I Z A Institute
of Labor Economics
Initiated by Deutsche Post Foundation

DISCUSSION PAPER SERIES

IZA DP No. 11172

Migration and Co-Residence Choices: Evidence from Mexico

Simone Bertoli
Elie Murard

NOVEMBER 2017

I Z A Institute
of Labor Economics

Initiated by Deutsche Post Foundation

DISCUSSION PAPER SERIES

IZA DP No. 11172

Migration and Co-Residence Choices: Evidence from Mexico

Simone Bertoli
CERDI, Université Clermont Auvergne, CNRS and IZA

Elie Murard
IZA

NOVEMBER 2017

IZA – Institute of Labor Economics

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

Phone: +49-228-3894-0
Email: publications@iza.org

www.iza.org

ABSTRACT

Migration and Co-Residence Choices: Evidence from Mexico*

Household composition is traditionally regarded as exogenous in economic analyses. The migration literature typically assumes that the migration of a household member is not associated with further variations in co-residence choices. We rely on a large Mexican panel survey to provide novel evidence on the correlation between the occurrence of an international migration episode and additional changes in household composition. Migrant households have a 34.5 percent higher probability of receiving a new member within one year after the migration episode. Attrition is significantly higher among migrant households, and we provide suggestive evidence that this is due to the dissolution of the household of origin of the migrant, with all its members left behind joining another household. The endogeneity of co-residence choices has implications for survey-based measurement of migration flows, for the analysis of selection into migration, and for the effects of migration on the individuals left behind.

JEL Classification: F22, J12

Keywords: international migration, household composition, gender, remittances

Corresponding author:
Elie Murard
IZA
Schaumburg-Lippe-Str. 5-9
53113 Bonn
Germany

E-mail: murard@iza.org

* The authors are grateful to Catia Batista, Isabelle Chort, Jesús Fernández-Huertas Moraga, Flore Gubert, Francesca Marchetta, Hillel Rapoport, Biagio Speciale, Gregory Verdugo, Jackie Wahba and to the participants to seminar presentations at NOVA School of Business and Economics, PSE, IZA and CERDI, at the Workshop on the Economics of Migration at the University of Southampton and at the 10th Conference on Migration and Development for their comments; Simone Bertoli acknowledges 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.

"Household structure is pervasively treated as an exogenous or fixed characteristics."
(Foster and Rosenzweig, 2002, p. 839)

1 Introduction

Surveys or population censuses conducted at the household-level in migrant-sending countries represent a key data source for the analysis of the scale of international migration flows, of their determinants, and of the ensuing effects on the individuals left behind. The design of the questionnaires used for data collection and most empirical analyses (often implicitly) rely on the assumption that the occurrence of migration episodes is *not* systematically associated with further variations in the composition of the household.[1] Such an assumption is in line with a long-standing practice in the economic literature, as suggested by the initial quote from Foster and Rosenzweig (2002), but it has a dubious plausibility, especially for migrant-sending countries characterized by a variety of living arrangements, where a large fraction of households have a non-nuclear structure. A violation of this assumption would entail that some migration episodes simply go unrecorded, and it would also have relevant analytical implications.

Consider, for instance, the phrasing of the question included in the 2000 Mexican population census, which is representative of the retrospective questions that are used to elicit information on past migration episodes:[2]

> "During the last five years, that is, from January 1995 to today, has any person that lives or lived with you (in this household) gone to live in another country?"

The migration episodes that emerge out of the answers to this question are relied upon to obtain an origin-based measurement of migration flows.[3] Furthermore, the members of the household reporting a migration episode are assumed to constitute the group of individuals the migrant was co-residing with at the time of migration. This reconstruction of the

[1] Gibson et al. (2011) represent a notable exception in this respect, as concerns the empirical plausibility of this assumption are dealt with at p. 1302.

[2] See, for instance, Yang (2008), who relies on a question with a similar wording to obtain information on Filipino migrants from a survey conducted in the Philippines.

[3] By construction, instances in which a household entirely migrates cannot be detected with this type of question (Ibarraran and Lubotsky, 2007).

composition of the household of origin of the migrant is then used to analyze the determinants of intra-household selection into migration (Chort and Senne, 2015, 2017; Dustmann et al., 2017), or to estimate the multifaceted effects of migration on those left behind (see, for instance, Yang, 2008, McKenzie and Rapoport, 2011, Batista *et al.*, 2012 or Bertoli and Marchetta, 2014).

A systematic association between migration and a variation in co-residence choices would drive a wedge between the composition of the household of origin of the migrant, and the household that reports the migration episode. New members might have joined the household since the migrant left the country, and some individuals that were co-residing with the migrant might have left. The households that these individuals joined (or formed) should *not* report any migration episode, as the phrasing of the retrospective question specifies that only the household that the migrant was living in should report it.[4] This also entails that a migration episode would remain unrecorded if the household of origin of the migrant has dissolved, with all its members left behind joining another household.[5] The non-reporting of migration episodes, while perfectly consistent with the design of the questionnaire, would pose an important threat to the analysis of the effects of migration on those left behind, as treated individuals would be incorrectly regarded as untreated, thus contaminating the control group.

Why should one expect migration to be systematically associated with further changes in co-residence choices of the individuals left behind? International migration episodes often reflect the outcome of a decision taken jointly by the migrant and by a group of non-migrants, as Stark and Bloom (1985) observe, which can extend beyond the household. International migration is depicted, since the seminal contribution by Sjaastad (1962), as an investment decision which can be subject to binding liquidity constraints. Resource pooling across non co-resident family members can help overcoming liquidity constraints, thus allowing to

[4]The compliance of the respondents to the 20000 Mexican population census with this requirement is also ensured by a follow-up question: "When [name] migrated (for the last time), was [name] living with you?", with no information being collected in case of a negative answer; the INEGI clarifies that this restriction is introduced to attain two distinct objectives: a correct assignment of migrant to his or her area of origin, and to avoid the double-counting problem that would arise if more than one household was allowed to report information about the same migration episode (see INEGI, *XII Censo General de Población y Vivienda 2000. Coordinación de Evaluación y Desarollo Metodológico*, p. 50).

[5]Wong *et al.* (2006), cited by Teruel et al. (2012), warned that household dissolution can lead to an undercount of migration episodes, even if the members left behind remain in the country of origin.

undertake the (lumpy) investment in the migration of a family member. The reshuffling of the partition of family members into separate households could thus be a by-product of the decision to migrate, with the choice to co-reside being driven by the objective of getting direct access to the remittances sent back by the migrants, or by the need to replace the migrant in the provision of labor-intensive services, such as child or elderly care.[6] If we consider non-unitary models of intra-household decision, international migration can lead to a reduction of the bargaining power of the migrant (Chen, 2006, 2013; Ambler, 2015; Clemens and Tiongson, 2017), and new household members could represent a monitoring device reducing the informational asymmetries to which the migrant is exposed to (de Laat, 2014; Ashraf et al., 2015).[7]

This paper addresses two interrelated research questions: (*i*) Do households that experience an international migration episode also undergo further changes in their composition? (*ii*) Do we observe a dissolution of the households of origin of the migrants, with all the members left behind joining another household within their family network? We provide an answer to these research questions in the case of Mexico. This country represents a focal point in the migration literature, and there is empirical evidence about the sharing of resources across non co-resident family members (Angelucci et al., 2010, 2017), and on the existence of binding financial constraints on migration (Angelucci, 2015), two factors that could magnify the association between migration and variations in co-residence choices.

Addressing the proposed research questions requires having access to panel data that allows observing the occurrence of international migration episodes, and the potential variations in household composition around the time of migration. We rely on the data from 12 quarters, from 2005Q1 to 2007Q4, of the *Encuesta Nacional de Ocupación y Empleo* (ENOE) run by the INEGI, the Mexican national statistical office. The ENOE is a short rotating panel survey where each household is followed over five consecutive quarters. This survey allows us observing variations in the household roster over time, as well as identifying migrant households, that we define as those where (at least) one member moves to the United States over the period of observation. Migrant households represent around 2.3 percent of

[6]Further reasons that could give rise to a correlation between migration episodes and variation in co-residence choices could be related to the associated savings in housing costs in urban areas, or to the need to replace the migrant in family-run agricultural activities in rural areas.

[7]For instance, having the spouse left behind co-residing with the migrant's parents could a way to give the migrant greater information (and hence control) over the use of the remittances sent back home.

the 170,306 households in the sample that we use for the empirical analysis, and a similar number of international migrants originates from urban and from rural areas. Households are asked about the reason why individuals that had been included in the roster in the previous quarter are absent from the household, and international migration represents one of the possible answers.[8] Notice that the identification of international migration episodes from variations in the roster shares a key feature with the one based on questions on past migration episodes, as both approaches require that the migrant was a member of the (surveyed) household at the time of migration.

Once we control for initial differences in the demographic structure of the households, we find that the probability that a migrant household receives at least one new member over a 12-month period around the migration episode is 34.5 percent higher than for non-migrant households, with new members arriving either at the time of migration or in the following two quarters. Migrant households are significantly *less* likely to lose one more of their members, and they face a probability of attrition that is 26.8 percent higher than non-migrant households. The relationship between the occurrence of a migration episode and either the arrival of a new member or attrition is stronger for urban households, and when the migrant is a woman. This heterogeneity in the estimated effects is consistent with a gender-specific specialization in tasks within household (Fafchamps and Quisumbing, 2007), and with the fact that gains from co-residence could be weaker when family members live in the same small rural village.

The dissolution of the households of origin of the migrants is a natural candidate for the estimated difference in the probability of attrition. Specifically, the data reveal that the probability that a non-migrant household reports receiving remittances from abroad is positively associated with the earlier arrival of a new member, and that such an effect is stronger in high-migration municipalities. This provides suggestive evidence that some households of origin of the migrants have actually dissolved, and their members have joined another household in their family network, with this household starting to receive remittances from abroad. The availability of individual-level information on the receipt of remittances in the ENOE allows us to show that this effect is entirely due to the remittances received by the new members, and not by the members initially present in the household roster. This test

[8]This entails that migration episodes (as well as further variations in the household composition) can be identified from the second to the fifth interview of each household, i.e., over a 12-month period.

dismisses the concerns of a spurious correlation between the arrival of a new member and an earlier, and thus unobserved, or deliberately mis-reported migration episode of a member of the remittance-recipient household.

Our paper makes three distinct contributions to the migration literature. First, it provides novel empirical evidence about the joint determination of migration decisions and co-residence choices. This variation in household composition poses challenges for the analysis of the effects of migration on those left behind similar to those observed in different domains of economic analysis employing household-level data (see Edmonds *et al.*, 2005, Barsbai and Thiele, 2013, Hamoudi and Thomas, 2014, Foster and Milusheva, 2015). Second, our paper complements our understanding of the implications of whole household migration (Steinmayr, 2015) and intra-household selection into migration (Murard, 2015): the analysis, and our interpretation, of the effects produced by migration on those left behind does not depend just on the decision concerning who migrates, but it also hinges on the co-residence decisions of non-migrant family members. Third, it suggests that efforts to collect data at origin on migration episodes should acknowledge the endogeneity of co-residence choices, which represents an additional challenge beyond those due to whole household migration (Ibarraran and Lubotsky, 2007) and to the deliberate non-reporting of migration episodes (Hamilton and Savinar, 2015).

The rest of the paper is structured as follows: Section 2 introduces the data used in the analysis and the relevant definitions, and Section 3 presents the descriptive statistics. Section 4 contains the results from the econometric analysis on the association between migration and variations in co-residence choices, while Section 5 explores whether the attrition of migrant households is due to household dissolution. Finally, Section 6 draws the main conclusions.

