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Leaving the Nest or Living with Parents: Evidence from Mexico's Young Adult Population

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Abstract

What makes adult children live with their parents? This paper examines the extent to which individual and family characteristics are associated with co-residence decisions between adult children and their parents. Using Mexico's 2011 *Social Mobility Survey* (EMOVI) retrospective data and focusing on the young adult population in Mexico, we test empirically what parent and adult children characteristics correlate with co-residence status. Marginal effects from a probit regression model show that, after controlling for individual characteristics and retrospective family conditions, adult children's education and employment status seem to be correlated with co-residence status, although only for males. Marital status, whether or not they have children, and retrospective parents' home ownership are all correlated with co-residence status. The probability of adult male children staying at their parents' home is reduced when the father has higher levels of education, while increased when the mother has higher levels of education.

Keywords Co-residence · Adult children · Living arrangements

JEL Classification D1 · J12 · J62

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1 Introduction

Leaving the parental home is a fundamental transition related to important demographic decisions, including partnering and parenting, and labor force participation. In recent decades, co-residence with parents and the age of leaving home have changed significantly in developed countries. In many cases, due to weaker labor market conditions, increasing housing costs, and higher educational requirements, children are leaving their parents' home later in life (Cobb-Clark, 2008; Di Stefano, 2019). In the case of developing countries, there is general consensus that intergenerational co-residence is declining in most countries as a result of economic development (Ruggles & Heggeness, 2008, p. 254), but in less developed economies, parents and their children tend to live together more often (see, e.g., Lindert, 1980; Cameron & Cobb-Clark, 2008).

Living with parents may serve as a mechanism through which children, depending on their parents' budget, might be able to obtain financial help from them to invest in their human capital (Parish & Willis, 1993) or to start their own families (Cobb-Clark, 2008).[1] On the other hand, Buck and Scott (1993) show that young adults increasingly leave the nest to get independence rather than to start a family. Becker et al. (2010) and Chiuri and Del Boca (2010) argue that staying at a parental home helps young adults to reduce income uncertainty and job insecurity. More recent literature indicates that when young adults face income risk, they are more likely to postpone long-lasting decisions, such as household formation and permanent labor market participation (Aassve et al., 2007; Gillespie, 2019).

As a developing country with a large young adult population that deals with strong cultural and economic forces, Mexico represents a good case to study co-residence conditions. Although there has been no comprehensive research in Mexico about the co-residence situation of young adults and their parents, the 2010 Mexican Census shows that 67% of young adults born between 1980 and 1990 (aged 20 to 29 years) were still living with their parents. In addition, the most recent data available (2015 Mexican Inter-Census Survey) indicate that young adults born between 1980 and 1995 are the largest population group in Mexico, representing ~28 million or nearly one fourth of total population. This generation also has higher educational attainment rates when compared to other previous generations at comparable ages.

In summary, and from the children's perspective, the decision to leave or stay at the parental home relates to issues of independence, marriage, parenting, and income insurance. Consequently, the decision to remain at the parental home might depend on individual and parental characteristics, like parents' and children's education, income, and socioeconomic status. In addition, this decision might be related to contextual characteristics, like labor market opportunities, housing costs, cultural perceptions, and needs for independence. Therefore, the focus of this paper is to examine the determinants of adult children's propensity to stay with their parents during their early adulthood, focusing on the young adult population in Mexico.

A common limitation in the study of intergenerational decisions and transfers within the household is that most surveys provide information only at a single point

[1] In practical terms, parents' budget might not be sufficient to provide this type of assistance to all children.

in time. The use of longitudinal surveys have been helpful in some developed countries. However, in Mexico, as in most developing countries, there is no longitudinal survey large enough to provide such information. As an alternative, this paper uses the 2011 EMOVI, *Social Mobility Survey*, which collects socio-economic information of individuals aged 25 to 64 years and includes a series of questions regarding the socio-economic situation of their family and the characteristics of their parents when the survey respondents were 14 years old.[2]

This analysis focuses on young adults 25 to 35 years old for the following two reasons. First, to exclude younger children who tend to live with their parents because they have not yet completed their formal education, and second, as noticed by Reher (1998), to exclude older children who usually live with their parents to provide care for them.

As a preview of our main results, we find important differences between female and male adult children and the probability of co-residence. For young adult females, we do not find evidence of an impact of schooling or been employed on the probability of co-residence with parents. However, for young adult males, we find that age and school attendance are negatively correlated with co-residence status, while age squared, years of schooling square, and been employed are positively correlated with co-residence status. Married males are more likely to co-reside than married females, but having children reduces the likelihood of co-residence for men, although not for women. With respect to parents' characteristics, higher levels of father's schooling are negatively correlated with the probability of co-residence, while higher levels of mother's schooling are positively correlated, although this is true only for young adult males.

The rest of the paper is organized as follows. Section 2 reviews the relevant literature. Section 3 describes a model of living arrangements between adult children and their parents. Section 4 describes the data to be used. Section 5 outlines the econometric methodology. Section 6 presents the results, and Section 7 concludes.

