

LIFE-CYCLE HYPOTHESIS IN MEXICO: AN ANALYSIS OF INCOME BY GENDER

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Abstract

This paper analyzes the income profile of Mexican households. In order to do so, a semi-parametric model was estimated using gender of the head of the household. The results indicate that, due to the age effect, the income profile of households with a female head of household forms a flat, inverted U, in contrast to the proposition put forth by the life-cycle hypothesis. Conversely, income patterns of male-headed households were consistent with the form established in the hypothesis. Unlike its female counterpart, this profile was unaffected by family structure. This confirms that income is lower in female-headed households throughout the life cycle.

Keywords: household income; life cycle hypothesis; female and male-headed households; semi-parametric model; pseudo-panel method.

1. INTRODUCTION

The flat, inverted U profile proposed by the life-cycle hypothesis (LCH) does not always appear, given that there are a range of factors that affect income and consumption patterns (Deaton, 1997). One characteristic that is distinct between men and women are their employment trajectories throughout the life cycle. As Espino *et al.* (2014) point out, women's employment trajectories can be interrupted by circumstances such as maternity, childcare, and the sexual division of labor in the household. It is important to emphasize that gender differences are not only observed in the labor market, but also in other aspects such as education and sources of income (Bobbitt-Zeher, 2007).

The analysis of income patterns is relevant because the concept of economic wellbeing is associated with a lack of monetary resources, referring to a state of income poverty. In this regard, Scuro *et al.* (2010, p. 10) indicate that: "Monetary income constitutes a fundamental resource—though not the only one—for people's wellbeing and is an indicator of the capacities that homes have to meet their necessities".¹

Along these lines, the literature emphasizes the importance of a dynamic focus that allows for an explanation of the evolution of income along the population's life cycle. To that effect, the following questions are posed: What have the income sources for Mexican households been for the period from 1994 to 2014? What is the income profile of households according to age? What are the differences according to gender of the head of household? The main objective of this research is to analyze household income profile, according to age, during the period 1994-2014, based on a semi-parametric calculation using synthetic cohorts by gender of the head of household.

The results show that the LCH does not apply for female-headed households, since their income patterns do not present a flat, inverted U. Conversely, the income profile of male-headed households does follow the pattern established by the hypothesis. This demonstrates that for such households the family structure does not affect income patterns, and confirms that income for female-headed households is lower than for male along the life cycle, including when the female heads have the same level of education as the male heads.

The article is structured in the following way: the second section presents the theoretical-empirical framework that substantiates the research. In the third section, methodological aspects are laid out. The fourth section describes the principal sociodemographic characteristics and the evolution of household income across time. In the fifth section, results of the calculations for the effect of age in function of income during household life cycles are provided. The last section presents the conclusions and gives some recommendations for public policy.

2. THEORETICAL-EMPIRICAL FRAMEWORK

Income behavior can be understood based on the LCH framework proposed by Modigliani and Brumberg (1954). The authors argue that the marginal utility of people's consumption is constant across lifetimes, considering the fact that consumption is a function of work income and that it shows an inverted U-shaped trajectory. In the first stages of life, in the face of a lack of work income, support, transfers and loans are necessary. Nevertheless, when middle age is reached, income derived from work activity begins to increase and rises above consumption levels, providing more possibilities for saving. During the last stage of life, participation in the labor market is reduced and with it there is a loss of work income; accordingly, it is necessary to turn to previously accumulated resources (savings), and back to transfers and the initial forms of support.

The LCH allows for an analysis of the income variable using a dynamic focus, by formulating its evolution across the lifetime. In the Mexican case, there is a variety of research that takes the LCH as an analytical framework and analyzes income, though in an indirect way, given that the emphasis is on savings behavior (Attanasio and Székely, 1999; Solís and Villagómez, 1999; Fuentes and Villagómez, 2001). For their part, using semi-parametric calculations, Campos and Meléndez (2013) analyze consumption patterns and Ceballos (2018) addresses the payment of debt along the life cycle.

Income patterns suggested by the LCH framework are determined by diverse factors, gender related ones among them. Inequalities in the use of time and the household life cycle condition the incorporation of women into the labor market (Tepichin, 2011; Arriagada, 2005; Valenzuela, 2003). As a consequence, the excessive amount of unpaid work means giving up activities that generate income or if the case may be, full-time employment, which directly impacts wellbeing. Along these lines, Blau (1997, p. 47) notes that: "A possible source of gender differences in economic wellbeing is the difference in the ability to combine success at work and family responsibilities, in order to reach the goals desired in both areas".

Within this context, Carrasco (2010) asserts that male participation in the labor market appears to have an inverted U shape, since they enter it and then remain in it until retirement. In contrast, the participation of women usually takes the form of an M or of two peaks that represent: their entry, leaving (when their first child is born) and their reincorporation (when the youngest child is no longer completely dependent). Additionally, it is demonstrated that female participation can also show a profile with one peak, if women do not reintegrate themselves into the labor market.

On this topic, a variety of authors (Sánchez *et al.*, 2016; Montes and Villagómez, 2002) have proven that the presence of small children determines the labor participation of women. They emphasize the importance of considering the age structure of household members, since an older member can help take care of infants, or incorporate into the labor market and contribute to family income.

