

Bertoli, Simone; Gautrain, Elsa; Murard, Elie

**Working Paper**

## Left Behind, but Not Alone: Changes in Living Arrangements and the Effects of Migration and Remittances in Mexico

IZA Discussion Papers, No. 13917

**Provided in Cooperation with:**

IZA – Institute of Labor Economics

*Suggested Citation:* Bertoli, Simone; Gautrain, Elsa; Murard, Elie (2020) : Left Behind, but Not Alone: Changes in Living Arrangements and the Effects of Migration and Remittances in Mexico, IZA Discussion Papers, No. 13917, Institute of Labor Economics (IZA), Bonn

This Version is available at:

<https://hdl.handle.net/10419/232669>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

DISCUSSION PAPER SERIES

IZA DP No. 13917

**Left Behind, but Not Alone: Changes in  
Living Arrangements and the Effects of  
Migration and Remittances in Mexico**

Simone Bertoli  
Elsa Gautrain  
Elie Murard

DECEMBER 2020

## DISCUSSION PAPER SERIES

IZA DP No. 13917

# Left Behind, but Not Alone: Changes in Living Arrangements and the Effects of Migration and Remittances in Mexico

**Simone Bertoli**

*Université Clermont Auvergne, CNRS, CERDI, IUF, IZA and IC Migrations*

**Elie Murard**

*Universidad de Alicante, NOVA SBE, LEAP and IZA*

**Elsa Gautrain**

*Université Clermont Auvergne, CNRS, CERDI and IC Migrations*

DECEMBER 2020

Any opinions expressed in this paper are those of the author(s) and not those of IZA. Research published in this series may include views on policy, but IZA takes no institutional policy positions. The IZA research network is committed to the IZA Guiding Principles of Research Integrity.

The IZA Institute of Labor Economics is an independent economic research institute that conducts research in labor economics and offers evidence-based policy advice on labor market issues. Supported by the Deutsche Post Foundation, IZA runs the world's largest network of economists, whose research aims to provide answers to the global labor market challenges of our time. Our key objective is to build bridges between academic research, policymakers and society.

IZA Discussion Papers often represent preliminary work and are circulated to encourage discussion. Citation of such a paper should account for its provisional character. A revised version may be available directly from the author.

ISSN: 2365-9793

**IZA – Institute of Labor Economics**

Schaumburg-Lippe-Straße 5–9  
53113 Bonn, Germany

Phone: +49-228-3894-0  
Email: [publications@iza.org](mailto:publications@iza.org)

[www.iza.org](http://www.iza.org)

## ABSTRACT

---

# Left Behind, but Not Alone: Changes in Living Arrangements and the Effects of Migration and Remittances in Mexico\*

We provide evidence that the occurrence of an international migration episode is associated with a variation in the living arrangements of the household members left behind. The migration of a married Mexican man typically induces his spouse and children to join the household of the wife's parents, a pattern that is at odds with the prevailing patrilocal norm. This change in living arrangements, which involves the extended family of the migrant, has two relevant implications for the analysis of the effects of paternal migration and remittances on the children left behind. First, it can give rise to an important heterogeneity in the effects of interest, which has not been explored in the migration literature. Second, it leads to attrition in longitudinal household surveys that is non-random with respect to potential outcomes.

**JEL Classification:** D10, F22, C83

**Keywords:** migration, remittances, household structure, living arrangements, extended family, schooling

**Corresponding author:**

Simone Bertoli  
CERDI  
Avenue Léon-Blum, 26  
F-63000  
Clermont-Ferrand  
France  
E-mail: [simone.bertoli@uca.fr](mailto:simone.bertoli@uca.fr)

---

\* The Authors are grateful to Maëlys de la Rupelle, Flore Gubert, David McKenzie, and to the participants to seminar presentations at the 2019 Summer School on Migration at PSE, UNU-WIDER, CERDI, IC Migrations, DIAL, Universidad de Alicante, Université Paris 1 Panthéon-Sorbonne and to the 13th AFD-WB Migration and Development Conference for their comments, and to Carlo Alcaraz, Daniel Chiquiar and Alejandrina Salcedo for kindly sharing the codes of their article on JDE, and to the INEGI for providing additional data derived from the survey connected to the 2010 Census; Simone Bertoli and Elsa Gautrain acknowledge the support received from the Agence Nationale de la Recherche of the French government through the program "Investissements d'avenir" (ANR-10-LABX-14-01); the usual disclaimers apply.

“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*.

## 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 the migration of a household member can produce multifaceted implications for the other members who are left behind. The strength of the interactions between the migrant and the left behind motivates the use of the expression of “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. The effects of migration on the left behind are generally analyzed assuming that migration is not associated with further variations in the living arrangements of those who remain at origin.<sup>1</sup> However, this assumption may lack empirical plausibility,<sup>2</sup> particularly when split household migration temporarily divides two spouses. In this case, migration can entail that the structure of the household formed by the left behind is no longer optimal,<sup>3</sup> and this can induce them to move in with previously not co-residing relatives.

Does the occurrence of an international migration episode change the living arrangements of those left behind? In particular, does the migration of one of the two spouses induce the spouse and of the children left behind to join another household within the extended family

---

<sup>1</sup>Gibson et al. (2011) and Cortés (2015) represent two exceptions.

<sup>2</sup>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.

<sup>3</sup>“Changes in household structure can be explained as the result of many of the same forces as those driving marriage formation and dissolution. Families are residentially extended when the gains from being extended (public goods, etc.) outweigh the gains of being nuclear (privacy, etc.).” ([Fafchamps and Quisumbing, 2008](#), p. 3235).

network? If this is the case, what are the ensuing implications for the analysis of the effects of migration and remittances on children, and for the way in which we should interpret the existing empirical evidence?

We analyze these research questions in the case of the migration of Mexican married men. 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 wives and children (Cerrutti and Massey, 2001),<sup>4</sup> 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.<sup>5</sup> 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). This allows us to draw on existing empirical studies to explore the analytical implications of variations in the living arrangements of the left behind.

Mexico is a traditionally patrilocal country, as recalled by the initial quotes from Boehm (2012) and Dreby (2010), 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. Matrilocality, i.e., co-residence with the parents of the wives, is rather infrequent. This living arrangement is however common for women who have experienced a marital dissolution because of separation, divorce, or the death of their spouse. The effect of the international migration of the husband on living arrangements is *prima facie* ambiguous, as remittances could accelerate the transition from patrilocality to neolocality (e.g., by providing the resources needed to set up an independent household), but the prolonged physical separation from the husband (and the economic and emotional uncertainty it entails) could also push the wives towards matrilocality, the living arrangement that predominates after

---

<sup>4</sup>McKenzie and Rapoport (2010) 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 have been presumably left behind.

<sup>5</sup>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 do not characterize how these changes modify the living arrangements of the individuals left behind.

marital dissolution.

We address the proposed research questions by using the 2016 wave of the *Encuesta Nacional sobre la Dinámica de las Relaciones en los Hogares* (ENDIREH) conducted by the INEGI, the Mexican National Statistical Institute, a data source that had, so far, remained untapped in the migration literature. Its in-depth interviews with Mexican women allow us to identify the wives left behind by a migrant husband, and provide us with information on the living arrangements of married women both at the time of the survey, and when they got married. We complement this survey with two other data sources, notably the large-scale survey connected to the 2010 Census of the Mexican population and various waves of the *Encuesta Nacional de Ocupación y Empleo* (ENOE), a quarterly rotating panel survey following households for five consecutive quarters.<sup>6</sup>

Our empirical analysis reveals that matrilocality is significantly more common among the wives left behind (27.4 percent are matriloocal) than among co-resident couples (7.0 percent), while the share of patrilocality is almost identical in the two groups (5.9 and 6.7 percent respectively) in the ENDIREH 2016. This pattern, which also emerges from the large sample of wives left behind from the 2010 Census, does not reflect differences in observables (including living arrangements at the time of marriage) between wives left behind and wives co-residing with their husbands. The ENOE survey also shows that the higher incidence of matrilocality among the wives left behind is not driven by differences in the living arrangements prevailing before the migration of the husband. The analysis of the data from the 2010 Census further confirms that changes in living arrangements occur after the husband moved out of Mexico. The 2010 Census contains retrospective questions on the migration of former household members over the five years prior to the survey, which are subject to a co-residence condition at the time of migration: only migration episodes of individuals that co-resided with all the members of the surveyed household when they left Mexico are recorded in the data. Our analysis reveals that the probability that a wife left

---

<sup>6</sup>We also considered drawing on the various waves of the Mexican Family Life Survey (see [Teruel et al., 2012](#)), and on the *Encuesta Demográfica Retrospectiva* conducted by the INEGI in 2011 and 2017; we did not use these two data sources as the first survey, which attempts to track individuals and not just housing units across waves, is characterized by a small sample size, while the second, which reconstructs through retrospective questions the evolution of the set of individuals with whom women aged 20 to 54 have been co-residing throughout their lives, does not include information on the reason of a possible non co-residence with the husband, thus preventing us from identifying wives left behind.

behind reports the migration of her husband correlates strongly with her living arrangements at the time of the survey. More precisely, wives left behind who are currently living with their parents are twice less likely to enumerate their husband as a migrant relative to wives left behind living with their parents-in-laws or living in neolocal household.<sup>7</sup> This, in turn, strongly suggests that the higher incidence of matrilocality among wives left behind reflects instances in which wives joined their parents' household after their husbands left, thus driving a wedge between the composition of the household of origin the migrant and the one that is surveyed, which induces a violation of the co-residence condition.

The variation in the living arrangements that we uncover implies that, from the perspective of the children, paternal migration increases the probability to live with maternal grandparents. We show that this has three major implications for the analysis of the effects of migration on the children left behind.

First, the longitudinal data from the ENOE allows us to establish that paternal migration is not associated with the arrival of grandparents in the household of origin of the migrant, but rather with the attrition of this household, with the children (and their mothers) moving to the house of their maternal grandparents. The dissolution of the household of origin of the migrant and the ensuing relocation of the children left behind results in attrition in longitudinal surveys that do not follow individuals, but only housing units. This, in turn, entails that econometric analyses using panel data, such as [Antman \(2011\)](#), that explore the short-run effects of paternal migration on (non-attriters) Mexican children are uninformative about the effects on the children who joined the household of their grandparents in response to their fathers leaving Mexico.<sup>8</sup> A similar issue arises with cross-sectional analyses, as the relocation of the children left behind leads to the non-reporting of paternal migration through retrospective questions embedding a co-residence condition similar to the one used in the 2010 Census of the Mexican population, which is in line with the guidelines for data collection in migrant-sending countries set out by [UNDESA \(2017\)](#), with the objective of minimizing the risk of double-counting of the same migration episode.

Second, using exclusively the large sample of children left behind in the 2010 Census, we show that co-residence with maternal grandparents is associated with a significantly higher

---

<sup>7</sup>The data from the survey connected to the 2010 Census also reveal that matrilocality is more likely among wives with a higher level of education, and the effect of education is stronger among wives left behind.

<sup>8</sup>The attrition rate for the children who experience the migration of their fathers in [Antman \(2011\)](#) is more than twice the corresponding rate for the other children.



probability of attending school relative to the children who live just with their mothers. This simple stylized fact implies that cross-sectional surveys are unlikely to provide an accurate representation of the sample of children left behind, as the survey design leads to the non-enumeration of episodes of paternal migration when the children left behind join the household of their maternal grandparents.

Third, drawing on the longitudinal data used by [Alcaraz et al. \(2012\)](#), we document that co-residence with grandparents significantly mitigated the negative consequences of the sudden decline in migrants' remittances due to the 2008-2009 recession in the United States, in particular for the school attendance of children left behind. This, in turn, suggests that the adjustments in the living arrangements of the left behind could represent an effective coping strategy to deal with the uncertainties associated with split household migration.<sup>9</sup>

Our paper makes three important contributions to the migration literature. First, we uncover that the wives left behind are more likely to move in to their own parents after their husbands' migration, a new stylized fact in the migration literature. This suggests that the distinction between the international migrant and the left behind should not be interpreted as an opposition between movement and immobility, as the changes in living arrangements mostly reflect the fact that individuals left behind relocate into different housing units within Mexico. In this respect, we extend the evidence provided by [Bertoli and Murard \(2020\)](#), who document that international migration is associated with further variation in the composition of the household of origin of the migrant. We are now able to characterize the prevailing direction of the changes in co-residence choices in the case of married male migrants: household members left behind move in with members of the extended family, thus forming larger three-generation households. Furthermore, we show that these changes have important implications for the empirical analysis of the effects of migration on the left behind: (*i*) they induce attrition of the households of origin of the migrants in longitudinal surveys, and non-reporting of the migration episode in cross-sectional surveys (*ii*) the children left behind that are either excluded from the analysis (because of attrition) or not identified as such (because of the non-enumeration of the migration episode) are likely to be a selected sample of the left behind with respect to the outcomes of interest, such as school attendance, and (*iii*) different living arrangements could mediate the effects of migration and remittances on

---

<sup>9</sup>This also indirectly suggests that the adverse short-run effects of paternal migration on Mexican children documented by [Antman \(2011\)](#) might be overestimated, as she only focuses on non-attriters, thus excluding treated children who adjusted their living arrangements.

the left behind, and notably the children. These relevant consequences related to 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) when analyzing the effects on the left behind. Third, our paper illustrates the new insights that can be gained by no longer considering household composition “an exogenous or fixed characteristics” (Foster and Rosenzweig, 2002, p. 832), 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). For example, 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 (Angelucci, 2015). Furthermore, as the relationship between the left behind and the migrant is characterized by information asymmetries (see Chen, 2006, 2013; Ashraf et al., 2015; Ambler, 2015; Rizzica, 2018), the departure from the traditional patrilocal norm that we observe in the data could be consistent with the fact that parents-in-law would otherwise play a role of monitoring device for the migrant (de Laat, 2014), something that the wife would like to avoid—provided that she has enough bargaining power to do so.

The rest of the paper is structured as follows: Section 2 introduces the three data sources, and Section 3 presents the descriptives. Section 4 provides evidence of the high incidence of matrilocality among the wives left behind, and Section 5 explores the role played by selection into migration and by post-migration changes in explaining this pattern. Section 6 explores the implications of the changes in the living arrangements of the left behind, providing evidence about their empirical relevance. Finally, Section 7 draws the main conclusions.

