The effect of union dissolution on the fertility of women in Montevideo, Uruguay

Preliminary version.
Comments and suggestions are welcome.

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Abstract

In Uruguay, since the mid-1980s, transformations in the formation and the dissolution of conjugal unions have led to unions that are more flexible in their structure and less stable than they used to be. Alongside, fertility has been decreasing since the end of the 1990s, hovering around values close to those of population replacement since 2004. This research focuses on the effect of union dissolution on the fertility of Uruguayan women. We focus on cohort cumulative fertility and total fertility rate. We use data from a retrospective survey and a three-pronged strategy: first, we decompose the cohort ASFRs and TFR according to each step of the conjugal history; second, we estimate the effect of being into each of these steps on the hazard of giving birth to the next child; third, we use these estimates to predict and compare the incomplete fertility of women who remained in their first union, that of women who ended their first union and, in a counterfactual fashion, that of women who ended their union if they had not. Results show that union instability does reduce fertility, but that the reduction was larger in the older cohorts than it is in the youngest one. This difference is a consequence of women from the younger cohort ending their first union more often and at an earlier age than women from the older cohorts.

Keywords: 1. Union dissolution; 2. Fertility contribution, 3. Fertility after dissolution; 4. Conjugal history; 6. Montevideo (Uruguay).

1. Introduction

In Uruguay, since the mid-1980s, a series of transformations in the formation and the dissolution of conjugal unions have led to a pattern in which unions are more flexible and less stable than they used to be. Previous studies point to substantial changes in three features: the timing of the first union, the type of union, and the intensity of union dissolution (Cabella 1998; Cabella 2009; Cabella 2007; Fernández Soto 2010; Paredes 2003; Cabella and Fernández Soto 2017). Among the main changes is the 'boom' of cohabitation (Esteve and Lesthaeghe 2016; Esteve, Lesthaeghe and López-Gay 2012; Lesthaeghe 1991; Binstock and Cabella 2011) that delays or replace marriage and the steady increase in separations and divorces (García and Rojas 2002; Quilodrán 2008; Cerrutti and Binstock 2009; Cabella 1998; Cabella 2009; Cabella 2007; Fernández Soto 2010). Taking cohabitation and marriage as a whole, the age at the formation of the first union increased slightly. The slight increase is due to differences between educational levels: low-educated women enter their first union as early as older cohorts did, while more educated women now enter theirs later (Fernández Soto 2010). Fertility has been decreasing since the end of the 1990s, hovering around values close to those of population replacement since 2004 and several studies show that one of the outstanding features of fertility in Uruguay is the heterogeneity of its behavior within the population, especially the difference across educational levels (Varela, Pollero, and Fostik 2008; Pellegrino 2010; Nathan 2013, 2015a, 2015b; Varela et al. 2014; Nathan, Pardo, and Cabella 2016).

The objective of this paper is to estimate the contribution of women's conjugal history to the cohort cumulative fertility, to the total fertility rate and to incomplete fertility, focusing on the effect of the dissolution of the first union on the hazard of having the next child according to birth cohort and educational level.

2. Background

2.1 Dissolution and fertility

Forming a union and having children are events that are usually interrelated, but, in a context of high levels of union dissolutions, the effects of each one on the other are not easy to disentangle (Leone and Hinde 2007; Guzzo 2014). In theory, ending a union may decrease or as well increase a woman's fertility. Without a spouse or a partner, a woman is less exposed to becoming pregnant. However, having lost the possibility to have a child while not having a spouse or a partner, she may try to catch this 'lost time' as soon as she enters a new union. She might even have a child she would not have had in the previous one. Or she might enter a new union because she wants another child. Over the last decades, research has moved from the simplest to more nuanced views of the relationship between dissolution and fertility (Leone and Hinde 2007).

Demography has first taken up the notion that conjugal dissolutions must decrease fertility because they reduce the time of exposure to pregnancy (Davis and Blake 1956; Bongaarts 1987). The increasing occurrence of separations during the 1970s in developed countries fostered a series of studies on the negative effect of separation on fertility (Lauriat 1969; Thornton 1978; Cohen and Sweet 1974). For instance, Lauriat (1969), using census data from the United States, showed that separation had a negative effect on the total fertility rate, mainly for women who did not remarry. The women who entered a second union achieved 79% of the fertility of those who did not put an end to their marriage. However, the author states that the effect varied according to race, cohorts, age at first union and time since the end of the first union. Using data from 1965–1975, Thornton (1978) compared the fertility of women who had ended their first union and that of women who had not and argued that marital conflicts and conjugal dissolutions had an impact on the reproductive behavior of

couples. His research showed that women who ended their first union 'lost' fertility in the years following the separation immediately and that this reduction was maintained until the end either of their reproductive years or the beginning of a new union. Cohen and Sweet (1974) studied the effect of dissolution and subsequent unions on fertility among US women aged between 25 and 54 years in 1965. They found that the fertility of women who divorced accumulated 0.6 fewer children than women who did not. Decomposing this difference, they found it was attributable to factors that increased or decreased fertility: divorced women had married earlier and had longer exposure, childlessness was higher among the divorcees. Overall, the difference came down to 0.1 children when they controlled for exposure time to marriage, first or subsequent.

However, the spread of separations and divorces in recent decades and their increasing social acceptance raised doubts about the relevance of this assertion (Leone and Hinde 2007; Thomson and Li 2002; Pasteeles and Mortelmans 2015; Cherlin 2017; Jansen, Wijckmans, and Bavel 2008; van Bavel, Jansen, and Wijckmans 2012; Cherlin 2016; Creighton et al. 2013). New empirical findings lead to consider alternative views. The increasing occurrence of dissolutions at young and reproductive ages increased the exposure time during later unions. Thus, it started to look as if children 'lost' to the dissolution of the first union could be "compensated" with children from later unions. Furthermore, the diffusion of consensual unions, the increasing number of later unions, and the growing social acceptance of both has diversified the context in which it is socially acceptable to have and to raise children, as well as the motivations to have them in later unions (Buber and Fürnkranz-Prskawetz, 2000; Thomson et al., 2002; Toulemon and Knudsen, 2006; Leone and Hinde, 2007; Beaujouan and Solaz, 2008; Persson and Tollebrant, 2013; Spijker, Simó and Solsona, 2012).

A new series of studies starting in the mid-2000s, on the relationship between union stability and fertility, showed that the relationship was not as simple as previously held. The common concern of these studies was to show whether children born into post-dissolution unions compensated the fertility 'lost' to time spent outside a union. Based on the evidence they provided, it was not possible to decide whether dissolution increased or decreased fertility nor was it possible to determine which one truly influenced the other. In some studies, on developed countries with high levels of gender equity in employment and income, the effect of instability on fertility seemed to be positive rather than negative (Creighton et al. 2013; Thomson et al. 2009; Rijken and Thomson 2011). Other studies still from developed countries found that conjugal dissolutions brought down the level of cumulative fertility. In Italy, for instance, the cumulative fertility of women who end their first union is 27% lower than that of women who don't end their first union (Meggiolaro and Ongaro 2010; Coppola and Di Cesare 2008). Still other studies such as those by Beaujouan and Solaz (2008) and by Spijker, Simó, and Solsona (2012) showed that dissolutions do not have much incidence on the level of fertility: The fertility of women who enter post-dissolution unions is similar to that of women who do not put an end to their first union. Finally, another group of studies showed that the negative or positive effect of dissolution on fertility depended on the age at which conjugal and reproductive events occur (van Bavel, Jansen, and Wijckmans 2012; Jansen, Wijckmans, and Bavel 2008).

