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MARITAL FERTILITY AND ASSORTATIVE MATING BEFORE, DURING, AND AFTER THE BABY BOOM IN BELGIUM

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Abstract

Over the course of the 20th century, the expansion of female participation in education and the gradual re-entrance of women into the labour market changed the dynamics of union formation and fertility. After the Baby Boom period, the association between wealth or social status on the one hand and fertility on the other was turned around. In the meantime, educational attainment became a key determinant of fertility. In this paper we investigate the relation between educational assortative mating and marital fertility. We focus on the fertility trends during the Baby Boom and subsequent Baby Bust, which have been shown to be related to changes in marriage patterns. More particularly, we investigate how changes in the timing and quantum of marital fertility were related to the changing combination of his and her educational attainment. We adopt a couple-oriented approach and use retrospective Belgian census data with rich information on educational attainment and marriage and childbearing histories, which allows us to use event history analysis to analyse fertility of the relevant birth cohorts. Results show that couples where both partners are poorly educated experienced the highest fertility among most of the Baby Boom producing birth cohorts. Hypergamous couples (husband more educated than wife) were not far behind, and their fertility levels even exceeded the levels of the low-educated couples among some birth cohorts. High-educated homogamous couples had slightly lower fertility than hypergamous couples. Hypogamy (husband less educated than wife) was clearly associated with lower fertility, even among the younger cohorts. The increasing prevalence of hypogamy during the Baby Bust could thus be one factor contributing to the fertility decline.

Introduction

Around the middle of the 20th century, the fertility decline that many Western countries had been experiencing since the second half of the 19th century was interrupted by a temporary surge in birth rates: the Baby Boom. Since it involved increasing fertility levels, it was as if the demographic transition was briefly resisted, before returning to sometimes rapidly decreasing fertility levels in the 1970s and 1980s. Classical explanations of the Baby Boom focus on the post-World War II optimism and economic boom as driving factors. However, recent research pointed out that these explanations fall short, as the recovery of fertility started already during or even before the war in many countries (Van Bavel & Reher, 2013). As a result, is it still not entirely clear what are the main drivers behind the Baby Boom. What is abundantly clear, however, is that it involved two demographic trends. On the one hand there was an acceleration of the shift to earlier transition into marriage and parenthood (Hajnal, 1953). On the other hand there was also an increase of the quantum of fertility (Bean, 1983; Van Bavel et al., 2015). More people had children, and more people had more than one child. The quantum increase is perhaps the most puzzling element of the Baby Boom as it seems at odds with other developments at the time, including the educational expansion (Van Bavel 2014).

In the Baby Boom era, marriage was maybe more than ever the prime context for having children (Coontz, 2005). On the surface at least, conformism and uniformity were leading people to a nuclear family with traditional norms and values and a sexual division of labour – male breadwinner, female homemaker — that had probably never been as strong (Janssens, 1997). Still, there was something on the move within the institute of marriage. Gender relations were at the verge of major changes (Goldscheider, Bernhardt, & Lappegard, 2015). The educational expansion was well underway, and education was increasingly becoming an important determinant of socio-economic structure and particularly a key issue in partner selection (Breen, 2010).

The expansion of education is particularly interesting to look at since increased access to higher education for men and especially for women is generally associated with the postponement of parenthood and with low fertility. This is exactly the opposite of what happened during the Baby Boom era, when having more children at a younger age went hand in hand with increased participation in secondary and tertiary education (Ronsijn, 2014). Recently Van Bavel (2014) and Sandström (2014) have looked into the educational gradient of fertility for women during the Baby Boom era, finding that the educational penalty on fertility decreased during the Baby Boom years. A more comprehensive account which investigates both male and female educational effects is however still lacking. As female educational attainment and female economic roles were changing, so were male patterns (Butz & Ward, 1979; Macunovich, 1995; Oppenheimer, 1994). While women had to give up work on the labour market in order to take care of the household and the children, men were increasingly becoming the sole breadwinner in a labour market where

education was becoming increasingly important (Janssens, 1997). When women started to re-enter the labour market, the balance between husband and wife started changing again (Goldin, 2006). It is therefore interesting not only to simply include male educational characteristics, but to look at the role of the particular combinations of husband and wife's educational attainment in union formation processes during the Baby Boom and Baby Bust era. People do not find a partner randomly, but select a partner given certain preferences and constraints. Assortative mating, as this phenomenon is called, basically organizes people into families as it determines the matches that come out of the marriage market, and is consequently of considerable interest if we want to understand fertility trends (Schwartz, 2013).

Marriage was thus at a crossroads, and so this paper makes the married couple the central unit of analysis. It looks at how changing marriage patterns due to the changing distribution of educational attainment influences marital fertility patterns. More precisely, this paper investigates the link between the matching (or the lack thereof) of his and her educational levels on the one hand and dynamics of marital fertility on the other, using retrospective census data of the 1981 and 2001 Belgian census. In the first section we will illustrate three key trends of interest for this paper: the Belgian Baby Boom and Baby Bust, the changing educational distribution and the changing pattern of assortative mating in this period. Next we will discuss the potential mechanisms behind a possible connection between educational assortative mating and fertility, and we will present the data and methods that will be used to investigate this.

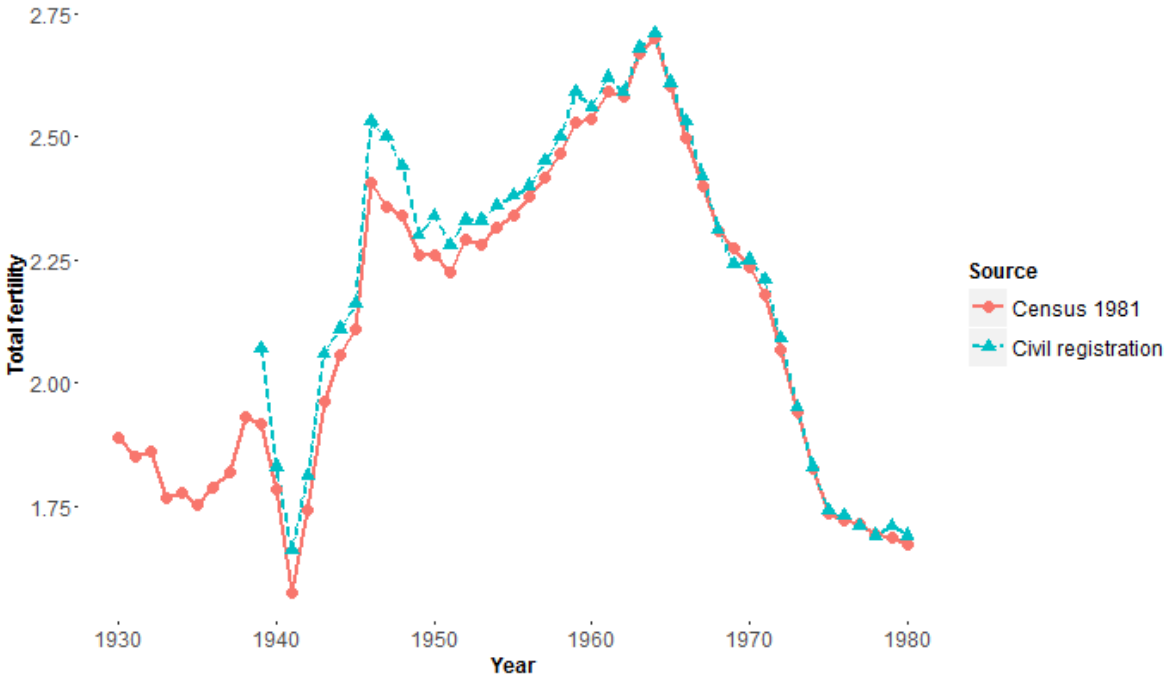
Background

The recovery of fertility in Belgium started around 1935 and, while temporarily interrupted by the first years of World War II, continued until 1964, after which a steady decline was initiated that brought fertility back to its pre-war level in the 1970s. Figure 1 shows the trends in the period total fertility rate during this era. We include a time-series based on civil registration (Matthijs & Bosscher, 1991) as a rough validation of our own 1981 Census based, retrospective calculations.. While both series match closely, the census estimates are consistently slightly below the vital registration total fertility rates, and this bias is a bit larger further back in time. This may be due to underreporting, which increases with old age, and to selective survival (Van Bavel, 2013).