2 Literature Review

Several characteristics influence a young adult's decision to leave or stay at a parental home. According to the literature, actual or expected employment conditions and labor income are decisive factors (Ermisch, 1999).[3] Aassve et al. (2002) suggest that countries with weak welfare states show more dependence between parents and their adult children; while in countries with more generous welfare provision and higher public support for youth, there seems to be a smaller effect of employment and labor income in the decision to leave a parental home. Ahn and Sánchez-Marcos (2017) found that cash subsidy programs that provided rental assistance for young people in Spain during the 2009–2013 recession made emancipation more likely, especially among full-time workers.

[2] This type of information might suffer from recollection bias or the failure to remember, which can be a serious concern.

[3] However, current income does not necessarily predict potential earnings. Researchers typically model the relationship between predicted wages and living arrangements (Cobb-Clark, 2008).

From a socio-demographic point of view, individual characteristics (age, gender, education, etc.), family composition (number of siblings, presence of both parents, etc.), and other individual characteristics (disabilities, ethnicity, etc.) are strong determinants of living arrangements (Aquilino & Supple, 1991; Aassve et al., 2002; Cobb-Clark, 2008). Regarding individual characteristics, Schwanitz et al. (2017) summarize the literature about the propensity to leave the parental home with respect to children's and parent's education. For young adults, higher educational attainments tend to encourage independence and appreciation for non-traditional ways to cohabitate (e.g., living with roommates or in a consensual union), and they are also related with economic autonomy. This economic autonomy is driven mainly by greater schooling returns. Correspondingly, countries with higher school enrollment rates among young adults tend to have higher rates of early departure from the parental home (Ermisch, 1986; Ogg & Renaut, 2006; Monserud & Elder, 2011). In addition, the literature has found that the economic factors derived from higher educational attainment tend to be more significant for men than for women. This suggests that having better access to economic resources in order to establish their own families is more important for men than for women (Aassve et al., 2002; Avery et al., 1992; Buck & Scott, 1993; Whittington & Peters, 1996).

On the other hand, the literature also points out the mixed evidence about the transmission of economic and cultural factors linked to parents' education, which might affect the young adult's decision to stay or leave home. There are economic factors that could be associated with the feathered-nest hypothesis, in which higher levels of parental education result in better economic status, and this relatively comfortable lifestyle reduces the probability of children to leave home. On the other hand, it is also possible that parents with more economic resources are able to support their children's decision to move out and establish their own households. The literature also suggests that highly-educated parents might try to impress upon their children the values of human capital accumulation and independence and emphasize the costs of long-lasting decisions, such as getting married or having children.

Co-residence has also been established as an important mechanism through which different generations transfer resources between them. In most developed countries, resources predominantly flow from parents to their adult children. However, there are situations where resources and support are bi-directional (Cobb-Clark, 2008). In addition, parents might provide advice and financial and emotional support to their children while they assume adult roles. Once children complete the transition, the direction of money, time resources, and support could change direction, and children might then provide support to their parents. In this regard, Selter and Friedman (2014) found that elderly mothers with poor health tend to co-reside with their children, and are even more likely to do so if there was a close relationship between them.

3 The Model

The study of co-residence decisions typically focuses on a family unit with more than one adult generation. A Multi-Generational Household (MGH) is a family that includes at least two adult generations (for example, parents and adult children ages

25 or older, where either generation can be the household head) or two non-sequential generations (for example, grandparents and their grandchildren). Models of co-residence between adult children and their parents typically involve a theoretical framework in which the children compare the utility of living with their parents to the expected utility of living outside home. Typically, the children make the decision of whether or not to stay at their parents' home, although, it might be equally important to consider the parents' decision to allow their children to stay home.

Regarding the adult children's decision to stay or leave their parents' home, Chiuri and Del Boca (2008) point out that since parents and adult children living together share income, housing expenditures, and other domestic goods, adult children's optimal choice would also depend on parents' optimal choice and vice versa. The model presented in this paper is based on Manacorda and Moretti's (2006) model of children's housing arrangements.

3.1 Assumptions

For simplicity, we assume that each household has only one parent and one child. This is a simplifying convention whereby *we call* the one or two parents as "parent" and the one or more adult children as "child." First, we assume the child derives some utility from cohabiting with the parent, but the parent values independence and derives a disutility from cohabiting with the child. Second, the parent can demand a money transfer from the child in order to allow her to stay at home. We assume that the parent is selfish and possesses all the bargaining power, so the parent appropriates the entire surplus if the child stays at home or leaves. And third, the parent demands a money transfer from the child, but only if the child decides to stay at home. In other words, the parent is not altruistic if the child decides to stay at home.[4]

We use a Stone–Geary utility function because it allows us to assume that the individual's optimal behavior for allocation of its budget takes place only after the agent secures the minimum necessary amount of each good (Chung, 1994). Following a Stone-Geary utility function, the system is characterized by the marginal budget–share and subsistence level parameters.[5]

3.2 Child's Utility Function

We assume that the child's utility is a function of consumption (C_c), and a term (a_c) representing the utility of living at home (with $0 < a_c < 1$). The child's maximization

[4] The opposite can also be modeled: we can assume that the parent derives some utility from cohabiting with the child, but the child values independence and derives a disutility from cohabiting with the parent. The only requirement is that one individual prefers to live together and the other prefers to live separately.