2.2 Dissolution and Fertility in Latin America

Evidence on the effect of union dissolution on fertility in Latin America and the Caribbean is scarce. A few studies from the 1960s and 1970s showed that there is a positive relationship between dissolution and fertility in some populations (Ebanks, George, y Nobbe 1974; Downing y Yaukey 1979; Rosero Bixby 1978). For example, Ebanks et al. (1974) found a

positive correlation between the number of unions and the number of children born alive in Barbados. In their study on the effect of time 'lost' because of conjugal dissolutions on fertility in five Latin American cities, Downing and Yaukey (1979) showed that later unions could have a positive impact on completed fertility and that the desire to have children in a later union increased the hazard of having more children. However, this form of fertility recovery was not found in all populations; its presence depending on the level and control of fertility. For example, in Buenos Aires – which had the lowest fertility among the five cities – remarried women had fewer children than those who had only one union. Downing and Yaukey (1979) concluded that in such populations, the positive effect of dissolution in later unions is weaker and perhaps a consequence of the postponement of the first birth in the first union. They also found that the positive or negative effect of union dissolution on fertility varied according to women's level of education. 'Losing' time had a greater negative impact on completed fertility for more educated women than for less educated ones. Among low-educated women, cumulative fertility increases with the number of unions. Finally, Rosero Bixby (1978) found that in Latin America, for all age groups, on average, women who with more than one union had more children than those who never had a husband or a partner and more than those who had only one union. Nevertheless, when studying fertility cumulative fertility by conjugal status, he concluded that there is a 0.8 reduction due to time 'lost' between unions.

Recent evidence from the region is almost non-existent. One study in Brazil reported in Leone and Hinde (2007) and Leone (2002), showed that women who remarried or repartnered had more children than those who had only one union.

2.3 Fertility and Social Strata in Uruguay

As we wrote in the introduction, the main changes that altered the Uruguayan family life over the last decades – mainly the decrease of fertility, increase in divorces and separations, and the spread of cohabitation – occurred in all social strata. However, although fertility decreased in all social strata, the decrease did not unfold in the same way in all of them, and the resulting differences became an important structural feature of fertility.

In Uruguay, fertility decreased gradually throughout the 20th century. The rhythm of the decrease became steeper in recent decades, and rates have been below the population replacement level since 2004 (Pellegrino 2013, 2010): the period total fertility rate stood at 2.45 in 1996, whereas it now stands at 1.71. During the last inter-census period (1996–2011), fertility decreased throughout the whole country and in all socioeconomic strata (Varela et al. 2014). However, numerous studies showed that this decline unfolded differently across strata: the gaps in the intensity and timing of fertility between women from different educational levels increased as fertile rates went down (Varela, Pollero, and Fostik 2008; Varela et al. 2014; Pellegrino 2010; Nathan, Pardo, and Cabella 2016; Nathan 2013, 2015a, 2015b). Using census data, Nathan (2015b) even found that fertility rates increased among very young women from the 1974–1976, 1979–1981 and 1984–1986 birth cohorts. Such a finding suggests that women who have not completed secondary education have their first child younger than those who complete it – and might never complete it as a result –, entrenching the association between educational level and fertility.

A flurry of other studies also points in the same direction: the reproductive behavior of young cohorts is more polarized than that of old ones. Low-educated women have their first child younger than high-educated women do, and the difference in the age at first birth is increasing rather diminishing from one cohort to the next (Fostik 2014; Varela, Fostik, and

Fernández Soto 2012; Varela, Fostik, and Fernández Soto 2012; Videgain 2007; Cardozo and Iervolino 2009; Cabella 2009; Filardo 2010). The Uruguayan fertility curve is bimodal, the first peak is located around age 20 and the second one around age 30. The distributions of the conditional fertility rates of the first- and second-order births are asymmetric and bimodal as well (Nathan, Pardo, and Cabella 2016, Nathan 2015b). The increasing polarization of fertility behavior has become the most salient feature of Uruguayan fertility.

3. Objective

This study aims at estimating the effect of union dissolution on the fertility of Uruguayan women. To do so, we use a longitudinal approach, and we focus on the differences in cumulative fertility induced by the ending of the first union. Given that previous research showed that the effect of union dissolution on fertility varied according to educational levels and is likely to have changed from older cohorts to younger ones, we pay particular attention to these and estimate the effect of union dissolution on the fertility taking them into account.

4. Data and method

We use data on the fertility and conjugal history of 1,201 women aged between 25 and 57 from Montevideo and its metropolitan area. The data comes from a retrospective survey conducted in 2008, the Family Situations Survey (*Encuesta Sobre Situaciones Familiares y Desempeños Sociales*, ESF). This survey provides retrospective information that allows estimating fertility at different stages of conjugal history. We use the age and the steps of the conjugal history of the woman as time-varying covariates. The retrospective information enables us to estimate the fertility before the first union, during the first union, after the end of the first union, during the second union and so on until the period following the end of the

third union, between 20 and 49 years old. In this article, we focus on the difference between three steps of women's conjugal history: never been in a union, being in the first union and having ended the first union, grouping together in the third step all the spells of the conjugal history that occur after the end of the first union. This comparison allows us to estimate the impact of the dissolution of the first union on cumulative fertility and on completed fertility.

We use a three-pronged approach. First, we adapt to cohort data and to the three steps of the conjugal history we are interested in, the decomposition of period fertility rates introduced by Laplante and Fostik (2015). We estimate the contribution of each step to the age-specific fertility rates, and the contribution of each state to the cumulative fertility at age 30 and the cohort total fertility rate. The contribution of a step to the age-specific rates (hereafter CASFR) is the age-specific rates weighted by the proportion of women in this step at the corresponding age. The sum of the CASFRs gives the contribution of each step to the cohort TFR (hereafter CTFR). In Laplante and Fostik (2015), the sum of the CTFRs is the period TFR, and the CTFRs are an estimation of the fertility of a synthetic woman who moves from the first step to the third over her reproductive life. When based on cohort data, the CTFRs become estimates of contributions to the cohort TFR, and the CASFRs and CTFRs describe the fertility history of the average woman rather than of a synthetic one. We estimate the CASFRs and the CTFRs for all women and by birth cohort (1950–1959, 1960–1969 and 1970–1979).

Second, we use a survival Poisson regression model stratified by birth cohort and educational level to estimate the effect of each step of the conjugal history on the hazard of giving birth to the next child. We use the smoothed estimates of the ASFRs from the Poisson regression to predict the incomplete and completed fertility of women. Finally, we use a counterfactual approach to estimate what would have been the incomplete and completed

fertility of women who experienced a dissolution if they had remained in their first union. We do this by predicting the incomplete and completed fertility of women who ended their union using the ASFRs estimated with the Poisson regression for women who did not put an end to their first union for the portion of the biography of women who ended their union that comes after the end of their first union.