3. DATA AND METHODOLOGY

Sources of information

This research took as a source of information the National Household Income and Expenditure Survey [Spanish ENIGH] which is performed by the National Institute of Statistics and Geography [Spanish INEGI], whose objective is to provide statistics about the behavior (amount, origin and distribution) of income and spending in households. This is in addition to the occupational and sociodemographic characteristics of household members, and the house's infrastructure and equipment. The data corresponding to the years 1994, 1996, 1998, 2000, 2002, 2004, 2006, 2008, 2010, 2012, and 2014 were used.²

Creating the pseudo-panel

In order to analyze income profile as a result of age, the LHC was taken as a theoretical reference point, which involves tracking information from one individual over time. However, it is difficult to obtain a series of consecutive observations of the same person, given that the ENIGH is a tool for transversal measurements. In an effort to solve this problem, Browning *et al.* (1985) propose the creation of a pseudo-panel. This method is based on the creation of n synthetic cohorts (groups of individuals) defined based on one fixed characteristic, for example, birth year, and for a constant interval. This allows for the tracking of behavior depending on the variables of interest for each cohort in successive surveys.

For the purposes of this research, 17 cohorts were created, defined by birth year of the head of household in intervals of five years. Cohort 1 is comprised of heads of household that were between 80 and 84 years old, that is to say, who were born between 1910-1914. This was followed until cohort number 17, with heads of household born between 1990-1994 and corresponding ages between 20 and 24 years old in 2014. The sample is restricted to heads of household whose minimum age is 20 years old and maximum age is 85 years old, given that before and after this age range there are few recorded observations.

Definition of variables

The principal variable in this study is income, given the importance that it has as a mechanism of economic security. Specifically, the behavior of monetary, work, and transfer income patterns are analyzed. Monetary income is the sum of: work income, comprised of subordinate or independent work, in addition to other jobs; property rentals, including income deriving from cooperatives, companies and businesses, and the leasing of tangible assets and finances; income from transfers, such as retirement, pensions and compensations, grants, donations, remittances, benefits from governmental programs, and the like; and other revenue streams. Incomes were deflated using the National Consumer Price Index database of 2014.

The control variables are: 1) Households with and without children. Within this, three groups are analyzed: a) with children exclusively under 6 years old; b) with children exclusively between 6 and 12 years old, and c) without children under 13 years old. And, 2) Formal education level. Three levels are established: a) low, with elementary school studies or less; b) middle, with middle school studies or incomplete high school studies; and c) having completed high school, a technical, bachelor's or postgraduate degree.

Specifications and calculation of income profile during the life-cycle

In order to examine the income profile during the life cycle of Mexican households, a semiparametric model was estimated, being linear in two phases, following Speckman (1988), and Fernández-Villaverde and Krueger (2004, 2007). The semiparametric regression has two components: a parametric form, obtained from ordinary least squares, and a non-parametric form, derived from a Kernel function.³ The specifications are the following:

$$Y_{it} = \pi_i \text{cohorte}_i + \pi_t \text{tiempo}_t + m(\text{edad}_{it}) + \varepsilon_i \quad (1)$$

Where Y_{it} represents household income, in cohort i and year t . The cohort and time variables are dichotomous for each cohort and year of the study, calculated in a parametric form. The residual ε_{it} is random and independent of the explanatory variables. Function $m(\text{age}_{it})$ is a smooth function of age_{it} estimated in a non-parametric manner. To calculate it, the framework of Gutiérrez *et al.* (2003) is utilized, using local polynomials, based on the model $Y_i = m(X_i) + \varepsilon_i$ where $X = \text{age}$ and Y is the dependent variable.⁴ The equation for an approximation of x_0 can be defined as:

$$m(x_0) = \sum_{i=1}^n \left\{ Y_i - \sum_{j=0}^p \beta_j (X_i - x_0)^j \right\}^2 K_h(X_i - x_0) \quad (2)$$

Where K_h represents a Kernel function that gives more weight to households with heads whose ages are near the values of x_0 . Based on equation 2, for each x_0 point an approximation $m(x_0)$ is calculated.⁵ To analyze household income patterns in this study, a Kernel Epanechnikov function is used with a zero-degree polynomial.

One of the problems that presents itself when calculating equation (1) is that the effects of cohort, time and age are linearly dependent, causing perfect multicollinearity by including all of the equation's variables. Accordingly, to avoid this problem this study follows Deaton's (1997) proposal and assumes that the dichotomous variables for each year t of the survey do not correlate to a tendency of time and the sum of dichotomous variables is zero. In this way, the proposed equation allows for the creation of artificial dichotomous variables based on dichotomies by year:

$$d_t^* = d_t - [(t-1)d_2 - (t-2)d_1] \quad (3)$$

Where d_t is a dichotomous variable for each year, and is equal to 1 if the year is t and 0 in the opposite case. For this study, $t = 1$ indicates the year of the first survey that was used, that is, 1994; $t = 2$ corresponds to the second survey, 1996; up until $t = n$ which refers to 2014.

Adjusting the data with equivalency scales

With the goal of calculating the effect of composition and size of household on income patterns, the data were adjusted using equivalency scales.⁶ Regarding this thematic, the scales created by the Organization for Cooperation and Economic Development [Spanish OCDE] have been widely used in the empirical literature. Accordingly, in the present work the most up-to-date scale offered by the organization is used, which involves dividing income between the root squared of the household size, due to the assumption that necessities increase less than proportionally with household size (OCDE, 2008).⁷

4. DESCRIPTIVE STATISTICS

Sociodemographic characteristics of Mexican households over time

Mexico has seen important demographic changes over time. Based on data from the ENIGH (1994-2014), the dynamics observed for households shows an increase in family units with female heads of household, along with a decrease in number of members, and an increase in the average age of those female heads of household. In 1994, there were 19.2 million households; only 15.4% were headed by women and 85% were headed by men. In 2014, the percentage of female-headed households increased significantly, representing 25.7% of 31.6 million households, and therefore the percentage of male heads of household decreased to 74.3%.

Additionally, the average number of household members went from 4.6 in 1994 to 3.8 in 2014. This average has been less for female-headed households, in comparison to male-headed ones. Furthermore, the percentage of households with minors has decreased across time, though there are important differences according to the gender of the household head. The percentage of male-headed households with children younger than 6 years old or between 6 and 12 years old is greater than those with female heads, across all of the years being analyzed. Thus, as an effect of the increase in life expectancy, the average age of heads of household shows a rising tendency between 1994 and 2014. This highlights the fact that female heads of household are older than male heads of household by an average of between 5 and 8 years.

