Studying Social Differentials in the Mid-Twentieth Century Baby Boom from Retrospective Census Data.

Potential Sources of Bias and Results for Belgium

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Abstract

In many countries, the historical transition towards low fertility was interrupted during the period around the 1950s and '60s, called the Baby Boom. That Baby Boom came completely unexpected. Indeed, at the time, all experts were foreseeing further fertility declines. Still today, we know little about the causes of the Baby Boom. It is not clear whether or not all social groups participated in the trend towards higher fertility. This paper uses data from the Belgian 1981 Census to analyse social differentials in the Baby Boom. More specifically, it analyses how the timing and quantum of fertility are associated with woman's level of education in the cohorts born between 1901 and 1940. Potential sources of bias are discussed when studying cohort fertility from retrospective data. Results indicate a consistent and persistent educational gradient for age at first birth but convergence between women with different levels of education in terms of total cohort fertility quantum.

1. Introduction

In many Western countries, the transition from medium-high to low fertility, as it occurred from then late nineteenth to the late twentieth century, was interrupted during the period around the 1950s and '60s. This period is called the Baby Boom era. This boom continues to weigh heavily on populations today. Yet, we know surprisingly little about its historical causes. At the time when it occurred, nobody was expecting it. Today, most text books routinely ascribe the revival of fertility to the air of optimism and economic growth in the wake of the low fertility trough of the Great Depression. Yet, the recovery of fertility started already before as well as during the Second World War in most countries and it can only for a small part be explained by a mechanism of postponement (during the Depression era) and recuperation (in times of postwar optimism) (Van Bavel & Reher 2012).

The end of the baby boom was just as unexpected as its start. Indeed, by the 1960s, pro-cyclical fertility was considered one of the most firmly based empirical findings in the social sciences. Around 1960, mainstream demography and social science was predicting continued fertility increases due to continuing economic growth (Butz & Ward 1979: 318). Ironically, the explanations given post hoc for subsequent fertility decline were very similar to the ones given for low and declining fertility before the Second World War (Van Bavel 2010).

The number of studies explicitly addressing the causes of the baby boom is very limited. The existing literature predominantly deals with the USA (Macunovich 1996; Emeka 2006). Most explanations emphasize the importance of the period of economic growth that affected many countries in the aftermath of the Second World War, a period in which relatively small cohorts had ample economic and social expectations before them, and a period of general optimism reinforced by cultural contexts in which large families were held up as a socially desirable goal. The work of Richard Easterlin is a key point of reference for these ideas. Easterlin (1961) emphasizes the importance of relative cohort size for fertility outcomes. Other explanations have emphasized the role of female labor, especially during the war (Doepke et al, 2007; or, more generally, Macunovich, 1996), the links between fertility, income and subjective well-being (Thornton, 1978), the role of parents, especially fathers (Rutherdale, 1999); or technological progress in the household sector (Greenwood et al, 2005). Most attention has gone to economic factors, much less to the importance of ideational and cultural change (with a notable exception being Lesthaeghe and Surkyn 1988).

It is not clear whether or not all social groups participated equally in the recovery of fertility. In fact, an understanding of the social heterogeneity of reproductive change during the period is nearly absent in the existing literature. There are some indications that social differences became smaller during the baby boom era (Glass 1968: 118-120; Festy 1979: 167-168). Also, it became evident that married women's gainful employment played an important role in explaining the social gradient in fertility, at least in a number of countries, with working wives having lower fertility (Glass 1968: 120). But social differences in the shifting demographic patters during this period are not thoroughly investigated at all.

This paper aims to begin filling this important gap in the literature by investigating differentials by socio-economic status in the baby boom in Belgium. More specifically, it will analyze how the transition to motherhood, marriage, and total fertility are associated with women's level of education in the cohorts born between 1901 and 1940, who had their kids roughly between 1921 and 1980. The next section first discusses the concept of socio-economic status as employed in this paper, and how it relates to women's education and reproductive behaviour. Then, the dimensions of the Belgian baby boom are put into an international perspective. Since the core of the analysis is based on retrospective census data, I then provide a discussion of potential biases introduced by this source. Sections four and five present results about the timing and quantum of fertility, and about the timing and likelihood of marriage versus extra-marital childbearing, respectively.

2. Socioeconomic status, women's education, and reproductive behaviour

Although there is no consensus among social scientists about its definition, socio-economic status (SES) is one of the most widely used concepts in the social sciences (Oakes and Rossi 2003). In the Weberian sociological tradition, social status refers to the social prestige or standing attached to positions in society (Giddens 1993). SES refers explicitly to the economic dimension of social status: people who occupy a position with high social status tend to be economically advantaged, and people with high SES tend to have more of all kinds of resources, generally. In this sense, SES corresponds to a large degree with what Max Weber called social class. He defined class as a group of people who have life chances in common, as determined by the resources they have to assure their economic wellbeing. Such resources include not just the property of the means of production (as in Marx's definition of social class) but also goods, skills, credentials, qualifications and experience which affect the economic conditions of individuals and families (Clark & Lipset 1991; Giddens 1993; Breen 2005). In practice, the concepts of social

class and SES are often used interchangeably to refer to socioeconomic differences between groups of individuals which create differences in their material prosperity (Giddens 1993).