[5] The expenditure system conforms to certain conditions. The first condition is an additively separable function of the form $U(x_1,x_2, \ldots, x_n)$ that can be represented, after a monotonic transformation, as the sum of a set of partial utility functions. Hence, the sum of expenditures of individual goods must equal the total expenditure. The second condition is homogeneity in prices and total expenditure: the sum of income and price elasticities equals zero (Chung, 1994). The third condition is regularity, which implies quasi-concavity of the utility function (Chang & Fawson, 1994).

problem can be written as follows:

$$\text{Maximize } U_c(C_c, H) = \log(C_c) - H\log(a_c) \tag{1}$$

subject to the children's budget constraint:

$$Y_c - b_1\mathrm{H} = C_c + R(1 - H) \tag{2}$$

where the coefficient H∈[0,1] describes the parent and child's shared living status, hence, H = 1 if the child is living at home, $H = 0$ otherwise. The child's resources are a function of her income (Y_c), and the compensation she has to pay to the parent if she lives at the parent's home (b_1). In the right-hand side of Eq. (2), the first term (C_c) is child consumption and (R) is the housing costs the child would have to pay if she did not live with her parent. (R) can only be observed if $H = 0$. In other words, the parent is responsible for the cost of housing if the child lives at the parent's home and the child pays for the cost of housing if she lives away from home.

3.3 Parent's Utility Function

Similarly, the parent's maximization problem can be written as:

$$\text{Maximize } U_p\left(C_p, H\right) = \log\left(C_p\right) - H\log\left(a_p\right) \tag{3}$$

subject to the parent's budget constraint:

$$Y_p + b_1 H = C_p \tag{4}$$

where (C_p) is the consumption of the parent, and (a_p) represents the disutility of cohabitation with the child (with $a_p \geq 1$). The parent has an amount of income (Y_p) and a transfer from the child (b_1) if the child stays at home ($H = 1$) to spend in consumption (C_p).

The child's and parent's consumption functions can be expressed as:

$$C_c = \begin{cases} C_c = Y_c - b_1 & \text{if} \quad H = 1 \\ C_c = Y_c - R & \text{if} \quad H = 0 \end{cases} \tag{5}$$

$$C_p = \begin{cases} C_p = Y_p + b_1 & \text{if} \quad H = 1 \\ C_p = Y_p & \text{if} \quad H = 0 \end{cases} \tag{6}$$

3.4 Equilibrium

In equilibrium, the parent sets $\left(b_1^*\right)$ to make the child indifferent between living with her or living on her own:

$$U_c(Y_c - b_1, 1) = U_c(Y_c - R, 0) \tag{7}$$

Replacing the child's utility function and solving by $\left(b_1^*\right)$, the optimal transfer is:

$$b_1^* = \frac{(Y_c - R)}{a_c} - Y_c \tag{8}$$

Conditional on $\left(b_1^*\right)$, the parent is willing to let the child to stay at home if her utility when the child is at home (after receiving the money transfer) is larger than her utility when the child goes away:

$$U_p\left(Y_p + b_1, 1\right) \geq U_p\left(Y_p, 0\right) \tag{9}$$

Replacing the parent's utility function and solving for (Y_p), we have:

$$Y_p \geq \frac{a_p}{\left(a_p - 1\right)} b_1^* \tag{10}$$

Replacing Eq. (9) on (10):

$$Y_p \geq A_1 Y_c - A_2 R \tag{11}$$

where:

$$A_1 = \frac{(1 - a_c)a_p}{a_c\left(a_p - 1\right)} > 0; A_2 = \frac{a_p}{a_c\left(a_p - 1\right)} > 0 \tag{11a}$$

In equilibrium:

$$P(H = 1) = Pr\left(Y_p \geq A_1 Y_c - A_2 R\right) \tag{12}$$

From Eq. (12), the propensity of the child to live with the parent depends directly on parent's income (Y_p) and inversely on child's income (Y_c) and on any housing cost the child will have to pay if she decides to live on her own (R).

Using this as context, we expect that the child's decision to remain at the parental home would be positively correlated with the parent's income (Y_p) – or its proxies/correlates, such as the parent's education attainment, labor participation status, home ownership or the number of children living at home– and inversely correlated with the child's income (Y_c) – or its proxies/correlates, which may be measured in a similar way as the parent's – and on housing costs (R).

4 The Data

4.1 Data Sources

As mentioned before, this paper uses the EMOVI 2011 database to analyze parents' and children's decisions to co-reside. The EMOVI 2011 database contains nationally representative samples over two generations and collects a wide range of data for individuals aged 25 to 64. Unlike previous surveys in Mexico, the EMOVI 2011 is a retrospective survey that allows us to match current respondent's information with their retrospective data from their parents' and family conditions at the time the respondent was 14 years old.[6]

We determine whether individuals co-reside or live independently based on whether or not they consider any of the adults in their household a parental figure, and also on whether or not they consider themselves to be living independently.

[6] A full description of EMOVI 2011, its survey design, and its methodology, can be found at https://ceey.org.mx/contenido/que-hacemos/emovi/.