Another important factor that has a direct effect on income earnings is education. In Mexico, important gender gaps can be seen by education level; in 1994 around 30% of female heads of household did not have any level of formal instruction. Although this percentage has been decreasing, in 2014 it was still almost double the percentage of male heads of household without formal instruction. The highest level reached for the majority of heads of household is elementary school, and only a small percentage end up with bachelor's degree or postgraduate studies. For example, in 1994 only 8 out of every 100 male heads of household and 4 out of every 100 female heads of household had completed higher studies.

The foregoing data gives a brief panorama of Mexican household dynamics over time. The description of these variables is important because it helps to explain income patterns. According to Tepichin (2011), women's participation in earning income is determined by the life cycle of the family unit: presence of minors, a partner, other women who help with domestic and care work, and adults who perform remunerated activities.

In this context the significant presence of female-headed households in Mexico may come with more vulnerability, given gender inequalities that are present both in public and private spaces, and to other factors such as household structure. Since female-headed households headed report fewer members, an important percentage have single parentage, and as Buvinic states (1991), women may be taking on the totality of household expenditures. On the other hand, age is an important factor that also explains income patterns. The LHC establishes that people earn their highest income in middle age. Nonetheless, women's work trajectories are distinct from those of men, and can involve an early retirement from the job market.

Evolution of income in Mexico

The evolution of household incomes in Mexico has been characterized by fluctuations influenced by the economic cycle. Between 1994 to 1996, a period of financial crisis, a fall in average household income stream was observed, to then show a mild recuperation in 2008. As a consequence of the global crisis, in 2010 another decrease was observed. From 2010 to 2014, a degree of stability in income levels was observed (INEGI, 1994-2014).

An initial approach to explain income patterns is to analyze its components. Table 1 demonstrates that the principal income source for Mexican households is work. Still, there are important gender gaps in terms of the percentage of income that female-headed households earn in this way, compared to what is seen for those with male heads of household. The widest gap was seen in 2000, when this percentage was lower by 20 points.

Another difference is observed in income from transfers: households headed by women obtain a higher percentage by this account in comparison to what is seen for men; this tendency is consistent across the years of analysis. It is important to note the increasing relevance of transfers as a source of income across time; in 1994 they represented 11.6% of the income stream for female-headed households, while in 2012 it made up 20.2% of that income.

For income earned from property rentals, an important asymmetry can also be seen, although in this case in favor of male-headed households, given that they earn a higher percentage by this means, than those headed by women. The foregoing leads to the thought that households headed by men have greater access to monetary assets and may be owners of certain capital goods.

Descriptive statistics demonstrate import gender asymmetries in terms of income sources that can impact household income patterns. The greatest inequality is

Table 1. Mexico. Evolution of Average Monthly Income of Households by Primary Structure Composition, 1994-2014 (in 2014 pesos, adjusted using OCDE equivalency scales)

Year	1994	1996	1998	2000	2002	2004	2006	2008	2010	2012	2014
Male-headed households											
Stream	8 515	6 199	6 591	7 712	7 431	7 738	8 635	8 440	7 418	7 749	7 399
Monetary	6 437	4 720	5 231	6 113	5 908	6 190	6 830	6 826	5 888	6 147	5 959
Work	5 898	4 252	4 671	5 508	5 173	5 284	5 849	5 606	4 841	4 883	5 078
Rentals	88	98	110	88	167	314	289	463	306	405	105
Transfers	385	311	399	514	558	589	688	752	736	851	767
Other income	67	59	51	3	11	4	4	4	6	8	9
Non-monetary	2 078	1 480	1 360	1 599	1 523	1 548	1 805	1 614	1 530	1 602	1 440
Female-headed households											
Stream	8 191	6 014	6 465	6 927	6 991	7 447	8 121	7 836	7 174	7 612	7 241
Monetary	5 357	4 009	4 657	4 965	5 107	5 489	5 826	5 801	5 242	5 536	5 254
Work	4 028	2 973	3 369	3 480	3 811	3 740	4 071	4 222	3 651	3 741	3 767
Rentals	253	127	232	184	97	323	235	235	156	155	112
Transfers	1 031	891	1 010	1 300	1 199	1 423	1 514	1 336	1 422	1 628	1 372
Other income	44	18	46	0	1	4	6	8	13	12	4
Non-monetary	2 834	2 005	1 808	1 962	1 883	1 958	2 295	2 035	1 932	2 075	1 987

Source: prepared by the authors based on the INEGI (1994-2014).

seen in income earnings from work, which can be explained by factors such as lower education level, household structure, unequal distribution of household tasks, and even employment discrimination (Tepichin, 2011; Valenzuela, 2003; Salles and Tuirán, 2002).

