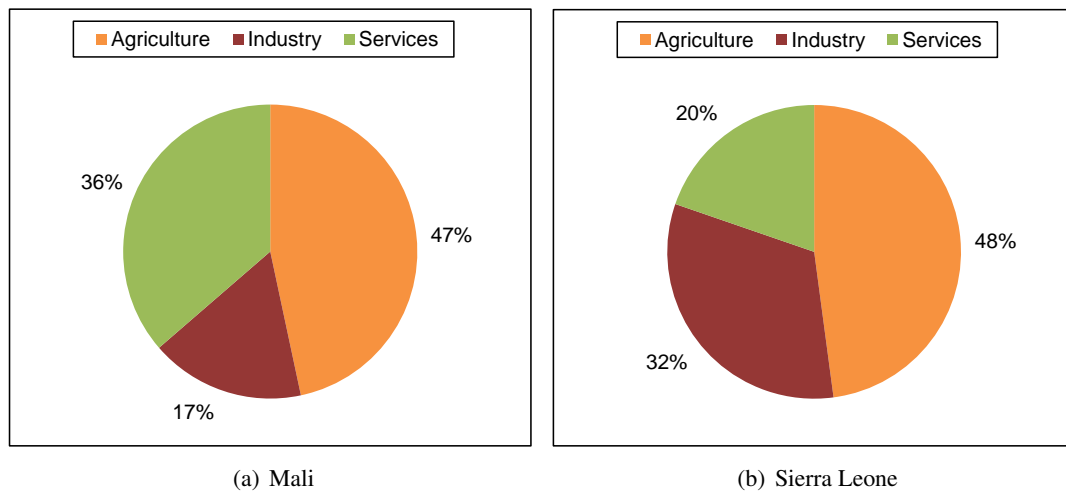
Note: The percentage in 1990s is calculated as the arithmetic mean of values in 1990–1999.

Source: World Bank, 2012, author's calculations

In Mali, the agricultural area stretches mainly along the banks of the Niger River while the north of this landlocked country is covered by the Sahara Desert. Overall, agricultural land represents only 28 % of the total area of the country and most of it is not irrigated (FAO, 2005, p. 1). Mali is the second largest producer of cotton, its most important export crop, in Sub-Saharan Africa. Growing cotton provides the main source of income for one quarter of the Malian population (Behrendt, 2006). Thus, not only economic output from agricultural production, but also livelihood of many people depends heavily on weather conditions as well as on the volatile agriculture commodity markets. At the beginning of the 21st century, gold has become a key export product reaching more than 70 % of total export in 2007. However, only 1 % of total labour force is employed in the gold mining sector and its financial stability is also vulnerable to fluctuations in gold prices in international commodity markets (Camard, 2008).

Sierra Leonean already poor economic infrastructure was destroyed during the civil war and its slow recovery is possible primarily thanks to foreign financial aid. As in Mali, agriculture remains the essential sector of the economy with two thirds of the population depending on it for livelihood. Major export crops involve cocoa, coffee and palm oil. Besides agriculture, the economy of Sierra Leone is driven by the mining sector, and diamonds in particular. Furthermore, the future boost of economy is expected in the connection with the discovery of new iron ore mines. Unfortunately, as a result of this narrow export base, country's economic performance is highly dependent on

demand and price changes in international commodity markets (IMF, 2011). Another persisting problem of the mining sector is the fact that government's diamond revenue remains low despite the rich local diamond deposits, and so it cannot bring prosperity to the population. Paradoxically, poverty rates are even higher in the mining districts. During the civil war, diamonds played an important role because they were used to fund this military conflict, which made them known as 'blood diamonds'. Even though Sierra Leone has been trying to reform its diamond sector in order to make it transparent and more profitable, it has been struggling with corruption, illegal mining and smuggling, and therefore, it has not managed to eliminate this serious problem hampering the further development yet (Polgreen, 2007).

As mentioned above, the majority of labour force participants, especially in rural areas, is engaged in the agricultural sector. The Demographic and Health Surveys proved, that women who worked in this sector were more likely to be married or in union in both countries. Overall, 60 % of Sierra Leonean women aged 15–49 worked in agriculture and 83 % of them were not paid for this work (SSL and ICF Macro, 2009, pp. 43, 45). In Mali, the proportion of women in the same age group working in agriculture was lower, equalling 48 %, and 23 % of them did not receive any earnings (CPS/DNSI et MI, 2007, pp. 45, 47). It is obvious that despite the crucial role of women in subsistence farming and ensuring food security of the whole family, they often do not generate any income from these activities. Moreover, their access to renting or owing land is strongly limited. This lack of economic power only deepens women's dependence on men (CEDAW, 2006; CEDAW, 2004).

With one of the lowest values of Human Development Index,[19] Mali and Sierra Leone rank among the least developed countries in the world. Moreover, both countries have seen only a little progress during the last three decades (see Tab. 2.3). Mali has been experiencing a steady rise in Human Development Index value since 1980 indicating a gently increasing level of development. A similar trend can be observed also in Sierra Leone, however, a slight drop was recorded during the civil war. Afterwards, the indicator has rebounded and started to rise again.

Table 2.3: Trends in Human Development Index, Mali and Sierra Leone, 1980–2012

Year	1980	1990	2000	2005	2007	2009	2012
Mali	0.176	0.204	0.270	0.312	0.328	0.344	0.344
Sierra Leone	0.255	0.247	0.244	0.315	0.331	0.346	0.359

Source: United Nation Development Programme, 2013, p. 150, author's adjustment

Potential for improvement can be found in the area of educational attainment. All the more so, because the education is considered to be one of the most significant protective factor against early female marriage. Evidence suggests that girls with higher level of education tend to marry later (Jensen and Thornton, 2003; Jain and Kurz, 2007). Girls with secondary education or higher

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[19]This indicator of development is defined by United Nations as 'a composite index measuring average achievement in three basic dimensions of human development: a long and healthy life, knowledge and a decent standard of living' (United Nations Development Programme, 2013, p. 151).

are three times less likely to marry or enter in union by age 18 than girls without any education (UNFPA, 2012, p. 34). Some parents take their daughters out of school in order to prepare them for marriage and future family life. This denies them their right to education as well as the chance to socialize with other people of the same age. As a result, they typically do not manage to fully develop their personalities and their life options are reduced (UNICEF, 2001, p. 12). Even if parents do not force their daughters to leave school, marrying early makes their opportunities to study further strongly limited because of family liabilities (Greene, Malhotra and Mathur, 2003, p. 10). Given all the above, the causality direction between education and early marriage is difficult to decide.

In Mali, compulsory education[20] starts officially at the age of seven and lasts nine years (UNESCO Institute for Statistics, 2012, p. 96). Malian government endeavours to improve situation in the area of education and to reduce a still significant gap between young boys and girls. For example, the law eliminating prohibition of girls' school attendance in case of pregnancy was enacted. Even though universal education is supported by the government[21] and progress has been recorded in the last years, the number of children in schools remains low. Boys dominate at all levels of education, especially at higher ones, and young Malian girls are also more likely to drop out of school than boys (CEDAW, 2004).

Figure 2.8: Youth and adult literacy rates by sex, Mali and Sierra Leone, 2010

(a) Mali (b) Sierra Leone
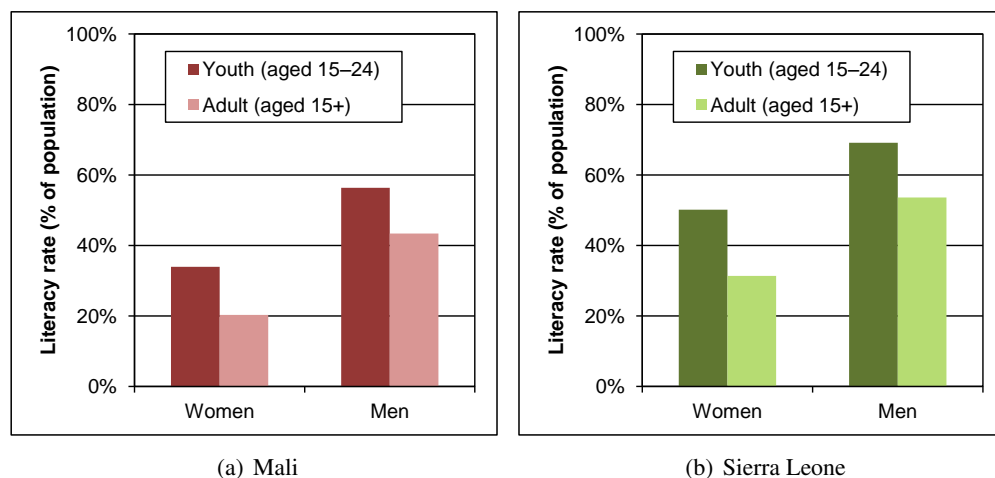
Source: UNESCO Institute for Statistics, 2012, p. 165, author's adjustment

The educational system in Sierra Leone is characterized by shorter public compulsory education starting at the age of six and taking only six years (UNESCO Institute for Statistics, 2012, p. 62). Historically, girls' access to education has been limited, particularly in rural areas. Because of prevailing norms and economic constraints many families prefer to put boys in schools rather than girls. Moreover, remote locations of schools represent another problem affecting more girls

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[20]It is defined as 'children's legal obligation to attend school' (UNESCO Institute for Statistics, 2012, p. 62).