Van Bavel and Reher (2013) show that the Belgian case is rather typical: the turnaround started earliest in the Nordic countries, that is, in mid-1933 in Denmark and Finland, mid-1934 in Sweden, and by the end of 1935 in Norway. Like in Belgium, the decline of fertility stopped in 1935 in France and England and Wales. The fact that the turning point in the total fertility rate was well before the war is an important indication that the classical interpretation of the baby boom as the result of post-war optimism and the economic boom of the 1950s and 1960s is insufficient. In some cases, the recovery of fertility was interrupted when the war broke out. Apart from Belgium,

this was for example the case in France in 1940, following the declaration of war in September 1939. After 1942, fertility began rising rapidly in many countries. In general the intensity of the baby boom in Belgium was rather low, compared to for example the United States or Canada and to a lesser extent France and The Netherlands (Van Bavel & Reher, 2013).

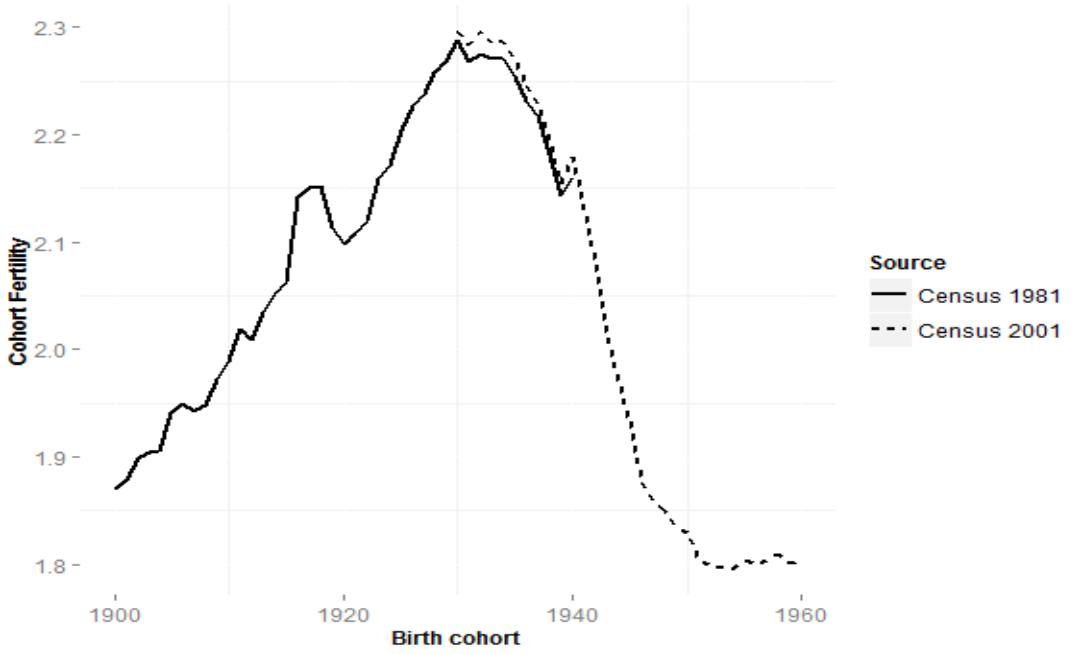
Figure 1: Period total fertility rates 1930-1980



Source: Belgodata (Matthijs & Bosscher, 1991) *and ADSEI (FOD Economie), Bevolkingsstatistieken*

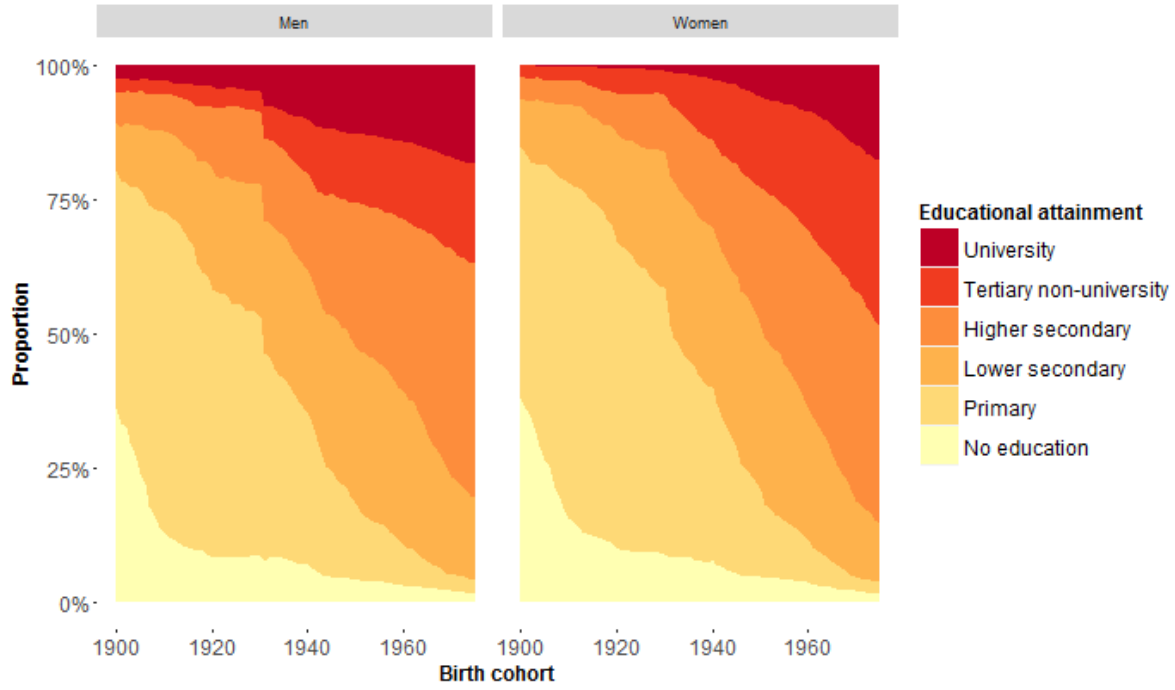
In Figure 2 we see the cohort fertility for generations born between 1900 and 1960. The clear inverted u-shape further substantiates the claim that the Baby Boom was more than a timing effect. It was more than recuperation of postponed births of the depression and war years resulting in higher period rates: there was a clear increase of fertility quantum over cohorts spanning 30 years. Each birth cohort between 1900, when cohort fertility was well below replacement levels (Van Bavel, 2010) and 1930, when it reached its peak of about 2.3 children per woman, had indeed higher fertility than the previous one. The only exceptions are women born right after World War I, who reached their reproductive years during the first years of the Second World War. For generations born after 1940, fertility decreased fairly quickly back to below-replacement levels.