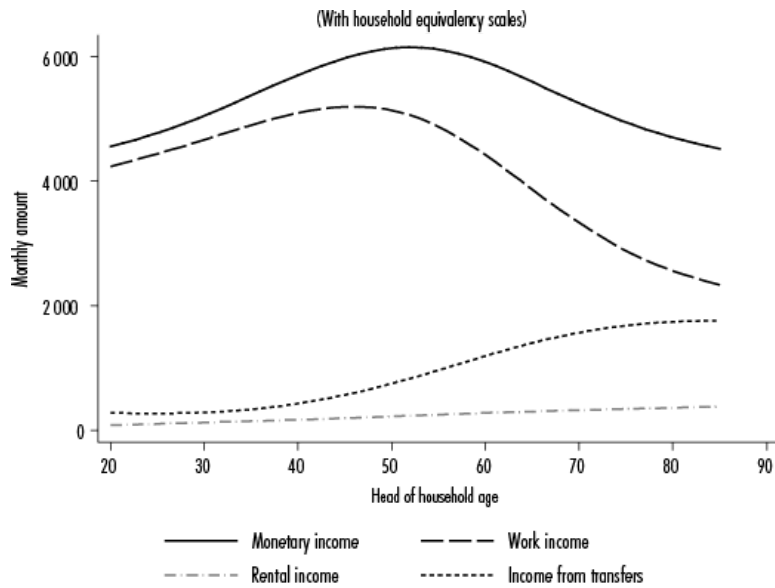
5. RESULTS

Income profiles for Mexican households

Below are presented the results for the calculation of the age effect on the behavior of income across the life cycle of households in Mexico. The main objective is to visualize the differences between female-headed and male-headed households, taking family structure and education as control variables, and to ascertain if both household types conform to the LHC.

Figure 1 shows income patterns for Mexican households. To obtain this, monetary income and three of its principal components were analyzed: 1) work; 2) property rentals, and 3) transfers. It can be seen that both monetary income and work income evidence an inverted U profile. Monetary income at the beginning (20 years old) and at the end (85 years old) of the life cycle is on average 4,500 pesos per month. The highest income level, slightly over 6,100 pesos per month, is reached between 50 and 52 years of age, the point at which it also begins to decrease. The average work income reaches its highest point between 45 and 50 years of age, but after this decreases significantly.

Figure 1. Household Income Profiles*



**Monthly amount in 2014 pesos adjusted with OCDE equivalency scales.
Source: prepared by the authors based on the INEGI (1994-2014)*

If the LHC indeed is directed to work income, the monetary resources obtained through transfers increase in relevance at advanced ages. In this way it can be observed that income from this avenue is low between 20 and 40 years of age, although it is high when the heads of household reach the age of 85, since it represents around 30% of household monetary income. This result coincides with that obtained by Campos and Meléndez (2013), who found that income from transfers represents 30% around 70 years of age, and reaches approximately 50% for people at 90 years of age.

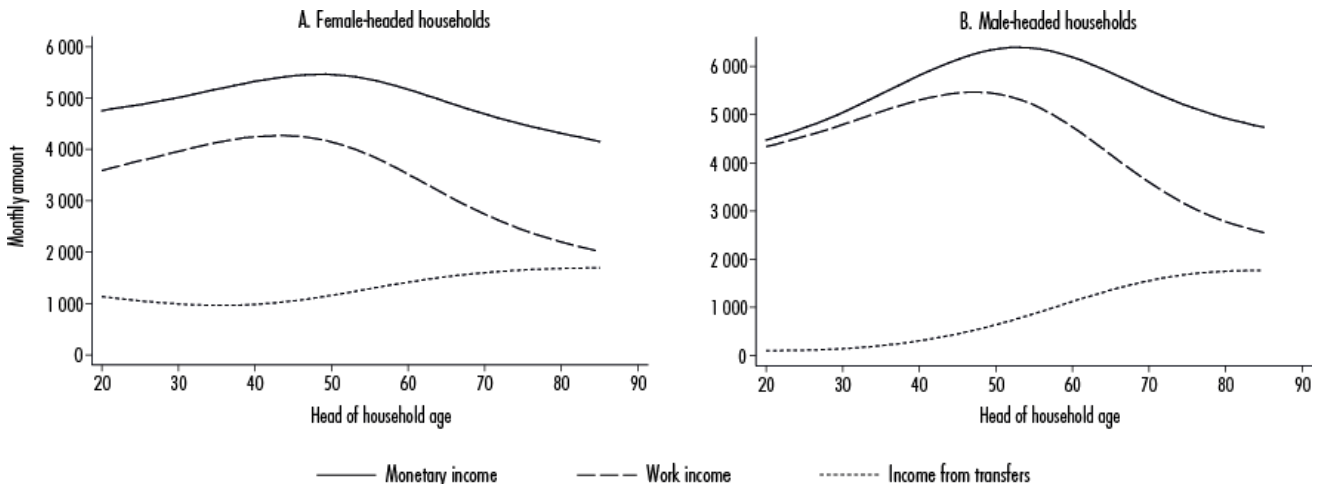
Finally, it can be observed that income by property rentals, that is to say, income originating from the possession of financial or tangible assets, is almost null across the life cycle in Mexican households. The amount of income for this rubric is low and has a relatively linear behavior.

Income profiles by head of household gender

The gender asymmetries in terms of sexual division of labor and the assigning of roles segregates women to the domestic space and men to the productive space. The consequence of such unfavorable conditions means women perform little-valued tasks, or enter jobs with part-time hours or low salaries, including those without social benefits (Salles and Tuirán, 2002). Moreover, gender inequalities in access to material assets and social capital (like education) experienced at a young age can have a lower level of wellbeing in old age as a consequence.

Figure 2, part A, demonstrates that income profiles, both monetary and work, of female-headed households form a relatively flat, inverted U, according to which it cannot be confirmed with certainty whether it is consistent with the LHC approach. The highest income amount, monetary and through work, that they end up obtaining are close to 5,500 and 4,300 pesos per month respectively. The fact is highlighted that the highest level of work income for these households is achieved around 45 years old, and starting at that age begins to decrease, thus proving the hypothesis that women have an earlier withdrawal from the labor market.

Figure 2. Household Income Profiles by Head of Household Gender*



**Monthly amount in pesos constant from 2014, adjusted with OCDE equivalency scales.
Source: prepared by the authors based on the INEGI (1994-2014).*

For female-headed households, transfers have an important role as a source of income, given that at the beginning of the life cycle they represent close to one fourth of their monetary income, until the head of household reaches 45 years of age, when the tendency begins to grow until it reaches a level of over 40% of their income at the end of the life cycle.