## 2 Data sources

We describe here the key features of the three data sources for our empirical analysis, drawn from three household surveys conducted by the INEGI, the Mexican National Statistical Institute. In particular, we describe how each of the three surveys allows us to identify the wives left behind by husbands who migrated to the United States, and the living arrange-

ments of co-resident couples and of the wives left behind.

## 2.1 ENDIREH 2016

Our main data source is represented by the 2016 wave of the *Encuesta Nacional sobre la Dinámica de las Relaciones en los Hogares* (ENDIREH 2016), a survey focusing on the relationship among household members, with in-depth interviews for a sub-sample of the women belonging to survey households. 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.

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.<sup>10,11</sup> The questionnaire used for the in-depth interview depends on the marital status of the woman, with different questionnaires used for women who are (*i*) married or in an informal union, (*ii*) separated, divorced or widowed, and (*iii*) single. The sample of women aged 20 to 49 who went through the in-depth interview in the ENDIREH 2016 includes 33,069 married women, 17,376 women who are in a union, 6,140 who are either separated or divorced, 919 widows, and 10,065 singles. We focus our analysis only on married women even though the ENDIREH 2016 provides the same set of information on women that are in an informal union, as women that report a stable relationship without being married are less likely than married women to co-reside with their partners, and a greater share of them has already experienced the dissolution of a previous marital union, so that their current partner is less likely to be the father of some of their children. The first feature would call into question the suitability of the approach that we use to identify the wives left behind by a migrant husband in the 2010 Census, which is described in Section 2.2 below, while the second one is problematic when examining paternal migration and its effect on the children of the women left behind in Mexico, as we do in Section 6.2.<sup>12</sup>

---

<sup>10</sup>When the enumerator used a tablet to conduct the interview, a software randomly selected the woman for the in-depth interview among eligible women; when using a paper questionnaire, the woman whose birthday (day and month) was closer to the date of the interview was retained for the in-depth interview.

<sup>11</sup>Sampling weights reflect the differential probability of selection for the in-depth interview for women belonging to housing units with a different number of eligible women.

<sup>12</sup>All the results presented in Sections 5 and 6.1 are robust when we also include women in an informal union in the sample.

For married women, the survey contains a question on the co-residence with the spouse, and the place of residence of the husband when the two spouses do not co-reside. The United States appear among the possible answers concerning the place of residence, so that we can unambiguously identify the married women left behind by an international migrant.<sup>13</sup> For the wives left behind, the survey also contains a question on the time elapsed since the two spouses have not been living together. The questionnaire includes information on the receipt of remittances from abroad, singling out the transfers sent from the migrant husband for the wives left behind.

The ENDIREH 2016 survey also provides information on the co-residence with one's own parents for all household members,<sup>14</sup> and on the relationship to the household head.<sup>15</sup> These two questions allow us defining matrilocality on the basis of the question on co-residence with one (or both) of the wife's parents, or on the basis of her relationship to the household head. For patrilocality, we can either rely on the question on the relationship with the household head for all married women, or on the questions related to the co-residence of the husband with his own parents when the two spouses live together.<sup>16,17</sup> We define as neolocality all instances in which the wife is co-residing neither with her parents nor with her parents-in-law, albeit she might live with other family members (thus belonging to a non-nuclear household). The ENDIREH 2016 survey also provides information with the living arrangements at the time in which a women got married (or began her stable relationship with the current

---

<sup>13</sup>The microdata files of the previous wave of the ENDIREH, which was conducted in 2011, interviewing all eligible women in sampled households, do not include the answers to this question, and this prevents us from using the data from this wave in the analysis; the INEGI declined our request to access this variable.

<sup>14</sup>In case of non co-residence, we also know whether each of the two parents is still alive.

<sup>15</sup>Regrettably, the ENDIREH 2016 adopts a coarse definition of the relationship to the household head, which includes only 9 cases (head, spouse or partner, child, nephew or niece, son or daughter-in-law, brother or sister, other relatives, non relative and domestic servants).

<sup>16</sup>Notice that the three surveys that we employ in the analysis allow to identify instances of co-residence with parents or parents-in-law, while the concepts of matrilocality and patrilocality also refer to the fact that co-residence occurs in the house of the wife's parents or parents-in-law; this slightly incorrect use of these two terms is justified by evidence that individuals aged 15 to 29 (and their children) are greatly over-represented among the individuals who move across households within Mexico, while mobility for elderly members is infrequent (see Figure A.1 in the on-line Appendix of Bertoli and Murard, 2020), so that we can reasonably assume that co-residence takes place in the housing unit of the elder generation.

<sup>17</sup>Reassuringly, the two definitions of patrilocality differ only for 222 out of the 32,011 wives who co-reside with their husbands.

partner), and this allows us identifying couples that were patrilocal, matrilocal or neolocal to begin with.

A limited amount of information is also available for other household members, and notably the co-resident husband, e.g., years of completed schooling, while the same information is not available when the two spouses do not co-reside.

## 2.2 Survey connected to the 2010 Census

The second data source is represented by the large-scale survey connected to the Census of the Mexican population conducted by the INEGI in June 2010, which we will be referring to the 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; this extended questionnaires included retrospective questions on the occurrence of international migration episodes. In particular, the questionnaire included the following question:<sup>18</sup>

(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 INEGI clarifies that these questions refer to individuals who “lived with the group of individuals who reside in the housing unit” that is surveyed (INEGI, 2010, p. 118). If the main respondent gives a positive answer to Question IV.1, then a follow-up question is asked separately for each migrant:

(Question IV.5) “When [name of the migrant] left for the last time, was he or she living with you?”

The migration episode is recorded only if this co-residence condition at the time of migration is satisfied. The INEGI informed us that a negative answer to Question IV.5 was given in

---

<sup>18</sup>Our translation from Spanish: “Durante los últimos 5 años, est es, de junio de 2005 a la fecha ¿alguna persona que vive o vivía con ustedes (en esta vivienda) se fue a vivir a otro país?”; the Spanish version makes clear that the question refers to co-residence with all individuals who belong to the survey household and not just with the respondent, as it uses the plural (ustedes), a subtlety that is lost in the English translation, as the singular and the plural coincide for the second person (you); the same applies to Question IV.5.

12,667 cases.<sup>19</sup> In case of a positive answer to Question IV.5, the survey records a limited amount of information each migrant, including sex, year of migration and country of destination, and age. We have no information on the marital status of the migrant, on his or her relationship with the head of the surveyed household, or on education.

The 2010 Census contains an explicit question on co-residence with the spouse, which allows us to distinguish between married women who live with their husbands and those who do not. However, differently from the ENDIREH 2016, no follow-up question is asked when the spouses do not co-reside, so we do not know where the husband is currently living. An option would be to use the information reported by the surveyed household in Question IV.1 and IV.5: we could identify as a wife left behind a married woman who belongs to a household reporting, among the current international migrants, a man whose age difference with the married women is consistent with the fact that they are a couple.

However, the co-residence condition embedded in Questions IV.1 and IV.5 of the 2010 Census, which is in line with the recommendations of UNDESA (2017) to reduce the risk of double-counting of the same migration episode, implies that it is problematic to use the answers to these questions to identify the wives left behind by international migrants. Wong Luna et al. (2006) first observed that this type of questions fail to capture migration episodes related to households that “dissolved their original composition over the reference period of the survey and formed new households.” (p. 14, our translation from Spanish), and Bertoli and Murard (2020) provided empirical evidence from the 2000 Census that a wife left behind who is likely to have modified her co-residence choices after the migration of her husband has a significantly lower probability of reporting this migration episode. Thus, relying on the procedure described above would fail to identify the wives left behind who adjusted their living arrangements after the migration of their husbands.

The 2010 Census offers us an alternative, as it contains information (separately for all individuals aged 12 and above) on the receipt of remittances from abroad. We can thus identify as (likely) wives left behind all married women that are reporting (*i*) not to be co-

---

<sup>19</sup>The 12,667 cases reported by the INEGI, which did not share with us the household identifiers corresponding to these cases, 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 never a member of the surveyed household, the main respondent can give a negative answer already to Question IV.1.

residing with their husbands, and (ii) to receive personally remittances from abroad. This proxy is motivated by the strong presumption that the non co-resident husband has left Mexico if the wife is personally receiving remittances. The main advantage of this proxy is that it is *independent* from the possible occurrence of post-migration changes in living arrangements for the wives left behind,<sup>20</sup> and that it also does not limit us to the five-year recall period covered by Question IV.1.

The 2010 Census provides questions on co-residence with one’s own parents, so that we can define matrilocality and patrilocality in a fully symmetric way for co-resident couples using the answers provided by each of the two spouses. In case of non co-residence, we have to rely on the very detailed wife’s relationship with the household head to identify instances of patrilocality.<sup>21</sup>

### 2.3 The ENOE rotating panel survey

The third data source is represented by various waves of the *Encuesta Nacional de Ocupación y Empleo*, a quarterly rotating panel survey conducted by the INEGI since 2005. 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. Differently from the ENDIREH, the ENOE survey (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 an international migration episode from variations in the household roster across interviews, and its questionnaire includes a question on the current place of residence of the former household members who left the household. Thus, the ENOE allows us identifying all instances in which a married man moves out of Mexico while leaving his wife behind, provided that the household of origin of the migrant does not

---

<sup>20</sup>This statement needs to be nuanced, as women that co-reside with their parents or parents-in-law are less likely to be the main respondent to the survey, and the main respondent in a remittance-recipient household is significantly more likely to be reporting that he or she is the one who is receiving remittances from abroad; thus, the condition at point (ii) is likely to induce an underestimation of the incidence of matrilocality and patrilocality among the wives left behind, as we show in Section 4 below.

<sup>21</sup>The relationship with the household head is even more detailed in the 2010 Census and in the ENOE than in the ENDIREH 2016, e.g., we can identify patrilocality when a married woman is the head, and the household also includes individual(s) who are reported to be parents-in-law of the head.

drop out of the sample because of household dissolution occurring at the same time as the international migration episode (Bertoli and Murard, 2020).<sup>22</sup> The ENOE survey does not provide the identifier of the spouse in case of co-residence, nor it contains explicit questions on the co-residence with one’s own spouse, or parents. This, in turn, obliges us to identify couples using information on the very detailed relationship of each the two spouses with the household head, and it also entails that we are *unable* to identify wives left behind if the husband migrated out of Mexico before his household of origin entered the ENOE sample.<sup>23</sup> The relationship with the household head can also be relied upon, as in the ENDIREH 2016 survey, to identify the living arrangements of co-resident couples.

### 3 Descriptive statistics

We document here that the data from the three surveys described in Sections 2.1-2.2 above are comparable, and then we present some basic descriptive statistics on the wives that co-reside with their husbands and on those left behind.

#### 3.1 Comparability of the three surveys

Table 1 reports the descriptive statistics for married women aged 20 to 49 on a subset of variables that are available in the three data sources, separately for stayers and for the wives left behind. The sample size for stayers stands at 32,011 (ENDIREH 2016), 1,111,122 (2010 Census) and 150,246 (ENOE 2011Q1-2016Q4),<sup>24</sup> while the corresponding (smaller) figures for the wives left behind stand at 446, 19,219 and 861. The characteristics of the sub-sample

---

<sup>22</sup>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).

<sup>23</sup>Some of the waves of the ENOE (notably all waves in 2005 and 2006, and typically the one conducted in the second quarter since 2007) contain information on the receipt of remittances from abroad separately for each household member aged 12 and above, something that can be used as a signal to identify the wives left behind by an international migrant among the married women for which we are not able to find their husband among the household members, as we do with the 2010 Census.

<sup>24</sup>We choose the waves of the ENOE in order to obtain a representation as accurate as possible of the pre-migration living arrangement of the wives left behind we observe in 2016 in the ENDIREH. Given that 74.2 percent of the wives left behind in the ENDIREH 2016 report that their husbands migrated in the five years before the survey, we selected all waves of the ENOE between 2011Q1 and 2016Q4.



of stayers are extremely similar across the three surveys. For the wives left behind, their profile that emerges from the three surveys are still similar, notwithstanding the smaller size of the samples (notably in the ENDIREH 2016 and in the ENOE 2011Q1-2016Q4), and the survey-specific criteria that are used to define this group of wives (see Sections 2.1-2.2). Around half of the wives left behind live in rural areas (defined as localities with less than 2,500 inhabitants), they are 35 years old, and 92.9-95.5 percent of them have at least one child. Differently from what we observe for stayers, the incidence of matrilocality is higher than the one of patrilocality in the ENDIREH 2016 and in the 2010 Census. The pattern is different in the ENOE, but this survey captures the living arrangements of the wives left behind shortly before the migration of their husbands. This key difference also explains why just 5.2 percent of the wives left behind in this third data source are household head and why they live households that are more likely to have a nuclear structure.

### 3.2 Basic descriptives for the three surveys

Table 2 reports the descriptive statistics for married women aged 20 to 49 in the ENDIREH 2016 survey that are either co-residing with their husbands (32,011 women), or left behind by a migrant husband (446 women). 90.5 percent of the wives left behind report to be receiving remittances from abroad (compared to just 0.9 percent for the stayers). The very large share of remittance-recipients is reassuring with respect to our choice to rely on the receipt of remittances from abroad to identify wives left behind in the 2010 Census.

The two groups of women are similar in terms of age, age difference with their respect to their husbands, years since marriage and number of children. The wives left behind have, on average, completed 9.0 years of schooling, less than the 10.1 years of schooling for the stayers, although this difference is mostly reflecting a compositional effect due to the large share of wives left behind that reside in rural areas in Mexico.<sup>25</sup> Table 3 reports the descriptive statistics from the 2010 Census for the wives that co-reside with their husbands, and for the wives left behind by an international migrant. Table 4 present the descriptive statistics for the sub-samples of wives left behind from the 2010 Census by living arrangement at the time of the survey. This table reveals that wives left behind co-residing with their parents-in-law are younger, with fewer years of completed schooling, less likely to have a child and mostly

---

<sup>25</sup>Table A.2 in the Appendix A report the descriptive statistics separately for rural and urban areas.

residing in rural areas compared to both neolocal or matrilocal wives left behind.<sup>26</sup>

Tables A.1 in the Appendix A reports the descriptive statistics from waves of the ENOE conducted between 2011Q1 and 2016Q4 for the 150,246 wives that co-reside with their husbands, and for the 861 wives left behind. All variables are measured at the first interview, so before the migration of the husband for the wives left behind, and the sample is restricted to households that went through all five interviews. The data reveal that the incidence of patrilocality and, albeit to a lesser extent, matrilocality is higher among wives left behind than among stayers. This pattern might reflect the fact that the probability of attrition after the migration of the husband is higher for a neolocal couple.