Figure 2: Cohort total fertility rates of women born between 1900 and 1960



Source: Belgian censuses of 1981 and 2001, own calculations, see also Van Bavel & Reher, 2013.

Figure 3: Evolution of the educational distribution for men and women born between 1900 and 1975



Source: Belgian censuses of 1981 and 2001, own calculations, see Nomes & Van Bavel (2015)

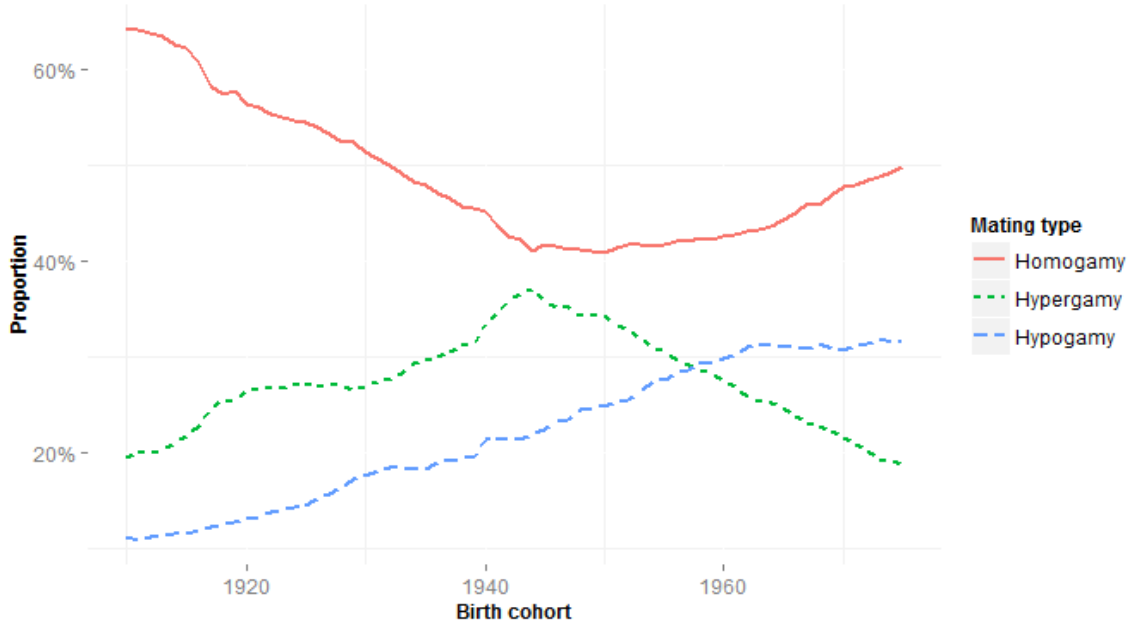
The expansion of participation in education is one of the main social changes of the 20th century in the Western world, a change in which Belgium participated as well (Nomes & Van Bavel, 2015;

Ronsijn, 2014). Figure 3 shows the cohort trends in educational attainment for both men and women. The expansion in education throughout the 20th century stands out. For generations born at the beginning of the century, completing education beyond the primary school was exceptional, both for men and women. Only 4% of men born in the first decade of the 20th century and 2% of women completed tertiary education. In the generations born around the middle of the century, who would go to produce the Baby Bust (1940-1960), the number of men and women with tertiary education had already increased to 18% and 17% respectively. For the generations responsible for the Baby Boom (1900-1940), however, the main shift occurs between primary and secondary education: among the oldest cohorts, about 80% of men and women had at most finished primary education, among the youngest Baby Boom producing generations, this was down to less than 25% for men and less than 35% for women.

A crucial element is that the educational expansion did not happen at the same time and with the same speed for men and women (Nomes & Van Bavel, 2015). Men took a head start and women had to catch up, which has important consequences for the balance within couples. A key result from sociological research is that "like marries like" in terms of social and educational background (Kalmijn, 1998; Schwartz, 2013; Van de Putte, 2005; van Leeuwen, Maas, & Miles, 2005). While parental social class background continues to play an important role in patterns of assortative mating, education has emerged as an increasingly important social dimension in the union formation process (Schwartz & Mare, 2005; 2012). This reflects the growing significance of educational attainment in modern society and modern economies in general. In the modern economy, the training expected to gain access to occupational positions has increasingly become school-based rather than family based (Weber, 1946).

Figure 4 shows the evolution of the proportion of educationally homogamous (spouses have the same educational attainment), hypergamous (the husband is higher educated than the wife) and hypogamous (the husband is lower educated than the wife) marriages. In all cohorts, homogamy remained most common. In all except the most recent cohorts, hypergamy came second, with hypogamy the least common pattern. Among the Baby Boom producing generations, homogamy was on the decline while both hyper- and hypogamy were getting increasingly more common. Women tended to marry men who are at least as highly educated as themselves. Among the Baby Bust producing cohorts, homogamy was on the rise again, while hypergamy started to decline. While homogamy reached its low point among cohorts born in the 1940s, hypergamy reached its high point, yet even among these cohorts, when traditional values and male breadwinner model stood strong, hypogamy was far from unusual. Among generations born by the end of the 1950s, hypogamy become more common than hypergamy.

Figure 4: Marriages by assortative mating type, birth cohorts 1910 - 1965



Source: Belgian censuses of 1981 and 2001, own calculations, see Nomes & Van Bavel (2015)

Theoretical framework

We have seen that there were considerable shifts in the prevalence of the types of educational assortative mating during the Baby Boom and Baby Bust era. We expect that the changing combinations of the educational attainment of husband and wife were related to changing fertility dynamics for several reasons. On the one hand there are certain causal mechanisms which might explain how different combinations of educational attainment could lead to distinctive marital fertility patterns, either directly through differences in fertility decisions, or indirectly through differences in marriage timing. On the other hand there is a distinct possibility that selection effects play an important role in the association between educational assortative mating and fertility.

Firstly, educational attainment is an important determinant of the monetary contribution of each partner to the household budget. Higher education enhances the income potential, which could both have a positive income effect on fertility, as child rearing is expensive, and a negative effect, since higher wages imply higher opportunity costs when having children negatively affects labour market activity (Kravdal & Rindfuss, 2008). Given the wage gap between men and women and the different expectations for involvement in housework and child rearing, the resulting effect of educational attainment on fertility strongly differs by gender (Becker, 1981). It is therefore important to consider both the educational attainment of the husband and the wife. Moreover, the educational attainment of the husband could influence the effect on fertility of the educational attainment and the corresponding income potential of the wife, and vice versa. If

both partners are highly educated, the opportunity cost for having children might have a smaller effect on childbearing decisions, as the household might be able to cope with the income of just one partner, or the combined income may be high enough for outsourcing child care, for example by hiring a nanny. Consequently, each particular combination of educational attainment of husband and wife could lead to a particular pattern of marital fertility.