In contrast to the female-headed household profile, monetary and work income patterns for male-headed households show a clearly defined inverted U form, conforming to the LHC. Part B of Figure 2 indicates that the amounts seen for male heads of household are higher than those for female heads of household across the life cycle.

On the other hand, contrary to female-headed households, income from transfers is almost null for male-headed households. At the beginning of the life-cycle (20 years of age), it represents 2.5% of the monetary income, then between 30 and 40 years of age the income percentage from this source begins to grow gradually, though less than 5%. Nonetheless, it reaches the point of constituting more than 30% at the end of the life-cycle (85 years of age).

It can thus be demonstrated that monetary and work income levels of households headed by women are lower than those headed by men.

One important factor to take into account is the considerable amount of unpaid domestic and care work days that the majority of women perform, a factor that limits the time they have to devote to other remunerated activities. According to INEGI (2017), women generally work at informal jobs, whether part-time or without pay at family businesses, given circumstances of lack of time or given their limited work experience. Additionally, the fact that 49.8% of women have as their highest remuneration level two minimum salaries is emphasized.

In this regard, and given the relative increase of female-headed households in Mexico, it is necessary to implement public policies with a focus on gender in a variety of contexts. It is necessary to end discrimination, in addition to segregation in the labor market and to reduce the salary gap between men and women. Another important action would be to eliminate informality, which would help improve remunerations and make offering social benefits possible, not just to the head of household, but to their children as well.

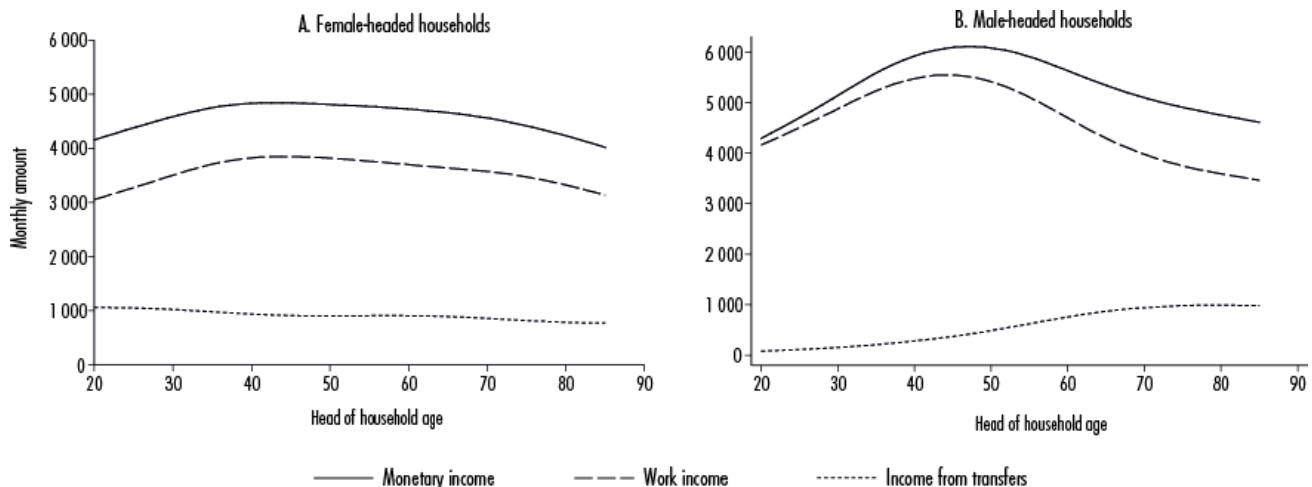
Effects of family structure on income patterns

The inverted U profile established by the LHC is not met in every case, given that a variety of factors exist which affect income patterns. The presence of children (between 0 and 5 years old) in the household represents an increase in unpaid domestic and care work, given that they are completely dependent. This means that female heads of households devote less time to the labor market, and as a consequence it is predicted that the function for incomes from these households does not comply with what is established by the LHC.

a) Income profiles of households with children exclusively under 6 years old

Income patterns for female-headed households with children under 6 years old do not show an inverted U form, as demonstrated by Figure 3, part A, where the figures are flat; the income levels, both monetary and from work, are low and do not present notable variations across the life cycle. The highest level, slightly observable, is reached at an average of 43 years old, a lower age compared to that of the female-headed households in general that reach this point around 50 years old. With respect to income from transfers, they have a linear form and gradually decrease, though in terms of percentage, they continue to represent an important source of income for female-headed households.

Figure 3. Income Profiles for Households with Children Exclusively Under 6 years Old by Head of Household Gender*



*Monthly amounts in 2014 consistent pesos, adjusted by OCDE equivalency scales.
Source: prepared by the authors based on the INEGI (1994-2014).