2 Data and definitions

We describe here the main data source for our empirical analysis and we introduce the relevant definitions.

2.1 The ENOE survey

We draw the data for our analysis from the quarterly Mexican *Encuesta Nacional de Ocupación y Empleo* run by the INEGI. The ENOE is a labor market panel survey, which is based on a rotating sample: each household is included in the sample for five consecutive quarters, with around 21,000 households entering the sample in each round of the survey. Our sample includes all the households that entered the sample of the ENOE over a two-year period, namely between the first quarter of 2005 and the last quarter of 2006, for which we potentially have data for five quarters.[9,10] The members of each household in the sample are assigned individual identifiers that do not vary across the five interviews, provided that they are continuously part of the household roster.[11] The ENOE allows tracking variations in the household composition occurring after the first interview; specifically, the enumerators compare the household roster with the one established in the previous interview, recording the reason of arrival and the place of origin of any individual who has joined the household, and the reason of the departure and the place of destination of any leaving member.[12] This also allows us identifying all the instances in which a household member migrates abroad. Seven out of the 12 rounds of the survey used for our analysis also include information on the receipt of remittances from abroad (see Table A.2 in the Appendix); notably, the question on the receipt of remittances from abroad is asked separately to all household members aged 15 and above, so that we can identify the recipient individual(s). Information on the amount of remittances is not provided by the ENOE.

[9]This entails that we also draw on the data from the 2007Q1-2007Q4 rounds of the ENOE, but just with respect to the households that had entered in the fourth quarter of 2005; see also Table A.1 in the Appendix.

[10]The ENOE tracks housing units over time: from the second to the fifth interview, a household is included in the sample if (*i*) it is still residing in the same housing unit, and (*ii*) there is at least one individual aged 12 or above that was listed in the household rosters of the previous interview (see INEGI, *Manual del entravistador de la ENOE*, p. 71).

[11]Similarly, the identity of the household head is determined during the first interview, and it is not updated in later interviews even if the household head no longer appears in the household roster.

[12]For the place of origin and of destination, the ENOE distinguishes between the same Mexican state, another Mexican state and abroad; the ENOE does not report the country of destination, but we can safely assume that it is the United States (see, for instance, Mishra, 2007).

2.2 Definitions

Let R^q_{js} represent the set of individuals listed in the roster of household j, which enters the sample in the quarter q =2005Q1,...,2006Q4, in the interview s, with $s = 1, ..., 5$, with $R^q_j \equiv \bigcup_s R^q_{js}$ being the set of individuals listed in the roster in at least one of the five interviews. We say that household j is a migrant household if there is at least one interview s, with $s = 2, ..., 5$, and an individual $i \in R^q_j$ such that: $i \in R^q_{js-1}$, $i \notin R^q_{js}$, and i is reported by the remaining household members to have migrated abroad. The first condition entails that no migration episode can be reported by household j for individuals that have not been included in at least one quarter in its roster. We then define a dummy variable m^q_{js} taking the value of 1 if household j reports at least one migration episode in interview s, and 0 otherwise, and $m^q_j \equiv \max\{m^q_{j2}, ..., m^q_{j5}\}$. Notice that non-migrant households might have experienced the migration of one of their members before the 12-month period over which these changes can be observed in the ENOE, which does not contain any retrospective question on migration. Furthermore, our definition of the treatment might be exposed to a deliberate mis-reporting of the destination of a leaving member (Hamilton and Savinar, 2015).

The individual $i \in R^q_j$ is a new member if there is an interview s, with $s = 2, ..., 5$, such that $i \notin R^q_{js-1}$, and $i \in R^q_{js}$. Newborn babies, domestic servants, and individuals that were incorrectly omitted from the household roster in the previous quarter are not counted as new members of the household. The same individual $i \in R^q_j$ can be at the same time a new member and an international migrant: for instance, a household member that is reported to have moved to the United States between the first and the second interview might re-appear in the household roster in, say, the fourth interview. Clearly, we need to avoid that temporary migration episodes give rise to a mechanical correlation between these two variables. We thus define a dummy variable n^q_{js} taking the value of 1 if household j reports at least one joining member in interview s who is *not* an international migrant in an earlier or later interview, and 0 otherwise, and we also define $n^q_j \equiv \max\{n^q_{j2}, ..., n^q_{j5}\}$. The ENOE assigns invariant identifiers to all the individuals in R^q_j that are continuously present in the roster, while a returnee is *not* assigned the same identifier that she had before leaving the household; thus, we verify whether new members have the same date of birth and gender of individuals appearing in the household roster in a previous interview, and we consider that they are the same individual when this is the case.

Similarly, we say that individual $i \in R_j^q$ has left household j if there is an interview s, with $s = 2, ..., 5$, such that $i \in R_{js-1}^q$, and $i \notin R_{js}^q$. Individuals that passed away, domestic servants and migrants to the United States are not counted as leaving members.[13] We thus define a dummy variable l_{js}^q taking the value of 1 if household j reports having lost at least one of its members to an internal destination in interview s, and 0 otherwise, and we define $l_j^q \equiv \max\{l_{j2}^q, ..., l_{j5}^q\}$. Combining the information on new and leaving members, we also define a dummy variable $v_j^q \equiv \max\left\{n_j^q, l_j^q\right\}$ that takes the value of 1 if household j has recorded a variation in its composition (either an expansion or a contraction) over the period of analysis, and 0 otherwise. Finally, we also define a dummy a_{js}^q equal to 1 if household j drops out of the sample between interview s and $s+1$, with $s = 1, ..., 4$, and 0 otherwise.

3 Descriptive statistics

The sample used in our analysis includes 170,306 households whose first interview took place between 2005Q1 and 2006Q4, out of which 141,168 were successfully interviewed for five consecutive quarters. The rate of attrition stands at 17.1 percent over the entire period (see Table 1),[14] and a large fraction of the instances of attrition, namely 10,718 out of 29,138, occur between the first and the second interview, as in Fernández-Huertas Moraga (2013).[15] As the probability that a household reports a migration episode increases with the number of interviews and no migration episode can be reported before the second interview, the share of migrant households that do not complete five interviews is mechanically lower than the corresponding one for non-migrant households: 8.5 and 17.3 percent respectively.

Table 1: Descriptive statistics

	Entire sample			Rural areas			Urban areas		
Households	All	Non-migr.	Migrant	All	Non-migr.	Migrant	All	Non-migr.	Migrant
Attrition rate	0.171	0.173	0.085	0.127	0.130	0.061	0.188	0.189	0.109
Household size	4.059	4.030	5.110	4.255	4.204	5.281	3.978	3.959	4.934
Years of education	10.757	10.768	10.366	8.542	8.513	9.140	11.677	11.678	11.619
Nuclear household	0.747	0.750	0.658	0.757	0.760	0.693	0.743	0.746	0.623
Three-generation	0.161	0.160	0.228	0.165	0.162	0.216	0.160	0.159	0.241
Remittances (5^{th} interview)	0.046	0.037	0.348	0.088	0.073	0.402	0.029	0.023	0.298
Remittances (1^{st} interview)	0.052	0.049	0.151	0.091	0.087	0.187	0.035	0.033	0.114
Observations	170,306	166,063	4,243	47,457	45,368	2,089	122,849	120,695	2,154
Observations (non-attrited)	141,168	137,287	3,881	41,422	39,461	1,961	99,746	97,326	1,920

Notes: Household characteristics are measured at the time of the first interview, unless otherwise stated; years of education is the highest among household members aged 15 and above; nuclear households are defined as those including, at most, the spouse and the children of the household head; three-generation households are non-nuclear households that include members belonging to three different generations (e.g., head, children and grand-children); information on remittances is available, for the entire sample, for 105,491 and 52,438 at the 1^{st} and at the 5^{th} interview respectively.
Source: Authors' elaboration on ENOE, 2005Q1-2007Q4.

3.1 Migration episodes

The international migration of 4,880 individuals are reported by 3,881 distinct households,[16] representing 2.75 percent of the sample of non-attrited households The number of migrant households is almost identical in urban (1,920) and in rural areas (1,961), although the share of migrant households is substantially higher in rural areas: 4.40 compared to 1.75 percent. International migrants are predominantly male (76.6 percent), younger (30.7 and 39.1 years of age respectively) and slightly less educated (8.3 and 8.6 years of completed schooling) than initial household members (see Table 2). The gender composition of the migrants varies between urban and rural areas: in urban areas, 31.2 percent of migrant households

[13]Without this latter restriction, we would have a mechanical and trivial correlation between migration episodes and instances in which an individual leaves the household, as by construction, any international migrant is also an individual that has left the household.

[14]The incidence of attrition is in line with the one reported by Alcaraz et al. (2012) for later rounds of the ENOE survey.

[15]We consider as attrited 6,120 households that drop out of the sample at least once and are then interviewed again in a later round.

[16]3,638 migrant households report just one migration episode over the period of analysis, 235 two episodes and just 8 households more than two.

Table 2: Initial, new, leaving and migrant members (all households)

	Type of member						
	Initial	New	Leaving	Migrant		Difference	
	(1)	(2)	(3)	(4)	(1)-(2)	(1)-(3)	(1)-(4)
Age	39.116	30.546	28.919	30.687	-8.570***	-10.413***	-8.455***
Female	0.520	0.505	0.499	0.234	-0.015***	-0.021***	-0.287***
Years of education	8.585	8.887	9.477	8.337	0.302***	0.911***	-0.249***
Relationship with the household head							
Head	0.246	0.017	0.074	0.306	-0.229***	-0.176***	0.060***
Spouse	0.176	0.072	0.038	0.065	-0.104***	-0.141***	-0.112***
Son or daughter	0.452	0.305	0.435	0.459	-0.147***	-0.017***	0.007
Parent	0.009	0.037	0.015	0.006	0.028***	0.006***	-0.003*
Sibling	0.010	0.036	0.027	0.018	0.026***	0.017***	0.008***
Grandchild	0.065	0.230	0.203	0.068	0.165***	0.141***	0.003
Nephew or niece	0.010	0.070	0.055	0.016	0.061***	0.046***	0.006***
Cousin	0.001	0.012	0.007	0.002	0.011***	0.006***	0.001**
Spouse's parent	0.004	0.016	0.008	0.002	0.012***	0.004***	-0.001
Son's parent in law	0.000	0.001	0.000	0.000	0.001***	0.000***	0.000**
Son or daughter in law	0.018	0.133	0.091	0.042	0.115***	0.075***	0.024***
Brother or sister in law	0.003	0.035	0.022	0.008	0.031***	0.019***	0.004***
Other relative	0.000	0.003	0.002	0.001	0.002***	0.002***	0.001*
Non relative	0.003	0.033	0.023	0.005	0.031***	0.020***	0.003***
Domestic worker	0.002	0.000	0.000	0.001	-0.002***	-0.002***	-0.000
Observations	573,032	27,038	44,774	4,880	600,070	606,141	576,490

Notes: age, years of education and sex are defined for members aged 15+; household headship is defined at the time of the first interview; the variables referring to new members, leaving members and migrants are measured at the time of the variation in their residence status; the four groups reported in this table are not mutually exclusive, as one individual can record multiple variations in her residence status over the period of analysis; *,** and *** denote significance at the 10, 5 and 1 percent confidence level.

