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# Regions in México Based on Marital and Reproductive Trajectories

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## ABSTRACT

The retrospective demographic survey offers information about the onset of sexual activity, and changes in fertility and marital status, that are used to build a family formation history for Mexican women aged over 40. Based on its sample size and design, this survey allows the study of population characteristics at state level. To consider the complexity of the life courses (incidence and order of events related to family formation), we use sequence analysis techniques. The most predominant trajectories in each state are illustrative of the flexibility or rigidity of the social standard. Visualising these trajectories is useful for grouping similar states, and separating them from others, and ultimately to propose a regionalisation based on the demographic pattern. Regions defined with this strategy are: very conservative, conservative, high fertility, mixed, tolerant, and liberal.

## KEYWORDS

EDER, Sequence analysis, Reproductive trajectories, Marital trajectories, Regionalisation

## Regiones en México Según Trayectorias Maritales y Reproductivas

### RESUMEN

La encuesta demográfica retrospectiva ofrece información sobre la edad de iniciación sexual y los cambios en la fecundidad y el estado conyugal, que son usados para reconstruir la historia de formación familiar de las mujeres de 40 años y más. El diseño estadístico de esta encuesta permite el estudio de las características de la población a nivel de entidad federativa. Con el fin de considerar la complejidad de las trayectorias de vida (la incidencia y el orden de eventos ligados a la formación familiar), se utilizan técnicas de análisis de secuencias. Las trayectorias que predominan en cada entidad ilustran la flexibilidad o la rigidez en relación con el estándar social. La visualización de esas trayectorias es útil para agrupar a las entidades semejantes, al tiempo que las separan de otras, y en última instancia para proponer una regionalización basada en el patrón demográfico. Las regiones definidas con esta estrategia son: muy conservadora, conservadora, de alta fecundidad, mixta, tolerante y liberal.

### PALABRAS CLAVES

EDER, Análisis de secuencias, Trayectorias reproductivas, Trayectorias maritales, Regionalización

### RÉSUMÉ

L'enquête démographique rétrospective offre des informations sur l'âge de l'initiation sexuelle et les changements d'état civil et de fécondité, qui sont utilisées pour reconstruire l'histoire de la formation familiale des femmes de 40 ans et plus. Le design statistique de cette enquête permet l'étude des caractéristiques de la population au niveau de l'état fédéré. Afin de considérer la complexité des trajectoires de vie (l'incidence et l'ordre des événements liés à la formation familiale), on utilise des techniques d'analyse de séquences. Les trajectoires qui prédominent dans chaque état illustrent la flexibilité ou la rigidité par rapport au standard social. La visualisation de ces trajectoires aide à la formation de groupes d'états qui se ressemblent, en même temps que la différenciation d'autres, et finalement à proposer une régionalisation à partir du patron démographique. Ainsi, les niveaux définissant les régions avec cette stratégie sont: très conservatrice, conservatrice, haute fécondité, mixte, tolérante et libérale.

### MOTS CLÉS

EDER, analyse de séquences, trajectoires reproductives, trajectoires maritales, régionalisation

**INTRODUCTION**

Retrospective demographic surveys (EDER) have been conducted in Mexico on three occasions, 1998, 2011 and 2017. This type of survey provides longitudinal information that serves both to describe the prototype trajectories of population groups and the relationships among different life trajectories (labour, reproductive, migratory, etc.), and to observe changes across generations (Coubès, 2016).

With respect to the topic of fertility, the first two EDER surveys made it possible to account for the diversity of reproductive patterns of cohorts born throughout the 20th century. In addition to noting the generational change in fertility levels, which other sources of information had already illustrated, the EDER 1998 and 2011 showed that the pace of change in the rural environment was different from the urban (Zavala de Cosío, 2005) and that factors such as social origin or educational level achieved to explain the coexistence of early and late reproductive trajectories and households as fertile as those of the past with households with very few children (Páez & Zavala, 2016).

For example, based on the analysis of the final offspring of the different generations represented in the 2011 EDER, it was observed that in Mexico a significant percentage of women still finish their reproductive life with three or more children. In fact, in the case of families with two children, the propensity for a third is greater if the first two children are of the same sex, two girls or two boys (Zavala, 2020). At the same time, the number of women with one child has also increased.