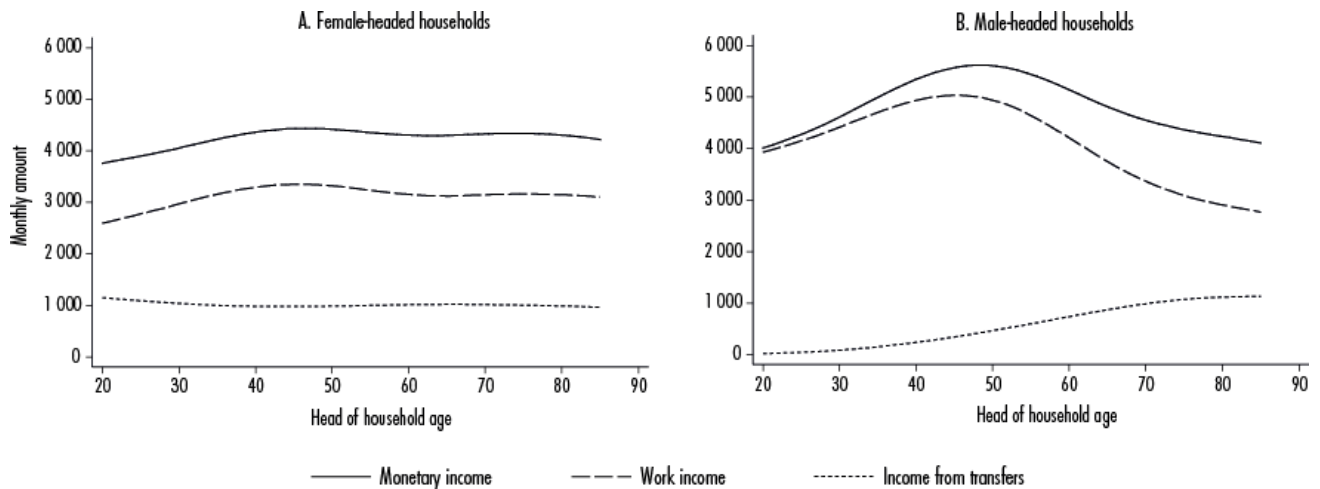
In male-headed households, family structure appears not to have an effect on income patterns, as demonstrated by part B of Figure 3. Both monetary and work income form an inverted U shape, as established by the LHC. With respect to income from transfers, it is under 2% of monetary income at the beginning of the life cycle, but later tends to grow, until it ends up representing one fifth of monetary income.

The presence of minors in the household demands more time performing domestic and care work, usually done by women—a situation which limits their participation in the labor market. The foregoing suggests the necessity of supporting public policies that help balance work with family life, and of carefully incorporating redistributive policies. To this end, it would be recommendable, as proposed by UN Women (2018): to recognize care work as an important factor in social wellbeing and the functioning of the economy; to redistribute unpaid domestic and care work in an equitable way between men and women; and to reduce care work via national care-providing systems.

b) Income profiles for households with children between 6 and 12 years of age

Just like female-headed households with children exclusively under 6 years old, the results presented in Figure 4, part A, indicate that the profile projected in the LHC is not met by households with children between 6 and 12 years old, given that the income patterns have a flat shape.

Figure 4. Income Profiles of Households with Children Exclusively Between 6 and 12 Years of Age by Head of Household Gender*



*Monthly amounts in 2014 consistent pesos, adjusted with OCDE equivalency scales.
Source: prepared by the authors based on the INEGI (1994-2014).

The highest monetary income level is reached at 47 years of age, and for work income at 45 years old. Since a decrease in monthly amount is registered for both income types at the end of the life cycle, in terms of percentages, said reduction is minimal due to said income not showing important changes during the cycle. Additionally, income from transfers represents approximately 30% of the monetary income at the beginning of the life cycle, although it diminishes slightly at advanced ages, to ultimately represent around 23% of monetary income.

In the case of male-headed households, the presence of children between 6 and 12 years old does not have an effect either on income patterns; the inverted U shape maintains the same pattern as Figures 2 and 3, part B. The foregoing can be explained by the presence of a spouse or partner as part the household, which may mean double income, and further, allow the heads of household to stay for more time on the labor market. By contrast, in the majority of female-headed households, there is generally not a spouse that can contribute to the family income. In this sense, Sánchez *et al.* (2016) show that the presence in the household of another woman older than 14 years old increases the possibility of women integrating themselves in the labor market, and with it the possibility of paid work hours.

For households with children exclusively between 6 and 12 years old, having a better-defined income profile was expected, given that children of this age are not completely dependent. Nonetheless, in both cases, the income levels obtained for female-headed households are low and are not consistent with the LHC.

The results demonstrate that the income profile of female-headed households is affected in a significant way by household structure. In this context, households with children under 6 years of age are more vulnerable. Accordingly, it is important for Mexico to attend to the recommendation given by OCDE (2017) which asserts the necessity of performing an analysis of budgets for each Secretary and level of government, from a gender perspective, to gain a more effective visualization of gender differences in policies and programs, considering the differentiated impact that allocations have on men and women. Further, it is highly important to perform evaluations and accordingly to implement redistributive policies to ensure better allocation of public spending in favor of gender equality.

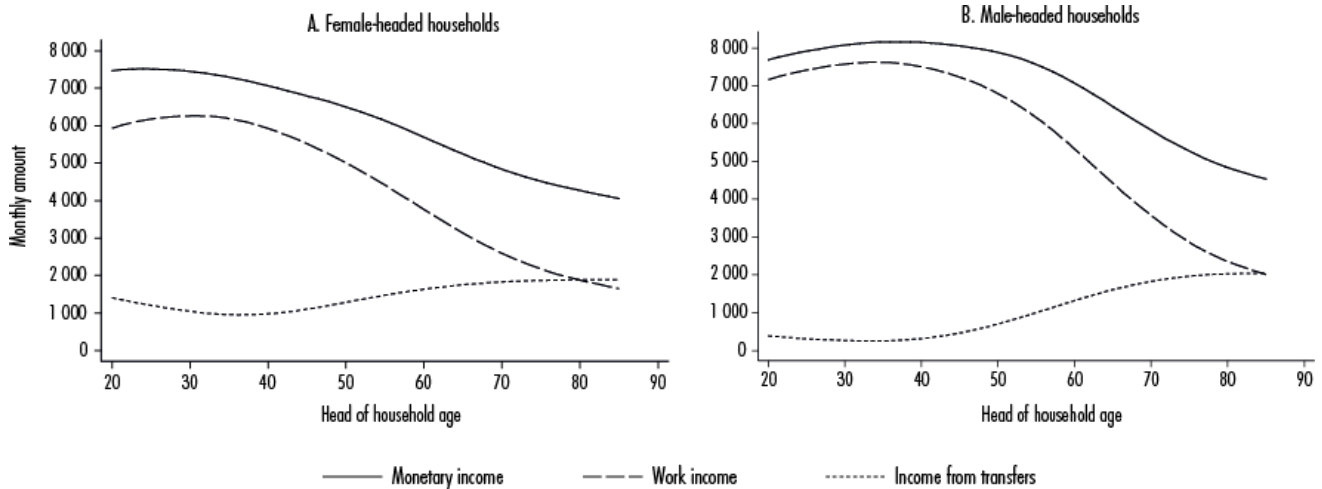
Under these circumstances, it would be a priority to attend to and offer resources to groups like female-headed households with minors, and to female heads of household of advanced age that find themselves in one-person households and whose income depends primary on transfers

