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Three Essays on Family and Migration Economics

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Resumé Exécutif

Dans les pays en développement, la migration d'un individu est bien souvent le fruit d'une réflexion collective visant à diversifier les sources de revenus au sein de la famille et/ou à partager les coûts et les bénéfices de la migration. De fait, les stratégies migratoires, les organisations familiales et les normes culturelles sont interdépendantes. Cette thèse est à la croisée des chemins de l'économie de la famille et de l'étude des migrations.

Le Chapitre 2 met en évidence les liens existants entre les conditions d'accès au marché du mariage en Indonésie et les mouvements migratoires des jeunes hommes célibataires. Dans ce pays où la formation des unions est codifiée (intra-ethniques, âge pour se marier) et où il existe de fortes injonctions sociales à se marier, les jeunes doivent mettre en place des stratégies pour satisfaire les conventions sociales. De plus, pour certains groupes ethniques, le paiement d'une dot de la part du marié est requis pour que la famille de la femme accepte l'union. Ce paiement pouvant atteindre un montant très élevé, son financement est une contrainte majeure à satisfaire pour les jeunes hommes. En s'appuyant sur un programme d'éducation associé à une hausse des attentes des parents pour leurs filles, ce chapitre montre que les futurs mariés ont tendance à migrer pour répondre à ces exigences. La migration étant un moyen de rejoindre des zones où les salaires sont plus élevés et donc d'accumuler les ressources nécessaires, ou bien de se marier ailleurs où les exigences parentales sont moindres.

Le Chapitre 3 vise à étudier comment les familles mexicaines s'adaptent à la migration des hommes vers les Etats-Unis. Au Mexique, il est commun que les hommes migrent sans leurs femmes et leurs enfants. Avant la migration des hommes, les familles vivaient dans des ménages nucléaires, mais après, les femmes rejoignent bien souvent d'autres ménages. En effet, elles ont tendance à intégrer le ménage de leurs parents, ce qui est un choix de co-résidence plutôt anormal au Mexique où il persiste une forte tradition de patrilocalité; c'est-à-dire que les couples ont tendance à résider avec (ou proche) de la famille du mari. Ces reconfigurations familiales peuvent signaler deux choses : (i) l'absence des maris amène à la dissolution des liens maritaux, ce qui pousse les femmes à se rapprocher de leur famille (ii) les femmes ont l'intention de rejoindre leurs maris aux Etats-Unis et préfèrent laisser leurs enfants auprès de membres de leur propre famille. D'après la littérature, vivre avec les grands-parents maternels est plutôt favorable

à l'éducation des enfants. Cependant, les recensements de population et les enquêtes traditionnellement utilisés pour identifier les émigrés sont incapables de capturer certaines migrations. En effet, lorsque ces outils cherchent à identifier les ménages d'origine des migrants ils se heurtent à la dissolution de ces derniers. De fait, il est fort probable que les études sur les caractéristiques des migrants mexicains et les impacts des migrations pour les femmes et les enfants de migrants ne prennent pas en compte bon nombre de déplacements.
Le Chapitre 4 montre que le confiage des enfants au Ghana est fortement lié à la dissolution des unions parentales. La séparation des parents ou les migrations masculines amènent bien souvent les femmes à devoir endosser la responsabilité quotidienne de l'éducation des enfants. Lorsqu'elles confient un de leurs enfants à d'autres membres de la famille, cela permet à l'enfant d'accéder à des conditions de vie plus favorables à leur éducation (ménages plus riches et davantage d'adultes disponibles). Dans des contextes où les ressources sont mises en commun et où la famille étendue joue un rôle assurantiel, le fait de confier des enfants peut être perçu comme un moyen d'atténuer les effets négatifs de la séparation des parents. Sous ce prisme, le déplacement des enfants permet de réallouer les ressources à l'échelle de la famille.

Executive Summary

In developing countries, an individual's migration is often the result of a collective strategy aiming to diversify the family's income sources and/or to share the costs and benefits of migration. Indeed, migration strategies are interdependent with family organizations and cultural norms. This Ph.D. dissertation is at the crossroads of family economics and migration studies.

Chapter 2 highlights the links between the conditions of access to the marriage market in Indonesia and the migratory movements of young single men. In this country where union formation is codified (intra-ethnic, age of marriage) and where there are solid social injunctions to marry, young men often need to implement strategies to comply with social conventions. In addition, for some ethnic groups, the payment of a bride price by the groom is required for the woman's family to accept the union. As this payment can reach a very high amount of money, financing it appears to be a major constraint for young men. Based on an educational program leading to the rise of parental expectations for the daughters, this chapter shows that the most disadvantaged grooms-to-be migrate to meet these requirements. Migration is a means to reach areas with there are higher wages on average to accumulate the necessary resources or to marry elsewhere where parental expectations are lower than in their place of origin.

Chapter 3 explores how Mexican families adapt to the migration of married men to the United States. In Mexico, it is common for men to migrate without their wives and children. Prior to men's migration, families primarily resided in independent nuclear households; post-migration, women often relocate to other households. Indeed, many women join their parents' household, which is a somewhat odd co-residence choice in Mexico, where there is still a strong tradition of patrilocality, i.e., couples tend to reside with (or close to) the husband's family. These family reconfigurations may signal two things: (i) the absence of husbands leads to the dissolution of marital unions, which pushes women to move closer to their families (ii) women intend to join their husbands in the United States and prefer to leave their children with members of their own family. According to the literature, living with maternal grandparents is relatively favorable for children's education. However, population censuses and surveys conducted at origin and traditionally used to identify migrants can fail to enumerate many migratory movements. Indeed, when these tools seek to identify

migrants' households of origin, they come up against the latter's dissolution. Thus, studies on the characteristics of Mexican migrants and the impacts of migrations on migrants' wives and children are likely to miss many displacements.

Chapter 4 shows that the practice of child fostering in Ghana is strongly linked to the dissolution of parental unions. Parental separation or male migration often leads women to take on the day-to-day responsibility of child-rearing alone. When they foster-out one of their children to other family members, the child can access living conditions that are more favorable to their education (richer households and more available adults). In this light, fostering children is a way of reallocating resources at the family level. In contexts where resources are pooled, and the extended family plays an insurance role, child fostering may be seen as a way to mitigate the adverse effects of parental separation.

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General Introduction

1.1 Challenging the notion of household

In microeconomics, the household is considered the basic and stable unit of society. However, to study family economics and migration strategies there are many reasons to believe that this framework is too restrictive.

Household's definition Most of the data used for empirical analyses come from surveys and censuses relying on the notion of household for data collection. The definition of a household slightly varies across data sources and can have large implications for our understanding of economic organizations (Beaman and Dillon, 2012; Hertrich et al., 2020). However, a common trait in existing definitions is that a household is a group of people who share living arrangements, such as a house, apartment, or another type of dwelling. Household members could be related by blood, marriage, or be unrelated individuals who have chosen to live together. Households can be of different sizes and compositions, ranging from a single person living alone to large extended families living together. While there are obvious drivers explaining household composition, such as the demographic vagaries of deaths, reproduction, and births, it is also driven by many incentives to live together.

Determinants of household composition First, co-residence with the extended family is customary in some cultures or religions. Marriage mostly leads to co-residence in a household unit. For married

couples, we distinguish between patrilocal norms, i.e., living with or close to the husband's family, matrilocal norms, i.e., living with or close to the wife's family, and neolocality when the couple lives apart from family members (Murdock, 1967). Co-residing with family members is a way to maintain cultural or religious traditions. The elders are often considered the guardians of the family values; when children live with grandparents, it allows the transfer of family norms and culture to the next generation (Grysole, 2019). Second, living with others provides emotional support and companionship, benefiting individuals' health and well-being. For instance, elders may need care, and co-residing with the next generation can contribute to elder-care. In that sense, living together in a household provides safety and security for vulnerable populations. Finally, there are significant economic benefits in sharing expenses through household formation. Sharing a place to live avoids the multiplication of expenses for public goods (Fafchamps and Quisumbing, 2008). By pooling their resources and sharing costs, household members can save money and improve their overall financial situation.
In this perspective, adults decide about their living arrangements and those of their children, depending on their current situation. Individuals might re-evaluate the benefits of forming independent households and adapt households' compositions when conditions vary. In developing countries, household units are remarkably flexible. To comply with adverse income shocks, individuals can relocate to other households of the kinship network (Akresh, 2009).

Resources pooling at the family level In most developing countries, many economic decisions are made at the kinship rather than the household level. Indeed, household revenues depend on numerous income transfers with the rest of the family (Cox and Fafchamps, 2008), so households of the same network are interdependent. Accounting for these money transfers, Angelucci et al. (2018) provide empirical evidence that programs targeting the poorest households also impact non-eligible households by redistributing resources at the family level. The solidarity mechanisms implemented at the network level allow households to smooth their income, playing an insurance role when resources are limited and markets are incomplete (Fafchamps and Lund, 2003). These economic organizations have implications for the living conditions of individuals and, in particular, for children's education. Households with local family support are more likely to

send children to school (Angelucci et al., 2010). In addition, several households could provide for the child's needs (Witoelar, 2013). For child expenditures, the household-level information record is likely to underestimate the investment in child education, as non co-resident family members can also contribute (De Vreyer and Lambert, 2021). Resource-sharing intensity largely depends on the complexity of family structures. Particularly in polygamous marriages, a man may have wives living separately. Nevertheless, these dwellings are interdependent and make collective decisions. It fuels the need to collect data at the family level and go beyond the notion of household (De Vreyer et al., 2008).
Family also plays an important role in shaping individual behaviors, in this dissertation we are particularly interested in migrations and marriage decisions.

Migration strategies Migration decisions in developing countries are typically made at the kinship level, involving several households. Migration of a member is a strategy to share the risk and diversify income sources at the scale of the family (Azam and Gubert, 2006). Having a member who is living and working in another environment allows him/her to obtain income that is not subject to the same economic and climatic conditions as the rest of the family. When family members pool their resources in uncertain environments, migration can be seen as an insurance mechanism or an adaptation strategy in case of climatic shocks (Defrance et al., 2022). In addition, emigration from developing countries is costly and requires the contribution of several households (Angelucci, 2015). In this context, those involved in financing a migration can expect a return on their investment and choose a member with specific characteristics (Chort and Senne, 2018). Consequently, selecting the best candidate for migration will likely occur at the family level. Then, migration may have implications for the whole kinship beyond the household of origin of the migrants, e.g., several households could receive financial and social remittances from a migrant. Moreover, international migrants can send money to a specific member in charge of redistributing them through internal transfers.

Marriage and family norms The decision to marry is likely to be dependent on family organization. Even if arranged marriages are declining globally, they persist in many developing countries (Rubio, 2014). Moreover, marriage payments are still largely practiced; in some

contexts, they reach very high amounts of money (Anderson, 2007).[1] Due to the high cost of marriage, the parents and the extended family could be involved in financing marriage payments. Furthermore, depending on norms and culture, the received payments for marriage do not (or partially not) benefit the married individuals, but could be cornered by the parents (Ashraf et al., 2020). As shown by Corno et al. (2020), in Sub-Saharan Africa, parents working in the agricultural sector and facing weather shocks hasten their daughter's marriage to decrease the household size and obtain a marriage payment from the groom's family. In addition, within a family, individuals do not receive the same assistance to find a spouse and finance the marriage, families sometimes give more importance to the marriage of the primogeniture for which they have particular expectations (Vogl, 2013). Marriage is also an opportunity to expand the family network. Marrying individuals from different geographic origins is a way to decorrelate family income sources (Rosenzweig and Stark, 1989). The marriage of a household member often induces that this individual will leave the household or that his/her spouse will join the household; this change in household composition relates to the family's norms.

1.2 Contributions of the dissertation

The purpose of this dissertation is to provide evidence that, in addition to having direct consequences on household composition, marriages, and migrations disrupt the organization of households so that all members re-evaluate their co-residence choices. In this way, it also illustrates how migrations and marriages interact with family norms. Therefore, this thesis is at the crossroads between the economics of the family and the economics of migration.

Migration and marriage In many developing countries, marriage is quasi-universal, and a formal or informal union ceremony is required to legitimate the union. Marriage marks an essential stage in adult life, allowing the establishment of a family cell recognized by peers. Finding a partner is not easy, and marriage markets are often codified and largely influenced by traditions: age at marriage, intra-ethnic groups,

[1] The most prevalent marriage payments are the transfers of wealth from the groom's family to the bride's family (bride prices). Nevertheless, the reverse is also practiced, e.g., in India, dowries are paid by the bride's family to the groom's family

intra-castes, and marriage payment (Anukriti and Dasgupta, 2017). Those not complying with society's expectations expose themselves to high social stigmas. Despite complying with the norms around marriage, individuals of marrying age also face competition in their marriage market. Indeed, extensive literature exists on the rules governing marriage markets following the seminal paper of Becker (1976), which assumes that individuals weigh the potential contribution of potential partners to household-produced goods (companionship, children, quality of meals, among others) to determine the gains of getting married over remaining single.
Stark (1988) suggests that due to the challenges in finding a suitable partner, the formation of new households is often dependent on migration. Notably, patterns of female migration for marriage purpose have been regularly observed (Amirapu et al., 2022; Becerra-Valbuena and Millock, 2021). Chapter 2 of the dissertation provides empirical evidence that in Indonesia, in communities traditionally practicing bride price, men implement migration strategies in order to be able to get married. Family norms in relation to marriage are such that men do their best to get married on time and hence to get enough financial resources to afford the bride price. Moreover, we find that migration strategies are more likely to be implemented by men who are not the first-sons among their siblings. Indeed, first-sons are advantaged in their marriage market and are likely to receive family help to get married, while latter-sons often need to self-finance their wedding. Thus, this Chapter highlights how marital norms at the family level significantly impact migration patterns.

Migration and households' composition The migration of a family member implies the loss of a productive member who is more or less offset by income transfers from the migrant member. Beyond the financial aspect, the distance between family members can have consequences on the well-being of migrants' close relatives who remain in the place of origin. When the migrant leaves behind his/her spouse in the country of origin, she/he is likely to suffer from emotional depression (Nobles et al., 2015). Moreover, the spatial separation of a couple generates a lack of information regarding the activities of both partners in their respective country of residence. The lack of interactions between spouses might lead to marital dissolution (Adserà and Ferrer, 2015; Caarls and Mazzucato, 2015). Otherwise, the migrant can also rely on the family network to obtain information about the left-behind

spouse's activities (de Laat, 2014).
When a family member migrates, it questions the family organization and the living arrangements of the left behind (Bertoli and Murard, 2020). If the migrant is also a parent, he leaves the burden of his children to his partner, who must confront single parenthood. The parent left behind will likely search for support from the extended family. In the case of parental migration, the preferred caregivers for the parents are likely to be the grandparents if they are available (Poeze et al., 2017). In the Mexican context, Chapter 3 of this dissertation provides evidence that when a Mexican father migrates to the US, leaving behind his wife and children, the latter are likely to integrate into the household of the previous generation. This phenomenon leads to the dissolution of the migrant households of origin, and the individuals left behind benefit from inter-generational support. For the wife, living with grandparents is also a way to have fewer constraints if she wants to join her husband in migration since, she can leave her children with family members. Interestingly, those women are likely to co-reside with their own families, which contradicts patrilocal norms in Mexico. This pattern of co-residence is mostly observed for divorced women, therefore it could also signal marital dissolution due to the geographic separation of the spouses. Thus migrations and adaptation of the left behind question the cultural norms around the family organization.

Marriages' dissolution and households' composition After a divorce or a separation, most ex-spouses stop co-residing and prefer to live apart. According to women's central role in childcare in developing countries, children from dissolved unions will likely remain with their mothers. The father's absence has been found to significantly and negatively affect the children's health (Clark and Hamplová, 2013), and education (Keith and Finlay, 1988). Also, households of single mothers need help in providing for the children's needs since it constrains the ability of women to participate in the labor market (Hancioglu and Hartmann, 2014).
Chapter 4 of this dissertation puts forward the high prevalence of foster children in Ghana, i.e., children with living parents but not co-residing with any of them. Using an innovative way of looking at data provided by large-scale surveys, we are looking at the characteristics of mothers who have sent a child to live in non-parental households. We find that 72 percent of women fostering out have experienced a form of marital instability (divorced, separation, widowhood, having a child out of

wedlock), compared to 43 percent of mothers who do not foster out. The dissolution of unions is likely to have knock-on effects on household composition, impacting the living arrangement of children from these unions. Given the negative consequences of divorce on children's education when they keep residing with their mother, being fostered out of the maternal household might be a way to mitigate the adverse educational impacts. Furthermore, for siblings of foster children, it could also be a way to increase the share of household resources dedicated to them and give them more opportunities to get education.

1.3 Challenges for data collection and potential solutions

This dissertation highlights several challenges for large-scale data collection. First, following a migration episode, the migrant's household of origin is likely to be dissolved or to experience substantial changes in its composition. UNDESA (2017) recommends using retrospective questions that ask whether individuals migrated from a particular household to determine migration episodes and include a co-residence condition before migration. However, such questions may not capture all instances of migration due to the flexible nature of household units. As a result, some individuals who are left behind by migrants may not be included in assessments of the impacts of migration on the migrants' countries of origin. To comply with family reorganizations following migrations, in collaboration with the National Statistical Institute in Mali (INSTAT), we have designed survey modules including individual questions on the relationship with emigrants. These recommendations are challenging to implement since they might induce more extended interviews, especially for women who are mothers or spouses of migrants, that could be subject to fatigue bias (Ambler et al., 2021).
Second, a few specific questions could be added to standard household surveys to understand better child fostering implications for children's development. Especially questions on parents' location would allow us to identify children fostered because of parental migrations. Also, more information on the parental background, especially the parental union, would be relevant to further account for correlates of child fostering. Third, as several households might participate in providing for children's needs, surveys recording expenditures at the household level are likely to miss some expenses for children. Especially for children who

do not co-reside with both living parents, questions about individual expenditures should not be constrained by the household notion.

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Chapter 2

Men's premarital migration and marriage payments: Evidence from Indonesia

This chapter is a joint work with Hugues Champeaux (Postdoctoral Fellow, Université de Namur, CRED) and Karine Marazyan (Professor, Université de Rouen, LASTA).

2.1 Introduction

The tradition of marriage payments is persistent in many developing countries, and these payments often reach very high amounts of money (Anderson, 2007). The bride price, paid by the groom to the bride's family at the time of the union, is a widespread practice in Sub-Saharan Africa or Asia, such as in Thailand or Indonesia. For young single men, paying a bride price may represent an additional constraint in the marriage market where assortative matting is based on their own or their family's characteristics (Fafchamps and Quisumbing, 2005; Anukriti and Dasgupta, 2017). For example, in Nigeria, Rexer (2022) shows that when this practice is associated with polygamy, it might generate violence and conflicts made by males who can not afford bride price payments.[1] This extreme response to local marriage conditions questions the strategies implemented by men to overcome social and budget constraints related to bride price practices. These strategies include risky behaviors before marriage, such as selling productive assets or migration, with long-lasting effects on men and their families. While a large part of the literature focused on the implications and the roles of the bride price custom on female well-being (e.g., Platteau and Gaspart, 2007; Corno et al., 2020; Hotte and Lambert, 2020), there is little empirical evidence about the relationship with males' premarital behaviors.

In this paper, we exploit the quasi-natural experiment of a school-building program in Indonesia (INPRES) to assess the effects of marriage market changes on men's premarital migration. Using the same setting, Ashraf et al. (2020) documents that the program induced heterogeneous patterns of parental investments in the daughters' education according to the marital customs. As a result of the program, girls belonging to ethnic groups that practice bride prices were more educated. Indeed, the bride price being indexed on women's education, the parents expected a higher amount for their marriage, encouraging them to enroll their daughters in primary schools. Thus, we relate to this context to identify the causal implications of variations in the local marriage market on men's premarital behaviors. Indonesia is a well-suited case study to explore intertwined issues between bride

[1] In political science literature, some scholars also depicted a relationship between the bride price inflation and local conflicts (Hudson and Matfess, 2017; Johnston, 2023).

price norms and marriage market changes, with traditional settings (local marriages and segmentation along ethnic groups) and high social stigma for late marriages and celibacy. In such a situation, men with limited marriage prospects face high social pressure to marry. Based on the age difference at first marriage, we thus identify a cohort of men not exposed directly to the program but being potential husbands of INPRES-treated women. In order to capture a causal effect, we compare this exposed male cohort to a control one who did not face such variations in their marriage market. Then, we discriminate between those who belong to ethnic groups traditionally practicing bride price and others. This framework allows us to perform a triple difference model providing causal evidence that migrations are linked to bride price customs.

As main result, we find that exposed men who belong to bride price ethnic groups were likely to migrate internally before their marriage. Conversely, for other men from non-bride price communities, we did not find any behavioral changes compared to their control cohort. In addition, this differential effect was driven by migrations towards districts with less program intensity (relative to the district of origin). This latter finding is consistent with interpreting marriage market constraints as central in designing migration strategies. Indeed, according to the INPRES design, districts with fewer newly built schools were associated with a higher economic development before the program and fewer variations in the marriage market. For impacted grooms-to-be, we assume two interlinked mechanisms: migrating to fund the marriage at home (affording the local bride price requirements) and migrating to marry (seeking a wife out of their district of origin under some constraints). We explore the drivers of such migration patterns by highlighting the marriage market losers. Our findings are attributable to the most disadvantaged men in their marriage market because of social and budget constraints: the latter-sons and those with a low social status. Both groups are more likely to be excluded from the marriage market than others when the costs of marrying increase; therefore, they implement migration strategies to overcome local constraints.

Our paper contributes to different strands of the literature. First, it belongs to the literature analyzing the relationship between migration and household formation. In the line of Stark (1988), our analysis argues that migration and marriage are interdependent in building a

family. There is substantial empirical evidence that women's migration relates to marital considerations. For instance, Amirapu et al. (2022) relies on the effects of a bridge construction in Bangladesh to prove that marriage-related migration is closely linked to migration costs. In Malawi, Becerra-Valbuena and Millock (2021) shows that women's migrations for marriage are coping mechanisms following droughts to face adverse income shocks at the family level. These two pieces of evidence demonstrate that displacements could relate to marriage intentions. In our study, we focus on the marriage-related migrations of men, which are still under-documented. From another perspective, migration experiences are also interlinked with cultural norms. Fertility patterns at local levels are notably affected by migration experiences (Eryurt and Koç, 2012), through assimilation of the fertility norms of the migrants' countries of destination (Daudin et al., 2016). Furthermore, migrations experiences of husbands influence their fertility preferences when they return in their country of origin (Bertoli and Marchetta, 2015). Our paper integrates the social norms dimension to investigate the implication of marriage market changes on migrations. This is the first paper rigorously identifying the interaction between marital norms and the marriage market to estimate causal evidence on men's internal migrations.

Second, we contribute to a growing literature about the role and implications of marriage payments on the behavior of market entrants. Studied in seminal approaches by anthropologists (such as Kressel et al., 1977), the economics literature analyzing the bride price custom has recently flourished. A large part of the papers focuses on the implications on women's welfare (Hotte and Lambert, 2020), showing negative impacts on women's independence (Kaye et al., 2005), increasing domestic violence and the risk of divorce (Gaspart and Platteau, 2010), or the prevalence of female genital cutting (Khalifa, 2022). Close to our work, some scholars show that the bride price custom may cause marriage market changes. Using estimates across Sub-Saharan countries, Corno et al. (2020) shows that parents smooth consumption and hasten their daugthers' entry into the marriage market when they face adverse income shocks. Similarly, Chort et al. (2022) provides evidence that Turkish women from bride price communities were married earlier when they faced droughts at their entry into the marriage market. Ashraf et al. (2020) also elaborates on parental behavior to understand the dynamics underlying the practice of bride price. These recent pa-

pers report marriage market changes when brides' living conditions are affected (directly or indirectly). To the best of our knowledge, we provide the first evidence assessing the effects of such norms on men's premarital behavior.

Third, our paper belongs to the literature on the importance of norms and cultures shaping social and economic interactions. For developing countries, analyzing culture's role is central to determine underlying mechanisms of development (Baland et al., 2020). Social norms have been studied for their persistent relation with gender inequalities (Jayachandran, 2015). Taking into account the role of culture also brings evidence that family institutions can be heterogeneously affected by the same policies in the same contexts (Bau and Fernández, 2021). The variation of norms across groups might be exacerbated or lead to unexpected effects of programs (Bau, 2021; Dahl et al., 2022). This paper extends such mechanisms showing unexpected policy impacts on men's migrations.

The rest of the paper is structured as follows: Section 2.2 provides background information on the Indonesian marriage market, and the school-building program INPRES. Then, Section 2.3 details our conceptual framework on males' migrations. Section 2.4 presents how we combine household surveys with administrative and ethnographic datasets to perform our analyses. It also lays out the retained sample of men. Section 2.5 details our empirical strategy, while main and placebo results are presented in Section 2.6. Section 2.7 provides the results on our mechanisms. Then in Section 2.8, we define the scope of our results and interpretations. Finally, Section 2.9 draws the main concluding remarks.

2.2 The Indonesia context

2.2.1 The marriage market

The rules governing the marriage market in Indonesia have been remarkably stable over time, suggesting that it could be an ideal framework for studying marriage issues. Marriage is universally practiced among social and ethnic groups (Jones, 2005) while child marriage and early marriages remain prevalent (Jones, 2001). For Indonesians, marriage is necessary to establish a family unit, and single adults suf-

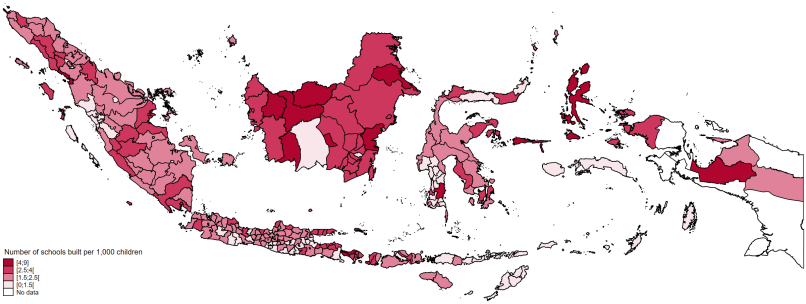
fer from social stigma and could be excluded from customary rituals (Jennaway, 2000; Situmorang, 2007). In addition, there are strong beliefs about the right age for marriage, so men and women who delay their marriage expose themselves to social discriminations (Himawan et al., 2018). As in many developing countries, the traditional setting is prominent in formalizing unions. Currently, in Indonesia, marriages still follow traditions of the *Adat* customs, ethnic-based codes ruling Indonesian peoples (before Islam), and Islamic laws (Nisa et al., 2016; Buttenheim and Nobles, 2009). Despite hundreds of ethnic subgroups in Indonesia, marriages are primarily endogamous, i.e., occurring between individuals with the same ethnic customs (Utomo and McDonald, 2021). Among other customs, marriage payments are highly persistent for several ethnic groups in Indonesia. Compared to most Sub-Saharan African countries where the bride price is widely practiced, this custom is heterogeneously distributed among the different tribes and cultures in Indonesia (Ashraf et al., 2020).

2.2.2 The Sekolah Dasar INPRES Program

The school-building program In the 1970s, the Indonesian government introduced several measures to develop the country's economy through Five-Year Development Plans (*Repelita*) implemented by the Indonesian Ministry of National Development Planning (*Bappenas*). After the oil boom in 1973, the government wanted to reduce regional inequalities. To do so, "presidential instructions" to decentralize were included in the development plans. Increasing the education supply was one of the program components, under the name *Sekolah Dasar INPRES*, leading to the construction of more than 60,000 primary schools between 1973 and 1979. Numerically, it represents, on average, the construction of two schools for 1,000 children per district. The newly built structures could accommodate about 120 students and required recruiting new teachers. Formally, each district has been allocated a certain number of new infrastructures depending on the pre-program level of education. Illustrated in Figure 2.1, the districts' endowment for new schools was heterogeneous across the territory, and inversely proportional to the number of children of primary school age enrolled in 1972. Before the program in 1972, Indonesia had 63,000 primary schools with an enrollment rate of around 70 percent of children of primary school age. The number of schools almost doubled in 1978, making INPRES one of the most extensive school-building programs. At the end of the

1980s, the primary school enrollment rate rose to 85 percent (Akresh et al., 2023).

Figure 2.1: School construction per district (INPRES Intensity)



Sources: authors' elaboration using geo-information from the 1990 Indonesian Census and administrative data.

INPRES and educational achievements Massive primary school construction programs have largely been studied both for their direct and intergenerational impacts (e.g., Handa, 2002; Kazianga et al., 2013). For Indonesia, a seminal paper from Duflo (2001) shows that INPRES positively impacted the share of boys completing primary education. Moreover, for treated individuals, it increased formal labor force participation (Duflo, 2004). Mazumder et al. (2019) also documents positive intergenerational effects on child education. Along the same line, child development was positively impacted by the mothers' exposure to the program (Hasan et al., 2020). Furthermore, Akresh et al. (2023) also finds a positive effect on the education of children of exposed men and women.[2]

While the literature shows a positive effect of the program on men's education, the impact on women's education is less clear, suggesting that there are gender differences in the implications of INPRES. Using the quasi-natural experiment setting of INPRES, Ashraf et al. (2020)

[2]Other implications of the INPRES program have been studied, such as structural change on the agricultural sector (Karachiwalla and Palloni, 2019), conflicts (Rohner and Saia, 2019), local governance (Martinez-Bravo, 2017), or religiosity (Bazzi et al., 2020).

provides causal evidence about heterogeneous impacts for girls depending on their ethnic group's practices. Based on a theoretical model with parental anticipations, it finds that daughters belonging to ethnic groups practicing bride prices are more likely to complete the primary level of education than daughters belonging to other ethnic groups. The authors empirically demonstrate that the amount of bride price is positively correlated with the bride's primary education. By increasing the potential bride price received, the program generates divergent incentives for parents depending on the marital customs and cultures of the ethnic group they belong to.

2.3 Conceptual framework

In this paper, we introduce several assumptions regarding the implications of the program on men's premarital behaviors and the marriage market. Both Ashraf et al. (2020)'s framework and the INPRES setting allow us to assume that the heterogeneous patterns of responses to school constructions influence the marital conditions of men. A prerequisite to our analysis is that INPRES led to an exogenous increase in women education and their bride price expectations for those who belong to ethnic group with bride price custom. Although we are not able to precisely determine the levels of bride price per district because of unavailable data, we rely on Ashraf et al. (2020) empirical findings to suppose that the variation of bride price requirements is higher in the most exposed districts than in the less exposed.[3] Furthermore, by the definition of the program, the areas less affected by INPRES were those with the highest level of primary education at the time of implementation. Therefore, these areas were previously in better conditions regarding economic integration and development.[4]

Facing localized shock on the marriage market indirectly generated by

[3]Some data are available in Indonesia to assess marriage payments (notably in the surveys IFLS). However, these datasets suffer from several caveats, making their use impossible at the district level. First, bride price data in these surveys notably present report and recall biases due to their retrospective aspect. Second, the representativeness of such information is not possible, notably at a local level and for particular periods (Ananta et al., 2015).

[4]Using data on water and sanitation access before the INPRES program, we find a negative and significant correlation with the school construction program intensity, meaning that treated areas were relatively less equipped with public services and infrastructures than the untreated ones.

INPRES, single men must find a way to adapt to find a bride. The central hypothesis we test is whether such market changes increase the males' willingness to migrate out of their district of origin. For the grooms-to-be exposed to such changes, migration may allow them to afford the bride price by (i) looking for resources or (ii) seeking a bride in an unexposed (or less exposed) marriage market. Because the less-treated districts were more economically attractive and had a less district variation of bride price (Ashraf et al., 2020), the migration towards these areas seems more plausible than the inverse. However, migrating to marry in another district would only make sense if men can find a bride from their ethnic group at destination and if parents' expectations for bride price are lower than in their district of origin (or at least equal).

An auxiliary hypothesis we test is that some groups of men might be more budget constrained than others and, thus, more likely to implement migration strategies. First, in the literature, it has been shown that siblings compete for limited resources in their household, and the first-born is more likely to be prioritized (De Haan, 2010; Jayachandran and Pande, 2017). Moreover, parents may not apply the same constraints for the first as for the latter-borns marriages.[5] Thus, latter-sons are likely to suffer more from the scarcity of resources to finance their bride price than their older brothers. Second, individuals with low social status likely belong to families with few financial resources to help them finance their marriages. Their social status might also undermine their desirability, excluding them from newly educated brides who expect better marriage outputs.

To test our hypotheses, we focus on the first cohort of men affected by marriage market changes generated by INPRES. Indeed, a prerequisite to our analysis is that parents do not anticipate males' migrations out of their district.[6] When parents observe an erosion of the pool of grooms-to-be in their district due to their migration, they might lower their expectations regarding bride prices. Our conceptual framework entails that parents did not anticipate migrations, expecting a high bride price for their daughters. However, we do not exclude a temporal adjustment for the bride price expectations after migrations occur and

[5]For women, Vogl (2013) provides evidence that parents emphasize the quality of the marriage for their first daughter more than for their other daughters.