In the most recent EDER edition (INEGI, 2017), the sample size offers the first opportunity to explore whether these reproductive traits are consistent across the country or regional differences can be identified. Our hypothesis is that it is possible to distinguish regions with more conservative reproductive patterns than others, even considering the diversity with respect to local size, educational level or social origin. To prove this, we propose a regionalisation based on the family formation trajectories of women over 40 years old who remained in the same entity throughout their lives. Their family formation trajectory includes the beginning of sexual activity, the entry into a union by type of union, the birth of each of the children and the entry into a second and successive union.

Regionalisation results from a process of optimal matching of trajectories according to their degree of similarity. Once the regions are defined, we explore the differences in the ages at first childbearing, the probabilities of family enlargement, the intervals between the first and the second child, the size of the final offspring, among other variables.

Figure 1. Final offspring by generations, according to sex  
Source: Author production with data from the 2017 Retrospective Demographic Survey.

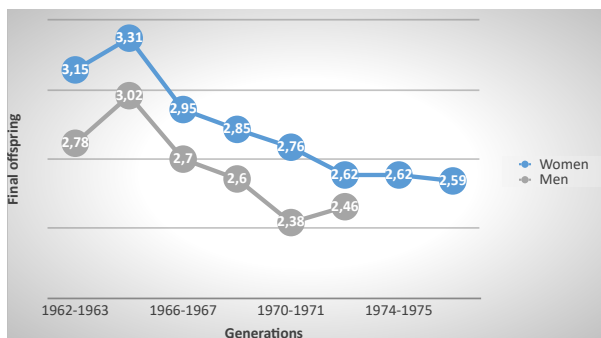
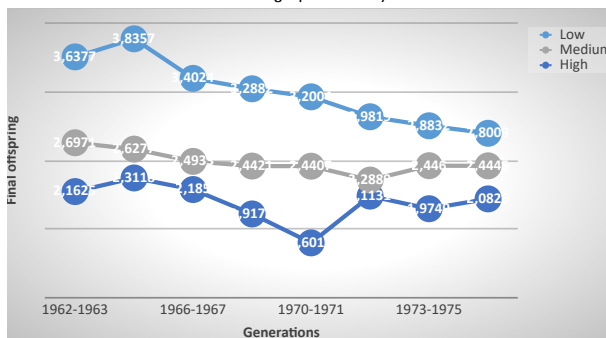


Figure 2. Final female offspring, by generations and level of schooling  
Source: Author production with data from the 2017 Retrospective Demographic Survey.



**1. NATIONAL EVOLUTION**

With data about the final offspring of women aged 40 and older and men aged 45 and older who have virtually completed their reproductive lives at the time of the survey, the following describes the change in fertility across generations, by sex and level of schooling. The decline in fertility has slowed from the generations born in the 1970s (fig. 1). The greatest generational variation (-23%) occurred among women with low levels of education (fig. 2), who in any case have maintained a greater number of children toward the end of their reproductive lives.

On the other hand, as for the relationship between the level of education and the absence of children, approximately one in seven women with high education had not had children by the age of 40 (fig. 3). This phenomenon is increasing across the generations, even for less educated women (fig. 4).

Furthermore, among those with higher levels of education, there is no significant generational change in the proportion of women with only one child at the end of their reproductive lives,

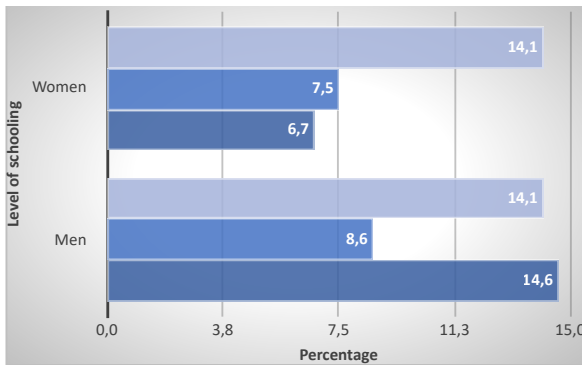


Figure 3. Percentage of men and women without children towards the end of their reproductive lives, by level of schooling  
Source: Author production with data from the 2017 Retrospective Demographic Survey.