[21]In fact, the total public expenditure on education as percentage of the total government expenditure was 22 % in 2010 (UNESCO Institute for Statistics, 2012, p. 160).

than boys. The educational sector was severely damaged during the civil war and a lot of schools were destroyed or devastated in this period (CEDAW, 2006). Equal access to education remains an important target of Sierra Leonean government that spent 18 % of total expenditure on education in 2009 (UNESCO Institute for Statistics, 2012, p. 160).

One possibility how the efficiency of educational system and gender disparities in both countries can be measured is to compare the literacy rates[22] (see Fig. 2.8). It is evident that females are less literate than males in youth as well as in adult group. However, the literacy rates are significantly higher among young males and females, which indicates progress in this area. When comparing the countries with each other, larger proportion of population (regardless of sex) acquires basic reading and writing skills in Sierra Leone than in Mali. Unfortunately, the literacy rates remain still relatively low among women in both countries, which consequently disadvantages them in the labour market and in the public area (CEDAW, 2004; CEDAW, 2006).

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[22]The literacy rate is defined as 'the total number of literate persons who are able to read and write, with understanding, a simple statement related to their daily life in a given age group, expressed as a percentage of the total population in that age group' (UNESCO Institute for Statistics, 2012, p. 67).

Chapter 3

Theoretical Framework

'A key factor is poverty, with the marriage of children seen as strategy for economic survival.'

Stephen H. Umemoto, Former Director of UNICEF Innocenti Research Centre

(UNICEF, 2001, p. 1)

As already mentioned in the previous chapter, poverty has been perpetually widespread and acute in both countries under study, affecting more than three quarters of the population. Daily life under tough economic conditions together with low level of development may increase the importance of economic incentives underpinning early female marriage. In this context, the practice of marrying off a girl early is often perceived as 'a family strategy for economic survival' (UNICEF, 2001, p. 6, Greene, Malhotra and Mathur, 2003, p. 6).

Parental expectations and attitude towards their daughters represent important factors in the decision-making process about marriage timing. According to the legislation in Mali and Sierra Leone, consents of both spouses as well as girl's parents are usually required in order to celebrate early marriages officially. Nevertheless, it is argued that the lack of a free, prior and informed consent can be found in each marriage of spouses younger than 18 years simply because children are too young to make such decisions and understand fully their implications. Furthermore, most of these unions are frequently arranged by a third party in reality, especially by parents (CEDAW, 2004; CEDAW, 2006), and in some cases girls even feel social and emotional pressure from them (UNFPA, 2012). Thus, this study does not focus only on young girls, but predominantly on the motivation of their parents and whether and how it can vary with increasing sibship size.

While analysing economic incentives, both the demand and the supply side[23] of marriage market should be taken into consideration. However, this study is narrowly restricted to the girls' natal household characteristics mainly with regard to the number of siblings and their age structure. Therefore, the supply side factors are discussed assuming that the demand side of marriage market

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[23]The demand side stands for reasons why men prefer younger brides while the supply side represents household's reasons for marrying off daughters early (Jensen and Thornton, 2003).

exists. In fact, this assumption seems to be realistic since no early marriage could be conducted without the presence of men who would want to marry a young bride, even if all families were willing to marry off their daughters during or before adolescence (Jensen and Thornton, 2003).

In general, interest in the impact of sibship size and sibling structure on future life chances has risen among many researchers from across disciplines. It was documented that a variety of child's outcomes differed depending on the number of siblings he or she had been growing up with, including, for instance, health outcomes (Garg and Morduch, 1998), educational attainment (Butcher and Case, 1994) or child labour participation (Edmonds, 2005). Unfortunately, literature on the relationship between the number of siblings and timing of marriage remains scarce. Jain and Kurz (2007) included number of siblings among possible explanatory variables in their empirical study on protective and risk factors concerning female child marriage in 19 hotspot countries. However, the results appeared to be mostly statistically insignificant across these countries with the only exception of Mali, and so authors did not focus on this issue any further.

In this chapter, we firstly describe how the presence of marriage transactions, especially bride price, in marriage market can influence decisions concerning marriage as well as the position of a woman in a family. As next, we provide typical economic framework in which siblings compete for parents' resources that are strongly limited due to poverty they live in. We focus specifically on Becker's quantity-quality model in order to illustrate how an increasing number of children (i.e. an increasing number of daughter's siblings) affects the intra-household allocation of resources. In the last section, we concentrate on sibling age structure and on the way how a daughter's birth order may influence the probability of her getting married or entering in union before 18th birthday.

3.1 Marriage Transactions in the Marriage Market

In many traditional societies, a wedding celebration is often associated with marriage transactions that involve transfers of property between participating sides. Their direction can vary strongly across cultures, and they can even take place in both directions simultaneously. In general, two main categories are recognized: bride wealth and dowry. Typically, bride wealth represents a transfer made by the groom or his family in favour of the bride's side. In the dowry system, it is the bride's family who pays to either the bride or to her perspective husband. While the practice of dowry is observed less frequently and mainly in South Asia, the bride wealth is more common with the highest prevalence in Africa (Anderson, 2007).

The following sections discuss only bride wealth payments since they occur traditionally in Mali as well as in Sierra Leone (CEDAW, 2004; CEDAW, 2006) and so they may have an important effect on household decision-making process about marriage timing. However, a detailed analysis of the reasons for their existence in the marriage market is beyond the scope of this text and so only general patterns are highlighted below in order to gain some insight.

3.1.1 Practice of Bride Wealth Payments in Mali and Sierra Leone

In Mali and Sierra Leone the practice of bride wealth is rather known as 'bride price' because it is often perceived as a purchasing price of a woman. This fact has severe implications for woman's status within the household. Indeed, woman's decision-making power may be reduced and husband is more likely to take an absolute control over his wife (Jensen and Thornton, 2003). If divorce is caused by woman's fault, husband may request to obtain bride price payments back (CEDAW, 2004; CEDAW, 2006). Thus, women are frequently regarded as an exchangeable commodity and it is believed that groom is purchasing girl's reproductive and productive abilities through the marriage by paying to her family (Amin and Bajracharya, 2011, p. 2).

In this context, marrying a young girl as soon as possible seems to be the best option for a man in countries with high fertility and child mortality levels, as in Mali and in Sierra Leone (see the section 2.2). Early marriage allows him to control a larger part of or even the whole girl's reproductive period and so one can expect that the demand for young brides not only exists, but that it is also high in both observed countries. In such case, parents who postpone daughter's marriage may receive less in bride price as their daughters may become less marriageable with increasing age since younger brides are generally preferred in marriage market (Jensen and Thornton, 2003).

The form of a marriage transaction is not strictly determined and so different kinds of financial as well as non-financial payments can be made, including money, cattle, goods or services. For example, a future husband of a Sierra Leonean girl aged 10–15 years old is obliged to offer free labour to her natal household as a part of demanded bride price before marriage can be conducted. The cost of this labour must be repaid by parents if their daughter finally refuses to marry the chosen husband when the time comes. However, parents are often too poor to afford such high expenses and so they rather force the girl to get married (Inter-African Committee on Traditional Practices Affecting the Health of Women and Children, 1984 cited in Forum on Marriage and the Rights of Women and Girls, 2000, p. 12).

3.2 Economic Reasons Underlying Early Female Marriage

From the economic perspective, early female marriage provides an effective way how to shift responsibility for a girl from her natal household to the family of her husband. As a result of widespread poverty in both countries under study, the presence of a girl in a family is mostly perceived as an economic burden which has to be relieved through marriage as soon as possible (Greene, Malhotra and Mathur, 2003). Moreover, earnings gained by means of bride price form an important improvement of family income, and therefore constitute other economic incentives for parents (Jensen and Thornton, 2003).

In the most basic neoclassical theory, parents invest in human capital (e.g. education) of their children up to the point in which the marginal cost equals the expected marginal return (Morduch, 2000, p. 405). In perfect marriage market, parents should be motivated to invest in girls similarly as in boys since the bride price should compensate fully parent's investment in their daughters.

However, in practice, the bride price evaluates the economic value of a girl only imperfectly, hence, parents are generally discouraged from investing in other girl's life options (such as education) as well as from delaying her marriage. While married sons are expected to stay in the natal family and to take care of their parents, married daughters traditionally leave the household to live with their husbands (Greene, Malhotra and Mathur, 2003). Thus, all the incurred investment in sons seems to be more rational in the eyes of parents because the investment in daughters is more likely to be reaped by her husband's family than by them someday in the future (Garg and Morduch, 1998, p. 473). As shown above, the typical economic treatment based on human capital investment and resource allocation can be employed in order to investigate the household decision-making process about marriage timing.