[6]Using the IFLS data in Indonesia, we find that only 12.47 percent of marriages were inter-district before 1950. Therefore, the parents' generation mainly marries locally and is likelier to expect local marriages for their daughters.

for the next generation of grooms. Nevertheless, the first cohort of men exposed to marriage market changes is likely to face higher bride price expectations than the previous ones. Furthermore, as men marry later than women, focusing on the first cohort of men exposed to marriage market changes allows excluding a direct impact of INPRES on their level of education, as they were too old to benefit from it (strategy detailed in Section 2.4.3).

Alternative behaviors for exposed males should not be excluded. One exposed grooms' strategy might be to delay the marriage or, more radically, remain single, which entails social stigma. Attracting a woman from a district where the bride price is relatively lower is also a strategy to bypass the local marriage market. These alternative situations are discussed later in the paper (Section 2.8). Another strategy is to marry a divorced or widowed woman (with a lower bride price requirement) or a woman from an ethnic group without a bride price custom. Both situations are unlikely to happen as the grooms-to-be and their families would suffer from high social stigma and pressure.

2.4 Data and sample

In order to study premarital patterns of migration related to ethnic customs, we rely on several sources of information: data from the Indonesian Family Life Survey, anthropological information from the Ethnographic Atlas (Murdock, 1967) and administrative data on INPRES. Then, we describe how we draw our sample of interest for our empirical analyses.

2.4.1 Indonesian Family Life Survey

The Indonesian Family Life Survey (IFLS) is a widely multi-topic household data source conducted by RAND in collaboration with Lembaga Demografi and the University of Indonesia. Implemented in 1993, the first survey aimed to interview 7,224 households spread across 13 provinces of Indonesia (representing 83 percent of the total population at that time). The four subsequent surveys sought to follow respondents from the initial sample in 1997, 2000, 2007, and 2014. Individuals are tracked independently from households' dissolution, households'

split, or the formation of new households (Frankenberg et al., 2003).[7] All individuals residing with respondents from the original sample are included, even if they arrived as new members or formed a new household with a former surveyed person. The last survey (2014) contains information about 15,921 households. In total, IFLSs collected detailed information on 83,786 individuals in Indonesia.
In 2012, the IFLS was extended to the easternmost areas of Indonesia. This initiative resulted in the Indonesia Family Life Survey East (IFLS EAST), sampling 2,547 households. SurveyMETER conducted the IFLS EAST on behalf of TNP2K (National Team for the Acceleration of Poverty Reduction), PRSF (Poverty Reduction Support Facility), and the AusAID (Australian Aid). The data collection and questionnaires were the same as for the IFLSs.
In this paper, we combine IFLSs and IFLS EAST data to obtain a database covering all Indonesian provinces.

Migration history and INPRES intensity All individuals aged 15 and over during one survey report their place of birth, their place of residence at the age of 12, and a complete list of all their locations up to the survey date. This questionnaire section is included in every IFLSs and IFLS EAST. For panel respondents, it allows taking into account changes of residence occurring between surveys. It also includes individuals who were surveyed before and after their 15th birthday. The respondents declare the destination place (at the district level for Indonesia) and the arrival date for each migration. We use the administrative division that prevailed at the time of INPRES implementation to define the residence districts.[8] This allows us to associate each district with the intensity of the school-building program. As previous papers assessing the impact of this program (e.g. Duflo, 2001; Mazumder et al., 2019; Ashraf et al., 2020; Akresh et al., 2023), we define local intensity

[7]The individual tracking was very efficient and led to a low attrition rate at the individual level (Strauss and Witoelar, 2019).

[8]The places of residence reported by individuals are coded according to the administrative classification prevailing at the time of the survey. Between 1999 and 2015, the Regional Autonomy Law (under President Soeharto) led to several reforms in regional governance. Before the reform, Indonesia was divided into 26 provinces and 299 districts. Since 2015, there have been 34 provinces sub-divided into 514 second-order levels (districts and important municipalities). As in Mazumder et al. (2019), we redraw the equivalent of district codes in 1993 to define residence places after the reform to obtain a stable classification.

as the number of schools built for 1,000 students at the district level.[9] As explained in the Section 2.2, the less impacted districts were those with the highest enrollment rates in 1972.

First marriage The IFLSs and IFLS EAST gather the entire marital history of individuals over 15. For each marriage, the respondents report the marital situation and background information such as the marriage date; if the marriage is dissolved at the time of the survey, the ending date and the reason (divorce or death) are declared. As for migration history, this questionnaire section is administered during each IFLSs to account for marital status evolution and the integration of new respondents. As we study issues related to entry into the marriage market, we focus on the individuals' first marriage. For each survey, all married household members declare whether their spouse is a household member. If so, the survey records the identifier of the spouse among the household members. This information allows us to identify first co-resident spouses.[10]

2.4.2 Ethnographic Atlas

The respondent's ethnicity is documented from the third IFLS (including the IFLS EAST). We matched the self-reported ethnicity with the corresponding ancestral ethnic groups using a language-based matching following the Ethnologue: Languages of the World (Gordon, 2009), compiled in the database used in Giuliano and Nunn (2018). For each past ethnic group, we rely on the Ethnographic Atlas (Murdock, 1967) to determine marital customs. In our setting, we define bride price as substantial wealth transfers from the groom's family to the bride's family at the time of the marriage.[11] Therefore, for each respondent who reported an ethnic group, we can characterize his or her traditional bride price practice. We precisely identify anthropological information for 66.64 percent of all the IFLSs and IFLS EAST respondents. Most

[9] Data on the educational component of the INPRES program have been made available by the Indonesian government and shared with us by Esther Duflo.

[10] For the current or the last marriage, individuals also report the marriage payments (bride price and gift at the time of the wedding). However, this information is unreliable at local and ethnic levels because of the lack of representativeness and recall biases (Ananta et al., 2015).

[11] In this framework, "bride price token" or "bride price services" are not considered as "bride price" since they are mostly symbolic and are not affected by an increase in the brides' education.

individuals for whom we cannot identify their ancestral ethnic group were surveyed during IFLS 1 or IFLS 2 and died before IFLS 3 or were unsuccessfully tracked. In detail, the bride price is practiced for 12 out of 22 present ethnic groups (recorded in the surveys), corresponding to 7 over 14 ancestral groups.[12] In total, 22.41 percent of the respondents with information on ethnicity belong to ethnic groups with bride price customs.

2.4.3 Sample definition

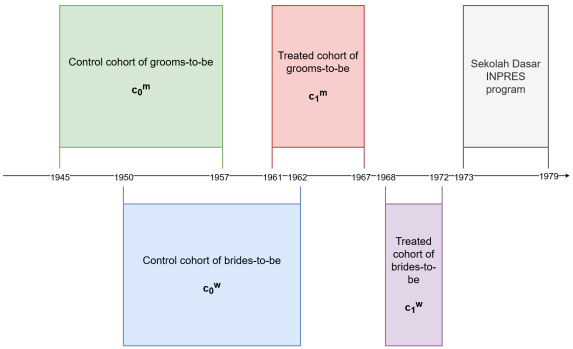
To test the validity of our hypotheses regarding males' premarital migrations (presented in Section 2.3), we focus on men who are supposed to find a wife among the first cohort of women exposed to the school-building program. Following the literature measuring the INPRES's impacts on primary education, individuals born between 1968 and 1972 were the first cohort who benefited from the program because they were aged 2 to 6 in 1974 (Duflo, 2001; Ashraf et al., 2020). This cohort is usually compared to individuals who were too old at the time of the school construction, aged 12 and older (born between 1950 and 1962). Women of primary age at the time of the INPRES implementation are named c_1^w and the control cohort of women is called c_0^w. On average, both cohorts of women married for the first time at 19 years old. The age difference with their husband is about five years for both.[13] We exploit this age difference between spouses to determine the exposed cohort of men that experienced local marriage market changes through women's education.

Figure 2.2 illustrates the definitions of the different cohorts used in the literature and in our analyses. The cohort called c_1^m comprises men aged five years older than women born in 1972, thus born in 1967 at maximum. To capture all potential grooms for the treated women, we consider a large bracket up to 1961. To be consistent, we conserve the same five-year difference between spouses to define the cohort of men, called c_0^m, who were likely to marry non-beneficiary women. Our empirical framework aims to capture a causal effect of marriage market changes on men's premarital migrations. Restricting our analysis

[12] The Appendix Table A.1 presents the classification of the bride price custom according to ancestral ethnic group matched with the individual declaration about ethnicity.

[13] We can determine the age difference based on the sub-samples of co-resident couples at the time of the IFLSs and IFLS EAST.

Figure 2.2: Definition of the cohorts



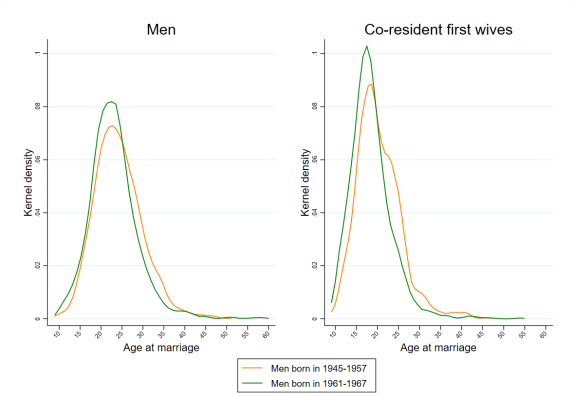
Notes: c_1^w is the cohort of exposed women to the program and c_0^w the control group, as defined in Ashraf et al. (2020); our cohort of exposed men is noticed c_1^m while the control group is c_0^m.

to men born before 1968 allows us to focus on individuals who are not directly exposed to the school-building program but who should marry women benefiting from it. Thus, the cohort c_1^m is only indirectly impacted by INPRES through brides' education. However, in the framework of Duflo (2001), men aged 7 to 12 (born between 1963 and 1968) at the time of the school building program might partially benefit from INPRES (starting school late or repeating a year). Using the same empirical framework applied to our cohorts c_1^m and c_0^m, we do not find any evidence that the program affected their probability to achieve the primary level (see Appendix Table A.3).

Figure 2.3 shows that age distribution at marriage is similar for both men's cohorts. In parallel, they both married women aged about 19 at their wedding. We can reasonably rely on this stability of age at marriage for men and women to determine our sample.[14]
For girls from the first impacted cohort (c_1^w), the program only increased the education of those belonging to ethnic groups with bride price customs (Ashraf et al., 2020). As marriage markets are segmented by ethnic group in Indonesia (Section 2.2.1), men from bride price

[14] We also verified the framework of the marriage market using matches between cohorts (c_0^m and c_0^w; c_1^m and c_1^w). Based on sub-samples of couples residing together, we show in Appendix Table A.2 that most married men in c_0^m have a co-resident first wife from c_0^w, and c_1^m are likely to have a first wife from c_1^w.

Figure 2.3: Age at marriage of sampled men and their first wife



Notes: kernel density estimates; the sample includes men born in 1945-1957 and 1961-1967, who co-reside with their first wife at survey time.
Source: authors' elaboration on IFLS 1, 2, 3, 4, 5 and IFLS EAST.

groups in c_1^m should observe changes in their marriage market. Their brides-to-be were more likely to be educated with higher expectations of bride price than women in c_0^w.

Table 2.1: Description of the sample according to the bride price custom and the cohort

	Bride price custom			No bride price custom		
	(1) c_0^m	(2) c_1^m	(1)-(2)	(3) c_0^m	(4) c_1^m	(3)-(4)
Married	0.980	0.972	0.008	0.993	0.975	0.019***
	(0.006)	(0.008)	(0.010)	(0.002)	(0.004)	(0.005)
$Intensity_d$	2.145	2.166	-0.021	1.955	1.949	0.006
	(0.063)	(0.062)	(0.089)	(0.021)	(0.022)	(0.031)
Co-reside with first wife	0.841	0.909	-0.068***	0.811	0.899	-0.088***
	(0.017)	(0.015)	(0.023)	(0.010)	(0.008)	(0.013)
First wife with bride price custom	0.858	0.835	0.023	0.031	0.040	-0.008
	(0.019)	(0.021)	(0.028)	(0.005)	(0.006)	(0.008)
Observations	461	394	855	1,511	1,419	2,930

Note: standard errors in parentheses; * p<0.10, ** p<0.05, *** p<0.01; the sample includes men born in 1945-1957 and 1961-1967 with information about their place of residence at 15; $Intensity_d$ is the number of primary schools built per 1,000 children during the INPRES program in the district of residence at 15; bride price custom of the first wife is defined for men co-residing with her at survey time.
Sources: authors' elaboration on IFLS 1, 2, 3, 4, 5, IFLS EAST, anthropological and administrative data.

Table 2.1 provides descriptive statistics on men by ethnic custom and cohorts. For those belonging to ethnic groups with bride price cus-

toms, the quasi totality of men married regardless of the cohort. For men without the custom, the rate of married decreases by about 2 percentage points over cohort, but it is still almost universal. For men, we set the age of entry into the marriage market at 15. We consequently define their district of residence at 15 as their local marriage market, characterized by the number of schools built during INPRES, namely $Intensity_i$. The location of ethnic groups has not followed a particular trend over time since we do not observe any difference in the INPRES intensity across cohorts. Importantly, we also observe no major difference in exposure to the program depending on the marital custom. On average, the program intensity in the local marriage market of men without bride price custom is about 1.9 schools for 1,000 children, while this is 2.1 for men belonging to ethnic groups with bride price practice.[15] Furthermore, regardless of their customs, most men co-resided with their first wives. The co-residence rate with the first wife is lower for men from c_0^m as they are older at the time of the survey; this cohort is more likely to have experience widowhood or several marriages. As explained in Section 2.2.1 and observed in Table 2.1, marriages are mostly intra-ethnic in Indonesia, and spouses mainly have the same marital customs.

2.5 Empirical strategy

Triple difference estimator We implement a triple-difference framework to test whether men exposed to local marriage changes were more likely to migrate before marriage. We precisely perform an empirical setting inspired by Ashraf et al. (2020) where impacted women were (i) in the age-cohort concerned by the school-building program (named c_1^w in our setting), (ii) originated from districts with high intensity of school construction, and (iii) belonged to ethnic groups with bride price custom. We retain these three layers to conduct causal estimates on the sub-sample of exposed grooms-to-be (c_1^m) in impacted areas ($Intensity_d$) practicing bride price (BP_e), using the following regression:

[15] The national level of intensity is about 2 newly built schools per 1,000 children at the district level. There is no significant difference in INPRES intensities between cohorts (c_0^m and c_1^m).

$$Y_{ied} = \beta_1 I_i^c \times Intensity_d \times BP_e + \beta_2 I_i^c \times Intensity_d \times noBP_e + \zeta_i^c + \zeta_e + \zeta_d + \zeta_i^c \zeta_e + \zeta_e \zeta_d + \alpha M_i + \epsilon_{ied}. \tag{2.1}$$

Here, we denote Y_{ied} the inter-district premarital migration for the respondent i, belonging to the ethnic group e and originates from the district d. The outcome is an index dummy equal to one if the respondent migrated at least once between the age of 15 and 23 (see the discussion below about this index). Exploring the migration destination, we separately estimate Equation (2.1) with dummies for migrations towards districts with lower intensity compared to i's district of residence at 15 (d), or towards areas with higher program intensity. BP_e is a dummy equal to one when the ethnic group traditionally practices bride price, zero otherwise. Similarly, $noBP_e$ is equal to one if the ancestral group does not, and zero otherwise. We name I_i^c, the index equal to one if the respondent belongs to the exposed cohort born between 1961 and 1967 (c_1^m), zero otherwise (c_0^m). $Intensity_d$ is a continuous treatment variable representing the number of schools built for 1,000 children at the district level. Therefore, the triple difference estimator allows us to capture separated effects of marriage market changes on males' premarital migration depending on marital customs, with β_1, the impact for exposed grooms-to-be with bride price customs, and β_2 for those who are not traditionally practicing.

Equation (2.1) also includes constitutive elements of the interactive terms, $I_i^c \times Intensity_d \times BP_e$ and $I_i^c \times Intensity_d \times noBP_e$. ζ_i^c is cohort fixed effects, used either under a dummy equal to one if the respondent belongs to the exposed cohort or with years of birth fixed effects, capturing the invariant disparities among cohorts. We also add district fixed effects, ζ_d, and ethnic group fixed effects, ζ_e, allowing us to capture unobserved heterogeneity at the local and ethnic levels. We allow ζ_e to vary depending on the cohort, $\zeta_i^c \zeta_e$, and depending on the district of origin, $\zeta_e \zeta_d$. In this way, we consider the temporal and spatial distribution of ethnic groups. All information in $Intensity_d$ and its subsequent interactive terms are absorbed in such a specification.

The triple difference estimator has become largely used in the literature to estimate causal evidence of shocks or programs that have heterogeneously affected exposed groups. This approach is equivalent to the dif-

ference between two difference-in-difference. This framework requires only one parallel trend assumption. For our approach, we should not observe any particular migration pattern between both types of ethnic groups before the program (Olden and Møen, 2022). To test the validity of this common trend, we use placebo specifications estimating Equation (2.1) on older cohorts (results are presented in Section 2.6). Our identifying assumption relies on the absence of other dimensions during the treatment, which may have affected men differently because of their customs. In our case, the program did not directly affect the exposed cohort. We also observe no strict difference between bride-price and non-bride-price communities in terms of INPRES intensity (Table 2.1), meaning that both groups faced the same treatment. Once controlling for cohort, district, and ethnic fixed effects, we capture all unobserved invariant heterogeneity across time, cultures, and locations. This allows us to highlight causal evidence on ethnic-specific migration patterns according to bride price customs. Furthermore, we later discuss some confounding factors related to the indirect effects of the program implementation.

Premarital migration proxy Used as dependent variables for most of our estimates, proxies for males' premarital migration are central to our analyses. We can redraw the migration history for all respondents using recorded past locations and moves. In IFLSs and IFLS EAST, temporal information is collected to determine the accurate migration timing. Using the correspondence with the marriage timing, we would have been able to identify raw premarital migrations correctly. Nevertheless, such a migration measure might be mechanically affected by the INPRES program and marital customs. For example, if the probability of migrating is the same each year, those who marry later are more likely to migrate before marriage. To assess causal evidence between exposed cohorts and ethnic groups, we use a measure independent of the age variation at first marriage. Therefore, we retain all men's moves and locations between 15 and 23 years old. This age range is likely to cover premarital migrations: 15 is assumed to be the males' first entry age in the marriage market, while 23 is the median age for marriage in our sample. Then, we define a dummy equal to one if the individual has migrated at least once to another district during this period. We also refine this measure by discriminating the destination districts according to their relative intensity levels compared to

the place of residence at 15 years old. In other words, we differentiate if the respondents migrated towards a district with a lower (or a higher) INPRES's intensity than the intensity at the origin. The idea is to capture particular migration strategies in areas where marital and economic environments differ from the grooms-to-be's district of origin.

This empirical proxy for premarital migration experience ensures disentangling the impact of INPRES on age at marriage and migration strategies. However, we might include post-marital migration if men who married before 23 changed their district of residence after their wedding. This inclusion error is about 11 percent in the unexposed cohort (born between 1945 and 1957) and 11.4 percent for the exposed cohort (born between 1961 and 1967).[16] We might also exclude some migration episodes for those who married after 23 years old and migrated between their 23 and their wedding. In our sample, we have found 8.9 percent of unexposed men and 11.7 percent of the exposed cohort in such a case. Finally, our measures allow capturing most of the migration episodes before marriage because almost 80 percent of men who migrated before marriage have moved between 15 and 23.[17]

2.6 Results

According to our conceptual framework presented in Section 2.3, exposed men with bride price custom experienced changes in their local marriage market. Below, we provide evidence that premarital migrations are used to overcome this local changes.

Prerequisite to the analysis In order to verify the validity of our underlying assumption regarding women's education, we reproduced the framework in Ashraf et al. (2020) using our data sources.[18] Our findings are consistent with the literature: high INPRES intensity led to women's education improvement for those who belong to ethnic groups

[16] This inclusion error only accounts for men who married before 23 and did not migrate before their wedding.

[17] 91 percent of these premarital migrations are autonomous, i.e., without any parent moving with the individuals.

[18] Replicating the empirical framework of Ashraf et al. (2020) with our data (Appendix Table A.4) we find a similar magnitude difference between women belonging to ethnic groups who practice bride price and those who do not as this seminal paper. However, due to the limited size of our sample, this difference is not significant.

with bride price custom (Appendix Table A.4). Consequently, we can assume that young single men faced local changes in their marriage market of origin. Furthermore, we find that the school-building program had no direct impact on the men's education as they were too old to directly benefit from the INPRES implementation (Appendix Table A.3).

Main results Table 2.2 presents the coefficients β_1 and β_2 estimated through our triple difference framework. We also implement a F-test procedure to check the significance of the difference between our two coefficients of interest. Associated p-values are reported under each specification. We estimated different models, progressively including control variables. We report results for each dependent variable related to inter-district migration experienced and migrations to districts with lower (higher) intensity than at the origin. Column (5) contains the complete specification with a full set of covariates.[19] Nevertheless, the magnitude and significance of our coefficients are relatively stable across all estimated specifications.

In response to the program implementation, exposed males (c_1^m) with bride price customs were more likely to experience an inter-district migration between 15 and 23 than the previous generation (c_0^m with the same marital customs). The effect is driven by migration towards districts with less INPRES intensity than their district of origin. Being affected by the program increased premarital migration by four percentage points. Relative to the previous cohort, the probability of migrating to a less impacted area rose by about 30 percent. Premarital migrations are concentrated in districts with relatively low modifications on the marriage market compared to the men's place of residence at 15.[20] This non-random migration pattern is specific to men from ethnic groups that make bride price payments at marriage.[21] This differential effect suggests that grooms-to-be who traditionally practice

[19] We estimates the specifications on 3,785 men in c_0^m and c_1^m. Some observations are omitted because of the limited size of our sample with the inclusion of fixed effects.

[20] We also tested the robustness of our findings accounting for the district of birth instead of the district at 15 to characterize the marriage market of origin. Our findings are robust to this change of definition. In our sample, about 10 percent of men moved from their district of birth before their 15th birthday (notably migrations with their parents or child fostering).

[21] By removing the ethnic dimension and particularity of marital customs, the difference-in-difference estimates do not provide any effect of the school-building program (see Appendix Table A.5).

Table 2.2: Impacts on migrations between 15-23

	(1)	(2)	(3)	(4)	(5)
	Dep. var.: Inter-district move				
$I_i^c \times Intensity_d \times BP_e$	0.038**	0.033**	0.038**	0.033**	0.030*
	(0.017)	(0.016)	(0.016)	(0.016)	(0.016)
$I_i^c \times Intensity_d \times noBP_e$	0.021	0.017	0.021	0.017	0.017
	(0.022)	(0.023)	(0.022)	(0.023)	(0.023)
P-value	0.494	0.549	0.503	0.555	0.600
Mean for c_0^m	0.217	0.217	0.217	0.217	0.217
	Dep. var.: Move to district with lower INPRES				
$I_i^c \times Intensity_d \times BP_e$	0.041***	0.044***	0.041***	0.044***	0.043***
	(0.015)	(0.015)	(0.015)	(0.015)	(0.014)
$I_i^c \times Intensity_d \times noBP_e$	-0.003	-0.009	-0.002	-0.008	-0.009
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
P-value	0.026	0.008	0.030	0.009	0.010
Mean for c_0^m	0.122	0.122	0.122	0.122	0.122
	Dep. var.: Move to district with higher INPRES				
$I_i^c \times Intensity_d \times BP_e$	0.007	0.003	0.007	0.003	0.003
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
$I_i^c \times Intensity_d \times noBP_e$	0.005	0.008	0.006	0.008	0.008
	(0.017)	(0.018)	(0.017)	(0.018)	(0.018)
P-value	0.953	0.842	0.957	0.838	0.832
Mean for c_0^m	0.096	0.096	0.096	0.096	0.096
Observations	3,755	3,755	3,755	3,755	3,755
Ethnic group FE	Yes	Yes	Yes	Yes	Yes
Ethnic group FE$\times I_i^c$	Yes	Yes	Yes	Yes	Yes
Ethnic group FE$\times Intensity_d$	Yes	Yes	Yes	Yes	Yes
District at 15 FE	Yes	Yes	Yes	Yes	Yes
District at 15$\times$ Ethnic group FE	No	Yes	No	Yes	Yes
Year of birth FE	No	No	Yes	Yes	Yes
Muslim dummy	No	No	No	No	Yes

Notes: standard errors clustered at the district level in parentheses; * p<0.10, ** p<0.05, *** p<0.01; the sample includes men born in 1945-1957 and 1961-1967 with information about their place of residence at 15; $Intensity_d$ is the number of primary schools built per 1,000 children during the INPRES program in the district of residence at 15.
Sources: authors' elaboration on IFLS 1, 2, 3, 4, 5, IFLS EAST, anthropological and administrative data.

bride price adapted their behaviors to the moving conditions of their marriage market. Furthermore, it provides evidence that policies create unexpected consequences through their interaction, even indirectly, with norms. We do not find variations in the probability of migrating to districts with higher INPRES intensity than in the district of origin, regardless of the males' marital customs.

Placebo test To assess the robustness of our triple difference estimator, we test the parallel trend assumption on the unexposed cohorts (Olden and Møen, 2022). In detail, we perform a placebo analysis, assigning men born between 1954 and 1960 to the treated cohort (c_1^m) and those born in 1938-1950 to the control cohort (c_0^m).[22] That way, we

[22]As individuals are interviewed between 1993 and 2014, we are concern about survivorship of the oldest cohort at the time of the survey. Nevertheless, for the

verify no systematic migration patterns across ethnic groups and locations. By definition, the INPRES program inversely targets the less developed areas (see Section 2.2.2), and we might suspect that low-treated districts are continuously attractive. Reproducing the Equation (2.1) applied to the placebo groups, we show that our interest coefficients are insignificant. Moreover, there is no evidence of divergent premarital migration behavior according to the bride price custom (Appendix Table A.6). From our placebo analyses, we assess that the effects are only driven by the program's implications and not by structural migration patterns based on marital norms.

2.7 Mechanisms

Our main results show that local marriage market changes in Indonesia have encouraged the migrations of young single men. In order to further explore the drivers of such patterns, we try to reveal which types of mechanisms are underlying the motivations of the grooms-to-be.

Individuals' constraints In our sample, about 50 percent of males with bride price custom completed the primary education before INPRES, and half of them married uneducated wives. After the school-building program, in districts intensively affected, the local share of educated brides-to-be in the marriage market has increased, whereas the education of their grooms-to-be stagnated. The age difference between spouses explains it, i.e., INPRES impacted brides-to-be met in the marriage market INPRES non-impacted grooms-to-be. The bride price asked by girls' parents respecting this tradition is indexed on the girls' education and consequently increased at the time of the program (Ashraf et al., 2020). However, their potential grooms might need help to comply with the parental expectations on bride prices. For this reason, we expect a heterogeneous response of males to marriage market changes depending on their financial capacities. With respect to this assumption, men with high budget constraints could have been more likely to use migration strategies to fund their marriage.

placebo analysis, 1,952 men belong to the oldest cohort (c_0^m), and 1,452 belong to (c_1^m). The cohort sizes are, therefore, similar to those used to perform our main analysis.

Birth order As mentioned in Section 2.3, the parental investments in child development are correlated with the birth rank. First-sons received more support to marry (either finding a bride or bearing the cost of marriage), and the latter-sons are disadvantaged relative to their elder. To an extent, this group is likely to face more budget constraints and implement an individual strategy to marry. Therefore, premarital migration could be a solution for latter-sons to overcome the marriage market requisites. Furthermore, depending on inheritance system, the eldest might inherit from the family land, thus less likely to migrate out of their place of origin.
To investigate the constraints linked to the birth order, we relied on co-resident siblings and respondents' declarations about their non-co-resident siblings.[23] Thus, we built the individual birth rank for a sub-sample of respondents who answered questions about their non-co-resident siblings (representing 51 percent of our sample of interest). Our main results hold on this selected sub-sample (see Appendix Table A.7).

We distinguish men between first-sons and latter-sons and replicate our empirical analyses on both groups.[24] Results presented in Table 2.3 highlight that only latter-sons were more likely to migrate in response to the marriage market changes (Columns (2) and (5)). Having experienced migration to a district with a higher program's intensity is slightly significant for first-sons, but the difference between ethnic groups is not significant, so the marriage market changes do not drive this pattern. The probability of experiencing a migration between 15 and 23 in a district with a lower program intensity quasi-doubled for latter-sons relative to the previous generation (Columns (1) and (2)). This implies that our effect is conditional on access to the household's resources and parental's investments. When men face marriage market changes, the most impacted are constrained to adopt risky strategies such as premarital migration.

Social status Social status correlates with the family's financial capacities but also with the individual desirability into their marriage

[23] IFLFs and IFLS EAST do not include a direct question on birth order. Moreover, co-residing with siblings is unusual because most men were married and lived in independent households at the time of the survey. A specific module recording information on non-co-resident siblings is only included in IFLS 1 and IFLS EAST.
[24] 67.8 percent of the first-sons are also the first-borns among their siblings.

Table 2.3: Impacts on migrations between 15-23 by birth order

	(1)	(2)	(3')	(4)	(5)	(6')
Panel	B: Latter-sons			C: First-sons		
	Dep. var.: Inter-district move					
$I_i^c \times Intensity_d \times BP_e$	0.106***	0.107***	0.041	-0.090	-0.067	-0.072
	(0.038)	(0.040)	(0.050)	(0.066)	(0.072)	(0.071)
$I_i^c \times Intensity_d \times noBP_e$	-0.050	-0.064	-0.053	0.009	0.038	0.047
	(0.044)	(0.044)	(0.038)	(0.059)	(0.060)	(0.057)
P-value	0.009	0.006	0.155	0.284	0.278	0.200
Mean for c_0^m	0.224	0.224	0.189	0.204	0.204	0.170
	Dep. var.: Move to district with lower INPRES					
$I_i^c \times Intensity_d \times BP_e$	0.115***	0.116***	0.037*	-0.002	0.017	0.014
	(0.032)	(0.030)	(0.019)	(0.059)	(0.068)	(0.068)
$I_i^c \times Intensity_d \times noBP_e$	-0.018	-0.030	-0.010	-0.033	-0.023	-0.015
	(0.032)	(0.032)	(0.023)	(0.037)	(0.037)	(0.034)
P-value	0.002	0.001	0.121	0.659	0.597	0.700
Mean for c_0^m	0.130	0.130	0.092	0.112	0.112	0.068
	Dep. var.: Move to district with higher INPRES					
$I_i^c \times Intensity_d \times BP_e$	0.014	0.017	0.005	-0.084*	-0.086*	-0.089*
	(0.027)	(0.026)	(0.025)	(0.047)	(0.050)	(0.050)
$I_i^c \times Intensity_d \times noBP_e$	-0.007	-0.000	-0.007	0.005	0.014	0.019
	(0.033)	(0.035)	(0.033)	(0.051)	(0.051)	(0.050)
P-value	0.639	0.710	0.779	0.211	0.158	0.121
Mean for c_0^m	0.091	0.091	0.085	0.102	0.102	0.100
Observations	1,159	1,159	1,159	704	704	704
Ethnic group FE	Yes	Yes	Yes	Yes	Yes	Yes
Ethnic group FE×I_i^c	Yes	Yes	Yes	Yes	Yes	Yes
Ethnic group FE×$Intensity_d$	Yes	Yes	Yes	Yes	Yes	Yes
District at 15 FE	Yes	Yes	Yes	Yes	Yes	Yes
District at 15× Ethnic group FE	No	Yes	Yes	No	Yes	Yes
Year of birth FE	No	Yes	Yes	No	Yes	Yes
Muslim dummy	No	Yes	Yes	No	Yes	Yes

Notes: standard errors clustered at the district level in parentheses; * p<0.10, ** p<0.05, *** p<0.01; the sample includes men born in 1945-1957 and 1961-1967 with information about their place of residence at 15 and birth order; $Intensity_d$ is the number of primary schools built per 1,000 children during the INPRES program in the district of residence at 15; columns (3') and (6') correspond to estimates with dependent variables excluding migrations to Jakarta districts.
Sources: authors' elaboration on IFLS 1, 2, 3, 4, 5, IFLS EAST, anthropological and administrative data.

market (see Section 2.3). After the INPRES implementation, women were getting relatively more educated in highly treated districts; consequently, they might become more selective in the marriage market. Relative to the local pool of single men, women were likely to prefer those with the highest social status. Accordingly, men with low social status were subject to budget and stigma constraints.