Figure 4. Percentage of women without children towards the end of their reproductive lives by generations, according to level of schooling  
Source: Author production with data from the 2017 Retrospective Demographic Survey.

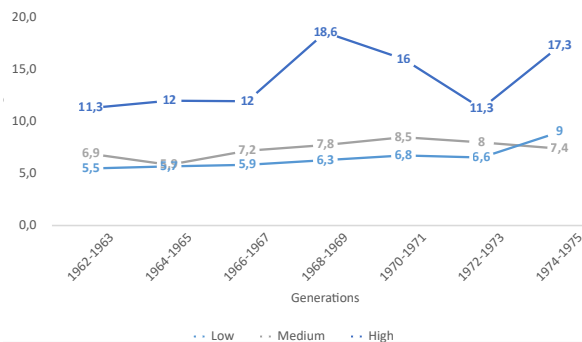


Figure 5. Percentage of women with only one child towards the end of their reproductive life by generation, according to level of schooling  
Source: Author production with data from the 2017 Retrospective Demographic Survey.

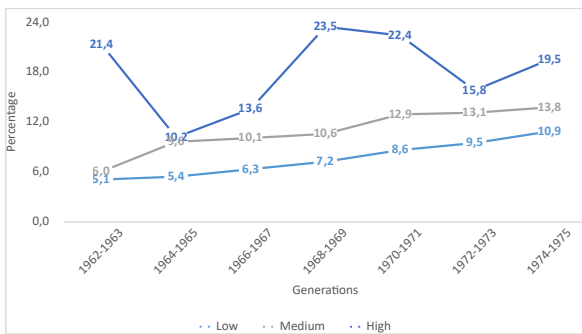
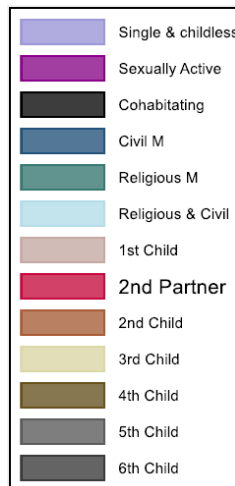


Figure 6. Phases of family formation  
Source: Author production with data from the 2017 Retrospective Demographic Survey.



but there is a growing trend in the percentage of women with only one child among those with medium and low levels of education, from 6 to 14 percent, and from 5 to 11 percent, respectively (fig. 5).

## 2.REGIONAL DIVERSITY OF THE FAMILY FORMATION PATTERN

The reproductive pattern in Mexico is different from that in developed countries, as reproduction still begins at early ages, with short intervals between children. However, there is a reduction in the final offspring and in the probabilities of enlargement of the families of higher orders throughout the generations.

Although there is an intuitive recognition of the coexistence of different reproductive patterns in Mexico, until now it has been impossible to verify this from analysing retrospective data. Sequence analysis is a useful technique for regionalisation based on the diversity and complexity of female trajectories in the formation of their families.

The technique requires the specific reconstruction of the phenomenon to be studied. In this case we combine the beginning of sexual life with reproductive and union trajectories, and we focus exclusively on the order of occurrence, not on the durations. With this input, the variety of the trajectories is grouped considering a measure of similarity. The stages or phases through which it is possible to move were conceptually defined as follows:

The differences by entity are shown below. The first bar, in violet, represents the total of women at the starting point, single and without children; the second bar indicates, according to the colour, which was the second status of these women: in Aguascalientes it was mostly light blue, that is, religious and civil marriage, unlike in Quintana Roo, where the second phase in the trajectory of an important proportion of the women was the beginning of sexual activity (purple). Furthermore, the trajectories are ordered by the number of stages that constitute them: we find at the base the longest trajectories, i.e. those that imply the greatest number of children and/or unions.

From the visualisation, we grouped the states that present a similar family formation pattern and we managed to distinguish six groups or regions: a) Very conservative, b) Conservative, c) High fertility, d) Mixed, e) Tolerant, and f) Liberal. The names of the regions correspond to the greater or lesser distance from the conventional or traditional family formation scheme in the country.

