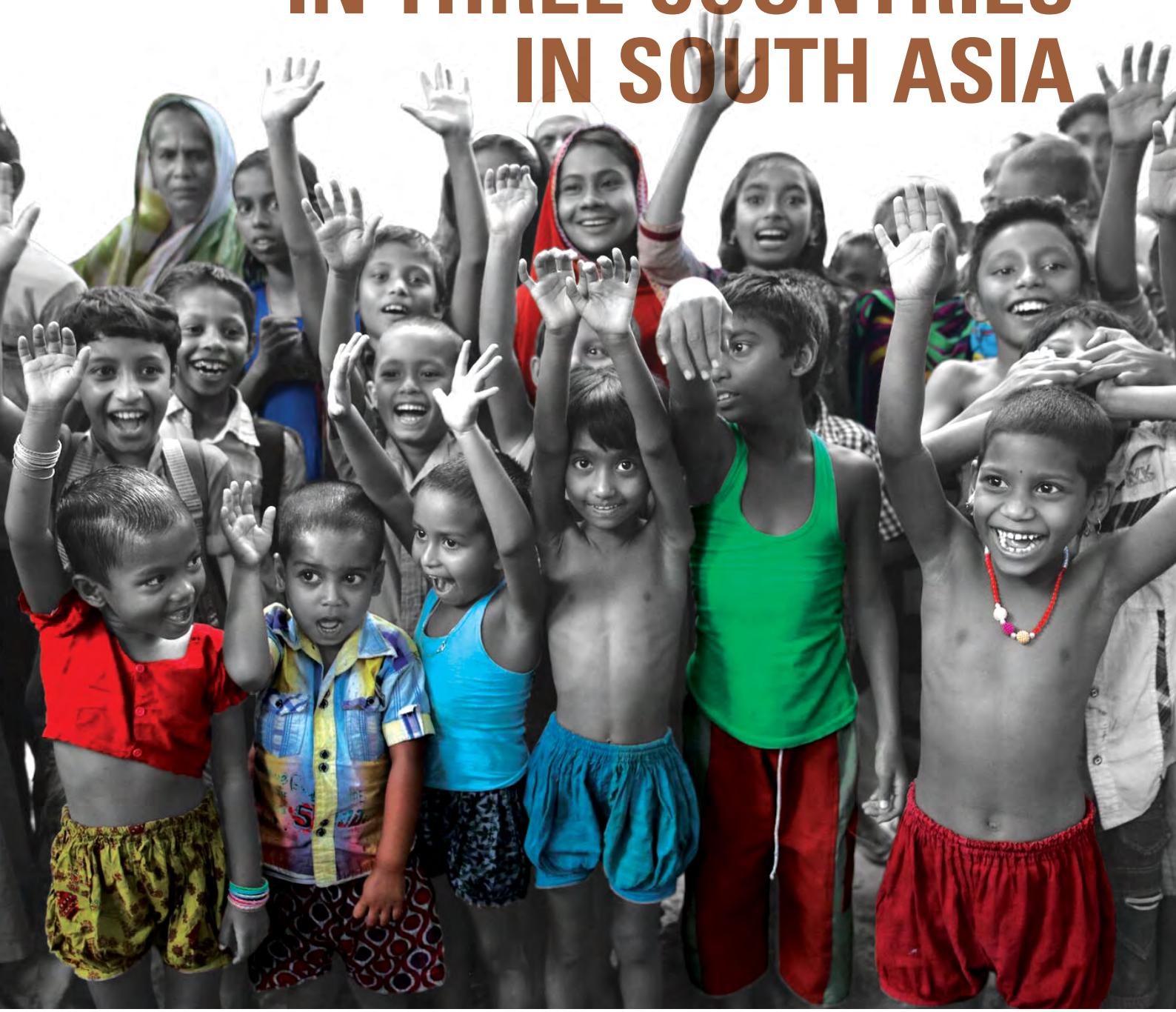
KEY DRIVERS OF THE CHANGING PREVALENCE OF CHILD MARRIAGE IN THREE COUNTRIES IN SOUTH ASIA



Working Paper

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Acronyms

DHS	Demographic and Health Surveys
GBV	gender-based violence
GDP	gross domestic product
HH	household
HHcm18(reg)	households with married member under 18 (regional share)
ICRW	International Center for Research on Women
ILO	International Labour Organization
MICS	Multiple Indicator Cluster Survey
NOAA	National Oceanic and Atmospheric Administration
NTL	night-time light
OECD	Organisation for Economic Co-operation and Development
SDG	Sustainable Development Goal
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund

Definitions of Child Marriage Used in the Figures and Tables of the Report

Introduction	
Child Marriage	Proportion of all women (aged 15-49) who were younger than 18 when the marriage initiated
Empirical Analysis	
Variable	***Definition***
HH child marriage below 18	Binary variable describing whether a household currently has a member below 18 that is married.
Under-age HH member married within last year	Binary variable describing whether a household currently has a member below 18 that married within the last 12 months
Women (20–49) married before 18 (reg.)	Proportion of all women (aged 20-49) who were younger than 18 when the marriage initiated at the province level.
Women (20–49) married before 15 (reg.)	Proportion of all women (aged 20-49) who were younger than 15 when the marriage initiated at the province level.
Note: appropriate DHS weights are used for child marriage calculations and summary statistics are in line with DHS reports.	

Executive Summary

Purpose and Aims

In 2014, almost half of all girls who were married before the age of 18 worldwide originated from South Asia (UNICEF, 2014). Despite progress in reducing the prevalence of child marriage, it remains an occurring practice in the region. Understanding the breadth and depth of drivers around child marriage is important to further reduce and ultimately end this deprivation, as per the Sustainable Development Goal (SDG) Number 5, target 5.3.

This study provides empirical evidence on the cross-sectional and temporal effects of micro-level and macro-level factors on child marriage in three South Asian countries, namely Bangladesh, Nepal and Pakistan. While micro-level effects on child marriage are extensively documented, the effects of macro-level drivers remain an open area of inquiry. To the extent that child marriage leads to limited opportunities and violation of basic human rights, this research seeks primarily to investigate those macro-level circumstances that are most effective in reducing the prevalence of child marriage in selected contexts. This study defines child marriage as a legal or customary union between two individuals, of whom one or both parties are younger than 18 years of age.

Approach

This report offers an updated review of drivers associated with child marriage in South Asia. These drivers are complex, diverse and interlinked. The conceptual framework of this report includes micro-level factors – i.e. gender composition, age composition, household size, religion, location and child characteristics – i.e. gender, age, education, birth order, and access to and use of information and communication technology. The macro-level factors comprise of demographic development indicators (e.g. fertility, mortality, sex ratio, life expectancy and family planning), the economic situation, labour market participation, social policies, migration and women's standing in society. The proposed conceptual framework provides an innovative rationale, in that it embeds decision-making factors at the child and household level into the broader socio-economic context of the country. In this framework, social norms and beliefs are channelling factors that link the effects of macro- and micro-level drivers with child marriage outcomes.

The principal data source for the empirical analysis is the Demographic and Health Surveys (DHS). In total, 14 DHS waves were used: for Bangladesh (1994, 1997, 2000, 2004, 2007, 2011 and 2014), for Nepal (1997, 2001, 2006 and 2011), and for Pakistan (1991, 2007 and 2013). At the household level, the pooled DHS waves contain 233,673 households in the three countries. Two additional datasets for auxiliary analyses were employed. Specifically, annual information from the international disaster database (em-dat) was used to approximate the occurrence and extent of natural disasters in the three countries. In addition, annual satellite night-time light data (NTL) from 1992 to 2013, provided by the National Oceanic and Atmospheric Administration (NOAA) were used to approximate for regional level economic activity in the targeted countries. The data are used to analyse a household's probability of having a child bride or groom member, accounting for micro- and macro-level indicators and time effects.

Key Findings

Child marriage: trends and differentials

Over time, the prevalence of child marriage decreased in Bangladesh, Nepal and Pakistan, although to different extents across and within countries. There is a higher likelihood of decreasing child marriage rates over time in Bangladesh and a lower likelihood in Pakistan as compared to Nepal. Between 1994 and 2014, the Dhaka region of Bangladesh experienced the strongest decline in child marriage rates compared to other regions in the country. In 2014, the prevalence of child marriage was highest in the Bangladeshi divisions of Rangpur and Barisal (ranging from 6 per cent to 8 per cent) and lowest in Sylhet (ranging from 2.5 per cent to 3.5 per cent). In the case of Nepal, between 1996 and 2011, the prevalence of child marriage was most visible in the far Western region and least noticeable in the Eastern region. In 2011, the Midwestern and Central provinces of Nepal had the highest rates of child marriage (ranging from 3.5 per cent to 4.5 per cent) compared to the Far Western, Western and Eastern regions (ranging from 2.5 per cent to 3.5 per cent). In Pakistan, between 1990 and 2012, the child marriage rates decreased most significantly in Balochistan and Khyber Pakhtunkhwa. In 2012, the prevalence of child marriage in Pakistan was highest in the Khyber Pakhtunkhwa-North West Frontier (between 3.5 per cent and 4.5 per cent), while in Baluchistan and Punjab the prevalence of child marriage was lowest (between 1.5 per cent and 2 per cent).

Drivers and their effects on child marriage

At the micro-level the results suggest that living in rural areas is associated with a higher risk of child marriage. Similarly, households with sons and daughters living away from home, either because of marriage or migration, also show an increased risk of child marriage. However, other drivers are associated with a decrease in child marriage, namely having a female household head and other indicators for women's empowerment such as women's influence on decisions regarding bigger purchases or attitudes towards domestic violence. Similarly, wealthier households and those in which members are more educated as well as those with a larger share of working members are less likely to have underage married household members. These results apply for the three countries analysed in this study (Bangladesh, Nepal and Pakistan).

At the macro-level, drivers for regional wealth, the above average growth in the economic activity of a region, lower mean age of childbearing, regional fertility rates and access to media are predictors that associate negatively with child marriage. However, women's average school attainment and migration drivers do not seem to have an effect on the prevalence of child marriage. The share of women, of older cohorts, who married under age increases the risk of child marriage, implying that child marriage is more likely to occur in regions where the practice is more prevalent and socially accepted.

Furthermore, the analysis tested if economic developments affect different households differently in relation to child marriage. The findings show that households whose members have higher average levels of education benefit significantly more from the economic growth than less educated households. This suggests that less educated households would benefit less from the local economic progress and are likely to respond more slowly to changing the way child marriage is practised. Subsequently, in regions where child marriage is less prevalent, increased economic activity is associated with a

decrease in the phenomenon. This is especially visible in Pakistan, a country with comparatively lower rates of child marriage. In Bangladesh and Nepal, countries with higher prevalence rates of child marriage, the increased economic activity has a modest impact on reducing child marriage.

Policy Initiatives to reduce child marriage

This study shows that drivers of child marriage are complex, interrelated and, at times, context specific. Although child marriage is on the decline, ending the practice must entail efforts at both micro- and macro-levels. For a start, the knowledge base of macro-level drivers is fragmented, with a lack of empirical information on specific measurements such as migration, economic progress and changing societal values and attitudes in relation to child marriage. Understanding the intricacies of the macro-level drivers are keys to channelling resources in achieving greater progress towards ending child marriage. It will also help design more effective policy interventions. Over the past decades, there have been increased policy initiatives to address child marriage, specifically in relation to its micro-level determinants such as education, social norms and gender inequality. Findings of this study suggest that macro-level policy initiatives can complement and add to targeting efficiency to further reduce the prevalence of child marriage and in fulfilment of the SDG 5, target 5.3. For instance, policy initiatives that address education imbalances in regions with increased economic activity may help reduce the prevalence of child marriage.

A practical approach to understand and efficiently address key drivers of child marriage is through the collection and availability of empirical data. The current empirical evidence is based on snapshot data, in which causes and consequences of child marriage cannot be clearly delimitated. This hinders the efforts to understand the underlining mechanisms driving the effects in the prevalence or decline of child marriage. The next step in data availability is the collection of longitudinal data of individual and household factors contributing to child marriage over time.

1. Introduction

1. While the prevalence of child marriage is generally in decline, it remains a widespread practice in many countries of the world. In 2014, around 720 million women were married before the age of 18 and out of those, approximately 250 million before the age of 15, with the highest rates in South Asia and sub-Saharan Africa. In comparison, 'only' 156 million men are estimated to have been married before the age of 18 (UNICEF, 2014). Hence, more than 8 out of 10 children who marry before the age of 18 are girls.

2. Causes and consequences of child marriage have been subject to countless studies. What makes studying this subject particularly relevant is the overall negative impact associated with child marriage, which calls for actions to reduce and ultimately end this practice (Wodon, et al., 2017). The international community has acknowledged the need to end the practice of child marriage by emphasizing this in Sustainable Development Goal Number 5 (target 5.3), with the target to eliminate child, early and forced marriage by 2030. Child marriage is a human rights violation affecting children's rights, health, education, equality, non-discrimination and their ability to live free from violence and exploitation. These rights are enshrined in the Universal Declaration of Human Rights (1948), the Convention on the Elimination of All Forms of Discrimination against Women (1979) and the Convention on the Rights of the Child (1989).

3. Under-age marriage can have deleterious consequences on children's emotional and physical lives. Evidence on child brides suggests that marital union is often associated with early childbearing, higher fertility, increased risk of maternal death and higher rates of infant mortality (Nasrullah, et al., 2014a; 2014b; Raj, Saggurti, Balaiah and Silverman, 2009; Roest, 2016). In addition, child marriage can have negative consequences on educational attainment and the overall personal development of children (Nguyen and Wodon, 2014). Furthermore, an early marriage increases the risk of children experiencing emotional, physical and sexual violence (Nasrullah, et al., 2014b).

4. Child marriage does not only affect the development of brides and grooms individually, but also the economic development of countries with a high prevalence of child marriage. A recent study conducted by the International Center for Research on Women (ICRW) and the World Bank (Wodon, et al., 2017) estimates that a reduction in child marriage would go hand in hand with a decline in fertility and population growth rates, leading to an increase in the gross domestic product (GDP) per capita in countries where child marriage is common. In addition, ending child marriage is associated with a reduction of under-five mortality and stunting at the national level, which is estimated to translate into global annual welfare gains of up to US$82 billion and US$16 billion respectively by 2030. Therefore, ending child marriage would have significant economic benefits on the macro-level amounting to "trillions of dollars between now and 2030" (Wodon, et al., 2017, p. 10).

5. Over past decades, there has been substantial research on the drivers of child marriage and its consequences (for a broad review of the literature see Parsons, et al., 2015). Through empirical and theoretical evidence, studies have informed explanations about the origin and persistence of child marriage, allowing monitoring and evaluating the progress towards ending the practice. Despite progress in child marriage research, gaps remain. First and foremost, little is known on the overarching empirical framework of determinants contributing to the decline in the prevalence of child marriage in South Asia and beyond. For the most part, studies employed explanations of why child marriage persists along micro-level lines, at the individual and household levels. At the same time, there is a lack of rigorous empirical evidence on whether and how macro-level determinants explain child marriage. Evidence on how micro-level and macro-level determinants interrelate to explain the persistence or the decline in child marriage is even scarcer. Moreover, the focus of the child marriage literature is on girl brides, despite boys being affected by the practice too. Some studies have looked at why grooms and their families prefer younger brides (Greene, 2014; Singh and Vennam, 2016) but overall, the onus of research lies almost exclusively with child brides. This impedes overarching conclusions of whether determinants of child marriage apply to the whole population of children in a given context. In addition, the prevalence of child marriage seems to have declined irrespective of specific child marriage programmes at the national level (United Nations Population Fund, UNFPA, 2016), suggesting that a wider range of factors may explain the general rates of reduction in child marriage.

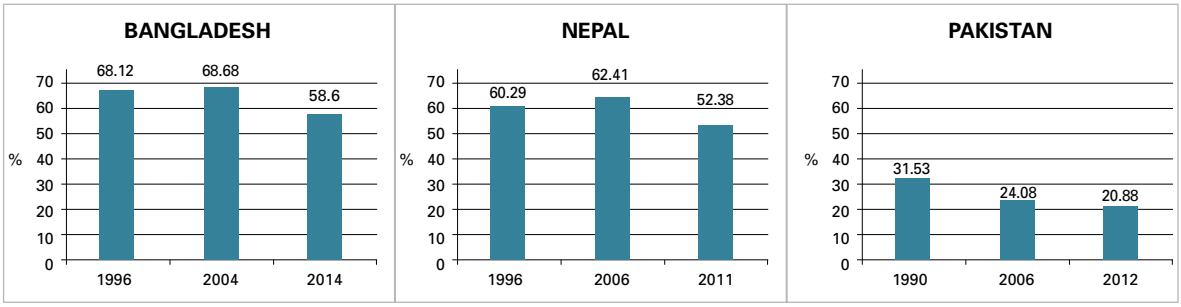
6. This study provides empirical evidence on the extent to which macro-level drivers (in addition to micro-level factors) explain child marriage dynamics in South Asia, which in 2014 was home to almost half of all girls who were married before the age of 18 worldwide (UNICEF, 2014). Specifically, the study aims at answering the following research questions: To what extent can observed declines in the prevalence of child marriages in parts of South Asia be associated with changes in the macro-environment? Under what circumstances were these developments most effective in reducing rates of child marriages?

7. The analysis in this study focuses on three countries, namely Bangladesh, Nepal and Pakistan and will serve as a basis for informing policy practices in the region. The three countries were selected because of a high prevalence of child marriages and because long-term data were available for their comparison to date.

8. Figure 1 provides an overview of child marriage trends among girls in these countries over past decades.[1] Available DHS (Demographic and Health Surveys) data show that most girls are married under age in Bangladesh, followed by Nepal. The prevalence of girl child marriage is the lowest in Pakistan. A strong decline in all three countries can be observed, particularly in the last decade. The prevalence of child marriage among girls declined by 10 percentage points in Nepal between 2006 and 2011 (from 62.4 per cent to 52.4 per cent) and in Bangladesh between 2004 and 2014 (from 68.7 per cent to 58.6 per cent) and by 11 percentage points in Pakistan between 1990 and 2012 (from 31.5 per cent to 20.9 per cent).

1 Figures only presented for girls as data for child grooms are not available for the same years. The prevalence of child marriage is calculated on the ever-married sample of women between the ages of 15–49 in DHS data set.

Figure 1. Prevalence of 15- to 49-year-old women who married before the age of 18



Source: Authors' own calculations based on DHS data.

9. In this study, child marriage describes a legal or customary union between two individuals, of whom one or both parties are younger than 18 years of age. This is not always represented in national legislation where the legal age of marriage can vary as the example of our three focus countries show: in Pakistan, the legal age for girls to marry is 16,[2] while in Bangladesh it is 18 and in Nepal it is 20. Except for Nepal, the legal age for boys to marry is higher compared to girls. In Pakistan it is 18, in Nepal it is 20 and in Bangladesh[3] it is 21. In all three countries, marriage before the respective legal age of marriage is criminalized and can be punished, although a strict enforcement of the law is missing (Kumar, 2014).

10. While child marriage has been extensively studied at the micro-level, macro-level drivers have been largely under-researched. In the analysis, we use all available data waves of the DHS from the beginning of the 1990s until 2014 and test how the province-level context affects the prevalence of child marriage controlling for household-level characteristics. Therefore, a multi-level approach is used in which households are nested within regions. However, despite its novelty, there are some limitations to this study: first, the data availability at the province level is limited due to the small number of data waves over time and missing data on the subnational level. Second, as brides typically leave their original household after the marriage, it is difficult to identify the drivers that have led households to marry off their brides. Third, the separation of the socio-cultural context from socio-economic developments in which child marriages decisions are taken has to be based on available indicators, which is a limitation to the extent that these indicators co-evolve.

11. The report is structured as follows. First, it reviews the existing literature and presents the conceptual framework for the analysis. Second, the empirical strategy and the data are presented, followed by the presentation of results and reflections. The final section of this study presents the conclusions and policy recommendations.

2 In Pakistan, provinces have the right to amend existing legislation to fit the provincial context. As such, in 2014, the Sindh province adopted the Sindh Child Marriage Restraint Act, which increased the minimum age for brides to 18. In all other Pakistani provinces, the legal age of marriage for brides is 16.

3 In Bangladesh, in special circumstances, girls and boys can get married below the age of 18 and 21, respectively, if a court agrees and parents' consent are given.

2. Literature Review and Conceptual Framework

12. The drivers of child marriage in South Asia are complex, diverse and interlinked. They include factors at the household and individual levels as well as features linked to macro socio-economic aspects that are context specific. Furthermore, the micro- and macro-level decision-making factors are embedded in social norms and beliefs specific to each context under analysis. In the following section, the existing academic literature is reviewed to identify micro- and macro-level drivers of child marriage and to establish a conceptual framework with contributing factors in relation to child marriage in South Asia, the regional focus of this study. This review aims to identify those factors that are captured consistently, through empirical evidence, by existing studies on child marriage in South Asian contexts and beyond.

Micro-level Factors

13. The literature regarding micro-level factors associated with child marriage distinguishes between general household characteristics and decision-making factors and characteristics of the girls and boys as well as their influence on the marriage decision. Bajracharya and Amin (2012) find robust evidence for the argument that household characteristics have a greater impact on marriage outcomes than individual characteristics of the potential child brides and grooms.

Household Characteristics and Decision-making Factors

14. The decision to marry children of younger age is often a household strategy to mitigate potential risks associated with raising children in a volatile socio-economic context. For instance, Bicchieri, et al. (2014) argue that, under certain circumstances, child marriage may seem the best option as the decision to enter a union is often thought to secure children's futures while the household benefits economically from dowry and more food on the table. A recent study conducted in Nepal and Bangladesh emphasizes that, from a household perspective, the perceived benefits of child marriage outweigh the perceived risks (Karim, et al., 2016). Among advantages of marrying children young are the material benefits from dowry, decreasing the household size, and the transfer of human capital between households. In some cases, child marriage is furthermore associated with more prestige and child safety (Karim, et al., 2016).

15. The literature emphasizes the dominant role of the socio-economic status for child marriage decisions. Poverty or limited household resources caused or exacerbated by individual economic shocks have been found to increase the risk of child marriage (see for instance Jensen and Thornton, 2003; Raj, Gomez and Silverman, 2014; Roest, 2016; Winter, and Nambiath, 2016; Nasrullah, et al., 2014a, 2014b; Bajracharya and Amin, 2012; Hotchkiss, et al., 2016; Singh and Vennam, 2016). Poverty limits the household's economic choices and marriage allows families to

transfer the economic burden of daughters to the husband's family. In South Asian countries, girls often have less status because they will eventually belong to their husband's family and therefore investing in girls is regarded as investing in someone else's family (Human Rights Watch, 2015; Nour, 2009; Maxwell Stamp Limited, 2015; Ghimire and Samuels, 2014). The earlier parents marry off their daughters, the sooner they leave their parents' house, which implies that there are fewer mouths to feed (Nour, 2009). This is further exacerbated through the dowry to be paid by the bride's family, either in the form of money or property, as the size of the dowry increases with the increasing age of the bride. Accordingly, the financial constraints of a family and the desire to find a suitable match for their daughters within the financial possibilities may force families to marry their daughters early (Bhat and Halli, 1999; Caldwell, et al., 1983; Mensch, et al., 2005; Rao, 1993, 2016; Chowdhury, 2004; UNICEF and ICRW, 2011; Maharjan, et al., 2012; Alston, et al., 2014). Sometimes the bride's family waits for an opportunity to marry their daughter up in status. In such cases, girls have an opportunity to receive more education. Increased education also raises the requirements for a suitable husband, which may justify the demand of a higher dowry to be paid to the groom's family, for instance in Bangladesh and India (UNICEF and ICRW, 2011; Geirbo and Imam, 2006).