We relied on the father's education to proxy the individual social status. We draw the father's education based on the recorded information about co-resident members. We use self-reported information on non-co-resident parents (available in IFLS 1, 5, and IFLS EAST) for respondents not living with their fathers. We retain 85 percent of our main sample, and our main results hold for this restriction (see Appendix Table A.8). Then, we discriminate between sons of primary educated fathers and others. In total, 40.5 percent of men in the sub-sample have uneducated fathers, so we draw comparable groups in size with

this distinction.[25]

We estimate Equation (2.1) separately for both groups. In Table 2.4, our results provide evidence that only the low-status individuals implemented migration strategy to comply with marriage market changes (Columns (2) and (5)). Compared to the previous cohort, the probability of having a migration experience in a district with a lower program intensity than at the origin is 2.6 times higher (Columns (1) and (2)). We do not observe such an adaptation strategy for those with the highest social status. These findings entail that premarital migration is unnecessary for more advantaged men to adapt to the local conditions of marriage. We confirm the assumption made in Section 2.3, premarital migration is only used as a strategy by individuals facing high constraints to marry.

Exclude migrations to Jakarta In 1972, at the time of the school-building program, 18 percent of the Indonesian population lived in urban areas. Twenty years after, the urbanization rate reached 33 percent, with an annual growth of around 5 percent. The main factor of urbanization is due to moves towards the western part of Java island, especially to the capital Jakarta. The Indonesian capital attracted large migration flows because of its economic development and job opportunities (Van Lottum and Marks, 2012).
We replicate our estimates, excluding all the moves toward the five districts covering the capital area. We consequently retain, as dependent variables, dummies equal to one if men changed location between 15 and 23 except for the Jakarta area. We re-conduct analyses on both groups of less advantaged grooms-to-be (latter-sons and low-status males).

After applying this restriction, our coefficient of interest for the grooms belonging to ethnic groups traditionally practicing bride price (β_1) decreases but remains significant. These results highlight that migration to accumulate resources seems to have dominated migration to marry elsewhere. This is not surprising since for migration for marriage to be attractive, the destination districts must respect several conditions: (i) the availability of single women of the same ethnic group, (ii) lower bride prices (or equally high), and (iii) families accepting that the

[25] These groups are not mutually exclusive with our previous definition of latter-sons and can overlap both dimensions. In our sample, 63.3 percent of men with an uneducated father are also latter-sons.

Table 2.4: Impacts on migrations between 15-23 by fathers' education

	(1)	(2)	(3')	(4)	(5)	(6')
Panel	D: Uneducated fathers			E: Educated fathers		
	Dep. var.: Inter-district move					
$I_i^c \times Intensity_d \times BP_e$	0.129**	0.129**	0.081**	-0.014	-0.022	-0.037
	(0.057)	(0.057)	(0.037)	(0.033)	(0.035)	(0.034)
$I_i^c \times Intensity_d \times noBP_e$	0.016	0.012	0.004	-0.016	-0.015	-0.004
	(0.022)	(0.022)	(0.023)	(0.030)	(0.031)	(0.030)
P-value	0.068	0.058	0.080	0.965	0.883	0.440
Mean for c_0^m	0.160	0.160	0.127	0.272	0.272	0.235
	Dep. var.: Move to district with lower INPRES					
$I_i^c \times Intensity_d \times BP_e$	0.136**	0.132**	0.083***	-0.010	-0.001	-0.021
	(0.055)	(0.054)	(0.031)	(0.025)	(0.028)	(0.022)
$I_i^c \times Intensity_d \times noBP_e$	0.001	-0.001	-0.008	-0.018	-0.021	-0.016
	(0.024)	(0.024)	(0.021)	(0.020)	(0.020)	(0.017)
P-value	0.012	0.012	0.005	0.813	0.563	0.842
Mean for c_0^m	0.081	0.081	0.047	0.165	0.165	0.110
	Dep. var.: Move to district with higher INPRES					
$I_i^c \times Intensity_d \times BP_e$	0.009	0.016	0.017	0.006	0.004	-0.001
	(0.019)	(0.020)	(0.020)	(0.024)	(0.027)	(0.026)
$I_i^c \times Intensity_d \times noBP_e$	0.008	0.004	0.004	-0.006	-0.000	-0.000
	(0.022)	(0.022)	(0.022)	(0.023)	(0.024)	(0.021)
P-value	0.968	0.714	0.684	0.751	0.919	0.971
Mean for c_0^m	0.070	0.070	0.068	0.117	0.117	0.114
Observations	1,271	1,271	1,271	1,888	1,888	1,888
Ethnic group FE	Yes	Yes	Yes	Yes	Yes	Yes
Ethnic group FE$\times I_i^c$	Yes	Yes	Yes	Yes	Yes	Yes
Ethnic group FE$\times Intensity_d$	Yes	Yes	Yes	Yes	Yes	Yes
District at 15 FE	Yes	Yes	Yes	Yes	Yes	Yes
District at 15$\times$ Ethnic group FE	No	Yes	Yes	No	Yes	Yes
Year of birth FE	No	Yes	Yes	No	Yes	Yes
Muslim dummy	No	Yes	Yes	No	Yes	Yes

Notes: standard errors clustered at the district level in parentheses; * p<0.10, ** p<0.05, *** p<0.01; the sample includes men born in 1945-1957 and 1961-1967 with information about their place of residence at 15 and father's education; $Intensity_d$ is the number of primary schools built per 1,000 children during the INPRES program in the district of residence at 15; columns (3') and (6') correspond to estimates with dependent variables excluding migrations to Jakarta districts.
Sources: authors' elaboration on IFLS 1, 2, 3, 4, 5, IFLS EAST, anthropological and administrative data.

spouses do not have the same geographical origin. More precisely, the effect on premarital migration for latter-sons decreases by 65 percent from the initial effect (Table 2.3 Column (3')). Concerning males with uneducated fathers, the variation is much smaller, β_1 decreases by 37 percent (Table 2.4 Column (3')). As explained above, those men are more likely to suffer from stigma constraints if locally educated women prefer to marry grooms with the highest social background. Regarding this additional constraint, men with uneducated fathers were less likely to find brides locally than the latter-sons.

2.8 Discussion

Confounding factors Our main interpretation claims an increase in the men's constraints to marry due to the parents' expectations

of the bride price of their marriageable daughters. However, the INPRES program could also impact men's preferences in bride price ethnic groups. Exposed cohorts of males might be concerned by their potential brides' education level and avoid marriage markets with a high average level of education. In that sense, males looking for submissive or not-empowered women can prefer uneducated brides. In such a case, premarital migration experiences aim to increase the chance of marrying an uneducated wife and, after all, increase the grooms' utility derived from the union. *Apriori*, there is no reason for less advantaged men (latter-sons and low-statuses) to adjust their preferences differently from the ones of other groups of men. However, parents could emphasize more on the quality of their first-son's marriage over the ones of their latter-sons. Thus the program might increase parental preference for educated women regarding first-sons' marriages. Other concerns might be related to the potential stigma linked to school enrollment for girls. The program might also change women's valuable characteristics in traditional marriage markets by increasing the school enrollment for girls in bride price groups. For example, the program might raise the men's perceptions of their pretended brides' first intercourse (Teitler and Weiss, 2000). However, as the program is concentrated on primary-age children, the risk of early intercourse at such ages remains low.

Other potential mechanisms Other potential mechanisms may alleviate our findings on men's premarital migration. First, by delaying their entry into their local marriage market, the affected cohorts of males could avoid the marriage market changes, increase their labor force participation or strain the negotiation on the bride price. However, as previously explained, the social stigma remains prevalent for single adults, and delaying the marriage is socially costly (Himawan et al., 2018). Using the same specification as Equation (2.1) with age at first marriage as a dependent variable, we show that globally there is no evidence of such a delay for the grooms-to-be affected by marriages market changes (Appendix Table A.9). However, for latter-sons, likely to migrate to accumulate resources (in districts of Jakarta), we find that, on average, they marry about one year older than the previous cohort. This finding might be linked to the time needed to collect enough money through migration to get married.
Another solution to avoid high constraints in the local marriage market aims to attract women from other districts (notably those less impacted

by the school-building program). To investigate this assumption, we focus on the exposed women's premarital migration for both groups traditionally practicing and not practicing the bride price. In such cases, we assume that migration for marriage can start at 12, and we study women's migration experiences from 12 to 20.[26] We use two different sub-samples, first the co-resident first wives of ever-sampled men, second all females surveyed in the IFLSs and the IFLS EAST.[27] Using the Equation (2.1)'s framework, we show that both women's and wives' patterns of migration are not affected by INPRES (Appendix Table A.10 and Table A.11). Therefore, we conclude that there are no evidence of such behaviors to cope with local marriage market changes.

2.9 Conclusions

In Indonesia, the marriage market is particularly codified, and those who attempt to rule out the social norms are subject to significant social stigma. Unions mainly occur in endogamous ethnic environments, and payments at the time of marriage are often used to condition family formation. Using the quasi-experimental variations associated with a schooling program in Indonesia, we show that this norm interacts with policies generating unexpected consequences.

By exploiting administrative data on the implementation of the INPRES program, we based on empirical and theoretical literature about bride prices. In this literature, it has been shown that parents have expectations of their daughters' bride prices that depend on their level of education. By extension, parents have differential incentives to educate girls according to the ethnic group they belong. Relying on such analyses, we show that the local increase in brides-to-be's education has impacted grooms-to-be's premarital behaviors. Because of the age gap between spouses, we designed an empirical framework where the

[26] As mentioned in the literature, notably in the seminal paper of Field and Ambrus (2008), the females' entry in the marriage market is coinciding with their first menarches. In Indonesia, child marriage is prevalent, and in 1995, 11.8 percent of women were married before 15 (Jones, 2001). For such reasons, we consider as the most accurate measure of the premarital migration experiences between 12 and 20.

[27] The sample of co-resident first wives can be associated with a selection concern related to the survival bias of the first marriages. If first marriages from migrant women are less likely to survive, a selection issue might drive our estimates. That is why we extend our analyses for all the women.

school-building program only affected women. At the same time, their pool of potential husbands did not benefit from INPRES. Then, this identified exposed group is compared to the previous cohort, which did not face such changes at the time of their entry into the marriage market. Using both groups, we implement a triple-difference framework, accounting for anthropological norms, the timing of INPRES, and the intensity of school-building at the district level. This empirical approach allows us to isolate the impact of marriage market changes on men's premarital behavior in ethnic groups with bride price customs. As a result, we document that exposed males' are more likely to migrate out of their district of origin when they traditionally practiced bride price. In detail, this migration pattern targeted areas less exposed to the program. This supports the idea of the attractiveness of these districts as well as assumptions regarding their marriage market relative stability. Furthermore, our findings are notably driven by less advantaged males, the latter-sons, and those with uneducated fathers. It suggests that the most affected men are the less advantaged because they lack access to their household or parental resources. They also are the most likely to suffer from social preferences and stigmas.

This article is the first to attempt to tackle migration strategy and wedding funding issues. Since our results are heterogeneous according to marital customs, our empirical approach highlights the link between marriage market changes and ethnic-group practices. It also emphasizes the role of norms and cultures in understanding demography and population dynamics. There are some limitations to our study. First, this paper lacks to identify marriage market equilibrium at the district level. Second, further studies will be necessary to disentangle the underlying motivations for migrations. Finally, another development would be to explore the marital implications of such premarital behaviors, notably in terms of well-being at the couple and individual levels.

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Appendix to Chapter 2

Table A.1: Bride price custom according to ancestral ethnic groups included in the Ethnographic Atlas

Present ethnic groups	Ancestral ethnic groups	Bride price custom
Ambon	Ambones	Yes
Bali	Balinese	No
Batak Nias	Batak	Yes
Aceh	Cham	No
Dayak	Iban	No
Bima-Dompu	Ili-Mandi	Yes
Jawa Madura Sunda	Javanese	No
Komering	Kubu	No
Makassar	Macassare	Yes
Banjar Betaw Kutai Manado	Malays	Yes
Gorontalo	Manobo	Yes
Minang	Minangkab	No
Sasak Sumbawa	Sumbawane	No
Bugis Toraja	Toradja	Yes

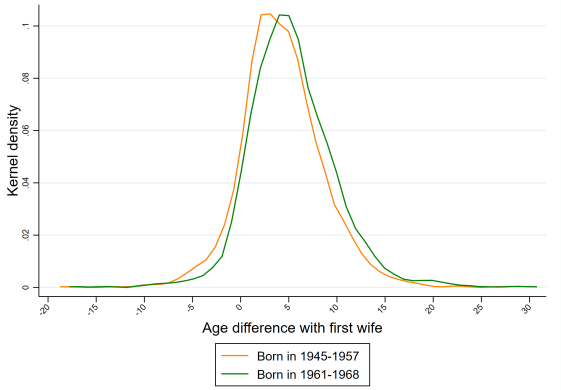
Sources: authors' elaboration on IFLS 3, 4, 5, IFLS EAST, and anthropological data.

Table A.2: Matching of spouses' year of birth

	Share of married men	
	c_0^m	c_1^m
First wife born before 1950	0.077	0.001
	(0.007)	(0.001)
First wife born between 1950-62 (c_0^w)	0.770	0.080
	(0.011)	(0.007)
First wife born between 1963-67	0.123	0.334
	(0.009)	(0.012)
First wife born between 1968-72 (c_1^w)	0.020	0.402
	(0.004)	(0.013)
First wife born after 1972	0.009	0.183
	(0.003)	(0.010)
Observations	1,381	1,433

Notes: standard errors in parentheses; the sample includes men born in 1945-1957 and 1961-1967, who co-reside with their first wife at survey time.
Sources: authors' elaboration on IFLS 1, 2, 3, 4, 5 and IFLS EAST.

Figure A.1: Men are mostly five years older than their first wife



Notes: kernel density estimates; the sample includes men born in 1945-1957 and 1961-1967, who co-reside with their first wife at survey time.
Sources: authors' elaboration on IFLS 1, 2, 3, 4, 5 and IFLS EAST.

Table A.3: Impact of INPRES on grooms' education

	(1)	(2)	(3)	(4)
	Dep. var.: Achieved primary education			
$I_i^c \times Intensity_d^{birth}$	-0.017	-0.014	-0.018	-0.015
	(0.015)	(0.016)	(0.016)	(0.016)
I_i^c	-0.050	-0.065	-0.003	-0.017
	(0.074)	(0.074)	(0.079)	(0.079)
Mean for c_0^m	0.727	0.727	0.727	0.727
Observations	3,827	3,827	3,827	3,827
Birth district * Ethnic group FE	No	Yes	No	Yes
Year of birth FE	No	No	Yes	Yes

Notes: standard errors in parentheses; * p<0.10, ** p<0.05, *** p<0.01; the sample includes men born in 1945-1957 and 1961-1967 with information about their place of birth and education; $Intensity_d^{birth}$ is the number of primary schools built per 1,000 children during the INPRES program in the district of birth.
Sources: authors' elaboration on IFLS 1, 2, 3, 4, 5, IFLS EAST, anthropological and administrative data.

Table A.4: Heterogeneous impact of INPRES on brides' education

	(1)	(2)	(3)	(4)
	Dep. var.: Achieved primary education			
$I_i^c \times Intensity_d^{birth} \times BP_e$	0.091	0.119**	0.092	0.123**
	(0.057)	(0.060)	(0.057)	(0.060)
$I_i^c \times Intensity_d^{birth} \times noBP_e$	0.085**	0.083**	0.085**	0.083**
	(0.033)	(0.033)	(0.033)	(0.033)
P-value	0.933	0.600	0.917	0.564
Mean for c_0^w	0.614	0.614	0.614	0.614
Observations	4,469	4,469	4,469	4,469
Birth district * Ethnic group FE	No	Yes	No	Yes
Year of birth FE	No	No	Yes	Yes

Notes: standard errors in parentheses; * p<0.10, ** p<0.05, *** p<0.01; the sample includes women born in 1950-1962 (I_i^c is equal 0) or in 1968-1972 (I_i^c is equal 1) with information about their place of birth and education; $Intensity_d^{birth}$ is the number of primary schools built per 1,000 children during the INPRES program in the district of birth.

Sources: authors' elaboration on IFLS 1, 2, 3, 4, 5, IFLS EAST, anthropological and administrative data.

Table A.5: Impacts on migrations between 15-23 without accounting for marital custom heterogeneity

	(1)	(2)	(3)	(4)	(5)
	Dep. var.: Inter-district move				
$I_i^c \times Intensity_d$	0.024	0.019	0.025	0.020	0.018
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
I_i^c	-0.046	-0.022	-0.059	-0.036	0.068
	(0.069)	(0.073)	(0.072)	(0.075)	(0.103)
Mean for c_0^m	0.217	0.217	0.217	0.217	0.217
	Dep. var.: Move to district with lower INPRES				
$I_i^c \times Intensity_d$	0.015	0.013	0.016	0.014	0.013
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
I_i^c	-0.052	-0.037	-0.058	-0.047	-0.035
	(0.053)	(0.056)	(0.055)	(0.058)	(0.049)
Mean for c_0^m	0.121	0.121	0.121	0.121	0.121
	Dep. var.: Move to district with higher INPRES				
$I_i^c \times Intensity_d$	0.004	0.004	0.004	0.004	0.004
	(0.010)	(0.011)	(0.010)	(0.011)	(0.010)
I_i^c	0.015	0.015	0.011	0.015	0.099*
	(0.038)	(0.040)	(0.040)	(0.042)	(0.052)
Mean for c_0^m	0.096	0.096	0.096	0.096	0.096
Observations	3,755	3,755	3,755	3,755	3,755
Ethnic group FE	Yes	Yes	Yes	Yes	Yes
Ethnic group FE$\times I_i^c$	Yes	Yes	Yes	Yes	Yes
Ethnic group FE$\times Intensity_d$	Yes	Yes	Yes	Yes	Yes
District at 15 FE	Yes	Yes	Yes	Yes	Yes
District at 15$\times$ Ethnic group FE	No	Yes	No	Yes	Yes
Year of birth FE	No	No	Yes	Yes	Yes
Muslim dummy	No	No	No	No	Yes

Notes: standard errors clustered at the district level in parentheses; * p<0.10, ** p<0.05, *** p<0.01; the sample includes men born in 1945-1957 and 1961-1967 with information about their place of residence at 15; $Intensity_d$ is the number of primary schools built per 1,000 children during the INPRES program in the district of residence at 15.

Sources: authors' elaboration on IFLS 1, 2, 3, 4, 5, IFLS EAST, anthropological and administrative data.

Table A.6: Impacts on migrations between 15-23, placebo test

	(1)	(2)	(3)	(4)	(5)
	Dep. var.: Inter-district move				
$I_i^c \times Intensity_d \times BP_e$	-0.006	-0.009	-0.006	-0.009	-0.009
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
$I_i^c \times Intensity_d \times noBP_e$	-0.008	-0.009	-0.007	-0.008	-0.008
	(0.026)	(0.027)	(0.026)	(0.026)	(0.026)
P-value	0.962	0.987	0.978	0.997	0.972
Mean for c_0^m	0.203	0.203	0.203	0.203	0.203
	Dep. var.: Move to district with lower INPRES				
$I_i^c \times Intensity_d \times BP_e$	-0.014	-0.014	-0.014	-0.014	-0.014
	(0.014)	(0.014)	(0.015)	(0.015)	(0.014)
$I_i^c \times Intensity_d \times noBP_e$	0.016	0.019	0.017	0.019	0.020
	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
P-value	0.240	0.211	0.235	0.210	0.201
Mean for c_0^m	0.113	0.113	0.113	0.113	0.113
	Dep. var.: Move to district with higher INPRES				
$I_i^c \times Intensity_d \times BP_e$	-0.015	-0.017	-0.016	-0.017	-0.018
	(0.015)	(0.015)	(0.015)	(0.015)	(0.016)
$I_i^c \times Intensity_d \times noBP_e$	-0.017	-0.019	-0.016	-0.018	-0.018
	(0.018)	(0.019)	(0.018)	(0.019)	(0.019)
P-value	0.948	0.936	0.995	0.969	0.996
Mean for c_0^m	0.085	0.085	0.085	0.085	0.085
Observations	3,376	3,376	3,376	3,376	3,376
Ethnic group FE	Yes	Yes	Yes	Yes	Yes
Ethnic group FE$\times I_i^c$	Yes	Yes	Yes	Yes	Yes
Ethnic group FE$\times Intensity_d$	Yes	Yes	Yes	Yes	Yes
District at 15 FE	Yes	Yes	Yes	Yes	Yes
District at 15$\times$ Ethnic group FE	No	Yes	No	Yes	Yes
Year of birth FE	No	No	Yes	Yes	Yes
Muslim dummy	No	No	No	No	Yes

Notes: standard errors clustered at the district level in parentheses; * p<0.10, ** p<0.05, *** p<0.01; the sample includes men born in 1938-1950 and 1954-1960 with information about their place of residence at 15; $Intensity_d$ is the number of primary schools built per 1,000 children during the INPRES program in the district of residence at 15.

Sources: authors' elaboration on IFLS 1, 2, 3, 4, 5, IFLS EAST, anthropological and administrative data.

Table A.7: Impacts on migrations between 15-23, sub-sample with birth order information

	(1)	(2)	(3)	(4)	(5)
	Dep. var.: Inter-district move				
$I_i^c \times Intensity_d \times BP_e$	0.065*	0.077**	0.064*	0.076**	0.076**
	(0.033)	(0.036)	(0.033)	(0.035)	(0.035)
$I_i^c \times Intensity_d \times noBP_e$	-0.007	-0.014	-0.006	-0.014	-0.014
	(0.032)	(0.031)	(0.032)	(0.031)	(0.031)
P-value	0.120	0.061	0.128	0.063	0.064
Mean for c_0^m	0.223	0.223	0.223	0.223	0.223
	Dep. var.: Move to district with lower INPRES				
$I_i^c \times Intensity_d \times BP_e$	0.094***	0.102***	0.093***	0.101***	0.102***
	(0.028)	(0.029)	(0.028)	(0.029)	(0.030)
$I_i^c \times Intensity_d \times noBP_e$	-0.010	-0.019	-0.009	-0.018	-0.018
	(0.025)	(0.024)	(0.025)	(0.024)	(0.024)
P-value	0.004	0.001	0.005	0.001	0.001
Mean for c_0^m	0.131	0.131	0.131	0.131	0.131
	Dep. var.: Move to district with higher INPRES				
$I_i^c \times Intensity_d \times BP_e$	-0.019	-0.008	-0.020	-0.009	-0.010
	(0.025)	(0.027)	(0.025)	(0.026)	(0.027)
$I_i^c \times Intensity_d \times noBP_e$	-0.006	-0.003	-0.005	-0.002	-0.002
	(0.025)	(0.026)	(0.026)	(0.026)	(0.026)
P-value	0.730	0.896	0.696	0.865	0.849
Mean for c_0^m	0.097	0.097	0.097	0.097	0.097
Observations	1,903	1,903	1,903	1,903	1,903
Ethnic group FE	Yes	Yes	Yes	Yes	Yes
Ethnic group FE$\times I_i^c$	Yes	Yes	Yes	Yes	Yes
Ethnic group FE$\times Intensity_d$	Yes	Yes	Yes	Yes	Yes
District at 15 FE	Yes	Yes	Yes	Yes	Yes
District at 15$\times$ Ethnic group FE	No	Yes	No	Yes	Yes
Year of birth FE	No	No	Yes	Yes	Yes
Muslim dummy	No	No	No	No	Yes

Notes: standard errors clustered at the district level in parentheses; * p<0.10, ** p<0.05, *** p<0.01; the sample includes men born in 1945-1957 and 1961-1967 with information about their place of residence at 15 and birth order; $Intensity_d$ is the number of primary schools built per 1,000 children during the INPRES program in the district of residence at 15.

Sources: authors' elaboration on IFLS 1, 2, 3, 4, 5, IFLS EAST, anthropological and administrative data.

Table A.8: Impacts on migrations between 15-23, sub-sample with information on fathers' education

	(1)	(2)	(3)	(4)	(5)
	Dep. var.: Inter-district move				
$I_i^c \times Intensity_d \times BP_e$	0.043**	0.041**	0.043**	0.041**	0.038*
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
$I_i^c \times Intensity_d \times noBP_e$	0.014	0.009	0.015	0.010	0.009
	(0.022)	(0.023)	(0.022)	(0.023)	(0.022)
P-value	0.255	0.226	0.263	0.233	0.287
Mean $forc_0^m$	0.224	0.224	0.224	0.224	0.224
	Dep. var.: Move to district with lower INPRES				
$I_i^c \times Intensity_d \times BP_e$	0.048**	0.052***	0.048**	0.052***	0.051***
	(0.020)	(0.019)	(0.020)	(0.019)	(0.019)
$I_i^c \times Intensity_d \times noBP_e$	-0.001	-0.009	-0.000	-0.009	-0.009
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
P-value	0.044	0.008	0.047	0.009	0.011
Mean for c_0^m	0.129	0.129	0.129	0.129	0.129
	Dep. var.: Move to district with higher INPRES				
$I_i^c \times Intensity_d \times BP_e$	0.004	0.001	0.003	0.001	0.000
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
$I_i^c \times Intensity_d \times noBP_e$	0.004	0.008	0.004	0.008	0.007
	(0.016)	(0.017)	(0.016)	(0.017)	(0.017)
P-value	0.992	0.795	0.983	0.791	0.776
Mean for c_0^m	0.097	0.097	0.097	0.097	0.097
Observations	3,196	3,196	3,196	3,196	3,196
Ethnic group FE	Yes	Yes	Yes	Yes	Yes
Ethnic group FE$\times I_i^c$	Yes	Yes	Yes	Yes	Yes
Ethnic group FE$\times Intensity_d$	Yes	Yes	Yes	Yes	Yes
District at 15 FE	Yes	Yes	Yes	Yes	Yes
District at 15$\times$ Ethnic group FE	No	Yes	No	Yes	Yes
Year of birth FE	No	No	Yes	Yes	Yes
Muslim dummy	No	No	No	No	Yes

Notes: standard errors clustered at the district level in parentheses; * p<0.10, ** p<0.05, *** p<0.01; the sample includes men born in 1945-1957 and 1961-1967 with information about their place of residence at 15 and father's education; $Intensity_d$ is the number of primary schools built per 1,000 children during the INPRES program in the district of residence at 15.

Sources: authors' elaboration on IFLS 1, 2, 3, 4, 5, IFLS EAST, anthropological and administrative data.

Table A.9: Impacts on age at marriage

	(1)	(2)	(3)	(4)	(5)
	Dep. var.: Age at first marriage				
	Panel A: All sampled men				
$I_i^c \times Intensity_d \times BP_e$	-0.450	-0.334	-0.445	-0.328	-0.405
	(0.413)	(0.443)	(0.422)	(0.454)	(0.410)
$I_i^c \times Intensity_d \times noBP_e$	-0.231	-0.243	-0.208	-0.219	-0.243
	(0.260)	(0.272)	(0.256)	(0.267)	(0.265)
P-value	0.682	0.872	0.662	0.850	0.758
Mean for c_0^m	22.976	22.976	22.976	22.976	22.976
Observations	3,645	3,645	3,645	3,645	3,645
	Panel B: Latter-sons				
$I_i^c \times Intensity_d \times BP_e$	1.148*	1.110*	1.165*	1.128*	1.119*
	(0.638)	(0.591)	(0.635)	(0.589)	(0.581)
$I_i^c \times Intensity_d \times noBP_e$	0.646	0.561	0.643	0.555	0.564
	(0.475)	(0.485)	(0.480)	(0.490)	(0.490)
P-value	0.537	0.483	0.522	0.465	0.478
Mean for c_0^m	22.131	22.131	22.131	22.131	22.131
Observations	1,139	1,139	1,139	1,139	1,139
	Panel D: Uneducated fathers				
$I_i^c \times Intensity_d \times BP_e$	0.002	0.042	0.037	0.069	0.067
	(0.582)	(0.590)	(0.588)	(0.591)	(0.591)
$I_i^c \times Intensity_d \times noBP_e$	0.132	0.186	0.069	0.125	0.117
	(0.382)	(0.377)	(0.370)	(0.365)	(0.368)
P-value	0.846	0.831	0.962	0.934	0.941
Mean for c_0^m	21.752	21.752	21.752	21.752	21.752
Observations	1,233	1,233	1,233	1,233	1,233
Ethnic group FE	Yes	Yes	Yes	Yes	Yes
Ethnic group FE$\times I_i^c$	Yes	Yes	Yes	Yes	Yes
Ethnic group FE$\times Intensity_d$	Yes	Yes	Yes	Yes	Yes
District at 15 FE	Yes	Yes	Yes	Yes	Yes
District at 15$\times$ Ethnic group FE	No	Yes	No	Yes	Yes
Year of birth FE	No	No	Yes	Yes	Yes
Muslim dummy	No	No	No	No	Yes

Notes: standard errors clustered at the district level in parentheses; * p<0.10, ** p<0.05, *** p<0.01; the sample includes men born in 1945-1957 and 1961-1967 who married, with information about their place of residence at 15; $Intensity_d$ is the number of primary schools built per 1,000 children during the INPRES program in the district of residence at 15.

Sources: authors' elaboration on IFLS 1, 2, 3, 4, 5, IFLS EAST, anthropological and administrative data.

Table A.10: Impacts on migrations between 12-20 for co-resident first wives

	(1)	(2)	(3)	(4)	(5)
	Dep. var.: Inter-district move				
$I_i^c \times Intensity_d^{12} \times BP_e$	-0.001	-0.005	0.000	-0.004	-0.005
	(0.030)	(0.031)	(0.030)	(0.032)	(0.032)
$I_i^c \times Intensity_d^{12} \times noBP_e$	-0.013	-0.024	-0.013	-0.023	-0.023
	(0.020)	(0.021)	(0.020)	(0.021)	(0.021)
P-value	0.720	0.623	0.703	0.633	0.645
Mean for first wives of c_0^m	0.147	0.147	0.147	0.147	0.147
	Dep. var.: Move to district with lower INPRES				
$I_i^c \times Intensity_d^{12} \times BP_e$	-0.001	-0.002	-0.000	-0.002	-0.001
	(0.025)	(0.026)	(0.025)	(0.026)	(0.026)
$I_i^c \times Intensity_d^{12} \times noBP_e$	-0.002	-0.008	-0.001	-0.007	-0.007
	(0.016)	(0.017)	(0.016)	(0.017)	(0.017)
P-value	0.978	0.869	0.976	0.879	0.858
Mean for first wives of c_0^m	0.076	0.076	0.076	0.076	0.076
	Dep. var.: Move to district with higher INPRES				
$I_i^c \times Intensity_d^{12} \times BP_e$	-0.001	-0.004	-0.001	-0.004	-0.004
	(0.014)	(0.015)	(0.014)	(0.015)	(0.016)
$I_i^c \times Intensity_d^{12} \times BP_e$	-0.016	-0.022	-0.016	-0.021	-0.021
	(0.013)	(0.014)	(0.013)	(0.014)	(0.015)
P-value	0.451	0.414	0.447	0.435	0.453
Mean for first wives of c_0^m	0.071	0.071	0.071	0.071	0.071
Observations	2,908	2,908	2,908	2,908	2,908
Ethnic group FE	Yes	Yes	Yes	Yes	Yes
Ethnic group FE$\times I_i^c$	Yes	Yes	Yes	Yes	Yes
Ethnic group FE$\times Intensity_d^{12}$	Yes	Yes	Yes	Yes	Yes
District at 12 FE	Yes	Yes	Yes	Yes	Yes
District at 12$\times$ Ethnic group FE	No	Yes	No	Yes	Yes
Year of birth FE	No	No	Yes	Yes	Yes
Muslim dummy	No	No	No	No	Yes

Notes: standard errors clustered at the district level in parentheses; * p<0.10, ** p<0.05, *** p<0.01; the sample includes the first wives of men born in 1945-1957 and 1961-1967 with information about their place of residence at 12; $Intensity_d^{12}$ is the number of primary schools built per 1,000 children during the INPRES program in the district of residence at 12.
Sources: authors' elaboration on IFLS 1, 2, 3, 4, 5, IFLS EAST, anthropological and administrative data.