A second, more indirect way in which educational assortative mating might influence marital fertility is related to the timing of marriage. Earlier transition into marriage and parenthood is associated with a higher total number of children (Berrington, Stone, & Beaujouan, 2015; Sobotka, 2003), not only because people who are prone to marry early tend to want to have more children, but also because women's fecundity declines with age. Higher education is generally associated with later transition into marriage, especially for women (Becker & Lewis, 1974; Gangadharan & Maitra, 2001). Not only do the higher educated spend more time in school, increased education opens up economic alternatives to getting married and raising children, which increases women's utility of being single compared to the utility of being married (Becker, 1974). The particular combination of educational attainment of a potential husband and wife here too could play a role. The theory of marriage timing developed by Oppenheimer (1988) suggest how this could be the case. Since men and women compete as they seek partners, a market in marriages can be presumed to exist (Becker, 1974). Each person tries to find a partner with the best possible set of characteristics, including education, given certain preferences and given certain restrictions imposed by market conditions. Since preferences depend on prevailing gender roles, the optimal outcome with respect to education of this process of assortative mating will have changed as female higher education and labour market participation increased. Furthermore, finding the "right" partner takes time while changing market conditions, i.e. a changing socio-economic context, can facilitate or hinder the search (Kalmijn, 2011). Better labour market opportunities for young, high-educated people, for example, would make it easier to spot potential mates with a high income potential, which could lead to earlier transition into marriage, especially for optimal matches. Uncertainty over job prospects on the other hand could make the matching process more difficult, as the income potential of potential partners remain unclear, which could result in people marrying at a later age (Oppenheimer, 1988).

Selection effects too could play an important role in the association between educational assortative mating and fertility. If people's preferences for having children are related to their preferences for finding a partner with a given level of educational attainment, it would lead to a statistical association between educational assortative mating and fertility, , even if the two are not directly causally related. If women who prefer to have a lot of children, for example, prefer to marry a man with more education than themselves, this would result in higher fertility levels for hypergamous couples without hypergamy itself being the reason. Conversely, if women who prefer a career in the labour market over childbearing put a higher value on education, they will be more likely to end up in highly educated homogamous marriages or in hypogamous marriages

(if they marry at all). Consequently, those type of couples would have lower fertility levels. This selection effect could furthermore be reinforced by the fact that education increases a person's bargaining power, not only because of the higher income potential associated with better education, but also because someone with a higher education will be more comfortable in dealing with all kinds of administrative and institutional structures (Doss, 2008). Highly educated women would therefore be better equipped to weigh on child bearing decisions.

The association between educational assortative mating and fertility itself may of course also be subject to change given the changing significance of male and female education, even during the Baby Boom era itself. The literature on the association between educational assortative mating and fertility today emphasizes the role of educational homogamy in providing marital stability, which has a positive effect on fertility (Bauer & Jacob, 2009; Huber & Fieder, 2011; Krzyżanowska & Mascie-Taylor, 2014). Recently, educational homogamy has been the dominant outcome of partner search, either because people prefer partners with similar characteristics, or because they prefer partners with the highest income potential (Kalmijn, 1994; 1998; Mare, 1991). Given that gender roles were different in Baby Boom era, it is likely that things were different in those days. Education was only starting to emerge as an important factor in partner search, and women's labour market participation and contribution to the household budget were at a historical low (Lambrechts, 1979; Vanhaute, 1998). Therefore, we can assume the income potential of women was considered much less important.

We assume that while the sexual division of labour and the male breadwinner norm became stronger (Janssens, 1997), hypergamy became the union type which provided an environment most conducive to childbearing and -rearing. The husband could take advantage of his higher education on the labour market while the wife, whose opportunity cost for staying home was relatively low given the low demand for female labour, could dedicate herself to taking care of children. This was reinforced by the kind of timing and selection effects pointed out above. Women with a desire to have children may have preferred a hypergamous match with a high-earning husband and may have preferred to marry as soon as possible. The growing importance of education might have made it easier for men to signal income potential at a relatively young age, thus making this hypergamous match easier to make. Such unions could consequently be formed at a younger age and could thus potentially lead to higher fertility.

High-educated homogamous couples might have profited from similar specialization strategies (Becker, 1981), however, due to higher opportunity costs for having children for the wife given her higher education and due to selection effects, their fertility levels are likely to have been slightly lower than the fertility levels of hypergamous couples.

In hypogamous marriages, the low income potential of the husband meant that the marginal utility of his wife's labour was comparatively higher, and her opportunity cost for having children was consequently considerably higher. As a result, hypogamous couples are likely to have had

lower fertility levels than homogamous and hypergamous couples. This could be reinforced by timing and selection effects: hypogamous couples tend to get married on average at a later age (Nomes & Van Bavel, 2015) and might have been more attractive to people who were less eager to have children. Moreover, if hypergamy became a social norm in the Baby Boom era, it seems likely that people who adhered to this norm, tended to adhere to similar social norms in general. Conversely, people in non-normative, hypogamous unions could be expected to deviate from other social norms more easily too, including the emerging two-child norm (Van Bavel et al., 2015). If so, hypergamous couples would be more likely to have two children, and hypogamous couples would be more likely to remain childless or have just one child.

Lastly, homogamous couples where both partners are low-educated, while having lower opportunity costs for having children, had a limited income potential at a time when parental investment was strongly increasing due to the growing importance of education, which might have become more and more detrimental to their fertility levels. Moreover, as with hypogamous couples, since the income potential of the husband was limited, the contribution to the household budget of the wife was more important and her opportunity cost for having children was higher. On the other hand, poorly educated people are likely to marry earlier and to value quantity over quality regarding their offspring (Becker & Lewis, 1974), which could offset the negative effects of their education on fertility.

All in all, among couples with at least one highly educated partner, we expect hypergamous couples to have to highest fertility levels during the Baby Boom era, closely followed by homogamous couples. We expect hypogamous couples to have considerably lower fertility levels. Couples were both partners are low-educated are expected to have higher fertility than hypogamous couples, but it is less likely that their fertility levels exceed those of hypergamous and high-educated homogamous couples as well.

Data and methods

To investigate whether changes in patterns of assortative mating are indeed associated with changes in fertility patterns, we investigate marital fertility based on retrospective information in the Belgian censuses of 1981 (Willaert & Deboosere, 2008) and 2001 (Deboosere & Willaert, 2004). The census of 1981 is used for couples were the wife was born between 1910 and 1939, the census of 2001 is used for married women born between 1940 and 1959. Although these censuses contain rich information on education and on marriage- and childbearing histories, there are some limitations given the retrospective nature of the data (Van Bavel, 2013). First of all, sometimes the educational information on either the husband or wife is missing, especially in the census on 2001, which reduces the number of couples we can take into consideration from about 2.7 million to 2.5 million. Second and more important, we can only link husbands and wives with

each other if they still live together at time of the census. If by this time a woman is widowed, divorced or separated from the man with whom she had (some) of her children, we cannot link them and they are excluded from the analysis. As a result, of the 2.5 million potential couples, we have to exclude about 20% (see Table 1). Some bias due to selection effects with regards to mortality is unavoidable, given the social gradient of mortality (Gadeyne & Deboosere, 2002). If there is furthermore a link between divorce and assortative mating, which is quite plausible (Blossfeld, 2014; Frimmel, Halla, & Winter-Ebmer, 2013), divorce could also introduce some bias. This is especially the case for the census of 2001, which has information on cohorts among which divorce had become much more common. This explains the percentage of excluded couples is much higher among cohorts born between 1955 and 1959, who were aged 42 to 46 at the 2001 census, compared to cohorts born between 1935 and 1939 who had the same age at the time of the 1981 census.