16. Another form of child marriage in South Asia is the case when young girls are married to disadvantaged men, for instance widowers with children, as attested by evidence in Nepal or India. In these specific contexts, the groom does not demand a dowry but pays a bride price. In such cases the bride joining the husband's family is seen as additional support in carrying out household activities (Maharjan, et al., 2012; UNICEF and ICRW, 2011; Jha, et al., 2016). Furthermore, the need for girls and women as (cheap) labourers becomes clear in the practices of *watta satta*, where two families "exchange girls through marriage so that neither family is worse off in terms of household labour" (Sharma, et al., 2015, p. 25).

17. This shows that economic aspects play an important role in understanding the practice of child marriage, especially among poorer households. Existing research suggests that girls from the poorest quintile are more likely to marry as children compared to girls from the richest quintile (Srinivasan, et al., 2015).[4] This is also confirmed by studies in India (UNICEF, 2014), Nepal (Bajracharya and Amin, 2012; Center for Reproductive Rights, 2016), and Bangladesh (Kamal, 2012). However, household wealth should not be overestimated since child marriage is also prevalent among richer families, which emphasizes that other factors are important in explaining the practice as well (UNICEF, 2012). For instance, Aryal (2007) finds that Nepali girls of higher socio-economic status (measured in terms of access to material items including food, water, computer, television, radio, vehicles, sanitation and housing; as well as household members' educational level and occupation) are at higher risk of being married off early, preferably before menarche, compared to girls of lower socio-economic status. However, recent aggregate evidence from across South Asia shows that women who married as children were overall more likely to be in the poorest quintile (UNICEF, 2014). Yet,

4 This report is based on a District Level Household Survey, conducted in 22 Indian states, covering 694 districts, in 2007–2008 (Srinivasan, et al., 2015).

despite this gap, the rates at which wealthiest brides marry young are still high in South Asia – in 2013, more than 30 per cent of females in the wealthiest quintile were married before the age of 18 (UNICEF, 2014). This signals a wider array of factors at work in modelling the decision of child marriage. Indeed, while poverty plays a critical role in marriage decisions, it is often in combination with other factors, such as rigid gender norms, religion, prestige and safety that drives the decision towards child marriage across different segments of the population (Aryal, 2007; Greene, et al., 2015; 2014; Verma and Srinivasan, 2014).

18. The majority of the existing literature establishes that the likelihood of child marriage depends on the location (Singh and Vennam, 2016; Sharma, et al., 2015).[5] Research suggests that, in general, children from rural areas are more likely to marry early than their counterparts who live in urban areas (Singh and Vennam, 2016).[6] This may be due to the fact that children living in rural areas are often more disadvantaged, for instance, when it comes to education and overall socio-economic status, predominantly due to limited infrastructure and low paid opportunities (Equality Now, 2014; Sharma, et al., 2015). In the case of Bangladesh, Gazi, et al. (2013)[7] found that financial problems were the common reason for child marriage in rural compared to urban areas.

19. Child marriage is also related to household composition (Smith, 2009) as well as the education of the parents (Singh and Vennam, 2016; Singh, Espinoza and Revollo, 2016) and the age gap between the parents (Nasrullah, Zakar and Zakar, 2014). In households with several children, the risk of child marriage is particularly high for the younger siblings. Having older sisters increases the risk of child marriage (Singh and Vennam, 2016) because parents often marry off several children at the same time to save costs for the festivities (UNICEF and ICRW, 2011). The festivities are usually organized when the oldest daughter is old enough for marriage (Sharma, et al., 2015).

20. Low levels of parental education are associated with higher risks of child marriage (Singh and Vennam, 2016). Increasing educational levels of both the father and the mother are associated with delayed marriage or consummation (Choe, et al., 2005; Bates, et al., 2007). Bates, et al. (2007) found, however, that in the case of rural Bangladesh this only held true for mothers and that the educational attainment of the father did not have an effect on the timing of the children's marriage. A higher level of education brings opportunities in parents' lives, such as better employment, more cosmopolitan values, and a tendency to send and keep their children in school, all of which were found to delay child marriage (Choe, et al., 2005).

21. In South Asian countries, it is mostly the father who is the primary decision maker regarding his children's marriage (Gazi, et al., 2013) even though women can have an influence as well (Bates, et al,. 2007; Smith, 2009; Breakthrough, 2012). A larger age gap between parents is associated with a decrease in the women's decision-

5 This report is based on a desk review of 171 documents including qualitative and quantitative research articles, intervention evaluation reports and government reports (Sharma, et al., 2015).

6 This report is based on nationally representative Young Lives Data for India (Singh and Vennam, 2016).

7 These results are based on data gathered by means of a comprehensive national survey targeting married women of reproductive age, using the same sampling technique as DHS. The sample size is 5,367 (Gazi, et al., 2013).

making in the household (Nasrullah, et al., 2014b). Depending on the context, having a female household head was found to improve girls' well-being, chiefly because women are more inclined to equally invest in children (Antman, 2012). This does not hold, however, if the household is especially vulnerable (UNICEF, 2015). Grandparents also have an important say in marriage decisions and usually are in favour of child marriages (Smith, 2009; Breakthrough, 2012; Human Rights Watch, 2016). Several studies indicate that the timing of the marriage can change depending on who is involved in the decision-making. A study among Pakistani women who got married as children finds that they mostly support the practice and are planning to marry off their daughters below age as well (Nasrullah, et al., 2014c). One should note that the women interviewed for this study were poor, uneducated and not aware of health risks associated with child marriage, which may influence their attitude towards child marriage. In the case of rural Bangladesh, where mothers seem to have more influence on the timing of their children's marriage, Bates, et al. (2007) found a positive relationship between the mother's education and the child's age at marriage.

22. In India and Nepal, the likelihood of child marriage depends on the caste (Singh and Vennam, 2016; Aryal, 2007; Maharjan, et al., 2012; Human Rights Watch, 2016). Children of lower-caste communities, for instance, are at higher risk of being married under age because of marginalization and discrimination by the State and other actors (Breakthrough, 2012; Human Rights Watch, 2016). Due to being deprived of basic rights, they "face severe restrictions and limited access to resources, services, and development, keeping most in severe poverty" (Human Rights Watch, 2016, p. 5), all factors being heavily associated with increased levels of child marriage. Similarly, several studies find differences between different religious groups. The results are however ambiguous. In some studies Muslim girls are found to be at a higher risk of being married under age (Equality Now, 2014; Palamuleni, 2011; Adebowale, et al., 2012) while others find that they marry later (Breakthrough, 2012).

Child Characteristics and Decision-making Factors

23. Girls are generally at a much higher risk of being married under age. The extent to which children can have a say in their own marriage is limited, with girls having less decision-making power than boys (Maharjan, et al., 2012). According to Karim, et al. (2016), Nepalese and Bangladeshi girls have limited influence on the marriage decision. If they try to voice their opinion, this is seen as a form of rebellion against their parents. Boys in contrast can voice their opinions about the choice of a bride depending on their educational level, employment situation and experience abroad, which, however, does not protect them from getting married early (Karim, et al., 2016).

24. Existing studies find that with increasing educational levels, the risk of child marriage decreases (Aryal, 2007; Gazi, et al., 2013). No education and primary education are associated with an increased risk of being married as a child (Winter and Nambiath, 2016; Nasrullah, et al., 2014a, 2014b; Hotchkiss, et al., 2016), while secondary or tertiary education are generally associated with a decreased risk of child marriage (Raj, et al., 2014c; Roest, 2016; Equality Now, 2014). Furthermore,

studies show that later age in marriage can be partly explained by increased school enrolment and attainment among children in South Asia. This may reflect a general tendency of families to invest more in girls' education (Antman, 2012). Indeed, the average educational levels of younger cohorts of women are higher than that of older cohorts, which may also explain the overall decline in child marriage among girls in the region (Allendorf, 2013; Goonesekere and Amarasuriya, 2013; UNICEF and ICRW, 2011). Educating girls is likely to increase their autonomy by increasing their influence over the timing of the marriage and the choice of partner (Islam, et al., 2016; Jejeebhoy, 1995). Allowing girls to attend school as well as broadening their modern livelihood skills using a community-based approach broadens the opportunities available to them, including working opportunities, political activism and alternatives to marriage (Caldwell, et al., 1983; Ghimire and Samuels, 2014; Lloyd and Mensch, 1999; Singh and Samara, 1996; UNICEF, 2013; Amin, et al., 2016).

25. However, there may be endogeneity in the relation between education and child marriage. Arguably, evidence also shows a strong link between child marriage and the cessation of education among brides and grooms in South Asia (UNFPA, 2016). Nevertheless, many countries in South Asia take proactive policies to invest in child education (Kumar, 2014) and there is evidence that educational levels of children are increasing in general, especially that of girls (UNICEF and ICRW, 2011). It means that children and specifically girls who are able to gain skills and get employed for instance in the service sector or the garment industry are less likely to get married under age compared to girls who have less education and work in their family's household (Singh and Vennam, 2016). Also, the additional human capital from education may contribute more to the household's financial situation than the economic benefits of child marriage (Aryal, 2007; Gazi, et al., 2013; Bajracharja and Amin, 2012). Where opportunities regarding education and employment of girls and women are limited, for instance due to poverty and location, child marriage is, nonetheless, more likely to occur (Karim, et al., 2016; Roest, 2016). For instance, a lack of infrastructure and education services has been associated with increased rates of child marriage, especially when schools are far away (Maharjan, et al., 2012; UNICEF, 2011; UNICEF, 2013).

26. The increased use of social media, television, mobile phones and the Internet are associated with changing patterns regarding marriage as they may provide children and parents with information and knowledge. Some authors find that it leads to more self-initiated marriages, so-called 'love marriages', among young people, as it provides a tool for girls and boys to communicate (secretly) and to intermingle (Verma, Sinha and Khanna, 2013; Maharjan, et al., 2012; Allendorf, 2013; Ghimire and Samuels, 2014). As a consequence, it seems that a greater share of young people, especially in urban areas, decides to get married because of love and sexual desire in the context of Nepal, Bangladesh, and India (Maharjan, et al., 2012; Sharma, et al., 2015; Yarrow, et al., 2015). Access to (social) media is generally associated with better access to knowledge and information, which could theoretically help inform young people about the risks of child marriage and therefore lead to an increase in their desire to delay marriage. Despite the popularity in the use of social media among youths in South Asian countries, the

prevalence of arranged child marriages largely prevails over love unions (Singh and Vennam, 2016). In contexts such as Pakistan, love marriages are even considered unacceptable and, more so, not much desired among youths, reflecting a more conservative approach to youth interaction on social media and the strict separation of boys and girls in social life (Yarrow, et al., 2015).

Macro-level Factors

27. At the macro-level, the literature identifies several drivers that influence the persistence of child marriage, including the economic situation of a country or region, demographics, social policies, migration, the labour market participation of women and women's position in society. These factors are exacerbated by prevailing social norms and gender roles as will be discussed below.

Demographics

28. Population dynamics and demographic transition can provide useful explanations for the dynamics in child marriage in South Asia. Traditionally, families married their children young to start childbearing early and to offset the high rates of child and maternal mortality (Kirk, 1996). Over the past decades, there have been substantial improvements in reducing the infant and child mortality rates in most South Asian countries (Lee, 2003; Mensch, et al., 2005). At the same time, the total fertility rates in the region have decreased noticeably in the past two decades.[8] Specifically, between 1990 and 2015, the total fertility rates decreased from 4.5 to 2.1 in Bangladesh, from 5.2 to 2.2 in Nepal, and from 6.0 to 3.5 in Pakistan (World Bank, 2015). Reduced fertility rates for women were found to associate positively with human development indicators such as health and education, while also leading to improvements in child marriage rates (Raj, et al., 2009; World Bank, 2016). Yet one must be attentive to the issue of endogeneity in measuring the association between child marriage and fertility rates as studies often discuss the two sides of this correlation interchangeably (see for instance Nasrullah, et al., 2014a; Raj, et al., 2009; Roest, 2016).

29. However, a rather new phenomenon is under way in the region: the sex ratio is tilting towards boys in a way that is unprecedented in the recorded demographic history. In South Asia, the number of males relative to females is unusually large which cannot be explained by maternal and child mortality alone. The expected natural ratio at birth in South Asia has been traditionally around 104 to 105 boys per 100 girls, subject to local biological variations (Guilmoto, 2007). Recent studies show that the observed sex ratio at birth was 110 in India (2012) (Kaur, et al., 2016); 109.9 in Pakistan (2007) (UNFPA, 2012); 109 in Bangladesh (2011) (Talukder, Rob and Noor, 2014); and 106 in Nepal (2011) (Puri and Tamang, 2015). According to these studies, the disproportionally large sex ratios are mainly due to sex-selective abortion because of a preference for boys. This trend led to the concept of 'missing women'— the number of extra women that were to be born if the natural sex ratio is not artificially skewed towards males, a term which was first coined by Sen (1990). By 2010, prenatal sex selection combined with declining rates of excess

8 The total fertility rate is defined as the average number of children a woman would have if she survives all her childbearing years (World Bank, 2015).

child mortality reduced the volume of the total young female population (aged 0–19) by 1.2 per cent in Bangladesh (N = 354,000), 5.6 per cent in India (N = 13,197,000), 1.7 per cent in Nepal (N = 114,000), and 0.7 per cent in Pakistan (N = 281,000) (UNFPA, 2012). Under a favourable scenario, the projected rates of birth masculinity in South Asia are expected to stay stable or slightly increase in the medium and long terms (i.e. by 2050 and 2100, respectively) (UNFPA, 2012).

30. The change in sex ratio and the decrease in child mortality resulted in a "marriage squeeze" (Caldwell, et al., 1983; Kaur, et al., 2016), meaning that an excess supply of men of marriageable age now exists in South Asia (UNFPA, 2012). Scholars argue that the rise in the mean age at first marriage in South Asia is a result of the marriage squeeze, in that it affects the demand side of the child marriage equation (Mensch, et al., 2005; Bhat and Halli, 1999; UNICEF, 2005). Once the number of single men trying to marry significantly exceeds the corresponding number of unmarried women, the age of marriage is expected to go up in both gender populations — a simulated scenario predicts a two years' increase in the age of marriage in India by 2030, if the current sex ratio in the country remains stable (UNFPA, 2012).

31. The marriage squeeze notwithstanding is embedded in cultural norms that shape marriage itself. In Rajasthan, India's largest state, a decline in female births has been associated with an increase in the practice of sibling marriages, where two families exchange their daughters (or sons) – i.e. when parents who want a bride for their son give away their daughter as a bride in exchange (ICRW and Plan, 2013). In addition, there is evidence that distorted sex ratios increases the risk of younger girls being kidnapped, trafficked and sold as brides in some parts of South Asia (UNFPA, 2012). However, the effects leading to child marriage are only partly fuelled by the existing gender imbalances in South Asia (Guilmoto, 2007). This means that the effects of demographic factors in relation to child marriage are likely to vary by context and be correlated with other macro and micro factors such as the economic situation of the country, the size of the family, education and others.

Economic Situation

32. Economic vulnerability of families is one of the most frequent reasons stated for child marriage. A study by Raj and colleagues (2014b) sees the economic welfare of the household, especially those headed by women, as crucial in addressing child marriage, not only in South Asia, but also other parts of the world. This is in line with findings from several other scholars (Evenhuis, 2014; Center for Reproductive Rights, 2013; Singh and Vennam, 2016; Kumar, 2014; ICRW and Plan international, 2013). In South Asia, the gap between men and women when it comes to access to formal financial institutions and saving mechanisms is among the largest worldwide (UN Women, 2015). In India for instance, only 20 per cent of women above the age of 30 can operate their own bank or savings accounts (Wen, 2012). For younger women and girls, the share is even less. The limited economic empowerment makes women very dependent on their families and husbands and restricts their possibilities to support their household economically, which reinforces the practice of child marriage. This is for instance manifested in women's limited

access to land and assets (National Research Council, 2005). Providing girls and women with more economic opportunities can be a way to decrease child marriage since it would imply that they can afford to delay marriage more easily (Evenhuis, 2014; Singh and Vennam, 2016). In addition, it could increase women's decision-making within the household which is associated with a delay in child marriage (National Research Council, 2005). Existing literature frequently recommends advancing women's empowerment to reduce child marriage. A review of existing initiatives against child marriage in developing countries suggests that "integrated programs focusing on girls' empowerment and programs offering incentives have been reasonably successful in preventing child marriage and changing related attitudes and knowledge" (Lee-Rife, et al., 2012, p. 297).

33. At the macro-economic level, studies have shown that the highest prevalence of child marriage can be found in countries with the lowest GDP per capita; 12 countries of the poorest 25 countries with the lowest GDP have child marriage rates over 40 per cent (Lemmon, 2014; Loaiza and Wong, 2012). In India, Srinivasan, et al. (2015) found that districts with better macro-economic conditions such as better amenities and infrastructure, education and low levels of poverty had lower levels of child marriage.

34. Economic crises, in contrast, have been linked to an increase in child marriage in South Asia (Davis, et al., 2013; Kumar, 2014; Islam, et al., 2016; Yarrow, et al., 2015). When faced with economic shocks, parents assume that a marriage might save their children from poverty, while at the same time reducing the burden on the household. In Indonesia, female respondents of a focus group explained that when families face economic crises, an arranged marriage is acceptable as long as it helps overpass the burden (Yarrow, et al., 2015). It has been also reported that child marriage was a way to cope with consequences of the 2004 tsunami in India and Sri Lanka ('tsunami weddings'), as well as with floods in Pakistan and Bangladesh (Republic, et al., 2016; Plan International, 2013; Kumar, 2014; Davis, et al., 2013; Islam, et al., 2016).

35. The link between state fragility and the prevalence of child marriage therefore deserves additional attention.[9] Lemmon (2014) noted that in 2013, nine out of ten countries with the highest rates of child marriage were on the OECD list of fragile States, including, among others, Afghanistan, Bangladesh, Nepal and Pakistan. These countries are characterized as fragile in terms of economic, environmental, societal and security aspects (OECD, 2016). The Fragile States Index 2016 classified Afghanistan and Pakistan as countries of high alert while Nepal and Bangladesh are classified as alert countries (Fund for Peace, 2016). In comparison, the situation in India is considered less alarming.[10] It is therefore important to further explore the link between child marriage and state fragility in South Asia, to which existing studies have attributed secondary importance (see UNFPA, 2012; Human Rights Watch, 2015).

9 The OECD (2016, p. 21) defines fragility as "the combination of exposure to risk and insufficient coping capacity of the state, system and/or communities to manage, absorb or mitigate the risks."

10 Afghanistan ranks 9th, Pakistan 14th, Nepal 33rd, Bangladesh 36th and India 70th on the Fragile States Index 2016 (Fund for Peace, 2016).

Labour Market Participation

36. Formal labour market participation of women indicates economic empowerment (OECD, 2012), which was found to have an influence on the timing of marriage in South Asian contexts (Mensch, et al., 2005; Singh and Samara, 1996). The access to paid employment opportunities not only exposes women to ideas that might encourage delayed marriage (Singh and Samara, 1996) but also improves their position in society and the household (Mathur, Greene and Malhotra, 2003). Manufacturing expansion has often been associated with increases in female labour force participation in South Asian countries (Choe, Thapa and Mishra, 2005; Jensen, 2012; Singh, Darroch and Ashford, 2014). In Bangladesh, for instance, Heath and Mobarak (2015) found that the rise in the garment industry is associated with declining fertility rates, increased educational attainment and delayed marriages among female workers. Similarly, Puri and Tamang (2015) show that it is now increasingly common that Bangladeshi women experience employment and start a career before they marry.

37. Despite these positive associations, the progress in economic empowerment of women in South Asia is still hindered by poverty and the lack of additional opportunities, in that women are often over-represented in time- and labour-intensive activities (such as agriculture), which are poorly remunerated (ILO, 2016). There are also persistent gender differences in durable asset ownership in South Asian countries, which undermine the economic empowerment of women in the region (National Research Council, 2005; UNFPA, 2012). The incidence of vulnerable and informal employment, which is represented by agriculture, family and own-account work, is also more predominant among female workers; overall, women face up to a 35 per cent higher risk of being in vulnerable and informal employment than men are in South Asian countries (ILO, 2016). However, there is evidence that women's quality of employment and empowerment has been changing over the years. For example, even though women's participation in Bangladeshi politics is limited, they do occupy leadership positions in government and in the opposition (Chowdhury, 1995). There are also policy initiatives catering to asset management training and land-based livelihoods that are increasingly popular among girls and women in countries such as Bangladesh and India (UNFPA, 2016). Similarly, women increasingly occupy teaching positions at schools and universities, even though their numbers are still disproportionate to those of men (Chowdhury, 2004). Women in influential positions either in government, management, teaching positions or health care can act as role models to educate and empower younger women to pursue their goals and aspirations (Ghimire and Samuels, 2014; Kumar, 2014).

Social Policies

38. Evidence shows that social policy provisions such as health care services are critical for enabling young people to make informed choices about reproductive health (Dornan and Pells, 2014). In addition, social provisions that guarantee universal basic education for boys and girls create a learning framework in which families and children are not always bound by traditional customs that promote child marriage (Lee, 2003). Moreover, social protection provisions that target single

mothers or those that stimulate women's employment have a beneficial effect on children in their care by reducing the vulnerability of children to harmful practices such as child marriage (Mathur, et al., 2003).

39. In addition, once married, wives, including women and girls, are expected to move to their husband's household and are required to do the house chores, take care of the household members and often also to do productive work – all unpaid (UNICEF, 2013; Glinski, Sexton and Meyers, 2015). In emerging economies, such as those in South Asia, large segments of the population work in vulnerable and informal positions that often lack adequate social protection, thereby raising the risk of poverty, especially among women (ILO, 2016). The risk of poverty, coupled with the absence of social protection provisions arguably lead to a higher occurrence in child marriage (Holley, 2011). Designing and strengthening social protection policies that specifically address child vulnerabilities may reduce the prevalence of child marriage. However, further research is needed to assess the interlinkages between social policies and child marriage.