Table A.11: Impacts on migrations between 12-20 for women

	(1)	(2)	(3)	(4)	(5)
	Dep. var.: Inter-district move				
$I_i^c \times Intensity_d^{12} \times BP_e$	0.036*	0.035*	0.036*	0.034*	0.032
	(0.020)	(0.020)	(0.019)	(0.020)	(0.020)
$I_i^c \times Intensity_d^{12} \times noBP_e$	0.005	0.000	0.003	-0.001	-0.001
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
P-value	0.186	0.158	0.169	0.144	0.174
Mean for c_0^w	0.140	0.140	0.140	0.140	0.140
	Dep. var.: Move to district with lower INPRES				
$I_i^c \times Intensity_d^{12} \times BP_e$	0.015	0.015	0.015	0.015	0.014
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
$I_i^c \times Intensity_d^{12} \times noBP_e$	-0.002	-0.003	-0.002	-0.004	-0.004
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
P-value	0.350	0.319	0.347	0.327	0.335
Mean for c_0^w	0.075	0.075	0.075	0.075	0.075
	Dep. var.: Move to district with higher INPRES				
$I_i^c \times Intensity_d^{12} \times BP_e$	0.017	0.015	0.018	0.015	0.013
	(0.012)	(0.013)	(0.013)	(0.013)	(0.013)
$I_i^c \times Intensity_d^{12} \times noBP_e$	0.001	-0.002	0.000	-0.003	-0.003
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
P-value	0.286	0.327	0.259	0.292	0.349
Mean for c_0^w	0.064	0.064	0.064	0.064	0.064
Observations	4,350	4,350	4,350	4,350	4,350
Ethnic group FE	Yes	Yes	Yes	Yes	Yes
Ethnic group FE$\times I_i^c$	Yes	Yes	Yes	Yes	Yes
Ethnic group FE$\times Intensity_d^{12}$	Yes	Yes	Yes	Yes	Yes
District at 12 FE	Yes	Yes	Yes	Yes	Yes
District at 12$\times$ Ethnic group FE	No	Yes	No	Yes	Yes
Year of birth FE	No	No	Yes	Yes	Yes
Muslim dummy	No	No	No	No	Yes

Notes: standard errors clustered at the district level in parentheses; * p<0.10, ** p<0.05, *** p<0.01; the sample includes women born in 1950-1962 (I_i^c is equal 0) or in 1968-1972 (I_i^c is equal 1) with information about their place of residence at 12; $Intensity_d^{12}$ is the number of primary schools built per 1,000 children during the INPRES program in the district of residence at 12.
Sources: authors' elaboration on IFLS 1, 2, 3, 4, 5, IFLS EAST, anthropological and administrative data.

Chapter 3

Left behind, but not immobile: Living arrangements of Mexican transnational households

This chapter is a joint work with Simone Bertoli (Professor, Université Clermont Auvergne, CERDI) and Elie Murard (Professor, University of Trento), accepted for publication in the review *Economic Development and Cultural Change*, https://doi.org/10.1086/717282.

"When her husband went to New Mexico just after their wedding, Jazmín decided to stay with her parents rather than following the tradition of moving to her husband's community. Jazmín said that her mother is a great help with her toddler son."
Deborah Boehm (2012), *Intimate migrations*.

"Grandparents are the most common caregivers when mothers migrate [...] The prevalence of the practice of leaving children with maternal grandparents is curious given [...] the predominance of patrilocal residential patterns."
Joanna Dreby (2010), *Divided by Borders*.

3.1 Introduction

The decision to cross a border can give rise to prolonged periods of physical separation for individuals who used to live together, and paternal migration can produce wide-ranging implications for the children who are left behind. The use of the expression "transnational household" (see, for instance, Ashraf et al., 2015; Ambler, 2015; Clemens and Tiongson, 2017; Abarcar et al., 2020) to jointly refer to the individuals who belonged to the household of origin of the migrant, even though they are no longer co-residing, is meant to reflect the strength of the interactions between the migrant and the left behind. However, paternal migration might expose the children to a heightened risk of separation of their parents, and it could also induce additional changes in the composition of the household of origin of the migrants. The effects of migration on the left behind are generally analyzed in the economic literature without taking into account the associated changes within the ensuing transnational household,[1] and this mostly reflects binding data constraints.[2] The occurrence of an international migration episode can entail that the resulting household structure is no longer optimal,[3] and this can induce the left behind to move in with previously non co-residing relatives. Interestingly, concerns about the influence of parental migration on the living arrangements of the children left behind motivated the choice of the World Bank to include retrospective

[1] Gibson et al. (2011) and Cortés (2015) represent two exceptions, as they discuss the influence of international migration on the living arrangements of the left behind.

[2] The limited evidence about the structure of the household of origin of the migrants contrasts with the scholarly interest around the living arrangements of the immigrants (see Adserà and Ferrer, 2015, for a review), which are typically considered as a yardstick of their integration in the country of destination.

[3] "Changes in household structure can be explained as the result of many of the same forces as those driving marriage formation and dissolution." (Fafchamps and Quisumbing, 2008, p. 3235).

questions on migration in its Living Standard Measurement Surveys (Bilsborrow, 2016).[4]

Does the occurrence of an international migration episode change the living arrangements of those left behind? In particular, does paternal migration induce the children left behind to join another household within the extended family network? If this is the case, what are the ensuing analytical challenges for data collection and for the analysis of the effects of migration and remittances on children, and how these can be addressed?

We analyze these research questions in the case of the Mexican migration. More precisely, we focus on Mexican children exposed to paternal (and possibly also to maternal) international migration. This choice has three main motivations: First, we know that migration from Mexico to the United States typically occurs in stages, with men living behind their partners and children (Cerrutti and Massey, 2001),[5] and with paternal migration being the main cause of non co-residence of Mexican children with their fathers (Nobles, 2013). Second, Bertoli and Murard (2020) have provided evidence that the occurrence of an international migration episode is associated with further variations in the composition of the households of origin of Mexican migrants.[6] Third, this country represents a focal point in the literature analyzing the effects of international migration on the left behind, and notably on the children (see, for instance, McKenzie and Rapoport, 2011; Antman, 2011, 2012, 2015; Alcaraz et al., 2012).

Mexico is a traditionally patrilocal country (see Angelucci et al., 2010, on this) where newly married couples co-reside, typically for a few years, with the parents of the husband before becoming neolocal, i.e., setting up an independent household, while matrilocality, i.e., co-residence

[4] "[T]he LSMS survey of Ecuador in 2005–2006 [...] included a module on emigrants from the household, recording their current age, sex, relationship, education, and whether the emigrant left minor children under age 18 behind (there being special concern at the time, following the surge of emigrants to Spain in 1997–2003, about who was taking care of them following the emigration of a parent, often the mother)." (Bilsborrow, 2016, p. 125).

[5] McKenzie and Rapoport (2010) provide evidence that almost two thirds of the Mexican male immigrants recently arrived to the United States are married but not co-residing with their wives, which are likely to have been left behind in Mexico.

[6] More precisely, Bertoli and Murard (2020) provide evidence using longitudinal data that the households of origin of Mexican migrants are significantly more likely to experience the arrival of a new member, or to drop out of the sample, but they are unable to characterize how these changes modify the living arrangements of the individuals left behind.

with the parents of the wife, is rather infrequent. The effect of the paternal migration on the living arrangements of the children is *prima facie* ambiguous, as remittances could represent the resources needed to set up an independent household. However, the prolonged physical separation from the father, with the economic and emotional uncertainty it implies, and a heightened risk of dissolution of the relationship of the two parents, could also push the children and their mothers, who previously formed a nuclear household, to move in the household of maternal grandparents, thus forming a new three-generation household. The initial quote from Dreby (2010) suggests that this is the case when the mother eventually joins the father in the United States. Co-residence with grandparents could, in turn, be associated with various outcomes for the children left behind (see, for instance, Schmeer, 2013; Arenas, 2017), and possibly mediate the effects of migration and remittances.

We address the proposed research questions by using three main data sources, notably the large-scale survey connected to the 2010 Census of the Mexican population,[7] the 2016 wave of the *Encuesta Nacional sobre la Dinámica de las Relaciones en los Hogares* (ENDIREH), a data source that had remained untapped in the migration literature, and all the waves between 2005Q1 and 2018Q4 of the *Encuesta Nacional de Ocupación y Empleo* (ENOE), a rotating panel survey following households for five consecutive quarters. These three surveys conducted by the INEGI, the Mexican National Statistical Institute, allow us to observe the living arrangements of the children left behind after or just before paternal migration.[8] Two additional data sources collected in the United States are also used in the analysis. Notably, various waves of the American Community Survey and of the Biannual June supplement of the Current Population Survey conducted by the Census Bureau allow us to document that a large share of Mexican couples that live together in the United States have left one or more children in Mexico. The use of data from five distinct surveys conducted at origin and at destination reflects the difficulty of overcoming the data constraints that had, so far, hindered the analysis of the frequency of changes in the living arrangements of the children left behind, and of their ensuing implications. Each data source taken separately gives valuable but just partial elements to answer our proposed research questions,

[7] We will be referring to this data source as the 2010 Census for short.

[8] We also draw on the Mexican Family Life Survey (see Teruel et al., 2012) to describe the analytical challenges that are related to the variations in the living arrangements of the children left behind.

but their joint use allows us to quantify the frequency of changes in living arrangements within Mexican transnational households.

The analysis of the data from the 2010 Census reveals that 45.3 percent of the Mexican children aged 0 to 16 who are exposed to paternal international migration (henceforth the treated) co-reside with their grandparents.[9] For the children left behind who live with their mothers, we are able to further characterize their living arrangements: four out of five of them co-reside with maternal grandparents (while co-residence with paternal grandparents largely prevails among untreated children), and 36.3 percent of these children have their co-resident mothers who are *not* in a relationship at the time of the survey, something that magnifies the incidence of co-residence with maternal grandparents, from 18.7 to 45.0 percent.[10]

In comparison, only 11.8 percent of (untreated) children living with their fathers (and with or without their mothers) in Mexico co-reside with their grandparents. The analysis of ENOE data reveals that these major differences in living arrangements between treated and untreated children do not simply reflect self-selection into migration, as just 10.2 percent of the children were co-residing with their grandparents before the migration of their father.[11]

Thus, the share of treated children who co-reside with grandparents after the migration of their fathers is roughly four times larger than the corresponding share for both the untreated children and treated children right *before* the migration of their fathers. Furthermore, the data collected at destination reveal that a substantial fraction of the children left behind are also exposed to the migration of their mother. In this case, the incidence of co-residence with grandparents is as high as 78.9 percent. Co-residence with the grandparents still stands at 36.1 percent for the children left behind who live with their mothers.

We also provide evidence from the ENOE that children exposed to

[9] We define a child as being treated if (*i*) she does not co-reside with their father, and if (*ii*) she belongs to a remittance-recipient household; the 2010 Census does not provide a direct way to identify these children, e.g., the questionnaire does not include a follow-up question about where the non co-resident father is living.

[10] Co-residence with paternal grandparents stands respectively at 10.3 and 5.0 percent for the children left behind respectively with partnered and not partnered mothers; 54.7 percent of the children that we identify as being exposed to paternal migration in the 2010 Census co-reside with grandparents or have a separated mother (or both), and our analysis of the data strongly suggests that this share represents a lower bound.

[11] Among these children, co-residence with paternal rather than maternal grandparents is predominant, as it is the case among untreated children.

paternal migration live in households that are significantly (and substantially) more likely to drop out of the sample, while they are not more likely to see their grandparents moving in in later interviews. This, in turn, suggests that co-residence with maternal grandparents is associated with children left behind moving to a different housing unit. Our paper makes three important contributions to the migration literature: first, we provide novel evidence on the prevalence of changes in the living arrangements of the children left behind. We find that the latter typically join their grandparents' household following paternal migration, which is a simple stylized fact that is consistent with sociological and ethnographic accounts of Mexican migration (Dreby, 2010, 2015; Boehm, 2012). This suggests that the distinction between the international migrant and the left behind should not be interpreted as an opposition between movement and immobility, and that it is not infrequent that Mexican transnational households are either deeply reshaped or fall apart. Furthermore, the evidence that we provide could extend to other migrant-sending countries, in particular those characterized by a higher incidence of independent maternal migration, such as the Philippines, and the empirical evidence in Cortés (2015) is consistent with this conjecture.

Second, we show that these changes give rise to important analytical challenges that are related to (*i*) the fact that a substantial portion of the children left behind might drop out of the sample (in longitudinal surveys) or not be identified as such (in cross-sectional surveys), and to (*ii*) the endogeneity of some household-level characteristics that are commonly used as controls in regressions aimed at estimating the effect of migration or remittances on the children left behind. Analyses of the short-run effects of paternal migration on the children left behind using data from panel surveys, such as in Antman (2011), do not include in the analysis the treated children who move in to a different housing unit, and thus drop out of the sample. Changes in living arrangements or the separation of the parents also interfere with standard retrospective questions on the occurrence of migration episodes. These typically embed an objective co-residence condition at the time of migration, following the recommendations of UNDESA (2017),[12] or a subjective

[12] These questions are employed in Mexico by the INEGI in the Census (including in 2020) and in the various waves *Encuesta Nacional de la Dinámica Demográfica* (ENADID); a change in the living arrangements of the left behind leads to the violation of the co-residence condition (Wong Luna et al., 2006; Bertoli and Murard, 2020), as the migrant was not living with all the members of the surveyed household at the time of migration.

condition about whether migrants are still perceived by the respondents as being members of the surveyed household National Statistics Office of the Philippines (as in the census of the Filipino population; see 2007). Similarly, questions on relatives residing abroad, which are included in the Mexican Family Life Survey, do not allow identifying children exposed to paternal migration when either the parents are no longer in a relationship, or the grandparents are the main caregivers of the child, irrespective of whether the living arrangements changed after the father moved out of Mexico. The reliance on the answers to these questions can fail to capture an important share of children left behind, which might represent a selected sample with respect to the outcomes of interest.

The change in household composition implies that a number of household-level variables, and notably a measure of the average education of adult household members, become bad controls, as they are affected by endogenous adjustments in household composition following migration. The reliance of a measure of the level of education of the mother (McKenzie and Rapoport, 2011), or of the highest level of education rather than of the average level within the household (Yang, 2008) is not sensitive to the formation of larger three-generation households. Conversely, the use of variables related to the household head is, as already observed by Cox-Edwards and Rodríguez-Oreggia (2009), certainly problematic, and the same applies to variables relating to all adult members (Bertoli and Marchetta, 2014).

Third, our paper illustrates the new insights that can be gained by treating household structure as endogenous or fluid (Foster and Rosenzweig, 2002; Halliday, 2010), and by intertwining more closely the migration literature with the economics of the household, and with the economic analyses of inter-household relationships (see Cox and Fafchamps, 2008, for a review). Variations in the living arrangements of the left behind can possibly reduce expenditures (notably related to housing), which helps mitigate the "temporary financial hardship" (Antman, 2011) induced by the monetary investment into migration.

The rest of the paper is structured as follows: Section 3.2 draws on various data sources to analyze the living arrangements of children left behind, and compare them with those of other Mexican children. Section 3.3 discusses the observed and unobserved factors that are likely to jointly determine migration decisions and the occurring of changes within transnational households. Section 3.4 explores the two main analytical challenges arising from the observed change in living arrange-

ments, and it sketches possible approaches to tackle them in analyses on the effects of migration and remittances on the left behind. Finally, Section 3.5 draws the main conclusions.

3.2 A simple stylized fact

We draw on five different surveys (three collected in Mexico, and two collected in the United States) to document and quantify a simple stylized facts: a large share of Mexican children that are exposed to the international migration of their fathers co-reside with their grandparents (mostly with their maternal grandparents). This share is significantly higher than the corresponding share for children that co-reside with their fathers in Mexico, and also higher than the share that we observe for the children left behind shortly before their fathers move to the United States. The frequency of variations in the living arrangements of the children left behind is magnified when the mother also migrates, or when she is no longer in a marital relationship with the migrant father.

3.2.1 Evidence from the 2010 Census

The first data source that we employ in the analysis is the large-scale survey connected to the Census of the Mexican population conducted by the INEGI in June 2010, to which we will be referring as the 2010 Census for short. An extended version of the questionnaire was administered to around 2.9 million households, which represented 10 percent of Mexican households. The questionnaire provides information on whether each household member co-resides with each of the two parents. In case of co-residence, the 2010 Census provides the individual identifier of the co-residing parent, while no follow-up question is asked in case of non co-residence, so we do not have information on whether the parent lives abroad. This prevents a direct identification of children exposed to paternal migration, but this data source offers two alternative ways of identifying them.

Identifying children left behind The first, and seemingly straightforward, way is to rely on the following retrospective question on the occurrence of migration episodes:

> (Question IV.1) "During the last five years, that is, from June 2005 to today, has any person who lives or lived with you (in this housing unit) gone to live in another country?"

The use of the answer to this question is exposed to several problems: (*i*) the relationship of the migrant with the head of the surveyed household (or his marital status) is not recorded, so we cannot unambiguously identify the father of the child among the enumerated migrants; (*ii*) migration episodes occurring more than five years before the Census are not recorded; (*iii*) surveyed household could deliberately misreport the information (Hamilton and Savinar, 2015), especially when the migrant is undocumented, and (*iv*) migrants are enumerated only if they co-resided with all the members of the surveyed household when they left Mexico, in line with UNDESA (2017). Point (*iv*) is particularly problematic to analyze variations in co-residence choices, as the movement of the child of a migrant father to a different household should automatically lead to a violation of the co-residence condition,[13] and thus the migration episode of their father would remain not enumerated.[14]

An alternative is to rely, for the children that do not co-reside with their fathers, on the question on the receipt of remittances from abroad,[15] relying on it as an (admittedly noisy) signal that the non co-resident father of the child has migrated to the United States.[16,17] The measurement error in this approach to identify the children left behind arises

[13] For each migrant listed in response to Question IV.1, the questionnaire includes this follow-up: (Question IV.5): "When [name] left for the last time, was [s]he living with you?", with no information that is recorded in case of a negative answer; the INEGI clarifies that these two questions refer to individuals who "lived with the group of individuals who reside in the housing unit" that is surveyed (INEGI, 2010, p. 118).

[14] Bertoli and Murard (2020) provide econometric evidence that variations in household composition lead to the non enumeration of migration episodes in the 2000 Census of the Mexican population.

[15] The question on the receipt of remittances (over an unspecified recall period) is asked separately to all household members aged 12 and above, and information on the amount that is received is not provided.

[16] It is worth noting that this approach is less exposed to the concerns related to deliberate misreporting (Hamilton and Savinar, 2015), as the 2010 Census does not include any question related to the migrant who is sending back remittances.

[17] The 2010 Census also contains a question on the receipt of domestic transfers; this would, in principle, allow us to employ a similar definition of children exposed to the domestic migration of their fathers; however, such a definition would not allow differentiating migration from a simple non co-residence with the father, e.g., because of a *de jure* or *de facto* separation, who makes transfer to his former partner and to his children.

from the fact a migrant father might not be sending remittances back to Mexico (exclusion error), and that a child whose non co-resident father is not an international migrant might still belong to a remittance-recipient household (inclusion error). We provide evidence on the limited incidence of these two types of measurement error in Section 3.2.3 below.

We restrict the sample to children aged 0 to 16, who are not married or in a free union, and who are not parents. This sample selection criterion is motivated by the fact that older children (and especially girls) might not be co-residing with their fathers as they get married or enter in a stable partnership, as Mexico is characterized by patrilocality, i.e., newly formed couples initially live together or close by the family of the male partner. This, in turn, would increase the likelihood that the child does not live with the father, and the receipt of remittances in the household to which the child belongs to is *un*informative about the occurrence of paternal migration. No restriction is introduced with respect to the co-residence of the mother, so that children left behind might be co-residing with neither of the two parents. Similarly, we do not restrict the sample with respect to the marital status of the mother of the child;[18] this analytical choice, which is also related to the previous one (as the marital status of the mother is not observed when she does not co-reside with her child), is coherent with the possibility that the maternal marital status could be endogenous with respect to paternal migration.

The 2010 Census includes 103,076 children left behind, i.e., not co-residing with their fathers and living in a remittance-recipient household, aged 0 to 16. We will be comparing their living arrangements and the marital status of their parents with those of either (*i*) 4,040,873 untreated children, i.e., children whose fathers is not identified as an international migrant, aged 0 to 16 or (*ii*) 3,338,629 untreated children who co-reside with their fathers. With few exceptions, Mexican children who co-reside with their fathers also co-reside with their mothers, so that the sample at point (*ii*) includes almost only children who co-reside with both parents, who are either married or in an informal union, while the (larger) sample at point (*i*) also includes children whose parents are not in a relationship. Thus, these two samples correspond to two different assumptions about the living arrangements

[18] The only minor exception is that we exclude from the analysis the children whose co-resident mother is widowed, as this strongly suggests that the father of the child is no longer alive.

of the children left behind in the absence of the treatment, with their (counterfactual) living arrangements lying somewhere in between those that we observe for the children in these two samples.

Table 3.1: Descriptive statistics, children aged 0 to 16

		Untreated			
	Left behind	All	Co-resident father	Difference	
	(1)	(2)	(3)	(1)-(2)	(1)-(3)
Age	8.490	7.981	7.930	0.509***	0.559***
	(0.015)	(0.002)	(0.003)	(0.017)	(0.017)
Male	0.504	0.509	0.510	-0.005**	-0.006***
	(0.002)	(0.000)	(0.000)	(0.002)	(0.002)
Remittances-recipient household	1.000	0.015	0.019	0.985***	0.981***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Household size	5.517	5.504	5.507	0.014*	0.011
	(0.008)	(0.001)	(0.001)	(0.008)	(0.007)
Rural	0.412	0.264	0.278	0.148***	0.134***
	(0.002)	(0.000)	(0.000)	(0.002)	(0.002)
Mother is not co-resident	0.203	0.063	0.024	0.140***	0.179***
	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
Father is not co-resident	1.000	0.198	0.000	0.802***	1.000
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Live with grandparents	0.453	0.195	0.118	0.258***	0.335***
	(0.002)	(0.000)	(0.000)	(0.001)	(0.001)
Observations	103,076	4,040,873	3,338,629	4,143,949	3,441,705

Notes: averages and standard errors (in parentheses) have been computed using individual sampling weights; the sample includes children aged 0 to 16 who are unmarried, not parent and whose mother, if present, is not widowed; the left behind are children not co-residing with their father and who belong to households that receive remittances from abroad; the untreated are children who either co-reside with their father, or those belonging to a non-recipient household and not co-residing with their father *** $p<0.01$, ** $p<0.05$, * $p<0.1$.
Source: authors' elaboration on the survey connected to the 2010 Census.

Table 3.1 presents some basic descriptive statistics for the children left behind and for untreated children in the samples at point (*i*) and (*ii*) above. There are two noteworthy differences: a larger share of children left behind resides in rural areas (41.2 versus 26.4-27.8 percent), consistently with the substantially larger incidence of male migration out of rural areas (Fernández-Huertas Moraga, 2013), and the non co-residence with the mother is substantially more frequent for the children left behind (20.3 versus 2.4-6.3 percent).
The 2010 Census includes just 2,681 children aged 0 to 16 in remittance-recipient households that co-reside with their fathers but not with their mothers, compared to 80,385 children left behind that co-reside with their mothers (see Table 3.2), consistently with the sequential character of international migration evidenced by Cerrutti and Massey (2001). Thus, Mexican children are very rarely exposed to the migration of their mother while the father stays in Mexico, while they can be exposed to the migration of both parents. In this respect, Section B.1 in the Appendix provides evidence from the American Community Survey and the Current Population Survey that confirms that a substantial share of

Table 3.2: Living arrangements of left behind and untreated children

	Untreated Co-resident mother			Left behind Co-resident mother			Difference with controls	
	All	Yes	No	All	Yes	No		
	(1)	(2)	(3)	(4)	(5)	(6)	(4)-(1)	(5)-(2)
Live with grandparents	0.118	0.113	0.336	0.453	0.368	0.789	0.344***	0.259***
	(0.000)	(0.000)	(0.002)	(0.002)	(0.002)	(0.003)	(0.001)	(0.001)
Live with maternal grandparents		0.040			0.283			0.249***
		(0.000)			(0.002)			(0.001)
Live with paternal grandparents		0.073			0.085			0.011***
		(0.000)			(0.001)			(0.001)
Observations	3,338,629	3,267,303	71,326	103,076	80,385	22,691	3,441,705	3,347,688
Share	1.000	0.976	0.024	1.000	0.797	0.203		

Notes: averages and standard errors (in parentheses) have been computed using individual sampling weights; the sample includes children aged 0 to 16 who are unmarried, not parent and whose mother, if present, is not widowed; the left behind are children not co-residing with their father and who belong to households that receive remittances from abroad; the untreated children are children co-residing with their fathers; the last row reports the share of untreated and left behind that co-reside (do not co-reside) with their mother; the last two data columns report regression estimates of the differences (4)-(1) and (5)-(2) that include in the controls a set of dummies for the gender and age of the child, rural areas, and state of residence; *** $p<0.01$, ** $p<0.05$, * $p<0.1$.
Source: authors' elaboration on the survey connected to the 2010 Census.

women who join their Mexican partners in the United States leave one or more of their children behind, rather than necessarily corresponding to instances of whole household migration (McKenzie and Rapoport, 2010).

3.2.2 Living arrangements

We can identify the children (both left behind and untreated) who co-reside with their grandparents using their relationship (and the ones of other household members) with the household head. The 2010 Census provides a very detailed description of the relationship with the household head, with 26 distinct entries.[19] When the child co-resides with the mother, we can also rely on her answers concerning co-residence with her own parents to differentiate between co-residence with maternal and paternal grandparents. These answers are not used to identify instances of co-residence with grandparents, as this would introduce an asymmetry in the definition for the children left behind, which could potentially inflate the share of these children co-residing with maternal grandparents.[20] Table 3.2 compares the living arrangements of the children left

[19] Almost invariably, instances of co-residence with the grandparents correspond to cases in which one of the grandparents is the household head (85.0 percent of the cases), or the parent of the household head (13.2 percent of the cases).

[20] This follows from the fact that children left behind do not, by construction, co-reside with their fathers,; our symmetrical definition induces a measurement error, which appears to be modest in size: we have 321 children left behind that are not identified as co-residing with their grandparents, but whose mothers reports to be

behind with those of the untreated children who co-reside with their fathers. 45.3 percent of the children left behind co-reside with their grandparents, while the corresponding share for the untreated children stands at 11.8 percent. The absence of the mother is associated with a major increase in the incidence of co-residence with grandparents for both groups of children (33.6 percent for the untreated, 78.9 percent for the left behind).[21]

The difference in the incidence of co-residence with grandparents (or with maternal grandparents) is not driven by the differences in observables between untreated and left behind that emerge in Table 3.1. This can be seen from the last two data columns in Table 3.2, where we report the estimates of a regression where we include dummies for the age and gender of the child, and for residence in rural areas and in each of the 32 Mexican states to control for possible spatial differences in living arrangements that might be correlated with the incidence of international migration. The coefficients obtained from these regressions are almost identical to the differences in the raw data, e.g., the difference between Column (4) and Column (1) stands at 0.453-0.118=0.335, while the coefficient of the corresponding regression stands at 0.344.

For the children left behind with their mothers (79.7 percent of the sample), 28.3 percent co-reside with maternal and 8.5 percent co-reside with paternal grandparents, while for untreated children we observe the opposite pattern, as 4.0 and 7.3 percent of them co-reside respectively with maternal and paternal grandparents. For these children, we also have information on the marital status of their mothers:[22] 63.5 percent of the children left behind have their mothers who is partnered (45.6 percent married, and 17.9 percent in a free union), while 36.5 percent

living with her own parent(s), compared to 28,393 children that are identified as co-residing with grandparents on the basis of the relationships with the household head.

[21] For the children left behind that do not co-reside neither with their parents nor with their grandparents, the main caregiver is typically either an aunt (50.1 percent), or an older sibling (27.8 percent).

[22] Interestingly, 3.4 percent of the 57,372 children left behind in our sample from the 2010 Census with partnered mothers live with the partner of their mothers (who are *not* their fathers); this figure is substantially below the corresponding share (39.6 percent) of children who co-reside with a step-father in a non-recipient household.; this pattern in the data is consistent with the plausible conjecture that the migrant father might stop sending remittances back when his former partner enters into a new stable relationship; if this is the case, then our approach to the identification of children left behind would also end up missing children that co-reside with a step father, leading to an underestimation of the extent to which Mexican transnational households reshape themselves, or fall apart.

Table 3.3: Marital status of the mother and living arrangements of Mexican children

	Partnered mother		Non partnered mother	
	Left behind	Untreated	Left behind	Untreated
Live with maternal grandparents	0.187	0.050	0.450	0.406
	(0.002)	(0.000)	(0.003)	(0.001)
Live with paternal grandparents	0.103	0.075	0.052	0.052
	(0.001)	(0.000)	(0.001)	(0.000)
Observations	57,337	3,418,337	22,932	365,295
Share	0.635	0.874	0.365	0.126
	(0.002)	(0.000)	(0.002)	(0.000)

Notes: averages and standard errors (in parentheses) have been computed using individual sampling weights; the sample include children aged 0 to 16 unmarried, not parent and and who co-reside with their mother (not widowed); the left behind are children not co-residing with their father and who belong to households that receive remittances from abroad, and the untreated are all children who are not left behind; partnered mothers are either married or in a free union, non partnered mothers are separated, divorced.
Source: authors' elaboration on data from the survey connected to the 2010 Census.

of them are not partnered (24.2 percent separated or divorced, 12.3 percent single), as reported in last row of Table 3.3. If we consider the 3,783,632 untreated children aged 0 to 16 who co-reside with their mothers, 87.4 percent of them have a mother who is partnered, while 12.6 percent of them not in a relationship at the time of the survey. Thus, the share of co-resident mothers who are not in a relationship is almost three times larger among children left behind than among other Mexican children.[23] This pattern might reflect a higher propensity of the parents who are still in a relationship to reunite on either side of the border (i.e., a higher risk of marital dissolution for the Mexican couples that experience a prolonged period of physical separation) or a higher propensity to migrate for men who are separated or divorced. Our data do not allow to tease out these alternative but not mutually exclusive explanations.

Table 3.3 reveals that 29.0 percent and 50.2 percent of the children left behind whose mothers are respectively partnered and non-partnered co-reside with grandparents, and nine out of ten children left behind of non-partnered mothers co-reside with maternal grandparents. The corresponding figures for other Mexican children stand at 12.5 percent and 45.8 percent respectively.[24] Thus, children left behind are always

[23] A similar pattern emerges from the ENDIREH 2016, as Mexican women that report to have their current or former partner in the United States are three times more likely to be separated or divorced compared to the women that report to have their current or former partner in Mexico.

[24] The average for this group is equal to 16.7 percent, and the difference with respect

more likely than other Mexican children to co-reside with their grandparents, but the difference is (both in absolute and in relative terms) higher for children whose mother is in a relationship. Table 3.3 can also be used to compute the share of children left behind (living with their mothers) who co-reside with grandparents (see Table 3.2) that we obtain assuming that they had the same propensity to co-reside with their grandparents as other Mexican children. This hypothetical share stands at $0.635 \times 0.125 + 0.365 \times 0.458 = 24.7$ percent. Thus, the difference in co-residence with grandparents between the children left behind and other Mexican children (36.8 percent and 16.7 percent respectively) reflects both the higher share of children with non-partnered mothers, and the higher propensity to co-reside with grandparents for each marital status of the mother. In total, 54.7 percent of the children left behind have a non-partnered mother or co-reside with grandparents, revealing that a large fraction of so-called Mexican transnational households either reshape their composition, or simply fall apart.

3.2.3 Concerns about measurement error

3.2.3.1 Exclusion and inclusion error

The indirect approach to the identification of the children exposed to paternal migration in the 2010 Census described in Section 3.2.1 above is exposed to the risk of both exclusion and inclusion error. The frequency of these two types of error is likely to vary with the marital status of the mother of children left behind. A solid relationship between the two parents is likely to be positively correlated with the receipt of remittances (lower exclusion error). A woman with a strained relationship may be more likely to receive transfers from a relative, e.g., a sibling, who has moved to the United States (higher inclusion error). The 2010 Census does allow to assess the relevance of measurement error, as it does not contain any information on the relationship between the recipients and the migrant who is sending back remittances. We thus need to draw on a different data source to address the concerns related to measurement error.

The ENDIREH 2016 is a survey focusing on the relationship among household members, with in-depth interviews for a sub-sample of the

to Table 3.2 is related to the fact that the sample used here also includes children in non-recipient households that do not co-reside with their fathers.

women belonging to survey households.[25,26] The INEGI interviewed 111,256 Mexican women in 2016, randomly selecting one woman among all women aged 15 and above from each one of the housing units that had been included in the sample. 40,754 partnered (married or in a free union) women aged 18 to 55 with at least one co-resident child aged from 0 to 16 went through the in-depth interview, and the survey contains a question on the co-residence with the partner, which allows identifying 1,313 partnered women that do not co-reside with their partner, with 554 of them reporting that their partner lives in the United States. For these 554 women left behind by a migrant partner, 522 report to be receiving remittances from abroad (94.2 percent), and only 8 (out of 759) women that do not co-reside with their partner who resides in Mexico report to be receiving remittances from abroad. This, in turn, is reassuring with respect to the limited incidence of the two types of measurement error: the exclusion error stands at 32/554=5.8 percent, and the inclusion error stands at 8/554=1.4 percent.

The ENDIREH 2016 also allows identifying 4,431 women that are currently separated or divorced and who co-reside with a child aged 0 to 16, and it allows identifying the place of residence of their former partner. 280 of them report that their former partner resides in the United States at the time of the survey.[27] Here, both types of errors are substantially more relevant: only 125 out of these 280 women report to be receiving remittances (44.6 percent), while 84 women whose former partner is not an international migrant belong to a remittance-recipient household. Thus, the exclusion error stands at 55.4 percent, and the inclusion error is lower but still substantial, as it stands at 84/280=30.0 percent.[28] The high share of children left behind whose mother is not in a relationship is potentially a source of concern as, in this case, the measurement error is more substantial, and the children are more likely to co-reside with the grandparents (see Table 3.3).