3.2.1 Sibship Size and Intra-Household Resource Allocation

The role of demographic composition of a family is emphasized in various human-capital investment theories explaining why siblings' outcomes may differ so significantly. In the concept of the 'dilution of the resources', resources available to each individual child decrease with an increasing number of children in the family. As a result, children with no siblings are raised with more generous resources available to them. This does not involve only material resources, but also non-material ones, such as for example the time parents devote to raising children (Blake, 1989, pp. 10-14).

By marrying off a girl early, a family can reduce costs of rearing children since it lowers the number of persons dependent on the provision of food, clothes etc. Similar implications as Blake's theory of resource dilution are offered by the concept developed by Gary Stanley Becker, the winner of the 1992 Nobel Prize in Economics. His name and research are related to the foundation of family economics as a field of study. He applies quantitative economic methods to the study of human behaviour in other aspects of life outside the market, such as racial discrimination, family organization or drug addiction. He assumes that human life decisions are governed by the same motives as their behaviour in the market and so the same theoretical approach based on rationality and cost-benefit analysis[24] can be employed in these areas likewise (Holman, 2005, pp. 440, 444).

Most of Becker's insights on fertility, marriage, and divorce are summarized in his book *A Treatise on the Family* (1991), including the fundamental model of household decision-making process concerning the number of children and subsequent resource allocation within the household. Becker has analysed the demand for children and parental investments continuously, also in cooperation with other authors, and has extended the model several times. However, only the persisting core concept is provided here.

According to Becker, the decision-making process within household is characterized primarily as a trade-off between quality and quantity of children. The altruism of parents[25] explains that

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[24]considering not only financial costs and benefits but also non-financial ones (such as time costs, the joy of having children,...)

[25]Moreover, according to Becker's 'rotten kid theorem', all members of the family contribute to the maximization of the family wealth disregarding the impact on their own income (Becker, 1991).

parents care about the welfare of the whole family since their utility is assumed to rise when their children are better off. Caring about their as well as children's welfare, parents are motivated to allocate resources in such a way that no alternative one would improve the welfare of any family member without reducing the welfare of others. As next, Becker presumes that the decisions of a family are limited by the budget constraint.[26]

This model presumes that it is not possible to hold quality of children when quantity is increasing under the budget constraint. The rising size of the family has a negative impact on all children because limited resources have to be divided among a higher number of family members. From this point of view, a decreasing change in the quantity of children, such as marrying a girl out of household, reduces the overall cost of raising the quality of children. Due to this negative trade-off between quantity and quality of children, siblings are perceived as rivals for parents' limited resources even though this rivalry may not be apparent (Becker and Thomes, 1976; Becker, 1991).

Moreover, the bride price, either in its financial or natural form, is usually paid to girl's parents and so it becomes a part of parents' own income (Anderson, 2007, p. 158). Becker and Tomes (1976) claim that an increase in income has a positive effect on household expenditure on quality of children, more significantly at lower incomes. Thus, early marriage is not perceived only as a relief of parental responsibility towards girls, but in fact, it relieves the whole family and allows parents to increase expenditure on each other household member.[27]

Given all the above, marrying off a girl early represents an effective way how to reduce the number of family members, especially if the budget constraint is tight. Moreover, some parents argue that marriage is often conducted in the best interest of a girl because it is the quickest way for her into a financially more stable household. These economic pressures are generally increased during periods of political or financial instability. Not only wars and civil conflicts but also hunger crises belong to main drivers of early female marriage. As the household is frequently dependent on agricultural sector for livelihood, food shortage may force parents to use the marriage of daughters as a family survival strategy (Jensen and Thornton, 2003, p. 17).

3.2.2   Daughter's Birth Order in the Family and Sibling Age Structure

Based on the concept of sibling rivalry discussed above, one can expect that under the budget constraint assumption, increasing number of daughter's siblings should lead to higher probability of her getting married or entering in union before her 18th birthday. The rise in probability should be greater for low-income families, where competition for resources escalates more rapidly with increasing sibship size. However, there are also other factors that may play a role in decision-making process about marriage timing including daughter's birth order and sibling age structure which is examined below.

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[26]If no time and credit constraints existed, parents would invest in human capital of their children based on the cost of borrowing and expected returns (Garg and Morduch, 1998, p. 474).

[27]From this point of view, obtained bride price for a girl can be, for example, transferred to her brother in order to provide him with enough funds to secure his own wife (Children Concern Organization, 2000 cited in Forum on Marriage and the Rights of Women and Girls, 2000, p. 12).

In reality the cost of raising children can be reduced not only by parents but also by children themselves. For instance, some of them can bring additional income to the family through participation in labour market, others can be engaged in household chores. In general, earlier-born children may be forced to work since they are typically more productive than their younger siblings due to their superior innate abilities (Emerson and Souza, 2008). This fact has two main implications for girls concerning their value and position within the household.

Firstly, if a girl has younger siblings, she is more likely to work during her childhood. Using data from Nepal, Edmonds (2005) proved that the probability of working was higher among girls with younger siblings regardless of their sex. In this particular case, the presence of a girl in the household may be appreciated since she contributes to family income and thus she is not seen as an economic burden any more. However, one can argue that labour market exhibits discrimination against women since they are usually engaged in low-income positions (CEDAW, 2004; CEDAW, 2006). Thus, the possibility of earning cash income is strongly limited for girls. However, paid jobs are not the only chance for a girl to increase her importance within the household. Edmonds (2005) claims that most girls are engaged in household chores or assist at family farms. Moreover, families can profit from their comparative advantage in taking care of younger siblings (Garg and Morduch, 1998, p. 477). In this case, the presence of a girl is important mainly for the mother since she benefits from her assistance, and consequently she may manage to persuade the girl's father to delay the marriage of this daughter. However, the legislation in neither country considers mother's opinion about marriage important and if parents disagree, father is the one who decides (see the section 2.3).

Secondly, based on findings of Emerson and Souza (2008), it is possible that if a girl has many older siblings, she might profit from their additional work that leads to the expansion of resources available to the whole family. Consequently, the need to marry her off early may be less acute. However, if the overall contribution of working family members is not high enough to provide each member with the necessary resources, the girl may be married out anyway.

To make the matter more complicated, Vogl (2012) argues that if arranged marriages are widespread, the typical economic approach fails to capture all forms of sibling rivalry. Based on his empirical evidence from South Asia,[28] girls are more likely to get married earlier if they have any younger brothers or sisters. He explains this finding by the fact that parents tend to time the marriage of their children in the order of birth.

Overall, the relationship between early female marriage and age composition of siblings appears to be a complicated question and its interpretation differs significantly among authors. The relevance of various hypotheses concerning the decision-making process about marriage timing remains mainly an issue of empirical testing.

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[28] He also proved that similar results could be observed in other countries, even in those where the practice of bride wealth was more common than dowry.

Chapter 4

Data and Methodology

In the previous chapter, we showed that the number of siblings and their age structure may be reflected in household decision-making process about marriage timing in many, sometimes contradictory, ways. Thus, the impact of having siblings on early female marriage is assessed by means of empirical testing in the following part of the study. In order to perform an empirical analysis, we examine data from the latest available standard Demographic and Health Surveys (DHS) conducted in two West African countries, Mali and Sierra Leone, in the framework of the MEASURE Demographic and Health Surveys Project.

Firstly, we introduce this project and describe the data acquisition process. As next, we briefly explain the approach to empirical testing, including description of data cleaning and of regression variables. In the last section of this chapter, we discuss the use of the logistic regression model, not only on a theoretical level, but also in the case we examine.

4.1 Demographic and Health Surveys and Data Sample

The MEASURE Demographic and Health Surveys Project is primarily designed to monitor and evaluate health and population trends in less-developed countries. Since its foundation as an extension of World Fertility Surveys and Contraceptive Prevalence Surveys in 1984 (Rojas and Rutstein, 2006, p. 1), it has collected reliable data for more than 85 countries[29] and more surveys are planned for the future. The project is realized by ICF International, commonly in cooperation with national government institutions in countries examined, including local ministries or statistical offices. Most financial resources are rendered by USAID, nevertheless, also other international organizations, such as UNICEF, WHO or UNFPA, belong to important co-sponsors of this project (MEASURE DHS, 2013).

Standard DHS is a nationally representative household survey which is usually repeated every five years in order to track the latest development of demographic and health indicators in each

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[29]for more information and current details see: http://www.measuredhs.com/What-We-Do/Survey-Search.cfm

country (MEASURE DHS, 2013). However, in this study we do not focus on changes in the observations over time, but we compare the situation in the countries under study at the point when the latest standard surveys were performed. Cross-sectional data are acquired through uniformly standardized questionnaires, which facilitates direct comparison of data collected across countries, even if surveys are targeted to country's specific problems or conducted at different times (MEASURE DHS, 2013). All datasets are available on request for scientific purposes on the MEASURE DHS website.[30]

In the case of Sierra Leone, the DHS from 2008 has been the only study of this kind up until now, and thus, it is the only one available for the analysis. In Mali, four standard DHS have been conducted since 1987 and another one is currently in progress (MEASURE DHS, 2013). For the purpose of this study, we selected the survey from 2006 because it was performed only two years earlier than the survey in Sierra Leone, and so it appears to be the most suitable one for comparison. In both these DHS several types of questionnaires were utilized but we investigate only the individual Women's Questionnaire which collects data on women in reproductive age[31] (MEASURE DHS and ICF International, 2012). Overall, the total sample of interviewed eligible women consists of 14,583 observations in Mali and 7,374 observations in Sierra Leone.