Migration

40. In general, migration, whether internal or international, is associated with child marriage in several ways. First, families with migrant members are usually economically better off and therefore able to pay higher dowries (Singh and Vennam, 2016). This implies that they can afford to wait and marry off their daughters later (UNICEF, 2011). At the same time, children living in migrant households are exposed to social remittances (Levitt, 1998), which are values and norms spurring empowering and emancipation ideas that may influence the decision-making of the household to avoid harmful practices, such as marrying children under age (Gartaula, 2009). Being exposed to outside values may indirectly relate to child marriage decisions, for instance, by emphasising the added value of education for children, particularly for girls (Antman, 2012; Cebotari and Mazzucato, 2016; UNICEF, 2011; UNICEF and ICRW, 2011). A study on regional variation in child marriage in Bangladesh found that in Sylhet, a region with high migration rates, child marriage was especially low (Islam, et al., 2016). A relationship between migration and marriage decisions was also found in Bangladesh, where Naved, et al. (2001) show that 44 per cent of workers, who married after they had migrated, selected their life partner themselves, compared to 14 per cent of workers who married before migration. Overall, migration is associated with a decrease in poverty and an increased awareness of the possible negative impacts of child marriage (Naved, Newby and Amin, 2001). This is not applicable to all migrant-rich contexts though: in the Indian state of Kerala, for instance, a region in which child marriage is less prevalent, migrants to the Middle East who have been exposed to different Islamic beliefs have actively lobbied against the prohibition of child marriage (Sharma, et al., 2015). This underlines that the effect of migration on child marriage depends on the destination country as well as on common beliefs and values of communities at the place of origin.

41. As the latter example shows, migration can also reinforce the practice of child marriage. Families from rural areas may marry off their children, before they themselves or the potential partners migrate abroad so as to ensure that they get

a suitable spouse or to prevent promiscuity (UNICEF, 2011; Breakthrough, 2012; Karim, et al., 2016; Sharma, et al., 2015). However, this may vary based on specific background characteristics. For instance, in Nepal, Hindu boys from poorer families get married before migrating, while Muslim boys from the same socio-economic background usually marry after returning home (Karim, et al., 2016). Furthermore, migration reinforces social norms concerning the marriageability of young women. In the absence of a male figure in the household, fears concerning the honour and safety of a child are amplified, leading to daughters being married off as children (Breakthrough, 2012). In addition, border regions deserve special attention due to an increased risk of child marriage to protect children, for instance, from violence and interstate trafficking (Hindu, 2013; Sharma, et al., 2015).

42. Evidence also suggests that humanitarian crises and forced migration due to conflict or environmental disasters are associated with an increased risk of child marriage (Women's Refugee Convention, 2016). There is growing concern that populations affected by humanitarian crises and various idiosyncratic and covariate shocks may experience forms of violence, such as gender-based violence (GBV), and deprivations, particularly when displaced and following their return (Inter-Agency Standing Committee, 2015, p. 6). Women and children are particularly vulnerable to GBV during crises and displacement because of separation from families, a breakdown of law and volatile institutions (UNFPA, 2014). In such situations, parents may see child marriage as a viable option to protect their children from an increased risk of, for instance, sexual violence (Human Rights Watch, 2015; Women's Refugee Convention, 2016; Republic, et al., 2016; Plan International, 2013; Islam, et al., 2016; UNFPA, 2014).

Social Norms, Beliefs and Women's Standing in Society

43. Scholars identify (patriarchal) social norms regarding the role of girls in society as a key determinant for child marriage (Bicchieri and Lindemans, 2014; Breakthrough, 2012; Chowdhury, 2004; Roest, 2016; Singh and Vennam, 2016). In other words, child marriage is a manifestation of social norms reflecting gender inequality that perpetuate discrimination against girls (UNICEF, 2014). In particular, gender-specific norms regarding chastity and respectability of girls play a role in pressuring families to marry their daughters early in countries across South Asia (Nasrullah, et al., 2014b; Roest, 2016). Delaying marriage then is regarded as an increased risk that girls might deviate from these norms (Roest, 2016). Risk of increased exposure to violence also restricts a girl's possibility to use public spaces, sometimes even their attendance in school, as families fear that their daughters might be hurt or 'dishonoured' (Crivello and Boyden, 2011; Jejeebhoy, et al., 2013; Puri and Tamang, 2015; Roest, 2016). Furthermore, premarital sex is not only regarded as threatening the girl's health or her marriageability, but also the honour of her family (Chowdhury, 2004; Kalyanwala, et al., 2013). These concerns do not apply to boys in South Asia, in that their marriageability and family honour are not affected by them engaging in premarital sex, exposure to violence or more education (Singh and Vennam, 2016; UNICEF, 2014; Yarrow, et al., 2015).

44. In South Asia then, socially constructed norms and ideals of how men and women – husbands and wives – should behave are closely linked to the prevalence of child marriage. Women are valued for their reproductive capabilities rather than in their own right, which is why parents choose to marry their daughters early (Parsons, et al., 2015; Warner, 2011). Child brides are often preferred as they are presumed to adjust to the husband's family more easily (Pandey, 2017; Raj, et al., 2014b). Norms around marriage see girls and women as destined to care for the household and bear children, leaving little incentive for parents to educate young women beyond the absolute minimum or to delay their marriage (Puri and Tamang, 2015; Roest, 2016). Furthermore, many caregivers see time spent in school as inhibiting girls from learning skills to improve their marriageability, such as learning how to manage a household and raising children (Roest, 2016). As a result, resources are more likely to be invested in boys rather than in girls, making women a perceived unproductive investment (Puri and Tamang, 2015; Singh and Vennam, 2016) with girls constituting the majority (76 per cent).

45. Child marriage is also linked to the prevalence of violence against women and girls. In South Asia, child marriage, in and of itself, can be considered a form of violence against girls (Solotaroff and Pande, 2014). Gender norms that devaluate women may also perpetuate the acceptability of violence. Many girls are married off to protect them from violence and sexual harassment (UNFPA, 2012). In reality, many girls who enter a union experience physical and sexual violence at the hands of their husbands and in-laws (Parsons, et al., 2015). In a worldwide study among developing countries, Clark, Bruce and Dude (2006) found that girls who are married early were more likely to experience intimate violence from their partners compared to girls who are married after the age of 18. In India, Kanesathasan and colleagues (2008) showed that younger married girls were twice as likely to be beaten, slapped or threatened by husbands and other family members compared to girls who married at a later age. Because younger brides often live with their husband's family and depend on them, they are often unable to voice their concerns, to speak or report these acts of violence. Overall, GBV and child marriage are two interlinked vulnerabilities that prevail among South Asian youth when compared to other regions of the world.

46. As a consequence of these norms, women have a low standing in society. The legal systems of South Asian countries often have lacunas in tackling female vulnerability. In Nepal for instance, women and girls can obtain citizenship from either of their parents or from their husband at the time of their marriage; if daughters did not acquire their citizenship through their parents, they are dependent on their husbands to acquire citizenship (Center for Reproductive Rights, 2016). All South Asian countries have legal frameworks to prevent and penalize child vulnerabilities such as marriage, domestic and sexual violence, and gender-based discrimination, although, at times, the strict enforcement of these laws is lacking (Kumar, 2014).

47. Bicchieri, Jiang and Lindemans (2014) developed a theoretical framework, which aims at integrating different explanatory factors of child marriage from a social norms' perspective. It implies that people base their decisions on what others within their society do or think. When considering child marriage as a consequence

of social norms, this complicates the solution, since members of a society will not necessarily change their behaviour unless a majority within the society does so publicly and simultaneously.

Conceptual Framework

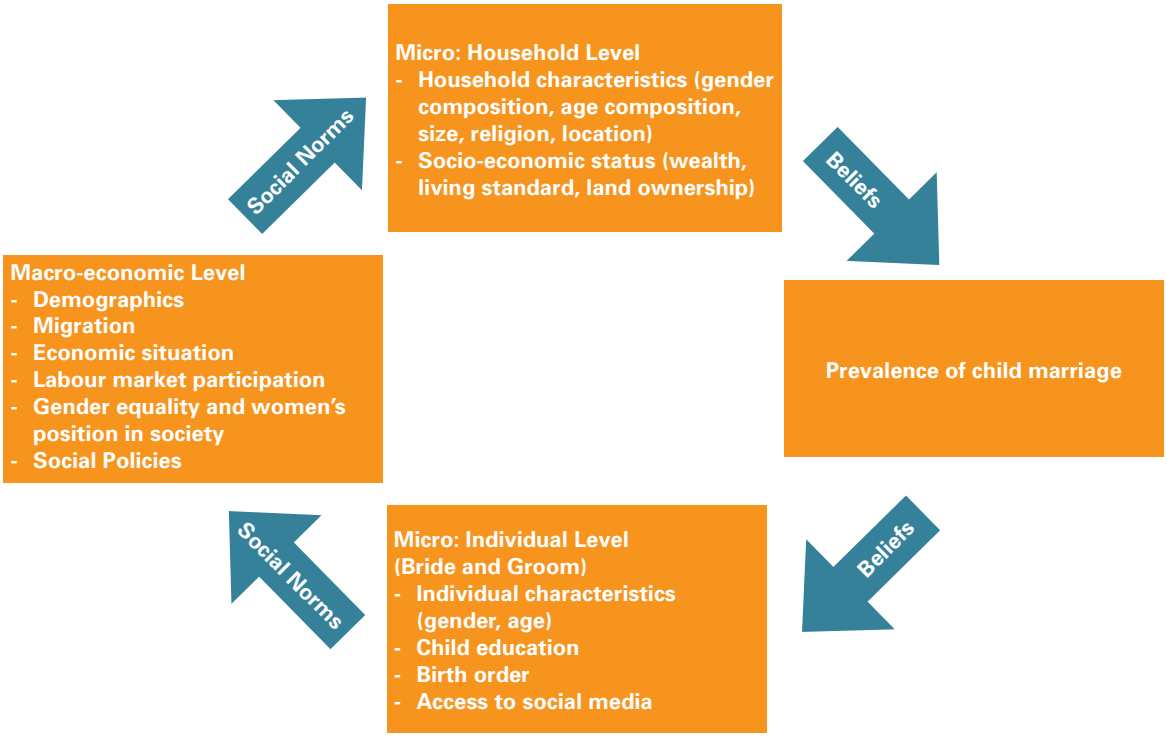
48. Based on the evidence presented above we develop an overarching framework that links the macro socio-economic environment, broadly defined, with the micro-level drivers of child marriage. The framework focuses first on macro-level drivers of child marriage, and the interplay between these drivers, since these are traditionally under-researched. Secondly, the well-known micro-level factors that play a role at household and individual levels are incorporated. Finally, the conceptual framework explores this idea of social norms and beliefs that societies embody, as they can strengthen or weaken the role of macro- and micro-level factors, driving the prevalence of child marriage. The framework focuses on those drivers that can be rooted in current knowledge and for which data are expected to be available.[11] It informs the empirical analysis of this study.

49. The conceptual framework is presented in Figure 2. One of the novelties of this framework is that it embeds child marriage decisions that are ultimately taken at the individual and household levels into their wider macro socio-economic context. The macro environment, such as social policies, the level of women's empowerment, the overall economic situation of a country, demographic changes and migration determines the circumstances that drive child marriage dynamics through influencing the decision-making at the household and individual levels. In the proposed conceptual framework, the macro-economic circumstances influence child marriage only indirectly, through micro-indicators at the household and individual levels. The macro and micro drivers are exacerbated by social norms and beliefs about child marriage and the standing of women in society. The specifics linked to each type of driver in relation to child marriage are discussed next.

50. At the macro-level, the **demographic** developments of a country can provide useful insights into the dynamics of child marriage. The literature has identified factors linked to fertility, mortality, sex ratio, life expectancy and family planning as potential drivers of child marriage. For instance, the gender imbalance that tilts towards more boys in South Asia may affect the demand side of the marriage equation, in that brides have now more choice for a husband and hence, not pressed for an early marriage (Mensch, et al., 2005; UNFPA, 2012). Arguably, the effects of these demographics in relation to child marriage are likely to vary by context and be correlated with other macro and micro factors such as the economic situation of the country, the size of the family, education and others.

11 The specific indicators and instrumental variables used for the different dimensions outlined in the framework will be discussed in the chapter describing the empirical strategy. Note that there might be several indicators suitable to measure one specific driver of child marriage.

Figure 2. Conceptual framework of micro-level and macro-level drivers of child marriage



51. There is limited evidence in scientific and policy research that directly identifies **migration** practices as drivers of child marriage. Migration may have an ambiguous effect on child marriage. Evidence shows that children with parents or other family members away have an early onset of sexual activity (Goldberg, 2013) and are more likely to enter an under-age marital union (Breakthrough, 2012). At the same time, families whose members are away have more resources and are able to pay significantly more dowry (UNICEF and ICRW, 2011; Geirbo and Imam, 2006). Similarly, children living in migrant households are exposed to social remittances (Levitt, 1998) – i.e. values and norms spurring empowering and emancipation ideas – which may protect young children from harmful practices, such as child marriage. Girls in migrant households were also found to stay more years in school, attesting that resources from migration are also invested in their education (Antman, 2012).

52. Harmful practices are often a feature of poor **economic** development, which is well known to produce a cascade of social risks for children. For instance, countries with some of the lowest GDP per capita are also those in which children are most at risk of child marriage (Lemmon, 2014). Limited wealth and various shocks are often decisive factors for families to marry their children at younger age (Davis, et al., 2013; Kumar, 2014; Islam, et al., 2016; Yarrow, et al., 2015). At the same time, economic development and better infrastructure, may reduce the practice of child marriage (Srinivasan, et al., 2015). It implies that better macro-economic conditions and improved economic development may benefit children.

53. Countries with high levels of labour market participation rates, especially for women, provide individuals with a variety of choices and opportunities. Employment

is well known to empower women by providing them with income, ideas and a voice in society and the household (Mathur, et al., 2003; Singh and Samara, 1996). Daughters of working mothers were found to fare better in schools, delay the timing of marriage and follow in their mothers' footsteps and become economically productive later in life (Jejeebhoy, 1995; Singh and Samara, 1996). Therefore, a positive association between labour market participation, especially of women, and lower rates of child marriage is assumed.

54. The unequal position of women in society and gender discrimination are key drivers of the persistence of child marriage practices in many South Asian countries (Raj, et al., 2014a). While state legislation mostly offers women equal rights, they are rarely enforced due to the persistence of traditional patriarchal norms that exclude women and girls from decision-making and expose them to the deprivation of child marriage and poor access to social and material resources (Singh and Vennam, 2016, Subramanian, 2008). However, in recent years, evidence suggests that women's position in society is changing in many South Asian countries. An increasing number of women start a career in politics and are represented in influential positions in the government, universities and management (Ghimire and Samuels, 2014; Kumar, 2014). These high-profile standings act as a role model for many girls who may feel empowered to follow into similar career paths and delay their marriage (Islam, et al., 2016; Singh and Samara, 1996).

55. Social policy provisions may play a key role in explaining child marriage decisions in South Asia. Evidence shows that social protection provisions linked to health (Dornan and Pells, 2014), education (Lee, 2003), and employment (Mathur, et al., 2003) play a critical role in reducing the vulnerability of children to harmful practices such as child marriage. In the absence of social protection policies targeting vulnerable populations, child marriage may emerge as a form of a safety net for children and their families. One would then expect that families in countries with more social protection expenditures would rely less on the practice of child marriage.

56. At the micro-level we distinguish between the household and individual drivers of child marriage. Household-level drivers include the gender composition, the age composition, household size, religion and location. All these drivers were found to associate with child marriage decisions. For instance, there is evidence to suggest that children living in female-headed households marry later (UNICEF, 2015). This is arguably because females tend to redistribute the economic welfare of the household equally among children, while finding alternatives to child marriage (Raj, et al., 2014b). Therefore, a household gender composition that includes more females will likely result in a lower risk of child marriage. It is, however, important to always take into account the household context. In some cases, female-headed households could also be more vulnerable and therefore resort to the practice of child marriage (Jensen and Thornton, 2003). The size of the household is also important, in that larger households need more resources to survive on a daily basis, and marrying children young often emerges as a strategic decision of the household to ease the burden on the family (Yarrow, et al., 2015). The age composition of the household nuances the marriage decisions, in that more children entail higher costs, for instance, with dowry (UNICEF and ICRW, 2011;

Singh and Vennam, 2016; Singh and Espinoza Revello, 2014). More elderly in the household also need additional care, and many brides find themselves in the position of caretakers after marriage (Goonesekere and Amarasuriya, 2013). The religion or caste status also plays a major role in child marriage decisions. In countries such as India or Nepal, for instance, belonging to a lower caste comes with a higher risk of being married early because of social norms that marginalize these communities (Singh and Vennam, 2016; Aryal, 2007; Maharjan, et al., 2012; Human Rights Watch, 2016). Similarly, belonging to different religions makes a difference. For instance, studies found that girls in Muslim households are more likely to marry early (Equality Now, 2014; Palamuleni, 2011; Adebowale, et al., 2012). However, the evidence linked to religion is highly contextual and needs to be approached with caution.

57. The socio-economic status of a household is an important covariate that may be associated with child marriage decisions. The household living conditions are found to determine the amount of dowry parents can pay to the groom's family (Anderson, 2007; Yarrow, et al., 2015). Similarly, the earlier the parents can marry their daughters, the smaller the dowry and the sooner they can transfer the responsibility of the bride to the groom's family (Nour, 2009). Poorer households might therefore choose to marry off their daughters at a younger age. Yet, these assumptions may be context specific and their effects may reverse when additional drivers, such as the sex ratio and location, are accounted for.

58. Individual characteristics such as gender and age play a key role in determining the risk of child marriage. For example, while there are cases of boy grooms, girls are more likely to marry young (Parsons, et al., 2015; UNFPA, 2016) as they have much less agency in the decision-making concerning their lives compared to boys (Maharjan, et al., 2012). Similarly, the age of a child is correlated to the risk of child marriage. Younger brides might be more desirable on the marriage market as they are often considered more obedient and can be moulded to fit in the new family (Singh and Vennam, 2016). Although boys are still married under age in Southern Asia, they have more freedom concerning the age at which they should enter the union, mainly because of the social convention that grooms must be older than brides (Mensch, et al., 2005).

59. An important relationship exists between child education and marriage decisions, in that higher levels of education delay the age of marriage and provides empowerment and increased opportunities for later life success (Aryal, 2007; Gazi, et al., 2013). Decisions regarding the marriage of children may also be prompted by the birth order of the child. Families who face economic difficulties may decide to wed their children who come of age, in that children at the top of the birth order may be able to contribute to the family's finances by marrying first (Islam, et al., 2016; Singh and Samara, 1996).

60. Finally, access to (social) media through the information and communication technologies may lead to more cosmopolitan ideas and changing patterns regarding traditional values such as marriage (Allendorf, 2013; Ghimire and Samuels, 2014; Verma, et al., 2013). For instance, the use of media was found to result in more love marriages among youngsters (Maharajan, et al., 2012). Yet the use of media

may also lead to feelings of sexual desire at an early age, which may perpetuate the under-age marriage, especially among boys (Sharma, et al., 2015).

61. The framework identifies social norms and prevailing beliefs as channels through which the above-mentioned drivers relate with child marriage decisions. Scholars provide informative accounts of how context-specific social norms shape decisions towards child marriage (Bicchieri, Jiang and Lindemans, 2014; Chowdhury, 2004; Singh and Vennam, 2016). However, explanations involving social norms do not identify the root cause that makes children vulnerable to the practice of child marriage in the first place. For instance, most frequently identified social norms in relation to child marriage in South Asia are safety, chastity and respectability, in that the reputation and marriageability of girls play a key role in pressuring families to marry their daughters early (Feeny and Grivello, 2015; Nasrullah, et al., 2014c; Roest, 2016). However, these norms are not convincingly a root cause of the outcome but rather two interim channels through which other factors exacerbate or ease child vulnerability. For instance, scholars identified labour market participation and education as factors that delay the age of marriage even when the context is riddled by social norms that favour child marriage (Mathur, et al., 2003; Roest, 2016; Singh and Samara, 1996). In other words, a social norm per se is not a necessary condition but rather a sufficient one, in that it accompanies more fundamental factors in order to exacerbate or alleviate the outcome. This study considers social norms as channelling factors that accompany the effects of macro drivers and link them with drivers at micro-level.

62. Household and individual level drivers are assumed to be channelled towards the outcome by prevailing beliefs of the benefits and risks associated with child marriage. From an economic perspective parents often balance the perceived benefits and risks associated with child marriage and strategically choose based on the long-term benefits for children and the household (Bicchieri et al., 2014; Karim et al., 2016). In contexts characterized by poverty, violence and underdevelopment, parents often choose on beliefs that marriage is more likely to secure the child's future and on benefits this practice unfolds, and these decisions sustain the practice (Pathfinder International, 2006). Like social norms, beliefs per se do not impact child marriage dynamics directly, but rather influence and channel the decisions taken at the household and individual levels. However, one must keep in mind that changes in social norms and beliefs occur slowly, which means that a temporal perspective needs to be employed to account for the steady, yet sluggish decline in child marriages in South Asia over time.

3. Empirical Strategy

Methodology

63. The objective of the analysis is to assess the drivers of child marriage in selected South Asian countries. Instead of presuming that the socio-cultural context or micro-factors alone drive child marriage decisions, the analysis examines whether macro developments are associated with child marriages in South Asia. Therefore, the analysis seeks to separate macro-level effects from the socio-cultural environment and household-specific characteristics. Along these lines, the study discusses to what extent observed declines in the prevalence of child marriage in parts of South Asia were associated with changes in the macro environment and where and under what circumstances these developments were most effective in reducing child marriages. In particular, we test how the province-level context affects the prevalence of child marriage controlling for household-level characteristics.

64. We model a household's probability of having a child bride or groom member accounting for household-level and aggregate province-level indicators with a multi-level model. The unit of analysis is the household nested within a province. The data of all selected countries and waves are pooled and used in a single estimation model. To account for the hierarchical structure, a random-intercept probit model is proposed as follows:

$$CM_{ij}^{*} = \beta + \theta MID_{ij} + \gamma MAD_{i} + \vartheta C + \varphi t + u_{i} + u_{ij}$$

$$u_{i} \sim \mathrm{N}(0,\psi);\ \mathrm{t} = 1,\ldots,\mathrm{T};\ j = 1,\ldots,N;\ i = 1,\ldots,P \qquad ;\ C=NP,\ BGL,\ PK$$

$$CM_{ij} = \begin{cases} 1\ if\ CM_{ij}^{*} > 0 \\ 0\ otherwise \end{cases}$$

where CM describes whether household j in province i has a child groom. MID refers to micro-level indicators, MAD to province-level indicators. The province effects are specified in terms of a province- and year-specific error variance with a random intercept and fixed effects of province-level predictors MAD. In addition, time and country fixed effects t and C are included in the model.

65. The estimation results are presented in two steps. In the first step, only the micro-level indicators are specifically modelled controlling for household's regional context using region-specific clustered standard errors. Thereafter, multi-level models as specified above are estimated to model how the regional context affects the probability of a household's having a child bride or groom. As robustness check the child marriage age is reduced to brides and grooms below 15 to assess whether coefficients change for a more extreme definition of child marriage.

66. In the analysis some assumptions on the mobility of households have to be made. As brides move into the household of the groom, the current household information does not capture information on the original background of the bride.[12] However, given that marriages are predominately contracted among families in the same region, the macro-level indicators are likely to capture the socio-economic environment in which the marriage decisions were taken. Yet this only applies if the bride's family resides in the same region and was thus exposed to the same macro environment as the groom's family. In case this assumption does not hold, the coefficients do not capture the factors that have led families to marry off their daughters and instead mainly reflect the drivers of the groom's family to contract this marriage.