Source: Authors' elaboration on ENOE, 2005Q1-2007Q4.

has at least one female migrant, while the corresponding share in rural areas is just 18.0 percent. Among the 4,880 international migrants, 90.1 percent of them were included in the roster of the household reporting their migration in the first interview, while 9.9 percent of them joined the household shortly before leaving Mexico. 11.3 percent of international migrants leave their households only temporarily, as they are observed again in the roster before the last interview. Around three out of four international migrants are either the household head (30.6 percent) or his or her sons and daughters (45.9 percent), as reported in Table 2.

3.2 Receipt of remittances

34.8 percent of migrant households report receiving remittances over a three-month recall period before the fifth interview. Remittance recipients represent 5.2 percent of the households in the first interview, and this share is substantially higher for migrant (15.1 percent) than for non-migrant households (4.9 percent), as reported in Table 1. The larger share of migrant recipient households before any migration episode is observed in the ENOE suggests that either remittances came from individuals who migrated out of other households in the same family network, or that they were sent by (former) members of the same household that migrated before the 12-month period in which migration episodes are recorded. This latter conjecture is strengthened by the observation that 20.2 percent of migrant households received at least one returnee from the United States over the period of observation,[17] while the corresponding share for non-migrant households stands at 0.9 percent only.

3.3 Demographic composition and living arrangements

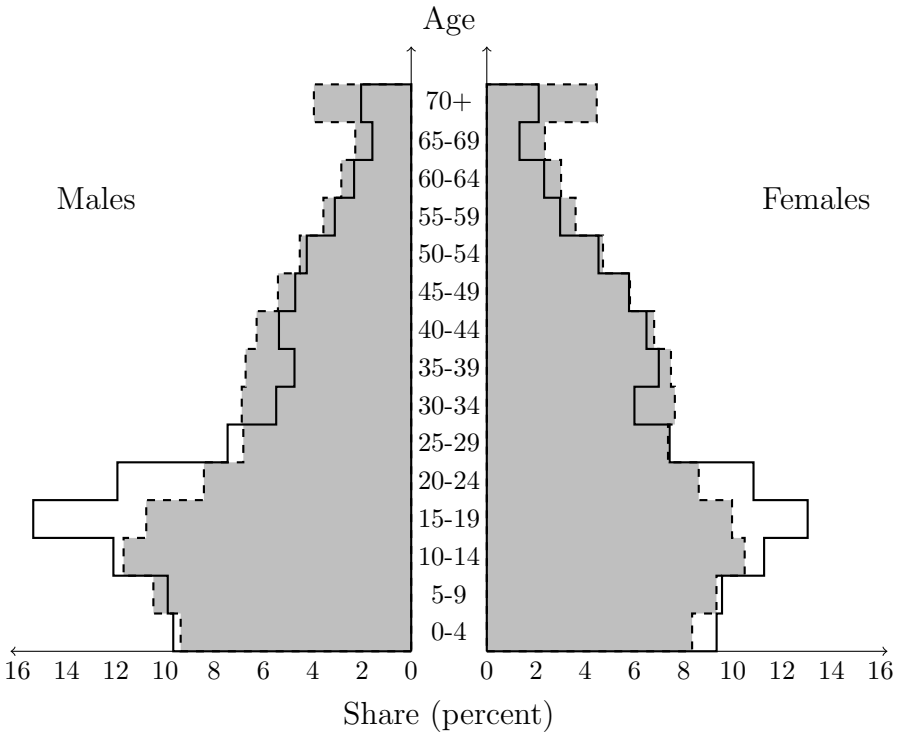
If we compare the characteristics of migrant and non-migrant households at the first interview, we can notice that living arrangements differ between the two groups of households already before the occurrence of a migration episode. Migrant households are larger than non-migrant households (5.11 and 4.03 members respectively), and tend to have a more complex structure, as 22.8 percent of them have at least three generations that co-reside,[18]

[17] Return migrants represent 183 out of the 1,143 new members joining migrant households.

[18] A three-generation household is a household including members belonging to at least two different generations between the ascendants (parents, grand-parents) or descendants (children, grand-children) of the household head and of his or her spouse; by definition, all three-generation households are non-nuclear.

compared to 16.0 percent for non-migrant households.

Figure 1: Age pyramid in migrant and non-migrant households



Notes: the solid (dashed) line represents the age structure of migrant (non-migrant) households observed in the first interview.
Source: Authors' elaboration on ENOE 2005Q1-2006Q4.

Figure 1 reports the age pyramid separately for the two types of households, and it reveals that both males and females in the age cohorts 15-19 and 20-24 are largely over-represented in migrant households, while the opposite pattern is observed between 30 and 44 years of age. As the likelihood of events that can lead to a variation in co-residence choices, such as marriage, divorce, internal or return migration from the United States, varies with age,[19] the initial differences in the household demographic structure have to be controlled for in the econometric analysis.

[19]For instance, 52.8 and 56.5 percent of male and female Mexican migrants in our sample are aged between 15 and 29, while the corresponding shares in the non-migrant population stand at 26.3 and 26.1 percent respectively.

Table 3: Migration and variations in co-residence choices

	Entire sample			Rural areas			Urban areas		
Households	All	Non-migr.	Migrant	All	Non-migr.	Migrant	All	Non-migr.	Migrant
$n_j^q = 1$	0.111	0.110	0.163	0.117	0.116	0.137	0.109	0.107	0.191
New members $\|n_j^q = 1$	1.723	1.720	1.803	1.706	1.706	1.705	1.731	1.726	1.874
One new member $\|n_j^q = 1$	0.634	0.636	0.591	0.642	0.642	0.642	0.630	0.633	0.555
$n_j^q = 1$, no returnees	0.103	0.102	0.130	0.103	0.103	0.099	0.103	0.102	0.161
$l_j^q = 1$	0.171	0.170	0.211	0.177	0.176	0.201	0.169	0.168	0.220
Leaving members $\|l_j^q = 1$	1.851	1.852	1.842	1.861	1.865	1.803	1.847	1.846	1.879
One leaving member $\|l_j^q = 1$	0.595	0.596	0.560	0.587	0.587	0.590	0.598	0.600	0.532
$v_j^q = 1$	0.227	0.225	0.302	0.239	0.237	0.280	0.222	0.220	0.325
$v_j^q = 1$, no returnees	0.221	0.219	0.277	0.228	0.226	0.253	0.218	0.216	0.301
Observations	141,168	137,287	3,881	41,422	39,461	1,961	99,746	97,326	1,920

Notes: n_j^q, l_j^q and v_j^q are dummies that take the value of one if household j entering the sample in quarter q receives at least one new member, loses one of its members or either of the two; the sample includes households that have been interviewed for five consecutive quarters.

Source: Authors' elaboration on ENOE, 2005Q1-2007Q4.

3.4 Variations in co-residence choices

As reported in Table 3, 22.7 percent of the households that have been interviewed for five quarters in the sample experience a variation in their composition over the 12-month period of observation ($v_j^q = 1$, using the notation introduced in Section 2.2), 11.1 percent saw at least one new member joining ($n_j^q = 1$), and 17.1 percent lost at least one of their member ($l_j^q = 1$). Households that receive at least one new member receive, on average, 1.72 new members, with 63.4 percent of them receiving only one new member; households leaving members lose, on average, 1.85 individuals, and 59.5 percent of them lose just one of their members over the period of analysis.

Table 3 also reveals that 30.2 percent of migrant households experience a variation in their composition, a share that is significantly larger than the 22.7 percent that is observed for non-migrant households. This comes both from a larger proportion of households receiving at least one new member (16.3 and 11.0 percent respectively), and from a larger share losing at least one member (21.1 and 17.0 percent respectively). The differences between migrant and non-migrant households are substantially more pronounced in urban than in rural areas.

3.5 Who joins and who leaves?

These variations in household composition are produced by 68,291 individuals who either join or leave a household, or both: 41,253 of them are observed leaving the household, 23,478 join the household, and 3,560 both join and leave in different quarters (see Table 2). Notice that we should *not* expect a balance between the number of individuals that join and that of the individuals that leave a household over the entire sample, unless all individuals move among existing households or the frequency of household formation and household dissolution coincide.[20] For instance, when a groom and a bride form an independent household, they are recorded as leaving members from their respective households, but they are not recorded as new members anywhere, as they do not join an existing household. The larger number of leaving with respect to new members from the ENOE suggests that the household formation is more frequent than household dissolution. While new members are gender balanced in non-migrant households, women represent 54.5 percent of the individuals joining migrant households (see Table A.3 in the Appendix).

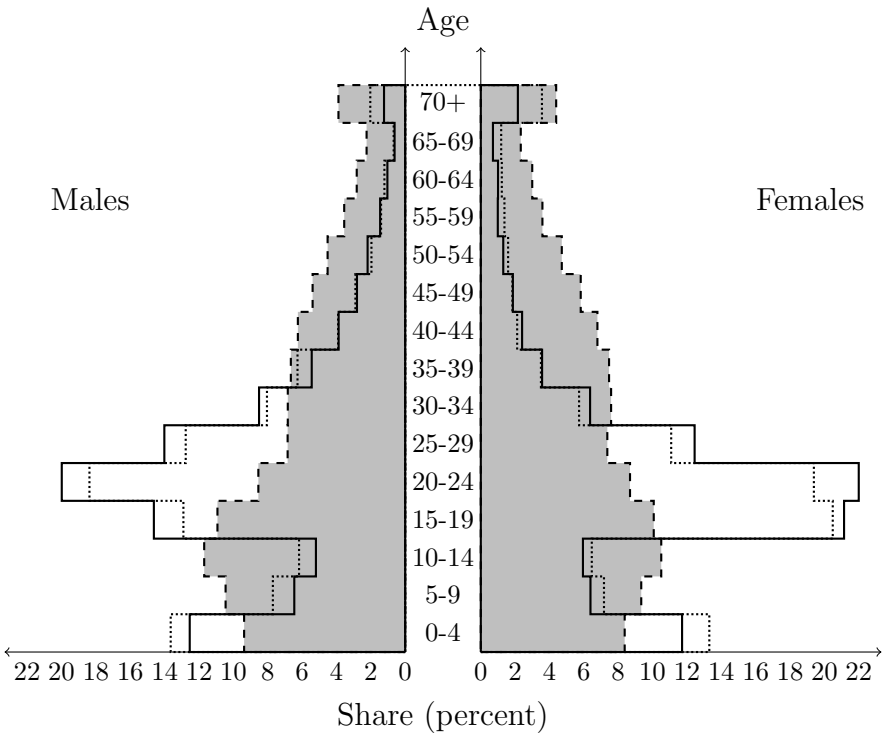
Figure 2 compares the age structure of initial household members with those of the individuals that either join or leave the household. The two latter age structures are broadly similar, with the share of new and leaving members aged 15 to 29 being larger than the corresponding share for initial members for both males and females. The same occurs for children aged 0 to 4, which move in or out the households in our sample together with their parent(s) (see also Edmonds *et al.*, 2005). The excess of leaving over new members aged 15 to 29 in Figure 2 is consistent with the fact that most individuals who get married and form an independent household belong to these age groups.

Table 2 provides information on some key individual characteristics and on their relationship to the household head for the new, leaving and migrant members, comparing them with those of initial household members, i.e., individuals included in the household roster at the time of the first interview.[21] Men and women are equally represented among the individuals that change their residence status over the period of analysis, they are significantly younger than initial household members, and have a similar level of education. Table 2 also reveals that the household head, his or her spouse, sons and daughters account for 87.4 percent of

[20] The ENOE is an household panel survey, which does not track individuals who leave the households in the sample.

[21] As individuals change change their residence status more than once over the period of observation, the four groups reported in Table 2 can partly overlap.