## 4 Living arrangements of wives left behind

Table 1 reveals that share of wives left behind in the ENDIREH 2016 and in the 2010 Census that co-reside with their own parents is much larger than the corresponding share of women that co-reside with their in-laws (27.4 and 5.9 percent in the ENDIREH 2016, and 18.9 and 8.0 percent in the 2010 Census).<sup>27</sup> This pattern starkly contrasts with the living arrangements of wives co-residing with their husbands (stayers), who are about equally likely to live with heir in-laws than with their own-parents (around 6-7 percent). As the ENDIREH 2016 reveals in Table 3, when they start co-residing with their husband just after marriage, wives left behind and wives of stayers had similar types of living arrangement: patrilocality largely prevailed (54.3 and 42.8 percent respectively among the wives left behind and of the

---

<sup>26</sup>A similar picture emerges when comparing the characteristics of the wives that co-reside with their husbands across different living arrangements, using data from the ENDIREH 2016 or the 2010 Census.

<sup>27</sup>The lower incidence of matrilocality among the wives left behind in the 2010 Census relative to the ENDIREH 2016 is to a large extent the by-product of the differences in the way we identify women left behind in the two surveys; when we also consider the 2,185 married women who do not co-reside with their husbands and that belong to remittance-recipient households (but do not personally receive remittances), the share of matrilocality increases from 18.9 to 22.9 percent, while patrilocality increases from 8.0 to 8.9 percent.

stayers),<sup>28</sup> and matrilocality was less frequent (12.4 and 10.7 percent).<sup>29</sup>

At the time of the survey, i.e., about 15 years after marriage according to Table 3, the incidence of matrilocality among wives left behind is several times higher than among wives of stayers. In urban areas, the incidence of matrilocality among wives left behind is nearly ten times larger than among stayers (39.1 and 4.0 percent), according to the ENDIREH 2016 (see Table A.2 in the Appendix A). Living arrangements vary greatly with age, and Figures 1 and 2 compare the age-specific incidence of patrilocality and matrilocality respectively for stayers, i.e., wives that co-reside with their husbands, and wives left behind from the ENDIREH 2016. The share of patrilocal wives left behind is in line with the corresponding figure for stayers for all age groups, while matrilocality is significantly higher among wives left behind. Figure 2 reveals that around 58 percent of the wives left behind aged 20 to 24 co-reside with their own parents, while this living arrangement is observed for less than 16 percent of the stayers. As most Mexican migrants originate from rural areas where patrilocal norms are stronger,<sup>30</sup> the compositional effect that is at play in Figures 1 and 2 compresses the difference in the share of matrilocality between wives left behind and stayers.

A legitimate concern is related to the limited number (446) of the wives left behind in the ENDIREH 2016, which is reflected in the large confidence intervals for this group of married women in Figures 1 and 2. Thus, we also rely on the data from the 2010 Census, where we are unable to unambiguously identify the wives left behind, but where numbers are much larger (19,219 married women). Figures 3 and 4 plot the age-specific share of patrilocal and patrilocal living arrangements for stayers and wives left behind in the larger sample from the 2010 Census. Consistently with the ENDIREH 2016, the share of patrilocality is identical in the two groups, while the incidence of matrilocality is substantially and significantly larger among wives left behind than among stayers.

Thus, the two surveys reveal a stylized fact that is consistent with the anthropological and sociological evidence described in the two initial quotes from Boehm (2012) and Dreby

---

<sup>28</sup>The higher incidence of patrilocality at marriage for wives left behind might be due to the fact that first-born children are more likely to co-reside with their own parents once they get married, and are more likely to migrate than their siblings (Bratti et al., 2020); none of the surveys provides us with information about the birth order of the husband, so we cannot test this conjecture.

<sup>29</sup>Similarly, Angelucci et al. (2010) provide evidence that couples in rural Mexico are more likely to live in the same village (but in a distinct housing unit) as the husband's parents (46.1 percent) than in the village of the wife's parents.

<sup>30</sup>See Table A.2 in the Appendix A.

(2010). The living arrangements of the wives whose husbands have moved out of Mexico depart from the traditional patrilocal norm, with a substantially higher incidence of co-residence with their own parents. This stylized fact, which had so far remained unnoticed in the economic literature on migration, deserves to be first challenged and then explained, provided that it proves to be robust.

## 5 Explaining the different living arrangements

We show here that the higher incidence of matrilocality among wives left behind reflects changes that occur *after* that their husbands move to the United States. We explore (and dismiss) possible alternative explanations (Sections 5.1-5.3) and then provide direct evidence in Section 5.4 that Mexican wives shift towards matrilocality when their husbands migrate. We then explore the various economic factors that might explain this shift towards matrilocality (Section 5.5).

### 5.1 A possible mis-reporting on marital status

The sample of women that we analyze only includes women that report to be married when going through the in-depth interview in the ENDIREH 2016 survey. Matrilocality is a common living arrangement in Mexico after marital dissolution,<sup>31</sup> so a legitimate concern is that the high share of matrilocality among the wives left behind might be reflecting a deliberate misreporting of their marital status if they perceive a social stigma associated to reporting that they are separated or divorced.<sup>32</sup>

The substantial share of women that report that to be divorced or separated in the ENDIREH 2016 survey (10.3 percent among women aged 20 to 49) helps mitigating the concern of a possible reluctance to talk about marital dissolution. Furthermore, the differential in matrilocality between wives left behind and stayers is larger among younger women (see Fig-

---

<sup>31</sup>42.1 percent of the women aged 20 to 49 in the sample of the ENDIREH 2016 who are separated, divorced or widowed co-reside with their own parents.

<sup>32</sup>The sensitive content of the in-depth survey implies that the women conducting the interview are instructed not to contradict the respondent even when they perceive, possibly on the basis of the replies to previous questions, that the respondent is reporting incorrect or contradictory information (see INEGI, 2016, p. 56); marital status is verified with a series of seven questions in the basic questionnaire of the ENDIREH 2016.

ure 2). These women are less exposed to the risk of marital dissolution,<sup>33</sup> and this further downplay the concern that matrilocal wives left behind might be misreporting their marital status.<sup>34</sup>

## 5.2 Different choice sets for stayers and wives left behind

The difference in the incidence of matrilocality that is observed for the wives that co-reside with their husbands and for the wives left behind could reflect a difference in the choice set from which they can select their preferred living arrangement. Differently from the 2010 Census, the ENDIREH 2016 provides information on whether the parents of all women in our sample are alive at the time of the survey.<sup>35</sup> This allows us checking whether selection into migration (of the husband) is negatively correlated with the death of the wife’s parents, something that might arise if the occurrence of this demographic event reduced the monetary resources that could be used to finance the migration of the husband, or it reduced the support that the wife could obtain from her family in case she was left behind. The data from the ENDIREH 2016 reveals that 91.8 percent of the wives left behind have at least one of their parents who is alive at the time of the survey, just slightly above the corresponding share for stayers (91.3 percent).<sup>36</sup> Thus, these minor differences in the set of available living arrangements cannot explain the differential incidence of matrilocality in the two groups of women in Section 3.<sup>37</sup>

## 5.3 Is selection into migration driving the observed pattern?

We now analyze whether the differences in living arrangements between the two groups of wives reflect selection into migration. We first explore whether differences in observable

---

<sup>33</sup>The share of women that report to be separated or divorced increases monotonically with age, from 5.3 percent for women aged 20 to 24, to 13.9 for women aged 45 to 49 in the ENDIREH 2016.

<sup>34</sup>Similar evidence emerges when we analyze the data from the 2010 Census.

<sup>35</sup>The corresponding information on the parents-in-law is available only when the wife co-resides with the husband, i.e., it is unknown to us for the wives left behind that do not co-reside with their parents-in-law.

<sup>36</sup>We obtain similar evidence if we just focus on the mothers (as matrilocality is almost invariably associated to the co-residence with the wife’s mother, not necessarily with the father), who are alive respectively for 84.0 and 84.2 percent of the wives left behind and of the stayers, or when we control for the difference in the age of the wives left behind and of the stayers that we see in Table 2.

<sup>37</sup>We also obtain a higher share of matrilocality among wives left behind relative to the wives of stayers when we restrict the sample to wives for whom both parents are alive.

characteristics explain the observed difference in the incidence of matrilocality still drawing on data from the ENDIREH 2016, and then we analyze whether the living arrangements of wives left behind might have already changed before the migration of their husbands using data from the ENOE.

### 5.3.1 Differences in observable characteristics

The descriptive statistics in Section 3 reveal that stayers and wives left behind differ with respect to some observable characteristics, such as age, education, or spatial distribution within Mexico, that could be correlated with their current living arrangements. Table 5 reports the results of regressions run on the sample of the ENDIREH 2016 survey where the dependent variable is represented either by (i) a dummy  $\text{mat}_i$  taking the value of 1 when the wife  $i$  lives with her parents (matrilocality), and 0 otherwise, or by (ii) a dummy  $\text{pat}_i$  taking the value of 1 when the wife  $i$  lives with her parents-in-law (patrilocality), and 0 otherwise.<sup>38</sup> We thus estimate the following OLS regression:

$$y_i = \alpha^{\text{left behind}}_i + \beta_1 \text{mat}_i^{\text{marriage}} + \beta_2 \text{pat}_i^{\text{marriage}} + d_i^{\text{age}} + d_i^{\text{schooling}} + d_i^{\text{children}} + d_i^{\text{rural}} + d_i^{\text{state}} + \epsilon_i^y, \text{ with } y = \{\text{mat}, \text{pat}\}, \quad (1)$$

where  $\text{left behind}_i$  is a dummy taking the value of 1 if the wife has been left behind by a migrant husband. Remarkably, we are able to control for the living arrangements at the time of marriage, i.e.,  $\text{mat}_i^{\text{marriage}}$  and  $\text{pat}_i^{\text{marriage}}$ , which are likely to influence current living arrangements, and that differ between stayers and wives left behind (see Table 2). We also allow for a flexible dependency of current living arrangements on the wife’s age, years of education and her number of children, including separate dummies for each value of these three variables. We also add fixed effects for living in rural areas and for living in each one of the 32 Mexican states in Eq. (1) to control for spatial variation in the predominant living arrangements that might be correlated with selection into (husband) migration.<sup>39</sup> Adding further controls increases the adjusted- $R^2$ , but it leaves the estimated coefficients for  $\alpha^{\text{mat}}$  and  $\alpha^{\text{pat}}$  virtually unaffected. The estimates in the third-data column in the regression for matrilocality in Table 5 reveal that wives left behind are 20.2 percentage points more likely

<sup>38</sup>We obtain similar results when estimating a multinomial logit model on a categorical variable describing current living arrangements (matrilocality, patrilocality, neolocality).

<sup>39</sup>Notice that we do not include household level variables, e.g., household size or income, in the controls of Eq. (1) as those are endogenous to co-residence choices.

to co-reside with their own parents, with this estimated coefficient being almost identical to the difference (20.4 percentage points) in the share of matrilocality between wives left behind and stayers that comes out of the simple descriptives in Table 2. Table A.3 in the Appendix A reports the estimates obtained when estimating Eq. (1), without controlling for the living arrangements at the time of marriage, on the sample of wives in the survey connected to the 2010 Census. Thus, differences in observable characteristics between stayers and wives left behind do not explain the different living arrangements between the two groups.

### 5.3.2 Living arrangements at the time of migration

The living arrangements of the wives left behind and of the stayers observed in the ENDI-REH 2016 might differ because of variations in living arrangements intervening before the migration of the husband. This explanation can be tested drawing on the ENOE, which allows observing the living arrangements of co-resident couples just before the husband moves to the United States. We estimate a specification that is close to the one in Eq. (1):<sup>40</sup>

$$y_i = \alpha^y \text{left behind}_i + d_i^{\text{age}} + d_i^{\text{schooling}} + d_i^{\text{children}} + d_i^{\text{rural}} + d_i^{\text{state}} + \epsilon_i^y, \text{ with } y = \{\text{mat}, \text{pat}\}, \quad (2)$$

where  $\text{mat}_i$  and  $\text{pat}_i$  are measured at the time of the first interview, and  $\text{left behind}_i$  is a dummy variable taking the value of 1 for the wives for which we observe their husbands migrating out of Mexico in one of the later interviews (about 6 months later on average, and no more than 12 months later). Thus, the main difference between Eqs. (1) and (2) is that, for the wives left behind, the former relies on the living arrangements prevailing after the migration of the husband, while the latter uses the living arrangements before the husband left Mexico.

Table 6 presents the results for Eq. (2), which is estimated on the sub-sample of wives belonging to non-attriter households, i.e., households that go through all five interviews in the ENOE. Wives left behind are more likely than stayers to co-reside with either parents or parents-in-law, but both coefficients are likely to be upward biased by differential probability of attrition across initial living arrangements for the wives left behind.<sup>41</sup> Even taking the

<sup>40</sup>The ENOE does not provide information on past living arrangements, so Eq. (2) does not control for matrilocality or patrilocality at the time of marriage, as we do in Eq. (1).

<sup>41</sup>As we discussed in Section 3 above, household dissolution intervening shortly after an international migration episode would simply leave the migration episode *unrecorded* in the ENOE; neolocal couples are

estimated coefficient in Column (2) in the regressions for matrilocality in Table 6 at face value, its size (0.027) is very far from the one obtained from the comparable specification in Column (2) in Table 5, which stands at 0.207. Thus, changes in living arrangements intervening before migration can, at most, account for a very limited portion of the higher incidence of matrilocality for wives left behind observed after the migration of their husbands.

We verified that the incidence of matrilocality among wives left behind after their husband’s migration is higher than the corresponding incidence for stayers when using the ENOE survey. We proceed in the same way as we did for the 2010 Census to identify wives left behind post-migration in the ENOE. We have a sample of 1,442 married women that are not co-residing with their husbands and that receive personally remittances from abroad (in the survey rounds after 2011Q1). Figure A.2 in the Appendix A displays the age-specific incidence of patrilocality and matrilocality for the wives left behind post-migration in the ENOE, and for wives of stayers. As expected, we find that matrilocality is several times more prevalent among wives left behind than among stayers. 61 percent of wives left behind aged 20 to 24 are matrilocal compared to 13 percent of wives of stayers, while the incidence of patrilocality is similar between the two groups. Figure A.1 shows that, consistently with Table 6, the living arrangements of women left behind that prevail before the husband’s migration are not substantially different from the one of stayers for all age groups.