c) Income profiles of households without children between 0 and 12 years old

Like the previous cases, the LHC appears to not be met by female-headed households without children under 13 years old, given that the shape of the monetary income function—if it presents an ill-defined highest point around 30 years old and after that begins to decrease—does not have an inverted U profile. At the same time, for work income a slight “hump” shape can be identified, though not sufficiently clear to confirm that it conforms to the LHC. Once again, the relevance of transfers for female-headed households is evident, given that at the end of the life cycle, the amount gained by this means reaches a point slightly greater than work income.

Another important result, demonstrated in part A of Figure 5, is that these households reach a higher level of monetary income, by between 70 and 90%, compared to what is registered for households with children only under 6 years old, and children between 6 and 12 years old, respectively. Similar findings are found by Montes and Villagómez (2002), and although their analysis is not divided by head of household gender, they find that in households without children the income is higher than for families with children.

Figure 5. Income Profiles for Households Without Minors Less than 13 years Old by Head of Household Gender*



*Monthly amounts in 2014 consistent pesos, adjusted with OCDE equivalency scales.
Source: prepared by the authors based on the INEGI (1994-2014).

Although monetary and work income patterns in male-headed households without minors under 13 years old show a slight “hump” form, and are much more defined than that of female-headed households, they do not reach a concave form in its totality. In part B of Figure 5, it is evident that although the income amounts of these households are higher, a greater loss at the end of the life cycle is also registered; at this stage work income and income from transfers contribute the same percentage as monetary income.

Effects of education on income profiles

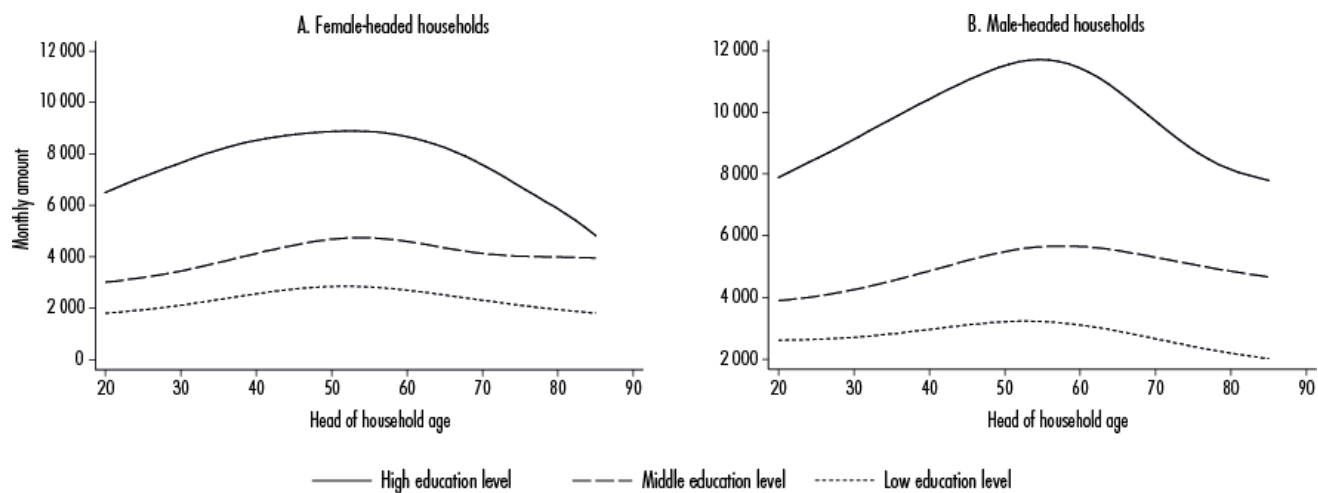
Gender differences are seen in various contexts, of which education is one. During the years analyzed in this study, it is shown that the percentage of female heads of household without any level of instruction is higher than that of male heads of household at the same time. It was also determined that the percentage of female heads of household that reached university level education is minimal. Thus, there is evidence that gender inequalities experienced at young ages affect future wellbeing in a significant way.

Various authors (Ceballos, 2018; Campos and Meléndez, 2013; Duval and Orraca, 2011; Fuentes and Villagómez, 2001) have noted that income and savings rates are higher when the head of household has a higher education level. Accordingly, it is expected that households with the same level of formal education have a similar income profile, which conforms to what is proposed by the LHC. This section only makes reference to work income, given that a greater participation by women in the labor market is assumed, based on the rate of increase of their education level.

In Figure 6, part A, one can see that the female heads of household with high education levels (high school graduates or higher), come to have a work income of close to 6,500 pesos per month, at the beginning of their life cycle. This amount represents slightly more than double the income observed for a female head of household with mid-level education (partially completed middle school or high school), and more than triple what is earned by a female household head with a low education level (elementary school or less). The income forms a concave shape, although more open, in comparison with the income shape of male-headed households. The highest point is reached between 53 and 55 years of age, with high to medium levels of education, and between 50 and 53 years old, with a low level.