Figure 2: Age pyramid for initial, new and leaving household members



Notes: the shaded area represents the age structure of individuals in the household roster in the first interview, while the dotted (solid) line represents the age structure of new (leaving) members; the sample is restricted to households successfully interviewed for five quarters.
Source: Authors' elaboration on ENOE 2005Q1-2007Q4.

the individuals in the initial roster (as most households have a nuclear structure, as evidenced in Table 1 above), but just 39.4 percent of new members, while grandchildren (23.0 percent) and sons or daughters in law (13.3 percent) are greatly over-represented among new members.[22]

4 Empirical analysis

Table 3 suggests that the occurrence of migration episodes is systematically associated with further variations in co-residence choices. Migration is, *per se*, a decision concerning co-

[22]The weaker family ties with the household head of the individuals that join the household could have an impact on the efficiency of the intra-household allocation of resources (Kazianga and Wahhaj, 2017).

residence, so that our objective here is not to establish a causal relationship between these two closely intertwined phenomena. Nevertheless, we need to verify whether the stylized facts emerging from Table 3 are robust once we control for initial household characteristics that could be correlated with both, and with possible spatial differences within Mexico in the incidence of migration and in the frequency of variations in household composition. Specifically, we are going to control for a vector $\mathbf{x}_{j1}^q$ of variables related to household j and measured during the first interview, i.e., $s = 1$, and include dummies for each Mexican municipality in the ENOE.[23] The vector $\mathbf{x}_{j1}^q$ includes the number of initial household members in each of the 30 gender-specific five-year age cohorts reported in Figure 1, as well as the highest number of years of education among adult household members.[24] We thus introduce fine-grained controls for the initial demographic structure of the household, as Figure 2 strongly suggests that the likelihood of a variation in one's own co-residence status greatly varies with age. A legitimate concern could be expressed about the endogeneity of $\mathbf{x}_{j1}^q$ due to reverse causality, as some migration-induced variations in household composition might actually occur already before an international migration episode is observed for household j. Reassuringly, variations in household composition actually do not occur before migration, as shown below in Sections 4.1 and 4.3.

4.1 Migration and the arrival of new household members

We initially collapse the longitudinal dimension of the data, and we estimate the following regression through a linear probability model on the sample of 141,168 non-attrited households:

$$n_j^q = \alpha m_j^q + \boldsymbol{\beta}' \mathbf{x}_{j1}^q + d_{m(j)} + d_q + \epsilon_j, \tag{1}$$

where, as defined in Section 2.2, n_j^q and m_j^q are dummies that signal whether household j received at least one new member and had at least one international migrant over the 12-month period of observation, and $d_{m(j)}$ and d_q are dummies for the Mexican municipality of residence of household j, and for the quarter q =2005Q1,...,2006Q4 in which household j

[23] There are 934 municipalities in the rural sample, with 45 households per municipality on average, and 389 municipalities in the urban sample, with 268 households per municipality on average in the 12 rounds of the ENOE survey that we use for the analysis.

[24] All reported results are robust to the inclusion in the vector $\mathbf{x}_{j1}^q$ of a dummy that signals whether household j had a nuclear structure in the first interview.

Table 4: Migrant households and new members

	Dependent variable: n_j^q					
	(1)	(2)	(3)	(4)	(5)	(6)
m_j^q	0.054***	0.037***	0.038***	0.038***	0.021***	0.023***
	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)
Female migrant(s)				0.066***	0.067***	0.063***
				(0.015)	(0.015)	(0.015)
Adjusted-R^2	0.00	0.02	0.03	0.00	0.02	0.03
Observations	141,168	141,168	141,168	141,168	141,168	141,168
Controls	No	Yes	Yes	No	Yes	Yes
Municipality FE	No	No	Yes	No	No	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
$n_j^q \vert m_j^q = 0$	0.110	0.110	0.110	0.110	0.110	0.110
F-test controls		59.558	60.433		59.505	60.283

Notes: ***, ** and * denote significance at the 1, 5 and 10 percent level respectively; standard errors are robust to heteroskedasticity; n_j^q is a dummy variable equal to 1 if household j reports at least one new member over the period of observation, and 0 otherwise; m_j^q is a dummy variable equal to 1 if household j reports at least one international migrant over the period of observation, and 0 otherwise; female is a dummy variable equal to 1 if at least one of the household members who migrate is a woman; the F-test is performed on the null hypothesis that the coefficients of all household controls are jointly zero; the household controls are measured at the time of the first interview. Source: Authors' elaboration on ENOE, 2005Q1-2007Q4.

entered the ENOE sample. The first three data columns in Table 4 reveal that the association between the occurrence of a migration episode and the arrival of new member(s) is robust to the inclusion of household-level controls and municipal fixed effects: when both are included, we obtain a highly statistically significant value for $\widehat{\alpha}$, which stands at 0.038. Thus, having at least one household member migrating out of Mexico is associated with a 34.5 percent increase in the probability of receiving a new household member with respect to the baseline probability for non-migrant households, which stands at 11.0 percentage points.[25]

What is the relative timing of the arrival of these new household members of the occur-

[25]Table A.4 in the Appendix shows that this result is robust once we exclude from the sample all households where the new member is a returnee from the United States: we obtain $\widehat{\alpha} = 0.22$, i.e., a 21.4 percent increase with respect to the (lower) baseline probability of 10.3 percentage points.

Table 5: Migrant households and new members (urban areas)

	Dependent variable: n_j^q					
	(1)	(2)	(3)	(4)	(5)	(6)
m_j^q	0.084***	0.068***	0.072***	0.063***	0.045***	0.051***
	(0.009)	(0.009)	(0.009)	(0.010)	(0.010)	(0.010)
Female migrant(s)				0.067***	0.073***	0.066***
				(0.020)	(0.020)	(0.020)
Adjusted-R^2	0.00	0.02	0.03	0.00	0.02	0.03
Observations	99,746	99,746	99,746	99,746	99,746	99,746
Controls	No	Yes	Yes	No	Yes	Yes
Municipality FE	No	No	Yes	No	No	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
$n_j^q \vert m_j^q = 0$	0.107	0.107	0.107	0.107	0.107	0.107
F-test controls		43.211	44.830		43.250	44.844

Notes: ***, ** and * denote significance at the 1, 5 and 10 percent level respectively; standard errors are robust to heteroskedasticity; n_j^q is a dummy variable equal to 1 if household j reports at least one new member over the period of observation, and 0 otherwise; m_j^q is a dummy variable equal to 1 if household j reports at least one international migrant over the period of observation, and 0 otherwise; female is a dummy variable equal to 1 if at least one of the household members who migrate is a woman; the F-test is performed on the null hypothesis that the coefficients of all household controls are jointly zero; the household controls are measured at the time of the first interview.
Source: Authors' elaboration on ENOE, 2005Q1-2007Q4.

rence of international migration episodes? Table A.5 in the Appendix exploits the longitudinal dimension of the data to answer this question: migrant households are more likely than non-migrant households to receive a new member in the same quarter in which the migration episode is recorded and in the following two quarters. Variations in household composition due to the arrival of new members do *not* appear to occur before migration, and this is reassuring with respect to the exogeneity of the vector $\mathbf{x}_{j1}^q$ in Eq. (1).

This statistically significant association between n_j^q and m_j^q in Table 4 is heterogeneous along two notable dimension: the sex of the migrant(s), and the area of residence of the household. The remaining three data columns in Table 4 allow the association between migration and the arrival of new members to be a function of the sex of the migrant(s): specifically, we introduce a dummy that takes the value of 1 if there is at least a woman

among the migrants of household j,[26] and 0 otherwise. The estimates suggests that the association between n_j^q and m_j^q is greatly magnified when a woman migrates: the increase in the probability of receiving a new member stands at 78.2 percent of the baseline probability, i.e., (0.023+0.063)/0.110, almost four times larger than the estimated effect (20.9 percent) for households with just male migrants. This differential effect is consistent with a gender-specific intra-household allocation of tasks (Fafchamps and Quisumbing, 2007): while men are the main breadwinners within the household, women are disproportionately in charge of the provision of household chores, possibly over and above their contribution to household income. While both male and female migrants could offset their foregone domestic earnings through the transfer of remittances from the United States, the migration of a woman also results in a decline in the provision of labor-intensive services, such as child and elderly care. These services could be more easily supplied by new co-resident family members rather than through market transactions financed by migrants' remittances.

Tables 5 and 6 present the estimates of the baseline and extended specification of Eq. (1) separately for urban and rural households. In urban areas, the estimated coefficient for m_j^q stands at 0.072 once we include household controls and municipal dummies, i.e., a highly statistically significant 67.3 percent increase over the baseline probability of receiving a new member over the 12-month observation period. Urban households with a female migrant experience a probability of receiving a new member that is more than twice as large as the baseline probability of 10.7 percentage points. Conversely, the differences in rural areas, that were smaller to begin with (see Table 3), are no longer statistically significant once we control simultaneously for initial household characteristics and municipal dummies. What could explain this sharp difference in the results between urban and rural areas? A possible conjecture is that mutual help or monitoring could be easier among non co-resident family members in a small rural village (Angelucci *et al.*, 2017; de Laat, 2014) than in large urban areas where different households within the same family network could be separated by large commuting distances. Similarly, the value of the housing space left vacant by the migrant is likely to be much higher in urban rather than in rural areas.

The fact that migrant households are significantly more likely to receive new member(s) entails that other households within their family network also experienced a variation in

[26] 24.5 percent of the 3,881 migrant households in our sample reported at least one woman among their migrant members.

Table 6: Migrant households and new members (rural areas)

	Dependent variable: n_j^q					
	(1)	(2)	(3)	(4)	(5)	(6)
m_j^q	0.021***	0.006	0.002	0.013	0.001	-0.003
	(0.008)	(0.008)	(0.008)	(0.009)	(0.009)	(0.009)
Female migrant(s)				0.045**	0.032	0.028
				(0.022)	(0.022)	(0.022)
Adjusted-R^2	0.00	0.02	0.05	0.00	0.02	0.05
Observations	41,422	41,422	41,422	41,422	41,422	41,422
Controls	No	Yes	Yes	No	Yes	Yes
Municipality FE	No	No	Yes	No	No	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
$n_j^q \vert m_j^q = 0$	0.116	0.116	0.116	0.116	0.116	0.116
F-test controls		21.046	21.143		20.939	21.035

Notes: ***, ** and * denote significance at the 1, 5 and 10 percent level respectively; standard errors are robust to heteroskedasticity; n_j^q is a dummy variable equal to 1 if household j reports at least one new member over the period of observation, and 0 otherwise; m_j^q is a dummy variable equal to 1 if household j reports at least one international migrant over the period of observation, and 0 otherwise; female is a dummy variable equal to 1 if at least one of the household members who migrate is a woman; the F-test is performed on the null hypothesis that the coefficients of all household controls are jointly zero; the household controls are measured at the time of the first interview. Source: Authors' elaboration on ENOE, 2005Q1-2007Q4.

their household composition that has been (indirectly) induced by migration. This happens as new members in migrant households are relatives of the household head (see Table 2), and they left a household that possibly did not record any migration episode over the period of observation.

