Comparative Population Studies
Vol. 48 (2023): 307-338 (Date of release: 11.07.2023)

# Transitions to Second Birth and Birth Intervals in France and Spain: Time Squeeze or Social Norms?

**Marie-Caroline Compans, Eva Beaujouan, Cristina Suero**

**Abstract:** As first births are increasingly postponed across Europe, a strong two-child family norm persists. Past research has examined educational differentials in progressions to second birth, testing various hypotheses but overlooking normative aspects. Comparing fertility surveys from France and Spain, we explore whether late first-time mothers, who have fewer reproductive biological years left to conceive, accelerate the transition to a subsequent child (time squeeze effect). We also consider a normative dimension, i.e., whether women have their first child earlier or later than others in their educational and cohort groups. In both countries, among first-time mothers between 25 and 34 years of age, highly-educated women transitioned to second birth more frequently than less-educated women did. Within the same age group, highly-educated women in Spain had a second child more quickly after the firstborn than their less educated counterparts did, while there is no such difference in France. These results hold after controlling for cohort effects, but are only partly explained by a time squeeze effect. Different normative ages at first birth by education and birth cohort explain the educational gap in the likelihood of transitioning to second birth, but not the birth intervals in Spain. In sum, our analysis demonstrates a persistent educational gap in second births in this country that cannot be reduced to biological or normative effects. This suggests that a broad range of economic constraints play a role, such as unfavourable individual economic conditions and lower levels of institutional support for parenthood.

**Keywords:** Second births · Time squeeze · Fertility norms · Birth intervals · France · Spain

## 1 Introduction

Family formation has been delayed in all of Europe, but large variations in total fertility rates persist across countries (*Sobotka* 2017). These differences depend on how much people delay their first birth and how many children they ultimately have

Federal Institute for Population Research 2023

URL: www.comparativepopulationstudies.de
DOI: https://doi.org/10.12765/CPoS-2023-13
URN: urn:nbn:de:bib-cpos-2023-13en4

(*Beaujouan et al.* 2023; *Frejka* 2008). This has been studied in terms of completed fertility or by parity, with a growing interest in parity progression ratios (PPR) owing to the importance of higher-order births in explaining fertility levels (*Brzozowska et al.* 2022). In contexts where a two-child family norm is strong (*Sobotka/Beaujouan* 2014), countries' economic conditions, the friendliness of their institutions towards the family and their surrounding social norms are commonly evoked as factors for cross-country differences. In addition, once the first birth is postponed, people may experience an ensuing time squeeze and respond by accelerating further births (*Rendall et al.* 2020). Hence, as people have children later in life, questions about the timing of subsequent births also arise.

Educational differentials in the transition to second and third births have been identified as crucial factors in analyses of fertility levels (*Brzozowska et al.* 2022; *Klesment et al.* 2014; *Kreyenfeld* 2002; *Van Bavel/Różańska-Putek* 2010). At the individual level, scholars have been interested in mechanisms that can explain why, in most countries, highly-educated women more commonly transition to another birth when the first one is delayed. This line of research examines whether this phenomenon is explained by income (*Baizán* 2005), selection (*Billari/Borgoni* 2005) or partner effects (*Kreyenfeld* 2002). It has also been proposed that highly-educated women shorten the interval between the first and second child to limit their time out of the labour market (*Ekert-Jaffé et al.* 2002; *Köppen* 2006; *Ní Bhrolcháin* 1986), while others argue that they accelerate the second birth to avoid biological limits after delaying the first one (*Castro* 2015; *Köppen* 2006; *Kreyenfeld* 2002). Previous research also emphasises the role of normative aspects in explaining educational differences in family enlargement, although this remains less studied (*Hoem* 1996; *Klesment et al.* 2014; *Van Bavel/Nitsche* 2013; *Van Bavel/Różańska-Putek* 2010).

This paper examines the extent and pace with which women who entered motherhood at different ages transition to a second child in France and Spain. We do so by focusing on educational attainment and by taking into account changes across cohorts. We are particularly interested in individual mechanisms and therefore do not address the effect of population composition on countries' fertility levels, which has been studied elsewhere (*Brzozowska et al.* 2022; *Lazzari et al.* 2021; *Zeman et al.* 2018). We focus on two possible dimensions of age (*Rennes* 2019). The first is chronological age, i.e., the number of years that have elapsed since a person was born, which also indicates when it may become more difficult for women to conceive since fecundity decreases with age. The second dimension is normative. The life course is organised into different stages, and social expectations around when transitions should occur vary across social groups and over time. In particular, age at first birth follows very different patterns across educational and cohort groups (*Ní Bhrolcháin/Beaujouan* 2012; *Rendall et al.* 2005) and presumably reflects differences in the appropriate timing of childbearing to which people adhere. We define here a normative age based on the distribution of first-birth schedules by women's characteristics, and we distinguish between whether women had their first child very early, early, late, or very late compared to the other mothers in their educational and cohort group.

We first examine age through its chronological dimension by asking whether educational differentials in progressions to second birth are associated with shorter birth intervals at later ages (time squeeze), especially among higher-educated women who tend to postpone entry into motherhood. Then, we explore whether differences in age standards at first birth explain educational gaps in subsequent family behaviours, by country. Finally, we discuss alternative factors by examining whether higher educational degrees induce greater progressions to second birth and shorter birth intervals. This stems from an assumption according to which highly-educated women are better able to afford expenses related to a second birth and are motivated by return-to-work considerations.

## 2 Past research on second births in Europe

### 2.1 Postponement of first births and parity progression to second births

The relationship between age at motherhood and completed cohort fertility has received growing attention regarding the extent to which higher-order births are foregone after postponing the first child (*Philipov* 2017) because delaying entry into parenthood can lead to smaller families (*Kohler et al*. 2001; *Tomkinson* 2019). However, this can be offset if women catch up on the delayed entry into motherhood so that cohort completed fertility remains stable despite a rise in age at first birth. This phenomenon, called "fertility recuperation," is also reflected by the extent to which the decrease in cohort fertility rates at early ages is offset by the increase in fertility rates at later ages (*Ciganda/Todd* 2019; *Goldstein et al.* 2009). Evidence for recuperation has been found in some Nordic countries' cohorts born before 1970 (*Andersson et al.* 2009; *Frejka/Calot* 2001) and has been projected in France (*Toulemon et al.* 2008). Similar evidence has not been found in the United Kingdom (*Berrington et al.* 2015) or any Eastern European countries (*Castro* 2015). Furthermore, fertility recuperation can also be captured by observing fertility transitions at each parity (*Frejka* 2008: 201; *Frejka/Sardon* 2007; *Toulemon et al.* 2008). Research in some Western European contexts shows that the likelihood of transitioning to a second child declines from around the age of 25-30 at first birth (*Kreyenfeld* 2002; *Tomkinson* 2019). However, a thorough examination of parity progression to a second child (PPR2) at different ages and in different contexts is lacking, despite the ongoing tendency to postpone first births to late ages (*Beaujouan/Sobotka* 2019).

Educational differentials in the transition to subsequent births are also crucial in understanding fertility levels across time and space (*Brzozowska et al.* 2022; *Klesment et al.* 2014; *Kreyenfeld* 2002; *Van Bavel/Różańska-Putek* 2010). Delayed fertility is a general trend among all population groups, but it is particularly prevalent among highly-educated women. This group is also more likely to catch up on delayed first births when compared to their less educated peers, exhibiting higher or similar PPR2 (*Klesment et al.* 2014; *Köppen* 2006; *Kreyenfeld* 2002; *Van Bavel/*

*Różańska-Putek* 2010). To deepen our understanding of the patterns observed, we integrate the educational dimension into our study of progressions to second birth.

### 2.2 The selection of family-prone women into parenthood: preferences explaining educational differentials in PPR2

Selection is a primary explanation for why highly-educated mothers are more likely to further enlarge their families. The line of reasoning is that because childlessness rates increase with levels of education, highly-educated first-time mothers may be particularly family-oriented (*Kreyenfeld* 2002). After having one child, these women may be more likely to continue enlarging their families until the desired size is achieved. Such "family proneness" is rarely measurable and therefore deduced from models that show evidence for selection effects. This has been supported by previous work on West Germany (*Kreyenfeld* 2002), Italy (*Impicciatore/Zuanna* 2017) and Norway (*Kravdal* 2001), but not on Spain, Hungary and Sweden (*Bartus et al.* 2013; *Billari/Borgoni* 2005). The lack of evidence for such an effect in some countries can reflect the diffusion of family preferences towards two-child families among all female educational groups (*Heiland et al.* 2005; *Testa* 2014). Furthermore, because families are now relatively small, selection may particularly explain differences in third-birth rates (*Brzozowska et al.* 2022), as suggested for Austria (*Prskawetz/Zagaglia* 2005). Arguably, selection can also be related to factors other than "family proneness," such as health conditions or personality traits.

### 2.3 Running out of time after the postponement of the first birth?

Besides the probability of having a second child, the speed at which this happens is relevant to understanding patterns of family enlargement. An important question to be addressed is whether some of the women who delayed their first birth accelerate the second to avoid having only one child. So far, birth-interval trends have been poorly documented in low fertility countries (*Casterline/Odden* 2016). For instance, some Eastern European countries have witnessed a lengthening of birth intervals over time (*Rutstein* 2011), while in other countries, family policies have contributed to shortening intervals between the first and second birth (*Berg/Rotkirch* 2014; *Miranda* 2020; *Šťástná et al.* 2020). To complement the study of parity progression ratios, we study birth intervals – defined as the time between the first and the second birth among women who have had at least two children – by age at entering motherhood.

At the macro level, fertility recuperation has also been described as "the action of compensating for the fewer reproductive years with higher fertility once motherhood begins" (*Castro* 2015: 276). Therefore, the inter-birth interval may influence the number of children achieved. Likewise, at the individual level, this process has been described as a "time squeeze" (*Kreyenfeld* 2002). Female fertility starts declining around a woman's thirties and accelerates around age 35 (*Dunson et al.* 2002). Age-specific infertility is generally considered to be stable over time and across countries (*Menken* 1985; *Smarr et al*. 2017). Consequently, one could expect women who become mothers at age 30 or older to progress to second birth more quickly because they are more constrained by age to achieve their desired family size (*Rendall et al.* 2020), especially in contexts with a strong two-child family norm (*Sobotka/Beaujouan* 2014). This mechanism is also expected to apply to highly-educated women, who tend to postpone first motherhood. This "time squeeze" effect has, however, not been found in previous work on Hungary (*Bartus et al.* 2013), Germany (*Bremhorst et al.* 2016) and Denmark (*Gerster et al.* 2007). Conversely, it does hold for Italy, where highly-educated women have a second child more quickly than their lower-educated peers, especially among first-time mothers above age 30 (*Impicciatore/Zuanna* 2017). In sum, the timing of second births differs by educational attainment, but whether highly or lower-educated women enlarge their families more quickly depends on the context (*Matysiak/Vignoli* 2019). Therefore, a study of birth intervals by age at first birth and level of education in two very different contexts may provide insights into this relationship.