Although the EMOVI 2011 data is well-suited to this research, there are also some important limitations. First, there is no socio-demographic information about other siblings who might have left the parental home; in these cases, it is not possible to determine how the co-residence decisions of those siblings can affect the co-residence decision of the interviewee. Second, another important variable for the decision to co-reside is the birth order of children (Chun et al., 2019). However, this variable is not available in this survey. Third, retrospective information on parents' income is not available; in this case, parents' education and household conditions, like home ownership, are used as proxies for parents' potential income. Fourth, information on the child's income is very limited; there is only information on total family income. Total family income, as well as current household conditions, are strongly related to the parents' conditions for co-habiting children. Hence, children's education and labor conditions are used as proxies for their children's potential income. Finally, there is a probability that some of the young adults currently residing with parents might have moved away from home and then returned. Unfortunately, it is impossible for us to know this based on the information provided by the survey.

This analysis focuses on Mexico's young adult population (aged 25 to 35 years). In total, there are 5202 individuals in the sample. As noted before, we focus on this sample cohort to exclude younger children who have not completed their education yet and older children who may cohabitate with their parents to take care of them. We also consider gender differences among children in the decision to co-reside with parents.

4.2 Descriptive Statistics

Table 1 summarizes some characteristics of young adults classified by condition of co-residence: living with both parents, one parent, or with parent(s)-in-law, or not co-residing. Twenty-seven percent of the survey respondents age 25 to 35 live with both parents, 13% with only one parent, 2% with parent(s) in law, and 58% live independently. Forty-one percent of the young adults who lived with both parents when they were 14 years old continue living with both or one parent. On the other hand, only 28% of the young adults who lived with only one parent when they were 14 years old live with both or one parent. On average, women and men follow almost the same paths of co-residence. With respect to marital status, only 2% of single young adults live independently, while 16% of married/in-union young adults live with their parents or with their parents-in-law.[7]

Divorced/separated young adults are more heterogeneous, 33% live with both parents, 25% live with one parent, and 42% live by themselves. By gender, while most divorced women live independently (46%), most divorced men live with their parents (74%). In general, young adults with children live independently (79%) while young adults without children live with their parents (90%).

[7] As noted, marital status is highly correlated with co-residence status, and these might be endogenous to each other- e.g., some young adults might leave the parental home to get married and some might even get married to leave the parental home. This issue would be hard to address in a single equation framework of co-residence status, given the absence of a good instrument to address the endogeneity concerns.

Table 1 Co-residence status of young adults aged 25 to 35 by selected characteristics

Selected characteristics	Current co-residence status					%[a]
	Both parents	One parent	In-laws	Do not co-reside	Total	
Observations	1405	676	104	3017	5202	100%
Percentage	27%	13%	2%	58%	100%	
Co–residence when was 14 years old[b]						
Both parents	1325	486	88	2517	4416	89%
	30%	11%	2%	57%	100%	
One parent	5	147	22	371	546	11%
	1%	27%	4%	68%	100%	
Gender						
Women	703	352	54	1596	2705	52%
	26%	13%	2%	59%	100%	
Men	674	300	75	1448	2497	48%
	27%	12%	3%	58%	100%	
Marital status						
Single	1026	351		28	1405	27%
	73%	25%		2%	100%	
Married/united	200	200	133	2796	3329	65%
	6%	6%	4%	84%	100%	
Divorced/separated	154	117		197	468	8%
	33%	25%		42%	100%	
Divorced/ separated women	87	81		144	312	6%
	28%	26%		46%	100%	
Divorced/separated man	81	34		41	156	2%
	52%	22%		26%	100%	
Parenting						
With children	401	291	73	2876	3641	71%
	11%	8%	2%	79%	100%	
Without children	1015	390	31	125	1561	29%
	65%	25%	2%	8%	100%	

[a]Selected characteristics in vertical percentage

[b]This excludes 240 (5%) observations related to adult children who did not co-reside with their parents when they were 14 years old

Source: authors' calculations with data from EMOVI 2011

Appendix Table 4 presents more descriptive statistics for the sample. Women represent 52% of all 25 to 35-year-olds in the sample and the average years of schooling is around 10. In addition, 6% are currently attending school, 67% are currently employed, 64% are married/united, 27% are single and 9% are divorced/separated; 70% have children (an average of 1.5 children), and 62% declare to be the head of the household. In terms of parents' characteristics; average fathers' and mothers' current ages are about 56 and 53 years, and their educational attainments are about 5.23 and 5.15 years, respectively.