## 5.4 Changes after the migration of the husband

The difference in living arrangements between wives left behind and wives of stayers appears to reflect neither a deliberate mis-reporting on marital status, neither a different set of feasible living arrangements for wives left behind, nor differences in observable between the two groups of women, and pre-existing living arrangements prevailing before the migration of the husband play, at most, a minor role. This suggests that variations in living arrangements intervening *after* the migration of the husband are the natural (remaining) candidate to explain the differences in living arrangements.

The survey connected to the 2010 Census gives us a unique opportunity to test this hypothesis. As explained in Section 2.2 above, the retrospective questions on the occurrence of migration episodes are subject to a co-residence condition (at the time of migration).

---

likely to belong to nuclear households, that are more likely to drop out of the sample than three-generation households.



Thus, this condition should be violated if a woman joined the household of her parents after her husband left Mexico (since it drives a wedge between her current household and the one of origin of the migrant), while it should be satisfied if the co-residence with her parents predates the migration episode.

We follow here [Bertoli and Murard \(2020\)](#): for each one of the 19,219 wives left behind in the 2010 Census, we search for her likely husband within the (possibly empty) set of current international migrants that are reported by the household to which the woman  $i$  belongs to at the time of the survey. We define a dummy variable  $\text{enumeration}_i$  that is equal to 1 if her household reports a male migrant currently living in the United States that is at most four years younger and no more than 10 years older than woman  $i$ , and 0 otherwise.<sup>42</sup> We then estimate the following equation:<sup>43</sup>

$$\text{enumeration}_i = \alpha \text{mat}_i + \beta \text{pat}_i + d_i^{\text{age}} + d_i^{\text{schooling}} + d_i^{\text{children}} + d_i^{\text{rural}} + d_i^{\text{state}} + \epsilon_i \quad (3)$$

Table 7 reports the estimates of Eq. (3) obtained on the entire sample, or separately for rural and urban areas. Matrilocal wives left behind are significantly less likely to report the migration of their husband than both patrilocal and neolocal wives left behind. The estimates in Column (2) reveal that matrilocality is associated with a 27.2 percentage points lower probability to enumerate the husband of a current international migrant, a reduction that is around half of the probability of enumeration for both patrilocal (55.5 percent) and neolocal (49.7 percent) wives left behind. This strongly suggests that changes in the living arrangements intervening after the migration of the husband are driving the higher incidence of matrilocality among the wives left behind.

The sample of wives left behind on which we estimated Eq. (3) includes all married women aged 20 to 49 who do not co-reside with their husbands and who report to be personally receiving remittances from abroad. The empirical evidence presented in Table 7 is robust when we extend the sample to include also the married women not co-residing with their husbands that belong to a remittance-recipient household, as shown in Table A.4 in the Appendix A. Thus, the results do not appear to critically hinge on the way in which we use the information on the receipt of remittances to define the sample of wives left behind

---

<sup>42</sup>This age difference between the two spouses covers 95 percent of the co-resident couples in the ENOE for which we observe the husband migrating out of Mexico.

<sup>43</sup>Results are unaffected if we replace the dummies for each Mexican state with a more demanding specification, with a dummy for each Mexican municipality.

in the 2010 Census.

The retrospective question on migration episodes is asked only to one member, the main respondent, for each surveyed household. Table 4 in Section 3 reveals that the share of wives left behind that are the main respondent varies greatly across different living arrangements: this share stands at 30.2 percent, 30.6 percent and 77.6 percent respectively for matrilocal, patrilocal and neolocal wives left behind. If the respondent (incorrectly) interprets the co-residence condition embedded in Questions IV.1 and IV.5 of the survey connected to the 2010 Census as related only to herself (rather than to all the members of the surveyed household), then the higher share of neolocal wives left behind that are main respondents might confound the estimated coefficient for matrilocality in Table 7, as different household members would answer differently to Question IV.5. If the wife left behind joined the household of her parents after the migration of her husband, then she might (incorrectly) consider that the co-residence condition in Question IV.5 is met, while (say) her mother would report that this condition is violated, as she was not living with her son-in-law when he left Mexico. The possible narrow interpretation of the co-residence condition is immaterial in the absence of variations in living arrangements after the migration episode, as all household members would give the same answer to Question IV.5. This subjective component in the interpretation of the the retrospective questions on migration indeed appears to be at play. When we restrict the sample used to estimate Eq. (3) to the wives left behind who were the main respondents to the survey, Table 8 reveals that the estimated coefficient for patrilocality remains stable, while the one for matrilocality is (in absolute terms) smaller than in Table 7. Specifically, matrilocality is associated with a 17.7 percentage points lower probability to enumerate the migration of the husband in Column (2) of Table 8, while the corresponding difference in Table 7 stands at 27.2 percentage points. Nevertheless, even if the possible incorrect interpretation of Question IV.5 clearly goes against us, matrilocality is still associated with a probability large and highly significant reduction in the probability to report the migration of one's own husband in Table 8.

## 5.5 Why do wives left behind opt for matrilocality?

Several economic factors can be put forward to explain why (*i*) wives left behind give up a neolocal independent living arrangement, and why (*ii*) the change in living arrangements results in a shift towards matrilocality rather than patrilocality.

With respect to point (i), almost all the Mexican wives left behind have children (see Tables 2 and 3), and co-residence with parents or parents-in-law could provide them with support for child care and domestic chores. Moreover, they might face a temporary financial hardship (Antman, 2011) associated to the investment into the migration of their husband.<sup>44</sup> Such an investment also exposes them to the uncertainty about the flow of remittances that they may receive, which depends on the evolution of economic conditions in the United States (see, for instance, Alcaraz et al., 2012), and on the risk of deportation of their husband in case of undocumented migration. Co-residence with other family members represents a coping strategy with respect to the (temporary) hardship and to the uncertainty associated to international migration, reducing expenditures related to some key public goods, notably housing, and allowing them to pool resources with a portion of the extended family.

As far as point (ii) is concerned, patrilocality could expose the wives left behind to a tighter control by their migrant husband with respect to the use of remittances, as parents-in-law might act as a monitoring device for the migrant (de Laat, 2014) that the wives left behind may want to avoid. Furthermore, wives left behind can be exposed to a higher risk of marital dissolution because of the prolonged period of physical separation from their husband. The negative economic and emotional consequences of a separation (or divorce) from their husbands would be further magnified if this also led to the end of the co-residence with in-laws,<sup>45</sup> thus further strengthening the preference for matrilocality for the wives left behind. The period of separation from their husbands can also end when wives eventually move to the United States, and the initial quote from Dreby (2010) suggests that mothers have a preference for leaving their children with maternal grandparents, so that matrilocality might also be a step taken to prepare their own migration to the United States. Unreported results from the ENDIREH 2016 reveal that wives receive a significantly greater help for

---

<sup>44</sup>McKenzie (2003) provides evidence of a change in the living arrangements of Mexican children following the 1994 *peso* crisis, with a reduction in the share of household members aged below 15 who are children of the household head, something that suggests that children moved in the households of their grandparents, or of other relatives.

<sup>45</sup>Boehm (2012) provides examples suggesting that patrilocality is no longer viable in cases of problems between the migrant and the wife left behind: “A week after receiving the news [of the infidelity] of Juan Carlos, she took her young daughter and went back to her parents’ home in a nearby rancho. In a twist that reflects how kinship is changing with migration, Fátima divorced her husband—and essentially her mother-in-law—by moving out of her mother-in-law’s house, severing ties with her husband but especially with her mother-in-law.” (p. 42).

child care and domestic chores (from household members other than their husbands) when they co-reside with their parents than with their parents-in-law,<sup>46</sup> and that matrilocality is also associated with greater wives' autonomy concerning their labor supply decisions, and the use of their own monetary resources. This latter dimension can be critical for wives left behind who have to share remittances with other co-resident family members.

## 6 Analytical implications for the children left behind

Section 5 has documented that a significant share of the wives left behind by a migrant start co-residing with their own parents after their husbands move out of Mexico. If we take the perspective of their children, this entails that paternal migration should be associated with an increase in the probability of co-residing with their maternal grandparents. This is indeed what we see in the data from the ENOE, even when we focus on older children, i.e., children aged 12 to 16, for which paternal migration should have a lower probability to induce a change in their living arrangements.<sup>47</sup> Panel A of Table 9 reveals that, for children who live with their mothers, paternal migration is associated with a major increase (from 2.0 to 7.8 percent) in the share of children left behind who co-reside with their maternal grandparents, while the incidence of co-residence with paternal grandparents remains virtually unaffected (3.2 and 3.3 percent before and after paternal migration).<sup>48</sup> In Panel B, we consider all children left behind, irrespective of whether they co-reside with their mothers, and for which we are no longer able to distinguish whether they live with maternal or paternal grandparents.<sup>49</sup> For these children, the probability of living with grandparents increases from 5.3 percent before

---

<sup>46</sup>The questionnaire allows the wife to identify the household members from which she obtains support for child care and domestic chores, but it provides no information on the extent of this support; results, which are available for the Authors upon request, are not reported as the limited number of wives left behind in the ENDIREH 2016 obliges us to pool them together with the wives of stayers, and analyze the entire sample of married women aged 20 to 49.

<sup>47</sup>Section 4 provides evidence that the change in living arrangements is more pronounced for younger wives left behind.

<sup>48</sup>Table 9 also reveals that children left behind have a lower probability of co-residing with maternal and paternal grandparents before the migration of their fathers compared to children who co-reside with both of their parents.

<sup>49</sup>The distinction between maternal and paternal grandparents is feasible only when a child co-resides with at least one of the two parents, as the relationship between the parent(s) and the grandparent(s) is the only variable that allows distinguishing between maternal and paternal grandparents.

paternal migration to 30.0 percent after the migration of their fathers. Thus, almost one out of three Mexican children aged 12 to 16 who have been left behind by one or two parents co-reside with grandparents, with Panel A of Table 9 strongly suggesting that, consistently with Dreby (2010), these are mostly maternal grandparents.

Children represent a focal point in the literature that analyzes the multifaceted effects of migration on the individuals left behind, and we need to understand which are the analytical challenges that arise because of the variations in their living arrangements. The main implications are that: (i) a variation in the co-residence choices of the children left behind leads to the non-enumeration of paternal migration through retrospective questions embedding a co-residence condition;<sup>50</sup> (ii) children will drop out of the sample of longitudinal surveys if the variation in co-residence choices is associated with the movement to a different housing unit, i.e., the one of their maternal grandparents; (iii) the children left behind that are either excluded from the analysis (because of attrition) or not identified as such (because of the non-enumeration of the migration episode) are likely to be a selected sample of the left behind with respect to the outcomes of interest, such as school attendance; (iv) co-residence with maternal grand-parents could mediate the effects produced by migration and remittances, a dimension of heterogeneity that has remained, so far, unexplored in the economic literature. We focus here on points (ii), (iii) and (iv), as point (i) is a direct implication of the empirical evidence provided by Bertoli and Murard (2020) using data from the 2000 Census of the Mexican population.

## 6.1 Attrition in short panel surveys

We use longitudinal data to understand whether paternal migration is significantly associated with the dissolution of the household of origin of the migrant, or with the arrival of the

---

<sup>50</sup>Interestingly enough, Bilborrow (2016) observes that the motivation that led the World Bank to include, for the first time, a migration module in one of its LSMS was related to concerns connected to the variation in household composition induced by international migration, and of its implications for the children left behind: “[t]he LSMS survey of Ecuador in 2005–2006 on 13,536 households included a module on emigrants from the household, recording [...] 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).” (p. 125); the retrospective question on migration embedded a co-residence condition, thus leaving unrecorded all the instances in which the children left behind had joined a different household.

grandparents of the children in this household. We thus draw on the data from the 2005Q1 to 2018Q4 waves of the ENOE survey to analyze whether children aged who live with both parents at the time of the first interview (but not with their grandparents), and for which we observe that the father migrates out of Mexico are either (i) more likely to drop out of the sample, or (ii) more likely to observe grandparents entering the roster of their household in a later interview, or both.<sup>51</sup> If starting to co-reside with maternal grandparents implies moving to a different housing unit, then we should observe that (i) is at play, while (ii) is not.

We have 168,879 households with at least one child aged 12 to 16 living with both parents, but not co-residing with their grandparents.<sup>52</sup> 1,796 children experience the international migration of their father over the period out of the 218,488 children in the sample.

Some notation is necessary to describe the specifications that we bring to the data. Let  $q = \{2005Q1, \dots, 2017Q4\}$  denote the quarter in which the first interview of household  $j$  takes place, and let  $s = \{1, 2, \dots, 5\}$  denote the number of the interview. We define migration $_{js}^q$  a dummy taking the value of 1 if paternal migration is observed between interview  $s - 1$  and  $s$ , i.e., during the quarter that precedes interview  $s$ , with  $s = \{2, \dots, 5\}$ . We also define attrition $_{js+1}^q$  as a dummy taking the value of 1 if household  $j$  goes through the interview  $s$  but drops out of the sample after interview  $s$  (with  $s = \{1, 2, \dots, 4\}$ ), and with grandparent $_{js}^q$  a dummy taking the value of 1 if a new member who is the grandparent of the child(ren) in our age range joins the roster of household  $j$  in any interview between  $s$  (with  $s = \{2, 3, \dots, 5\}$ ) and the fifth interview.

We bring to the data the following equation:<sup>53</sup>

$$\text{attrition}_{js+1}^q = \gamma \text{migration}_{js}^q + \beta' \mathbf{x}_{j1} + d_q \times d_s + d_j^{\text{rural}} + d_j^{\text{state}} + \epsilon_{js}, \text{ with } s = \{2, 3, 4\}, \quad (4)$$

where  $d_q$ ,  $d_s$ ,  $d_j^{\text{rural}}$  and  $d_j^{\text{state}}$  are dummies for the quarter, the number of the interview, for

---

<sup>51</sup>We use all the available waves of the ENOE rather than just those conducted between 2011Q1 and 2016Q4, as in Section 5.3.2 above, in order to increase statistical power, and as we are focusing on the children left behind, and not on the analysis of the living arrangement of a couple just before the husband migrates out of Mexico.

<sup>52</sup>The choice of the age group is meant to be in line with the choices made by Antman (2011), who focuses on children aged 12 to 18, and Alcaraz et al. (2012), who focus on children aged 12 to 16; the evidence that we present here is robust to employing a larger (0 to 18, or 12 to 18) or a different (0 to 12) age range, and the magnitude of the estimated effects for attrition is larger when we focus only on younger children.