Similarly, as in the research of Jain and Kurz (2007), we restricted the total sample only to women aged 20–24. In this age group, we can observe the full-extent of early female marriage and retrospectively examine possible risks and protective factors, including the number of siblings. Overall, this restricted sample contains various information about 2,673 women in Mali and 1,195 women in Sierra Leone.

As mentioned in the second chapter of this study, choosing the age group 15–19 could lead to discrepancies, as it mixes early married women and women married after their 18th birthday with women who remain single (and thus still at risk of getting married early) at the time of the survey interview. This fact would make the analysis far more complicated. Another possibility would be to select the age group 20–49, but it would not reflect the latest trends in early female marriage as women married early more than 30 years ago would be included in such a sample.

4.2 Description of Variables Used in the Empirical Analysis

For the purpose of empirical testing, we create a binary dependent variable, referred to as *Union*, that may take only two values: zero or one. In the case that a woman declared that she had been married off or entered in union before her 18th birthday, the value equals one, otherwise zero. That means that it takes zero either if she got married at the age of 18 and later or if she remained single when the survey was in progress. Unlike Jain and Kurz in their study (2007), we decided to include the group of not yet married women because we believe that the delay of daughter's marriage as well as the decision not to marry her off at all may be driven by the same incentives as

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[30]see http://www.measuredhs.com/

[31]i.g. aged 15–49

those discussed in the previous chapter. Even if these girls get married or enter in union someday in the future,[32] it would be no longer possible, given their age, to conduct the marriage before their 18th birthday.

Table 4.1: List of explanatory variables used in the empirical analysis

Explanatory variable	Brief description
Education	number of completed years of education
Total_siblings	total number of siblings (excluding a respondent)
Younger	number of younger siblings
First_born	equals 1 if the woman declared to be first-born, 0 otherwise
Islam	equals 1 if the woman declared to be Muslim, 0 otherwise
Poorest, Poorer, Middle, Richer, Richest	set of five variables which divide society into five quintiles based on wealth; the poorest quintile selected as the reference group
Bamako, Gao, Kayes, Kidal, Koulikoro, Mopti, Tombouctou, Segou, Sikasso	set of nine variables which represent nine Malian regions; region Kayes selected as the reference group
Eastern, Northern, Southern, Western	set of four variables which represent Sierra Leonean regions; Eastern Area selected as the reference group

Note: Dummy coding (i.g. 0 or 1) is used for variables representing wealth quintiles and regions.

Source: author's adjustment

Closely examining the explanatory variables[33] summarized in Tab. 4.1, we can notice that qualitative, as well as quantitative ones, are involved in the analysis. Unfortunately, some observations have to be deleted because of inconsistency in the respondents' answers or missing values which would be needed to specify the full set of explanatory variables. As a result of such inconsistent responses on regions, 35 women in Mali and 11 women in Sierra Leone were removed from the dataset. Furthermore, nine women in Mali and two women in Sierra Leone were excluded due to missing values on education. As next, 17 women in Mali and four women in Sierra Leone did not declare their religious belief consistently, and thus cannot be involved in the analysis either. Concerning the age composition of siblings, the data in Mali are complete, whereas five women in Sierra Leone had to be excluded due to faulty entries as they declared to have more younger siblings than siblings in total.

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[32] It is likely that they will do so because marriage is almost universal in both countries. This fact is declared also by DHS which find out that the proportion of never married women aged 45–49 in Mali and Sierra Leone equals only 0.1 % and 1.3 %, respectively (CPS/DNSI et MI, 2007, p. 81; SSL and ICF Macro, 2009, p. 84).

[33] The selection of other explanatory variables is based mainly on previous studies investigating early female marriage (Jensen and Thornton, 2003; UNICEF, 2005; Jain and Kurz, 2007).

4.3 Logistic Regression Model

In accordance with the previous text, we want to estimate the impact of having siblings on the probability of a girl getting married or entering in union before her 18th birthday. We specify a regression model for this purpose because it allows us to control for other relevant explanatory variables. In this and the following sections we presume that readers are familiar with basic statistical and mathematical instruments.

The choice of a suitable regression model is limited by the binary character of the dependent variable mentioned in the previous section. One possibility is to use the linear probability model which, however, has some disadvantages. Probably the most important drawback is the fact that predicted probabilities can take values lower than zero and greater than one (Wooldridge, 2009, p. 575).[34] In order to overcome this inconvenience, we decide to use the binary logistic (logit) regression model.

Based on Wooldridge (2009, p. 575), the following model is defined to estimate the probability that early female marriage occurs conditioned on the set of k explanatory variables denoted as $x_1, ..., x_k$:

$$P(Union = 1 \mid x) = G(\beta_0 + \beta_1 x_1 + ... + \beta_k x_k) = G(\beta_0 + x\beta) \tag{4.1}$$

where G is a function taking values strictly between zero and one, i.g. $0 < G(z) < 1$ for all real numbers z. Thus, predicted probabilities of dependent variable are guaranteed to be between these two values. In the logit model, G is selected to be the logistic function:

$$G(z) = \frac{exp(z)}{1 + exp(z)} \tag{4.2}$$

As Wooldridge (2009) points out, the nature of the logit model is nonlinear, and so the maximum likelihood estimation (MLE) has to be used instead of the ordinary least squares (OLS) method. Moreover, the logistic function makes interpretation of regression coefficients $\beta_1, ..., \beta_k$ more difficult. If we change one explanatory variable in the logistic regression, the slope coefficients can be interpreted only as the rate of change in the 'log odds'.[35] However, this interpretation is not very intuitive as we want to estimate how much the probability, that early female marriage occurs, changes typically with a one-unit change in focal explanatory variable, holding other explanatory variables at a fixed level.

In order to estimate the marginal effect of continuous variables, partial derivative of the logistic function can be calculated. Nevertheless, the marginal effect of changing discrete explanatory variables, such as education or the total number of siblings, can be obtained more simply. Let x_k be a discrete explanatory variable. The magnitude of its effect on the probability if x_k changes

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[34]Moreover, the partial effect of any explanatory variable is assumed to be constant in the linear probability regression model (Wooldridge, 2009, p. 575).

[35]Log odds is the natural logarithm of the fraction in which the probability that event occurs is divided by the probability that event does not occur.

from c_k to $c_k + 1$[36] can be measured as the following difference (Wooldridge, 2009, p. 577):

$$G\left[\beta_0 + \beta_1 x_1 + \beta_2 x_2 + ... + \beta_k(c_k + 1)\right] - G\left[\beta_0 + \beta_1 + \beta_2 x_2 + ... + \beta_k c_k\right] \tag{4.3}$$

Even though we are usually interested in the above-mentioned magnitude of the effects of each x_j for $j \in \{1, ..., k\}$ on the probability of the binary dependant variable, the coefficients themselves provide information on the direction of marginal effects which can be used as well. Thus, knowing the sign[37] of β_j is sufficient to decide whether x_j has a positive or negative effect on the probability of the binary dependent variable, holding all other explanatory variables fixed (Wooldridge, 2009, p. 577).

As we can see, the marginal effect of each explanatory variable depends on values of other explanatory variables. We provide the results from the regression model as average marginal effects (AMEs) which are calculated as a marginal effect of one explanatory variable across each observation in the sample and consequently all these effects are averaged (Baum, 2006, p. 251). This means that we vary only the focal variable when computing its marginal effect, holding all other variables fixed at their sample values. These estimates can be interpreted as the average change in the probability, that early female marriage occurs, evoked by a one-unit change in the selected explanatory variable. For variables representing regions or wealth quintiles average marginal effects show the average difference in predicted probabilities in one group relative to the reference group (see again Tab. 4.1).

Table 4.2: Summary of three logistic regression models used in the empirical analysis

Type of variable	Logistic regression model		
	First	Second	Third
Dependent variable:	*Union*	*Union*	*Union*
Explanatory variables:	*Education*	*Education*	*Education*
	Islam	*Islam*	*Islam*
	wealth quintiles	wealth quintiles	wealth quintiles
	corresponding regions	corresponding regions	corresponding regions
	Total_siblings	*Total_siblings*	*Total_siblings*
	—	*First_born*	—
	—	—	*Younger*

Note: Reference group is excluded for variables representing wealth quintiles and regions.

Source: author's adjustment

Overall, three logistic regression models are specified in order to test the hypotheses (see Tab. 4.2). We include explanatory variables representing education, Islam, wealth and corresponding regions in all these models and variables related to sibling composition are used in dependence

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[36]It makes no sense to calculate how $P(Union = 1 \mid x)$ would change if a discrete variable changed, for example, from 1 to 1.7, as it can never happen.