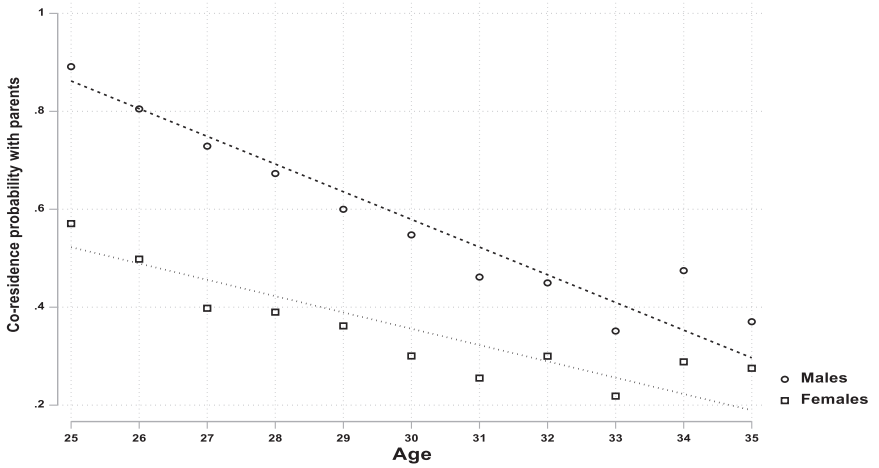

Fig. 1 Co-residence probability by age and gender. Source: authors' calculations with data from EMOVI 2011

In terms of retrospective information, 81% of respondents reported that their father used to work when they were 14 years old and 21% reported that their mother used to work at that time, 11% of the respondents reported that they used to live with only one of their parents (almost always the mother), 71% reported that their parent(s) owned the house they lived in, and 86% reported having brothers or sisters (3.8 siblings on average). Also, 54% reported 2.5 or more inhabitants per bedroom, and 21% reported that other relatives used to live in the household, in addition to their parents and siblings.

The last two variables of Appendix Table 4 are Housing Price Index and rural/urban status. These two variables are included in the regressions to try to control for the opportunity cost of living independently. The Housing Price Index does not come in the EMOVI 2011 database. It comes from the Mexican Mortgage Society, a federal government institution, which collects new and old house prices at the municipality level.[8] With respect to the rural/urban status, 55% of respondents in our sample live in urban communities with equal or more than 15,000 inhabitants.

Figure 1 illustrates the probability of co-residence for men and women by age. Co-residence with parents includes living with at least one parent or with at least one parent-in-law. Men present considerably higher probabilities of co-residence with parents than women at all ages. Also, the probability to co-reside with parents decreases with the age of the child. However, this relationship seems to be reversed somewhat at higher ages,

[8] The Housing Price Index reports purchase prices instead of rental prices. A rental/leasing price index would be preferable because it seems more likely that, to gain independence, adult children would rent houses or apartments before buying one. Although purchase prices and rental prices should be highly correlated, purchase prices won't be as accurate as rental prices to proxy for the costs of living independently. For more details see: https://www.gob.mx/shf/documentos/indice-shf-de-precios-de-la-vivienda-en-mexico-2019.

especially for women where this relationship reverses at a relatively younger age. This figure might reflect that older children stay at or come back home to take care of their parents as they get older, as suggested in Reher (1998).

Given the difference in co-residence probabilities, it might be appropriate to examine women and men independently. Analyzing gender differences in a comparative framework will allow us to explore better whether or not current and retrospective socio-demographic characteristics have different impacts on the propensity to stay at the parental home for males and females. For example, Hermisch and Di Salvo (1997) and Van den Berg et al. (2018) suggest that on average women leave the parental home sooner than men, which is closely associated with new household formation. Goldscheider and Da Vanzo (1989) and Goldscheider et al. (1993) propose that women, even among the unmarried, are more likely than men to live independently. Furthermore, Buck and Scott (1993) propose that labor force participation and income are more important determinants for men than for women in regards to the decision to leave their parental home and form a new household, mainly due to established social norms that expect men to be the main source of income needed to form a new home.

Table 2 summarizes variable means by gender for those who live with their parents and those who live on their own. Mean difference p-values are included. On average, men and women living with their parents are younger than men and women living on their own. Also, women and men who live with their parents are less likely to be married or to have children and tend to have fewer siblings. With respect to employment status, women who live with their parents are more likely to be fully employed while men who live with their parents are less likely to be fully employed. With respect to school attainment, women and men who live with their parents have higher levels of education.

5 Methodology

5.1 A Probit Model

In our empirical analysis, we define the utility of an adult child living with her parent (or parents) as U_c^1 and the utility of not living with her parent as U_c^0. More formally, we assume that the latent variable h_c^* reflects the propensity of a young adult to co-reside with her parent. This propensity can be described as a function of a vector of characteristics X_c and its corresponding vector of coefficients β. In the model, we use current individual data, retrospective information about parents' characteristics when the respondent was 14 years old, rural-urban status, a housing price index, and 31 state dummies to capture the state fixed effects. The rural-urban status, the housing price index, and the state dummies allow us to partially control for differences in economic activity, living costs, and employment opportunities.

Hence, the utility functions for an adult child c are defined as:

$$U_c^1 = X_c'\beta_1 + \varepsilon_{1c} \text{ and } U_c^0 = X_c'\beta_0 + \varepsilon_{0c} \tag{13}$$

where ε_c is an unobserved individual–specific component.