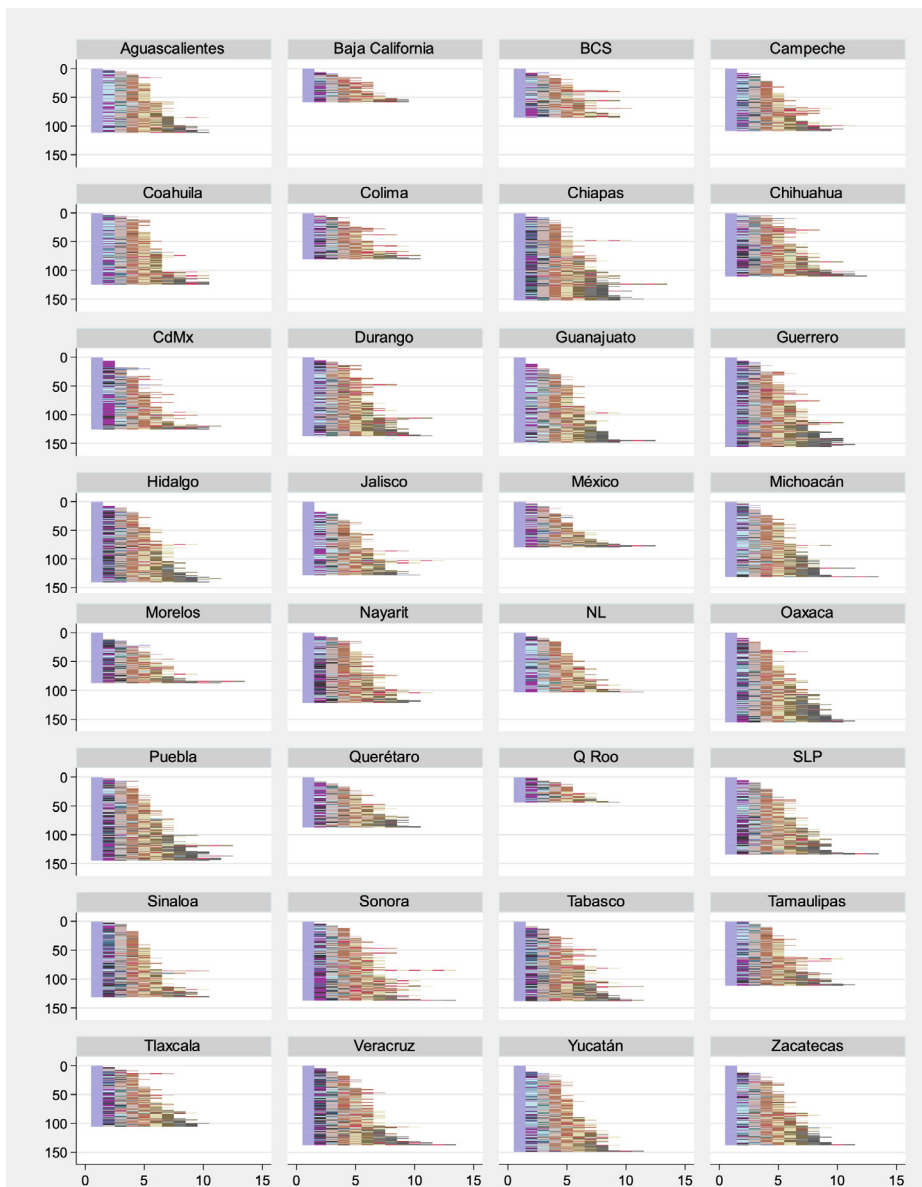


Figure 7. Family formation paths by state  
 Source: Author production with data from the 2017 Retrospective Demographic Survey.

Figure 8. Family formation trajectories by region  
 Source: Author production with data from the 2017 Retrospective Demographic Survey.