<sup>53</sup>As migration episodes can be observed only from the second interview, and a migration episode recorded at the fifth interview cannot be followed by attrition, we estimate Eq. (4) for  $s = \{2, \dots, 4\}$ .

living in rural areas and for the Mexican state in which household  $j$  resides, and  $\mathbf{x}_{j1}$  is a vector of controls measured at the time of the first interview: dummies for the child’s age and sex, the household size, the number of children below 5 and the number of children aged 12-16 in the household, as well as for the age and years of schooling of the child’s mother and father.

Table 10 reports the results from the estimation of Eq. (4). Paternal migration is associated with an increase in the probability of attrition by 3.79-3.90 percentage points, i.e., a 92.4-95.1 percent increase with respect to the baseline probability of attrition of 4.1 percent, an effect that is significant at the 1 percent confidence level. The coefficients in Table 10 clearly represent a lower bound of the effect of paternal migration and household dissolution, as (i) the latter can also occur after the time frame covered by the ENOE data, and because (ii) we are *unable* to identify instances of paternal migration that occur at the same time, i.e., in between two interviews, as household dissolution. With respect to point (i), notice that for an episode of paternal migration that is recorded in the fourth interview, only an instance of household dissolution occurring over the next three months would give rise to attrition, as the household leaves the sample of the ENOE afterwards. As far as point (ii) is concerned, an episode of paternal migration that is followed by a household dissolution occurring before the following interview is, for us, an instance of attrition that is *not* preceded by paternal migration, as this has remained *unrecorded* in the data, thus inducing a downward bias in the estimate of  $\gamma$  in Eq. (4). While clearly we cannot quantify the frequency of these instances, the evidence that paternal migration is strongly associated with household attrition intervening shortly after, suggests the downward bias induced by point (ii) could be substantial.

We also estimate the following equation, that has the same set of controls and fixed effects as Eq. (4), on the subsample of non-attriter households:

$$\text{grandparent}_{js}^q = \phi \text{migration}_{js}^q + \beta' \mathbf{x}_{j1} + d_q \times d_s + d_j^{\text{rural}} + d_j^{\text{state}} + \epsilon_{js}, \text{ with } s = \{2, 3, 4, 5\}, \quad (5)$$

which allows understanding whether paternal migration is associated with a higher probability of observing the grandparent(s) joining the household in which the child(ren) in our age range belong to. Table 11 reveals that this is *not* the case, as paternal migration does not increase the (low at baseline) probability of observing grandparents joining the household of their grandchildren. Tables 10 and 11 jointly strongly suggest that the variations in living arrangements intervening after paternal migration out of Mexico entail the movement of the



household of origin of the migrant to a different household unit within Mexico.

### 6.1.1 Antman (2011)

This empirical evidence entails that an analysis of the effects of migration on the children left behind on the basis of standard panel survey data will miss the children who adjust their living arrangements after the migration of their fathers. Consider, notably, [Antman \(2011\)](#), who uses the longitudinal data from the 1990Q1-2001Q1 waves of the *Encuesta Nacional de Empleo Urbano* (ENEU) conducted by the INEGI to analyze the short-run consequences of paternal migration on the time use of children aged 12 to 18 left behind in Mexico.<sup>54</sup> [Antman \(2011\)](#) restricts the sample used in her econometric analysis to non-attriter children who are sons or daughters of the household head, and she provides empirical evidence that paternal migration induces, in the short-run, a major reallocation of time away from schooling and towards child work, for treated children. Table 6 at p. 206 in her paper reveals that the incidence of attrition among treated children, i.e., children whose fathers migrated out of Mexico, is more than twice as high as the probability of attrition among *untreated* children.<sup>55</sup> As attriters are excluded from the estimation sample, this implies that the analysis is uninformative about the short-run consequences of paternal migration on Mexican children who adjusted their living arrangements after the migration of their fathers. If co-residence with grandparents represents an effective “demographic coping strategy” ([Barsbai and Thiele, 2013](#)) to cope with the temporary financial hardship induced by migration, then [Antman \(2011\)](#) might be over-estimating the detrimental short-run consequences of paternal migration on Mexican children left behind.

---

<sup>54</sup>The ENEU was a short rotating panel survey, which followed households living in urban areas in Mexico for up to five interviews; as in the ENOE, the occurrence of an international migration episode can be inferred from variations in the household roster from the second to the fifth interview, and from questions asked to the remaining household members on where the former household members currently reside.

<sup>55</sup>Table 6 in [Antman \(2011\)](#) reveals that respectively 1.1 percent of the 7,391 non-attriters and 4.9 percent of the 2,669 attriters are treated, i.e., they have their father in the United States; the attrition rate for treated is given by  $(0.049 \times 2,669)/(0.011 \times 7,391 + 0.049 \times 2,669) = 61.3$  percent, while for untreated this is  $[(1 - 0.049) \times 2,669]/[(1 - 0.011) \times 7,391 + (1 - 0.049) \times 2,669] = 25.8$  percent.



## 6.2 Heterogeneous effects by living arrangements

Co-residence with (maternal) grandparents, which is substantially higher for children left behind, could mediate the effects produced by migration and remittances on them. [Gutierrez et al. \(2017\)](#) provide evidence of the significant positive effects of an old-age pension scheme in Mexico for the school outcomes of the beneficiaries' co-resident grandchildren, and [Angelucci et al. \(2018\)](#) emphasize the substantial inter-household transfers within the extended family network in Mexico, which can influence the school outcomes of non co-resident children ([Angelucci et al., 2010](#)). Co-residence with maternal grandparents could be a signal of the extent of resource-sharing within the extended family, and it could also magnify the investment made by maternal grandparents in their grandchildren ([Duflo, 2003](#); [Cox and Fafchamps, 2008](#)).<sup>56</sup> Furthermore, the analysis of the 2010 Census reveals that matrilocality (patrilocality) is more (less) likely for wives with higher level of education (see [Table A.3](#) in the [Appendix A](#)), and the association between living arrangements and the wife's education is much stronger for wives left behind than for stayers.<sup>57</sup> As the relative level of education of the two spouses is used as a proxy for their bargaining power in models of intra-household decision making (see, for instance, [Browning et al., 2014](#)), this suggests that matrilocality could be associated with a stronger bargaining power of the wife, including in the use of remittances.<sup>58</sup>

We draw on the data from the 2010 Census to provide empirical evidence of the heterogeneity in the educational outcomes of children left behind depending on their living arrangements. More precisely, we focus on 10,580 children aged 12 to 16 of the 19,219 wives left behind, who are thus co-residing with their mothers, but not with their fathers, and we define categorical variables (based on the relationship of their mother with the household head) that describe whether each child lives with maternal grandparents (8.0 percent),

---

<sup>56</sup>[Duflo \(2003\)](#) estimates the effect of pension changes on nutrition indicators for grandchildren (weight for height and height for age), finding positive significant effects in just one case: grandchildren co-residing with their maternal grandmothers.

<sup>57</sup>[Angelucci et al. \(2010\)](#), using data for rural Mexico, provide evidence that wives' education correlates positively with the probability of living in the same village as their parents.

<sup>58</sup>We cannot unfortunately examine this for wives left behind as we do not observe the education of non-co-resident husbands; when focusing instead on co-resident couples for which we can also observe the education of the husband, we find that the difference in the educational level of the spouses is a key determinant of their living arrangement: couples are more likely to be matrilocal when the wife has a higher level of education than her husband, while the reverse is true for patrilocality (see [Table A.6](#) in the [Appendix A](#)).

paternal grandparents (3.7 percent), or with no grandparent. We examine whether school attendance varies significantly across these different living arrangements. We control in a flexible way for the age and the sex of the child, as well as for the age and the years of schooling of the mother, including also dummies for rural areas and for each Mexican municipality. Needless to say, the living arrangements of the children left behind are endogenous, and the objective of this estimation is just to establish a multivariate correlation between school attendance and living arrangements. However, notice that our sample only includes children left behind by a migrant father, so that we follow here the recommendation of Yang (2008), who observes that “the most natural comparison group for a migrant household is the set of other migrant households” (p. 601). This implies that we are not concerned by unobservables that influence selection into migration, but just with unobservables that are correlated with the living arrangements of the children left behind.<sup>59</sup>

Table 12 reveals that the children left behind who co-reside with maternal grandparents are significantly more likely to be attending school relative to children that do not co-reside with their grandparents, even when we include a set of dummies for the years of completed schooling of their mothers. Co-residence with maternal grandparents is associated with a 4.9 percentage points higher probability of attending school, a 5.9 percent increase with respect to the baseline probability of attending school of 83.0 percent. We also obtain similar results when we focus on the 38,812 children aged 12 to 16 in remittance-recipient households who do not co-reside with their fathers, irrespective of whether they live with their mothers; 31.7 percent of them co-reside with their grandparents, and these children have a significantly higher probability of attending school (see Table A.5 in the Appendix A).<sup>60</sup>

This simple stylized fact implies that the children left behind that cross-sectional surveys typically fail to identify as such—because they changed their co-residence choices after paternal migration—are likely to be a selected sample of the left behind, for example with respect to educational outcomes. Hence, due to the design of their retrospective questions

---

<sup>59</sup>These unobservables also include a different probability across living arrangements that the children will eventually join their fathers in the United States, as the prospect to migrate can reduce the incentives to invest in schooling (McKenzie and Rapoport, 2011); this probability might be higher for children co-residing with maternal grandparents, as their mother are more likely to migrate according to Dreby (2010).

<sup>60</sup>As these children do not necessarily co-reside with their mothers, we are not able to differentiate between maternal and paternal grandparents, and we cannot control for the age and education of their mothers, as these variables can only be defined in case of co-residence.

on migration and the co-residence condition they typically embed in line with the recommendations of UNDESA (2017), cross-sectional surveys are likely to provide an inaccurate representation of the sample of children left behind.

### 6.2.1 Alcaraz, Chiquiar and Salcedo (2012)

We now examine whether co-residence with maternal grand-parents could mediate the effects produced by migration and remittances. Alcaraz et al. (2012) analyze of the effects of the sharp decline in remittances induced by the 2008-2009 economic crisis in the United States on children left behind in Mexico. Using the 2008Q2 and 2009Q1 waves of the ENOE survey, the authors perform a difference-in-difference analysis on Mexican children aged 12 to 16. They look at the variation in children outcomes (school attendance and child work) before and after the start of the crisis between a treatment group composed of household receiving remittances in 2008Q2, with 63 percent of them no longer receiving remittances in 2009Q1 (Alcaraz et al., 2012, p. 159), and a control group composed of household that do not receive remittances neither in 2008Q2 nor in 2009Q1.

We analyze the same two waves of the ENOE data, which include 14,296 children aged 12 to 16 who either belong to a recipient household in 2008Q2 (657 treated children), or to a non-recipient household (13,639 untreated children), and who were successfully interviewed also in 2009Q1. In 2008Q2, 12.4 percent of untreated children were living with their grandparents, while the corresponding figure for treated children is 22.5 percent, with the difference being significant at the 1 percent confidence level. The difference is even larger in urban areas, where 26.9 and 12.6 percent of treated and untreated children co-reside with grandparents, while the difference is smaller (4.5 percentage points) and not statistically different from zero in rural areas.

We focus on the sub-sample of treated 390 children in urban areas, where a substantial share of children co-reside with grandparents.<sup>61</sup> We analyze whether treated children who

---

<sup>61</sup>Pooling together treated and untreated children would be problematic, as co-residence with (maternal) grandparents for children in households that do not receive remittances from abroad is likely to be correlated with the dissolution of the marital union of their parents; untreated children who do not co-reside with their fathers because of (say) divorce are likely to be on different pre-trends with respect to school attendance relative to treated children, thus calling into question the results of difference-in-difference analysis when we split the sample on the basis of the initial living arrangements of the children; these concerns resonate with the remarks by Fafchamps and Quisumbing (2008) on the difficulty of comparing outcomes between

co-resided with their grandparents in 2008Q1 (105 children) were better able to cope with the sudden shock to remittance income. Table 13 reveals that children co-residing with grandparents experienced a statistically insignificant 3.3 percentage points decline in school attendance between the two waves of the ENOE survey, while children not co-residing with grandparents experience a dramatic decrease by 11.9 percentage points (significant at the 1 percent confidence level). The differential in the probability to attend school between the two groups widened by 8.7 percentage points, from 3.2 percentage points in 2008Q2 to 11.9 percent percentage points in 2009Q1, and this differential is significant at the 5 percent confidence level. This result is remarkable, as children co-residing with grandparents were much more likely to live with neither of their parents relative to other children left behind (22.9 and 0.7 percent respectively), something that implies that they were exposed to a likely larger loss of income due to the economic crisis in the United States since both of their parents were probably affected.<sup>62</sup>

Thus, Table 13 illustrates the possibility that the effects of migration and remittances on the children left behind are heterogeneous with respect to their living arrangements.<sup>63</sup> If, beyond being sheltered by the adverse effects of a decline in remittances, the children who join the household of their (maternal) grandparents are also better able to cope with the temporary financial hardship induced by paternal migration, then the results of Antman (2011) would be overestimating the negative short-term effects of paternal migration on children's schooling and work outcomes.

## 7 Concluding remarks

International migration can lead to prolonged periods of physical separation for individuals that used to co-reside. We provide evidence that the migration of Mexican married men leads to significant changes in the living arrangements of the spouse and of the children left behind, with a substantial increase in the incidence of matrilocality, i.e., co-residence with

---

male-headed and female-headed households, as female-headship is endogenously determined.

<sup>62</sup>Consistent with this, we find that, at least at the extensive margin, the drop in remittances income is larger for children co-residing with grandparents: 71 percent of them no longer receive remittances in 2009Q1, compared to 60 percent of the children not co-residing with grandparents.

<sup>63</sup>We find no evidence of significant heterogeneous effects on the treatment on child work, the other outcome for children that Alcaraz et al. (2012) analyze; results are available from the Authors upon request.

the parents of the wife. 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, [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 three 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 (because of attrition), or not identified as such in cross-sectional surveys (because of the non-enumeration of the migration episode) are likely to be a selected sample of the left behind with respect to the outcomes of interest. Third, variations in living arrangements associated to migration can mediate the effects that scholars aim at estimating. These relevant consequences related to 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](#)).

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.