Upon analyzing the work income profile for male-headed households, in Figure 6, part B, it can be seen that this income is greater compared to female-headed households, from the beginning to the end of the life cycle, in all three levels of education. The case of households with a high level of education stands out, where the highest point is reached at 55 years of age, which is the same for female heads of household, but the amount of income calculated is greater by approximately 3,000 pesos per month compared to the maximum income earned by female-headed households.

Figure 6. Work Income Profiles for Households by Level of Education According to Head of Household Gender*



*Monthly amounts in 2014 consistent pesos, adjusted with OCDE equivalency scales.
Source: prepared by the authors based on the INEGI (1994-2014).

These final results are relevant because it was expected that the income profile of female-headed households would be similar to male-headed households when controlling for the same formal education level. Regardless, even when the female heads of household have a high level of education, their income is still lower across their life cycle in comparison to male heads of household. The foregoing suggests that there is horizontal and vertical segregation in the labor market that affects income patterns for female-headed households.

Accordingly, it is necessary to support the empowerment of women and to assure an equal remuneration to men when performing the same jobs. Furthermore, it would be opportune to incentivize policies that prevent school dropouts, in particular at the upper middle level, given what was observed in the descriptive analysis: the largest percentage of heads of household have elementary school as their highest level of study, and only a small percentage reach higher studies. As such, the graduation rate must be boosted for higher levels of education.

6. CONCLUSIONS

The present article analyzed the income profile of households in Mexico according to age, using the pseudo-panel method with data from the ENIGH (1994-2014). To this effect, 17 synthetic cohorts of five-year intervals were created, defined based on the birth year of the heads of household. A semiparametric calculation was performed which was controlled by cohort, survey year, age, head of household gender, family structure and level of education. The analysis examined the primary sources of monetary income.

The results of the semiparametric model demonstrate that the income profile in Mexican households, both monetary and from work, form an inverted U shape. Even though at the beginning of the life cycle the income amount from transfers is low, at the end it becomes an important source of income, given that it comes to represent around 30% of the monetary income. Furthermore, it was demonstrated that the income from property rentals is almost null along the life cycle.

Upon analyzing household income patterns in function of age and according to head of household gender, important differences are found. The income profile of female-headed households shows a flat, inverted U shape, which does not comply with what is established by the LHC. Additionally, with the presence of children under 6 years of age, income patterns continue to not form a definite inverted U profile. The same situation can be observed upon analyzing households with children exclusively between 6 and 12 years old. In contrast, the income profile for male-headed households has a clearly specified inverted U shape.

The monetary and work income for female-headed households appears to be lower than those with male heads of household, across the whole life cycle and independent of education level or family structure. In addition, female heads reach a maximum level of income at a younger age, which means that there is a decrease in their income at an earlier stage compared to male heads of household. However, income from transfers is higher for female-headed households in all cases, even though it ends up being an important source of income for both types of households at the end of the life cycle.

The increase in female-headed households seen in Mexico establishes new challenges for public policy with a focus on gender. An analysis of these households is needed considering more specific characteristics such as household structure. It is recommendable to promote actions that allow for a balance between work and family life, and to incorporate redistributive policies for care work so that female heads of household can devote more hours to paid work. An important element, as shown by the OCDE (2017), is to perform evaluations of the impact of budgetary allocations, and if necessary apply redistributive policies that guarantee the wellbeing of men and women under conditions of equality. Accordingly, it would be ideal to attend to vulnerable groups like female-headed households with the presence of small children, or with heads of household of advanced age.

It would also be important to analyze household income patterns using other characterizations like economic leadership, and to control other variables that could also have a salient effect, such as geographic location, among other sociodemographic dimensions. Income profiles could be analyzed according to different types of household; nuclear, extended and one-person. These topics are offered as future lines of research.

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structure by age, savings and social security in Mexico". The authors appreciate the important support of Owen Ceballos Mina, in addition to the comments from the two anonymous readers.

¹ From an economic point of view, if more necessities are met a higher level of wellbeing is reached, though this will only be possible if a higher income is accessed (Rojas, 2010). In Mexico the official poverty index with a multidimensional methodology uses the economic wellbeing space to identify the population whose income is insufficient to acquire goods and services to satisfy their necessities (CONEVAL, 2018). Nonetheless, there are other factors which contribute to general wellbeing.

² Given that the 2016 ENIGH was generated based on a new survey construction format, and its calculation of income marks the beginning of a new information set, it is not comparable with the set from 1994 to 2014, in terms of the income phenomenon; for this reason, it was not incorporated into the analysis.

³ Among the advantages of using this calculation technique, Fernández-Villaverde and Krueger (2004, 2007), note that the combination of a parametric and non-parametric focus allows for an equilibrium between flexibility and efficiency. A completely non-parametric calculation is ineffective when it uses a small sample size. On the other hand, a calculation using only a parametric focus and dichotomous age variables does not offer a smooth profile nor robust results. Regarding this, Campos and Meléndez (2013) argue that the less relevant estimators for the analysis can be calculated with parametric functions and the central variables, like age, with non-parametric functions.

⁴ The cohort and time variables are omitted from equation 1 for simplicity.

⁵ This formalization is used by authors such as Campos and Meléndez (2013) and Ceballos (2018).

⁶ According to Ortiz and Marco (2006, pp. 55-56), the income or spending in per capita terms presents some difficulties by not considering that: "Different individuals have different needs. They are not the same, for example, the needs of a child compared to those of an adult" and "There are scaled economies within a household, at least in terms of referring to goods other than alimentation. To put it another way, it is mostly costly, for example, to maintain two one-person households than one household comprised of a couple".

⁷ "The 'elasticity of the root squared' means that the necessities of a household composed of four people is double that of those with one person (1.4 and 1.7 times that of the solo case of a couple without children and a couple with one child)" (OCDE, 2008, p.47).