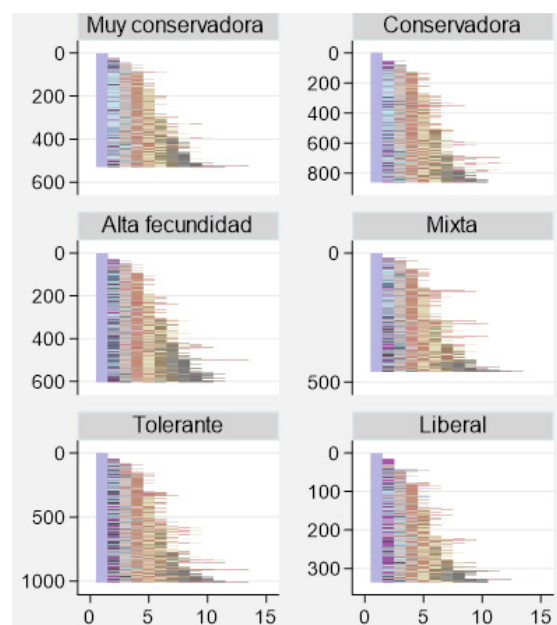




Figure 9. Regions in Mexico according to family formation pattern  
Source: Author production with data from the 2017 Retrospective Demographic Survey.

### 3. MOST FREQUENT FAMILY TRAINING PATHS BY REGION

This section describes the most frequent sequences in each region. At least 50% of the women in each region followed one of the illustrated trajectories, the rest of the women followed any other combination of stages that is less common than those presented here. So we show the more representative, still non-exhaustive, patterns within each region.

In the *Very Conservative region*, half of the women followed trajectories in which premarital sexual activity is not reported. The accumulation of these trajectories reflects the importance of religious marriage in family formation as it typically precedes the birth of children. The most frequent trajectory (14.9%) is religious and civil marriage followed by three consecutive descendants.

In the *Conservative region*, the pattern of traditional family formation is similar to that of the very conservative region, although less intense. One of the most frequent trajectories does not involve religious marriage, but certainly does not include the declaration of premarital sexual activity.

In the *states with High fertility*, trajectories that culminate in three or four children are also frequent, as in the very conservative and conservative regions, but unlike these, in the region of High fertility, family formation can often begin with free union or civil marriage. Moreover, among the preponderant trajectories there is already a group of trajectories (5.1%) in which the beginning of sexual life is declared before cohabitation with the partner.

Table 1. Most frequent family formation trajectories for women in the very conservative region  
Source: Author production with data from the 2017 Retrospective Demographic Survey.

14.9%	Single and without children	Religious and civil marriage	Children 1	Children 2	Children 3	
9.1%		Religious and civil marriage	Religious and civil marriage	Children 2		
7.9%		Religious marriage	Religious and civil marriage	Children 1	Children 2	
7.6%						
5.8%		Religious and civil marriage	Children 1	Children 2	Children 3	Children 4
5.2%		Religious marriage	Religious and civil marriage	Children 1	Children 2	Children 3

Table 2. Most frequent family formation trajectories for women in the conservative region  
Source: Author production with data from the 2017 Retrospective Demographic Survey.

12.2%	Single and without children	Religious and civil marriage	Children 1	Children 2	Children 3	
10.6%		Religious and civil marriage	Children 1	Children 2		
9.6%						
6.9%		Civil marriage	Children 1	Children 2	Children 3	
5.3%		Religious marriage	Religious and civil marriage	Children 1	Children 2	
5.3%		Religious and civil marriage	Children 1	Children 2	Children 3	Children 4

In contrast, in the *Mixed region*, just over half of women follow paths that culminate in a maximum of three children, regardless of the type of marital union. One of the most common trajectories is to have a child while still single. Another emerging path is that more than 6% of women stayed single and were not mothers. On the other hand, in the *Tolerant states*, although the predominant trajectories begin with civil or, civil and religious marriage, the free union is the basis of family formation in about 15% of the cases. In this region, there are more reports of the initiation of sexual life prior to religious marriage and cohabitation. And almost one woman in ten stayed single and without children.

Table 3. Most frequent family formation trajectories for women in the high-fertility region  
Source: Author production with data from the 2017 Retrospective Demographic Survey.

9.5%	Single and without children	Religious and civil marriage				
7.8%		Civil marriage	Children 1	Children 2		
7.4%		Civil marriage	Children 1	Children 2	Children 3	
5.7%		Cohabitation	Children 1	Children 2		
5.4%		Religious and civil marriage	Children 1	Children 2	Children 3	
5.1%		Beginning of sexual activity	Cohabitation	Children 1	Children 2	
5.1%		Religious marriage	Children 1	Children 2	Children 3	Children 4
4.7%		Religious and civil marriage	Children 1	Children 2		

Table 4. Most frequent family formation trajectories for women in the mixed region  
Source: Author production with data from the 2017 Retrospective Demographic Survey.