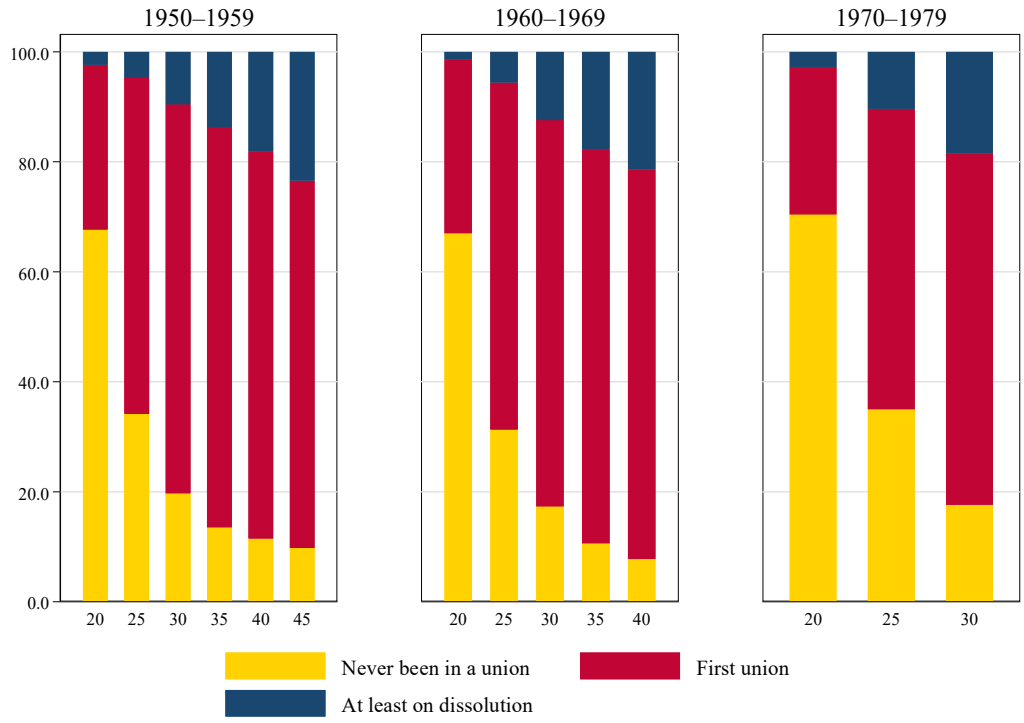
5. Results

5.1. The contribution of conjugal history to fertility

Figure 1 reports the proportion of women in each state of the conjugal history at different points of the life course by birth cohort. The proportion of women who ended their first union before they reached 30 grew from 9.5% in the 1950–1959 cohort to 12.4% in the 1960–1969 and raised again to 18.5% in the 1970–1979 cohort. In other words, this proportion is twice as high in the younger cohort as it is in the older one. This growth may be a consequence of an increase in the occurrence of separations and divorces, of their occurring sooner or of both.

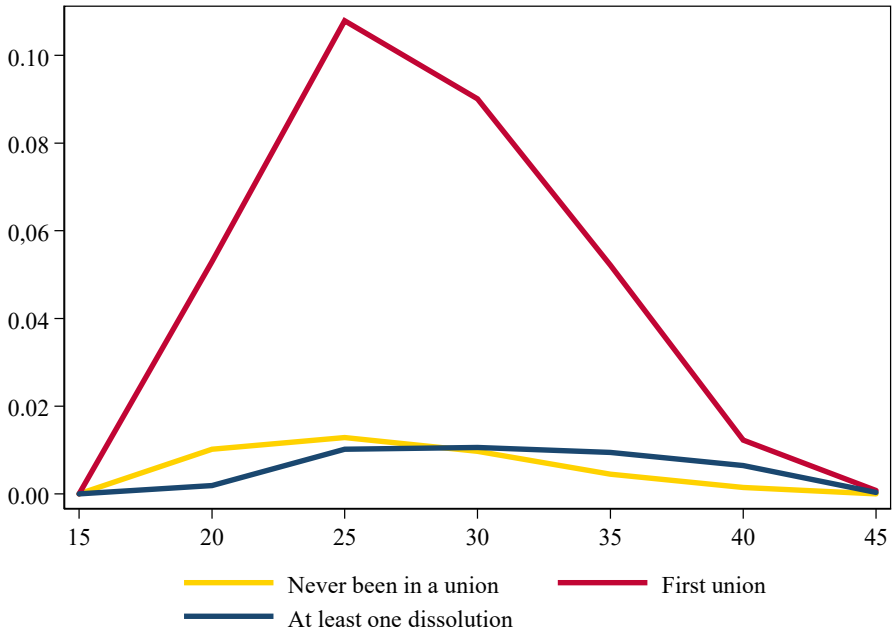
Figure 2 reports the contribution of each step of the conjugal history to age-specific rates for all cohorts. It shows that births occurring in the first union account for the most significant portion of fertility all over the reproductive years. The contribution of births occurring before the first union and that of births occurring after the end of the first union are relatively low. From age 30 onwards, the contribution of births occurring after the end of the first union is higher than that of births occurring before the beginning of the first union.

Figure 1. Proportion of women in each step of the conjugal history by age according to birth cohort. Women aged 20-49, Montevideo (Uruguay), 2008



N coh. 1970–1979=302; *N* coh. 1960–1969=365; *N* coh. 1950–1959=359.
Source: Family Situations Survey 2008. Estimates are reported in the appendix (Table 6).

Figure 2. Contribution of each step of the conjugal history to age specific rates. Women aged 20-49, Montevideo (Uruguay), 2008



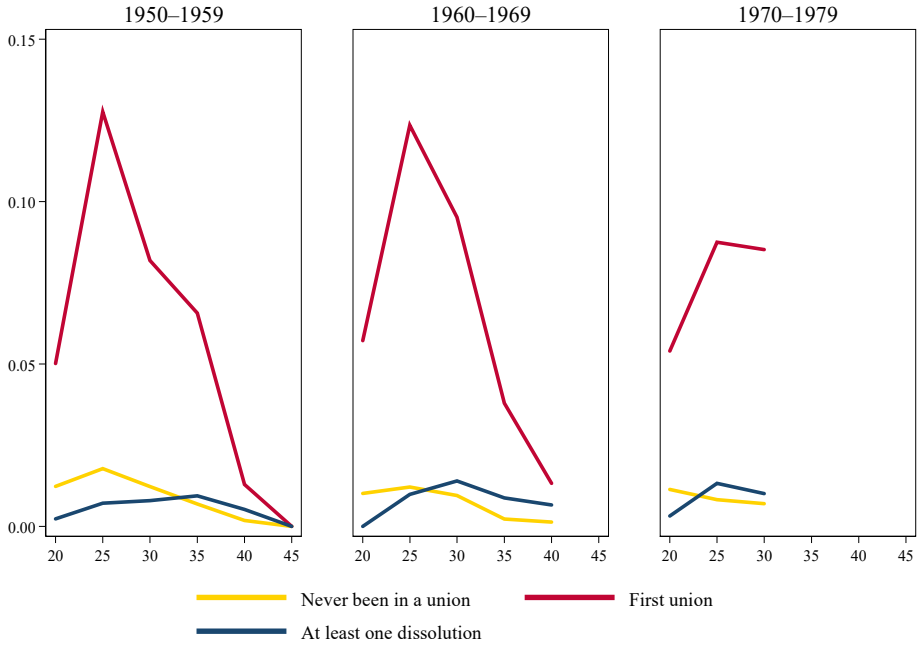
N=1026.
Source: Family Situations Survey 2008. Estimates are reported in the appendix (Table 9).

Figure 3 reports the contributions of each step of the conjugal history to age-specific rates by age group and birth cohort. The first union has the highest contribution at all ages and in all cohorts. However, in the youngest cohort, the contribution of births occurring after the first union is slightly higher, particularly from aged 20 onwards. That said, as both the ASFRs and the contributions of the first union are lower in this cohort, the relative contribution of births occurring after the first union is higher in this cohort than in older ones. This suggests that unions end earlier or in greater number in the youngest cohort than in the older ones.

Figure 4 depicts the cumulative fertility by steps of the conjugal history, that is the number of children a woman would have had if she had spent all her reproductive years in the same step. Although these figures are purely theoretical, they are instructive. A woman who would have spent all her reproductive years after having ended her first union would have had 1.12 fewer children than those who would have spent all her time in her first union.