This evidence entails that we need to assess the implication of an incor-

[25] Previous waves of this survey have been used in papers analyzing domestic or intimate partner violence (e.g., Angelucci, 2008), but not, to the best of our knowledge, to analyze Mexican migration.

[26] The ENDIREH 2016 is clearly uninformative about the incidence of measurement error for children who do not live with either of their parents.

[27] No information is provided on the relative timing of migration and of the dissolution of the relationship with the partner.

[28] Mothers of children whose father is a migrant to the United States can also enter into a new stable relationship (marriage or free union), but the ENDIREH 2016 does not, in this case, provide any information about her former partners.

rect identification of the sample of children left behind for the evidence provided in Section 3.2.2 above about their living arrangements.

3.2.3.2 Measurement error in living arrangements

One can reasonably conceive explanations of the higher incidence of co-residence with grandparents for the children left behind in Table 3.2 that are centered around a differential incidence of measurement error in the identification of the children left behind across various living arrangements. For instance, a woman that is *de facto* or *de jure* separated from the father of her children who lives in Mexico is more likely to co-reside with her own parents, and to receive support from a relative who has migrated to the United States. Her children would clearly meet the two conditions that are used to identify exposure to paternal migration, and would be then incorrectly classified as children left behind, thus unduly inflating the share of children left behind co-residing with grandparents. The empirical relevance of this legitimate concern can be assessed relying on the ENDIREH 2016, a survey that, on substantially smaller sample, allows for a more direct identification of the exposure to the treatment.

If we go back to the sample of separated or divorced women with at least one co-resident child in the ENDIREH 2016, we have that 28.1 percent of the 125 women who report to both have their former partner in the United States and to receive remittances live with their own parents. The influence of the inclusion error seems negligible, as the share of co-residence with one's own parents for the 84 women that we incorrectly identify as left behind stands at 28.2 percent. Conversely, the exclusion error reduces the incidence of co-residence with their own parents, as this share stands at 36.7 percent among the women whose former partner is in the United States, but who do not receive remittances from abroad. In total, the combination of the two types of measurement error results in an underestimation of the incidence of co-residence with grandparents for children left behind. This is confirmed by Table B.1 in the Appendix B.2, where we draw on the ENDIREH 2016 to define (among the women that do not co-reside with a partner) the women left behind by an international migrant either on the basis of the direct questions on the place of residence of the current or of the former partner, or on the question on the receipt of remittances from abroad, in line with what we do to identify children left behind in the 2010 Census.

Table B.1 also shows that our inability to include in the treatment group (exposure to paternal migration) children who live in non-recipient households lowers the share of those with a separated or divorced mother (37.0 percent using the direct question versus 29.2 percent using the receipt of remittances). Similarly, using the data from the 2010 Census, Table B.2 in the Appendix B.2 reveals that 74.3 percent of the children not co-residing with their fathers and belonging to non-recipient households have a non-partnered mother, which is more than twice as large as the corresponding share for children left behind. It also shows that, conditional on the marital status of the mother, the two groups of children have a similar propensity to co-reside with maternal and paternal grandparents. Thus, Tables B.1-B.2 in the Appendix B.2 strengthen the argument that the measurement error in the definition of the children exposed to paternal migration due to the non-receipt of remittances is likely to lead to an underestimation of both the incidence of the dissolution in the relationship of the parents, and of the incidence of co-residence with (maternal) grandparents.

3.2.4 Variations in living arrangements

The stylized fact that we put forward in Section 3.2.2 might reflect either a differential self-selection into paternal migration across different living arrangements, or variations in living arrangements after the exposure to the treatment,[29] or both. Notably, children belonging to a three-generation household might be more likely to be exposed to the migration of their fathers. The ENOE allows us to observe the living arrangements of the children left behind before paternal migration. This survey follows a household for (up to) five consecutive quarters, and around 20,000 Mexican households are included in the sample in each wave of the survey, and we draw on the waves conducted between 2005Q1 and 2018Q4. The ENOE (and its predecessors, such as the ENET and the ENEU) has been traditionally used in the economic literature on Mexican migration (e.g., Antman, 2011; Alcaraz et al., 2012; Fernández-Huertas Moraga, 2011, 2013; Bertoli and Murard, 2020). This survey allows identifying the occurrence of international migration episodes from variations in the household roster across interviews (so, from the second interview), and its questionnaire includes a question on the current place of residence of the former household members

[29] Unfortunately, none of the data sources that we employ allows us understanding the timing of the observed changes in living arrangements.

who left the household. Thus, the ENOE allows us identifying all instances in which a child is exposed to the migration of his or her father, provided that the household of origin of the migrant does not drop out of the sample because of household dissolution occurring at the same time (more precisely, between two consecutive interviews) as the international migration episode (Bertoli and Murard, 2020).[30] The ENOE survey does not provide the identifier of the co-resident parents. This, in turn, obliges us to identify parents using information on the very detailed relationship of the child and of all household members with the household head. Similarly, as we did with the 2010 Census, the relationships with the household head of the child and of other household members can also be relied upon to define the living arrangements of the child at the time of the first interview.

Table 3.4: Living arrangements for stayers and left behind before paternal migration

	Future status of the father		Difference	
	Stayer	Migrant	raw	with controls
	(1)	(2)	(2)-(1)	(2)-(1)
Live with grandparents	0.114	0.106	-0.008**	0.000
	(0.000)	(0.003)	(0.003)	(0.003)
Live with maternal grandparents	0.051	0.039	-0.011***	-0.001
	(0.000)	(0.002)	(0.002)	(0.002)
Live with paternal grandparents	0.064	0.067	0.003	0.002
	(0.000)	(0.003)	(0.003)	(0.003)
Observations	765,676	8,202	773,878	773,878

Notes: averages and standard errors (in parentheses) have been computed using individual sampling weights; the sample includes children aged 0 to 16 who live with both their father and mother (married or in free union) at the time of the first interview in a non-attriter household; the sample is split on the basis of the migration status living arrangements are defined at the first interview; the sample is split depending on whether the father is observed to have migrated to the United States between the second and the fifth interview; the last two data column report respectively the difference (2)-(1) between in the raw data and from a regression that includes controls a set of dummies for the age and gender of the child, rural areas, and state of residence; *** p <0.01, ** p <0.05, * p <0.1.
Source: authors' elaboration on data from the ENOE 2005Q1-2018Q4.

Table 3.4 is based on 773,878 children aged 0 to 16 in non-attriter households who co-reside with both parents at the time of the first interview. For 8,202 of them, their father is reported to migrate to the

[30] Clearly, we also miss instances of whole household migration (Ibarraran and Lubotsky, 2007), as this would also lead to attrition, and instances in which the household members left behind deliberately misreport the current place of residence of a household member who moved out of Mexico (Hamilton and Savinar, 2015).

United States in a later interview. For the (future) children left behind, only 10.6 percent co-resides with grandparents, and co-residence with paternal grandparents is predominant (6.7 and 3.9 percent respectively). As far as the stayers are concerned, their living arrangements are almost identical to the ones that emerge from Table 3.2: 5.1 percent co-reside with maternal and 6.4 percent with paternal grandparents.
It is important to notice that Table 3.4 misses the children left behind that are exposed to paternal migration if (*i*) they were not co-residing with their father when he left Mexico, or if (*ii*) they moved in a different housing unit shortly after the migration of their father. Point (*i*) is likely to lead to an underestimation in the incidence of co-residence with grandparents before the treatment, as children whose parents are separated or divorced are more likely to co-reside with (maternal) grandparents, as shown in Table 3.3 above. Reassuringly, McKenzie and Rapoport (2010) provide evidence that just a small fraction of ever-married recently arrived male Mexican immigrants to the United States is separated or divorced, among those who have ever been in a relationship (3.3/44.6=7.4 percent, see Table 1 at p. 814).
Conversely, point (*ii*) would lead to an overestimation of the incidence of co-residence with grandparents for the children left behind before they get exposed to the treatment, both in absolute and relative to the stayers. This follows from the fact that, in Table 3.4, households in which paternal migration and the relocation of the household members left behind to a different housing unit occur simultaneously, i.e., both before the following interview, are not identified as instances of paternal migration (as no one is left to report the migration episode in the subsequent interview), and nuclear households are more likely to drop out of the sample than larger, three-generation households.

3.2.5 Children left behind are moving

The implications of Table 3.4 is that the stylized fact described in Section 3.2.1 reflects variations in the living arrangements of the children left behind that intervene after their exposure to the treatment. Table 3.5 still draws on the 2005Q1-2018Q4 waves of the ENOE to understand whether these variations reflect the fact that the children left behind move to a different housing unit, joining the household of their grandparents, or if rather the grandparents move in with the children. We use the longitudinal dimension of the data, defining a dummy variable Paternal migration$^{q}_{js}$ equal to 1 if the father of child j is reported to have

migrated out of Mexico in quarter preceding the interview $s = 2, ..., 5$, and where $q = 2005Q1, ..., 2018Q1$ represents the quarter in which the household of child j entered into the sample. Similarly, we define a dummy variable a^q_{js+1} equal to 1 if the household of child j drops out of the sample in any quarter following the interview s, with $s = 2, 3, 4$, and a dummy variable G^q_{js} equal to 1 if one grandparent joins the household of child j in the interview s, with $s = 2, ..., 5$, or in a later interview. We run a regression of either a^q_{js+1} (Panel A) or G^q_{js} (Panel B) on Paternal migration$^q_{js}$ and on a progressively richer structure of fixed effects, which is described in Table 3.5. The units of observation are child-wave pairs, and standard errors are clustered at the household level.

Table 3.5: Children moving out or grandparents moving in?

Panel A

	Dep. var. a^q_{js+1}: Household attrition		
Paternal migration$^q_{js}$	0.021***	0.019**	0.017**
	(0.008)	(0.008)	(0.008)
Adjusted-R^2	0.018	0.027	0.036
Observations (household-wave pairs)	2,173,181	2,173,181	2,173,181
Average outcome (stayers)	0.064	0.064	0.064

Panel B

	Dep. var. G^q_{js}: Grandparents joining		
Paternal migration$^q_{js}$	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)
Adjusted-R^2	0.003	0.003	0.004
Observations (household-wave pairs)	2,644,204	2,644,204	2,644,204
Average outcome (stayers)	0.002	0.002	0.002
Dummies			
Rural FE, $q \times s$ FE and state FE	Yes	Yes	Yes
Child's age, gender and number of children	No	Yes	Yes
Household size, parents' age and years of schooling	No	No	Yes

Notes: standard errors are clustered at the household level; individual sampling weights used in the estimation; the sample consists of children aged 0 to 16 who co-reside with both of their parents, and do not co-reside with any of their grandparents at the time of the first interview; regressions in Panel A are estimated on up to three waves per household (from the third to the fifth interview), while regressions in Panel B are estimated on up to four waves per household (from the second to the fifth interview); all household and individual controls are measured at the time of the first interview; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$;
Source: authors' elaboration on ENOE 2005Q1-2018Q4.

The estimates reveal that paternal migration is significantly associated with a higher probability of attrition, while it is not associated with a higher probability that a grandparent moves in. In particular, the estimates in the third data column of Panel A imply that paternal

migration is associated with a 0.017/0.064=26.6 percent higher probability of attrition. These results are consistent with the idea that the variation in the living arrangements of the children left behind correspond to their own movement to a different housing unit, with the ensuing dissolution the household of origin of the migrant leading to attrition, rather than to a movement of the grandparents. Two remarks are necessary here: First, the estimated differential in probability of attrition is insufficient to account for the differences in living arrangements for children left behind and for stayers observed in Table 3.2. This might reflect a high incidence of the dissolution of the household of origin of the migrant shortly after the migration episode, so that the episode of paternal migration remains unrecorded. Second, the ENOE covers (at most) a period of nine months following paternal migration, so it does not allow ruling out a possible opposite pattern intervening later on in time.[31] However, Bertoli and Murard (2020) provide evidence that elderly individuals are *under*represented among the individuals that move in our out Mexican households, thus confirming that the observed variation in living arrangements of the children left behind in Mexico is unlikely to correspond to instances in which their grandparents move.

3.3 Joint determination of migration and living arrangements

The exposure of Mexican children to the migration of their fathers, which represents the single most important cause of non co-residence with them (Nobles, 2013), appears to be strongly associated with further major changes occurring within so-called transnational households. Co-residence with (maternal) grandparents for the children left behind can correspond to two opposite cases. A strained relationship between the migrant father and the mother left behind, which can induce a *de facto* or a *de jure* separation, can increase the chances that the children co-reside with maternal grandparents. But co-residence with maternal grandparents can also occur when the relationship between the parents

[31] We also considered using the MxFLS, as this longitudinal survey allows covering a longer time period since paternal migration; however, we have just 71 instances of the international migration of a father of children aged 0 to 16 between the first and the second wave, and 29.7 percent of the children exposed to paternal migration are attriters, i.e., they are not included in the sample of the second wave of the MxFLS.

remains solid, as this increases the chances that the mother joins her partner in the United States, leaving the children with her own parents (Dreby, 2010, 2015). Even though changes in living arrangements can intervene shortly after the migration of the father, as shown in Section 3.2.5, both cases become more likely as the time elapsed since paternal migration increases (see also Figure B.1 in the Appendix B.1 on the propensity of Mexican women to join their partners in the United States).

Furthermore, the (lumpy) investment into migration out of Mexico can be subject to binding liquidity constraints (Angelucci, 2015), and pooling resources beyond the household of origin of the migrant can be a way to overcome them.[32] Co-residence with either parents or in-laws for a woman left behind and her children can be more likely when other non co-resident family members have contributed to finance the investment into migration, and be correlated with the importance of inter-household transfers within the extended family of the migrant. The formation of a larger three-generation households can be a way for the formerly non co-residing relatives to secure their access to the remittances, which can represent the repayment of the loan that the migrant has obtained to move to the United States (Poirine, 1997). This, in turn, suggests that co-residence with the previous generation could be more likely when the migrant comes from a household of low socioeconomic status. Co-residence with grandparents could also represent a way to soften the otherwise negative short-run consequences of paternal migration for the children left behind, as evidenced by Antman (2011) because of the monetary investment into migration. This, in turn, also implies that the health conditions of grandparents, their willingness and ability to take on additional responsibilities with respect to child care, and the number of siblings of the mother that already co-reside with them could influence the decisions concerning paternal migration. The living arrangements of the children left behind are also likely to be correlated with the legal status of the migrant father. Undocumented migration exposes the migrant to a possible wage penalty (Borjas and Cassidy, 2019), and it makes the ensuing remittance income for the left behind lower and more unstable.

Unobservables that are correlated with some key children outcomes such as schooling and child work are also likely to vary across children left behind with different living arrangements. For instance, children

[32] See Angelucci et al. (2010, 2018) on the extent of resource pooling within family networks in Mexico.

whose mothers have also moved to the United States are more likely to co-reside with grandparents (see Section 3.2.2) and also more likely to migrate themselves in the future, and this could depress the expected return from their investment in education (McKenzie and Rapoport, 2011). These arguments imply that paternal migration could produce heterogeneous effects on children left behind in Mexico across various living arrangements. We do not explore the data from the 2010 Census in this respect. This choice, which is also constrained by the paucity of information on children's outcomes in the long form of the questionnaire, is motivated by the differential incidence of measurement error across various living arrangements. Measurement error is, in turn, likely to be correlated with unobserved variables, as those outlined above, that can also influence the observed outcomes for the children left behind.

3.4 Analytical challenges and tentative solutions

The changes in the Mexican transnational households following paternal migration that we have outlined in Section 3.2 above give rise to major analytical challenges for the analysis of the effects of migration and remittances on the children left behind. These challenges are related to the sheer possibility to identify the children left behind that moved to a different housing unit in standard cross-sectional or longitudinal surveys, and to the ensuing endogeneity of a number of relevant household-level variables. Reassuringly, some solutions can be deployed to tackle (at least partly) these challenges.

3.4.1 Missing children left behind in cross-sectional surveys

Asking questions about the occurrence of migration episodes in surveys conducted at origin is tricky, as current international migrants are *not* members of the surveyed household on the basis of its statistical definition, and the enumerators thus have to determine which migration episodes should be reported. Both a co-residence condition at the time of migration, recommended by UNDESA (2017) and used by the INEGI, or the subjective perception that the migrant is still part of the household (see, for instance, National Statistics Office of

the Philippines, 2007, 2010) run into problems when the household of origin of the migrant dissolves, or the migrant dissolves his union with the spouse or partner left behind (before or after migrating). Problems also arise when the survey lists, as done with the Mexican Family Life Survey, the relatives of the members of the surveyed household who are international migrants, if these questions do not relate directly to children.

3.4.1.1 Retrospective questions with an objective or subjective condition

The 2010 Census employs retrospective questions on migration that embed the typical co-residence condition, as recalled in Section 3.2.1 above. If this condition fails, the record related to the migrant is deleted from the publicly available data. When the children left behind move in with their maternal grandparents, this violates the co-residence condition.[33] The same retrospective questions have also been employed by the INEGI in the 2000 and 2020 Census, and in the various rounds of the *Encuesta Nacional de la Dinámica Demográfica* (ENADID).[34]
Do the children that are identified as exposed to paternal migration by the retrospective questions on migration episodes have different living arrangements from those that we identify using the approach described in Section 3.2 above? Table 3.6 reproduces the structure of Table 3.2,

[33] Following our request, he INEGI informed us that a negative answer to Question IV.5, which evaluates the respect of this condition, was given in 12,667 cases (compared to 152,344 cases with a positive answer). The 12,667 cases reported by the INEGI do not cover all instances of failure of the co-residence condition. This follows from the fact that, as observed by Bertoli and Murard (2020) for the 2000 Census, the key difference between Question IV.1 and Question IV.5 is that only the latter specifies that the co-residence condition has to be evaluated at the time of migration. Thus, if the migrant was a member of the surveyed household at some point in the past but not when he left Mexico, the respondent would give a positive answer to Question IV.1 but a negative one to Question IV.5. Conversely, if the migrant was never a member of the surveyed household, then the respondent can give a negative answer already to Question IV.1, and the latter appears to be the relevant case if the child moves in with his maternal grandparents, as Mexico is a patrilocal country and the migrant father is thus likely to have never co-resided with his in-laws.

[34] Interestingly, the LSMS conducted in Ecuador in 2005-2006 also gathered information on the migration of former members of the surveyed households (INEC, 2005, p. 210). This implies that this survey potentially missed instances of parental migration that were followed by a change in the living arrangements of the children left behind, even though the concern about their living conditions had motivated this data collection effort (Bilsborrow, 2016).

comparing the living arrangements of the children left behind, as defined in Section 3.2.1 with those of the 63,640 children aged 0 to 16 that do not co-reside with the father, and who live in a household that enumerates a current international male migrant who is between 17 and 69 years older than the child, and who might thus be the migrant father.[35,36]

Table 3.6: Children (not co-residing with their fathers) in households with an enumerated male migrant

	Enumerated migrant Co-resident mother			Left behind Co-resident mother		
	All	Yes	No	All	Yes	No
	(1)	(2)	(3)	(4)	(5)	(6)
Live with grandparents	0.312	0.259	0.757	0.453	0.368	0.789
	(0.002)	(0.002)	(0.005)	(0.002)	(0.002)	(0.003)
Live with maternal grandparents		0.163			0.283	
		(0.002)			(0.002)	
Live with paternal grandparents		0.095			0.085	
		(0.001)			(0.001)	
Observations	63,640	56,616	7,024	103,076	80,385	22,691
Share	1.000	0.894	0.106	1.000	0.797	0.203

Notes: averages and standard errors (in parentheses) have been computed using individual sampling weights; the sample includes children aged 0 to 16 who are unmarried, not parent and whose mother, if present, is not widowed; the left behind are children not co-residing with their father and who belong to households that receive remittances from abroad; children with an enumerated father are children living in a household that reports through the restrospective questions a male migrant currently living in the United States and whose age difference with the child is between 17 and 69 years; the last row reports the share of stayers and left behind that co-reside (do not co-reside) with their mother.
Source: authors' elaboration on the survey connected to the 2010 Census.

The enumeration of this migrant represents an alternative (noisy) signal of the exposure of the child to paternal migration. Table 3.6 reveals that 31.2 percent of the children in this second group co-reside with grandparents (compared to 45.3 percent for the children left behind). When the mother is present, co-residence with grandparents stands at 25.9 percent (compared to 36.8 percent for children left behind), and the difference between the two groups is driven by a significantly lower incidence of co-residence with maternal grandparents (16.3 and 28.3 percent respectively). Thus, relying on the answers to the retrospective

[35] Allowing for a very large (and unusual) difference between the age of the migrant and of the child is a conservative approach, that reduces (as discussed below) the chances of finding major differences in living arrangements in Table 3.6 between the two groups of children.

[36] Fewer children are identified as exposed to parental migration with this second signal; this could be due to various and not mutually exclusive explanations: (*i*) the father left Mexico before the five-year recall period covered by the retrospectively, (*ii*) deliberate non reporting, and (*iii*) the violation of the co-residence condition at the time of migration.

questions on migration included in the 2010 Census lowers the share of children co-residing with grandparents by (0.453-0.312)/0.453=32.1 percent.[37] A higher share (89.4 percent) of children living in a household with an enumerated male migrant co-reside with their mothers (compared to 79.7 percent for children left behind).

The differences in living arrangements that emerge from Table 3.6 are remarkable, as the two signals (enumeration of a migrant, and receipt of remittances from abroad) are clearly correlated, and 35,937 children are identified as exposed to paternal migration on the basis of both signals. Moreover, the inclusion error with this second signal is certainly higher for children living in larger, three-generation household, who are more likely to enumerate as a migrant a former household member who is *not* the father of the child, and this inflates the share of co-residence with grandparents for children in households with an enumerated migrant. Thus, Table 3.6 confirms that the reliance on retrospective questions subject to a co-residence condition can indeed give a distorted picture of the living arrangements of the children exposed to paternal migration.

The dissolution of the marital relationship between the migrant and the partner left behind, which should be immaterial for the co-residence condition described above, creates problems to identify the children exposed to parental migration when surveys employs a subjective condition. For instance, the Enumerator's Manual of the 2007 Census of the Filipino Population specifies that "undocumented [migrants] are included if *the household still considers them as members* and if they mention their names when you ask about the names of household members" (National Statistics Office of the Philippines, 2007, p. 86, emphasis added). The difficulty arises from the fact that marital dissolution is likely to be associated to the perception that the migrant is no longer a member of the surveyed household, and hence her migration episode could remain unrecorded. Thus, children left behind whose parents dissolved their union (before or after the migration episode) are less likely to be correctly identified on the basis of surveys that employ a subjective condition to define the migrants that should be enumerated.

[37] Similarly, 17.5 percent of the children in households with an enumerated male migrant have a co-resident mother who is non-partnered (compared to 36.5 percent for children left behind).

3.4.1.2 Listing relatives residing abroad

A similar problem arises with the Mexican Family Life Survey; the questionnaire of the 2002 wave of this survey provides information on whether various relatives of the respondents reside in the United States. More precisely, questionnaire asks to each respondent:

(Question RE01) "Do you have any relatives in the United States?"

In case of a positive answer, the name(s) of the relative(s) are listed, and for each of them the enumerator records the relationship with the respondent (Question RE03): partner, father, mother, sibling, son or daughter, parent-in-law, grandparent, grandchild, cousin, uncle or aunt, niece or nephew, and other relative (specify). These questions, which are meant to facilitate the tracking of (future) international migrants, are only asked to households members aged 15 and above, and the only option for younger children is to rely on the answers provided by other household members to (indirectly) infer whether the non co-resident father is an international migrant. This is problematic in the presence of the living arrangements of Mexican transnational households that we have described in Section 3.2.

Let us consider the answers provided by the mother, or by the maternal grandparents of the children (when the mother does not belong to the same household). From the viewpoint of the mother, the migrant father is (or could be) her partner, but this piece of information is missing when the mother is either not partnered at the time of the survey, or when the mother co-resides with her partner who is not the father of the child. For maternal grandparents, the questionnaire does not include questions related their son-in-laws.[38] Thus, the questionnaire does not allow identifying instances of paternal migration for children aged 0 to 14 who (*i*) have a non-partnered mother, (*ii*) co-reside with a step father, or (*iii*) live with maternal grandparents without their mothers. Our analysis of the sample of children left behind in the 2010 Census reveals that one of condition (*i*) is met for 0.797×0.365=29.1 percent of the children left behind, while conditions (*ii*) and (*iii*) hold respectively for 0.797×0.034=2.7 percent and 0.789×0.203=16.0 percent (see Tables 3.2 and 3.3). As these three conditions are mutually exclusive, the indirect identification of children exposed to paternal migration is impossible using the questions in the 2002 wave of the MxFLS for 47.8

[38] The detail for the last residual category (other relative) for the answers to Question RE03 are not included in the publicly available data.

percent of the children that we identify as being left behind, irrespective of whether their living arrangements changed after their exposure to paternal migration.

3.4.1.3 Alternative approaches to data collection and analysis

The ideal solution would be to detach the identification of the children exposed to paternal (or maternal) migration from the retrospective questions on the occurrence of migration episodes. Ideally, direct questions should be asked on where, in case of non co-residence, the parents of the child are living. However, this approach is not immune to concerns related to deliberate misreporting (Hamilton and Savinar, 2015), and it cannot be deployed with existing surveys. A pragmatic approach would be to rely on variables (notably, the receipt of remittances) that are likely to convey information on the (unknown) place of residence of non co-resident parent(s). If this is not possible, and the analysis has to be based on a data source that is likely to miss a substantial portion of children left behind that moved to a different housing unit or whose parents dissolved their union, then a re-weighting approach as the one used by McKenzie and Rapoport (2010) to deal with whole household migration could be considered, inflating the weight of the children left behind that are underrepresented in the sample. This approach rests on the assumption that the identification of the children left behind is, for a given living arrangement, orthogonal with respect to unobservables influencing the outcome of interest, and the empirical plausibility of this assumption should be adequately defended. In our case, we miss children exposed to paternal migration who belong to non-recipient households; as the absence of remittances is likely to be correlated with a strained relationship or with a separation of the parents, and with co-residence with grandparents, inflating the weights of children co-residing with grandparents in remittance-recipient households would be a questionable approach.

3.4.2 Missing children left behind in longitudinal surveys

Longitudinal surveys are also exposed to problems, as the changes in living arrangements of the left behind are associated with the dissolution

of the household of origin of the migrant, and hence with attrition.[39] This leads to a selected sample of children left behind, compounding the problems that arise when a sample selection criterion is (indirectly) based on the living arrangements of the children. For instance, Antman (2011) uses longitudinal data for Mexico that have the same structure as the ENOE, and she only includes in her sample children of the household head;[40] this implies that the evidence that Antman (2011) provides is uninformative about the short-run effects of migration on the Mexican children co-residing with grandparents, as almost none of them is included in the sample (as they are either grandchildren of the head, or attriters),[41]

Tracking of individuals who move to a different housing unit, as in the Mexican Family Life Survey, could in principle represent a solution. However, the major efforts related to tracking typically result in relatively small size of the sample, which, in turn, hinders the possibility of using the data to analyze the implications of relative rare events such as the occurrence of an international migration episode.

3.4.3 Household-level variables

Observational studies often employ household-level measures of adult education as controls, and household composition is observed after the exposure to the treatment. This is problematic when the data refer to the household head, as household headship can be endogenous to migration (Cox-Edwards and Rodríguez-Oreggia, 2009), or when the data on the migrant members are unavailable (Bertoli and Marchetta, 2014) and within-household selection into migration is not random. However, even the availability of data on the migrant members does not solve the problem in the presence of post-treatment variations in

[39] Bertoli and Murard (2020) propose an approach to identify new members in surveyed households that are likely to come from a dissolved household of origin of an international migrant, which rests on the fact that the new members report to be personally receiving remittances from abroad; this approach does not allow to have information on the characteristics of the migrant, including on the time elapsed since migration.

[40] This choice is related to the need to avoid ambiguity in the identification of the parents of the child (and hence of the exposure to paternal migration); this sample selection criterion also entails that children that were not co-residing with their fathers, e.g., because of the separation of their parents, are not included in the analysis.

[41] The only (minor) exception would be represented by a three-generation household in which the household head is the parent of the child.

household composition. These do not give rise to biases only as long as they just introduce a non-systematic measurement error in the variables that are measured after the exposure to the treatment (Lechner, 2008). However, the pattern that we uncover in the Mexican data suggests that the influence is likely to be systematic. The formation of larger, three-generation households would certainly depress any measure of the average level of education of adult household members, as grandparents are less educated of the mother of the children left behind.[42] The reliance of a measure of the level of education of the mother (McKenzie and Rapoport, 2011), or of the highest rather than of the average within the household (Yang, 2008) would represent two pragmatic approaches that clearly reduce the sensitivity to changes in household composition, as the mother is likely to have the highest level of education within the household. The problem remains when the child is exposed to the migration of both parents, whose characteristics are usually not recorded in the survey.

3.5 Concluding remarks

International migration can lead to prolonged periods of physical separation for individuals that used to co-reside. We provide evidence that paternal migration exposes Mexican children to a variety of further changes in their living arrangements. They are significantly more likely to start co-residing with their (mostly maternal) grandparents, and this pattern is magnified when the mother also moves to the United States, or when their parents dissolve their relationship.

Our analysis draws exclusively on Mexican data, but we can plausibly conjecture that variations in the living arrangements of the individuals left behind could even be more frequent in origin countries where women represent a larger share of international migrants. As Fafchamps and Quisumbing (2008) notice, "essential tasks often can only be performed by certain categories of people because of acquired skills or social norms–for instance, women for food preparation [...]. This implies that in order for a household to be an effective production unit, all these categories of people must be present" (p. 3202). Indeed,

[42] The data from the 2010 Census reveals that the children left behind co-residing with grandparents belong to households that have a significantly lower level of adult education than the households of the other children left behind, but their mothers are significantly more educated than the mothers of the other children left behind; results are available from the Authors upon request.

Cortés (2015) observes that, in the Philippines, "the children of migrant mothers are more likely to live in extended households" (p. 66), with 20 percent of the children left behind by a migrant mother co-residing with their grandparents, as opposed to 8 percent in case of paternal migration.

The changes in living arrangements that we uncover in the data have two major implications for the analysis of the consequences of migration on the left behind. First, when they join a different housing unit, the left behind drop out of longitudinal surveys that have been used to analyze the effects of migration or of the receipt of remittances (see, for instance, Antman, 2011; Murard, 2020), so that the resulting econometric evidence is uninformative about the left behind who adjusted their living arrangements. Second, the left behind that are either excluded from longitudinal analyses or not identified as such in cross-sectional surveys are likely to be a selected sample of the left behind with respect to the outcomes of interest. This, in turn, implies that variations in living arrangements associated to migration can mediate the effects that scholars aim at estimating. These important implications of variations in the living arrangements of the left behind further add to the challenges related to whole household migration (Steinmayr, 2020), intra-household selection into migration (Gibson et al., 2011), deliberate misreporting (Hamilton and Savinar, 2015), and to the violation of the co-residence condition embedded in retrospective questions (Bertoli and Murard, 2020). Econometric analyses should rely on definitions of the treatment and of relevant control variables that are least sensitive to the changes in living arrangements that are associated to paternal migration.

As Massey et al. (1993) observe, "migration decisions are not made by isolated individual actors, but by larger units of related people–typically families or households" (p. 436). Thus, a fuller understanding of the implications of migration for the left behind requires taking into account that each "household is actually embedded within an extended family network" (Angelucci et al., 2010, p. 197), and that the partition of family members into separate households can be impacted by the occurrence of an international migration episode.

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Appendix to Chapter 3

B.1 Migrant Mexican women with children left behind

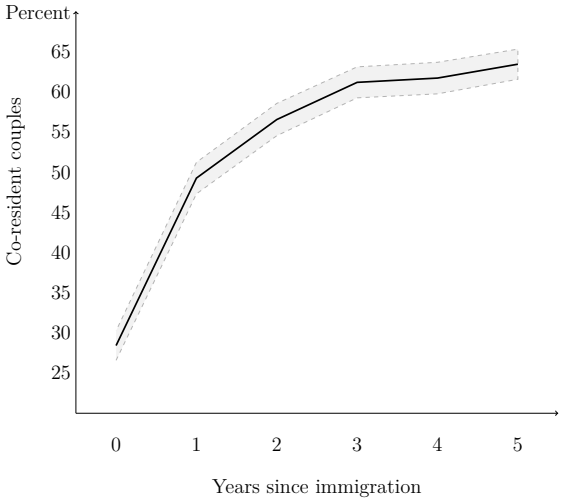
The American Community Survey (ACS) provides us with information on the year of immigration of Mexican (more precisely, Mexico-born) male immigrants, on their marital status (and year of marriage), and about their co-residence with a female Mexican partner. Using the 2000 to 2018 rounds of the ACS, we identify 14,502 Mexican male immigrants aged 25 to 64 who got married before migrating and are still currently married, and who arrived to the United States by no more than five years ago.