### 2.4 Differences in the "proper timing" of first births by education and birth cohort

Although biological factors influence fertility decisions, having a second child and having it more quickly after a late firstborn are not solely related to fecundity. Some scholars have shown the role that social rather than biological aspects play in fertility behaviours. For instance, in Sweden, school starts in late August and ends in June the following year, therefore women who graduated in one educational cohort are not all the same age. In this setting, *Skirbekk et al.* (2004) showed that mothers' fertility patterns followed those of their educational peers more closely than those of their birth cohort, confirming the importance of social age (*Skirbekk et al.* 2004). There is also evidence that social age norms, such as the common perception of what the ideal age at first birth is, are correlated with cross-national differences in the progression to second birth. Transitions to second birth are more frequent in normative contexts where perceptions of the "proper timing" of parenthood are at higher ages (*Van Bavel/Nitsche* 2013) or when first births occur in an age range close to what is seen as "normal" at the society level (*Van Bavel/Różańska-Putek* 2010).

At the individual level, it is also crucial to consider normative dimensions when analysing educational differentials in family enlargement, for instance by looking at a woman's age at first birth relative to the first birth schedule of mothers in her educational group (*Hoem* 1996; *Köppen* 2006). For instance, having a first birth at age 30 may have a different meaning from one group to another – presumably being perceived as "late" by lower-educated women and more "normal" by higher-educated women. As actual behaviours to some extent reflect age norms, the relative age at first birth may capture normative aspects. For example, the average perceived ideal age at first birth is higher in Spain than in France, as is the average age at first birth (*Liefbroer/Merz* 2009). In addition, as births are increasingly postponed, societal perceptions of the ideal age at first birth have also shifted towards later ages over time (*Seiz et al.* 2022; *Lazzari et al.* 2022). Hence, we investigate the role of norms in educational differences in second-birth behaviours by considering a woman's age at first birth relative to the prevailing first-birth schedule within her educational and cohort group.

### 2.5 Economic factors explaining the link between education and fertility: opportunity costs, income, and partner characteristics

Microeconomics also provides interpretations for educational differences in second births. While high opportunity costs theoretically explain first-birth postponement, highly-educated women are also likely to earn more – a fact that may explain why they are more likely to have a second child after the postponement of motherhood. As regards the timing of second births, shorter intervals after the first birth can be related to return-to-work motivations to limit time spent outside the labour market (*Ekert-Jaffé et al.* 2002; *Köppen* 2006; *Ní Bhrolcháin* 1986). Context may also reinforce educational differences in second-birth behaviours. Patterns of recuperation related to completed fertility have been found for both higher- and lower-educated women in the Nordic countries (*Andersson et al*. 2009), while differentials in second-birth schedules and progressions are more pronounced in Britain (*Berrington et al.* 2015). In Western Europe, higher-educated women end up having as many children as the medium-educated group despite delaying entry into motherhood, but still fewer than their lowest-educated counterparts (*Klesment et al.* 2014). These cross-national variations in educational gap magnitude are often explained by different institutional contexts which can ease the work and family life balance, such as the availability of childcare services and family policies (*Klesment et al.* 2014; *Van Bavel/Różańska-Putek* 2010).

The role of partners' characteristics has also been increasingly explored by focusing on educational status and couples' homogamy or heterogamy (*Nitsche et al.* 2018). Following the line of reasoning that people with more economic resources are more likely to transition to second birth, highly-educated women may be more likely to enlarge their family after postponing motherhood because they tend to be partnered with men of the same educational group (*Klesment et al.* 2014; *Kreyenfeld* 2002). However, the influence of male partners' education varies between contexts (*Trimarchi/Van Bavel* 2020). Evidence for such an influence has been found in West Germany (*Köppen* 2006; *Kreyenfeld* 2002) and Austria (*Prskawetz/Zagaglia* 2007), but not in France (*Köppen* 2006), Hungary (*Bartus et al.* 2013), Spain (*Bueno/García-Román* 2021) or Denmark (*Gerster et al.* 2007). Finally, although less explored, the partner's age may also play a role, as women who enter motherhood at late ages tend to have a first child with men their age or younger (*Compans* 2021; *Dudel et al.* 2020).

Analyses of the quantum and tempo of second births often test a limited number of mechanisms. Here, we disentangle age and educational differences in transitions to second birth and the intervals between first and second birth. Examinations of the influence of normative factors on second births have also remained scarce, hence we probe this question by looking at age at first birth relative to women's educational group and birth cohort. By doing so, we investigate to what extent biological factors explain second-birth acceleration and educational differentials at later ages (30 years old and above), or whether they can be challenged by other aspects. We focus on two national contexts, France, and Spain. In the following section, we describe aspects of these countries' fertility regimes relevant to understanding second birth trends.

## 3 France and Spain: distinct fertility regimes but similar cultural features

### 3.1 France: exceptionally high fertility levels

In France, birth rates before age 25 decreased substantially throughout the 1980s and 1990s (*Toulemon et al.* 2008). As a result, teenage births became rare – around 2 percent of mothers in the early-1970s cohort had their first child during adolescence (*Tomkinson* 2019). Fertility in women's thirties has increased accordingly, along with late fertility rates (40+) now close to the European average (*Beaujouan/Sobotka* 2019). This delay is partly driven by education extension because births occurring while studying are rare, at less than 5 percent (*Ní Bhrolcháin/Beaujouan* 2012; *Régnier-Loilier* 2016).

France is an unusual case among Western European countries, as fertility levels remained close to two children per woman in the past decades despite the postponement of first births (*Mazuy et al.* 2015; *Toulemon et al.* 2008). This suggests that fertility postponement and fertility levels developed relatively independently of each other. A long tradition of pronatalist family policies within a generous welfare state explains these comparatively high fertility levels and small educational gaps in fertility behaviours (*Toulemon et al.* 2008). For instance, maternity leave allowances and family benefits can influence first and higher-order births. Formal childcare is also widely available and used. In the early 2000s, enrolment rates in formal childcare among children under three years old was 43 percent, higher than the OECD average of 30 percent (*OECD* 2008). Such policies decrease the opportunity costs associated with having children, especially for highly-educated groups (*Van Bavel/Różańska-Putek* 2010) and allow women to achieve a more manageable work and family balance. French mothers return to work quickly after birth and often continue working full-time when having young children (*Pailhé/Solaz* 2006). In the 1990s and 2000s, 65 percent of the active female population were working mothers with children younger than 15 (*Beaujouan/Berghammer* 2019). The female load of parental and household tasks in France is close to the European average (*Aliaga* 2006) and the gap between men and women has decreased since the mid-1980s (*Champagne et al.* 2015).

Moreover, while the two-child family norm is strong (*Frejka* 2008; *Frejka/Sardon* 2007; *Sobotka/Beaujouan* 2014), large families (at least three children) are perceived as an ideal for many people (*Ruckdeschel et al.* 2018; *Sobotka/Beaujouan* 2014). Regarding the proper timing for childbearing, in 2006, the average ideal age for first motherhood was slightly above 25 years and the average perceived age deadline for motherhood was 42 years (*Liefbroer/Merz* 2009).

Hence, in this economic, institutional, and normative context, progressions to second birth are relatively more common than in other Western European countries such as the United Kingdom (*Tomkinson* 2019) and Southern European countries such as Spain (*Frejka* 2008).

### 3.2 Spain: strong postponement of births and lowest-low fertility

The postponement of births has been particularly substantial in Spain (*Castro Martín/Martín García* 2016). While early motherhood has become very rare, this country exhibits one of the highest shares of births occurring over the maternal age of 40 among European countries (6.1 percent; *Beaujouan/Sobotka* 2019). In line with actual fertility behaviours, perceptions of the normative window for parenthood in 2006 also correspond to higher ages in comparison to France – close to 28 years for the ideal age at first motherhood and 43 years on average for the age limit for female childbearing (*Liefbroer/Merz* 2009). In contrast to the French context, this substantial postponement has been associated with lowest-low fertility levels, down to 1.3 children per woman in the 1990s (*Kohler et al.* 2002). This is also visible in the decline in cohort completed fertility (*Esteve et al.* 2016). This trend is paralleled by the decrease in the desired number of children (*Delgado et al.* 2008) converging into a two-child family norm (*Sobotka/Beaujouan* 2014).

This dramatic decline in fertility occurred concurrently with changes in the labour market – unemployment rose tremendously from the 1980s, affecting young people in particular (*Adserà* 2011b/a; *Delgado et al.* 2008) – and was combined with a lack of family policies to reconcile motherhood and labour force participation (*Esping-Andersen* 2009). Indeed, Spain is a familistic welfare state that provides little childcare support. This can partly be explained by cultural norms. Motherhood is mainly seen as a private matter in which the state should not intervene (*Alvarez/Marre* 2022), resulting in a reliance on informal childcare by grandparents or other family members (*Rutigliano* 2020). As a result, preschool enrolment rates are close to the OECD average, but below those observed in France (*OECD* 2008). Employment rates among women are also much lower compared to France – only 49 percent in 2000-04 (*Beaujouan/Berghammer* 2019). In the private sphere, the sharing of household tasks remains gendered, which affects women's fertility intentions (*Suero* 2023). However, the country has progressed into the Second Demographic Transition as far as its neighbouring European countries have (*Sobotka* 2008). For instance, attitudes are now quite favourable towards "non-traditional" family behaviours such as cohabitation or divorce (*Seiz et al.* 2022).

Because the economic and policy landscape in Spain has made it difficult to seamlessly combine family life and work, highly-educated women still show lower completed fertility than their less-educated counterparts (*Klesment et al.* 2014). Here, delays in first births seem to have a causal effect on fertility decline and are accompanied by fewer transitions to second birth (*Billari/Borgoni* 2005; *Brodmann et al.* 2007). In line with this, previous research has shown an absence of any sign of recuperation (*Delgado et al.* 2008) and a persistent educational gap in fertility (*Requena* 2022).