Empirically, SES is usually indexed by wealth or income, occupation, or education; or a combination of these (for reviews see e.g. Oakes and Rossi 2003; Sirin 2005; Babones 2010). Each of these are not only considered as indices of SES, but also as proxies of one another. The idea is that, in modern society, educational attainment determines who can be considered for entry into specific occupations, which in turn affects the incomes earned. The income earned from a job is hence seen as the reward to the investment made in education (Oakes & Rossi 2003). Economists tend to call this the returns to education (Psacharopoulos 1985; 1994).

Over the course of the 20th century, participation in secondary and postsecondary education greatly expanded worldwide, but particularly in the West (Boli et al. 1985; Aldcroft 1998; Schofer and Meyer 2005; Lutz et al. 2007). In line with the law of diminishing returns, the rate of returns to education declines by the level of schooling in terms of income gained, such that the returns tend to be highest in low educated countries and lowest in high educated countries (Psacharopoulos 1985; 1994). However, this does not imply that education becomes less important in populations with a high level of educational attainment. On the contrary, education has become an increasingly important determinant of status during the 20th century, and it has become the most important indicator of SES in fertility research (Skirbekk 2008). Having the right degree has become a necessary condition to find gainful employment in a large number of occupations and professions; the decline of farming and other forms of self-employment and the transition towards service economies have led to an increase in the proportion of jobs in which education is a prerequisite. As a result, inequality in educational attainment has become a very important component of earnings inequality (Morris and Western 1999; Breen et al. 2009; 2010).

While men's participation in education has expanded, women's education has expanded even more. Until the 20th century, university education remained an almost exclusive male privilege. In the US, there were about as many women as men with "any college" in the cohorts born in the late nineteenth and early twentieth century because many women enrolled in two-year teacher's colleges, but they lagged behind in terms of bachelor's degrees (Goldin, Katz & Kuziemko 2006). In Europe, women attending university education were a rarity. The University of Oxford and the University of Leuven, two age-old universities, granted women the permission to enroll only in 1920 (Howarth 1994; De Neef 1985). Around 1950, participation in higher education was still very low for both sexes but, still, male enrolment ratios were more than double as high for men than for women. From the 1960s onwards, participation in tertiary

education rapidly expanded. Initially, this expansion disproportionately involved men, leading to an even widening gender gap in higher education to the advantage of men. However, from the 1970s onwards, the gender gap began to shrink (Schofer & Meyer 2005; Goldin et al. 2006). Worldwide, gender parity in higher education was achieved around 1990. Since the late 1990s, there were more women than men enrolled in tertiary education (Schofer & Meyer 2005).

Further down the road, the expansion of education among women led to increasing rates of female labour force participation (Pott-Buter 1993; Brewster & Rindfuss 2000; Blossfeld & Drobnič 2001; Goldin 2004; Beller 2009). Until the middle of the twentieth century, female labour market participation was still particularly low among married women, particularly in the middle and higher classes. For women, the socio-economic returns to higher education were realized along two separate pathways: via the marriage market or via the labour market, but not in both markets at the same time. On the marriage market, college educated women were far more likely to marry a college-educated man. On the labour market, it was often not accepted that a married woman would remain employed, so garnering the economic return to education happened more frequently among single women, at least in the US (Goldin et al. 2006). Still, an important driver of the expansion of women's education was the increased relative demand for female office workers in the early 20th century. These were considered relatively "nice" jobs that were acceptable to be carried out by women from respectable families, in contrast to factory work. Part-time work became more often available and institutional regulations that barred married women from employment, where they existed, were gradually abolished (Goldin 2006). All this stimulated the continued labour force participation of women after marriage.[1] In sum, the salience of woman's education for family SES has greatly increased, not only through assortative mating but also through the increased engagement of married women in paid labour (Korupp et al. 2002; Beller 2009).

From a meta-analysis of published studies, Skirbekk (2008) concluded that the association between SES and fertility tended to be positive before the onset of the fertility transition. As fertility declined, there was a general shift towards a negative or neutral status-fertility relation. However, the association between education and fertility has always been negative as far as the record goes, i.e. from early in the 20th century onwards. In particular, there has always been a negative relation between female education and fertility. The conventional explanation is that the negative price effects of children (i.e. the opportunity costs of childbearing) outweigh the positive income effects of education on fertility for women (but not for men) (Kravdal 1994; Gustafsson 2001; Joshi 2002; Kravdal & Rindfuss 2008).

[1] According to Goldin (2006), the growth of female labour supply was also pushed by the diffusion of more efficient household technology.