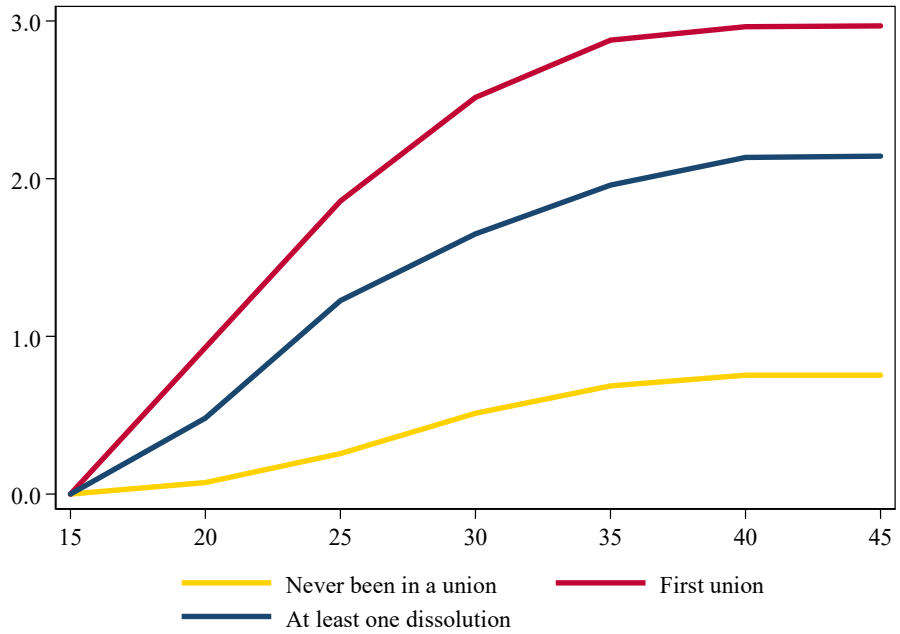
Figure 5 depicts cumulative fertility by steps of the conjugal history according to birth cohort. Because they start at age 20, the curves make more obvious that in all three cohorts, before age 20, fertility occurs almost completely within marriage or cohabitation. Few births occur to unpartnered very young women, and thus, births at an early age occur almost completely within unions that started early. Unlike in the oldest and youngest cohorts, in the second one, the cumulative fertility is close to zero at age 20. This suggests that the end of the first union occurred before age 20 more often in the first and third cohort than in the second one.

Figure 3. Contribution of each step of the conjugal history to age-specific rates by age group and birth cohort. Women aged 20–49, Montevideo (Uruguay), 2008



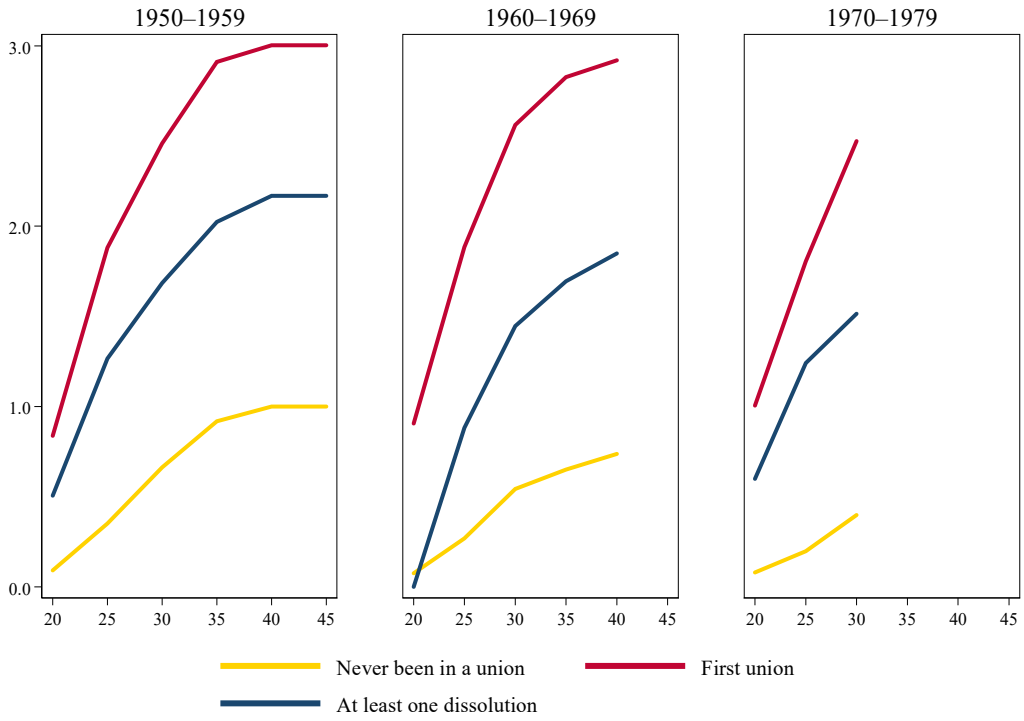
N coh.1970–1979=302; *N* coh. 1960–1969=365; N coh. 1950–1959=359.
Source: Family Situations Survey 2008. Estimates are reported in the appendix (Table 10).

Figure 4. Cumulative fertility by step of the conjugal history. Women aged 20–49, Montevideo (Uruguay), 2008



N=1026.
Source: Family Situations Survey 2008. Estimates are reported in the appendix (Table 13).

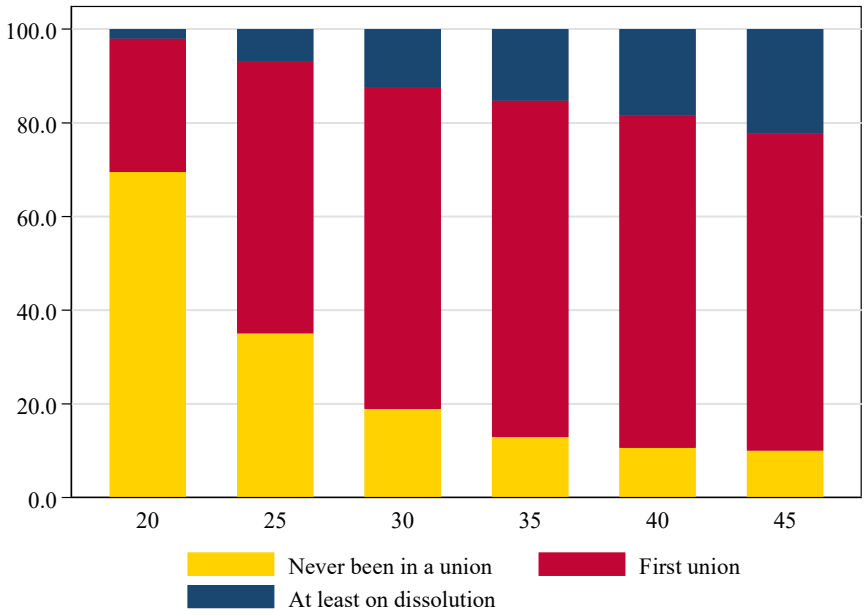
Figure 5. Cumulative fertility by steps of the conjugal history according to birth cohort. Women aged 20-49, Montevideo-Uruguay, 2008



N coh.1970–1979=302; *N* coh. 1960–1969=365; *N* coh. 1950–1959=359.
Source: Family Situations Survey 2008. Estimates are reported in the appendix (Table 14).