[37]The logistic function is positive and strictly increasing and so its partial derivative as well as the difference in 4.3 must be positive too (Wooldridge, 2009, p. 577).

on the particular model. The first model is used to investigate whether increasing total number of siblings affects the probability of a girl getting married or entering in union before her 18th birthday, regardless of sibling age structure or girl's birth order. Thus, the explanatory variable *Total_siblings* is involved in this model. In the second model, we examine whether first-born girls are at a higher or lower risk of early female marriage compared with girls with at least one older sibling. For this purpose, we add a dummy variable *First-born* to the first model. This approach allows us to hold the total number of siblings at a fixed level while estimating the impact of being first-born. In the third model, we add the explanatory variable *Younger* to the first model in order to test the effect of exchanging one older sibling for a younger one on the probability of a girl getting married or entering in union before her 18th birthday, holding the total number of siblings at a fixed level again. However, we have to exclude women without any siblings and also women with only younger siblings from this model. The reason is that if we gave them (theoretically) one additional younger sibling, it would necessarily lead to an increase in the total number of siblings as well, which violates the assumption of holding the total number of siblings fixed.

Chapter 5

Empirical Analysis

The impact of having siblings on early female marriage is assessed by means of empirical testing in this chapter and results obtained are compared with the theoretical framework. As already mentioned in the foregoing parts of the study, we selected two West African countries, Mali and Sierra Leone, with comparable background characteristics. Besides the fact that they are both located in the same region within Africa, similarities can be observed in many aspects of life, including demographic behaviour, gender stereotypes as well as recent economic development (for more details see the second chapter of this study). Therefore, we expect that the parental decision about their daughter's marriage might be affected by analogous factors.

Firstly, we provide descriptive statistics of the samples in order to get a better understanding of the datasets used for the analysis. As next, we attempt to answer the hypotheses set in previous parts of this study, investigating results derived from the logistic regression models for both countries. The logistic regression models are estimated using the statistical software Stata 11. Not only do we investigate whether the probability of a girl getting married or entering in union changes if the total number of siblings increases, but we also examine the impact of sibling age structure and the girl's birth order in more detail.

We also discuss some limitations of regression models used which are caused by both the unavailability of certain information and the simplification of models themselves. Consequently, we provide some suggestions for future research which might serve as a good starting point for subsequent analyses in this area. The third section of this chapter is devoted to other results which we receive as by-products of the empirical testing of the impact of having siblings. As they are not our main object of interest, they are not thoroughly examined, but rather compared with results presented in previous papers.

## 5.1   Descriptive Statistics of the Samples

After excluding missing and faulty observations (see the previous chapter), the sample for Mali consists of 2,612 women aged 20–24 while the Sierra Leonean sample includes 1,173 women in

the same age group. In this section, we analyse the descriptive statistics of these two samples and compare them with the overall characteristics of each country provided in the second chapter.

Fig. 5.1 shows the proportion of early married women in comparison with the proportions of single women and women married after their 18th birthday. Although we merge the last two categories for the purpose of performing a regression analysis, we decided to examine them separately here because this approach allows us to observe some interesting differences between the samples. It is obvious that the prevalence of early female marriage is higher in Mali as almost 70 % women got married or entered in union early, compared with only 45 % women in Sierra Leone. In fact, the prevalence of early female marriage in both samples is slightly lower than the overall prevalence reported by MEASURE DHS (summarized in Tab. 2.1), which is the result of restrictions we made during data cleaning (for details see the section 4.2).

The percentage of women who got married or entered into union after their 18th birthday is similar in both countries under study representing more than one fifth of all women in each sample. The greatest difference can be noticed in the group of single women. While more than one third of Sierra Leonean women remained single at the time when the survey was conducted, the percentage of single women was only 7% in Mali. In the sample for Sierra Leone, the proportion of single women is even larger than the proportion of women married after the 18th birthday. Nevertheless, the motivation for delaying and not conducting the marriage are expected to be the same, and thus, merging the group of single women with the group of women married after 18th birthday should not cause any discrepancies in the regression analysis.

Figure 5.1: Percentage of women aged 20–24 by marriage timing, Mali and Sierra Leone
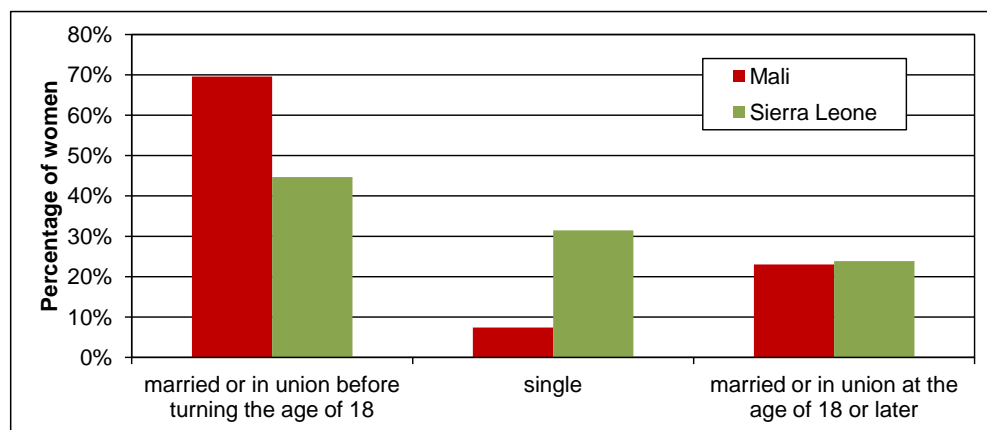
Source: MEASURE DHS Mali, 2006; MEASURE DHS Sierra Leone, 2008; author's calculations

Closely examining the age structure, we found out that the average age of women in both samples is very similar, equalling 21.69 in Mali and 21.64 in Sierra Leone. Moreover, the coefficient of variation of age is nearly identical in both cases, almost 7 %, which indicates that the variability around the mean value is nearly analogous. On the other hand, completed years of education differ considerably among respondents, ranging from 0 to 17 in Mali and to 18 in Sierra Leone. On average, a Malian woman aged 20–24 obtained only 1.81 years of education, while a Sierra

Leonean woman in the same age group remained at school almost twice longer.[38] Geographically, Mali covers much larger area than Sierra Leone, and so governmental efforts to improve education of young women might not be implemented as easily and effectively.[39] This fact is also confirmed by lower literacy rates in Mali than in Sierra Leone described in the second chapter of this study.

Table 5.1: Age at first marriage, ever married women aged 20–24, Mali and Sierra Leone

Country	Mean	Standard deviation	Mode	Min	Max
Mali	15.95	2.39	15	10	24
Sierra Leone	16.29	2.67	15	10	24

Note: We specify ever married sample as women who got married as well as those who entered in a cohabiting union.

Source: MEASURE DHS Mali, 2006; MEASURE DHS Sierra Leone, 2008; author's calculations

Looking more closely on ever married women aged 20–24 (see Tab. 5.1), we can observe that the average age at first marriage is 15.95 years in Mali and 16.29 years in Sierra Leone. Based on this fact, we can presume that women, on average, tend to marry or to enter in union earlier in Mali than in Sierra Leone, but the difference is rather small. On the other hand, the most frequently reported age at first marriage (mode) was the same in both countries equalling 15 years. Both the mode and average age have a greater statistical power in Mali because only 7 % of Malian women were single at the time when the survey was conducted. Even if these girls got married some day in the future, these two statistical values would not be likely to change significantly. The same cannot be said about Sierra Leone where, as already mentioned, more than one third of all women aged 20–24 were single at the time of survey.

Figure 5.2: Percentage of women aged 20–24 by wealth quintiles and by marriage timing, Mali and Sierra Leone
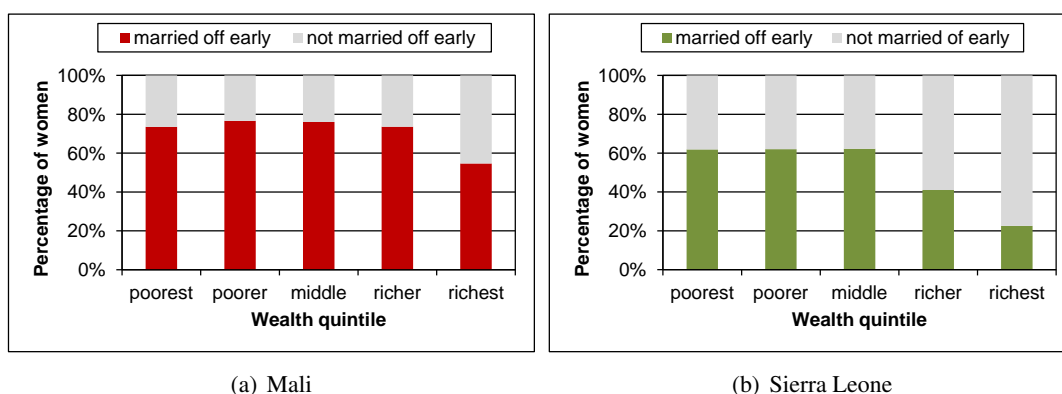
(a) Mali (b) Sierra Leone

Note: Being married off early refers to both getting married and entering in a union before 18th birthday.