Table 2 Co-residence with parents by gender

Variable	Female ($n = 2728$)			Men ($n = 2474$)		
	(a) Living with parents ($n = 1196$)	(b) Non-living with parents ($n = 1532$)	Mean Diff (a) − (b)	(a) Living with parents ($n = 1100$)	(b) Non-living with parents ($n = 1374$)	Mean Diff (a) − (b)
Age	28.930	30.892	−1.962***	28.758	31.267	−2.509***
Single	0.612	0.017	0.595***	0.616	0.002	0.614***
Married	0.209	0.885	−0.676***	0.316	0.981	−.665***
Divorced/ separated	0.174	0.097	0.077***	0.068	0.017	0.051***
1 if has children	0.448	0.968	−0.520***	0.278	0.956	−0.678***
1 if employed	0.631	0.381	0.250***	0.796	0.931	−0.135***
Years of schooling	11.359	8.989	2.3697***	10.957	9.435	1.521***
Number of siblings	3.195	4.386	−1.191***	3.470	3.906	−0.436***

***$p < 0.01$

Source: authors' calculations with data from EMOVI 2011

An adult child will co-reside with her parent if the utility of doing so is larger than the utility of living on her own:

$$h_c = \begin{cases} 1 \text{ if } h_c^* = U_c^1 - U_c^0 \geq 0 : \text{co} - \text{reside} \\ 0 \text{ if } h_c^* = U_c^1 - U_c^0 < 0 : \text{donotco} - \text{reside} \end{cases} \tag{14}$$

The choice depends on the differences in utilities: $U_c^1 - U_c^0 = X_c'(\beta_1 - \beta_0) + (\varepsilon_{c1} - \varepsilon_{c0})$. If the individual specific terms $\varepsilon_c = \varepsilon_{c1} - \varepsilon_{c0}$ are assumed to be independent and identically distributed with a symmetric density function (f), it follows that:

$$[h_c = 1] = P\left[\varepsilon_c \geq -X_c'(\beta_1 - \beta_0)\right] = P\left[\varepsilon_c \leq X_c'\beta\right] = F\left(X_c'\beta\right) \tag{15}$$

where $\beta = (\beta_1 - \beta_0)$ and F is the cumulative distribution function of ε_c. Assuming that F is differentiable with derivative f (the standard normal density function corresponding to F), the marginal effect of the jth explanatory variable is given by:

$$\frac{\delta P[h_c = 1]}{\delta x_j c} = f\left(X_c'\beta\right)\beta_j \qquad j = 2, ..., k \tag{16}$$

The last equation shows the impact of a marginal increase in explanatory variable j on the child's probability of co-residing with her parents.

Hence, the model can be empirically specified by the following Probit regression:

$$P[h_c = 1|X_c] = F\left(X_c'\beta\right) + e_c \tag{17}$$

where X_c is a vector of current characteristics of the child c (age, school attainment, employment, at-school indicator, marital, parental, and head of household status), retrospective characteristics of the parents when the child c was 14 years old (parents' school attainment, employment, marital status, home ownership, family size, and family composition), and three controls for current housing costs and economic conditions (rural-urban status, housing price index, and 31 state dummies), and e_c is an idiosyncratic error.

As mentioned before, we expect that the child's current characteristics, used as proxies for the child's income (Y_c), and housing costs (R) to be negatively related to the probability of co-residence, while the parents' retrospective characteristics, used as proxies for the parents' income (Y_p), to be positively related. More specifically, we expect that the young adult's age, educational attainment level, marital status and history, having their own children, having a job, and living in an urban locality to all be negatively related to the probability of living with parents, while the parents' school attainment, having been married, having a job, owning a house, or living in a locality with higher housing price index to be positively related.

6 Results

As mentioned before and given the important differences among the two population groups, we analyze female and male young adult co-residence status independently. Table 3 reports estimated average marginal effects for the probability of co-residing with parents for women and men.

Table 3 Probability of co-residence with at least one parent or parent-in-law (Binary probit model, average marginal effects)

Variable	Female adult children		Male adult children	
	(1)	(2)	(3)	(4)
Adult children characteristics (Y_c)				
Age	−0.281 (0.148)	0.100 (0.188)	−0.515*** (0.134)	−0.487** (0.187)
Age squared	0.004 (0.002)	−0.002 (0.003)	0.008*** (0.002)	0.008** (0.003)
Years of schooling	0.054** (0.021)	0.060 (0.037)	−0.042 (0.022)	−0.036 (0.021)
Years of schooling squared	−0.001 (0.001)	−0.002 (0.002)	0.003** (0.001)	0.002* (0.001)
=1 if currently in school	0.379** (0.135)	0.091 (0.240)	0.321** (0.113)	−0.606* (0.304)
=1 if employed	0.243*** (0.045)	0.075 (0.075)	−0.235*** (0.063)	0.395** (0.139)
=1 if single		0.853*** (0.185)		0.763*** (0.092)
=1 if divorced/separated		2.349*** (0.221)		1.479*** (0.312)
=1 if have children		−0.246 (0.134)		−0.373*** (0.089)
Single × have children		−0.284 (0.211)		−0.009 (0.230)
Divorced × have children		−2.059*** (0.221)		−1.239*** (0.274)
=1 if head of household		−1.232*** (0.087)		−1.292*** (0.168)
Retrospective characteristics (Y_p)				
Number of brothers and sisters	−0.025* (0.011)	−0.001 (0.014)	−0.001 (0.010)	0.019 (0.012)
=1 if parent single	−0.215** (0.083)	−0.128 (0.118)	−0.046 (0.073)	−0.028 (0.096)
=1 if parent own house	−0.118* (0.048)	−0.150* (0.062)	−0.020 (0.047)	−0.129* (0.059)
=1 if parent 2.5+ pers./bedroom	−0.052 (0.047)	0.092 (0.071)	−0.084 (0.046)	−0.048 (0.065)
=1 if parent extended household	−0.035 (0.057)	−0.069 (0.063)	−0.016 (0.052)	−0.020 (0.066)
=1 if father was employed	0.034 (0.065)	0.038 (0.077)	−0.037 (0.057)	−0.120 (0.078)
Father's years of schooling	0.002 (0.008)	−0.003 (0.011)	−0.009 (0.007)	−0.021* (0.008)
=1 if mother's was employed	0.102 (0.061)	0.090 (0.080)	−0.007 (0.053)	−0.070 (0.078)
Mother's years of schooling	0.002 (0.008)	0.000 (0.012)	0.024** (0.008)	0.045*** (0.009)