Data

67. This study uses data from three countries in South Asia, namely Bangladesh, Nepal and Pakistan. Because of the largest number of data waves over time, the DHS is used as the principal data source.[13]

68. For the analysis it is essential to use data that offer sufficient independent observations of the macro-indicators for the econometric analysis. As the analysis examines child marriages over time and across countries, data for the analysis need to i) cover several years and ii) be comparable across countries.

69. Several data modules from the DHS data set were used, including the full data set on households, information collected on the subset of women and men between 15 and 49 that were or are currently married (ever-married sample) and information collected on children. An overview of the used DHS survey waves is presented in Table 1.

12 Therefore we cannot identify several idiosyncratic risk factors that push parents into situations in which they decide to marry off their children.

13 Two main data sources were initially identified: the Demographic and Health Surveys (DHS) and the Multiple Indicator Cluster Survey (MICS). A major shortcoming of the MICS is that survey rounds administered between 1995 and 2003 are not available. In that case, we would only have one to two observations over time per country, which is too little to measure the effects of macro-level drivers. It is important to note that we cannot combine DHS and MICS at individual or household levels as several key variables are either not covered or defined differently in both surveys.

Table 1. Overview of available DHS data

Wave	Bangladesh	Nepal	Pakistan
1990–1991			X
1993–1994	X		
1996–1997	X	X	
1999–2000	X		
2001		X	
2004	X		
2006		X	
2006–2007			X
2007	X		
2011	X	X	
2012–2013			X
2014	X		
	Bangladesh	**Nepal**	**Pakistan**
Observations HH level (all waves combined)	83,051	36,217	114,405
Waves	7	4	3
Provinces	6	5	4
Observations (total)	233,673		
Provinces * waves (total)	74		

70. The DHS data set allows for empirical analyses at several levels of aggregation. At the household level, the pooled data set contains 233,673 households, from 3 countries over 14 waves. For reasons of consistency across years, the provinces as defined in the first available DHS wave of the respective country are used. In Pakistan the provinces are Punjab, Sindh, New Western Frontier (now Kyber Pakhtunkhwa) and Balochistan.[14] In Nepal five provinces are distinguished: Eastern, Central, Western, Far Western and Midwestern.[15] In Bangladesh the provinces

14 In 2012, DHS data were collected in the following six provinces: Punjab, Sindh, Kyber Pakhtunkhwa (former New Western Frontier), Balochistan, Gilgit Baltistan and Islamabad. For consistency between the years we use the provinces where DHS data were collected in the 1990 and 2006 waves; i.e Punjab, Sindh, New Western Frontier (now Kyber Pakhtunkhwa) and Balochistan. As a result, Islamabad is allocated to Punjab and Gilgit Baltistan is excluded from the analysis.

15 The DHS 2011—2012 Nepal data set subdivides Nepal also into ecological zones, including terrain, hill and mountain. However, for consistency with the previous waves, the provinces Eastern, Central, Western, Far Western and Midwestern were used.

considered for the analysis are: Barisal, Chittagong, Dhaka, Khulna, Rajhahi and Sylhet.[16] Over the 14 waves, the total number of observations possible at the province level is 74 data points.[17]

71. Additionally, numerous external data sets were reviewed in order to get data for aspects that are not covered in the DHS and that could be important aspects of the environment in which child marriage decisions are taken. Out of the reviewed data sources we only selected those indicators that offered a sufficient amount of data points for a regression analysis.[18] Two sources of external data are used to further approximate the province level context in the years before each DHS data wave. First, annual information from the international disaster database (em-dat) was used to approximate the occurrence and extent of natural disasters.[19] Based on the database, country profiles were created listing all environmental shocks that occurred between 1990 and 2014 for each studied country. More specifically, the data show the disaster type, start and end date, affected provinces, and the total number of individuals affected per disaster. The information on the number of individuals affected by a shock is given as a total and is not disaggregated by affected provinces. To get province-level estimates, we assume that each province was affected proportionally to its population size in cases where several provinces were affected by the same shock. For the analysis, we consider the average number of individuals affected by disasters in the past three years as share of the province population.

72. Second, annual satellite night-time light data (NTL) from 1992 to 2013 provided by the National Oceanic and Atmospheric Administration (NOAA) are used to approximate for regional level economic activity (see Figure 11). NTL has been used increasingly in the literature as useful approximation for economic activity like GDP or income growth (Chen and Nordhaus, 2011; Henderson, Storeygard and Weil, 2012; Dai, Hu and Zhao, 2017; Bhandary and Roychowdhury, 2011), income inequality (Mveyange, 2015) as well as the size of the informal economy (Ghosh. et al., 2013). Using NTL is especially useful if official data on economic growth and economic activity over time are poor or not available, which applies to developing countries especially (Chen and Nordhaus, 2011; Henderson, Storeygard and Weil, 2012; Mveyange, 2015). NTL can also help to estimate economic statistics at the supra- and subnational level for which traditional data are more difficult to obtain (Henderson, Storeygard and Weil, 2012). An example for this is a study conducted by Bhandary and Roychowdhury (2011), which concludes that NTL is a useful tool for better understanding GDP at the district level in the case of India and possibly also for other developing countries. In contrast to the DHS data, NTL is available for the years before the data collection took place and thus allows a more realistic

16 Formally, Bangladesh consists of seven provinces; Barisal, Chittagong, Dhaka, Khulna and Rajhahi, Sylhet and Rangpur. However, the province Sylhet was not interviewed in 1993, and Rajhani was split into Rangpur and Rajhani in 2010. Therefore, we allocate Rangpur to Rajhani as of DHS 2011.

17 These regions were pre-specified by the DHS data and pose the lowest level of disaggregation possible with the DHS data. Using GPS data a lower level of disaggregation would be possible, but based on the survey sampling design, data would not be representative anymore.

18 Indicators that are only available on the national level or for single years are not included in the analysis. This includes among others social policy indicators, governance indicators, social media indicators. This is discussed in more detail in the Discussion section.

19 <https://ngdc.noaa.gov/eog/dmsp/downloadV4composites.html> <www.emdat.be/>

approximation of the economic context in which marriage decisions were made. Besides that, instead of just considering the current level of wealth or economic activity in a province, the data can be used to estimate growth rates in past years. In the analysis we consider the current NTL level to approximate current economic activity and the average NTL growth in the last three years previous to the interview to analyse if regional economic developments affected the prevalence of child marriage.

Limitations

73. In the study, we face several major data limitations: first, the information regarding the bride's background and the original place of residence is missing. Several household surveys ask for the age at first marriage, which allows examining the prevalence of child marriages. However, brides typically leave the household after marriage, which means that the surveys cover information of their new households and offer only little information of the brides' household of origin. Therefore, the circumstances that have led parents to marry off their daughters are difficult to distinguish, if not impossible. Hence, we cannot reliably identify the individual level drivers of child marriage. Therefore, we analyse which micro and macro factors are associated with the probability of households having a child bride or groom member.

74. Second, survey data typically cover the current situation of households and do not cover the situation in the previous years in which marriage decisions were taken. In addition, in each wave different households are interviewed. As a result, households are not tracked over time limiting the ability to analyse the circumstances in which the marriage decision was taken. Therefore, with the available survey data, the assumption is that the current context is similar to the time when marriages were arranged.

75. Third, since the main focus of the analysis is on macro-level drivers, a sufficient amount of variation in these macro-level variables is necessary to estimate the relationship with the prevalence of child marriages. Therefore, instead of approaching the analysis at the national level, the analysis includes macro-level indicators at the province level together with household level indicators. In addition, several macro-level indicators of interest are not available for the beginning of the analysed period in the early nineties. For example, information on public social expenditures or the diffusion of social media is available only for recent years, which is not sufficient to explain consistently child marriage trends. Due to data limitations for macro-level indicators at the province level we aggregate household-level information at the province level or merge available external data with the household data.

4. Results

76. In the first step, the prevalence and changes over time in the share of households with under-age married members are presented per country and province. Furthermore, descriptive statistics of selected macro-level indicators are discussed. Thereafter, the main regression results are presented.

Descriptive Statistics

For brevity, the evidence pertaining to child marriage rates and macro-level indicators is presented and the descriptive statistics of the micro-level indicators are summarized in Table 6 in the Annex. Additional cross-tabulations on selected micro-economic variables can be found in Table 11 to Table 12 in the Annex. Definitions of the micro- and macro-level variables used in the analysis can be found in Table 2.

Table 2. Variable description

Variable Label	Description
Micro-level	
Wealth index	DHS comparative wealth index
Education	School attainment in single years
Employment status	Percentage of members in household that have been working in the last 12 months
Women's employment status	Percentage of females in household that have been working in the last 12 months
Child elsewhere	Household has a son or daughter elsewhere
Migration	Proportion of members in the household that migrated (rural to urban or urban to rural) aggregated at the regional level
Household has a radio	Household has a radio
Household has a television	Household has a television
Household has a telephone	Household has a telephone
Female decision power in household	Female decision-making power regarding large household purchases
Domestic violence in household	Beating is justified if wife argues with husband
Urbanization	Percentage of households living in urban areas
Sex of the head of household	Sex of head of household
Education	Head household education in single years

Macro-level	
Wealth index (reg.)	DHS comparative wealth index by region
Night-time light (regional average)	Regional average of night light
Night-light growth (regional average past 3 years)	Night-light growth (regional average past 3 years)
Women qualified work (reg.)	Women in professional/technical/managerial occupation aggregated at the regional level
Affected by shock (reg. share of pop.)	Regional share of population that has been affected by a shock (extreme weather, drought, floods, storm)
Female decision power (reg.)	Who has the final say on making large household purchases (regional level)
Domestic violence (reg.)	Beating is justified if wife argues with husband (regional level)
Total fertility rate (reg.)	Total fertility rate per region – Total fertility rate expressed per woman [20]
Mean age of childbearing (reg.)	Mean age of childbearing
Women school attainment in single years – reg.	School attainment in single years in the region
Household has a television (reg.)	Percentage of households in the region that have a television set
Migration household (reg.)	Proportion of members in the household that migrated (rural to urban or urban to rural) aggregated at the regional level
Women (20–49) married before 18 (reg.)	Women between 20 and 49 years old that were married before the age of 18 (regional level)

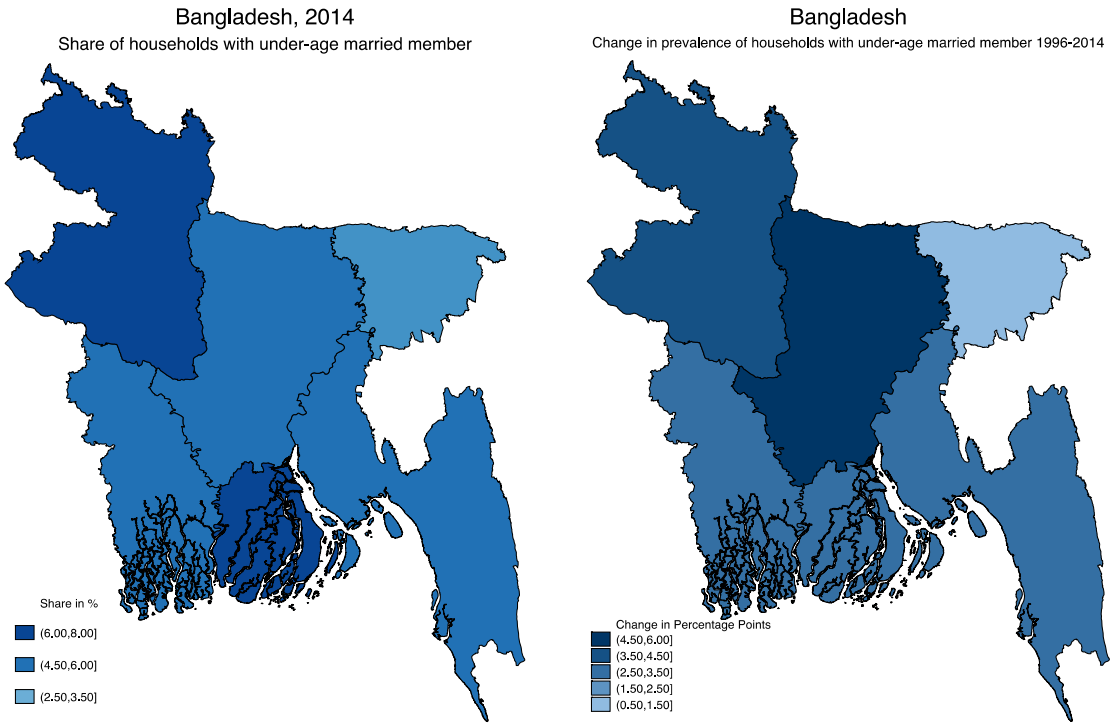
Child Marriage

77. As outcome variable we use a binary variable that describes whether a household currently has a married member below the age of 18. As robustness check we also use a definition of child marriage if the age of marriage was below 15 to test if drivers of marriage at an earlier age are different compared with the standard definition of child marriage (i.e. under the age of 18).

20 The total fertility rate (TFR) is the total number of births a woman would have by the end of her childbearing period if she were to pass through those years bearing children as currently observed by the Age-Specific Fertility rates, where the (ASFR) are expressed as the number of births per 1,000 women in a certain age group.

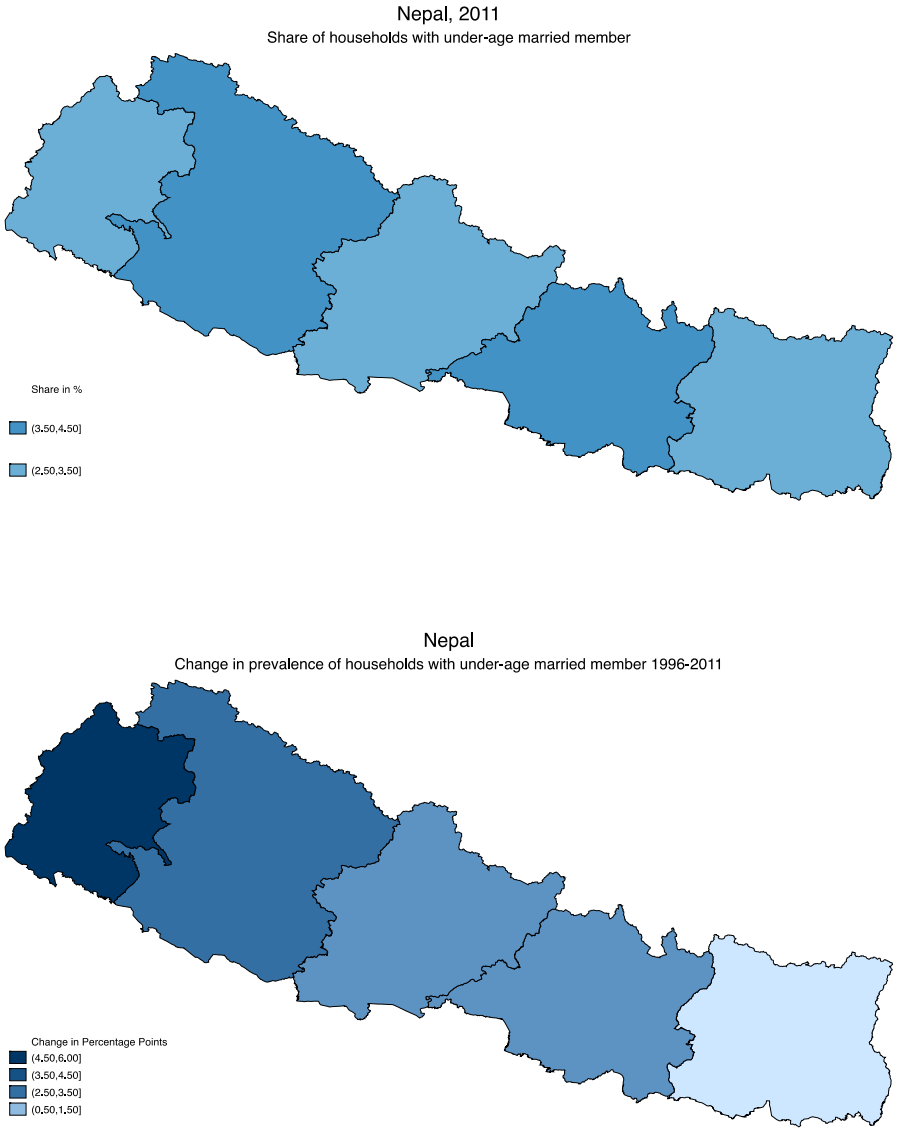
78. Figure 3 shows the prevalence of child marriage – households with a groom or bride below 18 – in 2014 and the change in the prevalence of child marriage between 1996 and 2014 across different regions of Bangladesh. In 2014, the highest concentration of households with an under-age married member was recorded in Rangpur and Barisal: an average of 6 to 8 per cent of all households in these regions had at least one member married currently under age. All other regions in Bangladesh had a recorded value of between 4.5 per cent and 6 per cent in 2014, except for the Sylhet region, which had an average rate of child marriage between 2.5 per cent and 3.5 per cent. Over the years, and specifically between 1996 and 2014, the prevalence of child marriage decreased most strongly in the Dhaka region.

Figure 3. Prevalence (left panel) and decrease (right panel) of child marriage rates in Bangladesh



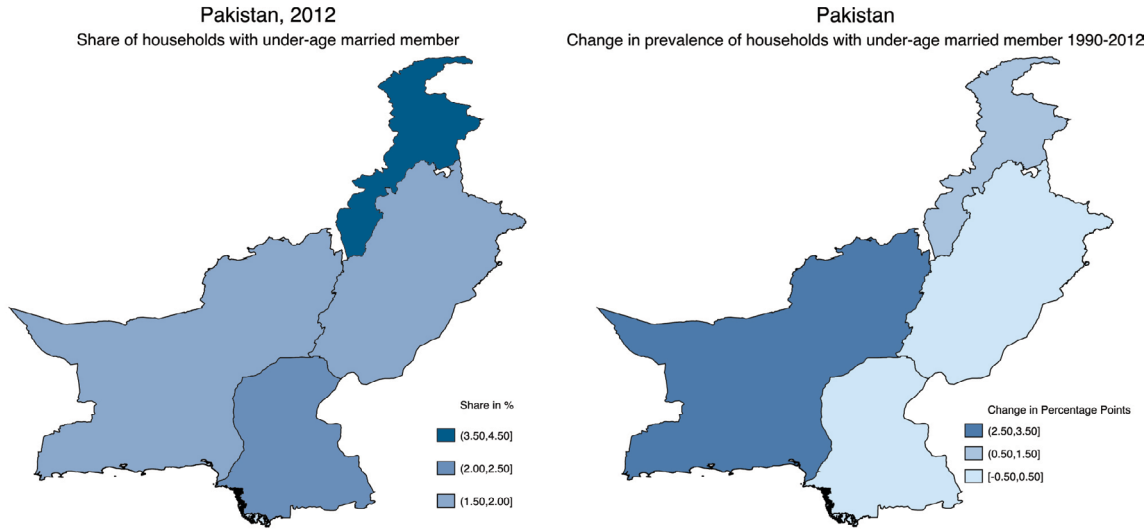
79. Figure 4 shows the share of child marriage rates in 2011 among regions in Nepal, and the decrease in the prevalence of child marriage rates among Nepali households between 1996 and 2011. Data show that the Midwestern and Central regions of Nepal had the highest rates of child marriage in 2011, which accounted for 3.5 per cent to 4.5 per cent of all households. The other regions – Far Western, Western and Eastern – had a prevalence of child marriage of between 2.5 per cent and 3.5 per cent. Between 1996 and 2011, the prevalence of child marriage decreased the most in the Far Western region followed by the Midwestern region. Child marriage in the Western and Central regions decreased at a similar rate while the decrease of child marriage in the Eastern region was the least pronounced.

Figure 4. Prevalence (top panel) and decrease (bottom panel) of child marriage rates in Nepal



80. Figure 5 presents the 2012 regional variation in child marriage in Pakistan and the change in the prevalence of households with married children between 1990 and 2012. Evidence shows that in 2012, the highest prevalence of child marriage was recorded in the Khyber Pakhtunkhwa (North West Frontier) province of Pakistan, where between 3.5 per cent and 4.5 per cent of all household reported having an under-age married member. The Sindh region had between 2 per cent and 2.5 per cent of households with a married child whereas the proportions of child marriage for the Baluchistan and Punjab regions ranged between 1.5 per cent and 2 per cent. Over a period of 22 years (1990–2012), the child marriage rates decreased the most in Balochistan (between 2.5 per cent and 3.5 per cent) followed by Khyber Pakhtunkhwa, where the decrease was in the range of 0.5 per cent and 1.5 per cent.

Figure 5. Prevalence (left panel) and decrease (right panel) of child marriage rates in Pakistan



Macro-level Indicator

81. A selected number of indicators further unfold the macro-level evidence across a number of dimensions (Table 7 to Table 9 in the Annex). The demographic developments of fertility and mortality reveal useful insights into population dynamics in the selected countries. The total fertility rate was calculated for the ever-married sample of women between 15 and 49 in the DHS data and shows the number of children born per woman, aggregated at the province level in each country. Data indicate that all countries of this study experienced a notable decrease in the total fertility rate per woman over the years. In Bangladesh, the average number of children per woman was 3.4 in 1993 and only 2.3 in 2014. Similarly, the total fertility rate of Nepali women was 4.6 in 1996 but went down to 2.5 in 2014. Of the sampled populations, Pakistani women had the highest number of children over years but on a descending trend: in 1990, the average number of children per woman was 4.9 but dropped to 3.8 in 2012.

82. The average age at which women give birth also decreased across the region (note that the mean age of childbearing is not limited to the first child and comprises all children of a mother). Over the years, the mean age of childbearing reduced by 1.5 years in Bangladesh (from 26.3 in 1993 to 24.8 in 2014), by 1.4 years in Nepal (from 27.5 in 1996 to 26.1 in 2011), and by 1 year in Pakistan (from 29.8 in 1990 to 28.8 in 2012).

83. The measurements of economic situation reveal useful insights into the change in wealth conditions in the three south Asian contexts. The harmonized factor scores of the DHS wealth index (based on a scale of assets, services and amenities, where more positive scores denotes better wealth recorded for all households), allow us to comparatively examine the evolution in the household wealth across time and contexts. The wealth scores show overall improvements in the living standards of households in Bangladesh and Nepal over time: the value of the Bangladeshi wealth index was -1.06 in 1993 and improved to -0.62 in 2011, while

the Nepali wealth index had a score of -1.13 in 1996 and improved to -0.40 in 2011. In Pakistan, data for the wealth index were available only for 2012 and show a value of -0.03. The availability of other assets and services, such as a motorcycle and electricity, shows similar improvements over the observed years.