In summary, progression to a second child is less common for women in Spain than in France (*Klesment et al.* 2014), which may be attributed to the two countries' very different economic and welfare conditions. Despite this, both countries share common cultural traits, such as the two-child family norm. Fertility intentions are more often unmet in Spain than in France, as there seems to be more of a conflict between fertility desires and the economic context (*Beaujouan/Berghammer* 2019; *Castro-Martín/Martín-García* 2016). There is also a negative educational gradient in transitions to second birth, which does not hold after controlling for age at first birth in both countries (*Klesment et al.* 2014; *Matysiak/Vignoli* 2019); while information on educational gradients in first and second childbirth intervals is lacking for both countries. By comparing France and Spain's second birth transitions and birth intervals along two dimensions of age (chronological and normative) and educational attainment, we provide new insights into how family enlargement patterns differ within these countries.

## 4 Research question and hypotheses

This paper examines, in France and Spain, the extent to which women who become mothers at different ages transition to second birth, at which pace they do so and how this varies by educational attainment.

The time squeeze effect posits that later first-time mothers speed up the transition to the second child in anticipation of greater biological constraints with age. Accordingly, we formulate the following hypotheses:

1a. Among mothers with at least two children, we expect women who delayed family formation to have transitioned to second birth more quickly after the firstborn.

1b. Assuming that biological constraints remain the same in France and Spain for women born between 1935 and 1974, we expect this time squeeze to be similar across countries and to hold after accounting for cohort effects.

1c. As highly-educated women are more likely to postpone a first birth, at later reproductive ages, we expect them to have a second child more often and more quickly than women of other educational groups.

Rather than biological concerns, the pace and extent of family building may also be driven by the prevalent fertility schedules within one's group, which differ depending on women's characteristics. To test whether this normative dimension of age explains educational differences in family enlargement, we examine transitions to second birth by comparing a woman's age at entry into motherhood with the distribution of first-birth schedules within her educational and cohort group. With this indicator of first birth timing relative to group membership, we formulate the following:

2. If the normative dimension of age holds more explanatory power than chronological age, we would expect there to be no educational differential in second births by relative age at first birth. This would indicate that women of different characteristics behave the same way when they conform or deviate from the standard within their group.

## 5 Data and Methods

### 5.1 Data and measures

This paper relies on samples of 146,555 observations retrieved from the French Family and Housing survey (*Enquête Familles et Logement*, Ined-Insee, 2011) and 12,451 women from three Spanish Fertility surveys conducted in Spain (*Encuestas de Fecundidad*, INE, 1985, 1999, and 2018) with observations of women born between 1935 and 1974. These samples were obtained after excluding 203 and 186 multiple first births for France and Spain, respectively. The French survey is conducted about every ten years in conjunction with the census, in a self-completed questionnaire that includes fertility histories. Despite an underestimation of the total number of children across cohorts in the 2011 survey, the quality is good as regards parity distribution (*Brée* 2017). The number of births in the Spanish surveys has been compared to Official Vital Statistics from INE, showing only slight variations. The cohorts studied are divided into 10-year groups, except for the oldest (1935-39) and youngest (1970-74) cohorts. In this work, we cover fertility history up to at least age 42 for most cohorts.[1] When cohorts which have not yet reached age 42 are excluded from the analyses, educational differentials and cohort effects – which are the main focus of this study – are similar (although the sample size for Spain is reduced and not all cohorts from 1935 to 1974 are observed). Therefore, most women are considered to have reached the end of their reproductive life. However, since some of them may have had a second birth after being surveyed, we discuss possible biases which may exist in the paper. We conduct analyses on different subsamples depending on the birth parity studied.

Educational groups are defined according to the level attained at the time of the survey and divided into three groups.[2] Following the ISCED classification, a low degree corresponds to no schooling, primary education, and lower secondary education. The medium group comprises upper secondary education and vocational training, while the highest levels include university graduates (Table 1).

1 Women born in 1970-74 in France were 37-41 years old at the time of the survey (in 2011). For Spain, data for cohorts 1935 to 1949 are measured in the 1985 fertility survey (at 37-50 years old), for cohorts 1950 to 1961 in 1999 (38-50 years old), and 1962 to 1974 in 2018 (44-56 years old).

2 The degree was not necessarily acquired before the first birth, particularly for the highly-educated mothers who had a child before age 25. Therefore, it is possible that their studies influenced the timing and occurrence of the second birth.

**Tab. 1:** Distribution of educational groups by female birth cohort in France and Spain

| | France (*n=146,555*) | | | Spain (*n=12,451*) | | |
|---|---|---|---|---|---|---|
| | Low | Medium | High | Low | Medium | High |
| 1935-39 | 66.9 | 24.7 | 8.4 | 81.8 | 13.2 | 5.0 |
| 1940-49 | 50.6 | 33.0 | 16.5 | 70.8 | 22.2 | 7.0 |
| 1950-59 | 37.7 | 40.0 | 22.2 | 33.2 | 52.1 | 14.8 |
| 1960-69 | 25.2 | 44.5 | 30.3 | 34.5 | 42.6 | 22.9 |
| 1970-74 | 17.2 | 39.4 | 43.3 | 25.9 | 39.9 | 34.3 |

Note: n's are unweighted.

Source: own calculation based on the French Family and Housing survey (2011) and Spanish Fertility surveys (1989, 1999, 2018) using survey weights.

Age at first birth is defined in two different ways: in absolute and relative terms. While the first can reflect a time squeeze effect after a late birth, the second is an indicator of deviation from (or conformity to) the norm in first-birth behaviour within an individual's cohort or educational group. It is computed by comparing the age at which a woman had her first child with the distribution of age at first birth in her educational group and birth cohort, by country. We distinguish between "very early" (below the 25th percentile, i.e., the ages at which 25 percent of women become mothers), "early" (between P25 and P50), "late" (between P50 and P75) and "very late" first-time mothers (above the 75th percentile). Note that "very late" births refer to first-time mothers of 30 years old or older for highly-educated women and even to those above age 35 among the most recent cohorts of women in Spain (Table A1). Thus, this category illustrates not only normative aspects of age but also biological ones, since fecundity declines from women's thirties onwards. These cut-offs are also above 30 years old for the medium and lower-educated groups from the 1960s cohort in Spain, but are below 30 for lower-educated women in France.

## 5.2 Methods

First, we report descriptive statistics by education. Our main focus is on parity progression ratios to second births (PPR2), computed as the ratio between the number of women with two children and the number of women with at least one child, generally by age 42 depending on the birth cohort (see above). We also focus on the number of years between the first and second birth, examining closed intervals (*Casterline/Odden* 2016). Conditional on having at least two children by the end of the reproductive life, birth intervals between the first and second child (BI2) are the differences between each child's birthdate (computed in months, shown in years). We calculate the median age interval within each observed group (e.g., by educational level).

Past research often focused on the occurrence of births after the firstborn using event-history models, which combine the analysis of the tempo and the event of second births when data are censored (*Klesment et al.* 2014; *Kreyenfeld* 2002). More recently, some studies have used cure models, which allow for the estimation of the share of people who have not experienced a second birth when analysing transition rates (*Bremhorst et al.* 2019; *Matysiak/Vignoli* 2019). Instead, we separate the analysis of transition occurrences from that of the timing of second births. This is made possible by examining the birth cohorts of women who are considered to have completed their fertility (these are the same cohorts used in the descriptive analysis): there is no censoring, and we know whether the second birth took place or not. Regarding fertility levels, we estimate the probability of having a second birth through logit models. These models are run among mothers with at least one child (n=120,946 for France, after excluding 7,174 observations due to missing values, and 10,247 minus two observations for Spain). For the analysis of second birth timing after entering motherhood, we use lognormal durations models. Assuming a non-monotonic hazard distribution, they are suitable to estimate duration to the next birth when hazards decrease over time (which is the case for second births) and show good statistical fit compared to other model specifications. We focus on women who have had at least two children by the end of their reproductive life, so the produced estimates reflect the timing of second births only, not their occurrence. We calculate predicted median birth intervals based on the estimates of the models. The lognormal models were run among a subsample of 92,213 French mothers with at least two children (after excluding 7,511 observations with missing values) and among 7,927 Spanish mothers (after excluding 30 observations with missing values).[3] In all models, we control for the birth cohort and allow the influence of age at first birth to vary by level of education, including interaction terms. Finally, we produce a second set of estimates using relative age instead of chronological age.

## 6 Differences in occurrence and timing of second birth by age at first birth and education

Before breaking down the analysis by age at first birth, we describe, at the macro level, the different intensities and paces at which educational groups transitioned to motherhood and enlarged their families in France and Spain. We only describe statistically significant results (significance level of 5 percent). For all cohorts (1935-74), transitions to first birth decrease with the level of education, with a more significant differential in Spain than in France (Table 2). The higher the woman's degree, the later the first birth is on average. Within the same educational groups, women in Spain postponed first births more than women in France did; this was especially the case for highly-educated women (30.9 vs 28.3 years old on average).

3 Additional analyses including further covariates were conducted when the information was available in the French survey (country of birth, professional category of the respondent's father) and with relevant variables depending on those available in each Spanish fertility survey. Including these controls do not change the education, age at first birth and cohort results substantially.

**Tab. 2:** Levels and timing of progressions to first and second birth by women's educational level in France and Spain (cohorts 1935-74)

| | France | | | | Spain | | | |
|---|---|---|---|---|---|---|---|---|
| | 1st births | | 2nd births | | 1st births | | 2nd births | |
| | PPR1 | MAB1 | PPR2 | Median BI2 | PPR1 | MAB1 | PPR2 | Median BI2 |
| High | 0.83 | 28.3 | 0.77 | 3.08 | 0.73 | 30.9 | 0.70 | 3.08 |
| Medium | 0.88 | 25.6 | 0.76 | 3.33 | 0.83 | 26.3 | 0.74 | 3.75 |
| Low | 0.89 | 23.8 | 0.80 | 2.84 | 0.86 | 25.2 | 0.79 | 3.74 |
| *n (unweighted)* | *146,555* | *120,946* | *120,946* | *92,213* | *12,451* | *10,247* | *10,247* | *7,927* |

Note: PPR refers to parity progression ratios to first (PPR1) and second birth (PPR2). MAB1 is the mean age at first birth. BI2 are birth intervals between the first and second births.

Source: own calculation based on the French Family and Housing survey (2011) and Spanish Fertility surveys (1989, 1999, 2018) using survey weights.