Table 1: Overview of the number of potential and matched couples by birth cohort.

Birth cohorts	Age at time of census	Ever married women	Linked couples	% excluded
1910-1914	67-71	217,380	121,086	44.3%
1915-1919	62-66	166,272	112,651	32.2%
1920-1924	57-61	267,635	209,044	21.9%
1925-1929	52-56	268,775	229,087	14.7%
1930-1934	47-51	274,946	246,087	10.5%
1935-1939	42-46	256,899	234,753	8.6%
1940-1944*	57-61	213,382	166,244	22.1%
1945-1949*	52-56	278,631	223,672	19.7%
1950-1954*	47-51	289,922	235,135	18.9%
1955-1959*	42-46	304,317	252,474	17.0%
TOTAL		2,538,159	2,030,481	20,0%

* Based on the census of 2001

Educational attainment was grouped into five categories: university, tertiary non-university, higher secondary, lower secondary and at most primary education. To analyse these data, we use measures of marital fertility. We compare cohort total marital fertility (number of children per married woman for a certain birth cohort) of groups with different assortative mating outcomes. More specifically, we compare couples where both partners are low-educated (at most lower secondary), with couples where at least one partner has a higher education (at least higher secondary). Among the latter, we distinguish between homogamous, hypergamous and hypogamous cases.

We pair this with an event history model approach. We apply a Cox proportional hazard model which estimates the hazard rate of having a child. A proportional hazard model is quite flexible

given its unspecified baseline hazard (Boyle & Starr, 1985; Mills, 2011). In such a model, the hazard rate at time *t* or the fertility risk a couple experiences at time *t* is explained by a non-parametric baseline hazard $h_0(t)$ which is subject to the influence of independent variables $X = (X_1, X_2, \ldots, X_n)$.

$$\mathrm{h}(\mathrm{t}|\mathrm{X}) = \mathrm{h}_0(t)\,\exp(\sum_{i=1}^{n} X_i\beta_i)$$

Firstly, we fit three models of first births. Time in these models is marriage duration in years, meaning that T_0 is the first year of marriage. The models estimates the risk for having a child that a couple experiences *t* years after they married, given that they did not have a child yet. The first model includes indicators of assortative mating type but excludes birth cohort and age at marriage. The second model adds birth cohort as a categorical independent variable, the third model adds age at marriage.

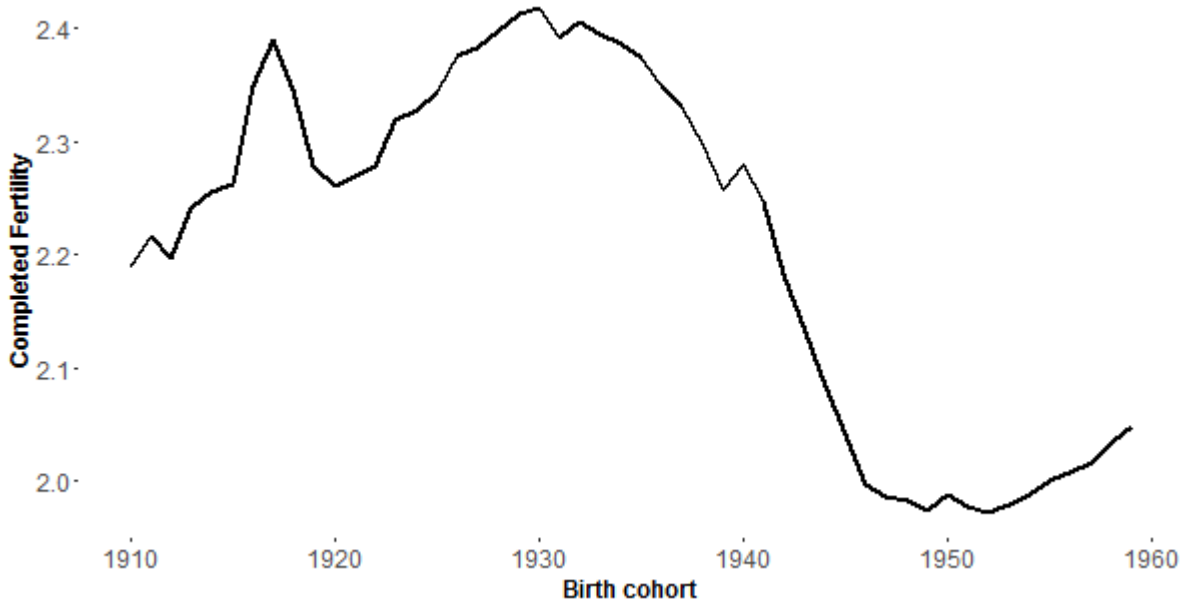
Secondly, we fit models for second births, third births and fourth births, which are conditional on having had a first, second and third child respectively. Time in these models is the number of years since the last birth, meaning that T_0 is the year of the previous birth.

Thirdly, we take a look at the interaction between assortative mating type and birth cohort. We fit two models for first births, one where we control for age at marriage and one where we do not, and we do the same for second births.

Results

Figure 5 displays the general trend of cohort marital fertility between 1910 and 1960. As more and more people got married during the Baby Boom years (Nomes & Van Bavel, 2015), these marital fertility levels were applicable to a growing share of the population. This already explains a substantial part of the Baby Boom. At the same time, Figure 5 shows that marital fertility itself increased as well, more precisely between the cohorts born in the 1910s and the cohorts born in the 1930s. This means that either less married couples remained childless, or more married couples had more than one child, or both.

Figure 5: Cohort marital fertility, birth cohorts 1910-1959

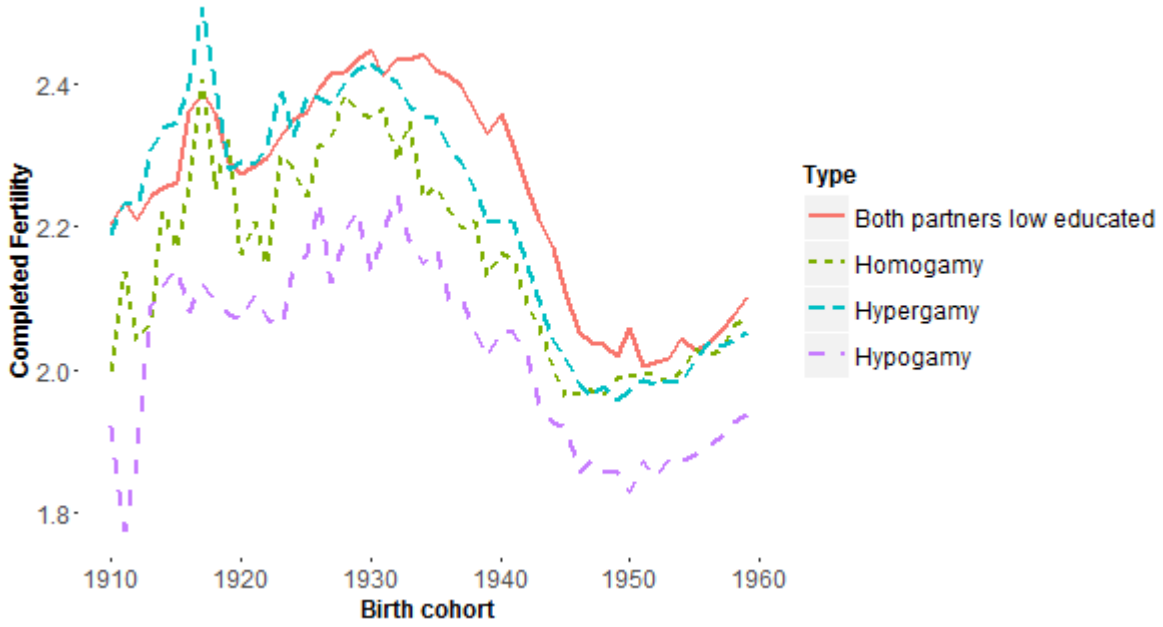


Source: Belgian censuses of 1981 and 2001, own calculations.