The share of these Mexican men who co-reside with a Mexico-born wife rises sharply with the time elapsed since migration, as shown in Figure B.1. This pattern suggests that children exposed to paternal migration could also be exposed to maternal migration; as the ACS does not provide information about fertility, we are not able to identify the Mexican migrant couples that have left behind one or more of their children.

The ACS allows us to compute the share of co-resident Mexican couples in the United States for which we observe at least one co-resident child in the data. Figure B.2 plots this share as a function of the age (from 20 to 49) of the woman, using data from 10,692 Mexican co-resident couples in the United States (who migrated less than five years before the survey and who got married before migrating), and using the corresponding share for more than 2 million non-migrant couples from the survey connected to the 2010 Census of the Mexican Population. Figure B.2 reveals that share of migrant couples with co-resident children is between 20 and 60 percentage points below the corresponding share for non-migrant couples. This major difference could reflect non-random self-selection into joint couple migration rather than the fact that some children have been left behind in Mexico.

The Current Population Survey (CPS) provides information on fertility in the June round of even years (see https://www2.census.gov/programs-surveys/cps/techdocs/cpsjun18.pdf). We use 11 Biannual June Supplements conducted between 1998 and 2018, which contain information on the number of live births for each woman aged 15 to 50, and either the year of birth of the last-born child (from 1998 to 2010), or the year of birth of the first-born child (from 2012 to 2018).

Figure B.1: Co-residence with a Mexican wife for Mexican male immigrants in the United States

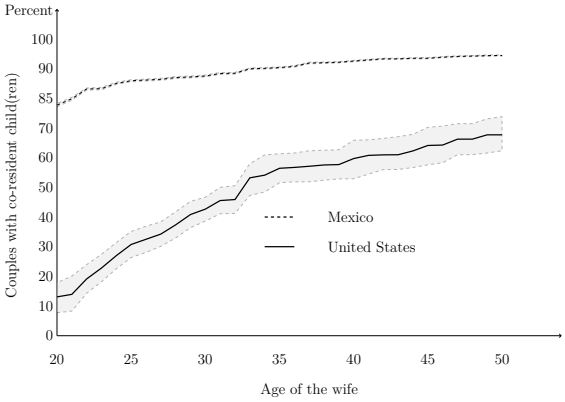


Notes: mean values and the 95 percent confidence intervals have been computed using individual sampling weights; the sample includes 14,502 Mexican men aged 25 to 64 who migrated to the United States in the five years before the survey, who were married before migrating and who are still married at the time of the survey.
Source: authors' elaboration on data from the American Community Survey 2000-2018.

For each woman aged 15 to 50, we also know the total number of children.
We identify 1,657 Mexican-born women who migrated to the United States at most five years before the survey, and who report to have at least one child no older than 16 at the time of the survey. Among those, we can identify 734 wives (44 percent) with at least one child born before the year in which they migrated to the United States, and therefore who should be born in Mexico,[43] 491 wives whose children are all born after they migrated to the United States, and 432 for whom we

[43] We have information on the country of birth of the children only if they co-reside with their mothers in the United States.

Figure B.2: Co-residence with a child for married Mexican couples in Mexico and in the United States



Notes: mean values and 95 percent confidence intervals computed using the individual sampling weights; the two samples include respectively 10,692 Mexican co-resident couples in the United States (who migrated less than five years before the survey and who got married before migrating), and more than 2 million non-migrant couples in Mexico where the age of the wife ranges from 20 to 49 years.

Source: authors' elaboration on data from the Biannual June Supplement of the Current Population Survey 1998-2018 and the survey connected to the 2010 Census of the Mexican Population.

cannot determine whether they have one (or more) child born before they migrated, as they have at least two children and we do not have the years of birth for the children other than the last-born (in the 1998 to 2012 surveys). This is because a child might be born (at an earlier parity) in Mexico before the migration of her mother.

For these 734 wives, we search the household roster for an individual who could be her Mexico-born child, on the basis of the country and of the year of birth (to be conservative, we allow for a difference of up to two years) and of the relationship of the wife and of the child with the household head (the CPS does not provide identifiers of the co-residing parents). We find that in 46 percent of the cases (335 wives) the household includes a member who respects these conditions. Given

that virtually all children aged below 16 normally live with their mothers (both in Mexico and in the United States),[44] this suggests that 54 percent of the wives who move with or join their husbands at destination leave at least one child behind in Mexico. Notice again that this is a lower bound, as we do not have information on all the children of a woman, but only on the year of birth of the last-born child (from 1998 to 2010), or the year of birth of the first-born child (from 2012 to 2018); thus, we are not able to detect instances in which a Mexico-born son or daughter born at a different parity and aged less than 16 at the time of the survey is not co-residing with his or her mother in the United States. For the 432 wives with children with undetermined place of birth (ambiguous relationship between the year of birth of the child and the mother's immigration year), there is a (unknown) fraction of those that are born in Mexico and for whom we cannot know whether they joined their parent in the United States or were left behind in Mexico. However there is no reason to believe that this unobserved group is a selected sample with respect to the migration decision, and we thus assume that the share of children left behind (54 percent) observed in the identified group of 734 wives prevails among the overall population. This is a conservative choice: if we focus on the CPS rounds after 2012 for which there is no ambiguity about the relative timing of children's birth and mother's migration (because the year of birth of the firstborn child is reported), we find that 61 percent leaves behind at least one child–compared with 54 percent in the entire sample.

Thus, the data from the ACS and the Biannual June Supplements of the CPS are consistent with the pattern that emerges from data collected at origin: a non-negligible share of children exposed to paternal migration are also exposed to maternal migration.

[44] In the CPS, 92.6 percent of children below 16 live with their mothers (376,000 observations); in the 2010 Census of the Mexican population, 91.5 percent of the children below 16 live with their mothers (4.4 million observations).

B.2 Additional results

Table B.1: Co-residence patterns with two different definitions of women left behind

	Married or in free union		Separated or divorced	
Definition of the treatment:	Direct question	Remittances	Direct question	Remittances
Co-residence with parents	0.257	0.243	0.333	0.282
	(0.019)	(0.019)	(0.028)	(0.031)
Co-residence with in-laws	0.091	0.093	0.000	0.000
	(0.012)	(0.013)	(0.000)	(0.000)
Observations	554	530	280	209
Share	0.630	0.708	0.370	0.292
	(0.017)	(0.017)	(0.017)	(0.017)

Notes: averages and standard deviation (in parentheses) have been computed using individual sampling weights; the sample includes women aged 18 to 55 who have at least one co-residing child between 0 and 16, who do not co-reside with a partner and who are either married or in free union (*union libre*), or declare to be divorced or separated (single women are not in the sample as no question about potential former partners is asked); we define a woman as having a former or current partner in the United States using either the direct question on this, or information on the receipt of remittances from abroad.
Source: authors' elaboration on data from the ENDIREH 2016.

Table B.2: Living arrangements of Mexican children not co-residing with their fathers in recipient and non-recipient households

	Partnered mother			Non-partnered mother		
	Left Behind	Non recipient	Difference with controls	Left Behind	Non recipient	Difference with controls
	(1)	(2)	(1)-(2)	(3)	(4)	(3)-(4)
Live with maternal grandparents	0.187	0.247	-0.026***	0.450	0.415	0.037***
	(0.002)	(0.001)	(0.002)	(0.003)	(0.001)	(0.004)
Live with paternal grandparents	0.103	0.110	-0.005***	0.052	0.052	0.001
	(0.001)	(0.001)	(0.002)	(0.001)	(0.000)	(0.002)
Observations	57,337	162,501	219,838	22,932	355,306	378,238
Share	0.635	0.257		0.365	0.743	

Notes: averages and standard deviation (in parentheses) have been computed using individual sampling weights; the sample include children aged 0 to 16 unmarried, not parent and who co-reside with their mother (not widowed) but not with their father; the left behind are children who live in households that receive remittances from abroad; the other children are those living in non-recipient households; the last row reports the share of left behind and other children whose mother is partnered (or not partnered); the third and the sixth data column report respectively regression estimates of the differences (1)-(2) and (3)-(4) that include in the controls a set of dummies for the gender and age of the child, rural areas, and state of residence; *** p <0.01, ** p <0.05, * p <0.1.
Source: authors' elaboration on the survey connected to the 2010 Census.

Chapter 4

Selection into child fostering and its implications for education: Evidence from Ghana

4.1 Introduction

There is evidence that the children's living arrangement and the identity of their caregiver have significant consequences for their development (Alesina et al., 2021). Fostering is highly prevalent in West Africa; as observed by Marazyan (2015), about 10 percent of non-orphan children aged 0-14 did not live with their parents in 2010. The parents and receiving households are linked by a tacit agreement inducing a provisional transfer of parental rights and obligations.[1] A large literature investigates the consequences of child fostering on the welfare of children. Parental absence is generally found to have adverse effects on children's outcomes (Case et al., 2004; Engle et al., 1996; Gaydosh, 2015), there is indeed some concern that child fostering could be detrimental to the foster children's welfare, and possibly involve exploitation of children's labor by the receiving households (Ainsworth, 1996; Asuman et al., 2018; UNICEF, 1999).

Ghana has a long-standing practice of child fostering. According to Isiugo-Abanihe (1985), one-third of Ghanaian women aged 15-34 had a child under 10 years old living away from their home in 1971. More recently, fostering has also been found to result from the high emigration rate from Ghana[2] due to the costs and risks associated with migration, parents leave their chidren behing in Ghana (Cebotari and Mazzucato, 2016). According to Cebotari et al. (2017), 37 percent of children aged 0-18 in Ghana had at least one parent living abroad in 2014. Studying the situation of foster children also participates in having a better understanding of the impact of migration on the development of countries of origin.

Other determinants of child fostering have also been identified in the literature. An important one is the family situation of children. Akresh (2005) found that child fostering is a response to a negative income shock experienced by the parental households. It could be considered a solidarity mechanism to buffer the inequality within the kinship (Eloundou-Enyegue and Shapiro, 2004). Foster children are likely to depart from households having difficulties bearing the children's needs

[1] There is an ambiguity between the practices of fostering and orphanhood in the literature. When at least one parent is alive, fostering is intended to be temporary, whereas, in the case of orphans, it can be considered as an adoption. The expression "child fostering" can describe both types of care (Serra, 2009) .

[2] Twum-Baah et al. (2005) acknowledged that the number of Ghanaians living abroad is around 1.5 million.

and investing in education. Paternal absence is also a strong predictor of child fostering. Women who have experienced single motherhood through migration of the partner, death of the partner, or divorce are much more likely to ask for help to rear their children (Vandermeersch and Chimere-Dan, 2002; Grant and Yeatman, 2014). Thus, child fostering is partly driven by children's needs. These selection issues regarding fostering lead to analytical challenges for researchers trying to assess the impact of this practice on children's well-being. Indeed, the consequences of fostering are very likely to depend on the children's previous situation. Survey instruments to track children moving from one household to another are rare,[3] and information on the family background is often not collected on a large scale.[4]

This paper provides partial answers to the following question: is child fostering detrimental to children's education? Using the Demographic and Health Survey conducted in 2014 in Ghana, we find that foster children have worse educational outcomes than other subgroups of children such as host siblings, i.e., children living with their parents in receiving households, biological siblings remaining in the parental household and other non-foster children. We also put forward that the instability of the parental union is a major correlate of child fostering. More precisely, we find that around 72 percent of Ghanaian mothers who have fostered out a child have experienced a marital breakdown or have a child born before their first union. Our results show that the marital instability of the mothers is negatively related to children's education when they are staying with their mothers. Thus, the attempt to mitigate the negative consequences of marital breakdown might motivate child fostering. We provide empirical evidence that this selection factor largely explains the difference in school attendance between foster and non-foster children. At the same time, it is not sufficient to explain differences in completed years of schooling that might have materialized before the children were fostered out. We also highlight that the identity of foster children's caregivers significantly influences their ac-

[3]The specific survey design implemented by Akresh (2004) in Brukina-Faso, allows observing the outcomes of foster children pre-fostering and post-fostering, matching the sending and receiving households and asking retrospective questions on school attendance. But this kind of survey design is costly to implement and results in a small sample of children not representative at the national level.

[4]Using a specific survey design in Senegal, Beck et al. (2015) are able to get information on foster children's background and the link between sending and receiving households (relying on declarations made by host households).

cess to financial resources and the time they can dedicate to education. Consequently, the selection of the host households is likely to depend on the motive for fostering.

Our contribution to the literature on child fostering is threefold. First, using standard survey data, we implement a method relying on women's declaration about their living children to identify mothers who have fostered out a child. Even if we cannot directly link sending and receiving households with our data, we provide descriptive evidence that foster children identified from sending households have the same average characteristics as foster children identified in receiving households. This is reassuring with respect to our method of identifying sending households and allowing us to define a group of children who reside with their biological mother but have at least one sister or brother who has been fostered out (called biological siblings in the remainder of the paper). We are thus able to compare a representative sample of foster children with a representative sample of biological siblings. The proposed method could be replicated in other countries for which Demographic and Health Survey data is available. Our method also allows us to provide evidence of the intra-siblings selection of foster children. We highlight that children who are the first-born and born out of union are more likely to be fostered out than their siblings. In addition, girls are more likely to be fostered out than boys, especially among children aged 10 years or more. These selection issues are likely to explain part of the observed differences in completed years of education between foster and non-foster siblings. For siblings remaining with their parents, the departure of a specific sibling from their household may influence their allocation of resources and outcomes. In this perspective, when the children's outcomes are measured after the fostering of a sibling, they should be considered endogenous to this practice.
Using parent-child co-residence, we can unambiguously identify the host siblings of foster children who reside in receiving households and compare their outcomes with the ones of foster children, as it is mainly done in the literature on child fostering. Our results suggest that the reference group used to assess the difference in educational outcomes critically influences the perception of foster children's living conditions. The reference group partly explains why the literature provides mixed results on the impact of child fostering on children's welfare (for a review, see Ariyo et al., 2019).

Second, we take into account the marital instability experienced by mothers when assessing the differences in educational outcomes between foster children and (i) host siblings, (ii) biological siblings, and (iii) other non-foster children. For foster children in their host households, the survey provides no information about the marital life of their biological mothers, so this needs to be inferred. To this end, we rely on mothers' declarations about fostering and marital life. We use the distribution of marital instability defined for foster-out children declared by their mothers. Then we draw from this distribution to randomly assign mothers' characteristics to foster children in their host households. We find that accounting for the selection of foster children regarding mothers' marital life significantly influences the differences in educational outcomes.

Third, we explore some consequences of the host household's selection for children's well-being. Indeed, receiving households are likely to be non-randomly selected by the parents. In Ghana, for instance, in the Akan ethnic groups with matrilineal descent rules, men are prone to host their sister's son for inheritance purposes (La Ferrara, 2007). If parents foster their child for educational purposes, children will likely join households having a preference for child education and/or located closer to schools (Akresh, 2009; Zimmerman, 2003). It means that foster children would have host siblings who are mechanically better educated than them (signaling how the host households value children's education).[5] Moreover, the family ties of the foster children with available caregivers will likely influence the choice of receiving households.[6] We provide evidence that the relationship between foster children and their host household head has heterogeneous consequences for children's welfare (also demonstrated by Beck et al., 2015; Cichello, 2003; Fafchamps and Wahba, 2006; Lloyd and Blanc, 1996; Lachaud et al., 2016; Serra, 2009). Notably, foster children spend less time working when they join the households of their grandparents. Consistent with previous findings, our paper shows how inter-generational support benefits children (Alber, 2004; Talamas Marcos, 2022; Bertoli et al., 2021). We discuss

[5]Also when educational outcomes are measured after child displacement, the host siblings might perform better at school if a foster child's presence leads them to undertake fewer domestic tasks and child work (Marazyan, 2015).

[6]Like other strategies implemented at the kinship level, the study of child fostering implies increasing our understanding of the extended family implication in resource allocation, and fuels the need for better data on the households' network (Madhavan et al., 2018).

how child fostering is linked with other inter-household exchanges, such as money transfers, which could influence children's outcomes and living conditions. Our study partially contributes to the literature by providing evidence that inter-household and intra-household allocation of resources are intrinsically linked (Cox and Fafchamps, 2008; LaFave and Thomas, 2017).

The remainder of the paper is structured as follows: Section 4.2 presents the data source used to produce our analyses and our sample of interest. Section 4.3 describes how we build the different groups of children according to their living arrangements. Then we provide descriptive statistics on the children's and households' characteristics depending on their group (Section 4.4). Section 4.5 puts the situation of foster children into perspective relative to the available reference groups built and provides evidence that differences in educational outcomes are largely driven by the selection of foster children regarding mothers' marital life. Section 4.6 examines the differences in household wealth and the receipt of money transfers among host households. It also puts forward differences in educational and labor outcomes among foster children according to their caregivers. Finally, Section 4.7 draws the main conclusions.

4.2 Data and sample

As the main data source for our analyses, we rely on the Ghanaian Demographic and Health Survey conducted in 2014 (2014 GDHS), implemented by the Ghana Statistical Service (GSS), the Ghana Health Service (GHS), and the National Public Health Reference Laboratory (NPHRL). The two-stage sample was designed from the 2010 Ghana Population and Housing Census. 11,835 households were sampled to be representative at the national and regional levels and successfully interviewed.

The survey distinguishes between household members and visitors; only individuals who are used to living and eating together in the surveyed residential unit are considered household members. Any household member must fill in general information about his or her own socio-demographic characteristics (sex, age, marital status). Adult members mainly respond for themselves, but for children under 15, the interviewer asks the parents or the person responsible for child care and re-

ports their line number. All members under 18 declare if their parents (mother and father) are alive and co-reside with them in the surveyed household; if this is the case, the interviewer reports their line number. Thus for individuals under 15 we can identify their co-residence pattern with the parents and their main caregiver among household members. Respondents also declare the school attendance over the current school-year of each child member and the highest grade completed.
Like many Demographic and Health Surveys, the 2014 GDHS includes a specific questionnaire for all women aged 15-49. The questionnaire aims to collect detailed information about the birth history, fertility preferences, marriage and sexual activities, and information concerning women's and children's health.

Our sample includes children aged 6 to 14 at the time of the survey because of the Ghanaian context and data constraints. For children aged over 5, we have complete information about education, as they should be enrolled in school. Children aged 6 should typically enter primary school (1992 Constitution of Ghana), which is free and compulsory (2002 Free Compulsory Universal Basic Education reform). Ghanaians must complete at least six primary and three secondary school years (2008 Education Act).
As we need to rely on parent-child co-residence information, we cannot extend the sample of children through to 18 since, in the 2014 GDHS, only individuals under 18 fill in information about the co-residence with parents. From the age of 15, individuals are allowed to be employed in Ghana (Labour Decree 1967, NLCD 157). Thus we focus on children aged under 15 who should attend primary or lower secondary schools and cannot legally work. According to the previous literature, this age bracket covers individuals who are old enough to contribute to home production (under 5 children are only consumers, Vandermeersch and Chimere-Dan, 2002) but too young to be forming an independent household (Ainsworth, 1996). Moreover, from age 15, individuals do not declare any caregiver in the 2014 GDHS as they should be autonomous and enable to care for themselves. Furthermore, individuals are commonly considered marriageable from this age threshold and likely to be treated as adults from then on (Akresh, 2005). Respondents aged 15 or over declare their marital status in the 2014 GDHS, even if few are already in a union at 15 (Appendix Figure C.1). We exclude individuals over 15 to focus on unmarried children who should depend on their caregiver.

4.3 Define children living arrangements

We present the definitions we used to classify children 6-14 into four groups according to their living arrangements (i) foster children, (ii) biological siblings living in sending households, i.e., children who live with at least one of their biological parents and who have a foster sibling; (iii) host siblings in receiving households, i.e., children who live with at least one of their biological parents and with at least one foster child; and (iv) children living in a non-fostering household (other children). Only a very small share of children belong to several groups, so we exclude these cases to obtain mutually exclusive groups.

4.3.1 Foster children

Foster children live in households with none of their biological parents. Following Serra (2009), we distinguish between voluntary and crisis child fostering, i.e., due to the death of both parents. For this reason, we exclude double orphans from our sample[7,8] and consider only children with at least one parent alive. When one or both parents are alive, they self-select in sending a child and choose (among their choice set) the place where their child will be sent. They can maintain a link with their children, looking after them even if they are not co-residing. This can make a considerable difference regarding children's health outcomes and education. According to the results presented by Ainsworth and Filmer (2006) about child fostering in different regions of the world, most single-parent orphans still live with the surviving parent in Sub-Saharan Africa. Thus, when children still have a parent alive and are fostered, we consider this situation as voluntary fostering.
Consequently, we define foster children as individuals aged 6-14 with at least one parent alive but not co-residing with either mother or father in the households surveyed by the 2014 GDHS. To identify this group, relying on declared parent-child co-residence rather than the individual's relationship to the head is preferable. Even if in the 2014 GDHS, the relationship to the head can be defined as "adopted/foster child," only 3.70 of foster children following our definition belong to this category. The category "adopted/foster child" is not used in the interview since the respondent can better describe the link of the foster

[7] Double orphans, i.e., with no parent alive, represent 1.07 percent of all children aged 6-14.
[8] Hampshire et al. (2015) reported that nearly two-thirds of children in kinship care in Ghana have both parents alive, using data from Child Mobility Survey.

child with the head through another category.[9] Indeed, the categories of relationship to the household's head are not mutually exclusive for foster children. For instance, they could also be the head's grandchild or be classified as the head's relative. For this reason, the relationship to the head declarations cannot be used to identify foster children; we rely only on parent-child non co-residence to define this group. We end up with a sample of 1,989 foster children aged 6-14, with complete information on their socio-demographic characteristics, the identity of their caregiver, and educational outcomes. Using sampling weights, they represent 1,827,766 foster children in 2014 in Ghana.

4.3.2 Non-foster children

We classify non-foster children into three groups according to their indirect exposure to child fostering.

4.3.2.1 Biological siblings

Definition To identify sending households, we require information from the parents who have fostered their children out of their household. Using the 2014 GDHS data collected from the women-specific questionnaire, we can define mothers who have fostered children 6-14. All women aged 15-49 fill in information about their children, such as their date of birth, gender, and whether they co-reside with them or not. There are no follow-up questions on the place of residence of these children. We call the non co-resident children of these women the foster-out children.
Thus, sending households are those including a female member aged 15-49 with a foster-out child. Several mothers can live together in the same household; some live with all their 6-14 children some do not. The biological siblings of foster-out children only include those living in a sending household whose mother has a foster-out child, other children living in sending households are excluded from the analysis. The biological siblings have a sibling likely to be hosted in a household

[9]Categories of relationship to the head might not be mutually exclusive for adopted/double-orphan children hosted by relatives for the same reasons. 10.21 percent of double orphans aged 6-14 and surveyed by the 2014 GDHS are declared as adopted/foster children of the head. It could also be the case for wives of the head in polygamous marriages; the first wife often belongs to the category "spouse of the head", but the latter wives could be classified as spouses or as "other relatives".

in Ghana. Nevertheless, we cannot directly link the biological siblings with the foster children observed in their host household at the time of the survey. Finally, 865 children aged 6-14 form the sample of biological siblings (representing 773,166 children in Ghana in 2014).

Exclusion error Our method of identification may result in some biological siblings being excluded from our sample for different reasons. First, our identification of biological siblings relies on the mothers' declarations, i.e., the mothers of the foster children must be alive, between 15 and 49 years old, and live in Ghana. The bracket for mothers' age seems reasonable regarding the age at which a woman can be pregnant. According to the fertility module, the pregnancy probability increases until 32 years old and decreases afterward. But still, women aged over 49 can have a 6-14 child. Among pregnant women at the time of the survey, 15.81 percent are 36 or over and will have a child aged 6-14 after 49 years old. Thus, we may miss children of older mothers. But as women over 49 do not give any information about their birth history, we cannot identify those mothers.
A more significant concern is the mother's death (positively correlated with age). When the mother died, children could live with the father or be fostered out by the latter. Regarding 6-14 children with only their father alive, 52.61 percent are not living with him. It seems more common to foster out a child after a mother's death than stay with the alive father.[10] Also, only 2.04 percent of surveyed 6-14 children have a dead mother and a father alive, so this situation should be infrequent. Given these measurement issues, we are missing some biological siblings of foster-out children and, mechanically, some mothers and fathers who have fostered out children in Ghana. Looking at mothers' declarations, we find 1,690 foster-out 6-14 children. But looking at host households, we find 1,989 foster children with the 2014 GDHS data. The difference between foster-out and foster-in children could be due to the parents' emigration. If parents migrate abroad (especially the mother), we cannot observe the sending household in Ghana as it is dissolved at the time of the survey. Some of the foster children we observed in their host household could be children of emigrants. If their biological siblings migrate abroad with their parents, we cannot account for them and observe their characteristics with our main data source. The difference between the number of foster-out and foster-in children could also

[10] Evans (2004) found that children are significantly more likely to be fostered in other households after a maternal death than following paternal death.

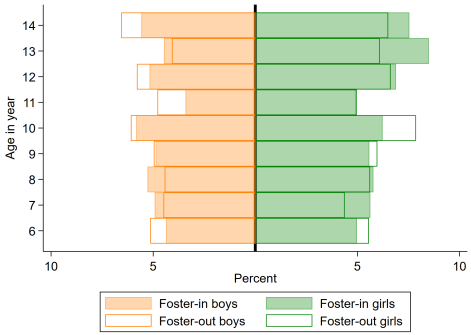
be due to the sampling design of the GDHS 2014; sending households being under-sampled compared to receiving households.

Inclusion error Our proxy of biological siblings of foster children is also subject to inclusion error due to the lack of information on mothers' non co-resident children. As mothers do not declare where their non co-resident children live, we are unsure that foster-out children live in a host household. They could also live in a boarding school or with their father only at the time of the survey.
Regarding children at boarding school, the mothers declare if one of their children under 18 is at boarding school; it is a general question that is not asked for each non co-resident child. There may be an ambiguity between the notion of a household member and boarding schools; the child could be considered a member who is used to live and eat in this household at least during the weekend. However, no women who live with all their children aged 6-14 declare that one child is currently at boarding school. Among women with a foster-out child aged 6-14, only 0.48 percent declared that they had a child at boarding school at the time of the survey. This type of error is not a major concern for our approach.
The foster-out children declared by the mothers may live with their father and not be hosted in a non-parental household. This case exists if the parents are not living in the same household unit, for instance, in case of divorce. However, only 5.47 percent of 6-14 children who have both parents alive do live only with their father. Co-residing only with the father is unusual in Ghana when the mother is still alive and can take care of the children. Nevertheless, it is also possible that the non co-resident children live abroad with their fathers. The 2014 GDHS does not provide any information on migrations abroad of current and previous household members; thus, we cannot quantify this type of inclusion error. Given the high cost of moving abroad and the risks associated with migration, Ghanaian children of emigrants are very likely to stay in their country of origin during the parental absence (Cebotari and Mazzucato, 2016), so children abroad should not be a major concern.

Cross validation In order to check the validity of our definition of foster-out children and their biological siblings, we compare the characteristics of foster-out children with the ones of foster children in their host households. The available characteristics for these two groups

are limited, but we can rely on age and gender. Also, we cannot use sampling weights since, for foster-out children, we only have the representative weight of their mothers. Figure 4.1 presents the percentage of children in the two groups by age and separately by sex. First, we find more girls among foster-in and foster-out children. Second, the results highlight similar age distributions for girls and boys (with a maximum two percentage points of difference per age). These two elements reassure us with respect to the limited incidence of exclusion and inclusion errors. According to these results, we believe that our proxy of foster-out children is credible, and we are confident with our identification of their mothers and biological siblings.

Figure 4.1: Foster-in and foster-out children



Notes: shares and standard errors have been computed without sampling weights.
Source: author's elaboration on the 2014 GDHS.

4.3.2.2 Host siblings

Receiving households are hosting a foster child. They can host children from different parents, i.e., two cousins could be hosted by a grandparent. Unlike non-foster biological siblings, we can unambiguously identify host siblings as they are members of the same household as the foster children. All 6-14 children with at least one parent in a receiving household are considered host siblings. Those children could have a family link with the foster children.
Using 2014 GDHS data, we removed 51 households with a double fostering arrangement from the sample, e.g., receiving and sending house-

holds at the time of the survey, excluding 71 host siblings. Double fostering arrangement is complex; the reasons to host and foster a child are very likely to be interdependent. For instance, it could result in a mutual exchange of skills for allocating children's work. Given the relatively few cases, this living arrangement is unusual and will not be analyzed in this paper. We ended up with a sample of 772 host siblings representing 722,995 Ghanaian children aged 6-14.

4.3.2.3 Other children

Our last sample of children includes all those children living in non-fostering households at the time of the survey, we call them the other children. It concerns 6,919 individuals representing 64.9 percent of 6-14 children in 2014. These children may have been exposed to fostering in the past, either directly (as foster children) or indirectly (as biological siblings in sending households or host siblings in receiving households), but we do not have this information.

4.4 Descriptive statistics

4.4.1 Children's characteristics

Table 4.1: Descriptive statistics of children aged 6-14 by fostering status

	Foster children	Host siblings	Biological siblings	Others
Girl	0.573	0.469	0.496	0.477
	(0.011)	(0.018)	(0.017)	(0.006)
Age	10.285	10.094	9.015	9.874
	(0.058)	(0.094)	(0.087)	(0.031)
Grandchild of the head	0.551	0.062	0.031	0.029
	(0.011)	(0.009)	(0.006)	(0.002)
Child of the head	0.000	0.901	0.907	0.933
	(0.000)	(0.011)	(0.010)	(0.003)
School attendance	0.803	0.859	0.784	0.813
	(0.009)	(0.013)	(0.014)	(0.005)
Schooling years	2.646	2.846	1.645	2.662
	(0.052)	(0.083)	(0.070)	(0.029)
Dead mother	0.059	0.010	0.000	0.013
	(0.005)	(0.004)	(0.000)	(0.001)
Cared by head or spouse of head	0.956	0.926	0.958	0.965
	(0.005)	(0.009)	(0.007)	(0.002)
Schooling years of the caregiver	5.335	5.788	4.751	5.940
	(0.111)	(0.173)	(0.138)	(0.057)
Co-resident mother aged 15-49	0.000	0.695	1.000	0.751
	(0.000)	(0.017)	(0.000)	(0.005)
Observations	1,989	772	865	6,919

Notes: averages and standard errors (in parentheses) have been computed using individual sampling weights; the sample includes children aged 6-14 and excludes those who have a double living arrangement (host siblings and biological siblings).
Source: author's elaboration on the 2014 GDHS.

Table 4.1 provides descriptive statistics of children according to their group. Foster children observed in their host household are more likely to be girls and are aged 10 years on average. Biological siblings are younger on average, suggesting that the probability of being fostered out increases with age. Most host siblings, biological siblings, and other children live in a household headed by their biological parents (the father in 68.6 percent of the cases). Being children of the head is likely to favor the allocation of resources towards them (Roby et al., 2014; Kazianga and Wahhaj, 2017). Regarding foster children, 55 percent live in a household headed by a grandparent, while the remaining 45 percent live in a household headed by another relative (including a sibling, an aunt, an uncle, or a cousin) or by a non-relative of the child. The identification of biological siblings is only made possible by the presence of their mother, aged 15-49, in their household. For other non-foster children, we observe that most of them live with their mothers, and less than 1.5 percent of them have a dead mother. Concerning foster children, 5.8 percent have a dead mother; given the differences with the other children, maternal death is likely to determine child fostering. Having experienced maternal death during childhood is likely to deteriorate the children's educational attainment (Beegle et al., 2006), and foster children are more subject to this negative shock. Almost all children are under the responsibility of the head or a spouse of the head; for non-foster children, the main caregiver is a parent. For foster children, it means that when they join a host household, the parental rights are mainly transferred to the main couple of the household, even if other adults can provide child care. On average, caregivers are slightly more educated in host households than in sending ones. Being taken care of by a more educated adult is positively correlated with investment in children's human capital (Strauss and Thomas, 1995). Notably, foster children complete, on average, one more year of schooling than biological siblings, but this difference could be driven by age since these two groups have a one year age difference. However, children not concerned directly or indirectly by fostering have more educated caregivers (who complete the primary level of schooling on average) and have completed as much schooling as foster children, even if they are younger.