Among those who did become mothers, lower-educated women in France exhibited the highest progression ratio to a second child (8 out of 10 mothers). For women with medium and high educational attainment, the ratio is lower, but similar between the two groups (0.76-0.77), despite the large educational variations in the first birth schedule. The median birth interval (BI2) was slightly shorter among low-educated women (under three years) than for other groups, but differences by educational degree were slight in France. Conversely, in Spain, transitions to second birth decreased more clearly with the level of education (from 0.79 to 0.70 between the ends of the educational scale). Highly-educated women had a second child more quickly after the firstborn than other groups did (though only significant compared to the medium educated).

All in all, the relationship between second birth progressions and birth intervals is not straightforward. For instance, fewer highly-educated women in Spain transitioned to second birth, even though they did so more quickly than the other groups. This may be explained by this group's much higher mean age at first birth. To better understand this, we examine women according to their educational level and age at entry into motherhood.

## 6.1 A time squeeze effect?

The top panel of Figure 1 reports predicted probabilities of transitions to second birth and their confidence intervals, estimated with logit models that include an interaction between age at firstborn and level of education, controlling for women's birth cohorts. Progressions to second birth decrease substantially with age for both countries. In France and Spain, young and highly-educated first-time mothers (<25 years) progress to second birth as often as their lower-educated counterparts of the same age at first motherhood do. Between 25 and 34 years old, highly-educated women are more likely to enlarge their families, while PPR2 are similar between medium and lower-educated groups. In Spain, PPR2 are also higher for higher-educated women after a late firstborn (35+), but this result is not significant due to the small sample size (Fig. 1b). The higher PPR2 at most ages for the most qualified group explain why, when controlling for age at first birth in both countries, higher-educated women are more likely to transition to second birth than those with medium educational attainment (see the estimates for second birth occurrence in Table A2 in the Appendix). Despite similar graphs for France and Spain in Figure 1, the age compositions of mothers in the two countries differ, leading to various aggregate fertility outcomes as shown in Table 2.

In France, the median birth interval curves shown in the bottom panel of Figure 1 display a similar BI2 between women with different educational levels. This is after a first birth occurred between 25 and 34 years (Fig. 1c).[4] Longer birth intervals among medium and highly-educated women at young ages can be explained by first births occurring during schooling or entry into the labour market, prompting a second birth postponement. At later ages, the median birth interval is considerably shorter than for younger first-time mothers and equal across groups. This may reflect the similar effect biological limits have in constraining fertility, regardless of the educational degree. By combining the analysis of PPR2 and BI2 in France, we find that second birth timing is more determined by age at first birth than by the level of education. That is, the time squeeze hypothesis does not explain why highly-educated women in France demonstrate a higher PPR2 between ages 25 and 34, since they do not have their second child faster than other groups do.

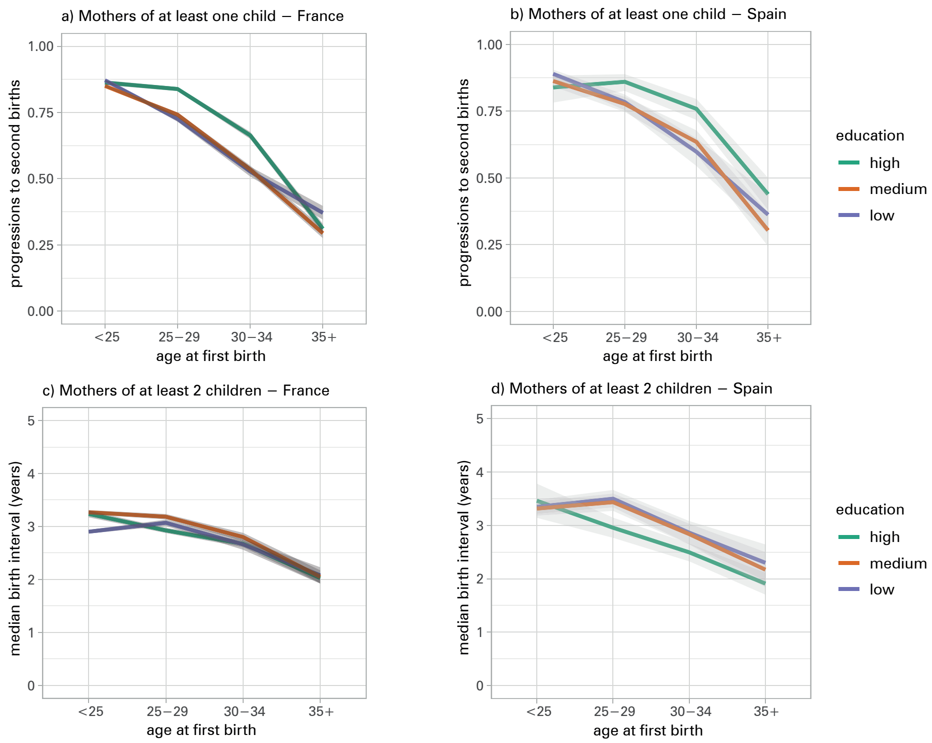
In Spain, the picture is different – highly-educated women exhibit shorter birth intervals between the first and second child than their counterparts in any age group do, except for those who became mothers before age 25 (Fig. 1d).[5] Faster family enlargement among highly-educated mothers may explain why they exhibit higher PPR2 than lower-educated women. However, at age 25-29, women are not yet constrained by biological limits. Thus, this correspondence between shorter birth intervals and larger transitions to second birth cannot be entirely attributed to a time squeeze effect.

On the whole, in both countries, women over 30 and even more so over 35 years old at first birth have a second child less frequently. However, when they do, they progress to second birth more quickly than other age groups do. The comparison with men lends support for an interpretation of these findings partly in biological terms (see Appendix A3): compared to later first-time fathers, later first-time mothers either have an only child or accelerate the second birth. In summary, the time squeeze hypothesis helps us understand the variations in progressions to second birth by age at firstborn. At the same time, biological constraints do not fully

4 See estimates without interaction in Table A3.

5 There are also strong cohort effects on BI2 in Spain, which are detailed in Appendix 4. Birth intervals increased significantly between women born in 1935 and 1974, especially if the first birth took place at a young age.

**Fig. 1:** Predicted progressions to second birth and median intervals between the first and second birth (with confidence intervals) by chronological age at first child and education in France and Spain




Note: Predicted progressions to second birth are estimated with logit models and median BI2 with lognormal duration models. Models control for cohort effects. Results are shown here for the 1950-59 cohort (reference level). They are displayed with confidence intervals (95%) in grey, which are small for France due to the large sample size. The full models can be found in Tables A2 and A3 in the Appendix.

Source: own calculation based on the French Family and Housing survey (2011) and Spanish Fertility surveys (1989, 1999, 2018).

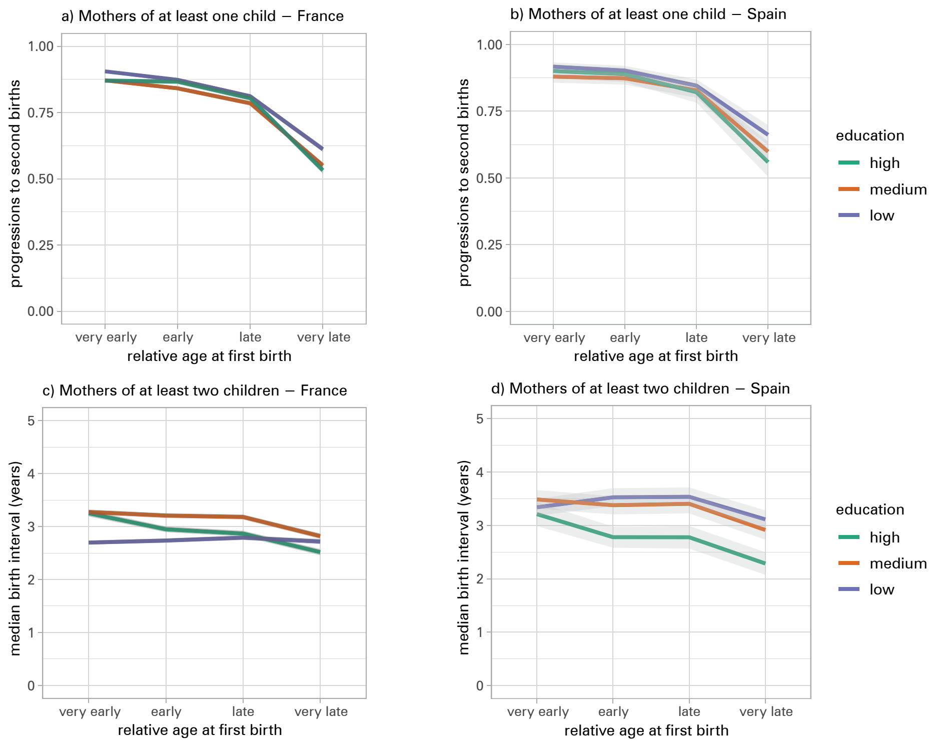
explain the differences by education. Indeed, in France, education and second birth timing seem disconnected (since patterns by education are different between PPR2 and BI2), while in Spain, higher PPR2 is associated with faster second births but this is not specific to late ages.

## 6.2 A reflection of various norms in first-birth schedules?

Next, we explore age from a normative perspective by estimating the level and timing of second births using ages relative to women's membership in educational groups and birth cohorts. This indicator allows us to examine family enlargement behaviours depending on whether women were deviating from or conforming to the prevailing first-birth schedule within their group.

Switching to relative ages in lieu of chronological age cancels out educational differentials in the occurrence of second births in both countries (Fig. 2a and 2b). For all educational groups, progressions to second birth decrease slightly between very early and late relative ages at first birth – a less pronounced curve than with absolute age at first birth – and decrease sharply from very late ages only.[6]

**Fig. 2:** Predicted progressions to second birth and median birth intervals between the first and second birth (with confidence intervals) by relative age at first child and education in France and Spain




Note: Predicted progressions to second birth are estimated using logit models and median BI2 with lognormal duration models. Models control for cohort effects. Results are shown here for the 1950-59 cohort (reference level). They are displayed with confidence intervals (95%) in grey, which are small for France due to the large sample size.

Source: own calculation based on the French Family and Housing survey (2011) and Spanish Fertility surveys (1989, 1999, 2018).

---

6 We can note that, among very late mothers at first birth, low-educated women show higher PPR2 (Fig. 2a and b, though not statistically significant for Spain because of the sample size). This may be explained by the lower age limits for this group (below age 30 in France) compared to highly or medium-educated women (Table A2).