## References

- ABARCAR, P., R. BARUA, AND D. YANG (2020): “Financial Education and Financial Access for Transnational Households: Field Experimental Evidence from the Philippines,” *Economic Development and Cultural Change*, 69, 373–404.
- ADSERÀ, A. AND A. FERRER (2015): “Immigrants and Demography: Marriage, Divorce, and Fertility,” in *Handbook of the Economics of International Migration*, ed. by B. R. Chiswick and P. W. Miller, North-Holland, vol. 1, 315–374.
- ALCARAZ, C., D. CHIQUIAR, AND A. SALCEDO (2012): “Remittances, schooling, and child labor in Mexico,” *Journal of Development Economics*, 97, 156–165.
- AMBLER, K. (2015): “Don’t tell on me: Experimental evidence of asymmetric information in transnational households,” *Journal of Development Economics*, 113, 52–69.
- ANGELUCCI, M. (2008): “Love on the rocks: Domestic violence and alcohol abuse in rural Mexico,” *The BE Journal of Economic Analysis and Policy*, 8, <https://doi.org/10.2202/1935-1682.1766>.
- (2015): “Migration and financial constraints: Evidence from Mexico,” *Review of Economics and Statistics*, 97, 224–228.
- ANGELUCCI, M., G. DE GIORGI, M. A. RANGEL, AND I. RASUL (2010): “Family networks and school enrollment: Evidence from a randomized social experiment,” *Journal of Public Economics*, 94, 197–221.
- ANGELUCCI, M., G. DE GIORGI, AND I. RASUL (2018): “Consumption and Investment in Resource Pooling Family Networks,” *Economic Journal*, 128, 2613–2651.
- ANTMAN, F. M. (2011): “The intergenerational effects of paternal migration on schooling and work: What can we learn from children’s time allocations?” *Journal of Development Economics*, 96, 200–208.
- (2012): “Gender, educational attainment, and the impact of parental migration on children left behind,” *Journal of Population Economics*, 25, 1187–1214.

- (2015): “Gender discrimination in the allocation of migrant household resources,” *Journal of Population Economics*, 28, 565–592.
- ASHRAF, N., D. AYCINENA, C. MARTÍNEZ A, AND D. YANG (2015): “Savings in transnational households: A field experiment among migrants from El Salvador,” *Review of Economics and Statistics*, 97, 332–351.
- BARSBAL, T. AND R. THIELE (2013): “Does Prime-Age Mortality Reduce Per-Capita Household Income? Evidence from Rural Zambia,” *World Development*, 45, 51–62.
- BERTOLI, S. AND E. MURARD (2020): “Migration and co-residence choices: Evidence from Mexico,” *Journal of Development Economics*, Article 102330.
- BILSBORROW, R. (2016): “Concepts, Definitions and Data Collection Approaches,” in *International Handbook on Migration and Population Distribution*, ed. by M. J. White, Springer, 109–156.
- BOEHM, D. (2012): *Intimate Migrations: Gender, Family, and Illegality among Transnational Migrants*, New York University Press.
- BRATTI, M., S. FIORE, AND M. MENDOLA (2020): “The impact of family size and sibling structure on the great Mexico–USA migration,” *Journal of Population Economics*, 33, 483–529.
- BROWNING, M., P.-A. CHIAPPORI, AND Y. WEISS (2014): *Economics of the Family*, Cambridge University Press.
- CERRUTTI, M. AND D. S. MASSEY (2001): “On the auspices of female migration from Mexico to the United States,” *Demography*, 38, 187–200.
- CHEN, J. J. (2006): “Migration and imperfect monitoring: Implications for intra-household allocation,” *American Economic Review*, 96, 227–231.
- (2013): “Identifying non-cooperative behavior among spouses: Child outcomes in migrant-sending households,” *Journal of Development Economics*, 100, 1–18.
- CLEMENS, M. A. AND E. R. TIONGSON (2017): “Split Decisions: Household Finance When a Policy Discontinuity Allocates Overseas Work,” *Review of Economics and Statistics*, 99, 531–543.

- CORTÉS, P. (2015): “The Feminization of International Migration and its Effects on the Children Left Behind: Evidence from the Philippines,” *World Development*, 65, 62–78.
- COX, D. AND M. FAFCHAMPS (2008): “Extended family and kinship networks: economic insights and evolutionary directions,” in *Handbook of Development Economics*, ed. by T. P. Schultz and J. A. Strauss, Elsevier, vol. 4, 3711–3784.
- DE LAAT, J. (2014): “Household allocations and endogenous information: The case of split migrants in Kenya,” *Journal of Development Economics*, 106, 108–117.
- DREBY, J. (2010): *Divided by Borders - Mexican migrants and their children*, University of California Press.
- DUFLO, E. (2003): “Grandmothers and granddaughters: old-age pensions and intrahousehold allocation in South Africa,” *World Bank Economic Review*, 17, 1–25.
- FAFCHAMPS, M. AND A. R. QUISUMBING (2008): “Household Formation and Marriage Markets in Rural Areas,” in *Handbook of Development Economics*, ed. by T. P. Schultz and J. A. Strauss, Elsevier, vol. 4, 3187–3247.
- FERNÁNDEZ-HUERTAS MORAGA, J. (2011): “New evidence on emigrant selection,” *Review of Economics and Statistics*, 93, 72–96.
- (2013): “Understanding different migrant selection patterns in rural and urban Mexico,” *Journal of Development Economics*, 103, 182–201.
- FOSTER, A. D. AND M. R. ROSENZWEIG (2002): “Household division and rural economic growth,” *Review of Economic Studies*, 69, 839–869.
- GIBSON, J., D. J. MCKENZIE, AND S. STILLMAN (2011): “The impacts of international migration on remaining household members: Omnibus results from a migration lottery program,” *Review of Economics and Statistics*, 93, 1297–1318.
- GUTIERREZ, E., L. JUAREZ, AND A. RUBLI (2017): “The Effect of a Transfer Program for the Elderly in Mexico City on Co-Residing Children’s School Enrollment,” *World Bank Economic Review*, 31, 809–828.



- HAMILTON, E. R. AND R. SAVINAR (2015): “Two sources of error in data on migration from Mexico to the United States in Mexican household-based surveys,” *Demography*, 52, 1345–1355.
- IBARRARAN, P. AND D. LUBOTSKY (2007): “Mexican immigration and self-selection: New evidence from the 2000 Mexican census,” in *Mexican immigration to the United States*, ed. by G. J. Borjas, University of Chicago Press, 159–192.
- INEGI (2010): *Censo de Población y Vivienda 2010: Manual del entrevistador del Cuestionario ampliado*, Mexico DF: Instituto Nacional de Estadística y Geografía.
- (2016): *Encuesta Nacional sobre la Dinámica de las Relaciones en los Hogares: Manual de la entrevistadora*, Mexico DF: Instituto Nacional de Estadística y Geografía.
- MASSEY, D. S., J. ARANGO, G. HUGO, A. KOUAOUCI, A. PELLEGRINO, AND J. E. TAYLOR (1993): “Theories of international migration: A review and appraisal,” *Population and Development Review*, 19, 431–466.
- MCKENZIE, D. J. (2003): “How do households cope with aggregate shocks? Evidence from the Mexican peso crisis,” *World Development*, 31, 1179–1199.
- MCKENZIE, D. J. AND H. RAPOPORT (2010): “Self-selection patterns in Mexico-US migration: The role of migration networks,” *Review of Economics and Statistics*, 92, 811–821.
- (2011): “Can migration reduce educational attainment? Evidence from Mexico,” *Journal of Population Economics*, 24, 1331–1358.
- MURARD, E. (2020): “On the Joint Consumption and Labour Supply Effects of Migration on those Left Behind,” *Journal of Development Studies*, 56, 129–150.
- NOBLES, J. (2013): “Migration and father absence: Shifting family structure in Mexico,” *Demography*, 50, 1303–1314.
- RIZZICA, L. (2018): “When the Cat’s Away The Effects of Spousal Migration on Investments on Children,” *World Bank Economic Review*, 32, 85–108.
- STEINMAYR, A. (2020): “When a Random Sample is Not Random. Bounds on the Effect of Migration on Household Members Left Behind,” Mimeo.

- TERUEL, G., L. RUBALCAVA, AND E. ARENAS (2012): “Migration in the Mexican Family Life Survey,” in *Migration and Remittances from Mexico*, ed. by A. Cuecuecha and C. Pederzini, Lexington Books, 15–36.
- UNDESA (2017): *Handbook on Measuring International Migration through Population Censuses*, Statistical Commission, United Nations Department of Economic and Social Affairs.
- WONG LUNA, R., E. RESANO PÈREZ, AND L. MARTÍNEZ MARTIÑÓN (2006): *Una Costante Cambiante: La Migración De La Población Mexicana hacia los Estados Unidos de Norteamérica*, Zapopan: Universidad de Guadalajara.
- YANG, D. (2008): “International migration, remittances and household investment: Evidence from Philippine migrants exchange rate shocks,” *Economic Journal*, 118, 591–630.

# Tables

Table 1: Descriptive statistics of wives of stayers and wives left behind

	ENDIREH 2016		2010 Census		ENOE 2011-2016	
	Stayers	Left behind	Stayers	Left behind	Stayers	Left behind
	(1)	(2)	(3)	(4)	(5)	(6)
Rural	0.235 (0.424)	0.475 (0.500)	0.222 (0.416)	0.470 (0.499)	0.234 (0.424)	0.536 (0.499)
Age	36.73 (7.68)	35.59 (8.02)	35.78 (7.72)	34.78 (7.73)	37.21 (7.49)	35.10 (7.97)
Household head	0.041 (0.199)	0.552 (0.498)	0.033 (0.178)	0.717 (0.450)	0.031 (0.173)	0.052 (0.223)
Matrilocality	0.070 (0.255)	0.274 (0.446)	0.052 (0.222)	0.189 (0.391)	0.058 (0.233)	0.075 (0.264)
Patrilocality	0.067 (0.250)	0.059 (0.237)	0.067 (0.249)	0.080 (0.271)	0.067 (0.250)	0.112 (0.315)
Years of schooling	10.131 (4.178)	8.954 (3.536)	9.286 (4.334)	7.615 (3.580)	9.547 (4.042)	8.145 (3.260)
At least one child	0.937 (0.242)	0.929 (0.257)	0.937 (0.244)	0.944 (0.230)	0.949 (0.219)	0.955 (0.206)
Household size	4.563 (1.650)	4.185 (1.857)	4.830 (1.938)	4.571 (2.207)	4.637 (1.518)	4.954 (1.614)
Nuclear household	0.756 (0.429)	0.568 (0.496)	0.747 (0.435)	0.580 (0.494)	0.777 (0.417)	0.712 (0.453)
Observations	32,011	446	1,111,122	19,219	150,246	861

Notes: average and standard deviation have been computed using individual sampling weights for each survey; the three samples only include married women aged 20 to 49; all variables are measured at the first interview in the ENOE survey; in the Census 2010, the stayers are women who co-reside with their husbands, and the left behind are women that do not co-reside with their husbands, and that report to be personally receiving remittances from abroad; in the ENOE, the stayers are women who co-reside with their husbands over the five interviews, and the left behind are women who co-reside with their husbands at the time of the first interview, and whose husbands is observed to migrate to the United States between the second and the fifth interview; in the ENDIREH 2016, the stayers are women who co-reside with their husbands, and the left behind are women who do not co-reside with their husbands, and who report that their husbands live in the United States.

Source: Authors' elaboration on data from the ENDIREH 2016, the survey connected to the 2010 Census and ENOE 2011Q3-2016Q3.

Table 2: Descriptive statistics (ENDIREH 2016)

	Wives	
	Stayers	Left behind
Matrilocality	0.070 (0.255)	0.274 (0.446)
Patrilocality	0.067 (0.250)	0.059 (0.237)
Matrilocality at marriage	0.107 (0.310)	0.124 (0.330)
Patrilocality at marriage	0.428 (0.495)	0.543 (0.499)
Years since marriage	15.439 (8.260)	14.636 (8.397)
Years since husband's migration		3.982 (4.486)
Married more than once	0.048 (0.214)	0.042 (0.201)
Husband's age	39.491 (8.598)	
Husband's years of schooling	10.046 (4.415)	
Remittance-recipient	0.009 (0.092)	0.905 (0.293)
Co-resident individuals (0-18)	1.873 (1.268)	1.870 (1.328)
Co-resident individuals (12-18)	0.723 (0.862)	0.744 (0.860)
Co-resident individuals (12-16)	0.535 (0.715)	0.563 (0.751)
Observations	32,011	446

Notes: average and standard deviation of each variable have been computed using individual sampling weights.

Source: Authors' elaboration on ENDIREH 2016.

Table 3: Descriptive statistics (2010 Census)

	Wives	
	Stayers	Left behind
Matrilocality	0.052 (0.222)	0.189 (0.391)
Patrilocality	0.067 (0.249)	0.080 (0.271)
Husband's age	38.879 (8.985)	
Husband's years of schooling	9.520 (4.543)	
Co-resident individuals (0-18)	2.098 (1.399)	2.439 (1.511)
Co-resident individuals (12-16)	0.551 (0.750)	0.660 (0.809)
Co-resident individuals (12-18)	0.752 (0.928)	0.896 (0.989)
Observations	1,111,122	19,219

Notes: average and standard deviation of each variable have been computed using individual sampling weights.

Source: Authors' elaboration the survey connected to the 2010 Census.

Table 4: Descriptive statistics for wives left behind by living arrangement (2010 Census)

	Wives left behind		
	Matrilocal	Patrilocal	Neolocal
Rural	0.356 (0.479)	0.575 (0.494)	0.488 (0.500)
Age	30.861 (7.054)	29.436 (7.377)	36.369 (7.303)
Household head	0.071 (0.257)	0.138 (0.345)	0.947 (0.224)
Main respondent	0.302 (0.459)	0.306 (0.461)	0.776 (0.417)
Years of schooling	9.184 (3.517)	7.476 (3.048)	7.224 (3.539)
At least one child	0.868 (0.338)	0.901 (0.299)	0.968 (0.175)
Co-resident individuals (0-18)	2.462 (1.701)	2.662 (1.810)	2.409 (1.418)
Co-resident individuals (12-16)	0.511 (0.731)	0.596 (0.830)	0.705 (0.821)
Co-resident individuals (12-18)	0.724 (0.919)	0.805 (1.002)	0.951 (0.999)
Household size	6.204 (2.440)	6.195 (2.545)	3.972 (1.755)
Nuclear household	0.030 (0.170)	0.000 (0.000)	0.785 (0.411)
Observations	3,230	1,856	14,133

Notes: average and standard deviation of each variable have been computed using individual sampling weights; wives left behind are matrilocal (patrilocal) when they co-reside with their own parents (parents-in-law), while they are neolocal when the do not co-reside with either parents or parents-in-law.