Figure 6 charts cohort marital fertility by each educational assortative mating type. On the whole, couples where both partners are poorly educated have the highest fertility. Among couples where at least one of the partners is highly educated, educationally hypergamous couples have consistently the highest fertility. Among the oldest cohorts, they even have more children than poorly educated couples. This is consistent with our expectations. The fertility of highly educated homogamous couples remains well below the fertility of hypergamous ones in all birth cohorts, only to overtake them towards the youngest cohorts, which might point to an evolution towards the contemporary situation where homogamy is positively associated with fertility.

Hypogamous couples clearly have the lowest fertility levels. Among the younger cohorts born in the 1940s and 1950s, there is some convergence between homogamous, hypergamous and low-educated couples, but the fertility levels of hypogamous couples remain well below the fertility levels of the others. As we have seen, the prevalence of hypergamy among these couples is on the decline, while hypogamy is becoming more common and even surpasses hypergamy among cohorts born at the end of the 1950s. This shift towards hypogamy is therefore a contributing factor to the Baby Bust.

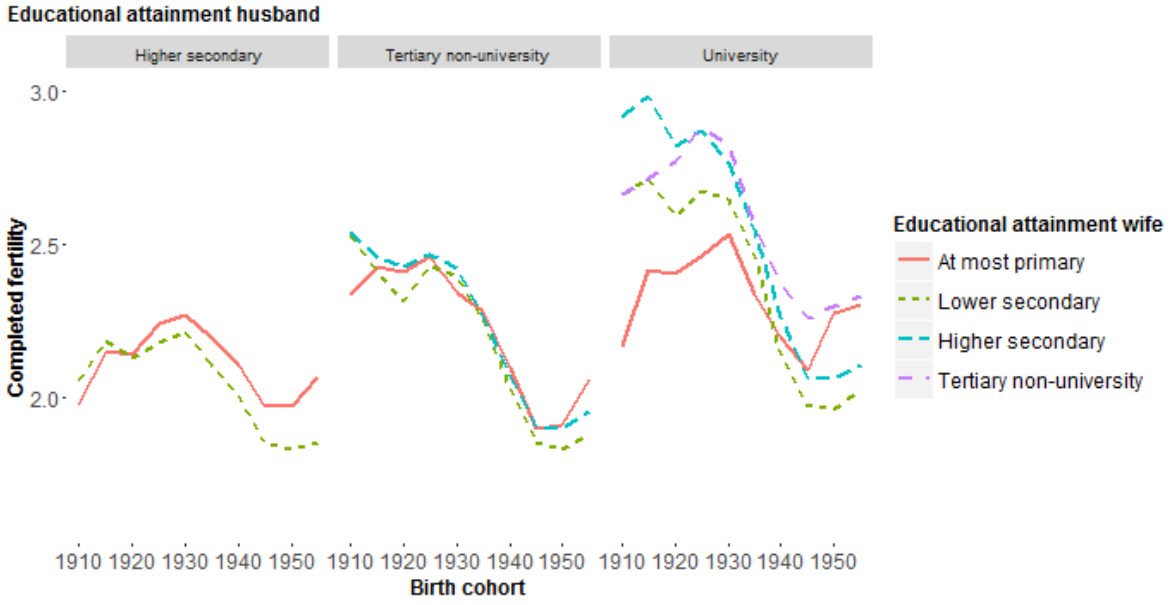
Figure 6: Assortative mating and cohort marital fertility, birth cohorts 1910-1959



Source: Belgian censuses of 1981 and 2001, own calculations.

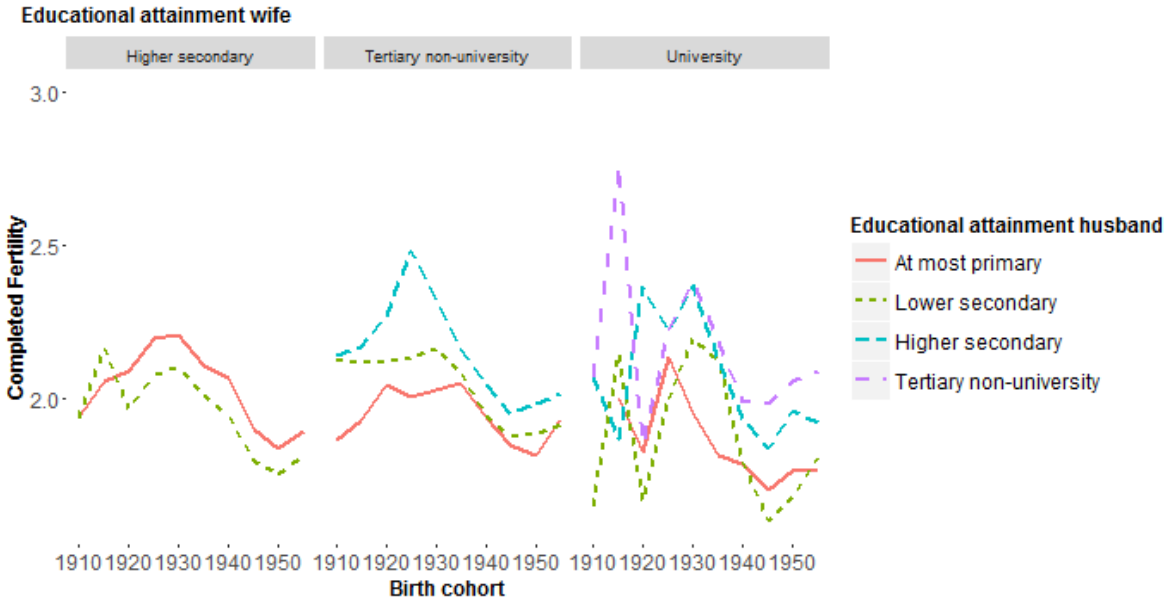
In Figure 7 we examine educationally hypergamous marriages in more detail. From left to right, marital fertility is plotted of men with a higher secondary degree, a non-university tertiary degree and a university degree respectively, given the educational attainment of their wives, which in hypergamy is by definition lower than their own. We see clearly that the higher the education of the husband, the higher the fertility level. Among hypergamous couples, couples where the man has a university degree have considerably higher fertility levels than couples where the man only has a higher secondary degree. There is less of an educational gradient for the wife's education, unless they are married to a university-educated husband. In this category, poorly educated women have a much lower fertility than better educated women. This is somewhat surprising, as we would expect that the higher the educational level of the husband, the higher his income potential, and therefore the lower the importance of the income potential (and educational level) of the wife. Nevertheless, women married to men with a university degree who have a non-university tertiary degree like nurses or teachers, and who consequently have a decent income potential, have more children than women married to men with a university degree who have for example only primary education.