Turning to birth intervals (bottom panel of Fig. 2), medium-educated women in France take slightly more time than the other groups to enlarge their families (Fig. 2c). In Spain, despite the lack of an educational gap in PPR2 by relative age, highly-educated women have second births more quickly than their less-educated counterparts in each age group, except for the very early one (Fig. 2d).

Birth intervals across relative age groups are also rather stable within each educational level, suggesting that the timing of a second child is barely influenced by the normative dimension of age within one's group. For instance, having a first birth at 27 can be considered late for medium-educated women and close to the norm for highly-educated women (Table 2), but deviation or conformity to this norm does not influence the timing of the second birth strongly (Fig. 2). Notably, the fact that very early first-time mothers do not tend to accelerate their second births suggests that they are not, as a group, more prone to family enlargement (with the exception of low-educated women in France who show slightly shorter birth intervals than their educational counterparts). It is only at very late ages that mothers from all educational groups have second births more quickly, a behaviour that possibly derives from both biological and normative pressures.

## 7 Conclusion and discussion

Through a thorough exploration of second birth occurrence and timing among the 1935-74 cohorts in France and Spain, we found that, at most reproductive ages, highly-educated mothers are more likely to have a second child than other groups are. To explain variations by age at first birth and education, we found evidence for the two hypotheses we tested: an age-related time squeeze and the normative influence of age.

First, as age at first birth increases, there is a parallel decrease in the occurrence of second births and shortening in birth intervals in both countries, which can be interpreted as a time squeeze effect. Especially for those entering motherhood at or above age 35, the shorter birth intervals we observe seem to reflect a phenomenon in which mothers enlarge their family before it is "too late" by having a second child within a short timeframe. Biological age effects on women's family enlargement are also visible in the comparison with men's fertility (which is less constrained by a decline in fecundity) since late first-time fathers had second births more often and less quickly than late first-time mothers. Furthermore, we showed that the time squeeze is visible in all educational groups, but because highly-educated women tend to have their first child later, the decrease with age in second birth progressions and birth intervals between the first and second child explains some of the educational differences in the aggregate indicators. However, this time squeeze effect does not explain why the highly educated in Spain accelerated the transition to a second child even before age becomes a biological constraint.

Next, we made alternative use of age-at-first birth data by exploring the influence of differences in norms between groups on fertility enlargement. Previous work highlights the importance of cultural factors in shaping transitions to second birth (*Hoem* 1996; *Van Bavel/Nitsche* 2013; *Van Bavel/Różańska-Putek* 2010). We considered age a factor that may prevent or encourage women to enlarge their family more or less quickly, depending on the distribution of age at first birth in their educational group and birth cohort. Of first note is that cultural and biological dimensions of age are linked. This link is particularly visible in the "very late first-time mother" category. Findings support the idea that age norms may be turning more fluid (*Lazzari et al.* 2022), as early or late first-time mothers do not show substantially different behaviours related to family enlargement. More interestingly, we show that, for both countries, differences in first-birth schedule standards explain the educational gap in second birth progressions. However, like the time squeeze effect, the relative dimension of age is insufficient to explain faster transitions to second birth among highly-educated women in Spain.

These conclusions leave room for alternative explanations. It has been assumed that second birth transitions among higher-educated mothers can be explained by a greater family proneness when compared to childless peers (*Kreyenfeld* 2002). However, there is little support for this selection hypothesis in our analysis and the literature (*Bartus et al.* 2013; *Billari/Borgoni* 2005), and selection effects may be more apparent while observing third birth dynamics (*Brzozowska et al.* 2022).

It can also be expected that, at the same age at first birth, highly-educated women would be more likely to have a second child than less-educated women for financial (because they can better afford to raise an additional child) or work-related reasons (to reduce cumulative time outside the labour market). Such economic factors can also interact with the partner's educational level, a relationship we did not explore here. However, previous work has found no evidence for a partner effect in France (*Köppen* 2006) and Spain (*Bueno/García-Román* 2021). Nonetheless, data on women's income or employment pathways or that of their partners would be useful in refining the analysis (*Baizán* 2005). Information on the motivations behind long or short birth intervals would also bring valuable insights.

Finally, findings in Spain suggest that women with a high level of education more often overcome normative and biological barriers to family enlargement by quickly transitioning to second birth. Such an education effect is not found in France, and this could be explained if, in general, fertility decisions are more constrained in Spain than in France. Cross-country variations in family enlargement are often attributed to differences in family policies and economic factors. Compared to France, childcare is less institutionalised and generous in Spain (*Delgado et al.* 2008), a country where labour market uncertainty has persisted for decades (*Adserà* 2011a; *Bueno/Brinton* 2019). Therefore, highly-educated Spanish women may wait to start a family until their professional goals are achieved to limit time spent outside the labour market in order to secure higher salaries and greater stability (*Dueñas et al.* 2017). After delaying childbearing, they likely find themselves in a better financial position than their lower-educated counterparts and are therefore able to transition to second birth more quickly. All in all, economic factors seem to significantly influence family enlargement in Spain more than in France, which could explain the greater educational gap. In addition, as labour conditions among young people in Spain are more uncertain than in France, unemployment rates are particularly high. This could explain why birth intervals for young first-time mothers rose more substantially across cohorts in Spain than in France. In Spain, in addition to improving the reconciliation of work and family, implementing public policies aimed to reduce job precarity may make it more feasible to transition to a second child, especially for women with low levels of education. Such conclusions are in line with recent work on low fertility levels in this country, calling for policies that not only target family behaviours but also increase social equality in education and labour market conditions (*Elizalde-San Miguel et al.* 2023).

## Acknowledgements

This work is supported by the Austrian Science Fund via project FWF P31171-G29, ("Later fertility in Europe"); and Grant PRE2018-086566 funded by MCIN/AEI/10.13039/501100011033 and "FSE invierte en tu futuro".

## References

*Adserà, Alicia* 2011a: The Interplay of Employment Uncertainty and Education in Explaining Second Births in Europe. In: Demographic Research 25,16: 513-544. https://doi.org/10.4054/DemRes.2011.25.16

*Adserà, Alicia* 2011b: Where Are the Babies? Labor Market Conditions and Fertility in Europe. In: European Journal of Population 27,1: 1-32. https://doi.org/10.1007/s10680-010-9222-x

*Aliaga, Christel* 2006: How Is the Time of Women and Men Distributed in Europe? Statistics in Focus 4. Population and Social Conditions. Eurostat [https://ec.europa.eu/eurostat/documents/3433488/5438881/KS-NK-06-004-EN.PDF.pdf/7af4b8e8-1d40-478c-8410-e41204e0b29c?t=1414690349000, 12/07/2020].

*Alvarez, Bruna; Marre, Diana* 2022: Motherhood in Spain: From the "Baby Boom" to "Structural Infertility." In: Medical Anthropology 41,6-7: 718-731. https://doi.org/10.1080/01459740.2021.1961246

*Andersson, Gunnar et al*. 2009: Cohort Fertility Patterns in the Nordic Countries. In: Demographic Research 20,14: 313-352. https://doi.org/10.4054/DemRes.2009.20.14

*Baizán, Pau* 2005: The Impact of Labour Market Status on Second and Higher-Order Births. A Comparative Study of Denmark, Italy, Spain and United Kingdom. DemoSoc Working Paper. Barcelona: Universitat Pompeu Fabra.

*Bartus, Tamás et al.* 2013: The Effect of Education on Second Births in Hungary: A Test of the Time-Squeeze, Self-Selection, and Partner-Effect Hypotheses. In: Demographic Research 28,1: 1-32. https://doi.org/10.4054/DemRes.2013.28.1

*Beaujouan, Éva; Berghammer, Caroline* 2019: The Gap Between Lifetime Fertility Intentions and Completed Fertility in Europe and the United States: A Cohort Approach. In: Population Research and Policy Review 38: 507-535. https://doi.org/10.1007/s11113-019-09516-3

*Beaujouan, Éva; Sobotka, Tomáš* 2019: Late Childbearing Continues to Increase in Developed Countries. In: Population & Societies 562,1: 1-4. https://doi.org/10.3917/popsoc.562.0001

*Beaujouan, Éva; Zeman, Kryštof; Nathan, Mathías* 2023: Delayed First Births and Completed Fertility across the 1940-1969 Birth Cohorts. In: Demographic Research 48: 387-420. https://doi.org/10.4054/DemRes.2023.48.15

*Berg, Venla; Rotkirch, Anna* 2014: Faster Transition to the Second Child in Late 20th Century Finland: A Study of Birth Intervals. In: Finnish Yearbook of Population Research XLIX: 73-86.

*Berrington, Ann; Stone, Juliet; Beaujouan, Éva* 2015: Educational Differences in Timing and Quantum of Childbearing in Britain: A Study of Cohorts Born 1940-1969. In: Demographic Research 33,26: 733-764. https://doi.org/10.4054/DemRes.2015.33.26

*Billari, Francesco C.; Borgoni, Riccardo* 2005: Assessing the Use of Sample Selection Models in the Estimation of Fertility Postponement Effects. In: Statistical Methods and Applications 14,3: 389-402. https://doi.org/10.1007/s10260-005-0122-x

*Brée, Sandra* 2017: Changes in Family Size over the Generations in France (1850-1966). In: Population (English Edition) 72,2: 297-332. https://doi.org/10.3917/popu.1702.0309

*Bremhorst, Vincent; Kreyenfeld, Michaela; Lambert, Philippe* 2019: Nonparametric Double Additive Cure Survival Models: An Application to the Estimation of the Non-Linear Effect of Age at First Parenthood on Fertility Progression. In: Statistical Modelling 19,3: 248-275. https://doi.org/10.1177/1471082X18784685

*Bremhorst, Vincent; Kreyenfeld, Michaela; Lambert, Philippe* 2016: Fertility Progression in Germany: An Analysis Using Flexible Nonparametric Cure Survival Models. In: Demographic Research 35,18: 505-534. https://doi.org/10.4054/DemRes.2016.35.18

*Brodmann, Stefanie; Esping-Andersen, Gosta; Güell, Maia* 2007: When Fertility Is Bargained: Second Births in Denmark and Spain. In: European Sociological Review 23,5: 599-613. https://doi.org/10.1093/esr/jcm025

*Brzozowska, Zuzanna; Beaujouan, Éva; Zeman, Kryštof* 2022: Is Two Still Best? Change in Parity-Specific Fertility Across Education in Low-Fertility Countries. In: Population Research and Policy Review 41: 2085-2114.
https://doi.org/10.1007/s11113-022-09716-4

*Bueno, Xiana; Brinton, Mary C.* 2019: Gender Egalitarianism, Perceived Economic Insecurity, and Fertility Intentions in Spain: A Qualitative Analysis. In: Population Studies 73,2: 247-260. https://doi.org/10.1080/00324728.2019.1604979

*Bueno, Xiana; García-Román, Joan* 2021: Rethinking Couples' Fertility in Spain: Do Partners' Relative Education, Employment, and Job Stability Matter? In: European Sociological Review 37,4: 571-587. https://doi.org/10.1093/esr/jcaa070

*Casterline, John B.; Odden, Colin* 2016: Trends in Inter-Birth Intervals in Developing Countries 1965-2014. In: Population and Development Review 42,2: 173-194.
https://doi.org/10.1111/j.1728-4457.2016.00134.x

*Castro, Rubén* 2015: Late-Entry-Into-Motherhood Women Are Responsible for Fertility Recuperation. In: Journal of Biosocial Science 47,2: 275-279.
https://doi.org/10.1017/S0021932014000121.