Source: MEASURE DHS Mali, 2006; MEASURE DHS Sierra Leone, 2008; author's calculations

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[38] In Sierra Leone, women obtained, on average, 3.60 years of education.

[39] Although both countries spend almost the same percentage of governmental expenditures on education (see the section 2.4)

Having discussed the descriptive statistics of quantitative variables we can now proceed to the qualitative ones. First, we examine the prevalence of early female marriage in relation to wealth (see Fig. 5.3) because most authors (UNICEF, 2001; UNFPA, 2012) state that poverty is the key factor underpinning early female marriage. This fact is confirmed by our analysis as the lowest percentage of women married off early[40] is in the richest quintile in both countries. The prevalence of early female marriage stays relatively stable in all remaining quintiles with the exception of a slight drop in the second richest quintile in Sierra Leone.

Islam is by far the dominant religion in both countries under study, and so, for the purpose of the analysis, women are divided into two groups depending on whether they declared to be Muslims or not. In Mali, 64,2 % respondents claimed to be Muslims and to have been married off or in union early, while 27.8 % were Muslims who were not married off early (see Fig. 5.2). This means that the prevalence of early female marriage among Muslims amounts to nearly 70 % in Mali.[41] Interestingly, the trend among non-Muslims is similar since nearly two thirds of them were married off early.

Figure 5.3: Percentage of women aged 20–24 by declaration of being Muslim and by marriage timing, Mali and Sierra Leone

(a) Mali

(b) Sierra Leone

Note: Being married off early refers to both getting married and entering in a union before 18th birthday.

Source: MEASURE DHS Mali, 2006; MEASURE DHS Sierra Leone, 2008; author's calculations
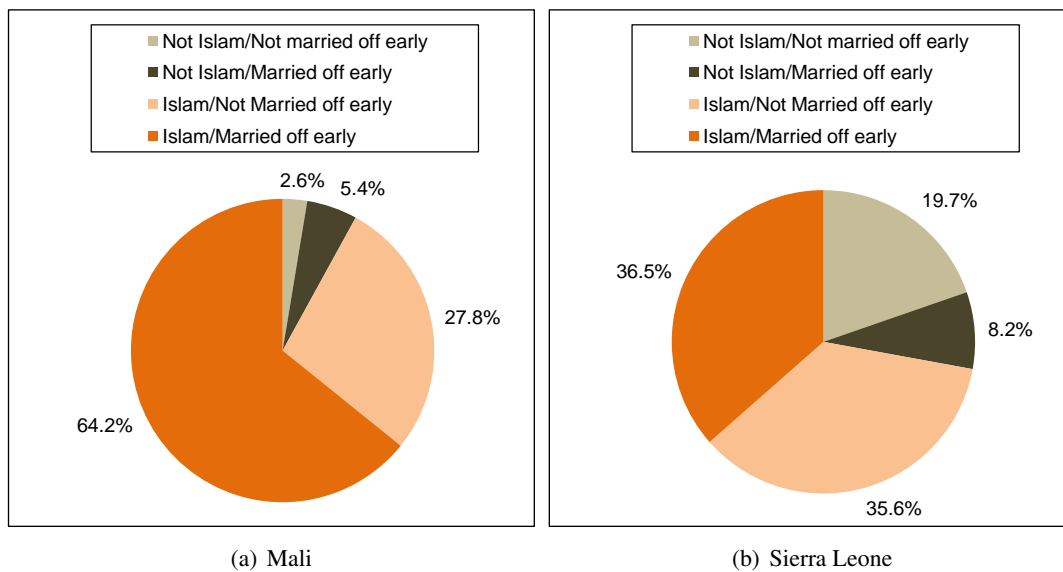
Islam is the most widespread religion also in Sierra Leone, but a relatively high share of population professes Christianity, which makes it the second most important religion in the country (SSL and ICF Macro, 2009). In Fig. 5.2, Christians are included together with other religions in

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[40]We have to keep in mind that being married off early refers to both getting married and entering in a cohabiting union before 18th birthday in this study.

[41]Overall, 92 % of all respondents claimed to be Muslims in Mali. To obtain the mentioned 70 % we can divide the percentage of early married women by the overall percentage of Muslims.

the group of non-Muslims that represents almost 28 % of all respondents. As we can see, every other Muslim weds or enters in union before her 18th birthday. On the other hand, only 3 out of 10 women declaring a different religious belief are affected by this traditional practice.

Finally, in both samples, regional differentiation of early female marriage is evident (see Fig. 5.4). The lowest percentage of women married before their 18th birthday can be observed in regions where capital cities are located, Bamako region in Mali and Western region in Sierra Leone. This corresponds with the results for the whole countries published by DHS and presented in the second chapter of this study. The highest prevalence of early female marriage can be noted in Kayes region in Mali and Northern region in Sierra Leone.

Figure 5.4: Percentage of women aged 20–24 married off early by regions, Mali and Sierra Leone
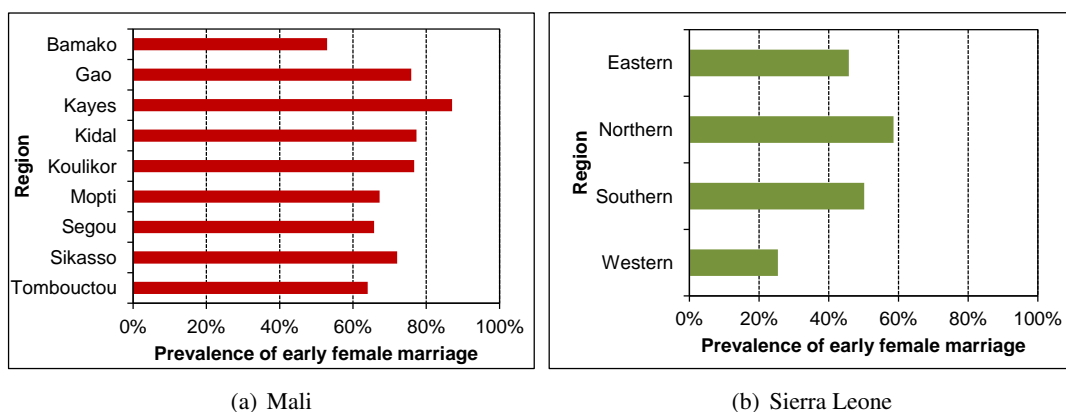
(a) Mali   (b) Sierra Leone

Note: Being married off early refers to both getting married and entering in a union before 18th birthday.

Source: MEASURE DHS Mali, 2006; MEASURE DHS Sierra Leone, 2008; author's calculations

5.2 The Impact of Having Siblings on Early Female Marriage

Before proceeding to the results of the regression analysis, we firstly compare the average sibship size in the countries under study. On average, a Malian woman aged 20–24 has 6.02 siblings while Sierra Leonean one in the same age group has 'only' 4.31 siblings. This difference confirms the current trends described in the section on demographic indicators and it also shows that fertility remains on a high level in both countries.

As mentioned in the previous chapter, we specify three logistic regression models (for results see Appendix) in order to investigate impact of having siblings on early female marriage. Overall, all estimated models appear to be jointly significant.[42] While interpreting the results, we have to keep in mind that the average marginal effect of changing one focal variable on the response probability[43] is estimated holding all other explanatory variables fixed at their sample values.

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[42] We can reject the null hypothesis which presumes that all regression coefficients are equal zero on the 1% level of significance.

[43] i.g. on the probability that early female marriage occurs

It is also necessary to mention that the models do not control for some explanatory variables that might be important for the decision making process about marriage timing, such as the education of mother and father. Adding these factors into the model could considerably improve its statistical power and provide better understanding of this process. However, these data are not included in DHS for Mali and Sierra Leone in years we consider, and so they cannot be used for the analysis. Other limitations of our analysis will be discussed in the following subsections.

5.2.1   The Impact of Sibship Size

First off all, we estimate the impact of sibship size regardless of sibling age structure or girl's birth order. For this purpose we specify the first model in which we include explanatory variables representing education, Islam, wealth, corresponding regions and the total number of siblings (for details see the section 4.3). According to the results of the regression analysis (see Tab. 5.2), we failed to prove that a one-unit change in the total number of siblings (regardless of their age structure or girl's birth order) has a significant effect on the probability of a girl getting married or entering in union before her 18th birthday, even on the 10% level of significance.[44]

Table 5.2: Estimated average marginal effect of sibship size (regardless of sibling age structure or girl's birth order), Mali and Sierra Leone

Focal explanatory variable	Country	
	Mali	Sierra Leone
Total_siblings	–0.0033	0.0029
	(0.315)	(0.547)

Note: P-value is indicated in the brackets. All results derived from the first model are summarized in Tab. A.1 in Appendix.