Figure 7: Cohort marital fertility of hypergamous couples by educational level of husband and wife



Source: Belgian censuses of 1981 and 2001, own calculations.

Figure 8: Cohort marital fertility of hypogamous couples by educational level of wife and husband



Source: Belgian censuses of 1981 and 2001, own calculations.

Figure 8 shows the fertility trends for hypogamous couples: from left to right, women's marital fertility is plotted for each of the three educational levels considered high, given the educational attainment of their husbands, which in hypogamy is by definition lower than their own. While for men with a higher degree who married hypergamously higher education meant higher fertility, this is not the case for women in a hypogamous marriage. Whether these women have a

university degree or only a higher secondary degree, their fertility levels are quite similar. Moreover, comparing Figures 7 and 8, highly educated women have considerably higher fertility when married to even higher educated men. For example, a woman with a non-university tertiary degree born in the 1920s and in a hypogamous union had on average a completed fertility between 2.0 and 2.4 children, depending on the educational level of her husband. However, a similarly educated woman married to a university educated man had an average fertility of more than 2.8 children.

With regards to the educational level of the husband in hypogamous marriages, there is an educational gradient of fertility regardless of the educational level of the wife. Among women with a higher secondary degree, a lower educated husband is associated with the highest fertility. For the other two categories, it is the other way around. Among hypogamous women a combination between a woman with a non-university tertiary degree (our teachers and nurses), and a husband with a higher-secondary degree (including technical fields) yields the highest fertility. This could be explained by the fact that some forms of secondary education (technical schools) and non-university tertiary education ("normal schools" for teachers) are not really that different in level or prestige, and so these might not represent cases of hypogamy in terms of prestige and even earning potential.

To disentangle the effects of some of the determinants of the fertility levels of different educational assortative mating types, we now turn to the results of our event history models. Table 2 reports the estimated hazard ratios for three models of first births. Model 1a shows that, overall, couples where both partners are poorly educated (i.e., the reference category) have the highest first birth rates, although the difference with hypergamous couples is negligible. Hypogamous couples have the lowest first child rates: the hazard ratio is about 6% lower compared to low-educated couples. When we include the birth cohort indicators in Model 1b, the net difference between couples where both partners are poorly educated and couples where at least one partner is highly educated turns out to be larger. This could be explained by the fact that couples with at least one highly educated partner became more common among younger cohorts, who experienced higher fertility in general. For example, since hypergamy was much more prevalent among generations born in the 1940s, which were the same generations who experienced the highpoint of the baby boom, not including a birth cohort variable would lead to an overestimation of the positive association between fertility and hypergamy as such.

After including the wife's age at marriage in Model 1c, the differences between union types become much smaller. After controlling for marriage timing, hypergamy is associated with a 1 % higher first birth rate compared to low-educated homogamous couples. These results confirm that fertility is negatively associated with age at marriage: the higher the age at marriage, the lower the rate of transition to parenthood. The higher fertility of the poorly educated couples we found in Model 1a and 1b is apparently largely explained by their younger age at marriage. The

cohort hazard ratios in Model 1c are lower than they were in Model 1b, pointing once again to the fact that the general decrease in age at marriage played an important role in the Baby Boom.

Table 2: Hazard ratios of having a first child based on a Cox proportional hazard model (time = marriage duration)

	Model 1a	Model 1b	Model 1c
Assortative mating type			
Both partners low-educated (ref.)			
Homogamy (H=W)	0.946	0.924	0.999
Hypergamous (H>W)	0.991	0.968	1.015
Hypogamous (H<W)	0.936	0.914	0.989
Birth cohort			
1910s (ref.)			
1920s		1.129	1.083
1930s		1.268	1.157
1940s		1.290	1.149
1950s		1.161	1.010
Age at Marriage			
< 21 (ref.)			
21-25			0.819
26-30			0.766
30-35			0.471
> 35			0.028

Table 3 reprints the estimates from Model 1c, next to the results from the models for second, third, and fourth births that include the same explanatory variables. It is striking that for second births, hypergamous and highly educated homogamous couples exhibit higher fertility compared to hypogamous couples as well as compared to poorly educated couples. This suggests that the two-child norm was indeed strongly adhered to in the former types of couples. However, we have to be wary of selection effects: as we only consider people who have had a first child already in these models, we may select a particular group of people among couples with at least one highly educated partner (Kravdal & Rindfuss, 2008).

For the parities beyond the second child, couples with at least one highly educated partner have lower rates. All of this suggest that the higher fertility of couples where both partners are poorly educated, as shown in our descriptive results, is due to their higher chances of transitioning to higher parities in combination with the fact that they marry younger, on average, than couples where at least one of the partners is relatively highly educated.

Table 3: Hazard ratios of having a first, second, third and fourth child based on Cox proportional hazard model (time = marriage duration)

	Model 1c	Model 2	Model 3	Model 4
	1st birth	2nd birth	3rd birth	4th birth
Assortative mating type				
Both partners low-educated (ref.)				
Homogamy (H=W)	0.999	1.239	0.959	0.781
Hypergamous (H>W)	1.015	1.188	0.976	0.849
Hypogamous (H<W)	0.989	1.066	0.867	0.790
Birth cohort				
1910s (ref.)				
1920s	1.083	1.057	1.002	0.967
1930s	1.157	1.186	0.967	0.843
1940s	1.149	1.089	0.629	0.508
1950s	1.010	1.059	0.544	0.450
Age at Marriage				
< 21 (ref.)				
21-25	0.819	1.022	0.902	0.834
26-30	0.766	1.115	0.939	0.833
30-35	0.471	0.857	0.705	0.648
> 35	0.028	0.194	0.197	0.397

Figure 9: Hazard ratios of having a first and second child based on Cox proportional hazard model including birth cohort and assortative mating type interaction.

Figure 9 shows the results of the models of first and second births including the interaction between birth cohort and assortative mating type. The full results can be found in Table 4 in the appendix. The top left panel of Figure 9 shows that in the oldest cohorts couples where at least one partner is highly educated have a lower hazard of transitioning into parenthood compared to couples where both partners are poorly educated, but this difference decreases as we move to the cohorts born around 1940. By generations born in the 1940s, hypergamous couples even overhaul the poorly educated couples. After controlling for age at marriage (top right panel of Figure 9), differences between the assortative mating types become smaller, and among generations born between 1920 and 1950 all types of couples where at least one partner is highly educated are more likely to have a first birth. The higher first birth rates for low educated couples are thus mostly the result of earlier transition into marriage.

Turning to second births (bottom of Figure 9), we see that differences between the types of educational assortative mating remain constant, and are hardly influenced by the inclusion of marriage timing, confirming the results of the less complex models.