10.9%	Single and without children	Religious and civil marriage	Children 1	Children 2	Children 3	
7.4%		Civil marriage	Children 1	Children 2		
6.6%		Civil marriage	Children 1	Children 2	Children 3	
6.3%						
6.3%		Religious and civil marriage	Children 1	Children 2		
5.5%		Beginning of sexual activity	Children 1			
5.1%		Beginning of sexual activity	Cohabitation	Children 1	Children 2	
4.3%		Religious marriage	Religious and civil marriage	Children 1	Children 2	

Table 5. Most frequent family formation trajectories for women in the tolerant region  
Source: Author production with data from the 2017 Retrospective Demographic Survey.

9.7%	Single and without children					
6.7%		Civil marriage	Children 1	Children 2	Children 3	
6.7%		Religious and civil marriage	Children 1	Children 2	Children 3	
6.5%		Civil marriage	Children 1	Children 2		
6.1%		Religious and civil marriage	Children 1	Children 2		
4.6%		Beginning of sexual activity	Religious marriage	Children 1	Children 2	
4.6%		Cohabitation	Children 1	Children 2	Children 3	
4.4%		Cohabitation	Religious marriage	Children 1	Children 2	Children 3
4.2%		Beginning of sexual activity				
4.2%		Beginning of sexual activity	Cohabitation	Children 1	Children 2	

Finally, in the *Liberal region*, there is a higher declaration of sexual debut compared to other regions and more than 16% of women stayed single and without children.

Table 6. Most frequent family formation trajectories for women in the Liberal region  
Source: Author production with data from the 2017 Retrospective Demographic Survey.

8.5%	Single and without children	Beginning of sexual activity				
8.0%						
8.0%		Beginning of sexual activity	Religious marriage	Children 1	Children 2	
7.0%		Beginning of sexual activity	Religious and civil marriage	Children 1	Children 2	Children 3
6.5%		Beginning of sexual activity	Children 1			
6.5%		Religious and civil marriage	Children 1	Children 2		
5.5%		Religious and civil marriage	Children 1	Children 2	Children 3	

#### 4. REGIONAL DIFFERENCES IN REPRODUCTIVE INDICATORS

The graphs and tables below show that according to various fertility indicators there are significant differences between regions and, in that sense, that the regionalisation obtained is relevant to explain gaps in the territory associated with aspects of social, cultural or institutional nature.

It is important to note that, for sequence and cluster analysis, a series of technical and conceptual decisions must be made in the process and that, therefore, there may not be one but several optimal solutions (Ritschard & Studer, 2018). In this case, the solution chosen among the multiple alternatives responds to preliminary knowledge about the subject and the states in the country.

Table 7a. Family formation and reproductive indicators (calendar) for women aged 40 and over, by region

Region	Median age at 1st union	Median age at 1st child	Mean age at 1st child	Years between 1st and 2nd child	Years between 2nd and 3rd child
Very conservative	20	21	22	4	5
Conservative	20	22	23	3	5
High fertility	19	20	21	3	4
Mixed	20	21	22	4	6
Tolerant	20	21	22	4	6
Liberal	21	22	24	4	7

Table 7b. Reproductive indicators (intensity) for women aged 40 and over, by region  
Source: Author production with data from the 2017 Retrospective Demographic Survey.

Region	Proportion of women without children	Proportion of women with one only child
Very conservative	0.07	0.10
Conservative	0.09	0.07
High fertility	0.07	0.08
Mixed	0.06	0.11
Tolerant	0.06	0.10
Liberal	0.09	0.13