84. The labour market indicators include the employment status of women and men in the three selected countries.[21] Over the years, women's employment for ever-married women between 15 and 49 increased in Bangladesh (from 16 per cent to 33 per cent, in 1993 and 2014, respectively) and Pakistan (from 17 per cent to 27 per cent, in 1990 and 2012, respectively) but decreased in Nepal (from 77 per cent to 60 per cent, in 1996 and 2011, respectively). Notably, despite the decline in employment, the overall proportion of working women in Nepal remained the highest among the three countries. In parallel, the employment rates of ever-married men between 15 and 49 years of age also declined in Nepal, from 96 per cent in 2001 to 77 per cent in 2011, which may reflect the worsening economic situation in the country during the observed decade. The employment rates of Bangladeshi men remained stable over years at a value of 98 per cent. The available data show that in 2012, the employment rate among Pakistani men was at 96 per cent.

85. Several macro-level indicators were employed to reflect on women's empowerment: the share of women in professional, technical, managerial and administrative employment, the regional share of women who reported having decision power on large household purchases and a domestic violence indicator measuring whether a partner beating their wife was justified if she argued with her husband. In addition, indicators such as women's educational attainment can be an indirect measure of women's empowerment and is discussed below.

86. The proportion of women doing qualified work was 0.4 per cent in Nepal (2011), 0.3 per cent in Bangladesh (2004) and 0.9 per cent in Pakistan (2012). These rates did not improve greatly over years. More generally, the proportion of women in paid labour decreased in Bangladesh (from 96 per cent in 2004 to 93 per cent in 2014) but increased in Nepal (from 30 per cent in 2001 to 40 per cent in 2011). In Pakistan the share of women in paid labour was at 86 per cent in 2012. In Bangladesh the proportion of ever-married women that indicate that they have decision-making power over large purchases either alone or jointly with their husband increased from 48 per cent in 2004 to 61 per cent in 2014. Similar trends can be observed in Nepal (from 40 per cent in 2001 to 58 per cent in 2011). Another indicator for women's empowerment is domestic violence, where respondents are asked whether beating is justified if a wife argues with her husband. In Nepal and Bangladesh the attitudes towards domestic violence decreased. In Nepal 11 per cent of ever-married men and women between 15 and 49 indicated that domestic violence was justified in 2001, which decreased to 1 per cent until 2011. In Bangladesh the rate decreased from 27 per cent in 2004 to 20 per cent in 2014. In Pakistan, the indicator could only be observed in 2012, where 31 per cent of men and women reported that beating a wife was justified if she argued with her husband.

21 Given that the employment status was only recorded for this subsample of the population and aggregated at the regional level, the employment status has to be interpreted as employment for all women and men ever-married between 15 and 49 and might not reflect the situation for the population as a whole.

87. Regional aggregated data on the average years of schooling provides additional insights on the education progress and in the target countries. The average years of education increased steadily over time in Bangladesh (from 2.3 in 1993 to 4.0 in 2014), Nepal (from 1.8 in 1996 to 3.5 in 2011) and Pakistan (from 2.1 in 1990 to 3.5 in 2012). A similar trend can be seen when looking only at the educational attainment of adults above 18 where the average years of education increased from 2.76 to 4.67 years between 1993 and 2014 in Bangladesh, from 3.33 years to 4.57 years between 1996 and 2011 in Nepal and 2.8 to 4.97 years between 1990 and 2012 in Pakistan. Similarly, school enrolment for children between 6 and 18 years has increased significantly in all three countries.

88. The variable measuring the mobility of household members may indicate migration patterns in the sampled populations. In the data, it is possible to observe if households had members elsewhere. Whether mobility takes place in the country or abroad is unknown. Results show increased mobility of household members in Bangladesh: over the years, the proportion of households with members away increased from 16 per cent in 1993 to 21 per cent in 2014. An increase in mobility was also observed in Pakistan, from 0.8 per cent in 1990 to 10 per cent in 2012. In Nepal, a rather modest decrease in mobility was noted, from 18 per cent in 1996 to 16 per cent in 2011.

89. Access to media sources provides accounts of how informed people stay with the overall state of affairs in the country and abroad. Results show discrepancies in the use of media sources in the analysed countries. Regional aggregated data show a steep decline in the use of radio and telephone among Bangladeshi households in the past two decades. At the same time, the share of Bangladeshi households with a television set increased radically, from 0.9 per cent in 1993 to 46 per cent in 2014. In Nepal, the availability of media sources (radio, television, telephone) increased over years, especially the use of television. The use of television has also doubled over time in Pakistan but the use of radio declined to trivial rates. These findings indicate a shift in the use of media in South Asian contexts, from more traditional radio and telephone sources to more intensive use of television.

90. Two macro-level indicators were employed to account for the regional practice and presumably the social acceptance of child marriage by measuring the women's marriage rate before the age of 15 and before the age of 18, for the cohort of women currently between 20 and 49 and aggregated at the regional level in each context. Women's marriage rates declined steadily in all countries but the magnitude of the decline varied in each setting. In Bangladesh, women's marriage rate before the age of 18 declined from 84 per cent in 1993 to 71 per cent in 2014, while the under-15 marriage rates declined from 60 per cent to 34 per cent in the same period. In Nepal, the baseline women marriage rates before the age of 18 was 68 per cent in 1996 and declined to 56 per cent in 2011. The under-15 marriage rates in Nepal were 27 per cent in 1996 and 17 per cent in 2011. In Pakistan, the under-18 marriage rates were 41 per cent in 1990 and 31 per cent in 2012, while the under-15 proportions were 15 per cent and 6 per cent in the same years.

Regression Results

91. In the main regression analysis observations of all available years and provinces are pooled and estimated jointly.[22] In the first step, we focus on the micro-indicators and do not specifically model the province-level environment (instead we allow observations within each province to co-vary to account for different province-level effects). Thereafter, households are embedded within the macro context of each province in a given year to assess the effects of the macro-level indicators. Furthermore, interrelations of micro- and macro-indicators are assessed and the effects of changes in selected macro-indicators on the probability of child marriages are graphically displayed.

Micro-level indicators

92. The complete regression results of the micro-level indicators are presented in Table 18 in the Annex and a shortened table with the main micro-indicators is displayed in Table 3. As expected, the age and gender composition of the household is very significantly associated with the likelihood of under-age married household members, as only households with children or unmarried adults are at risk of child marriage. For example, a household comprised of two married adults without children is clearly not at risk of child marriage.

93. Selected micro-level indicators are stepwise added to the baseline model describing the household composition. Several of these indicators are highly correlated, which is why we do not include all of them simultaneously in the regression models to avoid multi-collinearity issues. For example, the level of education in a household explains to a large extent the wealth index score of this household (correlation coefficient 0.64; see Table 13 in the Annex for an overview of the correlation coefficients). Moreover, several indicators are not available for all survey years or have many missing observations, which changes the number of observations quite significantly depending on the indicators included.

94. Households in rural areas are more likely to have married under-age members, and the likelihood decreases significantly if the household is led by a female head. This could support the importance of the female decision-making power in the household on child marriage decisions as described in the literature review. Women's empowerment in the household approximated with the women's decision power on big household purchases is negatively significantly related to child marriages. However, it has to be noted that the DHS module on women's empowerment was only included in later waves, which leads to a strong decrease in the number of observations. Alternative indicators for women's empowerment used were attitudes towards domestic violence, actual experience of domestic violence, women decision-making power over household earnings and use of contraceptives, which led to similar results, but which have more missing observations than the indicator on the decision power over big household purchases.

22 The descriptive statistics indicated that the prevalence of child marriage differed significantly across provinces and that the changes of child marriages over time also differed significantly by provinces. This is supported by regression results, which suggests that even within the selected countries there was considerable regional variation in the decline of child marriages.

95. The estimation results point out that wealthier households are on average less likely to have an under-age married member. The effect is robust and holds even after estimating the models for each country separately. In addition, households with higher mean levels of education are associated with a lower risk of child marriage. The effect of education holds considering school enrolment of children in the household and the education level of the household head instead of the average level of education in the household. Furthermore, the share of household members working was associated with a lower likelihood of child marriage.

96. The effect of access to media, measured with the presence of a television set and radio, has on tendency a positive effect on the decrease of child marriage. Yet this is only a crude measure of the influence of media as the variables say little about the actual use. It seems more likely that ownership of these assets on the household level captures household wealth and the ability to afford TV or a radio. Besides that, information on these assets is often missing, which reduces the number of observations by almost half. Households with members (15–49) who had sons or daughters living elsewhere – for example due to migration or because of marriages – were more likely to have married under-age members. Yet the proportion of household members who have migrated from rural to urban areas or vice versa is not significantly associated with the prevalence of child marriages.

97. Country and time fixed effects confirm the descriptive statistics showing a general decrease in child marriage over time and a larger likelihood in Bangladesh and a lower likelihood in Pakistan as compared with Nepal. The coefficients of the pooled data are similar to the results of each country separately and restricting child marriage to under-age brides leads to similar coefficient (see Table 19 in the Annex).[23] Furthermore, considering only households that are potentially at risk of child marriage does not change the results markedly. In the analysis we define households at (theoretical) risk of child marriage as households with family members between the age of 11 and 17 who are unmarried or who were married within the past year or households with unmarried household members up until the age of 40 who could potentially marry an under-age partner.

98. To summarize, household wealth, the level of education of the household head, and other household members including school enrolment of children seems to be the strongest protective factor against child marriage at the household level. It should be noted that the estimates reflect correlates and that do not necessarily imply causal relationships. Other studies did find differential effects of child marriages on education in different countries in South Asia (Population Council and UNICEF, work in progress, *Transforming Lives: The power of educating girls*), which underpins the importance of rigorous evidence on the causal impacts of education on child marriages. Controlling for household's wealth and education level, the selected indicators of women's empowerment in the household and female labour force participation are negatively associated with child marriage. This seems to suggest that female employment and women's empowerment reduces

23 We also estimated the models considering only child grooms, but due to the low prevalence maximum likelihood estimations do not converge in many cases. Besides that, we considered more extreme cases of child marriage defined below the age of 15, which leads to similar results in case estimates converge (not presented).

the risk of child marriages. However, we cannot clearly separate the causal effect pathways that could work in both ways for several indicators. For example women's empowerment in the household reduces the risk of child marriage, but low level of empowerment and oppression of the under-age marriage partner could also be the outcome of child marriage.

Table 3. Probit regression on the micro-level correlates of child marriage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
HH child marriage below 18	Child Marriage	Child Marriage	Child Marriage	Child Marriage	Child Marriage (At Risk)	Child Marriage (NPL)	Child Marriage (NPL)	Child Marriage (BGL)	Child Marriage (BGL)	Child Marriage (PK)
wealth index			-0.07***	-0.07***	-0.04		-0.27***		-0.21***	
			(0.02)	(0.03)	(0.03)		(0.10)		(0.08)	
education	-0.09***	-0.09***		-0.09***	-0.09***	-0.18***		-0.10***		-0.10***
	(0.01)	(0.00)		(0.01)	(0.01)	(0.01)		(0.01)		(0.01)
school enrolment children			-1.26***							
			(0.25)							
employment status		-0.23***	-0.14***	-0.22***		-0.16**		-0.27***		-0.11**
		(0.02)	(0.04)	(0.03)		(0.06)		(0.03)		(0.05)
women employment status					-0.20***		-0.23***		-0.30***	
					(0.04)		(0.07)		(0.04)	
child elsewhere			0.21***	0.21***	0.18***		0.17***		0.20**	
			(0.03)	(0.02)	(0.02)		(0.04)		(0.08)	
migration									0.01	
									(0.64)	
HH has a radio					0.05				0.13***	
					(0.03)				(0.04)	
HH has a television				0.09***			0.00			
				(0.02)			(0.07)			
HH has a telephone				0.06	-0.07		0.09		-0.04	
				(0.05)	(0.07)		(0.12)		(0.11)	
female decision power in HH					-0.39***		-0.41***		-0.55***	
					(0.03)		(0.05)		(0.05)	
urban	-0.12***	-0.12***	-0.10***	-0.11***	-0.08**	-0.22***	-0.15**	-0.10***	0.06	-0.10*
	(0.02)	(0.02)	(0.03)	(0.03)	(0.04)	(0.06)	(0.06)	(0.03)	(0.11)	(0.05)
sex head of household	-0.41***	-0.39***	-0.30***	-0.37***	-0.33***	-0.43***	-0.35***	-0.47***	-0.31*	-0.32***
	(0.03)	(0.03)	(0.04)	(0.03)	(0.05)	(0.06)	(0.08)	(0.05)	(0.16)	(0.06)
HH Composition	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country Fixed Effects	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO
Observations	228.130	125.427	54.902	89.436	38.076	19.157	13.849	41.841	5.881	15.408

Standard errors clustered at the province level (in parentheses). Complete Regressions results in Table 18 in the Annex. NPL = Nepal; BGL = Bangladesh, PK = Pakistan; At Risk = if household has under-age member 11–17/married within past years or unmarried member <age 40. * p < 0.1, ** p < 0.05, *** p < 0.01

Macro-level indicators

In this section, the province-level environment in which households reside is specifically modelled. We consider the baseline micro-level indicators as presented in column 1 of Table 3 and add aggregated province-level macro-indicators to the models as outlined in the methodology section. The macro-level indicators take on the same values for all households that reside in a province in a certain year. Given the number of survey waves and provinces in each selected country, macro-level indicators can take on up to 74 different values in the data. Due to the interrelations of some of the macro-level indicators and the limited variation in outcomes, some of the variables are highly correlated (see Table 6 in the Annex for an overview). Therefore, we stepwise test the influence of selected macro-level indicators on the prevalence of households with child marriage. For reasons of clarity, only the coefficients of the macro-level indicators are presented in the main text, but it should be noted that all regression includes household-level control variables, time, and country fixed effects (see Table 4 notes for a list of control variables). In the estimations, macro-level indicators for the regional economic situation, demographics, access to media, education, women's empowerment and the regional custom of child marriage are considered. The estimation results are displayed in Table 4.24

99. The regional economic situation is approximated by the average DHS comparative wealth index score, female (qualified) employment, the average regional level night-time lights, and the share of the population affected by natural disasters in the past three years. The regional level wealth score is negatively associated with the prevalence of child marriage, which is further supported by the results using night-time light data as approximation for the local economic activity. However, the effect is not robust and turns insignificant in half of the specified models. Controlling for regional wealth, the estimated share of people affected per province by shocks in the past three years is not significantly associated with child marriages. Considering shocks in the past five years or the past year only does not lead to different results. The regional share of women in qualified work is also not significantly associated with household-level child marriages. Yet, it has to be noted that the number of observations drops markedly after controlling for the share of women in qualified work, which may explain why the coefficient of the aggregated variables changes compared with the estimates on the household level.

100. As demographic indicators the regional mean age of childbearing and the fertility rate are considered. The local mean age of childbearing is negatively associated with child marriages. This negative effect could reflect regional norms and practices of child marriage as early marriages are associated with early parenthood. Surprisingly, the regional fertility rate is also negatively related with the likelihood of child marriages in households. This could support the marriage squeeze hypothesis discussed in the literature review; however, fertility rates are also associated with other socio-economic and cultural aspects and the relationship is thus very likely to be spurious. Other demographic indicators such as the under-

24 To increase readability of the regressions results, coefficients of the micro-level indicators are not presented in the tables. However, coefficients are generally in line with the estimates as presented in Table 18.

five, neonatal and post-natal mortality rates are also negatively associated with child marriages (results not presented as indicators are highly correlated with the mean age of childbearing).

101. The average school attainment among females in a province is not significantly related with child marriages. Considering the education of the household head instead of the mean level of education in the households leads to very similar results on the micro and macro, which is not surprising given the high correlation (correlation coefficient of mean education and education of household head = 0.73).

102. The regional share of households with members who have migrated in their life (either from rural to urban area or from urban to rural) – a crude measure for migration – is not significantly associated with child marriages. The effect of the regional pervasiveness of TVs – our measure of access to media – is negative and significant on the 10 per cent significance level controlling for regional-level wealth. This could indicate that access to media reduces the likelihood of child marriages and supports the importance of media on family planning decisions. However, it is difficult to separate the effect of access to media from other confounding effects based on the limited information on household assets in the data. This may also explain why the coefficient of TVs actually changes signs depending on whether used on the household level (see Table 3) or as average on the regional level. Detailed information on the use of media, particularly social media in recent years, could help to assess the effect on child marriages more clearly.

103. Lastly, the regional prevalence of child marriages among females including older cohorts (between 20 and 49) – regarded as indicator for existing customs of child marriages – has a strong positive effect on household's likelihood of child marriage. This is not very surprising and implies that households are more likely to have an under-age married member in regions where child marriages are more prevalent and more socially accepted.

104. Considering child marriages defined below the age of 15 (see Table 20 in the Annex) leads to similar estimation results. Yet the estimations tell little about the dynamics of the macro-level indicators and changes in the prevalence of child marriage. As outlined earlier, the current regional environment could be partly the consequence of high existing levels of child marriage, and the prevalence of child marriage does not indicate when and under which circumstances marriages were contracted. To rule out reversed causality, information on the development of the regional environment in previous years is necessary to capture the context in which marriage decisions were taken. However, subnational information is scarce and information on most indicators is not available on an annual basis. Therefore the night-time light data are used to approximate for the average growth of the regional level economic activity in the three years preceding the DHS survey. This allows us to analyse to what extent regional developments are associated with the current prevalence of child marriage. In order to ensure that child marriages were indeed formed within this context, we confine the analysis in the following to child marriages that were contracted within the last year and only consider households at risk of potentially having a child marriage member (defined as household with

members between the age of 11 and 17 or unmarried adult members up to age 40 and children may not already be married more than one year before the interview). This more narrow definition enables us to estimate the effect of economic growth on child marriages without facing reversed causality problems.[25] The estimation results are presented in Table 5.

105. The results indicate that regional growth in economic activity reduced the likelihood of child marriages significantly. It should be noted again that this effect is estimated controlling for a range of household-level characteristics that are not reported in the table for the sake of clarity (see table notes for control variable details). The effect of growth in economic activity holds after including other (current) economic and demographic macro-level indicators and the regional prevalence of child marriages. This implies that the developments in the regional economic activity are indeed associated with reductions in the prevalence of child marriages. The effect of regional growth in economic activity is insignificant in two specifications; yet this may be due to the marked reduction in observations in these estimations. The effect is stronger and more salient for child marriages defined as marriages with children below the age of 15. This seems to suggest that regional growth in economic activity increases the age at marriage, particularly of very young children. This could indicate that economic needs and the lack of resources may lead to very early marriages.

106. There are several reasons that may be driving the results. Economic developments could reduce the need to arrange child marriages and labour market improvements could make education a more viable option for parents. Besides the immediate economic environment, other aspects are likely to be associated with night-time light developments, such as for example access to media that requires electrification. Even though night-time light growth does not specifically indicate through which channels it affects child marriages, it suggests that wider economic developments play a key role in observed declines in the household's probability of having under-age married members. The results hold for separate estimations for Bangladesh and Nepal (Table 21 in the Annex; however, it has to be borne in mind that the number of observation on the province level becomes very small, potentially leading to biased standard errors) and that the analysis is limited to child brides.[26]

25 As this is a reduced sample, self-selection is accounted for by including the inverse Mill's ratio (IMR) as additional control variable in the (second stage) estimation. The IMR is included in all following regressions, but not explicitly reported in the estimation results. IMR enter the models significantly in most cases, but overall the results are comparable with and without considering self-selection into the group of households at risk of child marriage.

26 The results also hold when additional household-level characteristics are added to the model, yet, reducing the number of observations markedly.

Table 4. Multi-level probit regression on the macro-level correlates of child marriage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
HH child marriage below 18	Child Marriage	Child Marriage	Child Marriage	Child Marriage	Child Marriage	Child Marriage	Child Marriage	Child Marriage	Child Marriage	Child Marriage
wealth index (reg.)	-0.13					-0.22**		-0.16**		0.13
	(0.08)					(0.09)		(0.07)		(0.17)
night-time light (reg. average)		0.01	-0.05**				0.01			
		(0.02)	(0.03)				(0.01)			
women qualified work (reg.)				-0.40						
				(0.25)						
affected by shock (reg. share of pop.)	-0.34	-0.02	-0.04			-0.38*	-0.07	-0.13		-0.39
	(0.27)	(0.28)	(0.36)			(0.21)	(0.16)	(0.16)		(0.29)
female decision power (reg.)			1.49***							
			(0.41)							
attitudes toward domestic violence (reg.)				1.07***						
				(0.26)						
women (20–49) married before 18 (reg.)							0.01***			
							(0.00)			
total fertility rate (reg.)						-0.15***				
						(0.04)				
mean age of childbearing (reg.)								-0.12***		
								(0.01)		
women school attainment in single years (reg.)					0.07					
					(0.06)					
HH has a television (reg.)										-0.79*
										(0.44)
migration HH (reg.)									-2.18	
									(3.97)	
Household Level Controls	yes	yes	yes	Yes	yes	yes	yes	yes	yes	yes
Year	yes	yes	yes	Yes	yes	yes	yes	yes	yes	yes
Country	yes	yes	yes	Yes	yes	yes	yes	yes	yes	yes
N	209.160	226.460	95.244	50.403	233.649	209.160	226.460	209.160	37.034	209.160

Standard errors in parentheses. Note: HH level control include mean education level, age composition, sex of the HH head, gender composition, year and country fixed effects. (reg.) refers to variables measured at the regional level and NOT on the household level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 5. Multi-level probit regression on the macro-level correlates of child marriage in past year – only households at risk of child marriage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Under-age HH member married within last year	Child Marriage <18	Child Marriage <18	Child Marriage <18	Child Marriage <18	Child Marriage <18	Child Marriage <15	Child Marriage <15	Child Marriage <15	Child Marriage <15	Child Marriage <15
night-time light growth (reg. average past 3 years)	-0.20*	-0.20***	-0.36	-0.77	-0.15***	-0.36**	-0.28***	-0.23***	-0.34	-0.3***
	(0.11)	(0.06)	(1.76)	(0.54)	(0.06)	(0.16)	(0.06)	(0.06)	(0.34)	(0.08)
women qualified work (reg.)				0.17				0.84*		
				(0.67)				(0.49)		
women (20–49) married before 18 (reg.)					0.01**					-0. 300
					(0.00)					(0.00)
affected by shock (reg. share of pop.)	-0.25	0.01	-1.99	1.94	-0.06	0.12	0.19	-0.14	0.07	0.22
	(0.24)	(0.17)	(2.63)	(1.39)	(0.15)	(0.25)	(0.20)	(0.35)	(0.39)	(0.21)
female decision power (reg.)			1.74	0.55					1.89**	
			(2.92)	(0.81)					(0.78)	
mean age of childbearing (reg.)		-0.17***		-0.16***	-0.14***		-0.16***	-0.16***		-0.18***
		(0.02)		(0.05)	(0.02)		(0.02)	(0.03)		(0.03)
migration HH (reg.)			-9.95***							
			(2.63)							
Household Level Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Year	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Country	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Groups	58	58	10	24	58	54	54	34	30	54
Intra Class Correlation (ICC and Std. Error)	0.13 (0.003)	0.01 (0.002)	0.001 (0.005)	0.01 (0.003)	0.004 (0.001)	0.02 (0.01)	0.01 (0.003)	0.004 (0.004)	0.01 (0.01)	0.01 (0.003)
N	134.375	134.375	11.347	30.475	134.375	127.078	127.078	102.639	37.165	127.078

Standard errors in parentheses (clustered at the province/year level) * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ Note: Household Level Controls include mean education level, age composition, sex hh head, gender composition, year and country fixed effects and Inverse Mill's ratio (to control for self-selection of households at risk of child). Intra Class Correlation estimated without clustered standard errors. Household at risk = household has under-age member (who did not marry more than one year ago) or unmarried adult member up to age 40.