Source: MEASURE DHS Mali, 2006; MEASURE DHS Sierra Leone, 2008; author's calculations

Due to the statistical insignificance of our focal explanatory variable, we did not manage to prove or disprove that the motivation of families to marry off their daughters early changes when adding one additional child.[45] One possible explanation for this discrepancy is provided by Vogl (2012) who argues that in the presence of arranged marriage, economic motivations are not sufficient enough to explain the decision-making process about marriage timing completely. In fact, the results suggest that Malian and Sierra Leonean parents may rather consider other factors than the overall number of siblings, including sibling age structure and daughter's birth order. Moreover, traditions and customs may influence the parental decision as well, however, their impact is difficult to measure by statistical instruments.

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[44]We fail to reject the null hypothesis, that the effect is statistically different from zero even on the 10% level of significance.

[45]i.g. additional dependent family member who competes for limited resources

We can compare results obtained for Mali with the previous study of Jain and Kurz (2007).[46] While we included girls who were single at the time when the survey was conducted in our analysis, they concentrated solely on married women aged 20–24. Nevertheless, the percentage of single women equals only 7 % and so the results should remain relatively comparable from this point of view. On the other hand, we use data from DHS 2006 whereas Jain and Kurz (2007) used a five years older survey. This might be the reason why they found the total number of siblings to be a significant variable, while we did not reach the same conclusion.

When modelling parental decisions about their daughter's marriage, results derived from the model may be biased because parents may deliberately influence the number of children born to them. In other words, the Becker's quantity-quality model (1991) suggests that if parents want to marry off a daughter later, they may keep the total number of children small in order to ensure that they can provide enough resources to each member of the family. Therefore, more sophisticated methods should be used to estimate the effect of sibship size more precisely. These methods are beyond the scope of this particular study, but they should be included in a future full-scale analysis.

5.2.2   The Impact of Daughter's Birth Order and Sibling Age Structure

The effect of the total number of siblings described in the previous subsection appears to be statistically insignificant, suggesting that sibling age structure and a daughter's birth order may play an important role in household decision-making process about marriage timing in countries under study. Therefore, we investigate these effects in more detail in this section.

Table 5.3: Estimated average marginal effects of being first-born and of sibship size, Mali and Sierra Leone

Focal explanatory variable	Country	
	Mali	Sierra Leone
Total_siblings	–0.0050 (0.147)	0.0035 (0.518)
First-born	–0.0348 (0.116)	0.0071 (0.813)

Note: P-value is indicated in the brackets. All results derived from the second model are summarized in Tab. A.2 in Appendix.

Source: MEASURE DHS Mali, 2006; MEASURE DHS Sierra Leone, 2008; author's calculations

Firstly, we investigate the impact of being a first-born child on the probability of getting married early. We do so, because it captures both the effect of daughter's birth order and the effect of sibling age structure.[47] For this reason, we extend the model used previously (for details see section 4.3) by adding the dummy variable *First_born* that takes the value of 1 if a girl is first-born and 0 otherwise. Its estimated average marginal effect reveals to be insignificant in both countries

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[46] Jain and Kurz did not investigate the impact of having siblings on early female marriage in Sierra Leone because at the time of this study, no datasets were available for this country.

[47] being first-born means having no older siblings

under study, even on the 10% level of significance (see Tab. 5.3). Thus, we fail to prove that girls who declared to be first-born are at higher or lower risk of early female marriage than girls with at least one older sibling, holding the total number of siblings fixed.

Although we fail to prove the hypothesis outlined above, we can see that involving the variable *First_born* makes the average marginal effect of *Total_siblings* bigger and less insignificant.[48] Even though the impact of sibship size and being first-born on the probability of a girl getting married or entering in union before 18th birthday are still estimated to be insignificant on the 10% level of significance, we can observe that they become almost significant by adding the variable *First_born* in the model in the case of Mali. This result suggests that household decision-making process about marriage timing might be characterized by different factors in Sierra Leone than in Mali. Most of Sierra Leonean girls got married or entered in union early during the period of political instability, and thus parental decision may have been driven by incentives to protect girls against negative consequences of military conflict (Jensen and Thornton, 2003) rather than by sibling rivalry for limited resources. Thus, it is possible that Sierra Leonean parents considered daughter's birth order even less important than Malian parents. Moreover, girl's ability to increase her importance within the household through paid jobs or household chores is more limited in Sierra Leone as she can be simply replaced by a free labour offered by her perspective husband as a part of demanded bride price (see the subsection 3.1.1).

As next, we specify the third model for women aged 20–24 with at least one older sibling in order to investigate how the probability, that early female marriage occurs, changes with varying proportion of younger and older siblings, holding the total number of siblings at a fixed level again.[49] As we have already mentioned in the previous chapter, we have to exclude women without any siblings and also women with only younger siblings from the sample for this purpose.[50]

Table 5.4: Estimated average marginal effects of sibling age structure and sibship size, women aged 20–24 with at least one older sibling, Mali and Sierra Leone

Focal explanatory variable	Country	
	Mali	Sierra Leone
Total_siblings	–0.0042	0.0016
	(0.394)	(0.862)
Younger	–0.0042	–0.0171
	(0.403)	(0.868)

Note: P-value is indicated in the brackets. All results derived from the third model are summarized in Tab. A.3 in Appendix.

Source: MEASURE DHS Mali, 2006; MEASURE DHS Sierra Leone, 2008; author's calculations

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[48] In contrast with the first model, we control for being first-born when estimating the average marginal effect of a one-unit increase in the total number of siblings.

[49] In the third model, both the total number of siblings and number of younger siblings are included (for details see the section 4.3). Thus, the total number of siblings is fixed while estimating the average marginal effect of exchanging an older sibling for a younger one.

[50] Samples were restricted to 2,065 women aged 20–24 in Mali and 788 women in the same age group in Sierra Leone.

The average marginal effect of exchanging one older sibling for a younger one (regardless of their sex) is estimated to be insignificant, even on the 10% level of significance (see Tab. 5.4). Therefore we can conclude, based on our datasets and regression analysis conducted, that there is no evidence that exchanging one older sibling for a younger one affects the probability of a girl getting married or entering in union before her 18th birthday. Although there is no perfect multi-collinearity in the regression model, we should be aware of the fact that correlation between the total number of sibling a girl has and the number of younger siblings may exist. As mentioned in the section 2.3, societies are male-predominant in Mali and Sierra Leone and so sons may be preferred by families. Consequently, if a girl is born to a family, parents may tend to have at least one more additional child hoping for a son.

Even though our data suggest that factors other than girl's birth order or sibling age structure might be more important for household decision-making process about marriage timing, the role of being first-born, as well as having a younger or an older sibling, cannot be entirely dismissed. Butcher and Case (1994) argue that girls with only brothers are brought up differently than girls with at least one sister and so it would be interesting to investigate the impact of having siblings in dependence on their gender and marital status. Especially, the number of already married sisters could have considerable effects because they do not affect the budget constraints of the family any more. Furthermore, as the practice of sororate marriage[51] is relatively common in both countries (CEDAW, 2004; CEDAW, 2006), the more married sisters a girls has, the greater the risk she faces. Adding all these factors to the regression analysis might provide a clearer insight on this issue, but this is beyond the scope of this study due to the complexity of the model required.

5.3   Results Unrelated to Sibship Size and Sibling Age Structure

Now let us have a look at the results of other explanatory variables that are not directly related to the sibling structure (see again Tab.A.1, Appendix). As we have mentioned in the introduction to this chapter, they are not the main object of interest of this study, however, they may offer interesting insights on the early female marriage situation in both countries. Rather than discuss them thoroughly, we offer a comparison of our results with results stated in previous studies.

As in other studies (Jensen and Thornton, 2003; UNICEF, 2005; Jain and Kurz, 2007), the results suggest that education is one of the most significant protective factors against early female marriage. More specifically, the average marginal effect of one additional year of education is negative in both countries, even on the 1% level of significance. This makes it the most significant explanatory variable in our models. Finding the reason why the effect of education is higher in Sierra Leone than in Mali would require further research.

In accordance with descriptive statistics in the first section of this chapter, our results reveal that there is a different situation in Mali than in Sierra Leone concerning Islam. Although we

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[51]Sororate marriage refers to situations when a widower marries a (usually younger) sister of his wife automatically if his wife dies.

generally expected to obtain similar results in both countries, the influence of Islam was proven to be significant only in Sierra Leone. In this country, the average marginal effect of being Muslim, compared with non-Muslim, on the probability of a girl getting married or entering in union before her 18th birthday, is positive even on the 1% level of significance. On the contrary, being Muslim seems to be highly insignificant in Mali. These findings correspond with the results of Jain and Kurz (2007) who found that the practice of early female marriage was not connected with any specific religion.

Considering the influence of wealth quintiles and regions we must take into account that, even though these explanatory variables are not multicollinear, they may co-vary (Jain and Kurz, 2007). In fact, regional differentiation may capture the effect of wealth, and vice versa. While wealth quintiles appear to be significant and regions insignificant in Sierra Leone, the situation in Mali is the exact opposite. The average marginal effect of being in the first two wealthiest quintiles in Sierra Leone, compared with being in the poorest one, is negative at least on the 10% level of significance. In Mali, living in the region Kayes, which is selected as the reference group, proves to be related to a higher risk of early female marriage compared with other Malian regions, at least on the 10% level of significance.