4.2 Migration and leaving members

We estimate the following regression through a linear probability model on the sample of 141,168 non-attrited households:

$$l_j^q = \alpha m_j^q + \boldsymbol{\beta}' \mathbf{x}_{j1}^q + d_{m(j)} + d_q + \epsilon_j, \tag{2}$$

where l_j^q is a dummy equal to 1 if household j lost at least one of its members over the 12-month period of observation, and 0 otherwise. When we consider a simple bivariate correlation between l_j^q and m_j^q, we see that migrant households are also more likely to experience a variation in their composition because of a departure (for a domestic destination) of a member other than the migrant: over the entire sample, the probability of losing a member for migrant households stands at 21.0 percent, compared to 17.0 percent for non-migrant households. However, and differently from what happens in Table 4, the inclusion of the household controls completely changes the picture that emerges from Table 7. Notably, the probability of losing one member (intuitively) increases with the initial size of the household, and migrant households are significantly larger than non-migrant households (see Table 1). Once we control for the initial difference in size, as well as for all other household characteristics (notably the differences in the age structure of initial household members, see Figure 1), migrant households appear to have a significantly lower probability of losing one (more) of their members,[27] and the sex of the migrant does not appear to be playing a role here. According to the evidence provided in Section 4.1, a relevant *un*observed determinant of l_j^q that ends up in the error term ϵ_j of Eq. (2) could be the occurrence of migration episodes elsewhere within the family network of household j, which could induce some individuals to leave household j and join the migrant household. If just one migration episode occurs out of most family networks over the period of observation in the ENOE, then this possible

[27] Similar results are obtained when estimating Eq. (2) separately for urban and rural areas; results are available from the Authors upon request.

Table 7: Migrant households and leaving members

	Dependent variable: l_j^q					
	(1)	(2)	(3)	(4)	(5)	(6)
m_j^q	0.040***	-0.035***	-0.033***	0.027***	-0.040***	-0.036***
	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)
Female migrant(s)				0.053***	0.020	0.014
				(0.016)	(0.015)	(0.015)
Adjusted-R^2	0.00	0.11	0.12	0.00	0.11	0.12
Observations	141,168	141,168	141,168	141,168	141,168	141,168
Controls	No	Yes	Yes	No	Yes	Yes
Municipality FE	No	No	Yes	No	No	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
$l_j^q \vert m_j^q = 0$	0.170	0.170	0.170	0.170	0.170	0.170
F-test controls		365.093	376.404		364.567	375.892

Notes: ***, ** and * denote significance at the 1, 5 and 10 percent level respectively; standard errors are robust to heteroskedasticity; l_j^q is a dummy variable equal to 1 if household j reports at least leaving member over the period of observation, and 0 otherwise; m_j^q is a dummy variable equal to 1 if household j reports at least one international migrant over the period of observation, and 0 otherwise; female is a dummy variable equal to 1 if at least one of the household members who migrate is a woman; the F-test is performed on the null hypothesis that the coefficients of all household controls are jointly zero; the household controls are measured at the time of the first interview.
Source: Authors' elaboration on ENOE, 2005Q1-2007Q4.

omitted variable bias could contribute to explain the results reported in Table 7, as we would have a negative correlation between m_j^q and ϵ_j in Eq. (2).

Furthermore, notice that Table 7 is informative about the correlates of losing one member conditional upon *not* losing all its members: if a household dissolves by losing all its members, then this gives rise to attrition out of the ENOE sample, and the household is thus dropped out of sample upon which Table 7 is based.

4.3 Attrition

Are households that report a migration episode more likely to drop out of the sample in a later interview? We can answer to this question estimating the following regression:

$$a^q_{js} = \gamma m^q_{j[2;s]} + \boldsymbol{\beta}' \mathbf{x}^q_{j1} + d_{m(j)} + d_q \times d_s + \epsilon_{js}, \text{ with } s = 2, 3, 4, \tag{3}$$

where a^q_{js} is a dummy signaling whether household j drops out of the sample between interview s and $s+1$, $m^q_{j[2;s]}$ is a dummy that takes the value of 1 if household j reported one international migration episode in any interview up to s, and d_q and d_s are dummies for the quarter q in which household j entered the sample and for the interview s respectively. Migration episodes can be observed only since the second interview, and this is why we estimate Eq. (3) only between the second and the fourth interview.

Table 8 reveals that the occurrence of a migration episode significantly increases the probability of attrition, with an estimated effect that stands at 26.8 percent of the baseline probability of attrition for non-migrant households. This result only emerges once we control for initial household characteristics, given that attrition is more likely for households with fewer members, and migrant households are significantly larger (see Table 1). Similarly to what happens for the arrival of a new member, the size of the estimated effect depends on the gender of the migrant, and on the area of residence of the household. The last data column in Table 8 reveals that households with a female migrant are 73.2 percent more likely to drop out of the sample. Tables A.6 and A.7 in the Appendix reveal that the estimated effects is stronger in urban areas, and that rural households with a female migrant also experience a significantly higher probability of attrition. With respect to the relative timing of migration and attrition, Table A.8 in the Appendix reveals that a migration episode reported in interview s significantly increases the probability that $a^q_{js} = 1$, and marginally also the probability that $a^q_{js+1} = 1$.[28]

5 Is attrition due to household dissolution?

Migrant households are thus less likely to undergo a (further) marginal reduction in their size (see Table 7), but they are more likely to drop out of the sample, something that could

[28] A similar pattern emerges for urban areas, where migration significantly increases the probability of attrition in the same and in the following quarter; results are available from the Authors upon request.

Table 8: Migration and attrition

	Dependent variable: a^q_{js}					
	(1)	(2)	(3)	(4)	(5)	(6)
$m^q_{j[2;s]}$	-0.002	0.006***	0.011***	-0.007***	-0.001	0.004*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Female migrant(s)				0.022***	0.030***	0.026***
				(0.006)	(0.006)	(0.006)
Adjusted-R^2	0.00	0.02	0.02	0.00	0.02	0.02
Observations	457,587	457,587	457,587	457,587	457,587	457,587
Controls	No	Yes	Yes	No	Yes	Yes
Municipality FE	No	No	Yes	No	No	Yes
$q \times s$ FE	Yes	Yes	Yes	Yes	Yes	Yes
$a^q_{js} \vert m^q_j = 0$	0.041	0.041	0.041	0.041	0.041	0.041
F-test controls		168.430	160.467		168.712	160.744

Notes: ***, ** and * denote significance at the 1, 5 and 10 percent level respectively; a^q_{js} is a dummy variable signaling whether household j drops out of the sample between interview s and $s+1$; $m^q_{j[2;s]} \equiv \max\{m^q_{j2}, ..., m^q_{js}\}$; female is a dummy variable equal to 1 if at least one of the household members who migrate is a woman; the F-test is performed on the null hypothesis that the coefficients of all household controls are jointly zero; the household controls are measured at the time of the first interview; standard errors are clustered at the household level.

Source: Authors' elaboration on ENOE, 2005Q1-2007Q4.

be driven by household dissolution (see Table 8), which can be regarded as an instance of a radical reduction (to zero) of household size. If this conjecture is true,[29] then other household(s) within the same family network should receive the individuals coming from the dissolved migrant households. The ENOE does not provide information on the reason why new members joined the household that are sufficiently fine-grained to directly verify this, but it provides an indirect key signal: the information on the receipt of remittances from abroad.

5.1 The arrival of new members and the receipt of remittances

Our reasoning goes as follows: consider two households j and k, whose members are related by family ties; if the household j dissolves after the occurrence of an international migration episode and all its members join household k, then the migrant who left from household j is likely to send remittances to household k. Thus, we expect that the probability that a non-migrant household k reports having received remittances over a three-month recall period should be higher if household k has recently received new member(s) and it resides in a high-migration Mexican municipality, as in this case new members are more likely to come from a dissolved household of origin of a migrant.[30]

This approach to test whether attrition of migrant household is due to household dissolution is extremely demanding, as it hinges on two key assumptions that are worth discussing: (i) different households within the same family network are spatially concentrated in Mexico, and (ii) Mexican migrants starts sending remittances shortly after they moved to the United States. Assumption (i) justifies the interaction between the arrival of a new member with a dummy for a high-migration municipality.[31] Around 4 out of 5 the individuals who are observed changing their residence status in the ENOE remain within the same Mexican

[29] Other explanations are also conceivable, such a sequential migration to the United States of all household members; notice that a simultaneous whole household cannot explain the results in Table 8, as otherwise no migration episode would have been reported in the ENOE, and whole household migration would have rather given rise to the attrition of a (for us) non-migrant household.

[30] An alternative explanation could be that household k receives one or more members who left migrant household j, which has not dissolved; the data do not appear to be consistent with this explanation, as discussed below.

[31] If the family network is geographically concentrated, then the dissolved household of origin of the migrant and the household that its members join are likely to reside in municipalities with a similar migration rate.

state, and this is reassuring with respect to the empirical plausibility of the (untestable) assumption (i). With respect to assumption (ii), Section 4.3 provides evidence that the attrition of migrant households occurs in the two interviews that follow the migration episode, so that the members of the dissolved household of origin of the migrant probably join their new household no later than nine months since migration. This entails that only remittances sent by a migrant no later than one and a half year since she left could be recorded during the observation period of the ENOE. Although migrants might experience an initial spell of unemployment at destination, the extensive network of Mexican migrants in the the United States should facilitate the integration of newly arrived migrants on the labor market at destination (Munshi, 2003), and thus reducing the time lag between migration and the transfer of remittances back to Mexico.

We rely on the following specification, which is estimated on the sub-sample of non-migrant households only:

$$r_{ks}^{q} = \alpha_1 n_{k[2;s]}^{q} + \alpha_2 n_{k[2;s]}^{q} * \text{high}_{m(k)} + \boldsymbol{\beta}' \mathbf{x}_{k1}^{q} + d_{m(k)} + d_q \times d_s + \epsilon_{ks}, \text{ with } s = 2, ..., 5, \quad (4)$$

where r_{ks}^{q} is a dummy variable signaling whether household k entering the ENOE sample in quarter q reported receiving remittances from abroad over a three-month recall period before interview s, $n_{k[2;s]}^{q}$ is a dummy that takes the value of 1 if household k received a new member in any interview up to s, $\text{high}_{m(k)}$ is a dummy signaling whether household k resides in a high-migration municipality,[32] and $d_{m(k)}$ and $d_{q\times s}$ are municipality and quarter-interview fixed effects respectively. The inclusion of municipality dummies $d_{m(k)}$ absorbs the direct effect of living in a high-migration municipality on the likelihood of receiving remittances from abroad for non-migrant households,[33] while the interactive fixed effect $d_q \times d_s$ allows for a flexible dependency of the receipt of remittances on unobserved common time-varying factors.

Table 9 reports the estimates of Eq. (4) for a sub-sample of non-migrant households, excluding those where new members are returnees from the United States.[34] The estimated

[32]We rely on the 2000 Mexican population census to identify the municipalities with an emigration rate between 1995 and 2000 that is above the median value of the municipalities covered by the ENOE in the estimation sample.

[33]Non-migrant households could be receiving remittances from migrants from their family network with whom they were not co-residing because of migrants' altruism, or in exchange for the contribution they provided to cover migration costs.