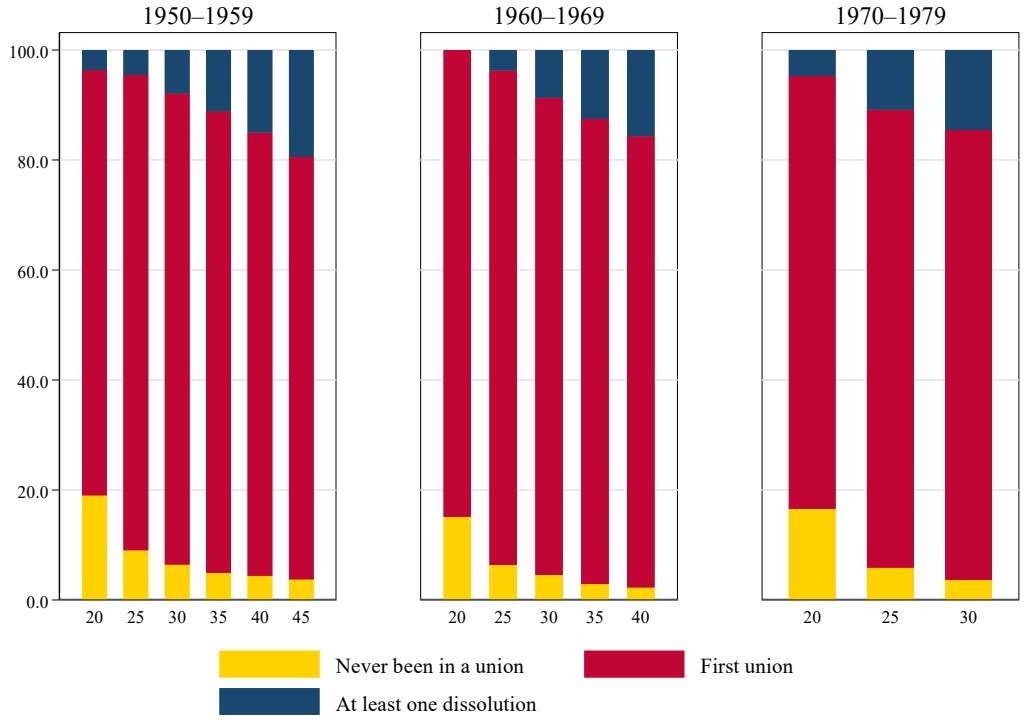
Finally, Figure 6 shows the contributions of each step of the conjugal history to cumulative fertility by age groups expressed as proportions and Figure 7 the same by birth cohort. The relative contribution to the fertility of having ended of the first union increases with age and does so in all cohorts. This contribution is the highest in the younger cohort, but higher in the older cohort than in the middle one. For instance, at age 30, it is about the same in the oldest and middle cohort, 8% and 9%, but 15% in the youngest one. Not surprisingly, it is almost null in the middle cohort before age 25. The contribution of the first union is always the highest, by far and large, but that of the time lived after the first union steadily increases.

Figure 6. Relative contribution of each step of the conjugal history to cohort cumulative fertility (Proportions). Women aged 20-49. Montevideo (Uruguay), 2008



N=1,026
Source: Family Situations Survey 2008. Estimates are reported in the appendix (Table 9).

Figure 7. Relative contribution of each step of the conjugal history to cumulative fertility according to birth cohort (Proportions). Women aged 20-49. Montevideo (Uruguay), 2008



N coh.1970–1979=302; *N* coh. 1960–1969=365; *N* coh. 1950–1959=359.
Source: Family Situations Survey 2008. Estimates are reported in the appendix in Table 10.

Table 1 summarizes the contributions of each step of the conjugal history to the cohort TFR and cumulative fertility at 30. When looking at the TFR for all cohorts, the largest share of the cohort TFR – 1.58 children or 80% – comes from the first union, while the remainder comes equally from spells of the conjugal history where women had not yet been in a union or had put an end to their first union. The picture is different when looking at cumulative fertility at 30. The proportion that comes from the first union is about the same as it is for all reproductive years – 85% –, but the contribution of the other two states are very different: only 5% from births occurring before the first union, but 10% from births occurring after it ended.

Table 1. TFR, contribution to TFR and contribution to TFR as proportions by steps of the conjugal history. Women aged 20–49, Montevideo (Uruguay), 2008

	Contributions	Before the first union	During the first union	After the first union	Total
All cohorts	To cohort TFR	0.19	1.58	0.19	1.97
	As a proportion	0.10	0.80	0.10	1.00
	To cumulative fertility at 30	0.17	1.26	0.12	1.54
	As a proportion	0.11	0.82	0.07	1.00
1970–1979	To cohort TFR	0.15	1.44	0.15	1.75
	As a proportion	0.09	0.83	0.09	1.00
	To cumulative fertility at 30	0.13	1.13	0.13	1.40
	As a proportion	0.10	0.81	0.10	1.00
1960–1969	To cohort TFR	0.18	1.64	0.20	2.01
	As a proportion	0.09	0.81	0.10	1.00
	To cumulative fertility at 30	0.16	1.38	0.12	1.66
	As a proportion	0.10	0.83	0.07	1.00
1950–1959	To cohort TFR	0.26	1.69	0.16	2.11
	As a proportion	0.12	0.80	0.08	1.00
	To cumulative fertility at 30	0.21	1.30	0.09	1.60
	As a proportion	0.13	0.81	0.05	1.00

N coh.1970–1979=302; *N* coh. 1960–1969=365; *N* coh. 1950–1959=359.
Source: Family Situations Survey 2008.

The largest differences between the cohorts are in the proportion of the cumulative fertility at 30 that comes from births occurring after the end of the first union. This proportion

is gradually increasing from 5% in the oldest cohort to 10% in the youngest one% in the youngest one. This suggests that the end of the first union occurs earlier in the youngest cohort than in the older ones and might signal that by the end of its reproductive period, the contribution of births occurring after the end of the first union to the TFR will be larger in the youngest cohort than in the older ones.

5.2 The effect of the dissolution of the first union on the risk of having the next child

We study the effect of dissolution on fertility by birth cohort and educational level first by estimating a Poisson regression of the hazard of having the next child. First, we use the estimates from this equation to predict the incomplete and completed fertility of women who remained in their first union of women who did not. Second, we use the coefficients associated with women who remained in their first union to predict the incomplete and completed fertility women who put an end to their first union would have had if they had remained in their first union, comparing these hypothetical values with the actual ones.

In our analyses, we model the hazard of having the next child as a function of age, educational level, cohort and conjugal history. The effect of age is modeled as a quadratic function whose parameters vary according to the combination of cohort and educational level. Thus, we estimate a separate fertility function – a smoothed series of age-specific fertility rates – for each educational level within each cohort and these functions are the baseline functions of a model stratified by educational levels and cohorts. This allows modeling explicitly the fertility schedule of each educational level as well as the delaying of the fertility schedule from the oldest to the youngest cohort. Age and the steps of the conjugal history are time-varying covariates.

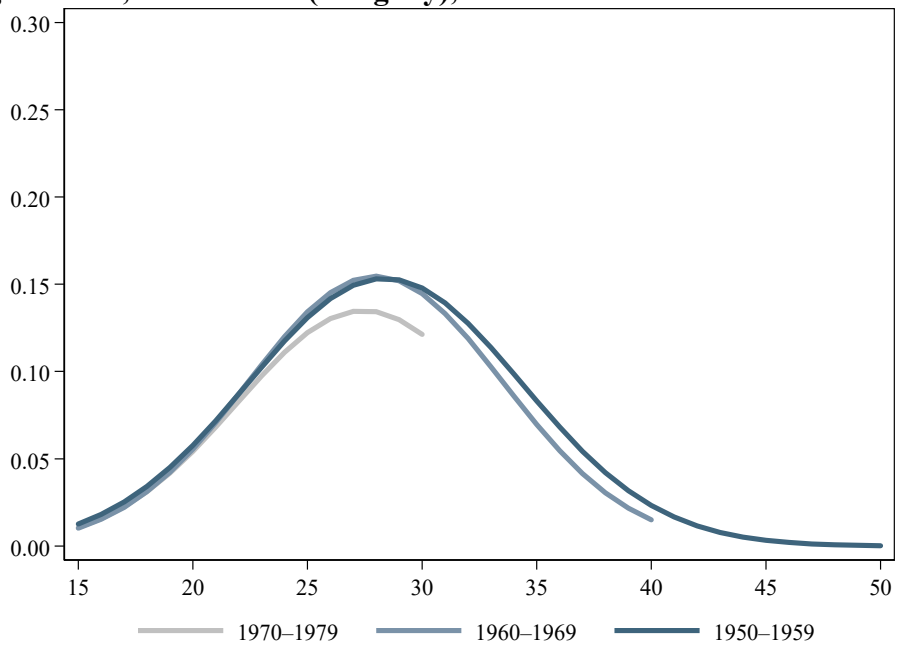
Figure 8 reports the smoothed fertility curves of each of the three cohorts without controlling or modeling the effects of other factors. The curves of the two older cohorts are very close; rates are somewhat lower from age 30 onwards in the middle cohort than in the oldest. The curve of the most recent cohort is different: its rates are close to those of the other cohorts up to about the mid-20s but are lower afterward. However, these curves hide stark differences between education levels.