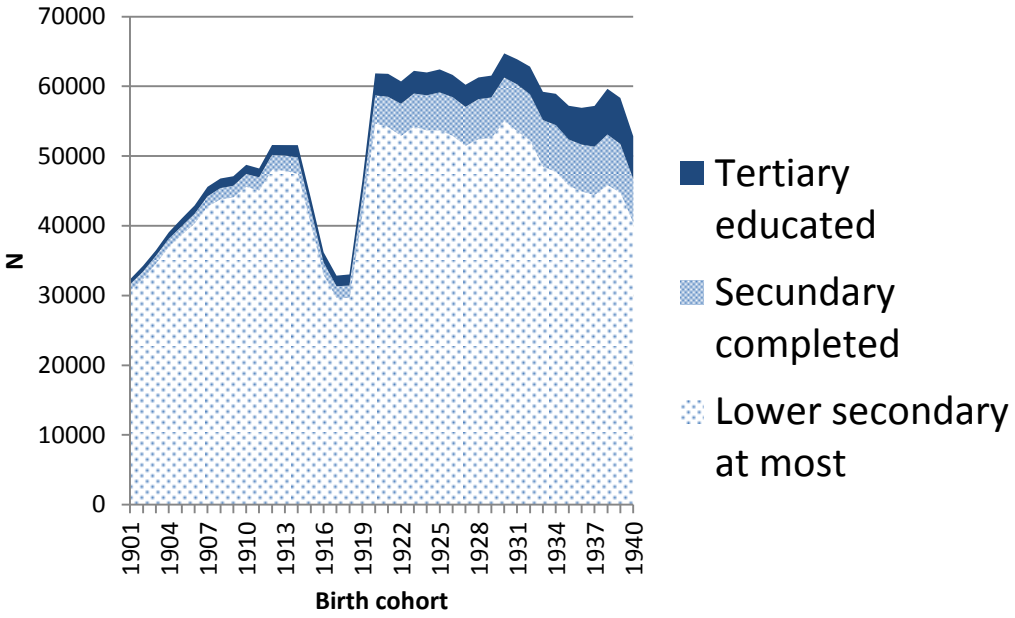
This paper looks at the implications of female education, and its expansion, for marriage and fertility during the era of the mid-twentieth century baby boom. Given the fact that woman's level of educational attainment has been found to be negatively related to fertility, the question is: how can this be reconciled with the fact that the baby boom occurred during a period of expansion of education, including the expansion of female education? One possibility is that the fertility of low educated women went up so much that it outweighed the low fertility of a growing number of women with a lengthy enrolment in education and a high level of educational attainment. If this is the case, we expect to see a strong increase of fertility among low educated women, and stability or even a declining fertility level among women with more education. Another option is that the negative association between education and fertility, if it existed in our study population, weakened during this period. This scenario supposes that the fertility of highly educated women went up during the baby boom era.

The following chapter first describes how the baby boom played out in Belgium in an international perspective. It looks both at period and cohort indicators. Cohort fertility indicators derived from vital registration are then used to validate the retrospective census data that I will subsequently use to investigate fertility trends by women's level of educational attainment.

3. The Belgian baby boom from retrospective census data

I use data from the Belgian 1981 Census (Willaert & Deboosere 2008) to analyze social differentials in the baby boom. Figure 1 plots the number of women who survived to the census date (i.e. 1 March 1981) by level of education. The effects of the First World War (with smaller birth cohorts due to a lower birth rate as well as increased mortality) and the Spanish Flu (with many casualties in 1919) are clearly visible. The proportion of women who received more than just primary education clearly rises with cohort. Of the women born before 1910, only 5% completed at least higher secondary education, of which 2% tertiary (i.e. college or university level) education. These percentages rose steadily towards 10% with at least a completed secondary education in the cohorts born around 1920 and over 23% in the late 1930s cohorts. In the latter cohorts, about 10% graduated from college or university.

Figure 1. Number of women recorded in the Belgian 1981 Census by level of education

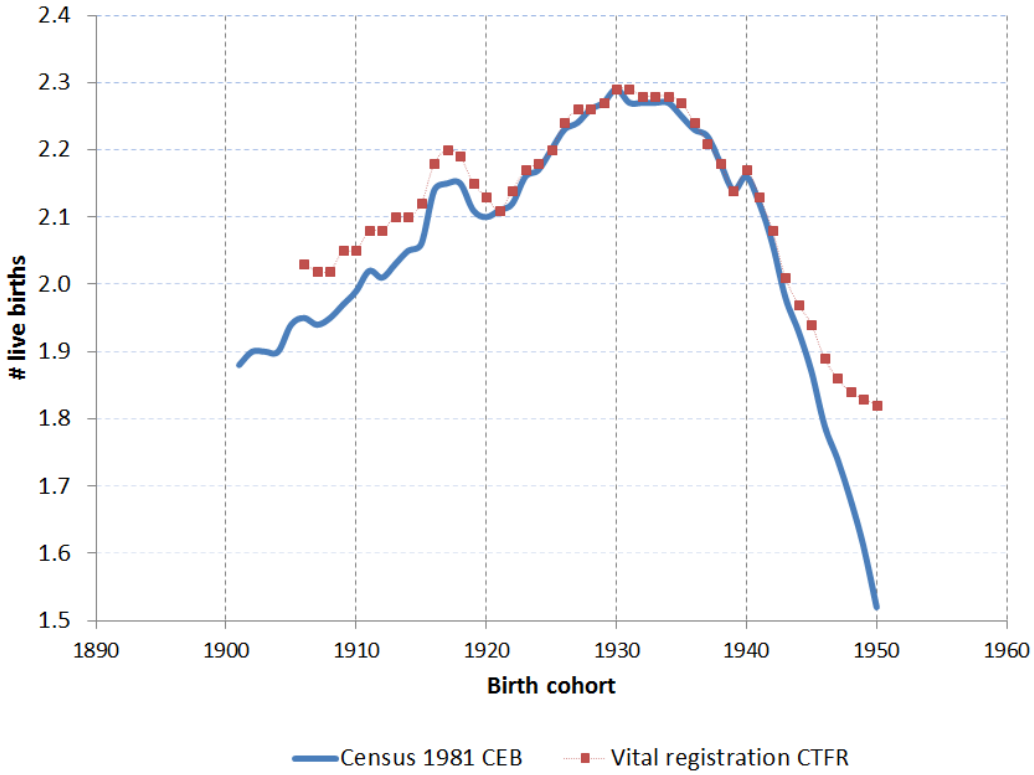


Given that the census is about the population living in Belgium in 1981, the retrospective reconstruction of the *number of births* that occurred in the past will be underestimated as a result of the combined effects of mortality, migration, and non-response. Therefore, the validation of the census estimates against vital registration data focuses solely on rates (Neels 2006: 275). How are estimates of cumulated fertility based on the census affected by these processes? I first present a general discussion, and then consider the potential implications for education-specific rates.