[34]This restriction to the sample, which does *not* affect the reported results, is introduced as the estimation

Table 9: Receipt of remittances by non-migrant households

	Dependent variable: r^q_{ks}					
	(1)	(2)	(3)	(4)	(5)	(6)
$n^q_{k[2;s]}$	0.0157**	0.0080***	0.0117***	0.0041**	0.0124***	0.0038*
	(0.0021)	(0.0020)	(0.0021)	(0.0020)	(0.0020)	(0.0020)
$n^q_{k[2;s]} * \text{high}_{m(k)}$		0.0178***		0.0177***		0.0182***
		(0.0193)		(0.0192)		(0.0474)
Adjusted-R^2	0.00	0.01	0.03	0.04	0.09	0.09
Observations	286,538	286,538	286,538	286,538	286,538	286,538
Controls	No	No	Yes	Yes	Yes	Yes
Municipality FE	No	No	No	No	Yes	Yes
$q \times s$ FE	Yes	Yes	Yes	Yes	Yes	Yes
$r^q_{ks} \vert n^q_{k[2;s]} = 0$	0.037	0.037	0.037	0.037	0.037	0.037
$r^q_{ks} \vert n^q_{k[2;s]} = 0, \text{high}_{m(k)} = 1$	0.058	0.058	0.058	0.058	0.058	0.058
F-test controls			83.595	81.931	66.986	66.970

Notes: ***, ** and * denote significance at the 1, 5 and 10 percent level respectively; $r^q_{ks} = 1$ if household k entering the ENOE sample in quarter q reported receiving remittances from abroad over a three-month recall period before interview s, $n^q_{k[2-s]} = 1$ 1 if household k received a new member in any interview up to s, and $\text{high}_{m(k)}$ is a dummy signaling whether household k resides in a high-migration municipality; sample does not include households with new member(s) returning from the United States; standard errors are clustered at the household level.

Source: Authors' elaboration on ENOE, 2005Q1-2007Q2 and 2000 Mexican population census.

coefficient α_2 for the interaction term stands at 0.0182 when we include both household controls and municipality fixed-effects. Non-migrant households receiving a new member and residing in a high-migration Mexican municipality are 49.2 percent more likely to start receiving remittances than non-migrant households without new members. Tables A.9 and A.10 in the Appendix report the estimates separately for urban and rural households: the estimated coefficient of interest is significant for both sub-samples, but the effect is larger in urban areas, where non-migrant households with a new member and residing in a high-migration Mexican municipality are 62.5 percent more likely to report the receipt of remittances, compared to 38.1 percent in rural areas. This difference in the size of the estimated effect is consistent with the different strength of the association between migration and attrition in urban and rural areas (see Tables A.6 and A.7 in the Appendix).

5.2 Threats to our interpretation

The estimates in Table 9 are consistent with our conjecture that the new members could come from dissolved households of origin of Mexican migrants, but such an interpretation is exposed to various threats, that would produce an identical pattern in the data. Specifically, households with no international migration episode over the 12-month period of observation in the ENOE might have deliberately mis-reported the destination of the members that left the household (Hamilton and Savinar, 2015), or they might have experienced a migration episode before the beginning of the observation period.[35] In both cases, remittances would be sent from an individual who used to be a member of household k, and this (unobserved or misreported) migration episode could also induce the arrival of new household members, as shown in Section 4.1. As previous or not reported migration episodes are likely to be more frequent in high-migration municipalities, this would produce a positive point estimate for

of Eq. (4) is instrumental to understanding whether new members come from dissolved households that were living in Mexico.

[35]Sections 4.1 and 4.3 above provide evidence that variations in co-residence choices in migrant households occur at the time or shortly after the occurrence of a migration episode. Nevertheless, the limited length of the observation period in the ENOE does not, *per se*, allow to rule out the hypothesis that the arrival of a new member could also occur later on, namely when the household of origin of the migrant starts benefiting from the positive income effect due to the receipt of remittances; Gutierrez et al. (2017) do not find that the positive income effect induced by the receipt of an old-age pension modifies the composition of Mexican households.

Table 10: Placebo test on the receipt of remittances by non-migrant households

	Dependent variable: r'^{q}_{ks}					
	(1)	(2)	(3)	(4)	(5)	(6)
$n^q_{k[2;s]}$	0.0023	0.0011	-0.0016	-0.0028	-0.0009	-0.0031*
	(0.0019)	(0.0017)	(0.0018)	(0.0017)	(0.0018)	(0.0017)
$n^q_{k[2;s]} * \text{high}_{m(k)}$		0.0042		0.0041		0.0046
		(0.0037)		(0.0037)		(0.0036)
Adjusted-R^2	0.00	0.01	0.03	0.04	0.09	0.09
Observations	286,538	286,538	286,538	286,538	286,538	286,538
Controls	No	No	Yes	Yes	Yes	Yes
Municipality FE	No	No	No	No	Yes	Yes
$q \times s$ FE	Yes	Yes	Yes	Yes	Yes	Yes
$r'^{q}_{ks} \vert n^q_{k[2;s]} = 0$	0.037	0.037	0.037	0.037	0.037	0.037
$r'^{q}_{ks} \vert n^q_{k[2;s]} = 0, \text{high}_{m(k)} = 1$	0.058	0.058	0.058	0.058	0.058	0.058
F-test controls			84.488	82.940	68.126	68.118

Notes: ***, ** and * denote significance at the 1, 5 and 10 percent level respectively; $r'^{q}_{ks} = 1$ if initial household members in household k reported receiving remittances from abroad over a three-month recall period before interview s, $n^q_{k[2-s]} = 1$ 1 if household k received a new member in any interview up to s, and $\text{high}_{m(k)}$ is a dummy signaling whether household k resides in a high-migration municipality; sample does not include households with new member(s) returning from the United States; standard errors are clustered at the household level.

Source: Authors' elaboration on ENOE, 2005Q1-2007Q2 and 2000 Mexican population census.

α_2.

These concerns can be fully dismissed by exploiting a key feature of the ENOE: information on the receipt of remittances is available separately for each household member aged 15 and above.[36] We can thus re-define the dependent variable in Eq. (4) and run a placebo test by using only information on the receipt of remittances by initial household members, thus excluding the remittances received by the new members that joined the household over the observation period. The estimation sample includes 1,359 remittance-recipient households

[36]On average, there are 1.39 members that report receiving remittances in each recipient household, with 72 percent of the recipient individuals being either the household head or his or her spouse; in 69 percent of recipient households just have one member reporting to have received remittances from abroad.

that record the arrival of a new member, and a new member reports to be directly receiving remittances in 304 of them. If new members previously co-resided with a migrant, then they should be reporting the receipt of remittances. Conversely, if they jointed a household with a previous unobserved or mis-reported migration episode, then remittances should be reported by individuals that appeared in the household roster already in the first interview. We thus define a dummy variable r'^{q}_{ks} that takes the value of 1 if initial members in household k reported the receipt of remittances over the three-month recall period before interview s, with $s = 2, ..., 5$, and 0 otherwise. If a spurious positive correlation between the interaction term $n^{q}_{k[2-s]} * \text{high}_{m(k)}$ and the error term in Eq. (4) is driving the reported positive estimates for α_2 in Table 9 and Tables A.9-A.10, then this change in the definition of the dependent variable should not affect the results.

Table 10 reports the results from this placebo test for the entire sample of non-migrant households: once we only consider the receipt of remittances by initial household members, we obtain a precisely estimated zero effect of their arrival in households living in high-migration municipalities on the receipt of remittances, and the same holds when we restrict the sample to either urban or rural households (see Tables A.11-A.12 in the Appendix). The estimated association between the arrival of a new member in a high-migration municipality and the receipt of remittances from abroad is entirely driven by the remittances received directly from the new members.

Although this placebo test strongly corroborates the interpretation that these new members originate from dissolved households of origin of Mexican migrants, it does not suffice to rule out the possibility that these new members might have left a migrant household which has not dissolved, as migration is associated with a higher *un*conditional probability of losing one member (see Table 7).[37] Two different arguments can be advanced to downplay the relevance of this alternative explanation. First, the cost of sending remittances from the United States to Mexico is proportionally higher for smaller amounts,[38] and this creates incentives for migrants to concentrate their transfers over a limited number of operations. This, in

[37]Notice that this alternative explanation would still entail that the individuals left behind in the household of origin of the migrant become members of households that do not report any migration episode; they would be regarded as untreated in an analysis of the effects of migration on the left behind, thus contaminating the control group.

[38]See http://remittanceprices.worldbank.org/en/corridor/United-States/Mexico (accessed on November 22, 2017).

turn, entails that Mexican migrants are unlikely to make distinct transfers to various individuals they were co-residing with before migrating, while they could rather rely on internal transfers from the (unique) remittance-recipient household to other households within their family network to distribute the resources that they send back home. Thus, a household receiving just some rather than all the members of the household of origin of the migrant would be less likely to report the receipt of remittances from abroad. Second, we know from Table 3 that migrant households with leaving members lose, on average, 1.84 members, and only 44 percent of them loses more than one member, and these numbers almost coincide with the profile of the new members that join the 1,359 remittance-recipient non-migrant households. Nevertheless, the picture is significantly different for the sub-sample of 304 non-migrant households with new members that report to have directly received remittances. These households, which are driving our results (as shown by the placebo in Table 10), receive, on average, 2.27 new members, and 62 percent of them received more than one member.[39] These differences, in turn, suggest that the results in Table 9 are not due to individuals that left migrant households, but rather to the dissolution of the household of origin of the migrants.

6 Concluding remarks

Co-residence choices represent an under-studied topic in economics, where household composition is usually assumed to be orthogonal with respect to the object of the analysis. The migration literature makes no exception in this respect, as it relies on the assumption that the migration of a household member is not systematically associated with further variations in the composition of the household. Our analysis of the data drawn from the *Encuesta Nacional de Ocupación y Empleo* reveals that this assumption lacks, at least in the case of Mexico, empirical plausibility.

Households that report an international migration episode experience further variations in their composition , and additional variations in co-residence choices might also occur beyond the limited length of the period over which we can track changes in household composition

[39]While women represent around half of the members leaving migrant households and they are typically in their 20s (see Figure 2), single and without children, 81.6 percent of these 304 households received at least one adult woman, that is typically married, aged above 30 and who joins her new household together with one or more children.

with the ENOE data. Migrant households are 34.5 percent more likely than non-migrant households to receive one new member over a one-year period around the migration episode. While they are less likely to experience a further reduction at the margin in their size (over and above the one induced by migration), they are 26.8 percent more likely to drop out of the sample. Both effects are magnified for households residing in urban areas, and when the migrant is a woman. While Mexican migration is still predominantly male, with international migration representing the single most important cause of separation between a father and his children (Nobles, 2013), this latter result suggests that the association between migration and variations in co-residence choices could be even stronger in migrant-sending countries characterized by a feminization of international migration, such as the Philippines (Cortes, 2015).

Attrition appears to be due to household dissolution, with all the remaining members leaving the household of origin of the migrant and joining another household. This interpretation is supported by a set of auxiliary results on the receipt of remittances by non-migrant households joined by a new member in high-migration municipalities, and it is greatly strengthened by the individual-level data on the receipt of remittances, which allow showing that remittances are received directly by the new rather than the initial household members.

The uncovered endogeneity of household composition has major implications both for the collection of survey-based data at origin, whose ability to record information on migration episodes hinges on the co-residence choices of the individuals left behind, and for the economic analysis of the causes and consequences of international migration. Both types of analysis–either examining the pattern of selection into migration or the impact of migration on the individuals left behind–should account for the reshuffling of the partition of family members into distinct households that can be associated with migration, as we have shown. Variations and adjustments in co-residence choices can contribute to diffuse the effects of migration beyond the household of origin of the migrant. This, in turn, suggests that a fuller understanding of the determinants and of the implications of international migration may require closing the gap between the theory, which focuses on the family, and applied research, which adopts the (data-constrained) choice to treat the household as the relevant unit of analysis.

References

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. (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 (2017): "Consumption and Investment in Resource Pooling Family Networks," *The Economic Journal*, DOI: 10.1111/ecoj.12534.

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.

Barsbai, T. and R. Thiele (2013): "Does Prime-Age Mortality Reduce Per-Capita Household Income? Evidence from Rural Zambia," *World Development*, 45, 51–62.