The detailed results of our estimation of the hazard of having the next child as a function of age, educational level, cohort, and conjugal history are reported in Table 15 in the appendix. On average, ending the first union decreases fertility rates by 29%. Figure 9 shows the estimated fertility functions of being in the first union and of having dissolved the first union for the lowest and highest educational levels within each cohort using the estimates of Table 15. The most salient feature of the figure is the differences between the fertility calendars of the low and the high educated, and the differences in the way these calendars changed from the oldest to the youngest cohort. In all cohorts, the peak of the fertility function of the low-educated is higher than that of the high educated. In all cohorts, the peak of the fertility function of the low-educated is located before age 25, while the peak of the fertility function of the high educated is located after age 25 in the oldest cohort, is around 30 in the middle cohort and is likely to be around 35 in the youngest cohort. This pattern is the graphic expression of the strong social polarization of the reproductive behavior in the Uruguayan society.

Figure 10 reports, first, the estimated average number of children predicted for women who did not end their first union and women who did end their first union and, second, the result of our counterfactual exercise, namely the estimated average number of children predicted for women who ended their first union based on the estimates of women who did

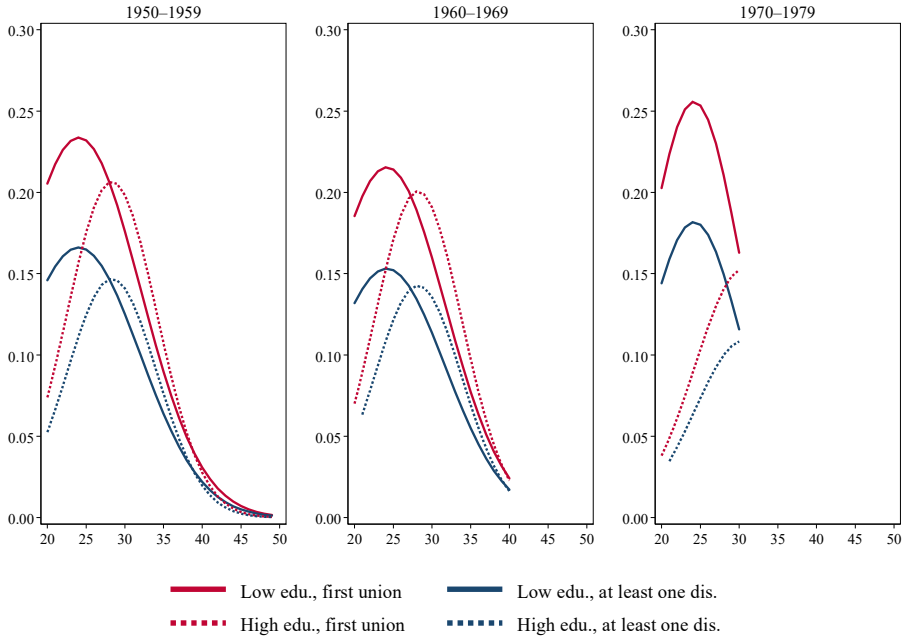
not end their first union. To keep things tractable, we contrast the highest and lowest educational levels within each cohort and we exclude women who never lived in a conjugal union. Women are classified according to the step of the conjugal history in which they were at the time of the survey, namely still in their first union or having ended it. Each dotted line represents the predicted incomplete fertility of a single woman. In our equation, each group defined by combining cohort and educational level has its own set of age-specific fertility rates. Thus, the dispersion of the curves within each group comes solely from each woman's unique sequence of spells in each the three steps of the conjugal history, each spell having its own timing and duration. In most groups, the predicted incomplete fertility of women who ended their first union is lower than that of women who did not and the counterfactual predicted incomplete fertility of the former is still lower than that of the latter.

Figure 8. Age-specific fertility rates by birth cohort. Poisson regression estimates. Women aged 20–49, Montevideo (Uruguay), 2008



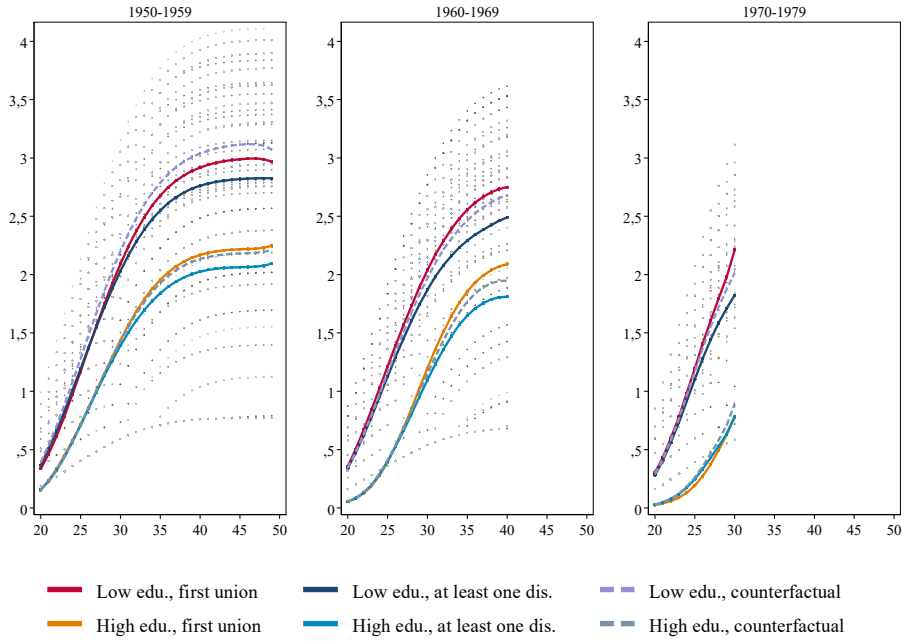
N coh.1970–1979=302; *N* coh. 1960–1969=365; *N* coh. 1950–1959=359.
Source: Family Situations Survey 2008.

Figure 9. Age-specific fertility rates estimates by step of the conjugal history for selected education level according to birth cohort. Poisson regression estimates. Women aged 20–49, Montevideo (Uruguay), 2008



N coh.1970–1979=302; *N* coh. 1960–1969=365; *N* coh. 1950–1959=359.
Source: Family Situations Survey 2008.

Figure 10. Estimated average number of children predicted and counterfactual by steps of the conjugal history for selected educational levels according to birth cohort. Poisson regression estimates. Women aged 20–49, Montevideo (Uruguay), 2008



N coh.1970–1979=302; *N* coh. 1961–1969=365; *N* coh. 1950–1959=359.
Source: Family Situations Survey 2008.

In the oldest cohort, the predicted incomplete fertility of low-educated women still in their first union is higher than predicted incomplete fertility of women who ended their first union. However, the counterfactual predicted incomplete fertility of women who ended their first union is higher than the actual predicted incomplete fertility of women still in their first union. Thus, in this group, post-dissolution fertility is relatively high, but the loss due to dissolution is not compensated by post-dissolution fertility despite its size.