Potential sources of bias

Figure 2 gives two different series of estimates for total fertility: the solid line gives the number of children ever born (CEB) by birth cohort, as calculated from the 1981 census, starting with the cohort born in 1901 (reaching age 80 in census year 1981) and ending with the cohort born in 1950 (reaching age 31 in 1981); the series indicated by squares gives cohort total fertility rates (CTFR) calculated from vital registration (as published in Sardon 1991; the rates for cohorts 1901-1905 are missing in this series).

Figure 2. Estimates of total cohort fertility based on retrospective census 1981 information on number of children ever born versus cohort total fertility rate based on vital registration



Both series exhibit an inverted U-shape: there is a recovery of cohort fertility from below-replacement level starting from the earliest 20th century birth cohorts, reaching a peak of 2.3 live births per woman in the 1930 birth cohort in both series, and declining in the cohorts after that. Another conspicuous similarity in both series is that there was a secondary, smaller peak reached in the 1917-1918 birth cohorts, then some decline again, just before the climb toward the major 1930 peak started. These similarities give confidence in the validity of the census data. Note that the decline of fertility after the 1917-1918 peak happened among the cohorts that were reaching the reproductive ages when the Second World War broke out (e.g. 1919+21 = 1940). So one could speculate that this War interrupted a trend of rising fertility that started (in terms of period fertility) well before the war among the earlier cohorts (cf. Van Bavel & Reher 2012).

However, there are clear differences as well. First, in the more recent cohorts, the census estimate is consistently below the CTFR estimate based on vital registration data: from the 1930 to the 1944 cohorts, the gap is always below 0.05 children. After that, the gap becomes bigger every year, from 0.07 births in the 1945 cohort to 0.30 births in the 1950 cohort. Obviously, the explanation for this gap is that fertility is not yet completed in 1981 for the more recent cohorts.

We will therefore exclude all cohorts born after 1940 from our analyses. Note that cohort 1940 reaches age 41 during the census year and we consider fertility approximately completed at that age.

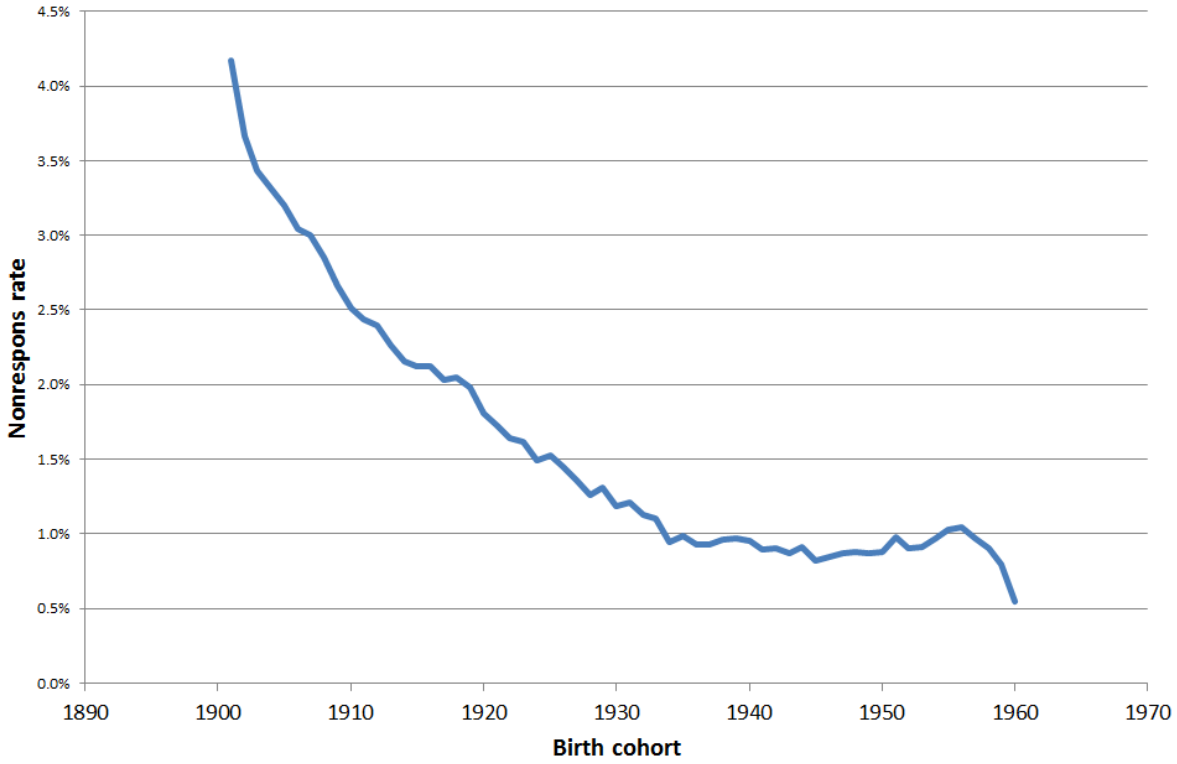
In the oldest cohorts, the census estimates are systematically below the vital registration CTFR as well: in cohorts born until 1917, the differences lie within the 0.05 – 0.08 range. After 1920 (and until 1940), in contrast, the difference is always smaller than 0.03. I assume that the differences can be neglected for the 1920-1940 cohorts, but not the differences in the earlier cohorts. In principle, they may be due to three mechanisms: migration, underreporting, and selective survival.