Conclusion

This paper has investigated how patterns of assortative mating are associated with patterns of marital fertility. Among birth cohorts who produced the Baby Boom, marital cohort total fertility increased significantly, from 2.2 children per couple to 2.4 children per couple at its peak, which was among generations born in the 1930s. Earlier research has pointed out that the Baby Boom went together with a shift towards heterogamy, and especially towards hypergamy, and that the Baby Bust coincided with the start of a shift to hypogamy. Our results show that couples where both partners are poorly educated experienced the highest fertility among most of the Baby Boom producing birth cohorts. Hypergamous couples were not far behind, and their fertility levels even exceeded the levels of the low-educated couples among some birth cohorts. Highly educated homogamous couples had slightly lower fertility than hypergamous couples. Hypogamy was clearly associated with lower fertility, even among the younger cohorts. The increasing prevalence of hypogamy during the Baby Bust could thus be one factor contributing to the fertility decline.

We found a clear educational gradient of fertility among men in both hypergamous and hypogamous marriages. For their wives, there was no such gradient, except among hypergamous couples where the husband had a university degree. In those type of hypergamous marriages, relatively highly educated women were not only having more children than lower educated women with a university educated husband, but they were also having more children than similarly educated women in a hypogamous marriage. It seems that while in general a relatively high education for women lead to lower fertility, this was not the case when they married a man who was at least as highly educated as she was. Consequently, since hypergamy became more

prevalent during the Baby Boom, this might have weakened the pattern of low fertility for highly educated women. Educational assortative mating may therefore explain at least part of the weakening educational gradient reported for this period in an earlier Belgian study (Van Bavel 2014).

Survival analysis shows that low educated couples had the highest first birth rates. However, when controlling for marriage timing, the differences between the first birth rates of low educated couples and the first birth rates of couples where at least one partner is highly educated almost completely disappear. The higher first birth rates for low educated couples are thus mostly the result of earlier transition into marriage. Among couples where at least one partner is highly educated, marriage timing also accounts for a big part of the differences between hypergamous, hypogamous and homogamous couples. However, some variance is still left over after controlling for it.

Analysis furthermore confirms that hypergamous marriages resulted in the highest second births rates, even after controlling for marriage timing. For second births, even hypogamous couples have higher rates than couples where both partners are poorly educated. Controlling for marriage timing does not alter these ratios much, which means that differences in second birth rates between different types of assortative mating were not due to differences in marriage timing. The latter were more likely to make the transition to third and fourth births. For those couples who have already resolved the question of whether to have children and have made the transition to parenthood, the majority will go on to have a second birth, since the two-child norm seems to have been very strong.

In general, these results confirmed our expectations based on theoretical considerations. Hypergamy was strongly associated with a strong sexual division of labour during the Baby Boom era, allowing husbands and wives to specialize in breadwinning and homemaking respectively. Hypogamy on the other hand was at odds with these gender roles. Hence, it was associated with lower fertility. Selection effects could have reinforced these patterns, as women with a preference for having children might have more often chosen a path leading to hypergamy, while women with professional ambitions of their own might have focused more on their own education and might have ended up more often in hypogamous marriages.

It is clear that both the education of the husband and the wife, and the particular combinations of their educational attainment resulting from educational assortative mating, were determinants of marital fertility patterns during the Baby Boom and Baby Bust. The influence of one partner's education on marital fertility was dependent on the education of the other partner. Education mattered, especially if the partner was low-educated. The shift to hypergamy, which was well adapted to prevailing gender roles, contributed to the Baby Boom, as highly educated men married to lower educated women did not experience a negative effect of their increased income

potential. Highly educated women on the other hand experienced considerably lower fertility when married to a lower educated partner. Even though these kind of hypogamous marriages where becoming increasingly more prevalent throughout the 20th century, gender roles seem to have lagged behind. The result was lower fertility for these kind of couples, which contributed to the Baby Bust.

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Appendix

Table 4: Hazard ratios based on Cox models for 1st and 2nd birth including assortative mating and birth cohort interaction.

	Model 1d	Model 1e	Model 2d	Model 2e
	1st birth	1nd birth	2rd birth	2th birth
Assortative mating type				
Both partners low-educated (ref.)				
Homogamy (H=W)	0.852	0.920	1.159	1.154
Hypergamy (H>W)	0.938	0.972	1.133	1.128
Hypogamy (H<W)	0.785	0.899	1.067	1.070
Birth cohort				
1910-1914 (ref.)				
1915-1919	1.069	1.050	1.065	1.057
1920-1924	1.121	1.086	1.058	1.050
1925-1929	1.184	1.115	1.121	1.117
1930-1934	1.245	1.144	1.181	1.178
1935-1939	1.321	1.184	1.253	1.252
1940-1944	1.346	1.193	1.217	1.220
1945-1949	1.329	1.161	1.078	1.083
1950-1954	1.262	1.089	1.033	1.041
1955-1959	1.178	1.005	1.044	1.052
Age at Marriage				
< 21 (ref.)				
21-25		0.820		1.022
26-30		0.766		1.115
30-35		0.473		0.858
> 35		0.028		0.195
Assortative mating type * Birth cohort				
1910-1914 (ref.)				
1915-1919				
Both partners low-educated (ref.)				
Homogamy (H=W)	1.068	1.071	1.035	1.033
Hypergamy (H>W)	1.017	1.018	1.077	1.077
Hypogamy (H<W)	1.117	1.111	0.990	0.985
1920-1924				
Both partners low-educated (ref.)				
Homogamy (H=W)	1.096	1.071	1.025	1.022
Hypergamy (H>W)	1.060	1.055	1.033	1.033
Hypogamy (H<W)	1.132	1.087	0.986	0.979
1925-1929				
Both partners low-educated (ref.)				
Homogamy (H=W)	1.114	1.098	1.069	1.067
Hypergamy (H>W)	1.060	1.055	1.057	1.057
Hypogamy (H<W)	1.142	1.087	1.001	0.996
1930-1934				
Both partners low-educated (ref.)				
Homogamy (H=W)	1.138	1.122	1.106	1.099
Hypergamy (H>W)	1.079	1.076	1.086	1.084

Hypogamy (H<W)	1.199	1.129	0.990	0.982
1935-1939				
Both partners low-educated (ref.)				
Homogamy (H=W)	1.148	1.141	1.046	1.037
Hypergamy (H>W)	1.087	1.095	1.069	1.066
Hypogamy (H<W)	1.209	1.162	0.966	0.955
1940-1944				
Both partners low-educated (ref.)				
Homogamy (H=W)	1.097	1.106	0.998	0.992
Hypergamy (H>W)	1.046	1.069	1.024	1.020
Hypogamy (H<W)	1.169	1.110	0.949	0.938
1945-1949				
Both partners low-educated (ref.)				
Homogamy (H=W)	1.046	1.059	1.045	1.038
Hypergamy (H>W)	0.987	1.011	1.024	1.022
Hypogamy (H<W)	1.148	1.091	0.991	0.979
1950-1954				
Both partners low-educated (ref.)				
Homogamy (H=W)	1.020	1.031	1.107	1.100
Hypergamy (H>W)	0.971	0.993	1.070	1.068
Hypogamy (H<W)	1.125	1.064	1.029	1.018
1955-1959				
Both partners low-educated (ref.)				
Homogamy (H=W)	1.083	1.099	1.180	1.172
Hypergamy (H>W)	1.003	1.032	1.114	1.112
Hypogamy (H<W)	1.160	1.097	1.094	1.081