Table 3 continued

Variable	Female adult children		Male adult children	
	(1)	(2)	(3)	(4)
Cost of living controls (*R*)				
Housing Price Index/1000	0.050 (0.033)	0.098* (0.045)	0.002 (0.028)	−0.076* (0.034)
=1 if urban locality	−0.069 (0.052)	0.020 (0.071)	−0.005 (0.046)	0.078 (0.058)
Observations	2728	2728	2474	2474
Log-likelihood full model	−966.030	−318.788	−923.666	−221.519
McFadden's R^2	0.266	0.758	0.228	0.815
Count R^2	0.750	0.941	0.731	0.951

Marginal effects at means, parentheses contain the mean of the estimated standard errors. Columns (1) and (2) include all women aged 25 to 35. Columns (3) and (4) include all men aged 25 to 35. Thirty-one state dummies were included in all regressions

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$

Source: authors' calculations with data from EMOVI 2011

Columns 1 and 3 report the probit results for co-residence status and includes the young adult's individual characteristics (age, age squared, years of schooling, years of schooling-squared, school attendance status, and employment status), retrospective characteristics of the household when the child was 14 years old, and the three controls for cost of living (rural/urban status, housing price index, and 31 state dummies) for women and men, respectively. Columns 2 and 4 add the young adult's family composition characteristics (two controls for marital status, a dummy for having children, a dummy for being head of the household, and two interaction terms).

For young adult women, after controlling for family composition characteristics (column 2), we do not find evidence of an impact of years of schooling or school attendance on the probability to co-reside with their parents. This finding suggests that, for women, family composition correlates more with the probability of living at the parental home than schooling or employment status. This result is contrary to previous studies' results where the children's schooling is highly correlated with co-residence status.

For young adult men (column 4), the impact of age and age-squared, years of schooling-squared, employment status, and school attendance status remain statistically significant after adding family composition characteristics. The results suggest that unemployed and older males are less likely to co-reside with their parents. However, there seems to be a small but statistically significant non-linear impact of completed years of schooling, which is consistent with previous studies about schooling and the probability of co-residing with parents.

With respect to general results after controlling for the young adult's family composition characteristics (columns 2 and 4), being employed is positively related to the probability of living at the parental home, but only for males. This result is related to previous studies that suggest that female labor force participation is affected by family composition, and not the other way around (Connelly et al., 2014).

As expected, we found a negative relationship between the age of a young adults and the decision to stay at the parental home, although only for males. This result is consistent with Flatau et al. (2003), who also found a slight increase over the years in the age at which children leave their parents' home. In addition, a negative effect of age, combined with a positive effect of age-squared, suggests a u-shaped pattern for the relationship between age and co-residence with parents. As a young adult increases in age, the probability of leaving the parents' home increases, but eventually it starts to decrease.

According to the results, married young adults have lower probabilities of parental co-residence than single and divorced/separated young adults do; and this effect is slightly larger for women than for men. Married men are more likely to live with their parents than married women, but having children reduces the probability of co-residence for men. A possible explanation is that, in Mexico, young married couples who co-reside live mostly with the parents of the groom (62%).[9]

Interactions of marital status and having children are included in the regressions in order to separate the effects of divorced/separated young adults with children and divorced/separated young adults without children. Contrary to expectations, being divorced/separated and having children reduces the probability of living with parents.

[9] Own estimations with data from EMOVI 2011.

It seems that in Mexico, divorced women and men without children are more likely to move back home (or to be accepted back home) than divorced women and men with children.

With respect to parental characteristics, father's and mother's employment status when the child was 14 do not have a significant impact on the probability of co-residence for either men or women. On the other hand, higher levels of the father's educational attainment are negatively correlated with the probability of co-residence with adult children, while higher levels of the mother's educational attainment are positively correlated, although this is statistically significant for males only. We did not find evidence of a significant effect of parents' educational attainment on the probability of adult females to stay at the parents' home.[10]

As expected, parental home ownership is negatively related to the probability of co-residence for women and men. The number of brothers and sisters, growing up in an overcrowded house (2.5+ persons/bedroom), or within an extended family, as well as the rural/urban indicator did not come up statistically significant in any model.