First, it could be that rates of outmigration are positively correlated with family size. However, if anything, it may be assumed that women who have given birth to a number of children would be less likely to migrate subsequently rather than more likely, so I do not expect that migration can account for the lower fertility in the census data in older cohorts. There may be one exception, although I expect that it plays at most a marginal role: women born around 1910 were around age 30 when the Second World War broke out. This War led to a high number of Belgian refugees, who fled particularly to the UK. However, almost all refugees returned back home after the war (Bernardo y Garcia & Buck 2001). It could be that people with children were over-represented among the exceptions who stayed outside Belgium, but I assume this can account at most for a very small portion of the lower completed fertility observed in the 1981 census for the oldest cohorts.

A second potential reason for the fact that the census estimates are systematically below the vital registration figures in the oldest cohort, is that people underreport the number of children ever born. Under this heading, I count both non-response in the 1981 census as well as the reporting of a number of births that is below the true number. Memory gaps due to old age may result in women failing to answer the census question about the number of births they had, or they may cause some women to forget to count some of the live births they had. Figure 3 confirms that nonresponse on the item of number of live births is indeed positively correlated with age among women. For women born before 1910 (older than 70 years in 1981), item non-response is 2,5% and more, reaching more than 4% in cohort 1901. From cohort 1919 onwards, non-response is always below 2% and decreasing. Women who did not respond to the question about number of births were left out of the calculations for CEB, but if they in reality had more births than the responding women, we will underestimate the true CEB. Given the all-in-all low non-response rate and given the fact there is no reason to expect a strong correlation between non-response and CEB, I assume that this bias will be only very minor, at most.

We cannot quantify the amount of misreporting for elderly women who did mention a number of births, but we assume a that the degree of underreporting could be similar to the degree of non-response. Assuming that the number of women that forgets to mention any children is low, and assuming that the number of children forgotten by these few women will also be very low, I again expect that the bias caused by this factor will be very limited. Taken together, non-response and under-reporting may explain a small portion of the gap between the census estimate and the vital registration estimate in Figure 2.

Figure 3. Item non-response rate in census 1981 on item of the number of children ever born, women by birth cohort



I expect that the gap between census CEB and vital registration CTFR in the older cohorts can be explained for the biggest part by the correlation between fertility and longevity: women with a (very) high number of births have a lower life expectancy in the post-reproductive life stage (age >50) than women with fewer births. This is the stylized fact, but research findings supporting it have not always been perfectly unequivocal.

Fertility and longevity

The arguments for expecting a negative correlation between completed fertility and longevity have been based on disposable soma theory. According to this theory, a trade-off exists between

energy invested in reproduction and energy required for longevity; reproduction demands energetic investments that reduce the resources left for somatic maintenance (Westendorp & Kirkwood 1998). This and other theories lead to the prediction that fertility quantum would be negatively related to longevity while a late fertility timing would be positively related with longevity (Le Bourg 2007; Gagnon et al. 2009). However, empirical research in historical populations (practicing only archaic forms of fertility control) has not generally confirmed the expectations. Few studies have found an undisputed negative association between fertility and longevity, other studies have reported no or even a positive association (Le Bourg 2007; Gagnon et al. 2009). When a negative effect has been found in a historical population, more detailed analysis suggests that socio-economic mechanism may explain it rather than purely physiological ones (Dribe 2004).

In more recent populations practicing more modern contraception, like the Belgian population studied here, the results have been clearer, although longevity in the strict sense of the word can often not yet be studied for recent cohorts since they are too recent to be living long enough. But the evidence about fertility and relative mortality risks suggests that there is a U-shaped correlation between the two in modern populations: childless women have higher mortality risk than parous ones, women with a few kids have lower mortality, and the ones having a large number of children (more than 5) experience higher mortality (Le Bourg 2007), although the differences depend on context (Grundy 2009). The reasons why childless women have higher mortality probably include various social and biological factors. For example, single women live shorter than women with a partner, and remaining childless can be related to health problems (Doblhammer 2000). Generally, however, the reported effect of parity on mortality is small when compared to the effects of factors like education or the socio-economic status of the family (Doblehammer 2000). The order of magnitude of the relative mortality risk of high parity women compared with the group with lowest mortality, is 1.10 (Le Bourg 2007).

General versus education-specific biases

In sum, selective survival and, in order of decreasing importance, underreporting of births and migration will, to the extent that they are correlated with fertility, affect our estimates of fertility in the older cohorts in particular, in the sense that our estimates will be too low. This may result in exaggerated estimates of the extent of fertility recovery during the baby boom, although the trends in CTFR based on vital registration are very similar in the cohorts that I will be looking at (1901-1940). Wherever relevant, in order to check the robustness of the conclusions reached in this paper, the census-based estimates can be uplifted with a factor equal to the ratio of

registration-CTFR / census-CEB. This factor is about 1.04 in the cohorts of the earliest decade, 1.03 in the 1910s cohorts, and less than 1.01 in all more recent cohorts.