Chapter 6

Conclusion

Even though early female marriage is internationally recognized as a violation of human rights, this harmful traditional practice persists in many less developed countries, hampering their further development. Therefore, there is an evident need to continue the research on possible risk and protective factors which should provide a better understanding of decision-making process about marriage timing and could help policy makers target their programs for reducing early marriage more effectively, especially in the most affected areas.

Granted that early life conditions may influence various outcomes in later life, this bachelor thesis investigated whether having siblings affects the probability of a girl getting married or entering in union before her 18th birthday using data from two West African countries, Mali and Sierra Leone. It focused predominantly on the motivation of girl's parents to marry her off early, and it examined whether and how it can vary with increasing sibship size and changing sibling age structure.

In the second chapter of this study we revealed similarities in different aspects of life in the countries under study, which led us to the presumption that the parental decision about their daughter's marriage might be affected by analogous factors. Besides the fact that Mali and Sierra Leone are both located in the same region within Africa, fertility remains on high level in both countries and population projections presume an increasing trend in the number of child spouses in the next twenty years. In addition, since most spheres of these strongly patriarchal societies are dominated by men, a lot of girl's rights and life options are limited. Consequently, women's most important role is childbearing and being a good wife and mother. Concerning the latest economic development, countries under study rank among the least developed countries in the world and they have seen only some progress in the last three decade. In reality, both economies are strongly dependent on agricultural production and on mining sector, which makes them highly vulnerable to fluctuations in prices in highly volatile international commodity markets.

Since more than three quarters of the population live under the poverty line, we discussed economic factors underlying early female marriage in more detail in the third chapter. In this context, marrying off a daughter early may relieve the whole family because the responsibility for

a girl is transferred throughout marriage from her natal household to the family of her husband. Based on the theory of intra-household resource allocation, siblings compete for their parents' limited resources even though this rivalry may not be apparent. Thus, early female marriage reduces overall costs of raising children and allows parents to increase expenditure on every other family member. Moreover, marriage transactions, such as bride price in Mali and Sierra Leone, form another important economic incentive to conduct marriages of daughters early.

However, other factors than overall sibship size may also play an important role in household decision-making process about marriage timing, including sibling age structure and girl's birth order. Earning additional income or assisting in household chores may improve the position of girls and increase their value within household. Therefore, possible ways a girl's birth order and relative proportion of younger and older sibling in the family can influence the parental decision were discussed in more detail in the third chapter. Various hypotheses were provided and they differed significantly among authors, and so their relevance in the case of Mali and Sierra Leone was tested in the empirical part of the study.

We performed the empirical analysis using data from the latest available Demographic and Health Surveys conducted in countries under study. Overall, three logistic regression models were specified in order to test whether there was a relationship between having siblings and early female marriage. Based on the datasets and regression analysis conducted, there was no evidence that overall sibship size or relative sibling age structure affected the probability of a girl getting married or entering in union before 18th birthday in both countries under study.

Even though the results suggest that other factors might be more important in household decision-making process about marriage timing, the impact of having siblings on early female marriage cannot be entirely dismissed. In fact, the average negative marginal effect of being first-born appears to be near-to significant in Mali on the 10% level of significance, holding the total number of siblings fixed. It is possible that some parents in Mali might delay the daughter's marriage if she is first-born, compared with girls with at least one older siblings. However, similar situation was not observed in Sierra Leone where the average marginal effect of being first-born remains highly insignificant. The results obtained for Mali almost confirm the hypotheses that first-born girls can increase their importance through additional work or household chores, whereas the Sierra Leonean parents seem to consider rather different factors while making the decision about their daughters' marriage.

Nevertheless, we believe that further research in this area is needed because the models we used are simplified and face several limitations mentioned in the previous chapter of this study. Therefore, our analysis should be seen only as the first step which needs to be followed by more sophisticated and elaborated studies in the future in order to provide a clearer insight on this issue. For instance, the extension of the models to sibling gender composition is highly recommended in this study. Moreover, examining the situation in other countries both inside and outside Africa might lead to the discovery of some common characteristics across countries and continents.

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APPENDIX

Table A.1: Estimated average marginal effects in the model without sibling age structure, Mali and Sierra Leone

Explanatory variable	Mali	Sierra Leone
Education	− 0.0235***	− 0.0383***
	(0.000)	(0.000)
Islam	0.0091	0.0854***
	(0.777)	(0.005)
Poorer	0.0264	0.0068
	(0.397)	(0.886)
Middle	0.0110	0.0013
	(0.719)	(0.977)
Richer	0.0163	− 0.0827*
	(0.587)	(0.063)
Richest	− 0.0375	− 0.1636***
	(0.309)	(0.001)
Total_siblings	− 0.0033	0.0029
	(0.315)	(0.547)
Bamako	− 0.1771***	---
	(0.000)	
Gao	− 0.0999**	---
	(0.014)	
Kidal	− 0.0918*	---
	(0.098)	
Koulikoro	− 0.0870**	---
	(0.010)	
Mopti	− 0.1948***	---
	(0.000)	
Segou	− 0.1791***	---
	(0.000)	
Sikasso	− 0.1370***	---
	(0.000)	
Toumbouctou	− 0.2287***	---
	(0.000)	
Northern	---	0.0589
		(0.107)
Southern	---	0.0141
		(0.701)
Western	---	0.0393
		(0.369)
Number of observations:	2,612	1,173
Correctly predicted:	72.05 %	68.54 %

Note: p-value is indicated in the brackets   *** p<0.01; ** 0.01<p<0.05; * p<0.1

Source: MEASURE DHS Mali 2006, MEASURE DHS Sierra Leone 2008, author's calculations

Table A.2: Estimated average marginal effects in the model with the *First-born* dummy variable, Mali and Sierra Leone

Explanatory variable	Mali	Sierra Leone
Education	− 0.0235***	− 0.0383***
	(0.000)	(0.000)
Islam	0.0106	0.0855***
	(0.740)	(0.005)
Poorer	0.0262	0.0066
	(0.400)	(0.889)
Middle	0.0110	0.0009
	(0.720)	(0.985)
Richer	0.0156	− 0.0828*
	(0.603)	(0.063)
Richest	− 0.0385	− 0.1641***
	(0.296)	(0.001)
Total_siblings	− 0.0050	0.0035
	(0.147)	(0.518)
First_born	− 0.0348	0.0071
	(0.116)	(0.813)
Bamako	− 0.1779***	---
	(0.000)	
Gao	− 0.0989**	---
	(0.015)	
Kidal	− 0.0886	---
	(0.107)	
Koulikoro	− 0.0880***	---
	(0.009)	
Mopti	− 0.1957***	---
	(0.000)	
Segou	− 0.1781***	---
	(0.000)	
Sikasso	− 0.1374***	---
	(0.000)	
Toumbouctou	− 0.2279***	---
	(0.000)	
Northern	---	0.0581
		(0.114)
Southern	---	0.0138
		(0.707)
Western	---	0.0389
		(0.374)
Number of observations:	2,612	1,173
Correctly predicted:	72.01 %	68.54 %

Note: p-value is indicated in the brackets   *** p<0.01; ** 0.01<p<0.05; * p<0.1

Source: MEASURE DHS Mali 2006, MEASURE DHS Sierra Leone 2008, author's calculations

Table A.3: Estimated average marginal effects in the model with sibling age structure, Mali and Sierra Leone

Explanatory variable	Mali	Sierra Leone
Education	− 0.0221***	− 0.0366***
	(0.000)	(0.000)
Islam	0.0343	0.1068***
	(0.316)	(0.004)
Poorer	0.0212	0.0139
	(0.542)	(0.811)
Middle	0.0243	0.0159
	(0.480)	(0.779)
Richer	0.0254	− 0.0823
	(0.446)	(0.128)
Richest	− 0.0474	− 0.1383**
	(0.251)	(0.024)
Total_siblings	− 0.0042	0.0016
	(0.394)	(0.862)
Younger	− 0.0042	− 0.0017
	(0.403)	(0.868)
Bamako	− 0.1636***	---
	(0.000)	
Gao	− 0.0413	---
	(0.378)	
Kidal	− 0.0784	---
	(0.270)	
Koulikoro	− 0.0895**	---
	(0.010)	
Mopti	− 0.1545***	---
	(0.000)	
Segou	− 0.1563***	---
	(0.000)	
Sikasso	− 0.1259***	---
	(0.000)	
Toumbouctou	− 0.2189***	---
	(0.000)	
Northern	---	0.0379
		(0.403)
Southern	---	0.0179
		(0.697)
Western	---	0.0035
		(0.949)
Number of observations:	2,065	788
Correctly predicted:	72.30 %	67.64 %

Note: p-value is indicated in the brackets   *** p<0.01; ** 0.01<p<0.05; * p<0.1

Source: MEASURE DHS Mali 2006, MEASURE DHS Sierra Leone 2008, author's calculations