Source: Authors' elaboration on the survey connected to the 2010 Census.

Table 5: Living arrangements and husband's migration

	<i>Dependent variable:</i>					
	Matrilocality			Patrilocality		
	(1)	(2)	(3)	(4)	(5)	(6)
Wife left behind	0.213*** (0.034)	0.207*** (0.033)	0.202*** (0.033)	-0.017 (0.015)	-0.024 (0.015)	-0.027* (0.015)
Matrilocality at marriage			0.177*** (0.012)			-0.009 (0.006)
Patrilocality at marriage			-0.002 (0.005)			0.092*** (0.005)
Adjusted- $R^2$	0.013	0.049	0.093	0.004	0.059	0.089
Observations	32,457	32,457	32,457	32,457	32,457	32,457
Average outcome (stayers)	0.070	0.070	0.070	0.067	0.067	0.067
<i>Dummies</i>						
Rural area	Yes	Yes	Yes	Yes	Yes	Yes
State	Yes	Yes	Yes	Yes	Yes	Yes
Age, years of schooling, number of children	No	Yes	Yes	No	Yes	Yes

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ ; standard errors are robust to heteroskedasticity; individual sampling weights used in the estimation.

Source: Authors' elaboration on ENDIREH 2016.

Table 6: Pre-migration living arrangements

	<i>Dependent variable:</i>			
	Matrilocality		Patrilocality	
	(1)	(2)	(1)	(2)
Wife left behind	0.031*** (0.012)	0.027** (0.012)	0.045*** (0.014)	0.031** (0.014)
Adjusted- $R^2$	0.006	0.028	0.006	0.061
Observations	151,107	151,107	151,107	151,107
Average outcome (stayers)	0.058	0.058	0.067	0.067
<i>Dummies</i>				
Rural areas	Yes	Yes	Yes	Yes
State	Yes	Yes	Yes	Yes
Age, years of schooling, number of children	No	Yes	No	Yes

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ ; standard errors are robust to heteroskedasticity; individual sampling weights are used in the estimation; the sample is restricted to women in non-attributing households; living arrangements are defined at the first interview, i.e., before the possible migration of the husband; wife left behind is a dummy equal to 1 for the women whose husbands migrated out of Mexico from the second to the fifth interview.

Source: Authors' elaboration on ENOE 2011Q1-2016Q4.

Table 7: Enumeration of the migration of the husband

	<i>Dependent variable: enumeration<sub>i</sub></i>					
	All		Rural		Urban	
	(1)	(2)	(3)	(4)	(5)	(6)
Matrilocality	-0.257*** (0.013)	-0.272*** (0.015)	-0.347*** (0.020)	-0.361*** (0.021)	-0.198*** (0.018)	-0.215*** (0.019)
Patrilocality	0.037* (0.020)	0.002 (0.021)	0.006 (0.022)	-0.029 (0.022)	0.070* (0.036)	0.035 (0.037)
Adjusted- $R^2$	0.118	0.151	0.107	0.140	0.078	0.115
Observations	19,219	19,219	11,632	11,632	7,587	7,587
Matrilocality-Patrilocality	-0.294***	-0.273***	-0.353***	-0.332***	-0.268***	-0.250***
Average outcome (neolocal)	0.497	0.497	0.598	0.598	0.402	0.402
Average outcome (patrilocal)	0.555	0.555	0.604	0.604	0.490	0.490
<i>Dummies</i>						
Rural area	Yes	Yes	Yes	Yes	Yes	Yes
State	Yes	Yes	Yes	Yes	Yes	Yes
Age, years of schooling, number of children	No	Yes	No	Yes	No	Yes

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ ; standard errors are robust to heteroskedasticity; individual sampling weights used in the estimation; rural areas are localities with less than 2,500 inhabitants.

Source: Authors' elaboration on the survey connected to the 2010 Census.

Table 8: Enumeration of the migration of the husband (sample of main respondents)

	<i>Dependent variable: enumeration<sub>i</sub></i>					
	All		Rural		Urban	
	(1)	(2)	(3)	(4)	(5)	(6)
Matrilocality	-0.165*** (0.024)	-0.177*** (0.024)	-0.232*** (0.037)	-0.227*** (0.037)	-0.123*** (0.031)	-0.136*** (0.031)
Patrilocality	0.009 (0.035)	-0.006 (0.033)	-0.028 (0.037)	-0.036 (0.035)	0.061 (0.068)	0.061 (0.064)
Adjusted- $R^2$	0.087	0.129	0.061	0.106	0.067	0.114
Observations	12,994	12,994	8,235	8,235	4,759	4,759
Matrilocality-Patrilocality	-0.174***	-0.171***	-0.205***	-0.191***	-0.184**	-0.198***
Average outcome (neolocal)	0.529	0.529	0.615	0.615	0.434	0.434
Average outcome (patrilocal)	0.546	0.546	0.579	0.579	0.488	0.488
<i>Dummies</i>						
Rural area	Yes	Yes	Yes	Yes	Yes	Yes
State	Yes	Yes	Yes	Yes	Yes	Yes
Age, years of schooling, number of children	No	Yes	No	Yes	No	Yes

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ ; standard errors are robust to heteroskedasticity; individual sampling weights used in the estimation; rural areas are localities with less than 2,500 inhabitants; the sample is restricted to the women who were the main respondent to the questions of the survey connected to the 2010 Census.

Source: Authors' elaboration on the survey connected to the 2010 Census.

Table 9: Changing living arrangements of children left behind

	Father is:				
	Stayer	Migrant	Migrant	(2)-(1)	(3)-(2)
	(1)	(pre-migration) (2)	(post-migration) (3)		
<hr/> Panel A: Children left behind with their mother <hr/>					
<i>Co-residence with:</i>					
Maternal grandparents	0.036 (0.000)	0.020 (0.003)	0.078 (0.004)	-0.016*** (0.004)	0.058*** (0.006)
Paternal grandparents	0.041 (0.000)	0.032 (0.004)	0.033 (0.003)	-0.009** (0.004)	0.001 (0.005)
Grandparents	0.077 (0.001)	0.053 (0.005)	0.111 (0.005)	-0.025*** (0.006)	0.059*** (0.008)
Observations	208,208	2,115	3,747	210,323	5,862
<hr/> Panel B: Children left behind with or without their mother <hr/>					
<i>Co-residence with:</i>					
Grandparents	0.077 (0.001)	0.053 (0.005)	0.300 (0.005)	-0.025*** (0.006)	0.247*** (0.010)
Observations	208,208	2,115	9,161	210,323	11,276

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ ; average and standard errors of each variable have been computed using individual sampling weights; the sample consists of children aged 12 to 16; children with a stayer father in Column (1) are children co-residing with their father and mother in the first interview and whose father does not migrate over the following fourth interviews; children with a migrant father in Column (2) that are observed before migration are children co-residing with their father and mother in the first interview and whose father the migrates out of Mexico; In Column (3) of Panel A children with a migrant father that are observed after migration are children living with their mother but not with their father and whose mother personally receives remittances from abroad; In Column (3) of Panel B children with a migrant father that are observed after migration are children not living with their father and living in a household in which at least one member receives remittances from abroad.

Source: Authors' elaboration on ENOE 2005Q1-2018Q4.



Table 10: Household attrition and paternal migration among children 12-16

	<i>Dep. variable: <math>a_{js+1}^q</math></i>		
	(1)	(2)	(3)
migration $_{js}^q$	0.039*** (0.012)	0.039*** (0.012)	0.038*** (0.012)
Adjusted- $R^2$	0.012	0.012	0.021
Observations	610,051	610,051	610,051
Average outcome (stayers)	0.041	0.041	0.041
<i>Dummies</i>			
Rural FE, $q \times s$ FE and State FE	Yes	Yes	Yes
Child's age, sex and number of children	No	Yes	Yes
Household size, parents' age and years of schooling	No	No	Yes

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ ; standard errors are clustered at the household level; individual sampling weights used in the estimation; the sample consists of children aged 12 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; all household and individual controls are measured at the time of the first interview. Source: Authors' elaboration on ENOE 2005Q1-2018Q4.

Table 11: Paternal migration and grandparents joining the household of origin of the migrant

	<i>Dep. variable: grandparent<sub>js</sub><sup>q</sup></i>		
	(1)	(2)	(3)
migration <sub>js</sub> <sup>q</sup>	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)
Adjusted- $R^2$	0.003	0.003	0.004
Observations	764,491	764,491	764,491
Average outcome (stayers)	0.002	0.002	0.002
<i>Dummies</i>			
Rural FE, $q \times s$ FE and State FE	Yes	Yes	Yes
Child's age, sex and number of children	No	Yes	Yes
Household size, parents' age and years of schooling	No	No	Yes

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ ; standard errors are clustered at the household level; individual sampling weights used in the estimation; the sample consists of children aged 12 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, and whose household does not attrit; all household and individual controls are measured at the time of the first interview.

Source: Authors' elaboration on ENOE 2005Q1-2018Q4.

Table 12: School attendance of children left behind (12 to 16)

	<i>Dependent variable: school attendance<sub>i</sub></i>			
	(1)	(2)	(3)	(4)
Maternal grandparents	0.081*** (0.022)	0.066*** (0.021)	0.065*** (0.021)	0.049** (0.021)
Paternal grandparents	0.039 (0.026)	0.031 (0.026)	0.032 (0.026)	0.029 (0.025)
Adjusted- $R^2$	0.044	0.165	0.168	0.185
Observations	10,580	10,580	10,580	10,580
Average outcome (no grandparent)	0.830	0.830	0.830	0.830
<i>Dummies</i>				
Rural area	Yes	Yes	Yes	Yes
Municipality	Yes	Yes	Yes	Yes
Age, sex	No	Yes	Yes	Yes
Mother's age	No	No	Yes	Yes
Mother's years of schooling	No	No	No	Yes

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ ; standard errors are robust to heteroskedasticity; individual sampling weights used in the estimation; rural areas are localities with less than 2,500 inhabitants.

Source: Authors' elaboration on the survey connected to the 2010 Census.

Table 13: Living with grandparents and school attendance for children in remittance-recipient households (ENOE 2008Q2 and 2009Q1)

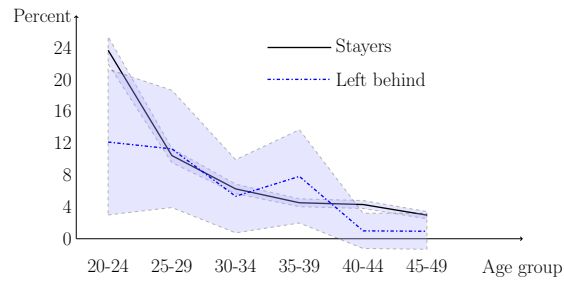
	School attendance		
	Living with grandparents in 2008Q2		
	No	Yes	
	(1)	(2)	(2)-(1)
2008Q2	0.927 (0.015)	0.959 (0.019)	0.032 (0.031)
2009Q1	0.808 (0.023)	0.926 (0.026)	0.119*** (0.045)
2008Q2 -2009Q1	-0.119*** (0.020)	-0.033 (0.024)	0.087** (0.040)
Observations	285	105	390

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ ; averages and standard errors have been computed using individual sampling weights; the sample consists of children aged 12 to 16 living in urban areas, belonging to remittance-recipient households in 2008Q2, and who are observed again in 2009Q1.

Source: Authors' elaboration on the ENOE 2008Q2 and 2009Q1.

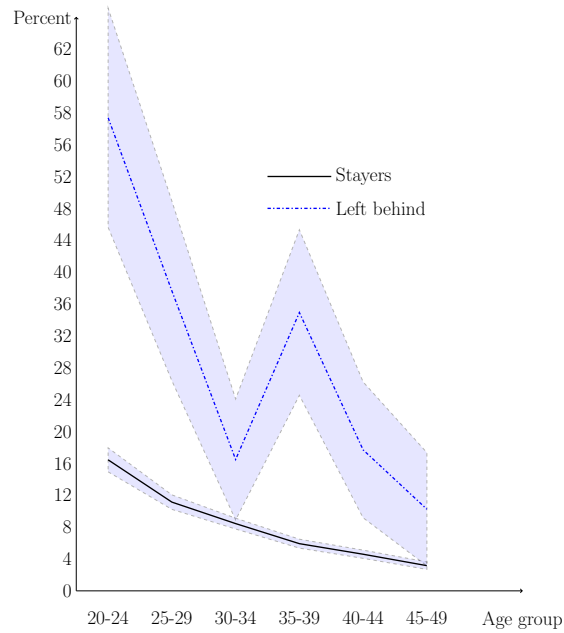
# Figures

Figure 1: Incidence of patrilocality for stayers and wives left behind



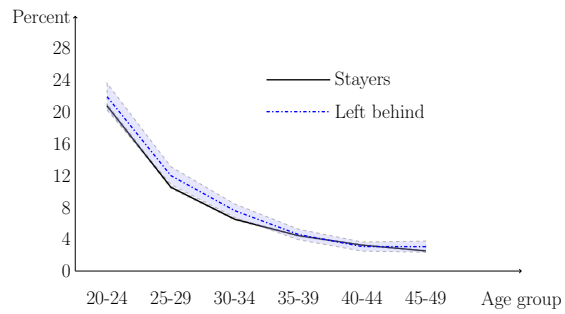
Notes: averages and 95 percent confidence intervals computed using the individual sampling weights.  
Source: Authors' elaboration on ENIDIREH 2016.

Figure 2: Incidence of matrilocality for stayers and wives left behind



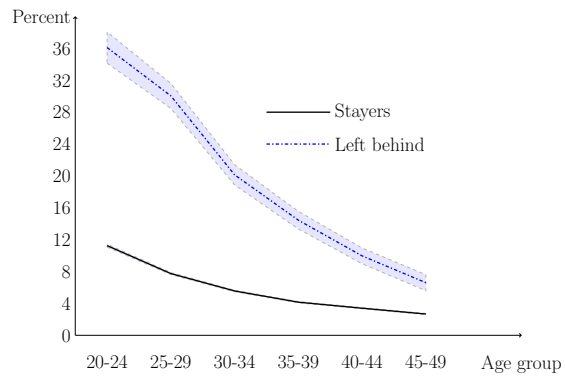
Notes: averages and 95 percent confidence intervals computed using the individual sampling weights.  
Source: Authors' elaboration on ENIDIREH 2016.