Mortality, migration, and underreporting may not only affect the level of our fertility estimates, but also the differences between levels of education. Mortality, migration, and underreporting/non-response are known to be associated with the level of educational attainment. As long as this correlation affects the numerator and the denominator of the estimated fertility rates to the same extent, it will not bias our estimates of the differences between levels of education. But if education-specific migration, mortality, and non-response are correlated with education-specific fertility rates, it will bias our estimates of fertility differences. For example, if high parity women with a low level of education are more likely to underreport live births than high parity women with a high level of education, we will underestimate the fertility level of the former group compared to the latter group, since this underreporting affects the nominator but not the denominator of the fertility rates. Second example: if the parity gradient in survival of high rates differs by level of education (e.g. low educated women suffer a higher big-family penalty than highly educated women), the estimate of the fertility differential will again be biased.

Summing up, if differences between education-specific fertility indicators are larger than factor 1.04 in the older cohorts and larger than factor 1.01 in the younger cohorts, we are confident that the difference is not entirely due to selective survival related to both education and fertility. If the differences are smaller, we should keep in mind that selective survival could explain them. The next section presents the results of the analyses of fertility differentials by level of education during the baby boom in Belgium. First, we look at the timing and quantum of general fertility. Next, we look at the timing and likelihood of marriage and extra-marital childbearing.

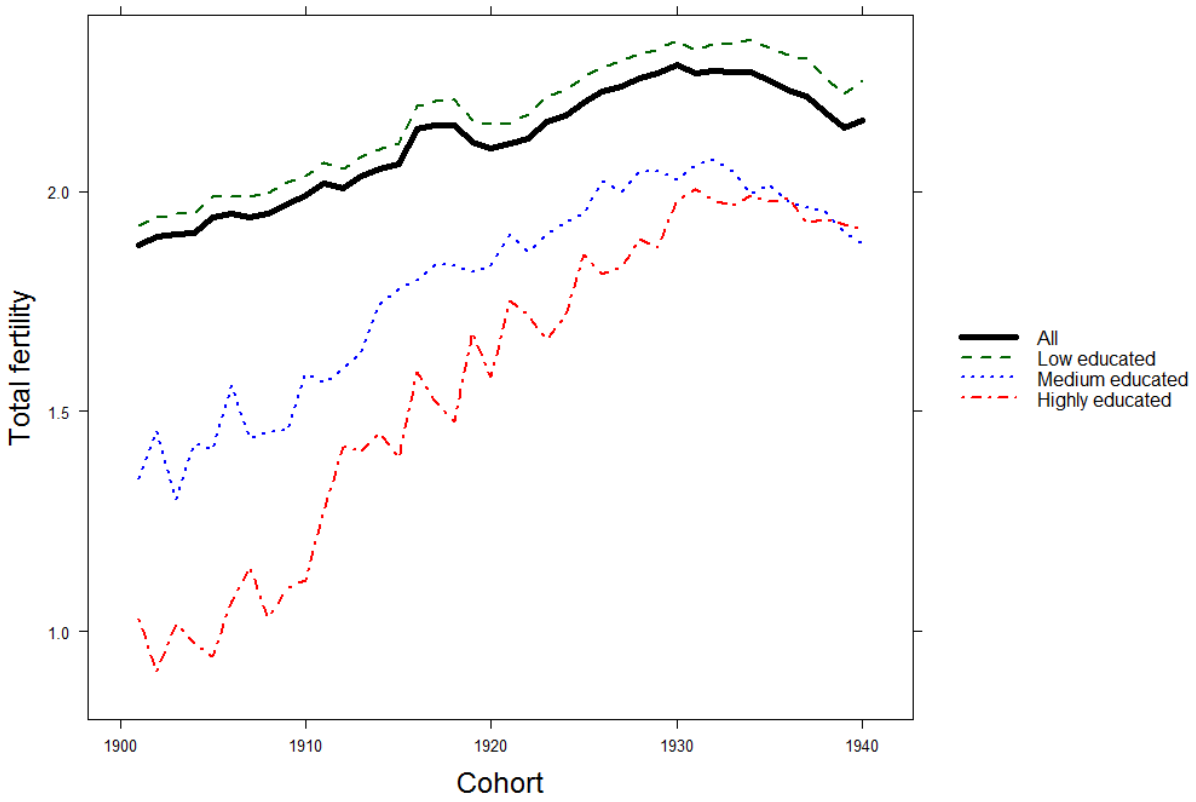
4. The timing and quantum of general fertility

Completed fertility

Figure 4 plots the total completed fertility by cohort (horizontal axis) and level of education (lines). The thick black line gives the trend for all levels combined, showing an increase of total completed fertility from 1.9 live births per women in the earliest cohorts towards almost 2.3 in the cohorts born around 1930. After that, fertility starts to decline. The differences between the levels of educational attainment are much bigger than the differences over time, but they become smaller in the more recent generations. In the cohorts born during the first decade of the twentieth century, women with a high level of education had about one birth, on average, women

with medium education had around 1.5 births, and the low educated had around 2; so the low educated had a full extra birth more than the highly educated. Gradually, these figures converged, with both medium and highly educated women having just below 2 kids in the cohorts born in the 1930s, while their low educated age peers had around 2.3 kids, on average. All these differences are too big to be explainable by selective survival.

Figure 4. Total number of live births by cohort and level of education, 1901-1940



Source: own calculations based on Census 1981 (Willaert & Deboosere 2008)

What is most spectacular about these figures is the strong increase of total fertility among highly educated women during this period. An interpretation in terms of bias due to selective survival seems implausible, since this would imply that this played a much more important role among the highly educated than among the low educated. I would rather argue that highly educated women (i.e. women earning a post-secondary, tertiary degree) were becoming a less exceptional, less selective group. In the cohorts born during the first decade of the 20th century, women with post-secondary degree comprised less than 1% of the female cohort (see Figure 1), whereas this was more than 5% in the 1930s cohorts. The pioneers of the older cohorts were probably strongly career-oriented, an attitude that did not fit with the breadwinner-homemaker gendered division of labour that dominated family life, especially in the higher social classes

where these highly educated women predominantly came from anyway. The figures about childlessness given below are consistent with this interpretation, as well as the analysis about nuptiality in section 4.