The high-educated women of the same cohort are an example of the most common pattern. Their predicted incomplete fertility of women still in their first union is higher than that of women who ended their first union and the counterfactual predicted incomplete fertility of those who ended their first union is slightly lower than the actual predicted incomplete fertility of those still in their first union. Things are not definitive in the youngest cohort because its members are not observed after age 30. That said, among the high-educated, the three curves are almost impossible to distinguish.

6. Discussion and conclusion

In Uruguay as in many other countries, union dissolution has become more common over the last decades and has been occurring more often over the life course. Putting an end to the first union has also been occurring earlier. Thus, dissolving the first union is more common in our youngest cohort, born between 1970 and 1979, than in older cohorts, and the proportion of unions ended before age 30 is higher in this cohort than in older ones, and is actually twice the proportion of the oldest cohort born between 1950 and 1959.Overall, the time spent over the life course after the end of the first union has been increasing from our oldest cohort to our youngest.

Obviously, by itself, ending the first union decreases the exposure to the hazard of having a child and thus, should decrease completed fertility. However, more time spent after the end of the first union means more exposure to repartnering and eventually to childbearing in a later union. Whether or not union dissolutions have an overall decreasing effect on completed fertility becomes an empirical question that translates as whether or not the time spent in a later union and of the fertility rates within later unions combine in a way that 'compensates' for the shortened duration of the first union.

In order to answer this question, we decomposed the cohort age-specific fertility rates and total fertility rate according to each step of the conjugal history, we estimated the effect of being into each of these steps on the hazard of giving birth to the next child, and we used these estimates to predict and compare the incomplete fertility of women who remained in their first union, that of women who ended their first union and, in a counterfactual fashion, that of women who ended their union if they had not.

Not unsurprisingly, the age-specific fertility rates are much higher during the first union than either before its beginning or after its end, and the contribution of the first union to the cohort total fertility rate is higher than those of the previous and following steps of the conjugal history. A hypothetical woman who would spend all her reproductive years in the last step of the conjugal history would have, on average, 1.12 children less than one who would have spent her reproductive years in her first union. That said, there are differences between the cohorts, as the ASFRs decrease from the oldest to the youngest. As expected, the proportion of women who reach the step of having ended their first union at a given age increases from the oldest to the youngest cohort, although this increase mainly occurs between the 1960–1969 and the 1970–1979 cohorts. This increase is noticeable even if the women of the youngest cohort are not observed later than age 30. On average, women from

this cohort end their first union at an earlier age and thus spend more time at risk of repartnering and having a child in a later union. Given this, the relative contribution of the last step of the conjugal history to cumulative fertility is higher in the youngest cohort than in the older ones.

We modeled our estimation of the effect of each step of the conjugal history on the hazard of having the next child with a special attention for the social polarization of the fertility behavior as it is known to exist in Uruguay: we estimated the fertility functions of each step of the conjugal history by educational level and cohort. The resulting curves show the striking differences between the fertility calendars of the low-and the high-educated, and the differences in the way these calendars changed from the oldest to the youngest cohort.

The model allows predicting each woman's incomplete and completed fertility from the rates, from the age at which she entered into each step of the conjugal history and from the time she spent in it. Averaging the resulting curves within each educational level and each cohort shows that in most cases, dissolving the first union reduces incomplete and completed fertility, the largest effect occurring among the low-educated women from the oldest cohort and the lowest one among the high-educated women of the youngest cohort. Using the same estimates to predict the incomplete and completed fertility of the women who ended their first union under the hypothesis that they would not have done so provide similar qualitative results, with the additional finding that among the high-educated women of the youngest cohort, the differences between the incomplete fertility of the women who remain in their first union, that who end it and the curve resulting from counterfactual prediction as so small as to conclude that at least until age 30, the complete fertility of these women seems insensitive to union instability.

The overall conclusions are that union instability does reduce fertility, but that the reduction was larger in the older cohorts than it is in the youngest one and could be almost null among the high-educated women of the youngest cohort. The difference in the effect of union instability is a consequence of women from the younger cohort ending their first union more often and at an earlier age than women from the older cohorts, thus spending less time in the first union but more in later unions.

This study has limits and the most important ones come from the limited size and the structure of the sample, and from the strongly polarized fertility behavior of Uruguayan women. The size of the sample 1,201. It comprises women from three different birth cohorts grouped into three different educational levels. Over their life course, women may move across the states of a state space of conjugal history that is more complex than the one we limited ourselves to – never having been in a union, being in the first union, having ended the first union, being in the second union and so forth – and may move from one state of the birth history to the next – never having had a child, having had one child, having had two children and so forth. With a sample of 1,201 women, there was no way to desegregate the decomposition of cumulative fertility and the total fertility rate according to so many states within cohort and educational level. It was not realistic either to estimate smoothed fertility curves according to so many states within cohort and educational level using Poisson regression. Given that the differences between the intensity calendar of fertility within cohort and within educational level is the dominant feature of Uruguayan fertility and given that the differences in the calendar are inherently non-proportional, we chose to invest most of the statistical power of the sample in the modeling of these important non-proportional differences. As a consequence, we had to summarize the conjugal history into three steps and estimate the differences in the effects of these steps as proportional. We would have been

more than happy to have access to a larger sample, but such a sample does not exist and it not likely to exist in any foreseeable future.

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Appendix

Table 2. Absolute and relative distribution of the sample (unweighted) according to steps of the conjugal history at the time of survey. Women aged 25–67. Montevideo (Uruguay), 2008

	Frequency	Proportions
Before the first union	1,229	0.44
During the first union	1,070	0.38
After the first union	493	0.18
Total	2,792	1.00

Based on episodes.
Source: Family Situations Survey 2008.

Table 3. Distribution of the sample (unweighted) by birth cohort and educational level. Women aged 20–49. Montevideo (Uruguay), 2008

	1950–1959	1960–1969	1970–1979	Total
Low	87	108	109	304
Medium	114	97	96	307
High	158	160	97	415
Total	359	365	302	1026

Source: Family Situations Survey 2008.

Table 4. Relative distribution of the sample by birth cohort and educational level. Women aged 20–49. Montevideo (Uruguay), 2008

	1950–1959	1960–1969	1970–1979	Total
Low	0.32	0.35	0.36	0.35
Medium	0.31	0.25	0.30	0.29
High	0.37	0.40	0.34	0.37
Total	1.00	1.00	1.00	1.00

Weighted estimates. Source: Family Situations Survey 2008.

Table 5. Steps of the conjugal history at the time of the survey by age group. Proportions. Women aged 20–49. Montevideo (Uruguay), 2008

Age group	Before the first union	During the first union	After the first union
15–19	0.97	0.03	0.00
20–24	0.70	0.29	0.02
25–29	0.35	0.58	0.07
30–34	0.19	0.69	0.13
35–39	0.13	0.72	0.15
40–44	0.11	0.71	0.18
45–49	0.10	0.68	0.22

Weighted estimates. Source: Family Situations Survey 2008.

Table 6. Steps of the conjugal history at the time of the survey by age group and birth cohort. Proportions. Women aged 20–49. Montevideo (Uruguay), 2008

	1950–1959			1960–1969			1970–1979		
Age	**Before**	**During**	**After**	**Before**	**During**	**After**	**Before**	**During**	**After**
15–19	0.98	0.02	0.00	0.97	0.02	0.01	0.97	0.03	0.00
20–24	0.68	0.30	0.02	0.67	0.32	0.01	0.70	0.27	0.03
25–29	0.34	0.61	0.05	0.31	0.63	0.06	0.35	0.55	0.10
30–34	0.20	0.71	0.10	0.17	0.70	0.12	0.18	0.64	0.19
35–39	0.14	0.73	0.14	0.11	0.72	0.18	--	--	--
40–44	0.11	0.70	0.18	--	--	--	--	--	--
45–49	0.10	0.67	0.23	--	--	--	--	--	--

Weighted estimates. Source: Family Situations Survey 2008.