4.4.2 Households' characteristics

We now compare households depending on whether they belong to the sending, receiving, or non-fostering group using the 2014 GDHS data

Table 4.2: Descriptive statistics by household types

	(1)	(2)	(3)	(1)-(2)	(1)-(3)	(2)-(3)
	Sending	Receiving	Not involved			
Nb of foster children hosted	0.000	1.397	0.000	-1.397***	0.000	1.397***
	(0.000)	(0.020)	(0.000)	(0.023)	(0.000)	(0.012)
Presence of a host sibling	0.000	0.314	0.000	-0.314***	0.000	0.314***
	(0.000)	(0.012)	(0.000)	(0.014)	(0.000)	(0.008)
Presence of a biological sibling	0.492	0.000	0.000	0.492***	0.492***	0.000
	(0.015)	(0.000)	(0.000)	(0.013)	(0.008)	(0.000)
Rural	0.578	0.476	0.506	0.102***	0.072***	-0.030*
	(0.015)	(0.013)	(0.008)	(0.020)	(0.017)	(0.016)
Region: Greater Accra	0.136	0.165	0.190	-0.029**	-0.054***	-0.025**
	(0.011)	(0.010)	(0.006)	(0.015)	(0.013)	(0.012)
Headed by a female	0.437	0.491	0.291	-0.054***	0.146***	0.200***
	(0.015)	(0.013)	(0.007)	(0.020)	(0.016)	(0.015)
Head's age	40.323	53.719	44.452	-13.396***	-4.129***	9.267***
	(0.352)	(0.418)	(0.179)	(0.569)	(0.387)	(0.391)
Household size	3.941	5.191	5.311	-1.250***	-1.370***	-0.120*
	(0.071)	(0.066)	(0.035)	(0.098)	(0.077)	(0.071)
Nuclear household	0.794	0.000	0.742	0.794***	0.053***	-0.742***
	(0.012)	(0.000)	(0.007)	(0.011)	(0.015)	(0.012)
Horizontally extended household	0.029	0.083	0.029	-0.054***	0.000	0.054***
	(0.005)	(0.007)	(0.003)	(0.010)	(0.006)	(0.006)
Vertically extended household	0.090	0.585	0.132	-0.495***	-0.042***	0.454***
	(0.009)	(0.013)	(0.006)	(0.017)	(0.011)	(0.012)
Nb of boys aged 5 or under	0.504	0.317	0.456	0.187***	0.048**	-0.139***
	(0.022)	(0.016)	(0.011)	(0.026)	(0.023)	(0.020)
Nb of girls aged 5 or under	0.458	0.311	0.433	0.146***	0.024	-0.122***
	(0.021)	(0.015)	(0.011)	(0.026)	(0.023)	(0.020)
Nb of boys aged 6-14	0.429	0.925	0.946	-0.496***	-0.517***	-0.021
	(0.022)	(0.026)	(0.014)	(0.035)	(0.029)	(0.028)
Nb of girls aged 6-14	0.431	1.097	0.862	-0.665***	-0.431***	0.235***
	(0.022)	(0.023)	(0.013)	(0.032)	(0.028)	(0.026)
Nb of men aged 15-59	0.375	0.371	0.456	0.004	-0.081***	-0.085***
	(0.020)	(0.019)	(0.012)	(0.028)	(0.025)	(0.023)
Nb of women aged 15-49	1.207	0.898	1.168	0.309***	0.040	-0.270***
	(0.016)	(0.024)	(0.012)	(0.031)	(0.024)	(0.025)
Nb of men aged 60 or over	0.046	0.192	0.098	-0.146***	-0.052***	0.094***
	(0.006)	(0.010)	(0.005)	(0.013)	(0.010)	(0.010)
Nb of women aged 50 or over	0.093	0.634	0.231	-0.541***	-0.138***	0.402***
	(0.009)	(0.015)	(0.008)	(0.019)	(0.015)	(0.016)
Wealth index: first quintile	0.173	0.173	0.193	-0.001	-0.020	-0.020
	(0.012)	(0.010)	(0.006)	(0.015)	(0.014)	(0.012)
Wealth index: second quintile	0.264	0.223	0.192	0.041**	0.072***	0.031**
	(0.014)	(0.011)	(0.006)	(0.017)	(0.014)	(0.013)
Wealth index: third quintile	0.261	0.227	0.199	0.034*	0.062***	0.028**
	(0.014)	(0.011)	(0.007)	(0.017)	(0.014)	(0.013)
Wealth index: fourth quintile	0.200	0.203	0.210	-0.003	-0.010	-0.006
	(0.012)	(0.011)	(0.007)	(0.016)	(0.014)	(0.013)
Wealth index: fifth quintile	0.102	0.173	0.206	-0.071***	-0.104***	-0.033***
	(0.009)	(0.010)	(0.007)	(0.014)	(0.013)	(0.013)
Observations	1,054	1,421	3,734	2,475	4,788	5,155

Notes: averages and standard errors (in parentheses) have been computed using household sampling weights; the sample includes households with a mother having a foster-out child (sending), hosting a foster child (receiving), or with a child 6-14 who is neither a biological sibling nor a host sibling of a foster child (not involved; household sending and receiving a foster child are excluded; *** $p<0.01$, ** $p<0.05$, * $p<0.1$.
Source: author's elaboration on the 2014 GDHS.

(Table 4.2). Receiving households host, on average, between one and two foster children, and only 31.4 percent of them also include a host sibling of the same age. Sending households are defined here as households having at least one mother who fostered a child out. 49.2 percent

of these households also include biological siblings of the same age (6-14) staying with their mothers. In terms of location, sending households are much more likely to be found in a rural area than non-fostering households, while the reverse holds for receiving households. This suggests that foster children more frequently depart from rural areas to live in an urban area, but not necessarily the Greater Accra region. Notably, sending households are more likely to be female-headed than non-fostering households. According to Fafchamps and Quisumbing (2008), having a female head signals that a household has experienced a negative shock.

Regarding households' size and composition, sending households are smaller on average than those not involved in child fostering. But they have, on average, more toddler children to take care of and fewer working-age men to financially help raise the kids. Also, they cannot rely on the support from elders since they are less likely to be vertically extended and hence have fewer elders on average than the other households.[11] By contrast, 58.5 percent of receiving households are vertically extended. This reflects the high prevalence of inter-generational child fostering in Ghana. Parents select households with a composition that seems favorable to the allocation of resources towards their foster children. Most foster children are hosted in the households of their grandmother, who is likely to be the household head (looking at the head's gender and age). Even if these households are larger than sending ones, their composition significantly differs; they have fewer children under 5 to care for, and elderly members are available to take care of the 6-14 children.

By contrast, non-fostering households have a significantly higher number of children under 15 to care for. On the one hand, the parents might not select these households since their children could face higher competition for resources if they joined. On the other hand, parents in non-fostering households are more likely to be able to rely on the previous generation to help them in child care. In any case, the decision to foster out a child seems to be partly determined by the intergenerational support the parents can receive either inside or outside the household. Sending households are looking for this support outside their households, while non-fostering households benefit from the co-

[11] We define vertically/horizontally extended households using the relationship to the head; vertically extended households include a parent of the head and a child or a head's grandchild, and horizontally extended households include a sibling of the head.

residence of three generations to avoid sending a foster child.[12] Also, sending households are more likely to belong to the first three quintiles of wealth distribution than receiving ones.[13] However, the receiving households are not the richest on average since households not involved in child fostering have a higher probability of belonging to the fifth quintile of the wealth distribution.

4.5 Relative educational outcomes

This section aims to provide empirical evidence that fostering induces different educational outcomes for children and to highlight the endogeneity and selection issues related to children living arrangements.

4.5.1 Differences between child groups

4.5.1.1 Empirical approach

To assess the impact of child fostering, the ideal settings would be to have an experimental design assigning the foster and biological children to adult caregivers randomly. For obvious ethical reasons, this kind of experiment cannot be implemented. Otherwise, we would like to compare the outcomes of foster children right before they were sent to live in the host household and right after they joined the host household. Such analysis implies having panel data with a short time gap between waves and tracking of children when they move to another household. Since such data is unavailable for Ghana, we study child fostering using the survey data presented in Section 4.2. We compare foster children to three groups of non-foster children which are imperfect counterfactuals since they are subject to selection bias and indirect effects. The first counterfactual group, mainly used in the child fostering literature, includes the host siblings, i.e., children living with parents in receiving households. The second is composed of the biological siblings of foster children who remain with their mothers. The last one includes children whose households were not involved in child fostering at the time

[12] Ruggles and Heggeness (2008) noticed that inter-generational co-residence is declining in developing countries. The prevalence of foster children at the grandparents' place could be an alternative to multigenerational family households.

[13] The wealth index is based on the housing characteristics and the assets owned by the household. It is computed by the data producer and made available in the 2014 GDHS data.

of the survey. Using the following specification, we provide descriptive evidence that the traditional counterfactual used in the literature has a non-negligible influence on our perception of the impact of child fostering on human capital.

$$\begin{aligned} y_i =& \alpha_1 \mathrm{F}_i + \alpha_2 \mathrm{H}_i + \alpha_3 \mathrm{S}_i + \beta \mathrm{Z}_i + d_i^{\text{age}} + d_i^{\text{sex}} \\ &+ d_i^{\text{age}} * d_i^{\text{sex}} + d_i^{\text{rural}} + d_i^{\text{region}} + \epsilon_i, \end{aligned} \tag{4.1}$$

for each child i, we regress educational outcomes y_i on dummy variables indicating the child's group and a large set of control (Z_i). 10,545 children aged 6-14 are divided into four groups following the procedure exposed in Section 4.3: foster children (F), host siblings (H), biological siblings (S), and others (the baseline group). The relative differences in educational outcomes can be observed respectively through the sign and significance of $\alpha_1 - \alpha_2$, $\alpha_1 - \alpha_3$, and α_1. We concentrate on two educational outcomes available for all children in our sample: school attendance during the current school year at the time of the survey and the total number of schooling years completed (averages presented in Table 4.1).

We implement flexible specifications by adding multiplicative variable dummies of children's age and sex to avoid the inclusion of gender discrimination. The vector of control variables Z_i includes demographic dummies capturing the household composition at the time of the survey: the number of individuals per gender and age range,[14] the gender and the age of the household head. These control variables account for the demographic determinants of fostering in or out a child (Ainsworth, 1996; Akresh, 2009) and the heterogeneity of household composition presented in Table 4.2. We also include wealth quintile dummies and caregivers' education to control for differences in the ability to invest in human capital, and preferences in child education (Strauss and Thomas, 1995).

Given the spatial distribution of the households presented in Table 4.2, child fostering may be correlated with child migration from rural to urban areas. Estimations are produced without and with the fixed effects for the place of residence at the time of the survey (d_i^{rural} and d_i^{region}).

[14] We distinguish toddlers aged 0-5 by gender, girls, and boys aged 6-14, women aged 15-49 and those over 49, and men aged 15-59 and those over 59. We do not apply the same age range for adult men and women, following the distinction made by the 2014 GDHS based on fertile age.

4.5.1.2 Results

Table 4.3: Relative educational outcomes

	(1)	(2)	(3)	(4)	(5)
	Dep. var.: School attendance				
Foster children	-0.008	0.016	0.012	0.011	0.004
	(0.015)	(0.016)	(0.016)	(0.016)	(0.016)
Host siblings	0.047**	0.083***	0.080***	0.075***	0.067***
	(0.021)	(0.022)	(0.022)	(0.022)	(0.021)
Biological siblings	-0.028	-0.031	-0.020	-0.016	-0.014
	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)
Adjusted R^2	0.004	0.033	0.039	0.045	0.118
Average outcome (Others)	0.813	0.813	0.813	0.813	0.813
Differences					
Foster children - Host siblings	-0.055***	-0.068***	-0.067***	-0.064***	-0.063***
Foster children - Biological siblings	0.020	0.047*	0.032	0.027	0.019
	Dep. var.: Schooling years				
Foster children	-0.316***	-0.280***	-0.386***	-0.394***	-0.379***
	(0.051)	(0.058)	(0.054)	(0.053)	(0.053)
Host siblings	0.025	0.233***	0.089	0.064	0.066
	(0.067)	(0.067)	(0.062)	(0.061)	(0.061)
Biological siblings	-0.430***	-0.447***	-0.219***	-0.197***	-0.188***
	(0.070)	(0.070)	(0.070)	(0.068)	(0.068)
Adjusted R^2	0.634	0.657	0.693	0.699	0.701
Average outcome (Others)	2.662	2.662	2.662	2.662	2.662
Differences					
Foster children - Host siblings	-0.341***	-0.513***	-0.475***	-0.459***	-0.444***
Foster children - Biological siblings	0.114	0.167*	-0.166**	-0.197**	-0.190**
Observations	10,545	10,545	10,545	10,545	10,545
Dummies:					
Age x sex	Yes	Yes	Yes	Yes	Yes
Household composition	No	Yes	Yes	Yes	Yes
Wealth quintile	No	No	Yes	Yes	Yes
Caregiver's schooling years	No	No	No	Yes	Yes
Rural area	No	No	No	No	Yes
Region	No	No	No	No	Yes

Notes: estimations have been produced using individual sampling weights; sample includes children aged 6-14; *** p <0.01, ** p <0.05, * p <0.1.
Source: author's elaboration on the 2014 GDHS.

Table 4.3 presents the results of the estimations gradually integrating control variables. All children aged 6-14 should typically be enrolled in primary or secondary school. However, in 2014 Ghana, there were still children who did not have access to education.

Comparing Column (1) with Column (2), specifications differ in accounting or not for the composition of the households. Children's living arrangement has substantial consequences on their ability to enroll in school and succeed in their educational career. Accounting for household composition, host siblings have a higher probability of being enrolled than other groups of children. Host siblings have 8.3 percentage points higher probability (α_2) to attend school than children living in households not involved in child fostering and 6.8 percentage points

more likely to attend school than foster children ($\alpha_1 - \alpha_2$). This outcome could be a direct result of the factor that caused child fostering. If child fostering aims to provide better access to education, parents should choose households with a higher ability to support child education. Having children currently enrolled at school means that the household highly values child education and offers a friendly environment to study. The educational outcomes of host siblings are likely to play a role in the inter-household selection of receiving households. From another point of view, when the caregivers emphasize more on the school performances of their biological children over the ones of the foster children, they can allocate child labor and domestic tasks to foster children allowing the biological children to dedicate more time to study. Since we observe host siblings' outcomes after the child fostering, they might be endogenous to this practice, and we cannot disentangle these two mechanisms.

Accounting for the ability to invest in child education through variables controlling for household wealth and caregivers' education, foster children and biological siblings have the same probability of attending school (Column (4)). This result is also observed by Akresh (2004), who used a specific survey design in Burkina Faso —using large-scale survey data with a proxy of the non-foster biological siblings leads to the same conclusion.

The foster children and the biological siblings have completed fewer schooling years than other groups of children. Relative to the non-foster biological siblings, the foster children are older on average (Table 4.1); mechanically, even if they started their education at the same age, foster children should have completed more years of schooling than their biological siblings. However, in Column (2) of Table 4.3, foster children have completed one more quarter of schooling year than biological siblings, even after controlling for age and gender. Nevertheless, this difference turns negative, adding control variables for household wealth. Also, as observed in Table 4.1, foster children benefit from more educated caregivers than siblings who remain with the mother; controlling for this difference increases the gap in schooling years between both groups. We have also noticed in Table 4.2 that the foster children mostly come from rural areas where they should have received part of their education and integrated urban host households. It is reasonable to assume that schools might be less accessible and that children are expected to participate more in household production and chores in rural areas (Fafchamps and Wahba, 2006). Thus controlling

for caregivers' education and the household location at survey time does not allow to account for the background of foster children and is not favorable to their educational outcomes compared to the biological siblings.
Our groups' definitions also favored biological siblings over the other groups of children regarding educational outcomes. Indeed, our sample definition of biological siblings relies on the co-residence with the mother. The absence of the mother can have significant consequences for children's development. To avoid the asymmetry in our sample definitions regarding the survival of the mother and the mother-child co-residence, we process a robustness analysis of the presented results accounting only for non-foster children with a co-resident mother (aged 15-49) and foster children with a living mother. The results (Appendix Table C.3) are robust to the sample restriction, and the interpretation remains stable.

4.5.2 Selection issues

According to the data constraints, our empirical approach does not allow us to isolate the impact of child fostering on educational outcomes since this practice is likely to have indirect consequences for host and biological siblings. Also, as foster children are not picked randomly, we investigate some selection issues related to this practice.

4.5.2.1 Mothers' characteristics

By examining their mothers' characteristics, we get more information on the motive for fostering and foster children's family background. 1,261 women aged 15-49 have a non co-resident child aged 6-14 likely to have been fostered out of the parental household. Among them, 613 also have a co-resident child aged 6-14.[15] The remaining ones have either one (or several) co-resident child outside the 6-14 age range, or no child co-residing with them.
Table 4.4 compares the whole sample of mothers having a foster-out child aged 6-14 with the 3,147 mothers who have not fostered any of their 6-14 children (they are the mothers of the host siblings and the other children presented in Table 4.1). There are significant differences between the two sub-samples. Mothers of the first group are younger

[15] They are the mothers of foster-out children and the biological siblings; see Appendix Table C.2 for statistics on this sub-sample of mothers.

Table 4.4: Descriptive statistics of mothers by fostering arrangement

	(1)	(2)	(1)-(2)	
	Fostering out a 6-14 child	Not fostering out		
Age	34.560	36.575	-2.015***	-0.428**
	(0.189)	(0.118)	(0.223)	(0.170)
Schooling years	5.110	5.762	-0.652***	-0.307**
	(0.116)	(0.081)	(0.149)	(0.130)
Nb of births	4.238	4.187	0.051	0.775***
	(0.061)	(0.035)	(0.068)	(0.060)
Age at first birth	19.227	20.356	-1.129***	-0.731***
	(0.107)	(0.074)	(0.137)	(0.149)
Months since last birth	58.288	59.945	-1.657	-5.066***
	(1.292)	(0.831)	(1.561)	(1.178)
Nb of boys under 15 alive	0.809	0.810	-0.001	0.114***
	(0.011)	(0.007)	(0.013)	(0.012)
Nb of girls under 15 alive	0.820	0.766	0.054***	0.181***
	(0.011)	(0.008)	(0.014)	(0.012)
Muslim	0.168	0.158	0.010	0.031**
	(0.011)	(0.007)	(0.012)	(0.013)
Christian	0.765	0.779	-0.013	-0.031**
	(0.012)	(0.007)	(0.014)	(0.014)
Akan	0.508	0.485	0.023	0.000
	(0.014)	(0.009)	(0.017)	(0.015)
Widowed	0.044	0.041	0.003	-0.000
	(0.006)	(0.004)	(0.007)	(0.008)
Divorced/separated	0.159	0.084	0.074***	0.034***
	(0.010)	(0.005)	(0.010)	(0.011)
In polygamous union	0.151	0.151	0.000	0.027**
	(0.010)	(0.006)	(0.012)	(0.013)
In monogamous union	0.579	0.688	-0.109***	-0.062***
	(0.014)	(0.008)	(0.016)	(0.015)
Co-resident partner/husband	0.576	0.690	-0.115***	-0.011
	(0.014)	(0.008)	(0.016)	(0.007)
Have been married/in union more than once	0.388	0.203	0.186***	0.170***
	(0.014)	(0.007)	(0.014)	(0.016)
Have a child out of wedlock	0.267	0.180	0.086***	0.049***
	(0.012)	(0.007)	(0.014)	(0.015)
Marital instability/child out of wedlock	0.719	0.428	0.291***	0.219***
	(0.013)	(0.009)	(0.016)	(0.017)
Observations	1,261	3,147	4,408	4,408
Dummies:				
Household composition	No	No	No	Yes

Notes: average and standard errors (in parentheses) have been computed using individual sampling weights; the sample includes women who have a child aged 6-14 at survey time; *** $p<0.01$, ** $p<0.05$, * $p<0.1$.
Source: authors' elaboration on the 2014 GDHS.

on average and got their first child at an earlier age, are slightly less educated, and have significantly more girls to take care of compared to mothers of the second group. This last result is in line with Akresh (2009), who finds that having more girls is correlated with sending out a child. These findings are consistent with the figures presented in Table 4.2, i.e., more girls are in sending households than in other types of households. In order to account for household composition, the fourth column of Table 4.4 presents the differences between groups of mothers including control variables for demographic observable at the household level and characteristics of the household head. Accounting for these observables, sending mothers are 3.1 percentage points more likely to be Muslim, but there is no significant difference regarding ethnicity.
All women interviewed declared their current marital status, if they

are in a union, a follow-up question is asked about the co-residence with their partner. They also report information about their marital life, such as the date of their first union and if they have experienced several marriages. Interestingly, mothers fostering out a child at survey time are more likely to be divorced, to have been married several times, or to have a child born before their first union. By contrast, mothers living with all their children aged 6-14 are more likely to be in a monogamous union.[16] We built a dummy variable indicating whether the women have experienced a marital breakdown (divorce, separation, widowhood) or have a child born before their first union. Mothers who have sent out a child are 21.9 percentage points more likely to have experienced this kind of instability. Dissolution of the parental union acts as a negative shock for children's expenditures and educational attainment, which have long-term consequences for children (Keith and Finlay, 1988; Amato and Keith, 1991). For those who co-reside with their mothers, we find a negative and significant impact of the mother's marital instability on the probability of attending school and the number of schooling years completed (Appendix Table C.5). Mothers' marital instability is a driver of child fostering (Grant and Yeatman, 2014), if foster children integrate a more stable family environment with more resources, they may benefit from child fostering.

4.5.2.2 Intra-siblings selection

Parents deciding to foster a child will likely select one non-randomly. Thus we investigate the differences between children who left and those who remain with their mothers among siblings. Thanks to the information provided by women on each of their children, we can compare the characteristics of siblings aged 6-14 depending on whether they co-reside with their mother or not. The available characteristics are limited in this latter case, but as shown by Table 4.5, there are nevertheless significant differences between the two groups, even including mothers' fixed effects. First, foster-out children are more likely to be girls (which is coherent with previous findings in Table 4.1) and are, on average, two years older than their biological siblings.
Second, child fostering correlates with being the eldest among the siblings, i.e., foster-out children are 18 percentage points more likely to be their mother's first-born child. If child fostering aims to provide bet-

[16] This finding is coherent with results of Beck et al. (2015) arguing that polygamous families are more likely to engage in child fostering.

Table 4.5: Selection of siblings

	(1)	(2)	(1)-(2)	
	Foster-out children	Biological siblings		
Age	11.089	9.014	2.075***	2.188***
	(0.087)	(0.087)	(0.125)	(0.142)
Girl	0.571	0.496	0.075***	0.090***
	(0.019)	(0.017)	(0.025)	(0.028)
Multiple births	0.066	0.055	0.011	0.012
	(0.009)	(0.008)	(0.012)	(0.010)
Mother's first born	0.267	0.086	0.182***	0.181***
	(0.017)	(0.010)	(0.018)	(0.020)
Born out of wedlock	0.102	0.052	0.049***	0.047***
	(0.012)	(0.008)	(0.013)	(0.008)
Observations	684	865	1,549	1,549
Fixed effects:				
Mother	No	No	No	Yes

Notes: average and standard errors (in parentheses) have been computed using mother sampling weights; the sample includes 6-14 children fostered-out or remaining in the maternal household; *** $p<0.01$, ** $p<0.05$, * $p<0.1$.
Source: authors' elaboration on the 2014 GDHS.

ter living conditions, it might be linked to parents' emphasis on their primogeniture (de Haan, 2010; Morduch, 2000). By crossing the date of the mother's first union with the date of all births, we are able to create a dummy equal to one if a child was born before the date of his mother's first union (or if his mother has never been in a union). Unfortunately, the 2014 GDHS does not provide information relative to the current marriage of the mother, so when mothers have experienced several marriages, we cannot identify children born from a previous union. Nevertheless, we note that foster-out children are more likely to be born before their mother's first marriage than their biological siblings (and it is likely to be a lower bound as 38.8 percent of mothers fostering out have experienced several unions). Moreover, the share of foster-out children born out of wedlock is higher when they don't have biological siblings of their age (Appendix Table C.4). This result could be because men are sometimes reluctant to raise the children their wives had from a previous union or outside marriage.

4.5.3 Negative shock on parental union

On average, 72 percent of foster-out children have a mother who has experienced marital instability or had a child out of wedlock (Appendix Table C.4). The breakdown of the parental union is a correlate of child fostering. Such an event represents a negative shock on children's education (Appendix Table C.5). In this case, fostering in a more stable

environment might mitigate the impacts of such a negative shock. In order to account for selection issues into child fostering at the mother and child level, we would like to add a control variable of mothers' marital instability, estimating Equation 4.2.

$$\begin{aligned} y_i =& \alpha_1 \mathrm{F}_i + \alpha_2 \mathrm{H}_i + \alpha_3 \mathrm{S}_i + \beta \mathrm{Z}_i + \gamma \mathrm{M}_i + d_i^{\text{age}} + d_i^{\text{sex}} \\ &+ d_i^{\text{age}} * d_i^{\text{sex}} + d_i^{\text{rural}} + d_i^{\text{region}} + \epsilon_i, \end{aligned} \tag{4.2}$$

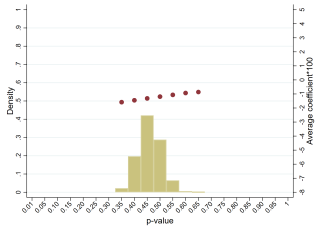
M_i is a dummy variable equal to one if the mother has experienced widowhood, divorce/separation, has been in union with different partners, or has a child out of wedlock. For non-foster children, the variable is only defined for those who have a co-resident mother aged 15-49, so we exclude children having a dead mother or whose mother's age is out of age brackets. However, no question is asked about the parental union when we observe foster children in their host household. In order to define this variable for foster children, we restrict the sample to those having a living mother and we randomly pick 72 percent of children in this group to assign 1 to the dummy variable M_i. Then we estimate α_1, $\alpha_1 - \alpha_2$, and $\alpha_1 - \alpha_3$ and their respective significant level after including the considered dummy variable. Figures 4.2 and 4.3 present the results of this empirical approach repeated 1,000 times to estimate the foster children's relative difference in school attendance and in schooling years respectively.

When we account for the marital life of the mothers, there is no more significant difference in school attendance between foster children and their host siblings. 36 percent of host siblings experienced mothers' marital instability, so most of them benefit from a stable family environment. This advantage explains the negative and significant difference between foster children and their host siblings found in Table 4.3. When children stay with their mother after marital instability, this situation negatively affects school enrollment. Moving to another household might be a way to escape the negative impact of parental union dissolution.

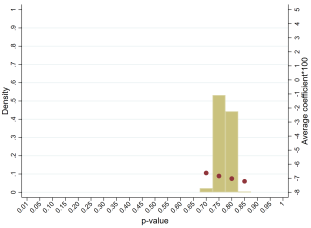
Regarding the number of schooling years, foster children completed, on average, as many years as children not involved in child fostering (other children). However, the negative differences with the host and biological siblings remain stable and significant with 5 percent confidence level. Even controlling for mothers' marital life, foster children achieved fewer schooling years than these two groups; fostering cannot remove differences that emerged before child fostering. However

Figure 4.2: Relative school attendance of foster children, accounting for mothers' marital life

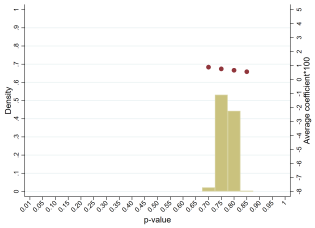
(a) Others (α_1)



(b) Host siblings ($\alpha_1 - \alpha_2$)



(c) Biological siblings ($\alpha_1 - \alpha_3$)

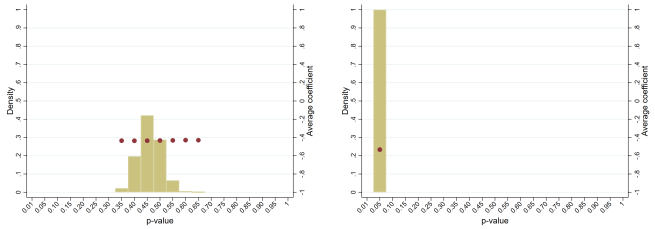


Notes: estimations have been produced using individual sampling weights; the sample includes children aged 6-14; p-value densities and average coefficients are computed from 1,000 estimations of Equation 4.1 with Z_i including age and gender dummies, their interaction, household composition, wealth quintile, caregivers' schooling years, household location dummies, and a dummy equal one if the mothers have experienced marital instability/child out of wedlock (the dummy equal one for 72 percent of foster children selected randomly).
Source: author's elaboration on the 2014 GDHS.

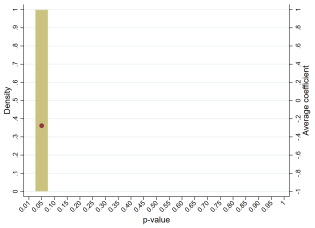
as explained above, completed schooling years depend on the previous situation of foster children. When we replicate Column (1) of Table 4.3 adding the dummy on mothers' marital life (Appendix Figure C.3) without controlling for caregivers' education and location, the difference between foster children and their host siblings is only significant with 10 percent confidence level. Concerning the difference between foster children and biological siblings, it even turns positive.

Figure 4.3: Relative schooling years of foster children, accounting for mothers' marital life

(a) Others (α_1) (b) Host siblings ($\alpha_1 - \alpha_2$)



(c) Biological siblings ($\alpha_1 - \alpha_3$)



Notes: estimations have been produced using individual sampling weights; the sample includes children aged 6-14; p-value densities and average coefficients are computed from 1,000 estimations of Equation 4.1 with Z_i including age and gender dummies, their interaction, household composition, wealth quintile, caregivers' schooling years, household location dummies, and a dummy equal one if the mothers have experienced marital instability/child out of wedlock (the dummy equal one for 72 percent of foster children selected randomly).
Source: author's elaboration on the 2014 GDHS.

4.6 Discussion

We provide evidence that the parental union's stability raises selection issues regarding child fostering, which impacts our perception of fostering's consequences on education. Nevertheless, there are also inter-household selection issues that we cannot account for but are worth investigating.

4.6.1 Host household selection

Grandparenting As observed in Table 4.1, most foster children join their grandparents' households. Parents select households to host their children among their choice set at a given time. Foster children living in the household of their grandparents are found to have different characteristics from the others (Appendix Table C.7). They are younger on average, which correlates with the survival and the availability of grandparents to take care of them. Also, there is a significant important difference of 28.3 percent in the probability of co-residing with a host sibling from the same age group between foster grandchildren and other foster children. Household composition influences the intra-household allocation of resources, especially towards children (Bargain et al., 2014). Children from the same age group compete to capture household resources for child rearing; at constant revenue, living in a household with more children mechanically decreases the share of revenue allocated to foster children.

Wealth and money transfers Parents are very likely to non-randomly select the host household for their child depending on the motive for fostering and the foster child's characteristics. One driver of their choice could be the wealth of the receiving households if they want to favor expenditures for their foster child. Also, according to Poeze et al. (2017), in Ghana, grandmothers are the preferred caregiver in the case of parental migration. Then the receipt of money transfers in host households might indicate that children are fostered because of parental migration. Unfortunately, there is no information on expenditures and transfers in the 2014 GDHS. Thus to investigate this issue, we exploit information about wealth and inter-household transfers provided by the Ghana Living Standard Survey 6 data collected in 2012-2013 (see Appendix C.2 for more details). With this data source, we can also identify children not co-residing with any parent, their receiving households, and their relationship with the head of the host household.[17] We differentiate between households hosting a foster grandchild and the other receiving households. We use total expenditure per capita on non-food items over the last year (in GHS) and the amount of transfers received and sent over the 12 months before the survey (in GHS).
According to the figures in Table 4.6, host households headed by a

[17] Receiving households are similar in both survey data regarding household composition and location (see Appendix Table C.8).

Table 4.6: Descriptive statistics by host household head

	(1)	(2)	(1)-(2)
	Grandparent receiving households	Other receiving households	
	All households		
Household expenditure per capita	1,683.043	1,874.231	-191.188***
	(36.430)	(44.647)	(58.284)
Amount of remittances received per capita	91.251	55.341	35.911**
	(15.246)	(8.001)	(16.914)
Net amount of remittances received per capita	63.195	-0.754	63.949***
	(15.318)	(11.601)	(19.094)
Observations	880	829	1,709
	Urban households		
Household expenditure per capita	2,019.183	2,204.783	-185.600*
	(63.348)	(70.191)	(99.476)
Amount of remittances received per capita	142.853	67.974	74.879**
	(35.626)	(13.615)	(34.850)
Net amount of remittances received per capita	123.359	15.833	107.526***
	(35.107)	(15.448)	(35.513)
Observations	344	398	742
	Rural households		
Household expenditure per capita	1,403.185	1,399.726	3.459
	(39.136)	(43.934)	(58.502)
Amount of remittances received per capita	48.290	37.206	11.084
	(3.849)	(7.298)	(7.925)
Net amount of remittances received per capita	13.104	-24.566	37.670**
	(6.189)	(17.682)	(17.684)
Observations	536	431	967

Notes: average and standard errors (in parentheses) have been computed using household sampling weights; the sample includes receiving households; *** $p<0.01$, ** $p<0.05$, * $p<0.1$.
Source: authors' elaboration on the GLSS6.

grandparent of foster children spend less on average than other caregivers. This assertion is verified out of rural areas, meaning that the identity of the host household head makes more difference in urban areas regarding the amount of resources available to care for foster children. The net amount of transfers received is the difference between the money received and the money sent by household members over the past year. We include internal transfers in Ghana and transfers from abroad to account for parental migration.[18] The net amount of transfers received allows accounting for redistribution. In particular, if migrants centralize their remittances to a person in charge of redistributing the money to different households of the network.