Childlessness

Figure 5 shows that, across all birth cohorts, there is clearly a connection between the level of childlessness and the age at first childbirth: the relatively highly educated groups who exhibited the highest level of childlessness are also making their transition to first births later than the lower educated ones. Figure 5 also shows that it is legitimate to distinguish between three rather than six levels of educational attainment. I will stick to three levels in most of the following analyses.

Figure 6 indicates that, over time, strongly declining childlessness must have been a major factor behind increasing total fertility. Across all educational groups, it halved, from around 30% in the oldest cohorts to around 15% in the youngest ones. Again, a convergence happened over time between the different levels of education and, again, the strongest trend is for women with a post-secondary degree: in the earliest cohorts, around 60% remained childless (double as high as the low educated), whereas this was only around 20% (only about 5 percentage points more than the low educated).

Figure 5. Kaplan-Meier survival curves for transition to first birth, by level of educational attainment, 1901-1940 cohorts combined

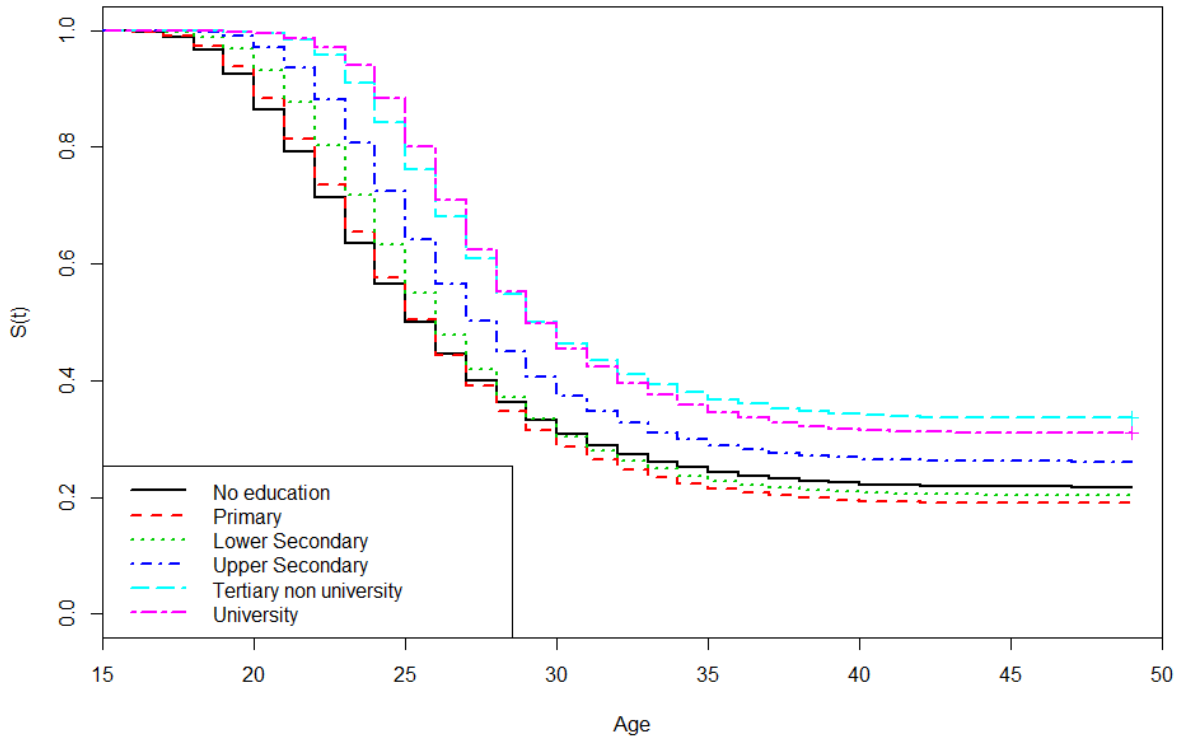
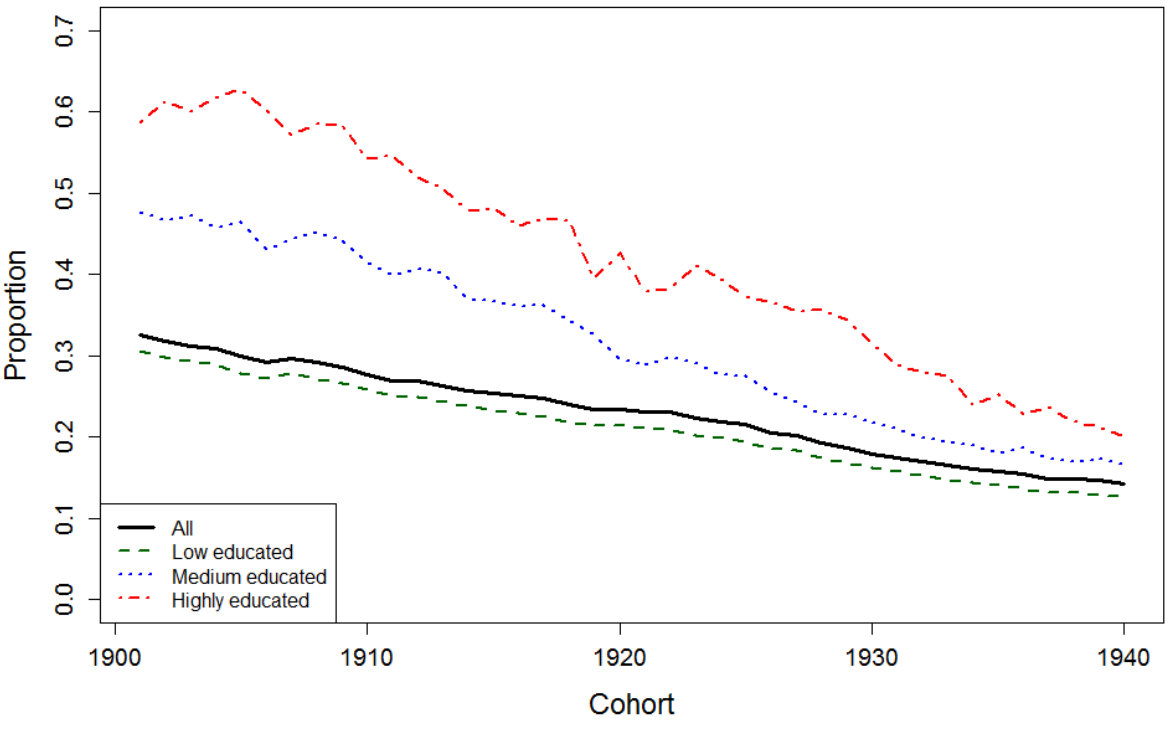