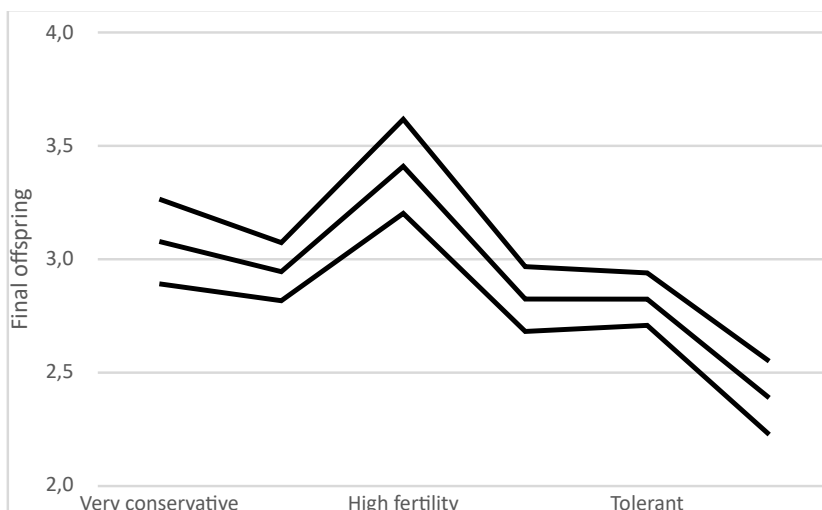


Figure 10. Final offspring of women aged 40 and over, by region  
Source: Author production with data from the 2017 Retrospective Demographic Survey.

Figure 11. Probabilities of family enlargement, by region  
Source: Author production with data from the 2017 Retrospective Demographic Survey.

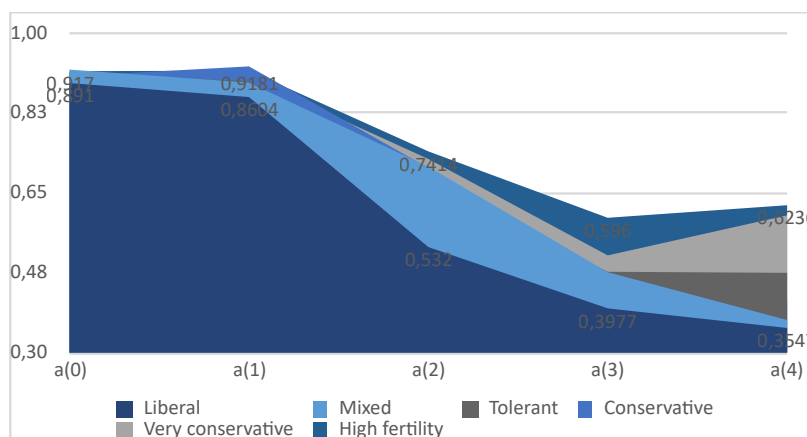


Table 8. Probability of having a third child according to the sex of the first two, by region  
Source: Author production with data from the 2017 Retrospective Demographic Survey.

Region	2 girls	2 boys	1 of each
Very conservative	0.72	0.77	0.71
Conservative	0.73	0.73	0.68
High fertility	0.77	0.75	0.73
Mixed	0.75	0.66	0.71
Tolerant	0.69	0.71	0.64
Liberal	0.53	0.54	0.53

REFERENCES

Coubès M. S., 2016, "Introducción", in M.-L. Coubès, P. Solís and M. E. Zavala (Eds), *Generaciones, cursos de vida y desigualdad social en México*, México, COLMEX-COLEF.  
 INEGI, 2017, *EDER*, México [online: [www.inegi.org.mx/programas/eder/2017/](http://www.inegi.org.mx/programas/eder/2017/)].  
 Páez O., Zavala M. E., 2016, "Tendencias y determinantes de la fecundidad en México: las desigualdades sociales", in M.-L. Coubès, P. Solís and M. E. Zavala (eds), *Generaciones, cursos de vida y desigualdad social en México*, México, COLMEX-COLEF, p. 45-76.

Ritschard G., Studer M., 2018, *Sequence Analysis and Related Approaches: Innovative Methods and Applications*, Berlin, Springer Open.

Zavala de Cosío M. E., 2005, "Las tendencias de la fecundidad en los tres grupos de generaciones urbanas y rurales según el sexo", in M.-L. Coubès (eds), *Cambio demográfico y social en el México del siglo XX. Una perspectiva de historias de vida*, México, EGAP ITESM-COLEF-PORRÚA, p. 97-119.

Zavala M. E., 2020, "La diversidad social de la fecundidad en México", in S. Giorguli (ed.), *Dinámica demográfica de México en el siglo XXI*, México, COLMEX, p. 283-324.

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