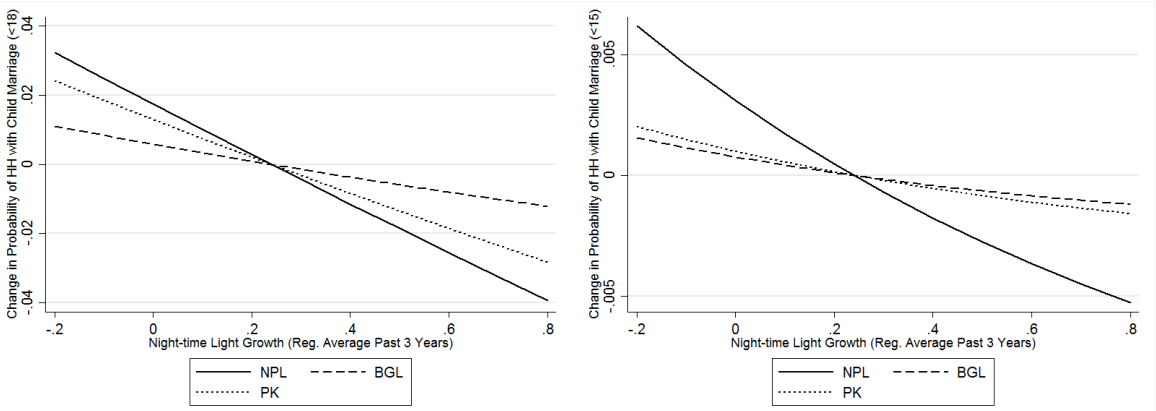
Predicted Changes in the Probability of Child Marriage

107. The interpretation of coefficients of probit models is not straightforward. To illustrate the effect size of the regional growth in night-time light and the regional prevalence of child marriages, we predict the probability of child marriage dependent on changes of these macro-level indicators based on models as presented in column 2 and 7 of Table 5. Therefore, we plot how a change in the macro-level indicator away from the mean changes the probability of child marriage according to the estimation models. For each indicator we present the graphs for the standard child marriage definition (<age 18) and for ages below 15.

108. Figure 6 shows how the predicted probability of child marriage changes dependent on the level of night-time light growth. The observed night-time light growth between 1995 and 2013 differ markedly by country. Annual growth was highest in Pakistan (0.39) followed by Bangladesh (0.09) and Nepal (0.05). On average, night-time light grew by 0.24 per year in the complete household-weighted sample. The unit interpretation of night-time lights is not so intuitive as it reflects the brightness in the satellite images. Yet positive numbers reflect a growth in regional night-time lights.

109. Above average growth reduced a household's probability of having under-age married members. For example, an average annual increase of 0.5 in night-time lights in the past three years is predicted to reduce child marriage by about 2 percentage points (pp) in Nepal, 1 pp in Bangladesh and 0.5pp in Pakistan. The predicted effects on child marriage under the age of 15 are similar in Pakistan and Bangladesh and have the largest impact in Nepal.

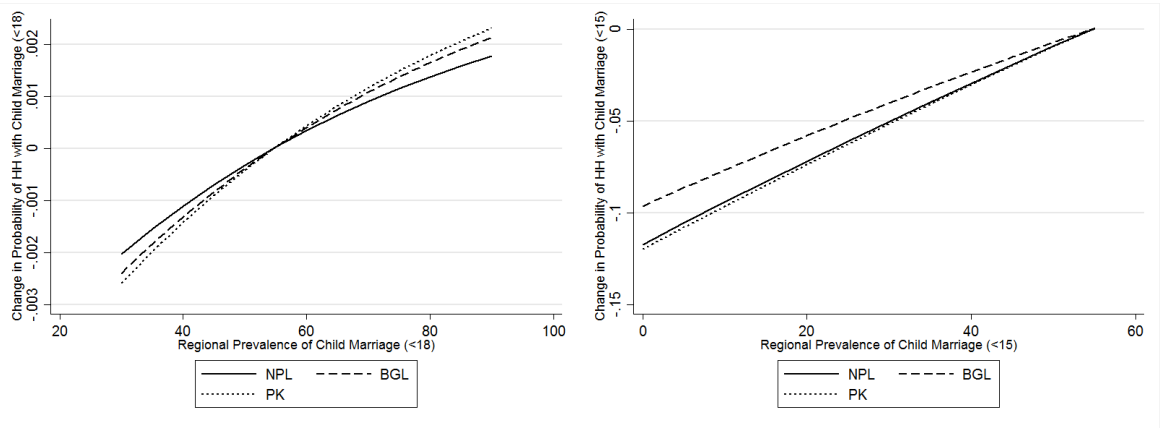
Figure 6. Predicted effect of night-time light growth on child marriages in households (<age 18 and <age 15) by country



110. Figure 7 shows the predicted probability of child marriage changes dependent on the regional prevalence of child brides (current and past cohorts age 20–44). The rates were highest in Bangladesh (77 per cent), followed by Nepal (63 per cent) and Pakistan (36 per cent). On average, the regional level of child brides in all selected countries was about 55 per cent of women between age 20 and 44. A reduction of

about 15 per cent in the local prevalence of child marriages of all cohorts is predicted to reduce households' current probability of child marriage by about 2 pp. The predicted effects of the regional prevalence of child marriage are similar in the three selected countries. The risk of child marriage grows increasingly with the regional prevalence of child marriage, which confirms that marriages at very early ages mainly occurred in regions where child marriages are pervasive and socially accepted.

Figure 7. Predicted effect of regional prevalence of child marriages on household child marriage (<age 18 and <age 15) by country



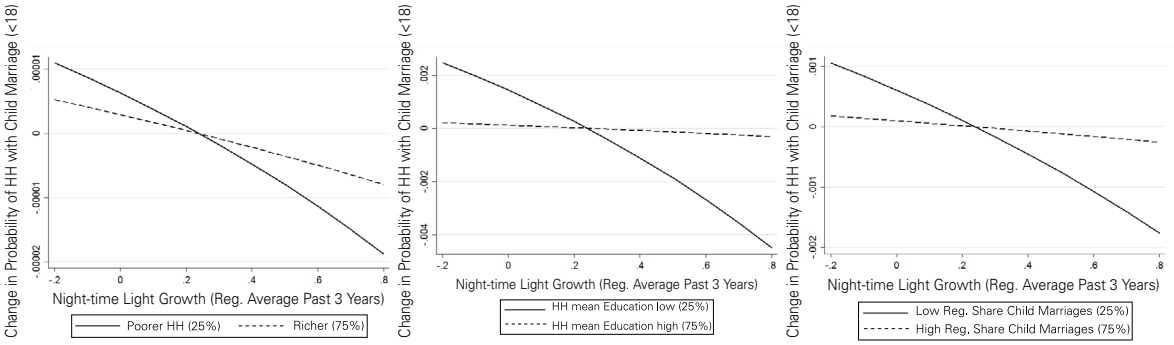
Interrelationships

111. The findings imply that past growth in regional economic activity decreases the likelihood of child marriages. However, these average effects may hide differences in the effects depending on household characteristics or other regional aspects. Not all households benefit equally from economic growth and even in this case, the motivations and drivers of child marriage are diverse and encompass more than just economic needs. To test whether the effect of past developments in the economic activity affect certain households differently, the inter-relationships between growth and other micro- and macro-levels indicators are examined in more detail.

112. On the household level we consider whether night-time light growth affects poorer households differently as compared with more well-off households. On one hand, in cases where child marriages are motivated by economic needs, we would expect a stronger effect of economic growth on the probability of child marriages in poorer households. On the other hand, if poorer households benefit less from growth, we may expect a smaller impact on child marriages. Besides that, we consider the effects of night-time light growth depending on the education level in households. More educated households are expected to be more likely to participate in economic developments than less educated households, for example through better employment possibilities. Lastly, we consider the regional prevalence of child marriages including older cohorts (20–49) as indicator for the strength of child marriage customs.

113. The estimation results are presented in Table 22 in the Annex. As the interpretation of the interactions of variables in probit models is difficult and different from linear estimation model, the results are graphically presented. Figure 8 shows the predicted probability dependent on night-time light growth for poorer versus richer households, more versus less educated households and regions with a high versus low prevalence of child marriage. The lower and upper bounds of each of the three interacted dimensions are defined by the 25 per cent and 75 per cent percentile of the respective variables. Additional interrelations are modelled in the estimations in the Annex, but not presented graphically.[27]

Figure 8. Predicted effect of night-time light growth depending on high vs low levels of household wealth, education and the regional mean age of childbearing (all countries pooled)



114. The graphs indicate that growth in night-time light tends to affect richer households similarly to comparatively worse off households. However, households with higher average levels of education benefit significantly more from NTL growth than less educated households. The interrelationship of NTL growth and education indicates that the risk of child marriages in households with higher levels of education is significantly more sensitive to changes in the local economic activity than households with lower education levels. The results hold after using alternative measures of household education such as the level of education of the household head. This could support that less educated households benefit less from changes in the local economic activity and thus react less to these changes in terms of child marriages decisions. Lastly, the model predictions suggest that regions with a low prevalence of child marriage are much more sensitive to growth in economic activity compared with regions in which child marriage is less common. In regions with strong child marriage customs NTL growth does not reduce the current risk of child marriage and instead the estimated interrelationship even suggests that growth in economic activity could increase the prevalence of child marriage in these regions. Contrary to that, in regions where child marriage is a less common practice, NTL growth reduces the risk child marriage significantly controlling for the regional level of child marriages. These results imply that economic developments

27 The estimates include the interrelation of NTL growth and women's empowerment indicators, but because of the large number of missing observations in the indicators, the estimates need to be interpreted with caution and are thus not presented in the main text.

reduce the risk of child marriages, but only in certain contexts and for some households. It has no impact in areas where child marriage is the norm and socially accepted and for households with low levels of education, which may be less likely to benefit from economic developments. Yet, in areas where child marriages are less common, economic developments may ease the financial pressure on households to engage in child marriages.

Regional sensitivity to NTL growth

115. For more realistic predictions of the impacts of local economic developments, the specific levels each province can be used. Therefore we consider growth in the local economic activity (measured as NTL growth) and the prevalence of child marriage (including older cohorts) in each province. Based on that, it is predicted how an increase in NTL growth by 0.05 (this reflects an average increase in NTL growth of about 20 per cent) changes the current prevalence of child marriage holding all other micro- and macro-indicators constant.[28] Figure 9 displays a map with the predictions for each selected country and province in 2011/2012. The darker the blue colour in the map, the larger the decrease in the prevalence of child marriage due to the increase in economic activity.

116. The results indicate that economic growth has mixed effects. In regions with a low prevalence of child marriages (especially Pakistan) the model predicts a decrease in child marriage of up to 0.4 pp. Given that around 1.5 per cent of households had an under-age married member in 2012 in Pakistan the predictions reflect a very significant reduction of child marriage of almost 30 per cent in these areas.

117. In contrast, the same additional increase in NTL growth in provinces where child marriages are a more common social practice the additional growth is even predicted to slightly increase the prevalence of child marriage. For example, in Bangladesh the additional growth is predicted to increase the prevalence slightly by 0.07 pp on average. Given that around 5.8 per cent of households had an under-age married member in 2011 in Bangladesh these predictions reflect an increase of about 1 per cent in child marriage for an additional increase in the level of economic activity holding all other factors constant. Similarly, for Nepal the additional increase in economic activity is predicted to have no or even a modest negative effect on the prevalence of child marriage.

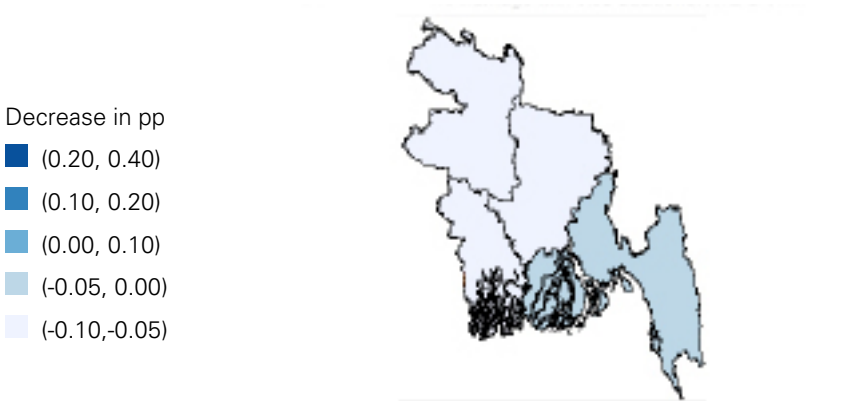
118. The results suggest the highest sensitivity to local economic developments in Pakistan but no or even a negative effect in Bangladesh and Nepal, where the prevalence of child marriage is significantly larger. This indicates that part of the observed declines in the prevalence of child marriage in the last decade may be driven by economic developments; yet, especially in Bangladesh and Nepal, this does not seem to be an important driver. A (speculative) explanation could be that economic developments affect other drivers of child marriage. For example, economic developments may attract investments in education in order to benefit from the opportunities that these developments generate. Such indirect effects are not considered in the simulation as other factors including education are held constant.

28 Predictions are based on model 1 of Table 22.

Figure 9. Predicted effect of an increase of 0.05 in local economic activity on the prevalence of child marriage

Bangladesh, 2011

Decrease in child marriage with 0,05 additional NTL growth

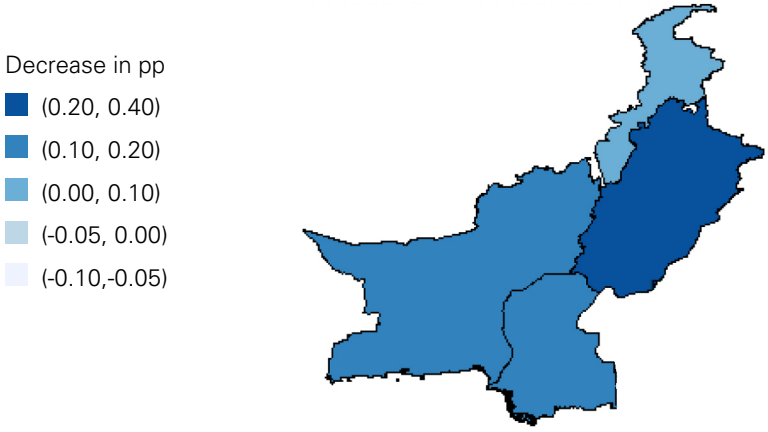


Nepal, 2011

Decrease in child marriage with 0.05 additional NTL growth

Pakistan, 2011

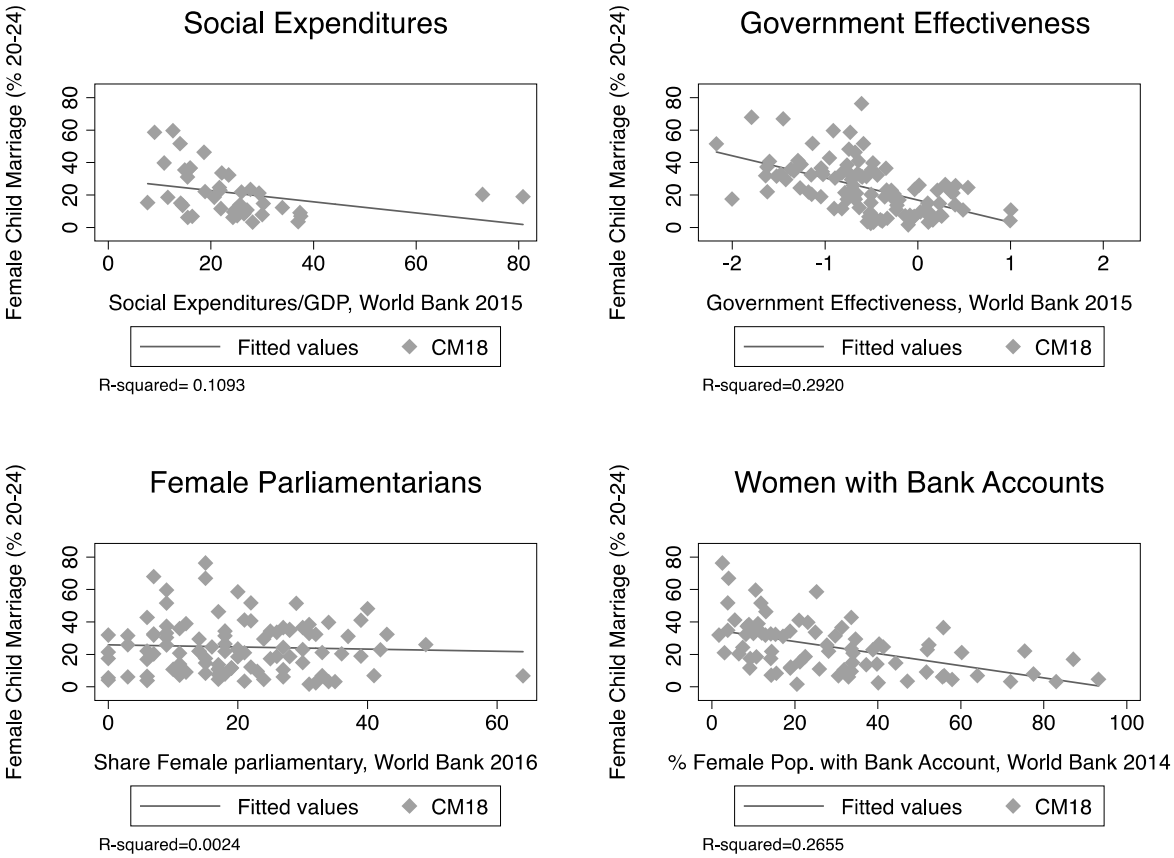
Decrease in child marriage with 0.05 additional NTL growth



5. Discussion

119. This study has shown that in addition to the micro-level drivers of child marriage, the macro-level circumstances that a household faces can add valuable insights to the existing literature on child marriage. However, despite its important finding, there are several limitations to this study. First, given that data are collected about the current situation of a household, the decision factors that drove parents to marry their child early cannot be investigated. In addition, the DHS data are cross-sectional, where in each wave households are randomly selected which might not correspond to the households selected in the previous years. As a result, there is no information on households over time, which could provide information on the circumstances under which child marriage decisions were taken. Second, data are usually collected in a given year, while the situation in the previous years is unknown. However, most macro-economic drivers, such as economic growth, demographic indicators or labour market participation are sluggish in their nature, showing effects only after several years or even decades. Third, for the regional analysis, data had to be aggregated from the household level or even ever-married sample of 15- to 49-year-old men and women to the regional level. Even though the data set is representative at the household and regional level, aggregating the data results in a loss of information on individuals and might reflect the actual economic situation in the region only to a limited extent. Finally, some indicators linked to social policies and governance were only available at the national level, while disaggregated, regional data could provide more data variation. For example, there might be other macro-level factors such as social expenditures, government effectiveness or the prevalence of women's leadership that might be linked to the prevalence of child marriage. Figure 10 shows the relationship between other possible macro-level factors contributing to child marriage, such as social expenditures, government effectiveness, share of female parliamentarians and the prevalence of child marriage. The data are pooled at the national level for all years and all available countries.

Figure 10. Other macro-economic indicators related to child marriage



Note: World Bank data on women in development and governance indicators used. Child marriage refer to data between 2009 and 2014.

120. Social expenditures such as social benefits towards poor households might mitigate the economic constraints of poor families and be negatively correlated to child marriage. Figure 10 shows that social expenditures are negatively correlated with child marriage, meaning that countries with higher social expenditures are more likely to have a lower prevalence of child marriage. A similar result holds for other measures of women's empowerment, such as the number of women in leadership positions. A larger share of female parliamentarians in a country might be negatively correlated to the prevalence of child marriage. However, the data show that this negative relationship is relatively weak. Finally, measurements of government effectiveness could provide an indication on how well legislation regarding child marriages is executed and to what extent laws are being followed. One can assume that under better governance child marriages could potentially decline. In Figure 10 the governance indicator estimate in standard normal units ranges from -2.5 (low government effectiveness) to 2.5 (high government effectiveness). It can be seen that countries with low governance are correlated with high child marriage and vice versa. However, further analysis of the data is needed to provide clear links between these indicators and the prevalence of child marriage.

121. In light of these limitations, there are several avenues for future research. An interesting future avenue would be to collect time-series data on households, where households are tracked over a longer period of time in order to understand the individual and household factors contributing to child marriage in all three countries. Ideally, data would provide consistent surveys across all countries and for the same time span. In addition, macro-level indicators should be consistently collected at the regional level for all countries for all years, as to include lagged observations on macro-level drivers to see whether macro-level drivers take longer in order to have an effect on child marriage.

122. The main limitation of current research on child marriage is that causes and consequences of child marriage cannot be clearly separated, leading to reversed causality issues. A final avenue to investigate is therefore to separate causes and consequences of child marriage. However, such a separation warrants rigorous field experiments. For example, one could measure the impact of social norms of child marriage on the prevalence of child marriage by introducing modules that measure preferences of child marriage or attitudes towards child marriage directly. Alternatively, experiments eliciting these norms and attitudes could provide reliable and useful additional measures on the social norms and beliefs that might drive the prevalence of child marriage.

6. Conclusion

123. While child marriage is widely considered a human rights issue, recent evidence shows that the practice also has consequences for economic development, posing additional costs at the individual and societal level (Wodon, et al., 2017). Ending the practice not only entails welfare gains at the individual level, but also for the economy as a whole, for example by improving a population's health levels, declining birth rates and resultantly increasing economic growth. Over the past decades there have been increased policy efforts to either end the practice or target the factors contributing to child marriage, including low education, existing social norms and gender inequality. However, these policies are often targeted at individuals at the micro-level. For example, in Bangladesh, several programmes are targeted at education, providing scholarships to women, raising awareness of the detrimental effects of child marriage and empowering women. However, improving overall economic development or employment opportunities for women is largely ignored in the context of child marriage. In Nepal, several policies aim at community development for women, women's empowerment, providing employment opportunities through training and information on child marriage through radio programmes. In Pakistan, policies are aimed at empowering women, mobilizing communities, strengthening legal rights and girl's participation in education. The results from this study indicate that while targeting child marriage at the micro-level can decrease the practice, macro-level policies can complement these initiatives by promoting economic development in regions that are at high risk for child marriage to prevail.

124. In particular, this study has shown that the economic development in a region is negatively correlated with child marriage. Using the Night-Time Light Growth data of the past three years preceding the survey allowed for a robust causal relationship between economic development and the prevalence of child marriage. The negative effect on night light growth on the prevalence of child marriage is particularly salient when looking at child marriage below the age of 15. However, night light data only provide an aggregated measure of economic development, while the specific channels through which it reduces child marriage cannot be disentangled. These findings imply that economic developments reduce the risk of child marriages, but only in certain contexts and for some households. It has no impact in areas where child marriage is the norm and for households with low levels of education, which may be less likely to benefit from economic developments. Yet, in areas where child marriages are less common, economic developments may ease the financial pressure on households to engage in child marriages. In these regions economic development can significantly reduce the economic pressure on households, which might lead to a delay to marry off their children. On the other hand, in regions where child marriage practices are salient or there is a strong social norm for child marriage practices, economic development is not enough to reduce the practice.