*Castro Martín, Teresa; Martín García, Teresa* 2016: La Fecundidad En España: Entre Las Más Bajas Del Mundo y Sin Muchas Perspectivas de Recuperación. In: Panorama Social 23: 11-26.

*Champagne, Clara; Pailhé, Ariane; Solaz, Anne* 2015: Le temps domestique et parental des hommes et des femmes : quels facteurs d'évolutions en 25 ans? In: Economie et statistique 478,1: 209-242. https://doi.org/10.3406/estat.2015.10563

*Ciganda, Daniel; Todd, Nicolas* 2019: The Limits to Fertility Recuperation. MPIDR Working Paper WP-2019-024. Rostock: Max Planck Institute for Demographic Research. https://doi.org/10.4054/MPIDR-WP-2019-024

*Compans, Marie-Caroline* 2021: Late Mothers and Late Fathers Have a First Birth with Younger Partners. N-IUSSP [https://www.niussp.org/fertility-and-reproduction/late-mothers-and-late-fathers-have-a-first-birth-with-younger-partners/, 03.03.2022].

*Delgado, Margarita; Meil, Gerardo; López, Francisco Zamora* 2008: Spain: Short on Children and Short on Family Policies. In: Demographic Research 19,27: 1059-1104. https://doi.org/10.4054/DemRes.2008.19.27

*Dudel, Christian; Cheng, Yen-hsin Alice; Klüsener, Sebastian* 2020: The Unexplored Parental Age Gap in an Era of Fertility Postponement. WP-2020-018. Rostock: Max Planck Institute for Demographic Research. https://doi.org/10.4054/MPIDR-WP-2020-018

*Dueñas, Diego; Moreno, Almudena* 2017: Mujeres, madres y trabajadoras. Incidencia laboral de la maternidad durante el ciclo económico 2005-2016. In: Revista de Economía Laboral 14,2: 66-103. https://doi.org/10.21114/rel.2017.02.04

*Dunson, David B.; Colombo, Bernardo; Baird, Donna D.* 2002: Changes with Age in the Level and Duration of Fertility in the Menstrual Cycle. In: Human Reproduction 17,5: 1399-1403. https://doi.org/10.1093/humrep/17.5.1399

*Ekert-Jaffé, Olivia et al.* 2002: Fécondité, Calendrier Des Naissances et Milieu Social En France et En Grande-Bretagne. Politiques Sociales et Polarisation Socioprofessionnelle. In: Population 57,3: 485-518. https://doi.org/10.3917/popu.203.0485

*Elizalde-San Miguel, Begoña; Díaz Gandasegui, Vicente; Sanz, María T.* 2023: Growing Pains: Can Family Policies Revert the Decline of Fertility in Spain? In: Social Inclusion 11,1. https://doi.org/10.17645/si.v11i1.6141

*Esping-Andersen, Gøsta* 2009: Incomplete Revolution: Adapting Welfare States to Women's New Roles. Cambridge: Polity Press.

*Esteve, Albert; Devolder, Daniel; Domingo, Andreu* 2016: Childlessness in Spain: Tick Tock, Tick Tock, Tick Tock! In: Perspectives Demogràfiques 1-4. https://doi.org/10.46710/ced.pd.eng.1

*Frejka, Tomas* 2008: Parity Distribution and Completed Family Size in Europe: Incipient Decline of the Two-Child Family Model. In: Demographic Research 19,4: 47-72. https://doi.org/10.4054/DemRes.2008.19.4

*Frejka, Tomas; Calot, Gerard* 2001: Cohort Reproductive Patterns in the Nordic Countries. In: Demographic Research 5,5: 125-186. https://doi.org/10.4054/DemRes.2001.5.5

*Frejka, Tomas; Sardon, Jean-Paul* 2007: Cohort Birth Order, Parity Progression Ratio and Parity Distribution Trends in Developed Countries. In: Demographic Research 16,11: 315-374. https://doi.org/10.4054/DemRes.2007.16.11

*Gerster, Mette et al.* 2007: Education and Second Birth Rates in Denmark 1981-1994. In: Demographic Research 17,8: 181-210. https://doi.org/10.4054/DemRes.2007.17.8

*Goldstein, Joshua R.; Sobotka, Tomáš; Jasilioniene, Aiva* 2009: The End of "Lowest-Low" Fertility? In: Population and Development Review 35,4: 663-699. https://doi.org/10.1111/j.1728-4457.2009.00304.x

*Heiland, Frank; Prskawetz, Alexia; Sanderson, Warren C.* 2005: Do More Educated Individuals Prefer Smaller Families? VID Working Paper 0503. Vienna Institute of Demography (VID) of the Austrian Academy of Sciences in Vienna.

*Hoem, Britta* 1996: The Social Meaning of the Age at Second Birth for Third-Birth Fertility: A Methodological Note on the Need to Sometimes Respectify an Intermediate Variable. In: Finnish Yearbook of Population Research 33: 33-39. https://doi.org/10.23979/fypr.44916

*Impicciatore, Roberto; Zuanna, Gianpiero Dalla* 2017: The Impact of Education on Fertility in Italy. Changes across Cohorts and South-North Differences. In: Quality & Quantity 51,5: 2293-2317. https://doi.org/10.1007/s11135-016-0388-0

*Klesment, Martin et al*. 2014: Varying Association between Education and Second Births in Europe: Comparative Analysis Based on the EU-SILC Data. In: Demographic Research 31,27: 813-860. https://doi.org/10.4054/DemRes.2014.31.27

*Kohler, Hans-Peter; Billari, Francesco C.; Ortega, Jose Antonio* 2002: The Emergence of Lowest-Low Fertility in Europe During the 1990s. In: Population and Development Review 28,4: 641-680. https://doi.org/10.1111/j.1728-4457.2002.00641.x

*Kohler, Hans-Peter; Skytthe, Axel; Christensen, Kaare* 2001: The Age at First Birth and Completed Fertility Reconsidered: Findings from a Sample of Identical Twins. MPIDR Working Paper WP 2001-006. Rostock: Max Planck Institute for Demographic Research. https://doi.org/10.4054/MPIDR-WP-2001-006

*Köppen, Katja* 2006: Second Births in Western Germany and France. In: Demographic Research 14,14: 295-330. https://doi.org/10.4054/DemRes.2006.14.14

*Kravdal, Øystein* 2001: The High Fertility of College Educated Women in Norway: An Artefact of the Separate Modelling of Each Parity Transition. In: Demographic Research 5,6: 187-216. https://doi.org/10.4054/DemRes.2001.5.6

*Kreyenfeld, Michaela* 2002: Time-Squeeze, Partner Effect or Self-Selection? An Investigation into the Positive Effect of Women's Education on Second Birth Risks in West Germany. In: Demographic Research 7,2: 15-48. https://doi.org/10.4054/DemRes.2002.7.2

*Lazzari, Ester; Compans, Marie-Caroline; Beaujouan, Eva* 2022: Changing Childbearing Age Norms in Europe in Times of Fertility Postponement. In: SocArXiv. https://doi.org/10.31235/osf.io/xbheq

*Lazzari, Ester; Mogi, Ryohei; Canudas-Romo, Vladimir* 2021: Educational Composition and Parity Contribution to Completed Cohort Fertility Change in Low-Fertility Settings. In: Population Studies 75,2: 153-167. https://doi.org/10.1080/00324728.2021.1895291

*Liefbroer, Aart; Merz, Eva-Maria* 2009: Report on Analysis of ESS Data on Cross-National Differences in Perceived Norms Concerning Fertility-Related Behaviour. European Commission Project "Reproductive Decision-Making in a Macro-Micro Perspective" (REPRO) Grant Agreement: SSH-CT-2008-217173. Vienna: Vienna Institute of Demography, Austrian Academy of Sciences.

*Matysiak, Anna; Vignoli, Daniele* 2019: Revisiting the Relationship between Higher Education and Second Births across Europe and the US. Presented at the Population Association of America Conference. Austin [https://paa2019.populationassociation.org/uploads/192587, 02/09/2023].

*Mazuy, Magali et al.* 2015: The Demographic Situation in France: Recent Developments and Trends over the Last 70 Years. In: Population (English Edition) 70,3: 393-460. https://doi.org/10.3917/popu.1503.0417

*Menken, Jane* 1985: Age and Fertility: How Late Can You Wait? In: Demography 22,4: 469-483. https://doi.org/10.2307/2061583

*Miranda, Vitor* 2020: Recent Trends in Birth Intervals in Sweden: A Decline of the Speed-Premium Effect? In: European Journal of Population 36,3: 499-510. https://doi.org/10.1007/s10680-019-09539-8

*Ní Bhrolcháin, Máire* 1986: Women's Paid Work and the Timing of Births: Longitudinal Evidence. In: European Journal of Population 2,1: 43-70. https://doi.org/10.1007/BF01796880

*Ní Bhrolcháin, Máire; Beaujouan, Éva* 2012: Fertility Postponement Is Largely Due to Rising Educational Enrolment. In: Population Studies 66,3: 311-327. https://doi.org/10.1080/00324728.2012.697569

*Nitsche, Natalie et al.* 2018: Partners' Educational Pairings and Fertility Across Europe. In: Demography 55,4: 1195-1232. https://doi.org/10.1007/s13524-018-0681-8

*OECD* 2008: PF11: Enrolment in Day-Care and Pre-Schools. OECD Family Database. OECD – Social Policy Division – Directorate of Employment, Labour and Social Affairs [https://www.oecd.org/education/school/44975703.pdf, 02/06/2022].