Figure 3: Incidence of patrilocality for stayers and wives left behind (2010 Census)



Notes: averages and 95 percent confidence intervals computed using the individual sampling weights.  
Source: Authors' elaboration on the survey connected to the 2010 Census.

Figure 4: Incidence of matrilocality for stayers and wives left behind (2010 Census)



Notes: Notes: averages and 95 percent confidence intervals computed using the individual sampling weights.  
Source: Authors' elaboration on the survey connected to the 2010 Census.

## A Appendix

Table A.1: Descriptive statistics (ENOE)

	Wives	
	Stayers	Left behind
Matrilocality	0.058 (0.233)	0.075 (0.264)
Patrilocality	0.067 (0.250)	0.112 (0.315)
Co-resident individuals (0-18)	1.939 (1.249)	2.202 (1.306)
Co-resident individuals (12-18)	0.781 (0.884)	0.821 (0.914)
Co-resident individuals (12-16)	0.574 (0.733)	0.603 (0.744)
Observations	150,246	861

Notes: average and standard deviation of each variable have been computed using individual sampling weights; all variables are measured at the first interview, so before the migration of the husband for the wives left behind; the sample is restricted to non-attriters.

Source: Authors' elaboration on ENOE 2011Q1-2016Q4.

Table A.2: Descriptive statistics (ENDIREH 2016)

Wives	Rural		Urban	
	Stayers	Left behind	Stayers	Left behind
Age	35.878 (7.815)	34.899 (8.272)	36.989 (7.618)	36.206 (7.756)
Household head	0.030 (0.172)	0.600 (0.491)	0.045 (0.207)	0.509 (0.501)
Matrilocality	0.048 (0.214)	0.144 (0.352)	0.077 (0.266)	0.391 (0.489)
Patrilocality	0.078 (0.268)	0.082 (0.274)	0.063 (0.244)	0.040 (0.195)
Matrilocality at marriage	0.071 (0.256)	0.085 (0.279)	0.119 (0.323)	0.159 (0.367)
Patrilocality at marriage	0.601 (0.490)	0.604 (0.490)	0.375 (0.484)	0.487 (0.501)
Years of schooling	7.661 (3.650)	8.087 (3.196)	10.890 (4.034)	9.738 (3.651)
Years since marriage	15.995 (8.325)	14.475 (8.493)	15.268 (8.233)	14.783 (8.325)
Years since husband's migration		3.584 (4.246)		4.369 (4.685)
Married more than once	0.037 (0.189)	0.049 (0.217)	0.052 (0.221)	0.035 (0.184)
Husband's age	39.051 (8.885)		39.626 (8.503)	
Husband's years of schooling	7.369 (3.722)		10.874 (4.282)	
Remittance-recipient	0.014 (0.117)	0.926 (0.262)	0.007 (0.083)	0.886 (0.318)
At least one child	0.956 (0.204)	0.946 (0.227)	0.932 (0.252)	0.914 (0.281)
Co-resident individuals (0-18)	2.202 (1.445)	2.037 (1.141)	1.773 (1.190)	1.719 (1.463)
Co-resident individuals (12-16)	0.814 (0.944)	0.793 (0.928)	0.695 (0.834)	0.699 (0.792)
Co-resident individuals (12-18)	0.610 (0.772)	0.558 (0.788)	0.512 (0.696)	0.567 (0.717)
Household size	4.829 (1.847)	4.077 (1.456)	4.481 (1.576)	4.283 (2.155)
Nuclear household	0.774 (0.418)	0.629 (0.484)	0.751 (0.433)	0.514 (0.501)
Observations	8,317	243	23,694	203

Notes: average and standard deviation of each variable have been computed using individual sampling weights.

Source: Authors' elaboration on ENDIREH 2016.



Table A.3: Living arrangements and husband's migration (Census 2010)

	<i>Dependent variable:</i>							
	Matrilocality				Patrilocality			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Wife left behind	0.134*** (0.005)	0.135*** (0.005)	0.135*** (0.005)	0.082*** (0.006)	-0.011*** (0.003)	-0.013*** (0.003)	-0.013*** (0.003)	-0.004 (0.004)
Secondary education			0.017*** (0.001)	0.016*** (0.001)			-0.002*** (0.001)	-0.002** (0.001)
Tertiary education or more			0.016*** (0.001)	0.015*** (0.001)			-0.030*** (0.001)	-0.029*** (0.001)
Wife left behind × Secondary education				0.084*** (0.010)				-0.013** (0.006)
Wife left behind × Tertiary or more				0.225*** (0.034)				-0.042*** (0.011)
Adjusted- $R^2$	0.042	0.043	0.043	0.044	0.073	0.075	0.075	0.075
Observations	1,130,341	1,130,341	1,130,341	1,130,341	1,130,341	1,130,341	1,130,341	1,130,341
Average outcome (stayers)	0.052	0.052	0.052	0.052	0.067	0.067	0.067	0.067
<i>Dummies</i>								
Rural area	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age, number of children	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Years of schooling	No	Yes	No	No	No	Yes	No	No

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ ; standard errors are robust to heteroskedasticity; individual sampling weights used in the estimation; educational level is the highest level of education attained: primary education or less (reference category), some or completed secondary education, at least some tertiary education.

Source: Authors' elaboration on the survey connected to the 2010 Census.

Table A.4: Enumeration among women living in remittance-recipient households

	<i>Dependent variable: enumeration<sub>i</sub></i>					
	All	Rural		Urban		
	(1)	(2)	(3)	(4)	(5)	(6)
Matrilocality	-0.268*** (0.011)	-0.272*** (0.013)	-0.351*** (0.018)	-0.359*** (0.019)	-0.217*** (0.015)	-0.219*** (0.016)
Patrilocality	-0.009 (0.018)	-0.038** (0.019)	-0.037* (0.021)	-0.069*** (0.021)	0.017 (0.031)	-0.009 (0.031)
Adjusted- $R^2$	0.133	0.161	0.114	0.143	0.088	0.120
Observations	21,404	21,404	12,723	12,723	8,681	8,681
Matrilocality-Patrilocality	-0.258***	-0.234***	-0.314***	-0.290***	-0.234***	-0.210***
Average outcome (neolocal)	0.479	0.479	0.588	0.588	0.381	0.381
Average outcome (patrilocal)	0.487	0.487	0.547	0.547	0.414	0.414
<i>Dummies</i>						
Rural area	Yes	Yes	Yes	Yes	Yes	Yes
State	Yes	Yes	Yes	Yes	Yes	Yes
Age, years of schooling, number of children	No	Yes	No	Yes	No	Yes

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ ; standard errors are robust to heteroskedasticity; individual sampling weights used in the estimation; rural areas are localities with less than 2,500 inhabitants; sample restricted to married women that do not co-reside with their husbands and that live in households with at least one member that reports to be personally receiving remittances from abroad.

Source: Authors' elaboration on the survey connected to the 2010 Census.

Table A.5: Children living without their fathers in remittance-recipient households

	<i>Dependent variable: school attendance<sub>i</sub></i>					
	All		Rural		Urban	
	(1)	(2)	(3)	(4)	(5)	(6)
Grandparents	0.039*** (0.007)	0.022*** (0.007)	0.038*** (0.010)	0.013 (0.009)	0.036*** (0.010)	0.022** (0.010)
Adjusted- $R^2$	0.038	0.142	0.078	0.212	0.018	0.106
Observations	38,812	38,812	22,915	22,915	15,897	15,897
Average outcome (neolocal)	0.795	0.795	0.761	0.761	0.819	0.819
<i>Dummies</i>						
Rural area	Yes	Yes	Yes	Yes	Yes	Yes
Municipality	Yes	Yes	Yes	Yes	Yes	Yes
Age, sex	No	Yes	No	Yes	No	Yes
Mother's age	No	No	No	No	No	No
Mother's years of schooling	No	No	No	No	No	No

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ ; standard errors are robust to heteroskedasticity; individual sampling weights used in the estimation; rural areas are localities with less than 2,500 inhabitants; sample restricted to children aged 12 to 16 that do not co-reside with their fathers and that live in households with at least one member that reports to be personally receiving remittances from abroad.

Source: Authors' elaboration on the survey connected to the 2010 Census.

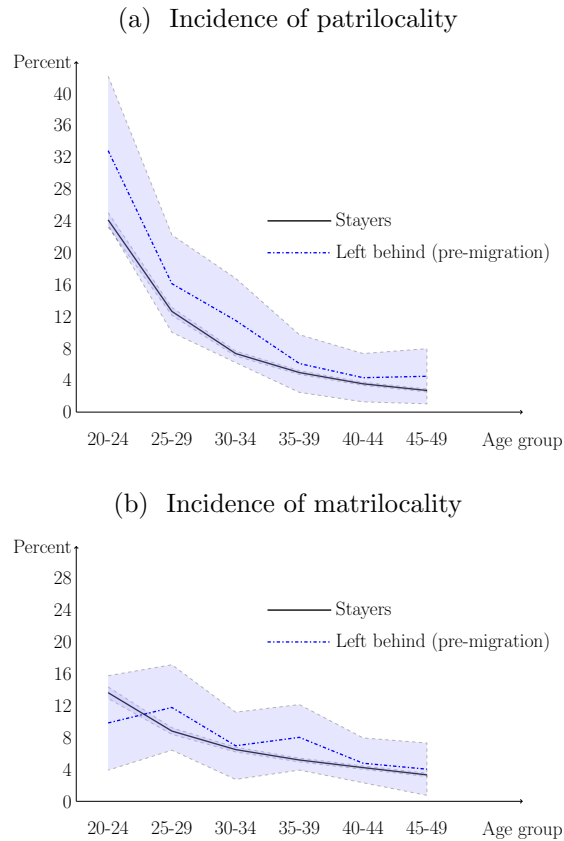
Table A.6: Living arrangements and wife's bargaining power among co-resident couples

	<i>Dependent variable:</i>			
	Matrilocality		Patrilocality	
	(1)	(2)	(3)	(4)
Wife's education: Secondary	0.015*** (0.001)	0.020*** (0.001)	-0.004*** (0.001)	-0.008*** (0.001)
Wife's education: Tertiary or more	0.014*** (0.001)	0.031*** (0.002)	-0.031*** (0.001)	-0.034*** (0.002)
Husband's education: Secondary		-0.005*** (0.001)		0.012*** (0.001)
Husband's education: Tertiary or more		-0.029*** (0.002)		0.008*** (0.002)
Adjusted- $R^2$	0.040	0.042	0.078	0.078
Observations	1,105,068	1,105,068	1,105,068	1,105,068
Average outcome	0.052	0.052	0.067	0.067
<i>Dummies</i>				
Rural area	Yes	Yes	Yes	Yes
State	Yes	Yes	Yes	Yes
Age, number of children	Yes	Yes	Yes	Yes
Husband's age	Yes	Yes	Yes	Yes

Notes: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ ; standard errors are robust to heteroskedasticity; individual sampling weights used in the estimation; rural areas are localities with less than 2,500 inhabitants; the sample is restricted to co-resident couples (with non-missing education data); educational level is the highest level of education attained: primary education (reference category), some secondary education, or some tertiary education (or higher).

Source: Authors' elaboration on the survey connected to the 2010 Census.

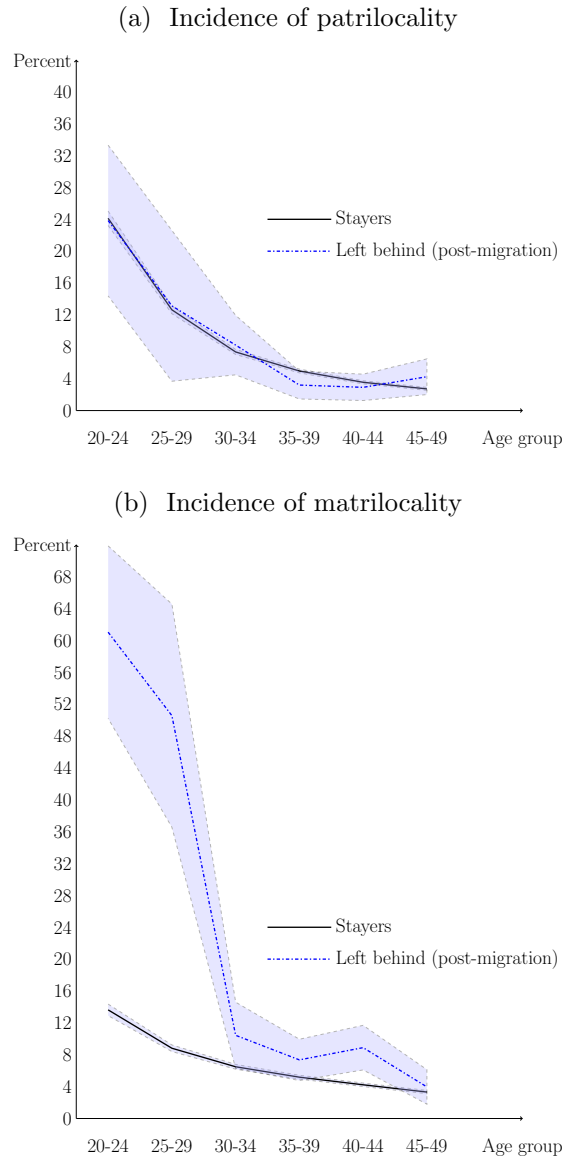
Figure A.1: Living arrangements of stayers and left behind *before* husband's migration



Notes: Living arrangements are measured at the first interview of the ENOE survey, so before the migration of the husband for the wives left behind; the stayers are women who co-reside with their husbands over the five interviews, and the left behind are women who co-reside with their husbands at the time of the first interview, and whose husbands is observed to migrate to the United States between the second and the fifth interview; average incidence of patrilocality and matrilocality and 95 percent confidence intervals for wives of stayers and wives left behind (before migration) computed using the individual sampling weights.

Source: Authors' elaboration on ENOE 2011Q1-2016Q4.

Figure A.2: Living arrangements of stayers and left behind *after* husband’s migration



Notes: wives left behind after husband’s migration are defined as married women not co-residing with their husband and personally receiving remittances; the sample uses all rounds of the ENOE after 2011Q1 with non-missing information on remittances receipt; average incidence of patrilocality and matrilocality and 95 percent confidence intervals for stayers and wives left behind computed using the individual sampling weights.

Source: Authors’ elaboration on ENOE 2011Q1-2016Q4.