Batista, C., A. Lacuesta, and P. Vicente (2012): "Testing the 'brain gain' hypothesis: Micro evidence from Cape Verde," *Journal of Development Economics*, 97, 32–45.

Bertoli, S. and F. Marchetta (2014): "Migration, remittances and poverty in Ecuador," *The Journal of Development Studies*, 50, 1067–1089.

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.

Chort, I. and J.-N. Senne (2015): "Selection into Migration within a Household Model: Evidence from Senegal," *The World Bank Economic Review*, 29, S247–S256.

——— (2017): "You'll be a migrant my son: Accounting for migrant selection within the household," *Economic Development and Cultural Change*, forthcoming.

Clemens, M. A. and E. R. Tiongson (2017): "Split Decisions: Household Finance When a Policy Discontinuity Allocates Overseas Work," *The Review of Economics and Statistics*, 99, 531–543.

Cortes, P. (2015): "The Feminization of International Migration and its Effects on the Children Left Behind: Evidence from the Philippines," *World Development*, 65, 62–78.

de Laat, J. (2014): "Household allocations and endogenous information: The case of split migrants in Kenya," *Journal of Development Economics*, 106, 108–117.

Dustmann, C., F. Fasani, F. Meng, and L. Minale (2017): "Risk attitudes and household migration decisions," Discussion Paper Series 14/15, Centre for Research & Analysis of Migration.

Edmonds, E. V., K. Mammen, and D. L. Miller (2005): "Rearranging the family? Income support and elderly living arrangements in a low-income country," *Journal of Human Resources*, 40, 186–207.

Fafchamps, M. and A. R. Quisumbing (2007): "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. (2013): "Understanding different migrant selection patterns in rural and urban Mexico," *Journal of Development Economics*, 103, 182–201.

Foster, A. D. and S. Milusheva (2015): "Household Recombination and Retrospective Evaluation: Evidence from a Health and Family Planning Experiment," BREAD Working Paper No. 460.

Foster, A. D. and M. R. Rosenzweig (2002): "Household division and rural economic growth," *The 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," *The 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.

Hamoudi, A. and D. Thomas (2014): "Endogenous coresidence and program incidence: South Africa's Old Age Pension," *Journal of Development Economics*, 109, 30–37.

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.

Kazianga, H. and Z. Wahhaj (2017): "Intra-household resource allocation and familial ties," *Journal of Development Economics*, 127, 109–132.

Mishra, P. (2007): "Emigration and wages in source countries: Evidence from Mexico," *Journal of Development Economics*, 82, 180–199.

Munshi, K. (2003): "Networks in the modern economy: Mexican migrants in the US labor market," *The Quarterly Journal of Economics*, 118, 549–599.

Murard, E. (2015): "The impact of migration on family left behind: estimation in presence of intra-household selection of migrants," Mimeo.

Nobles, J. (2013): "Migration and father absence: Shifting family structure in Mexico," *Demography*, 50, 1303–1314.

Sjaastad, L. A. (1962): "The costs and returns of human migration," *Journal of Political Economy*, 70, 80–93.

Stark, O. and D. E. Bloom (1985): "The new economics of labor migration," *American Economic Review*, 75, 173–178.

Steinmayr, A. (2015): "When a Random Sample is Not Random. Bounds on the Effect of Migration on Children Left Behind," Mimeo.

Teruel, G., L. Rubalcava, and E. Arenas (2012): "Migration in the Mexican Family Life Survey," in *Migration and Remittances from Mexico: Trends, Impacts, and New Challenges*, ed. by A. Cuecuecha and C. Pederzini, Lexington Books, 15–36.

Wong, R., E. Resano, and I. Martínez (2006): *Una Costante Cambiante: La Migración De La Población Mexicana hacia los Estados Unidos de Norteamérica*, Zapopano.

Yang, D. (2008): "International migration, remittances and household investment: Evidence from Philippine migrants exchange rate shocks," *The Economic Journal*, 118, 591–630.

A Appendix

Table A.1: Structure of the sample

	Interview					
	1^{st}	2^{nd}	3^{rd}	4^{th}	5^{th}	Total
Quarter						
2005Q1	20,919	0	0	0	0	20,919
2005Q2	21,114	19,534	0	0	0	40,648
2005Q3	21,189	19,581	18,454	0	0	59,224
2005Q4	21,088	19,769	18,622	17,605	0	77,084
2006Q1	21,534	19,853	18,840	17,924	17,130	95,281
2006Q2	21,444	20,251	18,931	18,109	17,359	96,094
2006Q3	21,508	20,108	19,222	18,161	17,547	96,546
2006Q4	21,510	20,189	19,162	18,461	17,569	96,891
2007Q1	0	20,303	19,374	18,480	17,952	76,109
2007Q2	0	0	19,421	18,661	17,950	56,032
2007Q3	0	0	0	18,572	18,013	36,585
2007Q4	0	0	0	0	17,648	17,648
Total	170,306	159,588	152,026	145,973	141,168	769,061

Source: Authors' elaboration on ENOE, 2005Q1-2007Q4.

Table A.2: Non-attrited households with information on the receipt of remittances

	Interview					
	1^{st}	2^{nd}	3^{rd}	4^{th}	5^{th}	Total
Quarter						
2005Q1	17,129	0	0	0	0	17,129
2005Q2	17,356	17,121	0	0	0	34,477
2005Q3	17,543	17,357	17,128	0	0	52,028
2005Q4	17,568	17,547	17,354	17,126	0	69,595
2006Q1	17,950	17,567	17,545	17,355	17,130	87,547
2006Q2	17,945	17,948	17,568	17,544	17,359	88,364
2006Q3	0	0	0	0	0	0
2006Q4	0	0	0	0	0	0
2007Q1	0	0	0	0	0	0
2007Q2	0	0	17,647	18,011	17,949	53,607
2007Q3	0	0	0	0	0	0
2007Q4	0	0	0	0	0	0
Total	105,491	87,540	87,242	70,036	52,438	402,747

Source: Authors' elaboration on ENOE, 2005Q1-2007Q4.

Table A.3: Characteristics of initial, new, leaving and migrant members (migrant households)

	Type of member						
	Initial	New	Leaving	Migrant		Difference	
	(1)	(2)	(3)	(4)	(1)-(2)	(1)-(3)	(1)-(4)
Age	35.417	29.803	26.485	30.687	-5.614***	-9.125***	-5.169***
Female	0.504	0.545	0.565	0.234	0.041*	0.062***	-0.293***
Years of education	7.773	8.137	9.082	8.337	0.364*	1.338***	0.617***
Relationship with the household head							
Head	0.196	0.024	0.037	0.306	-0.172***	-0.161***	0.123***
Spouse	0.148	0.041	0.013	0.065	-0.107***	-0.138***	-0.091***
Son or daughter	0.504	0.290	0.439	0.459	-0.215***	-0.065***	-0.050***
Parent	0.006	0.026	0.010	0.006	0.020***	0.004	-0.001
Sibling	0.012	0.036	0.025	0.018	0.024***	0.014***	0.007***
Grandchild	0.080	0.244	0.238	0.068	0.164***	0.161***	-0.014**
Nephew or niece	0.012	0.084	0.062	0.016	0.072***	0.051***	0.005*
Cousin	0.001	0.011	0.003	0.002	0.011***	0.003***	0.002**
Spouse's parent	0.004	0.021	0.005	0.002	0.017***	0.001	-0.001
Son's parent in law	0.000	0.001	0.000	0.000	0.001**	-0.000	0.000
Son or daughter in law	0.029	0.139	0.119	0.042	0.111***	0.092***	0.014***
Brother or sister in law	0.005	0.045	0.027	0.008	0.040***	0.023***	0.003*
Other	0.001	0.001	0.005	0.001	0.000	0.005***	0.000
Non relative	0.002	0.038	0.016	0.005	0.035***	0.014***	0.003***
Domestic worker	0.002	0.000	0.000	0.001	-0.002	-0.002	-0.000
Observations	19,830	1,143	1,468	4,880	20,973	20,923	23,288

Notes: age, years of education and sex are defined for members aged 15+; household headship is defined at the time of the first interview; the variables referring to new members, leaving members and migrants are measured at the time of the variation in their residence status; *,** and *** denote significance at the 10, 5 and 1 percent confidence level.

Source: Authors' elaboration on ENOE, 2005Q1-2007Q4.

Table A.4: Migrant households and new members, excluding returnees

	Dependent variable: n_j^q					
	(1)	(2)	(3)	(4)	(5)	(6)
m_j^q	0.031***	0.015***	0.022***	0.017***	0.001	0.009
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Female migrant(s)				0.058***	0.059***	0.053***
				(0.014)	(0.014)	(0.014)
Adjusted-R^2	0.00	0.02	0.03	0.00	0.02	0.03
Observations	140,017	140,017	140,017	140,017	140,017	140,017
Controls	No	Yes	Yes	No	Yes	Yes
Municipality FE	No	No	Yes	No	No	Yes
$n_j^q \vert m_j^q = 0$	0.103	0.103	0.103	0.103	0.103	0.103
F-test controls		55.790	58.138		55.736	58.021

Notes: ***, ** and * denote significance at the 1, 5 and 10 percent level respectively; n_j^q is a dummy variable equal to 1 if household j reports at least one new member over the period of observation, and 0 otherwise; m_j^q is a dummy variable equal to 1 if household j reports at least one international migrant over the period of observation, and 0 otherwise; female is a dummy variable equal to 1 if at least one of the household members who migrate is a woman; the F-test is performed on the null hypothesis that the coefficients of all household controls are jointly zero; the household controls are measured at the time of the first interview.

Source: Authors' elaboration on ENOE, 2005Q1-2007Q4.

Table A.5: Relative timing of migration and of the arrival of new members

	Dependent variable: n^q_{js}		
	(1)	(2)	(3)
m^q_{js-3}	0.003	-0.002	-0.001
	(0.005)	(0.005)	(0.005)
m^q_{js-2}	0.023***	0.019***	0.020***
	(0.005)	(0.005)	(0.005)
m^q_{js-1}	0.025***	0.020***	0.021***
	(0.004)	(0.004)	(0.004)
m^q_{js}	0.018***	0.014***	0.014***
	(0.003)	(0.003)	(0.003)
m^q_{js+1}	0.010***	0.005	0.006
	(0.004)	(0.004)	(0.004)
m^q_{js+2}	0.004	-0.001	-0.000
	(0.004)	(0.004)	(0.004)
m^q_{js+3}	0.011*	0.008	0.008
	(0.006)	(0.006)	(0.006)
Controls	No	Yes	Yes
Municipality FE	No	No	Yes
$q \times s$ FE	Yes	Yes	Yes
Adjusted-R^2	0.00	0.00	0.01
F-test controls		57.158	58.300
Observations	564,672	564,672	564,672

Notes: *,** and *** denote significance at the 10, 5 and 1 percent confidence level respectively; each observation corresponds to a household-interview pair js, with $s = 2, ..., 5$; n^q_{js} is a dummy variable equal to 1 if household j reports one new member in the interview s and 0 otherwise; m^q_{jt}, with $t = s-3, ..., s+3$, is a dummy variable equal to 1 if household j reports one international migrant in the interview t, and 0 otherwise; all specifications include dummies for each quarter-interview pair qs; standard errors are clustered at the household level.

Source: Authors' elaboration on ENOE, 2005Q1-2007Q4.