*Pailhé, Ariane; Solaz, Anne* 2006: Employment and Childbearing: Women Bear the Burden of the Work-Family Balance. In: Population & Societies 426.

*Philipov, Dimiter* 2017: Rising Dispersion in Age at First Birth in Europe: Is It Related to Fertility Postponement? Human Fertility Database Research Report HRD RR-2017-005. Working Paper 11/2017. Vienna: Vienna Institute of Demography.

*Prskawetz, Alexia; Zagaglia, Barbara* 2005: Second Births in Austria. In: Vienna Yearbook of Population Research 1: 143-170. https://doi.org/10.1553/populationyearbook2005s143

*Régnier-Loilier, Arnaud* 2016: Qui Sont Les Étudiants-Parents En France ? Caractéristiques et Difficultés Rencontrées. In: *Giret, Jean-François; Van de Velde, Cécile; Verley, Élise* (Eds.): Les Vies Étudiantes. Tendances et Inégalités. La Documentation Française. Paris: 277-292.

*Rendall, Michael S. et al.* 2005: First Births by Age and Education in Britain, France and Norway. In: Population Trends 121: 27-34.

*Rendall, Michael S.; Harrison, Eowna Young; Caudillo, Mónica L* 2020: Intentionally or Ambivalently Risking a Short Interpregnancy Interval: Reproductive-Readiness Factors in Women's Postpartum Non-Use of Contraception. In: Demography 57,3: 821-841. https://doi.org/10.1007/s13524-020-00859-7

*Rennes, Juliette* 2019: Biological age versus social age: A problematic distinction. In: Geneses 117,4: 109-128. https://doi.org/10.3917/gen.117.0109

*Requena, Miguel* 2022: Spain's Persistent Negative Educational Gradient in Fertility. In: European Journal of Population 38,1: 1-13. https://doi.org/10.1007/s10680-021-09599-9

*Ruckdeschel, Kerstin et al.* 2018: Unequal Neighbours? A French-German Comparison of Family Size Intentions. In: Comparative Population Studies 43: 187-210. https://doi.org/10.12765/CPoS-2018-12

*Rutigliano, Roberta* 2020: Counting on Potential Grandparents? Adult Children's Entry Into Parenthood Across European Countries. In: Demography 57,4: 1393-1414. https://doi.org/10.1007/s13524-020-00890-8

*Rutstein, Shea* 2011: Trends in Birth Spacing. DHS Comparative Report 28. Calverton, Maryland: ICF Macro.

*Seiz, Marta et al.* 2022: The evolution of social norms on family transitions in Spain. In: Spanish Journal of Sociology 31,2: a106. 2. https://doi.org/10.22325/fes/res.2022.106

*Skirbekk, Vegard; Kohler, Hans-Peter; Prskawetz, Alexia* 2004: Birth Month, School Graduation, and the Timing of Births and Marriages. In: Demography 41,3: 547-568. https://doi.org/10.1353/dem.2004.0028

*Smarr, Melissa M. et al.* 2017: Is Human Fecundity Changing? A Discussion of Research and Data Gaps Precluding Us from Having an Answer. In: Human Reproduction 32,3: 499-504. https://doi.org/10.1093/humrep/dew361

*Sobotka, Tomáš* 2008: Overview Chapter 6: The Diverse Faces of the Second Demographic Transition in Europe. In: Demographic Research 19,8: 171-224. https://doi.org/10.4054/DemRes.2008.19.8

*Sobotka, Tomáš* 2017: Post-Transitional Fertility: The Role of Childbearing Postponement in Fuelling the Shift to Low and Unstable Fertility Levels. In: Journal of Biosocial Science 49,S1: S20-S45. https://doi.org/10.1017/S0021932017000323

*Sobotka, Tomáš; Beaujouan, Éva* 2014: Two Is Best? The Persistence of a Two-Child Family Ideal in Europe. In: Population and Development Review 40,3: 391-419. https://doi.org/10.1111/j.1728-4457.2014.00691.x

*Šťástná, Anna; Kocourková, Jiřina; Šprocha, Branislav* 2020: Parental Leave Policies and Second Births: A Comparison of Czechia and Slovakia. In: Population Research and Policy Review 39,3: 415-437. https://doi.org/10.1007/s11113-019-09546-x

*Suero, Cristina* 2023: Gendered division of housework and childcare and women's intention to have a second child in Spain. In: Genus 79,3. https://doi.org/10.1186/s41118-023-00182-0

*Testa, Maria Rita* 2014: On the Positive Correlation between Education and Fertility Intentions in Europe: Individual- and Country-Level Evidence. In: Advances in Life Course Research 21: 28-42. https://doi.org/10.1016/j.alcr.2014.01.005

*Tomkinson, John* 2019: Age at First Birth and Subsequent Fertility: The Case of Adolescent Mothers in France and England and Wales. In: Demographic Research 40,27: 761-798. https://doi.org/10.4054/DemRes.2019.40.27

*Toulemon, Laurent; Pailhé, Ariane; Rossier, Clémentine* 2008: France: High and Stable Fertility. In: Demographic Research 19,16: 503-556. https://doi.org/10.4054/DemRes.2008.19.16

*Trimarchi, Alessandra; Van Bavel, Jan* 2020: Partners' Educational Characteristics and Fertility: Disentangling the Effects of Earning Potential and Unemployment Risk on Second Births. In: European Journal of Population 36,3: 439-464. https://doi.org/10.1007/s10680-019-09537-w

*Van Bavel, Jan; Nitsche, Natalie* 2013: "The Proper Age for Parenthood" and Second Birth Rates in Europe. In: European Sociological Review 29,6: 1149-1161. https://doi.org/10.1093/esr/jct003

*Van Bavel, Jan; Różańska-Putek, Joanna* 2010: Second Birth Rates across Europe: Interactions between Women's Level of Education and Child Care Enrolment. In: Vienna Yearbook of Population Research 8: 107-138. https://doi.org/10.1553/populationyearbook2010s107

*Zeman, Krystof et al.* 2018: Cohort Fertility Decline in Low Fertility Countries: Decomposition Using Parity Progression Ratios. In: Demographic Research 38,25: 651-690. https://doi.org/10.4054/DemRes.2018.38.25

*Date of submission: 24.10.2022* *Date of acceptance: 10.05.2023*

Dr. Marie-Caroline Compans (✉), Dr. Eva Beaujouan. University of Vienna – Wittgenstein Centre for Demography and Global Human Capital (IIASA, OeAW, University of Vienna). Vienna, Austria.
E-mail: marie-caroline.compans@univie.ac.at; eva.beaujouan@univie.ac.at
URL: http://www.wittgensteincentre.org/en/staff/member/compans.htm
http://www.wittgensteincentre.org/en/staff/member/beaujouan.htm

Cristina Suero. Spanish National Research Council, Universidad Carlos III de Madrid. Madrid, Spain. E-mail: cristina.suero@cchs.csic.es
URL: https://cchs.csic.es/es/personal/cristina-suero-garcia

## Appendix

### Appendix 1: Relative ages at first birth by level of education and birth cohort

**Tab. A1:** Age at first birth corresponding for percentiles 25, 50 and 75 within educational groups and by birth cohort in France and Spain

| | France | | | Spain | | |
|---|---|---|---|---|---|---|
| | P25 | P50 | P75 | P25 | P50 | P75 |
| High | | | | | | |
| 1935-39 | 23.5 | 25.9 | 29.0 | 25.0 | 27.7 | 31.0 |
| 1940-49 | 23.2 | 25.7 | 29.2 | 24.8 | 27.1 | 29.5 |
| 1950-59 | 24.0 | 26.8 | 30.4 | 24.3 | 27.3 | 30.7 |
| 1960-69 | 25.7 | 28.3 | 31.6 | 26.7 | 30.2 | 33.7 |
| 1970-74 | 26.5 | 28.6 | 30.9 | 28.9 | 31.9 | 35.0 |
| Medium | | | | | | |
| 1935-39 | 22.1 | 24.2 | 26.8 | 18.2 | 20.2 | 22.2 |
| 1940-49 | 21.3 | 23.4 | 26.3 | 23.5 | 25.6 | 28.8 |
| 1950-59 | 23.7 | 26.4 | 30.1 | 22.3 | 24.3 | 27.2 |
| 1960-69 | 22.5 | 25.3 | 28.7 | 22.9 | 26.8 | 30.8 |
| 1970-74 | 23.0 | 25.7 | 28.6 | 24.3 | 28.4 | 31.9 |
| Low | | | | | | |
| 1935-39 | 21.0 | 23.2 | 25.8 | 23.1 | 25.0 | 27.3 |
| 1940-49 | 20.2 | 22.2 | 24.8 | 22.3 | 24.4 | 26.7 |
| 1950-59 | 19.9 | 22.2 | 25.4 | 21.4 | 23.5 | 26.0 |
| 1960-69 | 20.4 | 23.2 | 27.2 | 22.1 | 25.6 | 29.3 |
| 1970-74 | 20.3 | 23.0 | 26.6 | 21.9 | 26.3 | 30.8 |

Note: P=percentile.

Source: own calculation based on the French Family and Housing survey (2011) and Spanish Fertility surveys (1989, 1999, 2018), using survey weights.

## Appendix 2: Multiple regression analyses

**Tab. A2:** Estimation of transitions to second birth for women in France and Spain (logit models)

| | France | | | Spain | | |
|---|---|---|---|---|---|---|
| | Coeff. | Std. Err. | p-value | Coeff. | Std. Err. | p-value |
| Age at first birth | | | | | | |
| < 25 | 0.711 | 0.02 | 0.000 | 0.652 | 0.07 | 0.000 |
| 25-29 | 0.000 | | | 0.000 | | |
| 30-34 | -0.867 | 0.02 | 0.000 | -0.732 | 0.07 | 0.000 |
| 35+ | -1.992 | 0.03 | 0.000 | -1.998 | 0.09 | 0.000 |
| Educational attainment | | | | | | |
| High | 0.442 | 0.02 | 0.000 | 0.085 | 0.06 | 0.000 |
| Medium | 0.000 | | | 0.000 | | |
| Low | 0.098 | 0.02 | 0.000 | 0.527 | 0.07 | 0.162 |
| Birth cohort | | | | | | |
| 1935-39 | 0.022 | 0.03 | 0.483 | 0.883 | 0.13 | 0.000 |
| 1940-49 | -0.154 | 0.02 | 0.000 | 0.701 | 0.09 | 0.000 |
| 1950-59 | 0.000 | | | 0.000 | | |
| 1960-69 | 0.236 | 0.02 | 0.000 | -0.321 | 0.07 | 0.000 |
| 1970-74 | 0.185 | 0.03 | 0.000 | -0.053 | 0.08 | 0.531 |
| Constant | 1.030 | 0.02 | 0.000 | 1.219 | 0.07 | 0.000 |
| N | | 117,612 | | | 10,245 | |
| Log-likelihood | | -56,108 | | | -4,716 | |

Source: own calculation based on the French Family and Housing survey (2011) and Spanish Fertility surveys (1989, 1999, 2018).