125. While there are positive developments in ending the practice of child marriage through policies targeted at micro-level drivers, significant improvements have to be made to reach the target to eliminate child, early and forced marriage by 2030 stipulated in the Sustainable Development Goal Number 5. This study has shown that developments of economic activity at the macro-level can significantly contribute to our understanding of child marriage developments and help design policies to end the practice by 2030. However, just relying on economic developments to end the practice of child marriages will not be sufficient as growth seems to affect the low-hanging fruits strongest. Yet, access to education, a fair chance to benefit from economic developments and knowledge about the detrimental consequences of child marriages are expected to play a key mediating role in the impacts of economic growth on the prevalence of child marriages.

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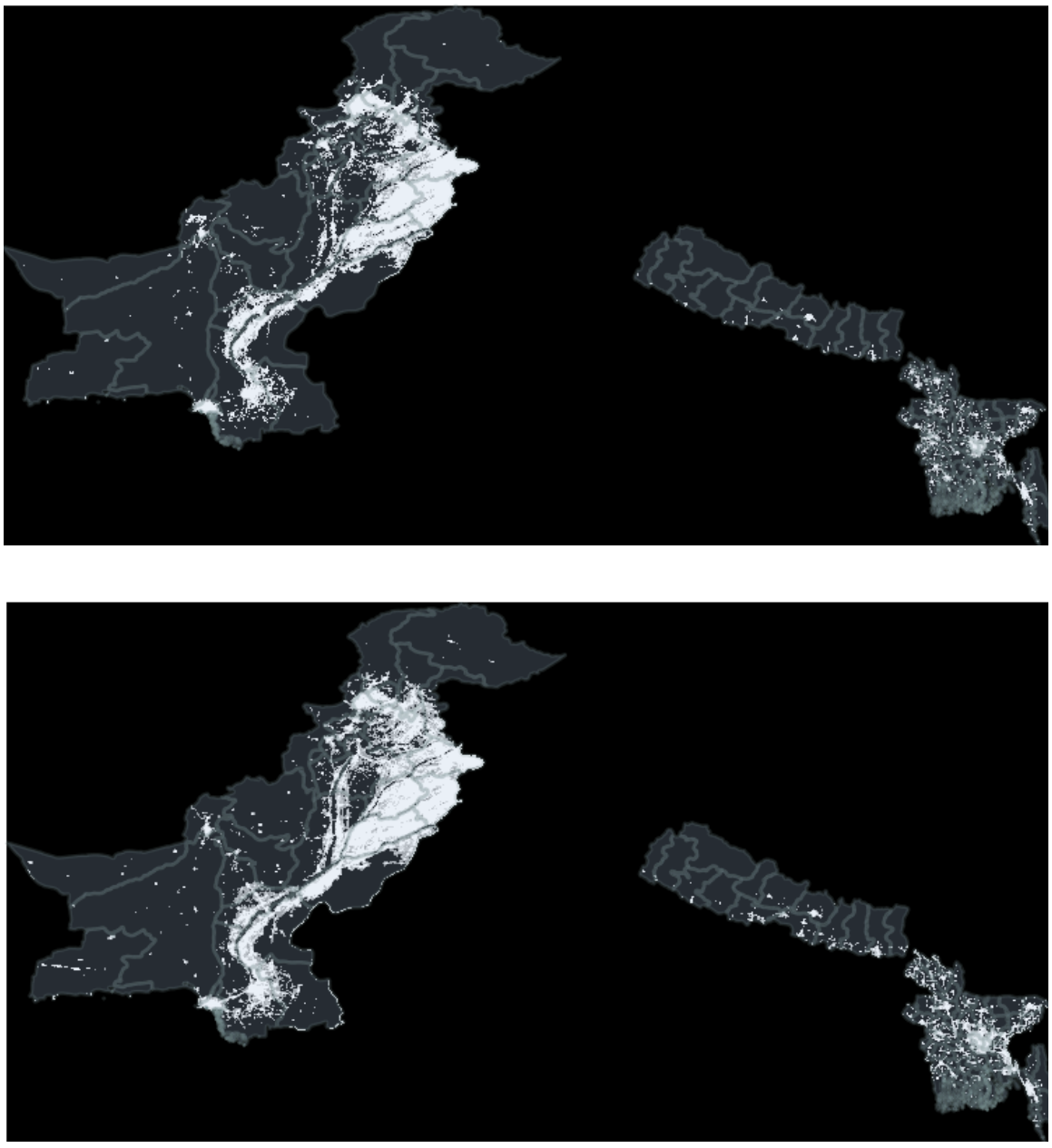
Annex

Figure 11. Satellite night-time light image of Bangladesh, Nepal and Pakistan, 1992 (above) and 2013 (below)



Source: own calculations based on NOAA data.

Table 6. Descriptive statistics micro-indicators, all countries and years pooled

	N	Mean	S.D
HH size	233672	6.20	3.36
gender	233672	0.49	0.18
HH-dependent	233672	0.40	0.22
married and >17	233470	0.78	0.28
wealth index	127582	-0.68	0.96
employment status	128233	0.44	0.45
men employment status	30461	0.94	0.22
women employment status	126057	0.37	0.47
child elsewhere	128299	0.22	0.41
migration	38149	0.03	0.08
education	233649	3.13	2.84
education HH head	232879	4.06	4.71
HH-member still in school	71157	0.27	0.43
HH has electricity	151791	0.53	0.50
HH has a radio	151819	0.27	0.45
HH has a television	151842	0.32	0.47
HH has a bicycle	151791	0.27	0.45
HH has a motorcycle	117264	0.10	0.30
HH has a car	72608	0.03	0.17
HH has a telephone	126790	0.08	0.27
HH owns agricultural land	89775	0.48	0.50
hectares of agricultural land	39607	13.09	93.39
HH has a bank account	65694	0.36	0.48
decision-maker large HH purchases	78677	0.59	0.46
domestic violence justified if wife argues with husband	75909	0.19	0.37

Table 7. Descriptive statistics macro-indicators, Bangladesh

	1993			1996			1999			2004			2007			2011			2014		
	N	Mean	S.D	N	Mean	S.D	N	Mean	S.D	N	Mean	S.D	N	Mean	S.D	N	Mean	S.D	N	Mean	S.D
total fertility rate (reg.)	9174	3.42	0.36	8682	3.23	0.54	9854	3.30	0.43	10500	3.01	0.48	10400	2.69	0.45	17141	2.31	0.33	17300	2.28	0.28
under-5 mortality rate (reg.)	9174	131.47	19.07	8682	114.33	16.13	9854	93.08	18.73	10500	85.88	14.89	10400	63.26	11.07	17141	53.03	6.53	17300	45.19	8.16
infant mortality rate (reg.)	9174	87.11	5.49	8682	81.87	11.12	9854	65.88	15.44	10500	64.34	11.60	10400	50.53	8.17	17141	42.50	5.84	17300	37.70	6.43
gender (reg.)	9174	0.50	0.01	8682	0.50	0.01	9854	0.50	0.01	10500	0.49	0.01	10400	0.49	0.01	17141	0.49	0.01	17300	0.49	0.01
mean age of childbearing (reg.)	9174	26.30	0.77	8682	25.55	1.04	9854	25.68	0.88	10500	25.38	0.82	10400	24.99	0.90	17141	24.55	0.77	17300	24.85	0.89
dependency ratio (reg.)	9174	0.45	0.02	8682	0.43	0.02	9854	0.42	0.02	10500	0.41	0.02	10400	0.40	0.02	17141	0.39	0.02	17300	0.37	0.02
wealth index (reg.)	9174	-1.06	0.08	8682	-0.93	0.09	9854	-0.75	0.09	10500	-0.80	0.14	10400	-0.77	0.14	17141	-0.62	0.22	.	.	.
HH has a motorcycle (reg.)	.	.	.	.	.	.	9854	0.02	0.01	10500	0.03	0.01	10400	0.04	0.01	17141	0.07	0.02	17300	0.07	0.03
HH has electricity (reg.)	9174	0.20	0.07	8682	0.25	0.09	9854	0.34	0.10	10500	0.42	0.09	10400	0.49	0.09	17141	0.61	0.09	17300	0.62	0.10
women employment status (reg.)	9174	0.16	0.05	8682	0.37	0.07	9854	0.23	0.05	10500	0.22	0.05	10400	0.32	0.09	17141	0.13	0.02	17300	0.33	0.07
men employment status (reg.)	9174	0.99	0.01	8682	0.98	0.01	9854	0.98	0.01	10500	0.87	0.02	10400	0.98	0.01	17141	0.98	0.01	.	.	.
employment status (reg.)	9174	0.37	0.04	8682	0.53	0.06	9854	0.37	0.05	10500	0.40	0.05	10400	0.49	0.08	17141	0.29	0.03	17300	0.33	0.07
women qualified work (reg.)	9174	0.01	0.00	.	.	.	.	.	.	10500	0.03	0.02	.	.	.	.	.	.	.	.	.
women paid labour (reg.)	.	.	.	.	.	.	.	.	.	10500	0.96	0.02	10400	0.88	0.01	17141	0.99	0.01	17300	0.93	0.04
education (reg.)	9174	2.28	0.23	8682	2.61	0.30	9854	3.08	0.24	10500	3.10	0.23	10400	3.35	0.20	17141	3.72	0.21	17300	4.03	0.26
Individual >18 education (reg.)	9159	2.76	3.74	8673	3.13	4.80	9842	4.28	6.39	10479	3.67	3.99	10390	3.82	4.00	17134	4.35	3.70	17282	4.67	3.72
member still in school (reg.)	9174	0.22	0.01	8682	0.24	0.02	9854	0.25	0.02	10500	0.24	0.01	10400	0.71	0.02	.	.	.	.	.	.
children currently enrolled in school (6–18) (reg.)	7429	0.59	0.41	7045	0.62	0.41	7947	0.63	0.41	8214	0.65	0.40	7532	0.74	0.37	.	.	.	.	.	.
women currently in school (reg.)	9174	0.21	0.01	8682	0.23	0.02	9854	0.24	0.01	10500	0.24	0.01	10400	0.58	0.00	.	.	.	.	.	.
men currently in school (reg.)	9174	0.24	0.01	8682	0.25	0.02	9854	0.25	0.02	10500	0.24	0.02	10400	0.66	0.02	.	.	.	.	.	.
child elsewhere (reg.)	9174	0.16	0.01	8682	0.16	0.01	9854	0.17	0.01	10500	0.15	0.01	10400	0.15	0.01	17141	0.17	0.01	17300	0.21	0.02
HH has a radio (reg.)	9174	0.29	0.02	8682	0.36	0.03	9854	0.35	0.03	10500	0.34	0.04	10400	0.26	0.03	17141	0.09	0.01	17300	0.04	0.01
HH has a television (reg.)	9174	0.09	0.04	8682	0.13	0.05	9854	0.20	0.04	10500	0.25	0.05	10400	0.33	0.06	17141	0.42	0.07	17300	0.46	0.08
HH has a telephone (reg.)	.	.	.	.	.	.	9854	0.02	0.01	10500	0.06	0.03	10400	0.02	0.01	17141	0.02	0.01	17300	0.02	0.01
women (20–49) married before 18 (reg.)	9174	83.50	3.16	8682	82.37	5.40	9854	77.77	5.50	10500	80.32	5.65	10400	77.59	5.94	17141	73.99	7.08	17300	70.89	7.49
women (20–49) married before 15 (reg.)	9174	59.67	6.15	8682	60.67	8.95	9854	50.18	8.55	10500	52.03	8.04	10400	44.35	7.46	17141	38.85	8.25	17300	33.94	8.09
urbanization (reg.)	9174	0.12	0.05	8682	0.12	0.05	9854	0.19	0.06	10500	0.22	0.07	10400	0.22	0.08	17141	0.24	0.09	17300	0.27	0.07
decision-maker large HH purchases (reg.)	.	.	.	.	.	.	.	.	.	10500	0.48	0.03	10400	0.56	0.06	17141	0.60	0.04	17300	0.61	0.05
domestic violence justified if wife argues with husband (reg.)	.	.	.	.	.	.	.	.	.	10500	0.27	0.05	10400	0.22	0.03	17141	0.23	0.05	17300	0.20	0.03

Table 8. Descriptive statistics macro-indicators, Nepal

	1996			2001			2006			2011		
	N	Mean	S.D	N	Mean	S.D	N	Mean	S.D	N	Mean	S.D
total fertility rate (reg.)	8082	4.65	0.43	8602	4.10	0.45	8707	3.12	0.20	10826	2.60	0.16
under-5 mortality rate (reg.)	8082	115.85	21.83	8602	89.94	14.38	8707	59.93	14.19	10826	54.23	5.76
infant mortality rate (reg.)	8082	77.13	13.56	8602	63.46	13.06	8707	46.99	11.89	10826	45.96	4.63
gender (reg.)	8082	0.49	0.01	8602	0.48	0.01	8707	0.47	0.01	10826	0.46	0.01
mean age of childbearing (reg.)	8082	27.55	0.54	8602	27.29	0.46	8707	25.93	0.20	10826	26.09	0.36
dependency ratio (reg.)	8082	0.46	0.02	8602	0.46	0.01	8707	0.44	0.01	10826	0.41	0.01
wealth index (reg.)	8082	-1.13	0.08	8602	-1.12	0.12	8707	-0.80	0.22	10826	-0.40	0.20
HH has a motorcycle (reg.)	.	.	.	.	.	.	8707	0.05	0.03	10826	0.12	0.04
HH has electricity (reg.)	8082	0.18	0.08	8602	0.24	0.08	8707	0.50	0.11	10826	0.75	0.07
women employment status (reg.)	8082	0.77	0.09	8602	0.83	0.08	8707	0.71	0.09	10826	0.60	0.07
men employment status (reg.)	.	.	.	8602	0.97	0.01	8707	0.87	0.02	10826	0.77	0.04
employment status (reg.)	8082	0.77	0.09	8602	0.86	0.06	8707	0.75	0.06	10826	0.64	0.05
women qualified work (reg.)	8082	0.01	0.01	8602	0.02	0.00	8707	0.02	0.01	10826	0.04	0.01
women paid labour (reg.)	.	.	.	8602	0.30	0.10	8707	0.69	0.05	10826	0.40	0.14
education (reg.)	8082	1.84	0.27	8602	2.04	0.25	8707	2.75	0.15	10826	3.46	0.22
Individual >18 education (reg.)	8082	3.33	0.38	8602	2.63	0.32	8707	3.27	0.29	10826	4.07	0.31
member still in school (reg.)	8082	0.20	0.03	8602	0.24	0.03	.	.	.	.	.	.
children currently enrolled in school (6–18) (reg.)	8082	0.59	0.07	8602	0.65	0.06	.	.	.	.	.	.
women currently in school (reg.)	8082	0.16	0.03	8602	0.20	0.02	.	.	.	.	.	.
men currently in school (reg.)	8082	0.25	0.02	8602	0.28	0.03	.	.	.	.	.	.
child elsewhere (reg.)	8082	0.18	0.02	8602	0.15	0.01	8707	0.19	0.01	10826	0.16	0.01
HH has a radio (reg.)	8082	0.41	0.03	8602	0.46	0.05	8707	0.64	0.04	10826	0.52	0.02
HH has a television (reg.)	8082	0.08	0.05	8602	0.15	0.05	8707	0.31	0.09	10826	0.48	0.08
HH has a telephone (reg.)	8082	0.02	0.01	8602	0.03	0.02	8707	0.07	0.04	10826	0.10	0.02
women (20–49) married before 18 (reg.)	8082	68.37	7.96	8602	64.13	8.79	8707	63.97	4.54	10826	56.06	7.66
women (20–49) married before 15 (reg.)	8082	27.47	7.70	8602	18.94	3.74	8707	16.04	2.33	10826	17.17	3.11
urbanization (reg.)	8082	0.08	0.04	8602	0.10	0.04	8707	0.16	0.05	10826	0.13	0.04
decision-maker large HH purchases (reg.)	.	.	.	8602	0.40	0.04	8707	0.59	0.01	10826	0.58	0.04
domestic violence justified if wife argues with husband (reg.)	.	.	.	8602	0.11	0.02	8707	0.08	0.03	10826	0.01	0.00

Table 9. Descriptive statistics macro-indicators, Pakistan

	1990			2006			2012		
	N	Mean	S.D	N	Mean	S.D	N	Mean	S.D
total fertility rate (reg.)	7193	4.92	0.24	95441	4.07	0.19	11770	3.83	0.10
under-5 mortality rate (reg.)	7193	112.76	15.07	95441	94.47	8.97	11770	89.44	11.44
infant mortality rate (reg.)	7193	86.49	11.71	95441	78.01	7.00	11770	73.99	8.15
gender (reg.)	7193	0.52	0.01	95441	0.50	0.01	11770	0.50	0.01
mean age of childbearing (reg.)	7193	29.83	0.07	95441	29.41	0.45	11770	28.79	0.48
dependency ratio (reg.)	7193	0.47	0.01	95441	0.44	0.02	11770	0.42	0.01
wealth index (reg.)	.	.	.	95441	-0.11	0.18	11770	-0.03	0.21
HH has a motorcycle (reg.)	7193	0.08	0.02	95441	0.21	0.06	11770	0.38	0.10
HH has electricity (reg.)	7193	0.63	0.05	95441	0.89	0.04	11770	0.94	0.04
women employment status (reg.)	7193	0.17	0.06	95441	0.26	0.06	11770	0.27	0.08
men employment status (reg.)	.	.	.	.	.	.	11770	0.96	0.02
employment status (reg.)	7193	0.17	0.06	95441	0.26	0.06	11770	0.40	0.08
women qualified work (reg.)	.	.	.	95441	0.09	0.03	11770	0.10	0.06
women paid labour (reg.)	.	.	.	95441	0.86	0.05	11770	0.86	0.08
education (reg.)	7193	2.15	0.31	95441	3.13	0.31	11770	3.52	0.32
Individual >18 education (reg.)	7193	2.83	0.40	95441	4.54	0.36	11770	4.97	0.33
member still in school (reg.)	7193	0.20	0.02	.	.	.	.	.	.
children currently enrolled in school (6–18) (reg.)	7193	0.50	0.06	.	.	.	.	.	.
women currently in school (reg.)	7193	0.16	0.03	.	.	.	.	.	.
men currently in school (reg.)	7193	0.24	0.01	.	.	.	.	.	.
child elsewhere (reg.)	7193	0.08	0.01	95441	0.12	0.01	11770	0.10	0.01
HH has a radio (reg.)	7193	0.36	0.04	95441	0.36	0.09	11770	0.11	0.05
HH has a television (reg.)	7193	0.29	0.07	95441	0.56	0.06	11770	0.62	0.09
HH has a telephone (reg.)	.	.	.	95441	0.48	0.05	11770	0.09	0.01
women (20–49) married before 18 (reg.)	7193	40.88	6.97	95441	34.73	5.93	11770	30.89	4.35
women (20–49) married before 15 (reg.)	7193	15.31	5.43	95441	11.23	2.41	11770	5.80	1.64
urbanization (reg.)	7193	0.32	0.10	95441	0.34	0.09	11770	0.33	0.10
decision-maker large HH purchases (reg.)	.	.	.	.	.	.	11770	0.69	0.10
domestic violence justified if wife argues with husband (reg.)	.	.	.	.	.	.	11770	0.31	0.12

Table 10. Selected micro-level variables by household child marriage status, Bangladesh

	N	Child Marriage (<18)	NO Child Marriage (<18)	t-test p-value	Child Bride (<18)	NO Child Bride (<18)	t-test	Child Groom (<18)	NO Child Groom (<18)	t-test p- value
household head education in single years	82848	2.94	4.34	0.00	2.93	4.34	0.00	2.72	4.24	0.00
age at first marriage	73315	15.28	16.35	0.00	15.27	16.35	0.00	15.23	16.26	0.00
mean age of childbearing	73792	25.48	25.34	0.00	25.48	25.34	0.00	25.61	25.35	0.00

Table 11. Selected micro-level variables by household child marriage status, Nepal

	N	Child Marriage (<18)	NO Child Marriage (<18)	t-test p-value	Child Bride (<18)	NO Child Bride (<18)	t-test	Child Groom (<18)	NO Child Groom (<18)	t-test p- value
household head education in single years	36002	2.08	3.31	0.00	2.05	3.31	0.00	1.94	3.26	0.00
age at first marriage	29792	15.93	17.41	0.00	15.87	17.40	0.00	16.08	17.34	0.00
mean age of childbearing	30969	26.82	26.63	0.00	26.83	26.63	0.00	26.88	26.64	0.00

Table 12. Selected micro-level variables by household child marriage status, Pakistan

	N	Child Marriage (<18)	NO Child Marriage (<18)	t-test p-value	Child Bride (<18)	NO Child Bride (<18)	t-test	Child Groom (<18)	NO Child Groom (<18)	t-test p- value
household head education in single years	114029	2.90	4.68	0.00	2.88	4.67	0.00	2.60	4.65	0.00
age at first marriage	23510	16.08	18.99	0.00	15.97	18.99	0.00	16.61	18.93	0.00
mean age of childbearing	114404	29.42	29.39	0.00	29.42	29.39	0.00	29.39	29.39	0.99

Table 13. Correlation coefficients of selected micro-indicators (n = 73.047)

	HH Child Marriage (<18)	Wealth index	Education	Urbanization	Women employment status	Employment status	HH has a radio	HH has a television	HH has a telephone	Decision-maker large purchases	Child away
HH Child Marriage (<18)	1.00	-0.08	-0.03	-0.04	-0.03	-0.02	0.01	-0.06	-0.05	-0.08	0.04
wealth index	-0.08	1.00	0.64	0.55	-0.22	-0.23	0.11	0.69	0.53	0.04	-0.05
education	-0.03	0.64	1.00	0.33	-0.16	-0.16	0.12	0.45	0.31	0.07	0.02
urbanization	-0.04	0.55	0.33	1.00	-0.14	-0.13	-0.02	0.39	0.24	0.06	-0.05
women employment	-0.03	-0.22	-0.16	-0.14	1.00	0.93	0.16	-0.17	-0.10	0.06	0.05
employment status	-0.02	-0.23	-0.16	-0.13	0.93	1.00	0.14	-0.18	-0.13	0.04	0.04
HH has a radio	0.01	0.11	0.12	-0.02	0.16	0.14	1.00	0.09	0.13	-0.04	0.02
HH has a television	-0.06	0.69	0.45	0.39	-0.17	-0.18	0.09	1.00	0.32	0.03	-0.04
HH has a television	-0.05	0.53	0.31	0.24	-0.10	-0.13	0.13	0.32	1.00	-0.12	-0.03
decision-maker large purchases	-0.08	0.04	0.07	0.06	0.06	0.04	-0.04	0.03	-0.12	1.00	0.02
child away HH	0.04	-0.05	0.02	-0.05	0.05	0.04	0.02	-0.04	-0.03	0.02	1.00