7 Conclusions

This paper adds to the literature by examining the probability of Mexico's young adults to stay at their parents' home, while considering potential gender differences. We use a special database that allows us to inquire into family characteristics when the child was 14 years old. We focus on the young adult population (25- to 35-year-olds), given some special characteristics of this generation, such as a larger cohort size, higher levels of education, and lower fertility rates than previous generations. This age group is also part of the millennial generation, which is also the largest population group in Mexico and its economic behavior may have an important impact on Mexico's future economic development.

Living with parents may serve as a mechanism through which children obtain financial help from their parents to invest in their human capital, to start their own families, or to reduce income uncertainty. The decision of adult children to co-reside with their parents after reaching adulthood, or after marriage, has additional explanations; for example, as a mechanism through which parents transfer resources to their adult children or as part of the transition to independent living arrangements for adult children.

Given the absence of long-enough longitudinal surveys in Mexico, we use the *Social Mobility Survey* of 2011 (EMOVI 2011). This survey collects socio-economic information of individuals aged 25 to 64 and includes a number of questions regarding the socio-economic condition of their families when the survey respondents were 14 years old. Using the EMOVI 2011 retrospective data, we test empirically whether or not staying at the parents' home is correlated with parent's characteristics, in addition to children's own characteristics.

Unlike previous studies, after controlling for the young adult's family composition (marital status, having children, and head of household status), we find evidence of the

[10] Originally we included a variable indicating parents' indigenous background. It did not result statistically significant in any regression and all other results are consistent with the omission of such variable. Parents with indigenous background represent 11% of the sample.

effect of the child's own schooling on the propensity to co-reside with the parents, although only for males. This result is consistent with previous studies' results where the children's schooling is highly correlated with co-residence status. For females, family composition correlates more with the probability of living at the parental home.

Family characteristics during the young adult's adolescence seem to be important determinants on the propensity of adult children to stay at parents' home. That implies that using only cross-sectional data may lead to inaccurate results. Our results suggest that having a mother with higher levels of schooling increases the likelihood of staying at the parental home, while having a father with higher levels of schooling decreases it, although this is true for males only. In addition, married males are more likely to live with their parents than married females, but having children reduces the probability of co-residence for males.

Intergenerational studies in developing countries like Mexico are very scarce, mainly for the lack of longitudinal information. Therefore, the use of a retrospective database like EMOVI 2011 allows us to reconstruct, although in a limited way, the conditions of young adults before taking the decision of moving out of their parents' home. One limitation of this database is that retrospective information might not be completely accurate since it relies in the interviewees' recollection. Another limitation is that it only allows us to study a small window in time, which makes the results depend on the specific economic conditions of that time. It would be interesting to know if the results presented here are applicable to the entire millennial generation or to other generations in Mexico and in other countries. Unfortunately, there are no long-enough longitudinal surveys or previous retrospective surveys in Mexico to measure these effects 20 or 40 years ago.

Understanding family strategies to transfer wealth, develop human capital, and reduce economic uncertainty from generation to generation is a step towards a better understanding of social mobility, the intergenerational distribution of wealth, and their impact on the well-being of the children, especially in countries with relatively weak welfare states. Finally, leaving the parental home is a key demographic transition that is undoubtedly related to other important demographic transitions, including partnering and parenting, which reiterates the importance of the study of adult children's co-residence with parents.

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Compliance with ethical standards

Conflict of interest The authors declare no competing interests.

8 Appendix

Table 4

Table 4 Descriptive statistics of sample

Variable	Min	Max	Mean	Std. Dev.	Count (N)
Dependent variable					
=1 if co-reside with parent's	0	1	0.441	0.497	5202
Adult children characteristics					
=1 if female	0	1	0.524	0.499	5202
Age	25	35	30.088	3.327	5202
Age squared	625	1225	916.380	198.990	5202
Years of schooling	0	26	10.068	4.038	5202
Years of schooling squared	0	676	117.676	84.616	5202
=1 if currently in school	0	1	0.058	0.233	5202
=1 if employed	0	1	0.671	0.469	5202
=1 if married/united	0	1	0.635	0.482	5202
=1 if single	0	1	0.277	0.447	5202
=1 if divorced/separated	0	1	0.088	0.283	5202
=1 if has children	0	1	0.699	0.459	5202
Number of children	0	7	1.463	1.262	5202
=1 if head of household	0	1	0.624	0.484	5202
Retrospective characteristics					
=1 if father was employed	0	1	0.809	0.393	5202
Father's years of schooling	0	25	5.227	4.901	5202
=1 if mother was employed	0	1	0.214	0.410	5202
Mother's years of schooling	0	24	5.146	4.308	5202
=1 if parent(s) were home owners	0	1	0.714	0.452	5202
=1 if parent was single/divorced	0	1	0.109	0.312	5202
=1 if have/had brothers or sisters	0	1	0.857	0.350	5202
Number of brothers and sisters	1	18	3.791	2.427	5202
=1 if 2.5 or more persons per bedroom	0	1	0.544	0.498	5202
=1 if extended household	0	1	0.208	0.406	5202
Controls for the cost of living					
Housing Price Index/1000	0.363	6.75	2.127	1.147	5202
=1 if urban locality (>14,999 habs.)	0	1	0.551	0.497	5202

Source: authors' calculation with data from EMOVI 2011

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