Table 7. Age-specific fertility rates by step of the conjugal history. Women aged 20–49. Montevideo (Uruguay), 2008

Age group	Never been in union	First union	At least one dissolution
20–24	0.08	0.93	0.48
25–29	0.19	0.93	0.75
30–34	0.26	0.66	0.42
35–39	0.18	0.37	0.31
40–44	0.07	0.09	0.18
45–49	0.00	0.01	0.01

Weighted estimates. Source: Family Situations Survey 2008.

Table 8. Age-specific fertility rates by step of the conjugal history and birth cohort. Women aged 20–49. Montevideo (Uruguay), 2008

	1950–1959			1960–1969			1970–1979		
Age	**Before**	**During**	**After**	**Before**	**During**	**After**	**Before**	**During**	**After**
20–24	0.02	0.17	0.10	0.02	0.18	0.00	0.02	0.20	0.12
25–29	0.05	0.21	0.15	0.04	0.20	0.18	0.02	0.16	0.13
30–34	0.06	0.12	0.08	0.05	0.14	0.11	0.04	0.13	0.05
35–39	0.05	0.09	0.07	0.02	0.05	0.05	--	--	--
40–44	0.02	0.02	0.03	--	--	--	--	--	--
45–49	0.00	0.00	0.00	--	--	--	--	--	--

Weighted estimates. Source: Family Situations Survey 2008.

Table 9. Contribution of each step of the conjugal history to age-specific fertility rates. Women aged 20–49. Montevideo (Uruguay), 2008

Age	Before the first union	During the first union	After the first union
20–24	0.01	0.05	0.01
25–29	0.01	0.11	0.01
30–34	0.01	0.09	0.01
35–39	0.01	0.05	0.01
40–44	0.01	0.01	0.01
45–49	0.00	0.01	0.00

Weighted estimates. Source: Family Situations Survey 2008.

Table 10. Contribution of each step of the conjugal history to cohort age-specific fertility rates. Women aged 20–49. Montevideo (Uruguay), 2008

Age	1950–1959			1960–1969			1970–1979		
	Before	During	After	Before	During	After	Before	During	After
20–24	0.06	0.25	0.01	0.05	0.29	0.00	0.06	0.27	0.02
25–29	0.09	0.64	0.04	0.06	0.62	0.05	0.04	0.44	0.07
30–34	0.06	0.41	0.04	0.05	0.48	0.07	0.04	0.43	0.05
35–39	0.03	0.33	0.05	0.01	0.19	0.04	--	--	--
40–44	0.01	0.06	0.03	--	--	--	--	--	--
45–49	0.00	0.00	0.00	--	--	--	--	--	--

Weighted estimates. Source: Family Situations Survey 2008.

Table 11. Age-specific fertility rates by steps of the conjugal history. All cohorts and all educational levels. Women aged 20–49. Montevideo (Uruguay), 2008

Age	Before the first union	During the first union	After the first union
20–24	0.05	0.27	0.01
25–29	0.07	0.54	0.05
30–34	0.05	0.45	0.06
35–39	0.02	0.26	0.05
40–44	0.01	0.06	0.03
45–49	0.00	0.01	0.00

Weighted estimates. Source: Family Situations Survey 2008

Table 12. Contribution of each step of the conjugal history to age-specific fertility rates by birth cohort. Women aged 20-49. Montevideo (Uruguay), 2008

Age	1950–1959			1960–1969			1970–1979		
	Before	During	After	Before	During	After	Before	During	After
20–24	0.06	0.25	0.01	0.05	0.29	0.00	0.06	0.27	0.02
25–29	0.09	0.64	0.04	0.06	0.62	0.05	0.04	0.44	0.07
30–34	0.06	0.41	0.04	0.05	0.48	0.07	0.04	0.43	0.05
35–39	0.03	0.33	0.05	0.01	0.19	0.04	--	--	--
40–44	0.01	0.06	0.03	--	--	--	--	--	--
45–49	0.00	0.00	0.00	--	--	--	--	--	--
Total	0.26	1.69	0.16	0.18	1.64	0.20	0.13	1.13	0.13

Weighted estimates. Source: Family Situations Survey 2008.

Table 13. Cumulative fertility by steps of the conjugal history. Women aged 20-49. Montevideo (Uruguay), 2008

Age	Before the first union	During the first union	After the first union
20–24	0.07	0.93	0.48
25–29	0.26	1.86	1.23
30–34	0.51	2.51	1.65
35–39	0.69	2.88	1.96
40–44	0.75	2.96	2.13
45–49	0.75	2.97	2.14

Weighted estimates. Source: Family Situations Survey 2008.

Table 14. Cumulative fertility by steps of the conjugal history and birth cohort. Women aged 20-49. Montevideo (Uruguay), 2008

Age	1950–1959			1960–1969			1970–1979		
	Before	During	After	Before	During	After	Before	During	After
20–24	0.09	0.84	0.51	0.08	0.91	0.00	0.08	1.01	0.60
25–29	0.35	1.88	1.27	0.27	1.88	0.88	0.20	1.81	1.24
30–34	0.66	2.46	1.68	0.54	2.56	1.45	0.40	2.47	1.51
35–39	0.92	2.91	2.02	0.65	2.83	1.69	--	--	--
40–44	1.00	3.00	2.17	--	--	--	--	--	--
45–49	1.00	3.00	2.17	--	--	--	--	--	--

Weighted estimates. Source: Family Situations Survey 2008.

Table 15. Hazard of having the next child as a function of age, educational level, birth cohort and step of the conjugal history. Poisson regression. Coefficients reported in exponential form. Women aged 20-49. Montevideo (Uruguay), 2008

	Coefficients
Age and age^2 by cohort and step of the conjugal history	
(Cohort 1970–1979 and low level)	0.001***
(Cohort 1970–1979 and medium level)	0.001***
(Cohort 1970–1979 and high level)	0.001***
(Cohort 1960–1969 and low level)	0.001***
(Cohort 1960–1969 and medium level)	0.001***
(Cohort 1960–1969 and high level)	0.001***
(Cohort 1950–1959 and low level)	0.001***
(Cohort 1950–1959 and medium level)	0.001***
(Cohort 1950–1959 and high level)	0.001***
(Cohort 1970–1979 and low level) · Age	1.904***
(Cohort 1970–1979, medium level) · Age	1.783**
(Cohort 1970–1979, high level) · Age	2.115**
(Cohort 1960–1969, low level) · Age	1.523***
(Cohort 1960–1969, medium level) · Age	2.194***
(Cohort 1960–1969, high level) · Age	2.417***
(Cohort 1950–1959, low level) · Age	1.465***
(Cohort 1950–1959, medium level) · Age	1.728***
(Cohort 1950–1959, high level) · Age	2.312***
(Cohort 1970–1979, low level) · Age^2	0.987***
(Cohort 1970–1979, medium level) · Age^2	0.988***
(Cohort 1970–1979, high level) · Age^2	0.988*
(Cohort 1960–1969, low level) · Age^2	0.991***
(Cohort 1960–1969, medium level) · Age^2	0.985***
(Cohort 1960–1969, high level) · Age^2	0.984***
(Cohort 1950–1959, low level) · Age^2	0.992***
(Cohort 1950–1959, medium level) · Age^2	0.990***
(Cohort 1950–1959, high level) · Age^2	0.985***
Step of the conjugal history [Never in a union]	
First union	5.307***
At least one dissolution	3.772***

*$p< 0.05$; **$p< 0.01$; ***$p< 0.001$. Reference category between brackets. Weighted estimates. Source: Family Situations Survey 2008.