Table A.6: Migration and attrition (urban areas)

	Dependent variable: a^q_{js}					
	(1)	(2)	(3)	(4)	(5)	(6)
$m^q_{j[2;s]}$	0.007*	0.015***	0.017***	0.003	0.008*	0.011**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Female migrant(s)				0.012	0.022***	0.020**
				(0.008)	(0.008)	(0.008)
Adjusted-R^2	0.00	0.02	0.02	0.00	0.02	0.02
Observations	325,934	325,934	325,934	325,934	325,934	325,934
Controls	No	Yes	Yes	No	Yes	Yes
Municipality FE	No	No	Yes	No	No	Yes
$q \times s$ FE	Yes	Yes	Yes	Yes	Yes	Yes
$a^q_{js} \vert m^q_j = 0$	0.045	0.045	0.045	0.045	0.045	0.045
F-test controls		134.722	130.789		134.860	130.926

Notes: ***, ** and * denote significance at the 1, 5 and 10 percent level respectively; a^q_{js} is a dummy variable signaling whether household j drops out of the sample between interview s and $s+1$; $m^q_{j[2;s]} \equiv \max\{m^q_{j2}, ..., m^q_{js}\}$; female is a dummy variable equal to 1 if at least one of the household members who migrate is a woman; the F-test is performed on the null hypothesis that the coefficients of all household controls are jointly zero; the household controls are measured at the time of the first interview; standard errors are clustered at the household level.

Source: Authors' elaboration on ENOE, 2005Q1-2007Q4.

Table A.7: Migration and attrition (rural areas)

	Dependent variable: a^q_{js}					
	(1)	(2)	(3)	(4)	(5)	(6)
$m^q_{j[2;s]}$	-0.004	0.001	0.004	-0.009***	-0.005*	-0.001
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Female migrant(s)				0.028***	0.034***	0.028***
				(0.009)	(0.009)	(0.009)
Adjusted-R^2	0.00	0.01	0.03	0.00	0.01	0.03
Observations	131,653	131,653	131,653	131,653	131,653	131,653
Controls	No	Yes	Yes	No	Yes	Yes
Municipality FE	No	No	Yes	No	No	Yes
$q \times s$ FE	Yes	Yes	Yes	Yes	Yes	Yes
$a^q_{js} \vert m^q_j = 0$	0.030	0.030	0.030	0.030	0.030	0.030
F-test controls		33.189	30.450		33.309	30.547

Notes: ***, ** and * denote significance at the 1, 5 and 10 percent level respectively; a^q_{js} is a dummy variable signaling whether household j drops out of the sample between interview s and $s+1$; $m^q_{j[2;s]} \equiv \max\{m^q_{j2}, ..., m^q_{js}\}$; female is a dummy variable equal to 1 if at least one of the household members who migrate is a woman; the F-test is performed on the null hypothesis that the coefficients of all household controls are jointly zero; the household controls are measured at the time of the first interview; standard errors are clustered at the household level.

Source: Authors' elaboration on ENOE, 2005Q1-2007Q4.

Table A.8: Relative timing of migration and attrition

	Dependent variable: a^q_{js}		
	(1)	(2)	(3)
m^q_{js-2}	-0.005	0.003	0.007
	(0.005)	(0.005)	(0.005)
m^q_{js-1}	-0.008**	0.003	0.007*
	(0.004)	(0.004)	(0.004)
m^q_{js}	0.003	0.010***	0.014***
	(0.004)	(0.004)	(0.004)
Controls	No	Yes	Yes
Municipality FE	No	No	Yes
$q \times s$ FE	Yes	Yes	Yes
Adjusted-R^2	0.00	0.02	0.02
F-test controls		168.460	160.504
Observations	457,587	457,587	457,587

Notes: *,** and *** denote significance at the 10, 5 and 1 percent confidence level respectively; each observation corresponds to a household-interview pair js, with $s = 2, ..., 4$; a^q_{js} is a dummy variable equal to 1 if household j attrites in interview s, and 0 otherwise; m^q_{jt}, with $t = s-2, ..., s$, is a dummy variable equal to 1 if household j reports one international migrant in the interview t, and 0 otherwise; standard errors are clustered at the household level.

Source: Authors' elaboration on ENOE, 2005Q1-2007Q4.

Table A.9: Receipt of remittances by non-migrant households (urban areas)

	Dependent variable: r^q_{ks}					
	(1)	(2)	(3)	(4)	(5)	(6)
$n^q_{k[2;s]}$	0.0135**	0.0060***	0.0107***	0.0031	0.0103***	0.0032*
	(0.0021)	(0.0019)	(0.0021)	(0.0019)	(0.0020)	(0.0019)
$n^q_{k[2;s]} * \text{high}_{m(k)}$		0.0170***		0.0171***		0.0150***
		(0.0042)		(0.0042)		(0.0042)
Adjusted-R^2	0.00	0.01	0.01	0.02	0.03	0.03
Observations	204,976	204,976	204,976	204,976	204,976	204,976
Controls	No	No	Yes	Yes	Yes	Yes
Municipality FE	No	No	No	No	Yes	Yes
$q \times s$ FE	Yes	Yes	Yes	Yes	Yes	Yes
$r^q_{ks} \vert n^q_{k[2;s]} = 0$	0.024	0.024	0.024	0.024	0.024	0.024
$r^q_{ks} \vert n^q_{k[2;s]} = 0, \text{high}_{m(k)} = 1$	0.035	0.035	0.035	0.035	0.035	0.035
F-test controls			34.965	34.438	33.417	33.420

Notes: ***, ** and * denote significance at the 1, 5 and 10 percent level respectively; $r^q_{ks} = 1$ if household k entering the ENOE sample in quarter q reported receiving remittances from abroad over a three-month recall period before interview s, $n^q_{k[2;s]} = 1$ 1 if household k received a new member in any interview up to s, and $\text{high}_{m(k)}$ is a dummy signaling whether household k resides in a high-migration urban municipality; sample does not include households with new member(s) returning from the United States.

Source: Authors' elaboration on ENOE, 2005Q1-2007Q2 and 2000 Mexican population census; standard errors are clustered at the household level.

Table A.10: Receipt of remittances by non-migrant households (rural areas)

	Dependent variable: r^q_{ks}					
	(1)	(2)	(3)	(4)	(5)	(6)
$n^q_{k[2;s]}$	0.0198***	0.0119**	0.0164***	0.0090*	0.0186***	0.0059
	(0.0052)	(0.0050)	(0.0051)	(0.0051)	(0.0049)	(0.0050)
$n^q_{k[2;s]} * \text{high}_{m(k)}$		0.0207**		0.01871*		0.0267***
		(0.0103)		(0.0101)		(0.0098)
Adjusted-R^2	0.00	0.03	0.04	0.07	0.13	0.13
Observations	81,562	81,562	81,562	81,562	81,562	81,562
Controls	No	No	Yes	Yes	Yes	Yes
Municipality FE	No	No	No	No	Yes	Yes
$q \times s$ FE	Yes	Yes	Yes	Yes	Yes	Yes
$r^q_{ks} \vert n^q_{k[2;s]} = 0$	0.069	0.069	0.069	0.069	0.069	0.069
$r^q_{ks} \vert n^q_{k[2;s]} = 0, \text{high}_{m(k)} = 1$	0.116	0.116	0.116	0.116	0.116	0.116
F-test controls			43.696	41.790	35.463	35.417

Notes: ***, ** and * denote significance at the 1, 5 and 10 percent level respectively; $r^q_{ks} = 1$ if household k entering the ENOE sample in quarter q reported receiving remittances from abroad over a three-month recall period before interview s, $n^q_{k[2;s]} = 1$ 1 if household k received a new member in any interview up to s, and $\text{high}_{m(k)}$ is a dummy signaling whether household k resides in a high-migration rural municipality; sample does not include households with new member(s) returning from the United States.
Source: Authors' elaboration on ENOE, 2005Q1-2007Q2 and 2000 Mexican population census; standard errors are clustered at the household level.

Table A.11: Placebo on the receipt of remittances by non-migrant households (urban areas)

	Dependent variable: $r^{'q}_{ks}$					
	(1)	(2)	(3)	(4)	(5)	(6)
$n^q_{k[2;s]}$	0.0026	-0.0004	-0.0003	-0.0033**	-0.0006	-0.0033**
	(0.0018)	(0.0016)	(0.0017)	(0.0016)	(0.0017)	(0.0016)
$n^q_{k[2;s]} * \text{high}_{m(k)}$		0.0075**		0.0075**		0.0055
		(0.0036)		(0.0035)		(0.0035)
Adjusted-R^2	0.00	0.01	0.02	0.02	0.03	0.03
Observations	204,976	204,976	204,976	204,976	204,976	204,976
Controls	No	No	Yes	Yes	Yes	Yes
Municipality FE	No	No	No	No	Yes	Yes
$q \times s$ FE	Yes	Yes	Yes	Yes	Yes	Yes
$r^{'q}_{ks} \vert n^q_{k[2;s]} = 0$	0.024	0.024	0.024	0.024	0.024	0.024
$r^{'q}_{ks} \vert n^q_{k[2;s]} = 0, \text{high}_{m(k)} = 1$	0.035	0.035	0.035	0.035	0.035	0.035
F-test controls			35.765	35.256	34.271	34.272

Notes: ***, ** and * denote significance at the 1, 5 and 10 percent level respectively; $r^{'q}_{ks} = 1$ if initial household members in household k reported receiving remittances from abroad over a three-month recall period before interview s, $n^q_{k[2;s]} = 1$ 1 if household k received a new member in any interview up to s, and $\text{high}_{m(k)}$ is a dummy signaling whether household k resides in a high-migration urban municipality; sample does not include households with new member(s) returning from the United States; standard errors are clustered at the household level.

Source: Authors' elaboration on ENOE, 2005Q1-2007Q2 and 2000 Mexican population census.

Table A.12: Placebo on the receipt of remittances by non-migrant households (rural areas)

	Dependent variable: $r^{'q}_{ks}$					
	(1)	(2)	(3)	(4)	(5)	(6)
$n^q_{k[2;s]}$	0.0005	0.0032	-0.0029	0.0003	-0.0006	-0.0026
	(0.0047)	(0.0046)	(0.0046)	(0.0047)	(0.0044)	(0.0047)
$n^q_{k[2;s]} * \text{high}_{m(k)}$		-0.0017		-0.0036		0.0042
		(0.0092)		(0.0091)		(0.0088)
Adjusted-R^2	0.00	0.03	0.04	0.07	0.13	0.13
Observations	81,562	81,562	81,562	81,562	81,562	81,562
Controls	No	No	Yes	Yes	Yes	Yes
Municipality FE	No	No	No	No	Yes	Yes
$q \times s$ FE	Yes	Yes	Yes	Yes	Yes	Yes
$r^q_{ks} \vert n^q_{k[2;s]} = 0$	0.069	0.069	0.069	0.069	0.069	0.069
$r^{'q}_{ks} \vert n^q_{k[2;s]} = 0, \text{high}_{m(k)} = 1$	0.116	0.116	0.116	0.116	0.116	0.116
F-test controls			43.432	41.626	35.362	35.343

Notes: ***, ** and * denote significance at the 1, 5 and 10 percent level respectively; $r^{'q}_{ks} = 1$ if initial household members in household k reported receiving remittances from abroad over a three-month recall period before interview s, $n^q_{k[2;s]} = 1$ 1 if household k received a new member in any interview up to s, and $\text{high}_{m(k)}$ is a dummy signaling whether household k resides in a high-migration rural municipality; sample does not include households with new member(s) returning from the United States; standard errors are clustered at the household level.

Source: Authors' elaboration on ENOE, 2005Q1-2007Q2 and 2000 Mexican population census.