**Tab. A3:** Estimation of the duration between first and second birth for women in France and Spain (lognormal duration models)

| | France | | | Spain | | |
|---|---|---|---|---|---|---|
| | Coeff. | Std. Err. | p-value | Coeff. | Std. Err. | p-value |
| Age at first birth | | | | | | |
| < 25 | 0.015 | 0.01 | 0.007 | -0.022 | 0.02 | 0.174 |
| 25-29 | 0.000 | | | 0.000 | | 0.000 |
| 30-34 | -0.119 | 0.01 | 0.000 | -0.203 | 0.02 | 0.000 |
| 35+ | -0.401 | 0.02 | 0.000 | -0.470 | 0.04 | 0.000 |
| Educational attainment | | | | | | |
| High | -0.058 | 0.01 | 0.000 | 0.008 | 0.02 | 0.000 |
| Medium | 0.000 | | | 0.000 | | |
| Low | -0.098 | 0.01 | 0.000 | -0.067 | 0.02 | 0.674 |
| Birth cohort | | | | | | |
| 1935-39 | -0.194 | 0.01 | 0.000 | -0.330 | 0.03 | 0.000 |
| 1940-49 | -0.163 | 0.01 | 0.000 | -0.360 | 0.02 | 0.000 |
| 1950-59 | 0.000 | | | 0.000 | | |
| 1960-69 | 0.057 | 0.01 | 0.000 | 0.215 | 0.02 | 0.000 |
| 1970-74 | 0.041 | 0.01 | 0.000 | 0.245 | 0.03 | 0.000 |
| Constant | 1.164 | 0.01 | | 1.227 | 0.02 | |
| N | | 89,660 | | | 7,934 | |
| Log-likelihood | | -98,178 | | | -7,571 | |

Source: own calculation based on the French Family and Housing survey (2011) and Spanish Fertility surveys (1989, 1999, 2018).

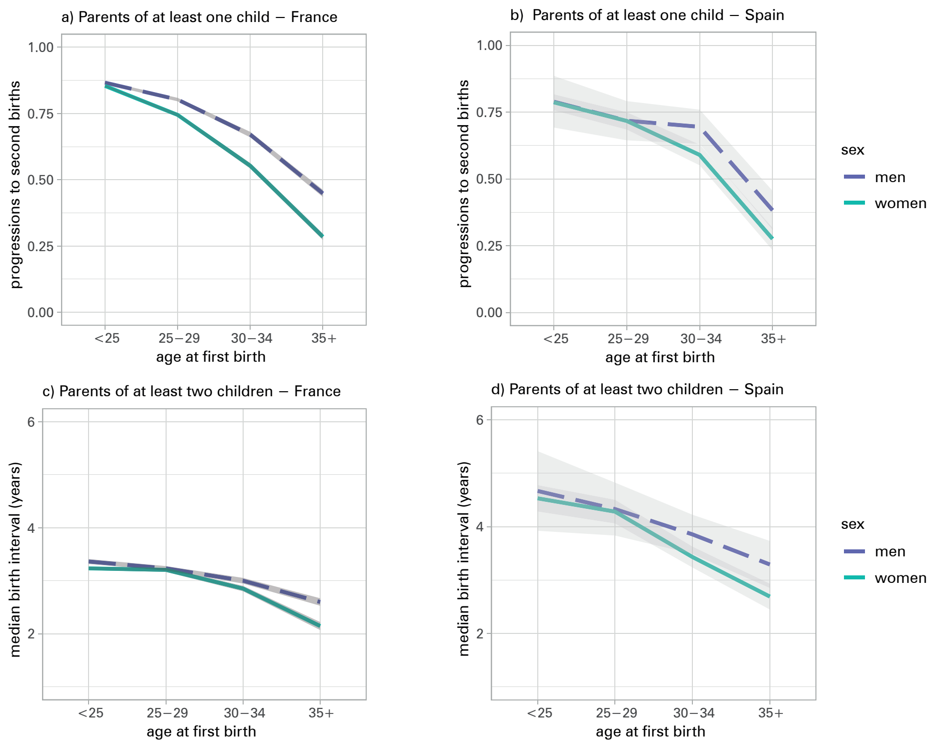
## Appendix 3: Comparison between male and female fertility

Family enlargement is often studied by observing female fertility, as data on male fertility by parity are scarcer. One might expect time squeeze effects to have less of an influence on fathers' likelihood to progress to second birth than on mothers' because men are less biologically constrained by age when conceiving. The survey data we use allow for some comparison between women's and men's fertility. For France, this analysis was conducted using the same cohorts as those used for women (1935-74, n=74,822 men after excluding multiple first births). For Spain, data on male fertility are only available in the 2018 Spanish Fertility survey (n=1,025). While the comparison to women's fertility is possible, among the cohorts of interest the sample size is too limited to obtain significant results by both men's education and age at first fatherhood.

Since men meet fewer biological barriers to conception than women, we expect more transitions to second birth and later completed fertility among fathers than mothers. Indeed, men have a higher probability than women of enlarging their family to two children, and this gender gap increases after age 30 (Fig. A1a). Results (not shown) do not differ by education. Among late-first-time parents, men also tend to have a second child within later and longer timeframes than women (Fig. A1b). Results are similar in both countries, although with large confidence intervals for Spain due to the small sample size (Fig. A1c and A1d).

In turn, differences in late fertility behaviours by sex provide evidence for a biological age effect on female family enlargement.

**Fig. A1:** Predicted progressions to second birth and median birth intervals between the first and second birth (with confidence intervals) by age at first child and sex in France and Spain




Note: Progressions to second birth are estimated using logit models and median birth intervals with lognormal duration models. They are shown for women and men with medium educational attainment and for the cohort 1950-59 for France, and 1965-69 for Spain (reference levels). They are displayed with confidence intervals (95%) in grey, which are small for France due to the large sample size.

Source: own calculation based on the French Family and Housing survey (2011) and Spanish Fertility surveys (1989, 1999, 2018).

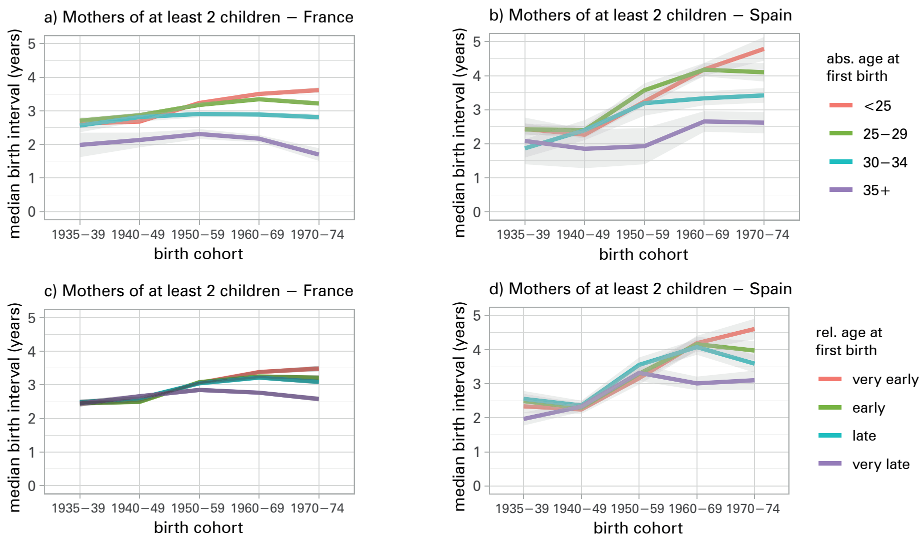
## Appendix 4: Trends in birth intervals across cohorts

Across the observed cohorts, Figure A2 shows substantial changes in birth intervals in Spain (1935 to 1974). Holding the level of education constant and allowing for the effect of age at first birth to vary by cohort, the age gradient in the timing of second birth after the first widened, especially compared to France (Fig. A2a and A2b). Birth intervals mainly increased among the youngest first-time mothers in Spain (<25 years old), with half of those born in the early 1970s enlarging their family nearly five years after the firstborn. This is substantially above young mothers' median birth interval in France (around 3.5 years).

As birth intervals have increased across cohorts, the appropriate timing for entering motherhood has also shifted towards later ages. Figures A2c and A2d display trends in birth intervals by relative age at first motherhood across cohorts. In France and Spain, among women born before the 1950s cohort, very late mothers did not have a second birth faster than other mothers did. When compared to other age groups, these women only accelerated second births from the 1960s cohorts onwards. These are cohorts for which the very late timing of the first birth corresponds to ages above 30 years old (Table A1).[7] This, in turn, provides further evidence for a time squeeze effect.

[7] For France, the specific decline among the 1970-74 cohort should be viewed with caution, since some women in the sample had just reached 37-38 years old at the time of the survey and may have experienced a second birth at later ages. This implies that some women will eventually have a second child before they turn older, which may flatten the curve we see for women who became mothers at age 35 or more (Fig. A2a) or at a relative very late age (Fig. A2c).

**Fig. A2:** Median interval between the first and second birth (with confidence intervals) across women's cohorts by absolute and relative age at entering motherhood in France and Spain




Note: Median BI2 are estimated with lognormal duration models. They are displayed with confidence intervals (95%) in grey, which are small for France due to the large sample size. Models control for education (reference level = medium).

Source: own calculation based on the French Family and Housing survey (2011) and Spanish Fertility surveys (1989, 1999, 2018).

**Comparative Population Studies**

*www.comparativepopulationstudies.de*

ISSN: 1869-8980 (Print) – 1869-8999 (Internet)

**Published by**
Federal Institute for Population Research (BiB)
65180 Wiesbaden / Germany

**Managing Publisher**
Dr. Nikola Sander



**Editor**
Prof. Frans Willekens

**Managing Editor**
Dr. Katrin Schiefer

**Editorial Assistant**
Beatriz Feiler-Fuchs
Wiebke Hamann

**Layout**
Beatriz Feiler-Fuchs

E-mail: cpos@bib.bund.de