Households headed by grandparents are undoubtedly net recipients of transfers, whereas other host households are net senders in general. The grandparents may receive money from the parents of the foster children, i.e., their children. The GLSS6 data gives information on the relationship between the sender and the household's head. Indeed, 39.1 percent of grandparent households received money from a head's child (compared to 4.1 percent for other fostering arrangements).[19] However, we cannot ensure that the head's child is a parent of foster children; it

[18] 4.2 percent of households received money from abroad over the 12 months before the survey.

[19] This transfer pattern associated with grandparent fostering has also been observed by Marazyan (2011) in the case of foster Indonesian children.

could be an uncle, especially if cousins are fostered at the grandparents' place. Hosting a child can be a source of additional income. According to these findings, we cannot assume that the household income is not impacted when a foster child leaves or enter a household.[20]

Issues for child expenditures Depending on the time spent by foster children in their host household, the measures of expenditures and transfers are very likely to be endogenous to child fostering. Also, we cannot be sure that these transfers occurred after child fostering; children could be strategically hosted in households that received financial support or that are linked to migrants. Nevertheless, money transfers could encourage allocating resources to foster children, especially if there is a tacit contract between parents and caregivers, including this clause. It means that several households could provide for the child's needs (Angelucci et al., 2018; Witoelar, 2013). The parents of foster children might send transfers to the host households, but they can also directly finance child expenditure as school fees or health services. Non-foster children could also receive financial support from the extended family to invest in education (Angelucci et al., 2010). The GLSS6 reports individual expenditures on health and education. However, for foster children, it only includes expenditures made by the host household. According to De Vreyer and Lambert (2021), family members out of the children's households can contribute to child expenditure. Thus, child expenditures will likely be underestimated without accounting for external funding sources. Especially if the children entered the household recently at the time of the survey, for new members, the retrospective period to measure individual expenditures is likely longer than the time they spend in the household.[21]

[20] It means that models assuming a constant household budget before and after the arrival of a child, as the one presented by Deaton (1997) to estimate discrimination between children, cannot be applied to foster children (Arndt et al., 2006; Penglase, 2021).

[21] For instance, a new member entered the last month into the household and planned to stay one year, but at the time of the survey, the respondent declared the expenditures made for this individual over the last 12 months. According to the survey constraints, the respondent will only declare the expenditures made over the last month when the individual was a member of this household.

4.6.2 Heterogeneous children's outcomes

The caregiver's identity can significantly influence the ability of foster children to cope with parental absence (Cox, 2007). Moreover, the presence of a grandparent (especially a grandmother) is expected to benefit the grandchildren (Duflo, 2003; Edmonds et al., 2005; Talamas Marcos, 2022). According to this, we expect those foster children to have better educational outcomes when their grandparents host them. In order to test this assumption, we implement the following simple specification for the sample of foster children.

$$\begin{aligned} y_i =& \alpha \mathrm{G}_i + \beta \mathrm{Z}_i + d_i^{\text{age}} + d_i^{\text{sex}} \\ &+ d_i^{\text{age}} * d_i^{\text{sex}} + d_i^{\text{rural}} + d_i^{\text{region}} + \epsilon_i, \end{aligned} \tag{4.3}$$

The dummy G_i is equal to one if the foster children belong to a household headed by a grandparent. We estimate the following specification using the same educational outcomes y_i as in Table 4.3 with the 2014 GDHS data. Caregivers' involvement in education is also negatively correlated with child work. Whether paid or unpaid, labor time reduces the time available for study and can affect the physical development and health of children under 14. Child fostering has long been denounced as a form of exploitation of children for domestic work. Since we can also identify foster children using GLSS6 (less precisely, as we cannot exclude double orphans), we can also use children's outcomes in this data. We focus on the number of hours of work (paid, unpaid, family help) and the number of hours dedicated to household chores,[22] both outcomes are measured over the week preceding the interview.
The results from the 2014 GDHS presented in Table 4.7 suggest that there is no significant heterogeneity in school attendance among foster children according to their family link with the host household head (we find similar results using GLSS6; see Appendix Table C.9). However, in Column (6), the foster children who are living in the household headed by their grandparents have completed significantly more schooling years than the other foster children.
However, the number of completed schooling years is also determined by the situation of foster children before child fostering, i.e., when they were in their parents' households. It could be that the most talented foster children are preferably hosted by their grandparents. While the labor outcomes defined with GLSS6, hours worked and hours of chores,

[22] Household chores cover various domestic tasks such as collecting firewood and water, eldercare, childcare, cooking, and cleaning.

Table 4.7: Educational outcomes of foster children, with the 2014 GDHS data

	(1)	(2)	(3)	(4)	(5)
	Dep. var.: School attendance				
Foster grandchildren	-0.026	-0.014	-0.013	-0.015	0.013
	(0.025)	(0.034)	(0.033)	(0.033)	(0.034)
Adjusted R^2	0.009	0.097	0.099	0.115	0.186
Average outcome (not grandchildren)	0.810	0.810	0.810	0.810	0.810
	Dep. var.: Schooling years				
Foster grandchildren	0.181**	0.151	0.197	0.232*	0.241**
	(0.087)	(0.119)	(0.120)	(0.119)	(0.118)
Adjusted R^2	0.600	0.618	0.644	0.647	0.647
Average outcome (not grandchildren)	2.982	2.982	2.982	2.982	2.982
Observations	1,989	1,989	1,989	1,989	1,989
Dummies:					
Age x sex	Yes	Yes	Yes	Yes	Yes
Household composition	No	Yes	Yes	Yes	Yes
Wealth quintile	No	No	Yes	Yes	Yes
Caregiver's schooling years	No	No	No	Yes	Yes
Rural area	No	No	No	No	Yes
Region	No	No	No	No	Yes

Notes: estimations have been produced using individual sampling weights; sample includes foster children aged 6-14; *** $p<0.01$, ** $p<0.05$, * $p<0.1$.
Source: author's elaboration on the 2014 GDHS.

Table 4.8: Labor outcomes by fostering arrangement

	(1)	(2)	(3)	(4)	(5)
	Dep. var.: Nb of hours worked				
Foster grandchildren	-1.193**	-2.124**	-2.545***	-2.729***	-2.679***
	(0.537)	(0.829)	(0.820)	(0.809)	(0.790)
Adjusted R^2	0.036	0.088	0.106	0.108	0.124
Average outcome (not grandchildren)	5.258	5.258	5.258	5.258	5.258
	Dep. var.: Nb of hours of chores				
Foster grandchildren	0.459	-0.338	-0.479	-0.567	-0.613
	(0.348)	(0.411)	(0.417)	(0.417)	(0.407)
Adjusted R^2	0.189	0.245	0.251	0.252	0.272
Average outcome (not grandchildren)	7.079	7.079	7.079	7.079	7.079
Observations	2,532	2,532	2,532	2,532	2,532
Dummies:					
Age x sex	Yes	Yes	Yes	Yes	Yes
Household composition	No	Yes	Yes	Yes	Yes
Wealth quintile	No	No	Yes	Yes	Yes
Average adults' education level	No	No	No	Yes	Yes
Rural area	No	No	No	No	Yes
Region	No	No	No	No	Yes

Notes: estimations have been produced using individual sampling weights; sample includes foster children aged 6-14; *** $p<0.01$, ** $p<0.05$, * $p<0.1$.
Source: author's elaboration on the GLSS6.

are measured over the week before the interview and is indicative of the situation of foster children in their host household only.[23] According

[23]Children could also be selected to be fostered because they were used to working

to the results presented in Table 4.8, foster grandchildren spent as much time as other foster children on household chores but worked less. They worked 2 hours and 42 minutes less than the other foster children the week before their interview. It represents 50.9 percent less time dedicated to child labor. This difference might be explained by the motive to host a foster child: reallocating child labor among a network or educational purpose. Grandparents might be less demanding for child labor than other receiving households.

4.7 Conclusions

This paper has built several imperfect counterfactual groups of foster children: host, biological siblings, and children not involved in child fostering. We defined a coherent proxy for biological siblings remaining in the parental household, which overcomes the absence of specific questions about fostering in large-scale representative surveys and could be replicated for other contexts. We proved that our perception of the welfare implications of child fostering differs according to the reference group considered. If foster children have lower school attendance compared to their host siblings, this is not the case when we compare them to biological siblings. Moreover, the receiving households are not selected randomly by the parents, and those who foster a child for educational purposes are likely to select households with well-educated children.

Our analysis highlights the different selection issues related to the study of the living conditions of foster children. In Ghana, rural households with many children under 15 are very likely to foster out a child. The demographic composition of sending households implies that mothers have to bear the burden of child care alone and that there are few adult members to support them. The birth and marital history of the mothers are essential correlates of child fostering: women having experienced single-motherhood or marital instability are more likely to send a child. According to these findings, child fostering could be a solidarity mechanism driven by the need to rely on extended family to provide for the children and not systematically leading to child exploitation. Following the dissolution of the parental union, being fostered may mitigate the negative impact of this shock on school enrollment. Especially when

and providing for domestic tasks in their parental household. But the measure we use is not determined by their labor outcomes before the child fostering.

the children are hosted in the household of their grandparents, they face less competition to access resources and child care and dedicate about 50 percent less time to work than other foster children. Child fostering can lead to a more efficient resource allocation towards children in sending and receiving households.

We also provided evidence that child fostering and the choice of the receiving households are correlated with inter-household money transfers. Our analysis aimed to put forward the complexity of this practice and the analytic issues related to its study. Child fostering influences the allocation of resources among households from a same network. The link between the sending and receiving households cannot be ignored and is likely to directly or indirectly determine the children's life path. The foster grandchildren may include many children left behind by migrant parents (Poeze et al., 2017) likely to benefit from remittances. We cannot identify them through the data sources used in this paper. If migrants have different preferences than other parents for child education, being hosted by grandparents could correlate with parents' educational investment and ability to send remittances. To increase our knowledge of the implications of migration in child fostering in Ghana, survey designs questioning the location of absent parents, and the transfers they send to children would be necessary.

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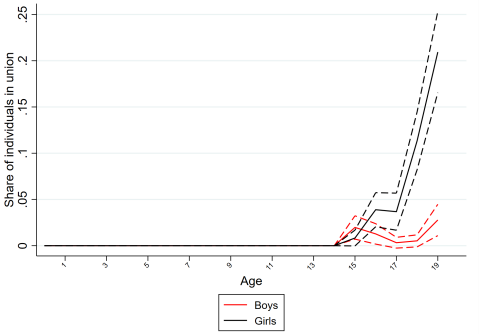
Appendix to Chapter 4

C.1 Additional results

Figure C.1: Individuals in union (married or living with a partner) by age



Notes: shares and standard errors have been computed using individual sampling weights.
Source: author's elaboration on the 2014 GDHS.

Table C.1: Descriptive statistics of children aged 6-14, by fostering status and gender

	Foster children	Host siblings	Biological siblings	Others
		Boys		
Age	10.002	9.982	9.080	9.951
	(0.088)	(0.129)	(0.123)	(0.043)
Grandchild of the head	0.614	0.061	0.027	0.028
	(0.016)	(0.012)	(0.008)	(0.003)
Child of the head	0.000	0.908	0.926	0.935
	(0.000)	(0.014)	(0.013)	(0.004)
School attendance	0.819	0.862	0.783	0.815
	(0.013)	(0.017)	(0.020)	(0.006)
Schooling years	2.451	2.725	1.631	2.684
	(0.077)	(0.112)	(0.102)	(0.039)
Dead mother	0.055	0.006	0.000	0.017
	(0.008)	(0.004)	(0.000)	(0.002)
Cared by head or spouse of head	0.958	0.929	0.966	0.964
	(0.007)	(0.013)	(0.009)	(0.003)
Schooling years of the caregiver	4.995	5.868	4.650	5.921
	(0.165)	(0.246)	(0.201)	(0.078)
Co-resident mother aged 15-49	0.000	0.725	1.000	0.753
	(0.000)	(0.022)	(0.000)	(0.007)
Observations	874	401	440	3,683
		Girls		
Age	10.496	10.221	8.949	9.789
	(0.078)	(0.137)	(0.124)	(0.046)
Grandchild of the head	0.505	0.063	0.036	0.031
	(0.015)	(0.013)	(0.009)	(0.003)
Child of the head	0.000	0.893	0.888	0.931
	(0.000)	(0.016)	(0.015)	(0.004)
School attendance	0.791	0.856	0.786	0.810
	(0.012)	(0.018)	(0.020)	(0.007)
Schooling years	2.790	2.983	1.659	2.639
	(0.070)	(0.123)	(0.096)	(0.042)
Dead mother	0.061	0.015	0.000	0.009
	(0.007)	(0.006)	(0.000)	(0.002)
Cared by head or spouse of head	0.953	0.922	0.950	0.966
	(0.006)	(0.014)	(0.011)	(0.003)
Schooling years of the caregiver	5.588	5.698	4.854	5.961
	(0.150)	(0.241)	(0.189)	(0.084)
Co-resident mother aged 15-49	0.000	0.661	1.000	0.748
	(0.000)	(0.025)	(0.000)	(0.008)
Observations	1,115	371	425	3,236

Notes: averages and standard errors (in parentheses) have been computed using individual sampling weights; the sample includes children aged 6-14 and excludes those who have a double living arrangement (host siblings and biological siblings).
Source: author's elaboration on the 2014 GDHS.

Table C.2: Descriptive statistics of mothers by fostering arrangement, restricted to those with a co-resident child aged 6-14

	(1)	(2)	(1)-(2)	
	Fostering-out a 6-14 child	Not fostering-out		
Age	36.376	36.575	-0.199	0.339*
	(0.239)	(0.118)	(0.297)	(0.196)
Nb of births	5.324	4.187	1.137***	1.112***
	(0.083)	(0.035)	(0.091)	(0.071)
Age at first birth	19.368	20.356	-0.988***	-0.614***
	(0.148)	(0.074)	(0.187)	(0.180)
Months since last birth	50.624	59.945	-9.321***	-5.899***
	(1.555)	(0.831)	(2.074)	(1.391)
Nb of boys under 15 alive	0.906	0.810	0.096***	0.112***
	(0.012)	(0.007)	(0.017)	(0.013)
Nb of girls under 15 alive	0.936	0.766	0.171***	0.174***
	(0.010)	(0.008)	(0.018)	(0.013)
Muslim	0.159	0.158	0.001	0.008
	(0.015)	(0.007)	(0.017)	(0.016)
Christian	0.745	0.779	-0.034*	-0.019
	(0.018)	(0.007)	(0.019)	(0.017)
Akan	0.486	0.485	0.001	0.013
	(0.020)	(0.009)	(0.023)	(0.018)
Schooling years	4.450	5.762	-1.313***	-0.336**
	(0.161)	(0.081)	(0.204)	(0.158)
Widowed	0.053	0.041	0.012	0.010
	(0.009)	(0.004)	(0.009)	(0.009)
Divorced/separated	0.122	0.084	0.037***	0.023*
	(0.013)	(0.005)	(0.013)	(0.012)
In polygamous union	0.178	0.151	0.027	0.020
	(0.015)	(0.006)	(0.016)	(0.015)
In monogamous union	0.630	0.688	-0.059***	-0.039**
	(0.020)	(0.008)	(0.021)	(0.018)
Co-resident partner/husband	0.662	0.690	-0.028	0.004
	(0.019)	(0.008)	(0.021)	(0.008)
Have been married/in union more than once	0.373	0.203	0.170***	0.146***
	(0.020)	(0.007)	(0.019)	(0.019)
Have a child out of wedlock	0.206	0.180	0.026	0.035*
	(0.016)	(0.007)	(0.018)	(0.018)
Marital instability/child out of wedlock	0.613	0.428	0.185***	0.172***
	(0.020)	(0.009)	(0.023)	(0.021)
Observation	613	3,147	3,760	3,760
Dummies:				
Household composition	No	No	No	Yes

Notes: average and standard errors (in parentheses) have been computed using individual sampling weights; the sample includes women co-residing with a child aged 6-14 at survey time; *** $p<0.01$, ** $p<0.05$, * $p<0.1$.
Source: authors' elaboration on the 2014 GDHS.

Table C.3: Relative educational outcomes, restricted to foster children with a living mother and non-foster children with a co-resident mother aged 15-49

	(1)	(2)	(3)	(4)	(5)
	Dep. var.: School attendance				
Foster children	-0.016	-0.011	-0.015	-0.016	-0.021
	(0.016)	(0.020)	(0.020)	(0.020)	(0.020)
Host siblings	0.034	0.073***	0.065**	0.062**	0.058**
	(0.025)	(0.026)	(0.026)	(0.026)	(0.025)
Biological siblings	-0.043*	-0.043*	-0.032	-0.027	-0.025
	(0.024)	(0.023)	(0.023)	(0.023)	(0.023)
Adjusted R^2	0.004	0.037	0.044	0.052	0.123
Average outcome (Others)	0.827	0.827	0.827	0.827	0.827
Differences					
Foster children - Host siblings	-0.050**	-0.085***	-0.080***	-0.078***	-0.079***
Foster children - Biological siblings	0.026	0.032	0.016	0.011	0.004
	Dep. var.: Schooling years				
Foster children	-0.331***	-0.392***	-0.471***	-0.485***	-0.468***
	(0.054)	(0.070)	(0.065)	(0.064)	(0.064)
Host siblings	0.125	0.278***	0.123*	0.099	0.104
	(0.078)	(0.080)	(0.072)	(0.071)	(0.071)
Biological siblings	-0.442***	-0.453***	-0.212***	-0.188***	-0.179***
	(0.070)	(0.069)	(0.069)	(0.067)	(0.067)
Adjusted R^2	0.642	0.665	0.703	0.710	0.712
Average outcome (Others)	2.514	2.514	2.514	2.514	2.514
Differences					
Foster children - Host siblings	-0.456***	-0.669***	-0.595***	-0.584***	-0.572***
Foster children - Biological siblings	0.111	0.061	-0.259***	-0.296***	-0.289***
Observations	8,334	8,334	8,334	8,334	8,334
Dummies:					
Age x sex	Yes	Yes	Yes	Yes	Yes
Household composition	No	Yes	Yes	Yes	Yes
Wealth quintile	No	No	Yes	Yes	Yes
Caregiver's schooling years	No	No	No	Yes	Yes
Rural area	No	No	No	No	Yes
Region	No	No	No	No	Yes

Notes: estimations have been produced using individual sampling weights; sample includes children aged 6-14 who are fostered with a alive mother or who are non-fostered with a co-resident mother aged 15-49; *** p <0.01, ** p <0.05, * p <0.1.
Source: author's elaboration on the 2014 GDHS.

Table C.4: Descriptive statistics of foster-out children

	(1)	(2)	(1)-(2)
	Have biological siblings 6-14	Do not have biological siblings 6-14	
Age	11.089	9.695	1.394***
	(0.087)	(0.082)	(0.124)
Girl	0.571	0.506	0.066***
	(0.019)	(0.016)	(0.025)
Multiple births	0.066	0.057	0.009
	(0.009)	(0.007)	(0.012)
Mother's first born	0.267	0.395	-0.128***
	(0.017)	(0.015)	(0.024)
Born out of wedlock	0.102	0.221	-0.119***
	(0.012)	(0.013)	(0.019)
Mother's marital instability/child out of wedlock	0.616	0.792	-0.177***
	(0.019)	(0.013)	(0.022)
Observations	684	1,006	1,690

Notes: average and standard errors (in parentheses) have been computed using mother sampling weights; the sample includes 6-14 children fostered-out according to their mother's declarations; *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Source: authors' elaboration on the 2014 GDHS.

Table C.5: Relationship between mothers marital instability and educational outcomes

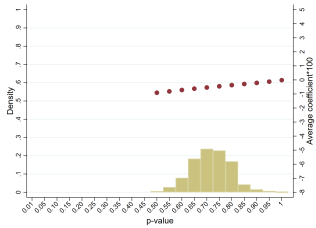
	(1)	(2)	(3)	(4)	(5)
		Dep. var.: School attendance			
Mother's marital instability/child out of wedlock	-0.050***	-0.057***	-0.051***	-0.058***	-0.044***
	(0.011)	(0.012)	(0.012)	(0.012)	(0.012)
Adjusted R^2	0.005	0.041	0.052	0.061	0.130
Average outcome	0.820	0.820	0.820	0.820	0.820
		Dep. var.: Schooling years			
Mother's marital instability/child out of wedlock	-0.136***	-0.233***	-0.170***	-0.189***	-0.187***
	(0.041)	(0.043)	(0.040)	(0.040)	(0.040)
Adjusted R^2	0.649	0.678	0.721	0.730	0.732
Average outcome	2.472	2.472	2.472	2.472	2.472
Observations	6,464	6,464	6,464	6,464	6,464
Average interest variable (all)	0.429	0.429	0.429	0.429	0.429
Average interest variable (Host siblings)	0.360	0.360	0.360	0.360	0.360
Average interest variable (Biological siblings)	0.592	0.592	0.592	0.592	0.592
Average interest variable (Others)	0.411	0.411	0.411	0.411	0.411
Dummies:					
Age x sex	Yes	Yes	Yes	Yes	Yes
Household composition	No	Yes	Yes	Yes	Yes
Wealth quintile	No	No	Yes	Yes	Yes
Caregiver's schooling years	No	No	No	Yes	Yes
Rural area	No	No	No	No	Yes
Region	No	No	No	No	Yes

Notes: estimations have been produced using individual sampling weights; sample includes children aged 6-14 who are non-fostered with a co-resident mother aged 15-49; *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

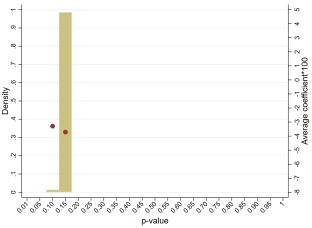
Source: author's elaboration on the 2014 GDHS.

Figure C.2: Relative school attendance of foster children, accounting for age, gender and mothers' marital life

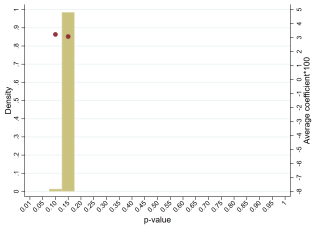
(a) Others (α_1)



(b) Host siblings ($\alpha_1 - \alpha_2$)



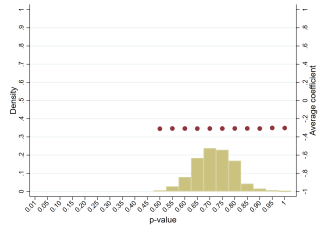
(c) Biological siblings ($\alpha_1 - \alpha_3$)



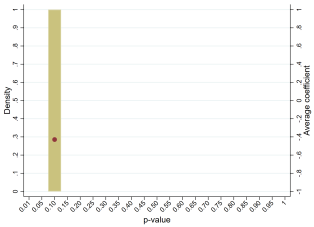
Notes: estimations have been produced using individual sampling weights; sample includes children aged 6-14; p-value densities and average coefficients are computed from 1,000 estimations of Equation 4.1 with Z_i including age and gender dummies, their interaction and a dummy equal one if the mothers have experienced marital instability/child out of wedlock (the dummy equal one for 72 percent of foster children selected randomly).
Source: author's elaboration on the 2014 GDHS.

Figure C.3: Relative schooling years of foster children, accounting for age, gender and mothers' marital life

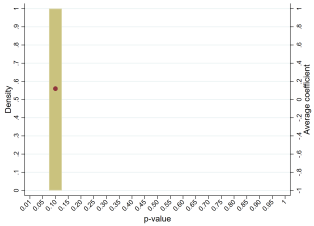
(a) Others (α_1)



(b) Host siblings ($\alpha_1 - \alpha_2$)



(c) Biological siblings ($\alpha_1 - \alpha_3$)



Notes: estimations have been produced using individual sampling weights; sample includes children aged 6-14; p-value densities and average coefficients are computed from 1,000 estimations of Equation 4.1 with Z_i including age and gender dummies, their interaction and a dummy equal one if the mothers have experienced marital instability/child out of wedlock (the dummy equal one for 72 percent of foster children selected randomly).
Source: author's elaboration on the 2014 GDHS.

Table C.6: Compare foster children across data sources

	(1)	(2)	(1)-(2)
	2014 GDHS	GLSS6	
Girl	0.573	0.557	0.016
	(0.011)	(0.010)	(0.173)
Age	10.285	10.250	0.035
	(0.058)	(0.050)	(0.881)
Grandchild of the head	0.551	0.534	0.017
	(0.011)	(0.010)	(0.173)
Presence of a host sibling	0.283	0.268	0.015
	(0.010)	(0.009)	(0.154)
School attendance	0.803	0.912	-0.109
	(0.009)	(0.006)	(0.098)
Nb of hours worked		4.264	
		(0.215)	
Nb of hours of chores		6.742	
		(0.153)	
Observations	1,989	2,532	4,521

Notes: averages and standard errors (in parentheses) have been computed using individual sampling weights; the sample includes foster children aged 6-14; *** p <0.01, ** p <0.05, * p <0.1.
Source: author's elaboration on the 2014 GDHS and the GLSS6.

Table C.7: Compare foster children across data sources, by relationship to the host household head

	Foster grandchildren			Foster not grandchildren		
	(1)	(2)	(1)-(2)	(3)	(4)	(3)-(4)
	2014 GDHS	GLSS6		2014 GDHS	GLSS6	
Girl	0.525	0.521	0.004	0.632	0.598	0.034
	(0.015)	(0.013)	(0.231)	(0.016)	(0.015)	(0.258)
Age	9.767	9.851	-0.084	10.921	10.707	0.214
	(0.079)	(0.067)	(1.156)	(0.082)	(0.074)	(1.315)
Presence of a host sibling	0.158	0.157	0.002	0.436	0.396	0.041
	(0.011)	(0.010)	(0.168)	(0.016)	(0.014)	(0.257)
Currently attending school	0.797	0.920	-0.123	0.810	0.903	-0.093
	(0.012)	(0.007)	(0.126)	(0.013)	(0.009)	(0.156)
Schooling year	2.372			2.982		
	(0.067)			(0.079)		
Nb of hours worked		3.396			5.258	
		(0.222)			(0.387)	
Nb of hours of chores		6.448			7.079	
		(0.205)			(0.231)	
Observations	1,084	1,389	2,473	905	1,143	2,048

Notes: averages and standard errors (in parentheses) have been computed using individual sampling weights; the sample includes foster children aged 6-14; *** p <0.01, ** p <0.05, * p <0.1.
Source: author's elaboration on the 2014 GDHS and the GLSS6.

Table C.8: Compare foster children across data sources

	(1)	(2)	(1)-(2)
	2014 GDHS	GLSS6	
Rural	0.476	0.471	0.005
	(0.013)	(0.012)	(0.472)
Region: Greater Accra	0.165	0.158	0.007
	(0.010)	(0.009)	(0.345)
Nb of foster children hosted	1.397	1.638	-0.241
	(0.020)	(0.025)	(0.972)
Headed by a female	0.491	0.390	0.101
	(0.013)	(0.012)	(0.462)
Head's age	53.719	52.907	0.812
	(0.418)	(0.365)	(14.278)
Household size	5.191	6.817	-1.627
	(0.066)	(0.077)	(3.009)
Vertically extended household	0.585	0.534	0.051
	(0.013)	(0.012)	(0.472)
Nb of boys aged 5 or under	0.317	0.431	-0.113
	(0.016)	(0.017)	(0.682)
Nb of girls aged 5 or under	0.311	0.401	-0.090
	(0.015)	(0.016)	(0.607)
Nb of boys aged 6-14	0.925	1.189	-0.264
	(0.026)	(0.028)	(1.087)
Nb of girls aged 6-14	1.097	1.313	-0.216
	(0.023)	(0.025)	(0.982)
Nb of men aged 15-59	0.371	1.289	-0.918
	(0.019)	(0.029)	(1.152)
Nb of women aged 15-49	0.898	1.391	-0.493
	(0.024)	(0.028)	(1.100)
Nb of men aged 60 or over	0.192	0.198	-0.005
	(0.010)	(0.010)	(0.377)
Nb of women aged 50 or over	0.634	0.606	0.028
	(0.015)	(0.015)	(0.603)
Wealth index	2.979	3.010	-0.031
	(0.036)	(0.037)	(1.446)
Observations	1,421	1,709	3,130

Notes: averages and standard errors (in parentheses) have been computed using household sampling weights; the sample includes households hosting a foster child at survey time; *** $p<0.01$, ** $p<0.05$, * $p<0.1$.
Source: author's elaboration on the 2014 GDHS and the GLSS6.

Table C.9: Educational outcomes of foster children, with the GLSS6 data

	(1)	(2)	(3)	(4)	(5)
	Dep. var.: School attendance				
Foster grandchildren	0.012	0.023	0.028	0.033*	0.024
	(0.014)	(0.019)	(0.020)	(0.019)	(0.019)
Adjusted R^2	0.011	0.084	0.091	0.100	0.102
Average outcome (not grandchildren)	0.903	0.903	0.903	0.903	0.903
Observations	2,532	2,532	2,532	2,532	2,532
Dummies:					
Age x sex	Yes	Yes	Yes	Yes	Yes
Household composition	No	Yes	Yes	Yes	Yes
Wealth quintile	No	No	Yes	Yes	Yes
Average adults' education level	No	No	No	Yes	Yes
Rural area	No	No	No	No	Yes
Region	No	No	No	No	Yes

Notes: estimations have been produced using individual sampling weights; sample includes foster children aged 6-14; *** p <0.01, ** p <0.05, * p <0.1.
Source: author's elaboration on the GLSS6.

C.2 Ghana Living Standard Survey 2012-2013

As an additional data source, we use the Ghana Living Standard Survey conducted between September 2012 and September 2013 (GLSS6), by the GSS. This survey is part of the Living Standards Measurement Study (LSMS), a project initiated by the Policy Research Division of the World Bank. Differently from previous survey rounds, GLSS6 includes a specific labour force module focusing on employment and time use. As the 2014 GDHS, the sample is representative at the national and regional levels and was designed from the 2010 Ghana Population and Housing Census.[24]

Household members fill in detailed information on their socio-demographic characteristics, education, health and labour force participation. According to the definition, a household member is used to live and eat in the residential unit for 6 months at least or is planning to stay at least 6 months. Any member, regardless of age, declares if the parents are household members, but there is no question of their survival if they are not found among household members. 15,218 households were successfully interviewed and have clean information about parent-child co-residence.

The survey also includes a fertility module addressed to women, general questions are asked to the mother about her children. Contrary to the 2014 GDHS, there is no question on birth history since the women do not declare the date of birth of all their children (only the number of births).

The main advantage of this survey, compared to the 2014 GDHS, is that we dispose of many outcomes regarding education, labor, time use, and expenditures for individuals aged 5 or over. At the household level, the main respondent reports detailed information on the expenditures and transfers sent or received over the past 12 months.

[24] The sample of surveyed households was designed independently for each round of GLSS, so we cannot exploit a longitudinal dimension.

Chapter 5

General conclusions

Today, people are increasingly mobile, and migratory movements have never been greater. With growing populations in developing countries, high spatial inequalities, climate change, and conflicts, migrations will intensify. Therefore, there is an urgent need to understand both the underlying motivations for migration and the impacts of such movements on the origin and destination regions of migrants. While global studies of migration flows are necessary to inform politicians and the general public, they are insufficient to understand how migration strategies are implemented and the consequences for migrants and their families. Often, migration strategies are context-specific and vary embedded in cultural norms. Paying attention to family organizations provides a better understanding of the framework of migration and a finer vision of its impacts on the migrants themselves and the left behind. First, economic migration strategies in developing countries are very often family-based. Second, family norms largely influence the mobility of individuals, e.g., female migration is sometimes frowned upon by the family. Third, family organizations are not immutable and adjust to migration.

This Ph.D. dissertation highlights several traditions that interact with migration strategies, (i) marriage payment in Indonesia, (ii) patrilocality in Mexico, and (iii) child fostering in Ghana. More precisely, Chapter 2 shows that the practice of bride price in Indonesia may be a pushing factor to the internal migration of young single men. Then, Chapter 3 suggests that male migration to the United States encour-

ages women to reconsider the norms of patrilocality in Mexico and motivate them to join their parents' household. Lastly, Chapter 4 provides evidence that the long tradition of child fostering in Ghana can help children cope with the adverse effect of single motherhood on education by joining households more able to satisfy their needs. While this study falls within the domain of development economics, it is essential to incorporate anthropological, sociological, and demographic research to comprehend the highlighted mechanisms.

Finally, this dissertation puts forward the high flexibility of household composition in developing countries. While the concept of household is widely used in economics, it may overlook the complexity of family organizations and the many impacts of migrations. Consequently, this thesis warns researchers about using standard data from large-scale household surveys and censuses whose information collection is restricted by household units. To overcome these issues, data producers should devote more time and attention to improve data collection mechanisms, notably by designing innovative survey modules to identify migrants and their families of origin.