Table 14. Correlation coefficients of selected macro-indicators (n= 144.833)

	HH Child Marriage (<18)	Wealth index (reg.)	Night-time light 3 years (reg.)	Night-time light growth 3 years (reg.)	Women qualified employment (reg.)	HHcm18 (reg.)	Shocks (reg.)	Total Fertility Rate (reg.)	Mean age of child bearing (reg.)	Women education (reg.)	Decision-maker large purchases (reg.)
HH Child Marriage (<18)	1.00	-0.10	-0.07	-0.06	-0.05	0.13	-0.04	-0.05	-0.10	-0.03	0.05
wealth index (reg.)	-0.10	1.00	0.87	0.68	0.38	-0.73	0.02	0.24	0.50	0.61	-0.45
night-time light 3 years (reg.)	-0.07	0.87	1.00	0.81	0.27	-0.53	-0.18	0.28	0.36	0.62	-0.34
night-time light growth 3 years (reg.)	-0.06	0.68	0.81	1.00	0.18	-0.47	-0.19	0.13	0.29	0.50	-0.43

	HH Child Marriage (<18)	Wealth index (reg.)	Night-time light 3 years (reg.)	Night-time light growth 3 years (reg.)	Women qualified employment (reg.)	HHcm18 (reg.)	Shocks (reg.)	Total Fertility Rate (reg.)	Mean age of child bearing (reg.)	Women education (reg.)	Decision-maker large purchases (reg.)
women qualified employment (reg.)	-0.05	0.38	0.27	0.18	1.00	-0.38	0.45	0.36	0.49	-0.06	-0.27
Households with a married member under 18 (HHcm18) regional share (reg.)	0.13	-0.73	-0.53	-0.47	-0.38	1.00	-0.30	-0.42	-0.76	-0.20	0.43
shocks (reg.)	-0.04	0.02	-0.18	-0.19	0.45	-0.30	1.00	0.32	0.58	-0.40	-0.18
total fertility rate (reg.)	-0.05	0.24	0.28	0.13	0.36	-0.42	0.32	1.00	0.79	-0.44	-0.60
mean age of childbearing (reg.)	-0.10	0.50	0.36	0.29	0.49	-0.76	0.58	0.79	1.00	-0.22	-0.69
women education (reg.)	-0.03	0.61	0.62	0.50	-0.06	-0.20	-0.40	-0.44	-0.22	1.00	0.09
decision-maker large purchases (reg.)	0.05	-0.45	-0.34	-0.43	-0.27	0.43	-0.18	-0.60	-0.69	0.09	1.00

Table 15. Partial correlation coefficients of selected macro-indicators

	Partial Correlation Child Marriage (<18)
wealth index (reg.)	-0.011
night-time light 3 years (reg.)	0.006
night-time light growth 3 years (reg.)	-0.005
women qualified employment (reg.)	0.001
HHcm18 (reg.)	0.046
shocks (reg.)	0.002
total fertility rate (reg.)	-0.003
mean age of childbearing (reg.)	0.003
women education (reg.)	0.008
decision-maker large purchases (reg.)	-0.008

Table 16. Correlation coefficients of selected macro-indicators (n= 144.833)

	HH Child Marriage (<18)	Wealth index (reg.)	Night-time light 3 years (reg.)	Night-time light growth 3 years (reg.)	Women qualified employment (reg.)	HHcm18 (reg.)	Shocks (reg.)	Total Fertility Rate (reg.)	Mean age of child bearing (reg.)	Women education (reg.)	Decision-maker large purchases (reg.)
HH Child Marriage (<18)	1.00	-0.10	-0.07	-0.06	-0.05	0.13	-0.04	-0.05	-0.10	-0.03	0.05
wealth index (reg.)	-0.10	1.00	0.87	0.68	0.38	-0.73	0.02	0.24	0.50	0.61	-0.45
night-time light 3 years (reg.)	-0.07	0.87	1.00	0.81	0.27	-0.53	-0.18	0.28	0.36	0.62	-0.34
night-time light growth 3 years (reg.)	-0.06	0.68	0.81	1.00	0.18	-0.47	-0.19	0.13	0.29	0.50	-0.43
women qualified employment (reg.)	-0.05	0.38	0.27	0.18	1.00	-0.38	0.45	0.36	0.49	-0.06	-0.27
HHcm18 (reg.)	0.13	-0.73	-0.53	-0.47	-0.38	1.00	-0.30	-0.42	-0.76	-0.20	0.43
shocks (reg.)	-0.04	0.02	-0.18	-0.19	0.45	-0.30	1.00	0.32	0.58	-0.40	-0.18
total fertility rate (reg.)	-0.05	0.24	0.28	0.13	0.36	-0.42	0.32	1.00	0.79	-0.44	-0.60
mean age of childbearing (reg.)	-0.10	0.50	0.36	0.29	0.49	-0.76	0.58	0.79	1.00	-0.22	-0.69
women education (reg.)	-0.03	0.61	0.62	0.50	-0.06	-0.20	-0.40	-0.44	-0.22	1.00	0.09
decision-maker large purchases (reg.)	0.05	-0.45	-0.34	-0.43	-0.27	0.43	-0.18	-0.60	-0.69	0.09	1.00

Table 17. Partial correlation coefficients of selected macro-indicators

	Partial Correlation Child Marriage (<18)
wealth index (reg.)	-0.011
night-time light 3 years (reg.)	0.006
night-time light growth 3 years (reg.)	-0.005
women qualified employment (reg.)	0.001
HHcm18 (reg.)	0.046
shocks (reg.)	0.002
total fertility rate (reg,)	-0.003
mean age of childbearing (reg.)	0.003
women education (reg.)	0.008
decision-maker large purchases (reg,)	-0.008

Table 18. Probit regression of household with current married member below 18 on selected micro-level indicator (full regression output)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
HH married member below 18	**Child Marriage**	**Child Marriage**	**Child Marriage**	**Child Marriage**	**Child Marriage (At Risk)**	**Child Marriage (NPL)**	**Child Marriage (NPL)**	**Child Marriage (BGL)**	**Child Marriage (BGL)**	**Child Marriage (PK)**
HH -comparative wealth index factor score			-0.07***	-0.07***	-0.04		-0.27***		-0.21***	
			(0.02)	(0.03)	(0.03)		(0.10)		(0.08)	
HH -education in single years	-0.09***	-0.09***		-0.09***	-0.09***	-0.18***		-0.10***		-0.10***
	(0.01)	(0.00)		(0.01)	(0.01)	(0.01)		(0.01)		(0.01)
			-1.26***							
			(0.25)							
HH - currently working (prop of HH)		-0.23***	-0.14***	-0.22***		-0.16**		-0.27***		-0.11**
		(0.02)	(0.04)	(0.03)		(0.06)		(0.03)		(0.05)
HH - women employment status					-0.20***		-0.23***		-0.30***	
					(0.04)		(0.07)		(0.04)	
HH - HH has son or daughter elsewhere			0.21***	0.21***	0.18***		0.17***		0.20**	
			(0.03)	(0.02)	(0.02)		(0.04)		(0.08)	
HH - proportion of members migrated									0.01	
									(0.64)	
HH -has radio					0.05				0.13***	
					(0.03)				(0.04)	
HH -has television				0.09***			0.00			
				(0.02)			(0.07)			
HH -has telephone				0.06	-0.07		0.09		-0.04	
				(0.05)	(0.07)		(0.12)		(0.11)	
HH - person who usually decides on large household purchases					-0.39***		-0.41***		-0.55***	
					(0.03)		(0.05)		(0.05)	
HH -percentage of households in urban areas	-0.12***	-0.12***	-0.10***	-0.11***	-0.08**	-0.22***	-0.15**	-0.10***	0.06	-0.10*
	(0.02)	(0.02)	(0.03)	(0.03)	(0.04)	(0.06)	(0.06)	(0.03)	(0.11)	(0.05)
HH -sex of head of household	-0.41***	-0.39***	-0.30***	-0.37***	-0.33***	-0.43***	-0.35***	-0.47***	-0.31*	-0.32***

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
HH married member below 18	**Child Marriage**	**Child Marriage**	**Child Marriage**	**Child Marriage**	**Child Marriage (At Risk)**	**Child Marriage (NPL)**	**Child Marriage (NPL)**	**Child Marriage (BGL)**	**Child Marriage (BGL)**	**Child Marriage (PK)**
	(0.03)	(0.03)	(0.04)	(0.03)	(0.05)	(0.06)	(0.08)	(0.05)	(0.16)	(0.06)
HH -gender (1=male)	-0.76***	-0.68***	-0.55***	-0.70***	-0.73***	-0.71***	-0.31***	-0.97***	-0.82***	-0.18**
	(0.07)	(0.04)	(0.07)	(0.05)	(0.09)	(0.10)	(0.11)	(0.05)	(0.16)	(0.08)
HH -members group 0–6	0.93***	1.01***	1.29***	1.10***	1.50***	0.88***	1.85***	1.67***	2.30***	3.51***
	(0.12)	(0.13)	(0.19)	(0.14)	(0.18)	(0.27)	(0.31)	(0.14)	(0.47)	(0.31)
HH -members group 7–14	1.30***	1.76***	2.40***	1.78***	1.83***	1.25***	1.89***	2.31***	2.49***	2.51***
	(0.11)	(0.15)	(0.21)	(0.15)	(0.19)	(0.29)	(0.27)	(0.17)	(0.55)	(0.40)
HH -members group 15–19	4.64***	5.45***	4.91***	5.38***	5.18***	4.71***	4.87***	5.57***	5.34***	6.94***
	(0.13)	(0.18)	(0.21)	(0.19)	(0.20)	(0.44)	(0.34)	(0.18)	(0.62)	(0.40)
HH -members group 20–24	1.55***	1.94***	1.32***	2.01***	2.65***	2.15***	1.86***	3.39***	2.84***	2.87***
	(0.10)	(0.12)	(0.11)	(0.14)	(0.20)	(0.22)	(0.23)	(0.18)	(0.51)	(0.47)
HH -members group 25–29	1.08***	1.40***	0.85***	1.54***	2.43***	1.26***	1.28***	3.14***	2.81***	2.92***
	(0.10)	(0.12)	(0.16)	(0.15)	(0.22)	(0.21)	(0.28)	(0.16)	(0.69)	(0.28)
HH -members group 30–34	0.06	0.29**	0.24	0.56***	1.05***	0.00	0.36	1.22***	1.35**	2.30***
	(0.10)	(0.12)	(0.17)	(0.15)	(0.20)	(0.17)	(0.25)	(0.15)	(0.68)	(0.32)
HH -members group 35–39	-0.39***	-0.26**	0.02	-0.08	0.21	-0.05	0.08	0.07	-0.09	1.01**
	(0.08)	(0.10)	(0.19)	(0.12)	(0.16)	(0.19)	(0.27)	(0.12)	(0.28)	(0.45)
HH -members group 40–44	-0.30***	-0.21**	-0.13	-0.19	-0.12	-0.14	-0.06	-0.24*	-0.96*	0.15
	(0.09)	(0.10)	(0.15)	(0.12)	(0.16)	(0.18)	(0.22)	(0.13)	(0.50)	(0.43)
HH -members group 50–64	0.46***	1.48***	1.10***	1.45***	1.16***	0.41**	1.01***	1.71***	1.38**	2.14***
	(0.09)	(0.15)	(0.18)	(0.16)	(0.21)	(0.21)	(0.26)	(0.17)	(0.60)	(0.43)
HH -members group 65+	0.61***	1.67***	1.30***	1.65***	1.64***	0.85***	1.44***	2.14***	2.12***	2.71***
	(0.10)	(0.15)	(0.22)	(0.17)	(0.23)	(0.28)	(0.26)	(0.20)	(0.65)	(0.52)
HH –has widow/er	-0.28***	-0.29	-0.24	-0.28	-0.59*	-0.76***	-0.71**			0.56***
	(0.10)	(0.20)	(0.21)	(0.22)	(0.30)	(0.29)	(0.33)			(0.19)
year=1993	-0.12	-0.03								
	(0.14)	(0.13)								
year=1996	-0.09	0.05						0.03		
	(0.13)	(0.12)						(0.09)		
year=1999	-0.08	0.01		-0.06				0.03		
	(0.14)	(0.14)		(0.11)				(0.09)		
year=2001	-0.00	0.16		0.08		0.09				

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
HH married member below 18	**Child Marriage**	**Child Marriage**	**Child Marriage**	**Child Marriage**	**Child Marriage (At Risk)**	**Child Marriage (NPL)**	**Child Marriage (NPL)**	**Child Marriage (BGL)**	**Child Marriage (BGL)**	**Child Marriage (PK)**
	(0.14)	(0.13)		(0.08)		(0.09)				
year=2004	-0.07	0.01		-0.08	-0.06			0.02		
	(0.14)	(0.14)		(0.11)	(0.13)			(0.10)		
year=2006	-0.14	-0.09	-0.18**	-0.18**	-0.19**	-0.07	-0.17*			-0.10
	(0.11)	(0.10)	(0.09)	(0.08)	(0.09)	(0.08)	(0.10)			(0.10)
year=2007	-0.25*	-0.15		-0.24**	-0.20			-0.10		
	(0.14)	(0.14)		(0.11)	(0.13)			(0.09)		
year=2011	-0.23*	-0.19	-0.22***	-0.27***	-0.13	-0.07	-0.11	-0.12		
	(0.13)	(0.12)	(0.08)	(0.07)	(0.08)	(0.06)	(0.09)	(0.10)		
year=2012	-0.16	-0.15	-0.07	-0.21*	-0.74***					-0.15
	(0.11)	(0.10)	(0.12)	(0.11)	(0.11)					(0.12)
year=2014	-0.23	-0.17						-0.13		
	(0.14)	(0.14)						(0.10)		
Bangladesh	0.38***	0.30***	0.18***	0.32***	0.14					
	(0.05)	(0.05)	(0.07)	(0.08)	(0.09)					
Pakistan	-0.44***	-0.43***	-0.42***	-0.41***	0.00					
	(0.09)	(0.08)	(0.08)	(0.08)	(.)					
Constant	-1.88***	-2.26***	-2.34***	-2.39***	-2.20***	-1.49***	-2.65***	-2.24***	-2.86***	-4.25***
	(0.15)	(0.17)	(0.16)	(0.14)	(0.16)	(0.18)	(0.24)	(0.13)	(0.51)	(0.29)
Observations	228.130	125.427	54.902	89.436	38.076	19.157	13.849	41.841	5.881	15.408

Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 19. Probit regression of household with current married brides below 18 on selected micro-level indicator

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
HH child bride below 18	**Child Marriage**	**Child Marriage**	**Child Marriage**	**Child Marriage**	**Child Marriage (At Risk)**	**Child Marriage (NPL)**	**Child Marriage (NPL)**	**Child Marriage (BGL)**	**Child Marriage (BGL)**	**Child Marriage (PK)**
wealth index			-0.20***	-0.08***	-0.05*		-0.30***		-0.21***	-0.16***
			(0.02)	(0.03)	(0.03)		(0.09)		(0.08)	(0.05)
education	-0.09***	-0.09***		-0.09***	-0.09***	-0.19***		-0.10***		
	(0.01)	(0.00)		(0.01)	(0.01)	(0.01)		(0.01)		
employment status		-0.25***	-0.22***	-0.23***		-0.17**		-0.29***		
		(0.02)	(0.02)	(0.03)		(0.07)		(0.03)		
women employment status					-0.22***		-0.26***		-0.31***	
					(0.04)		(0.07)		(0.05)	
child elsewhere			0.22***	0.23***	0.20***		0.22***		0.21***	
			(0.02)	(0.02)	(0.02)		(0.04)		(0.08)	
migration									0.03	
									(0.64)	
HH has a radio					0.05				0.13***	0.01
					(0.03)				(0.04)	(0.06)
HH has a television				0.10***			-0.01			
				(0.03)			(0.06)			
HH has a telephone				0.03	-0.11*		-0.02		-0.04	
				(0.05)	(0.07)		(0.14)		(0.11)	
decision-maker large HH purchases					-0.40***		-0.43***		-0.56***	
					(0.03)		(0.06)		(0.05)	
urbanization	-0.11***	-0.11***	-0.06***	-0.09***	-0.06	-0.18***	-0.09	-0.10***	0.07	-0.01
	(0.02)	(0.02)	(0.02)	(0.03)	(0.04)	(0.07)	(0.07)	(0.03)	(0.11)	(0.06)
sex head of household	-0.42***	-0.40***	-0.40***	-0.37***	-0.35***	-0.44***	-0.38***	-0.50***	-0.30*	-0.33***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.05)	(0.06)	(0.08)	(0.05)	(0.17)	(0.08)
HH Composition	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Year Fixed Effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Country Fixed Effects	yes	yes	yes	yes	yes	no	no	no	no	no
Observations	228.130	125.427	105.191	89.436	38.076	19.157	13.849	41.841	5.881	16.950

Standard errors clustered at the province level (in parentheses). Complete Regressions results in Table 18 in the Annex. NPL=Nepal; BGL=Bangladesh, PK=Pakistan; At Risk = if household has under-age member 11–17/married within past years or unmarried member <age 40. * p < 0.1, ** p < 0.05, *** p < 0.

Table 20. Multi-level probit regression on the macro-level correlates of child marriage (age <15)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
HH child marriage below 15	**Child Marriage**	**Child Marriage**	**Child Marriage**	**Child Marriage**	**Child Marriage (At Risk)**	**Child Marriage (NPL)**	**Child Marriage (NPL)**	**Child Marriage (BGL)**	**Child Marriage (BGL)**	**Child Marriage (PK)**
wealth index	-0.01					-0.02		-0.01	0.00	-0.03
	(0.02)					(0.02)		(0.02)	(0.02)	(0.03)
education		0.04	-0.02				0.03			
		(0.03)	(0.03)				(0.02)			
school enrolment children				2.95						
				(3.41)						
employment status	0.34	0.58	0.08			0.33	0.46	0.51*	0.36	0.35
	(0.29)	(0.38)	(0.55)			(0.24)	(0.28)	(0.27)	(1.27)	(0.29)
women employment status			2.24***							
			(0.63)							
child elsewhere				0.13						
				(2.03)						
migration							0.01***			
							(0.00)			
HH has a radio						-0.25***				
						(0.04)				
HH has a television								-0.14***		
								(0.02)		
HH has a telephone					-0.01					
					(0.12)					
female decision power in HH										0.05
										(0.04)
HH Composition	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Year Fixed Effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Country Fixed Effects	yes	yes	yes	yes	yes	no	no	no	no	no
Observations	228.130	125.427	54.902	89.436	38.076	19.157	13.849	41.841	5.881	15.408

Standard errors clustered at the province level (in parentheses). Complete Regressions results in Table 18 in the Annex. NPL=Nepal; BGL=Bangladesh, PK=Pakistan; At Risk = if household has under-age member 11–17/married within past years or unmarried member <age 40. * p < 0.1, ** p < 0.05, *** p < 0.

Table 21. Multi-level probit regression on the macro-level correlates of child marriage separately for Bangladesh and Nepal

	(1)	(2)	(3)	(4)
HH child marriage below 18	**BGL**	**BGL**	**NPL**	**NPL**
night-time light growth (regional average past 3 Years)	-0.43**	-0.09	-0.48	-0.73*
	(0.20)	(0.09)	(0.56)	(0.43)
affected by shock (regional share of pop.)	-0.26	-0.25	2.49	2.52
	(0.25)	(0.16)	(1.78)	(2.26)
mean age of childbearing (reg.)		-0.13***		-0.16**
		(0.02)		(0.06)
Household Level Controls	yes	yes	yes	yes
Year	yes	yes	yes	yes
N	59.491	59.491	36.214	36.214

Standard errors in parentheses. Note: HH level control include mean education level, age composition, sex hh head, gender composition, year and country fixed effects.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 22. Multi-level probit regression on the interrelationships of micro- and macro-level correlates of child marriage – without IMR

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Child Marriage <18	Child Marriage <18	Child Marriage <18	Child Marriage <18	Child Marriage <18	Child Marriage <15	Child Marriage <15	Child Marriage <15	Child Marriage <15	Child Marriage <15
night-light growth (regional average past 3 years) # regional - women marriage rate before 18 (20–49)	0.004	0.004								
	(0.002)	(0.004)								
night-light growth (regional average past 3 years) # regional - mean age of childbearing - regional			-0.076***	0.016						
			(0.024)	(0.042)						
night-light growth (regional average past 3 years) # HH - comparative wealth index factor score							-0.055	-0.000		
							(0.049)	(0.235)		

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Child Marriage <18	Child Marriage <18	Child Marriage <18	Child Marriage <18	Child Marriage <18	Child Marriage <15	Child Marriage <15	Child Marriage <15	Child Marriage <15	Child Marriage <15
night-light growth (regional average past 3 years) # HH - education in single years					-0.045***	-0.011				
					(0.008)	(0.021)				
night-light growth (regional average past 3 years) # HH – decision on large household purchases									-0.112	-1.128***
									(0.193)	(0.319)
night-light growth (regional average past 3 years)	-0.330***	-0.507***	1.916***	-0.742	-0.077	-0.261***	-0.155**	-0.294	0.173	0.477
	(0.121)	(0.170)	(0.684)	(1.237)	(0.066)	(0.072)	(0.064)	(0.180)	(0.160)	(0.339)
HH - education in single years	-0.143***	-0.075***	-0.143***	-0.075***	-0.135***	-0.073***	-0.149***	-0.077***	-0.137***	-0.059***
	(0.005)	(0.008)	(0.005)	(0.008)	(0.006)	(0.009)	(0.006)	(0.011)	(0.009)	(0.021)
HH - comparative wealth index factor score							-0.024	0.023		
							(0.021)	(0.044)		
regional - mean age of childbearing - regional	-0.149***	-0.193***	-0.175***	-0.160***	-0.164***	-0.162***	-0.191***	-0.166***	-0.206***	-0.216***
	(0.024)	(0.035)	(0.015)	(0.020)	(0.016)	(0.020)	(0.017)	(0.022)	(0.024)	(0.040)
affected by shock (regional share of pop.)	-0.064	0.218	0.038	0.161	-0.028	0.168	-0.015	0.156	0.076	0.260
	(0.151)	(0.227)	(0.172)	(0.208)	(0.178)	(0.207)	(0.176)	(0.217)	(0.224)	(0.605)
HH - HH – decision on large household purchases									-0.346***	-0.251***
									(0.029)	(0.068)
regional - w_cm18	0.005*	-0.005								
	(0.003)	(0.005)								
Household Level Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Year	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Country	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
N	132.840	125.599	132.840	125.599	132.840	125.599	74.239	66.998	36.167	31.321

Standard errors in parentheses (clustered at the province/year level) * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Household Level Controls include mean education level, age composition, sex hh head, gender composition, year and country fixed effects and Inverse Mill's ratio (to control for self-selection of households at risk of child). Intra Class Correlation estimated without clustered SE. Household at risk = household has under-age member (who did not marry more than 1 year ago) or unmarried adult member up to age 40.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