Figure 6. Proportion childless by cohort and level of education, 1901-1940

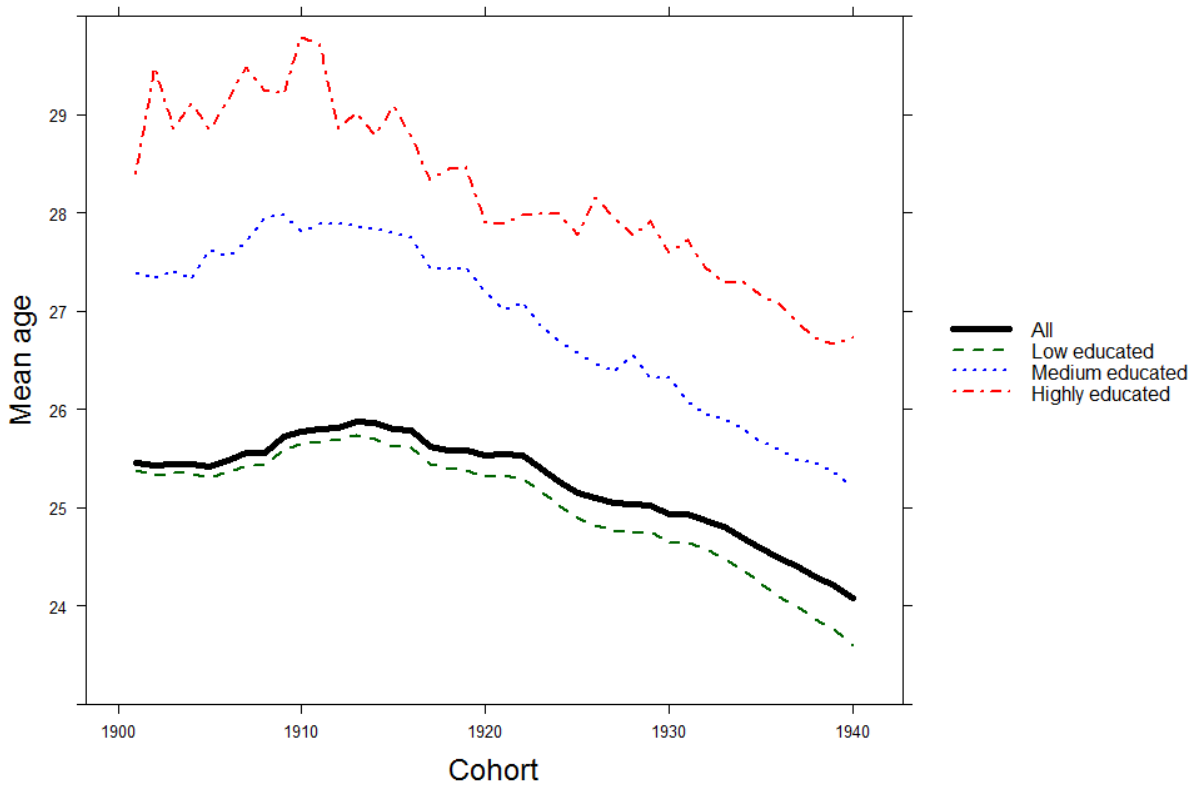


With respect to selective survival, it can be pointed out that, if childlessness was indeed associated with higher mortality, as concluded from studies in contraceptive populations, the true proportions childless would even have been higher than reported here for the oldest cohorts. The trends in Figure 6 could only (partly) be explained by selective survival if one assumes that childless women had higher survival rates than other women in the Belgian population of the early 20th century. We will try to investigate empirically in a future study whether that is the case, when microdata from the 1961 census become available, but I see no *a priori* reason to attribute part of the decline in childlessness to selective survival. Rather on the contrary, I expect that the true level of childlessness in the oldest cohorts may have been even higher.

Age at first birth

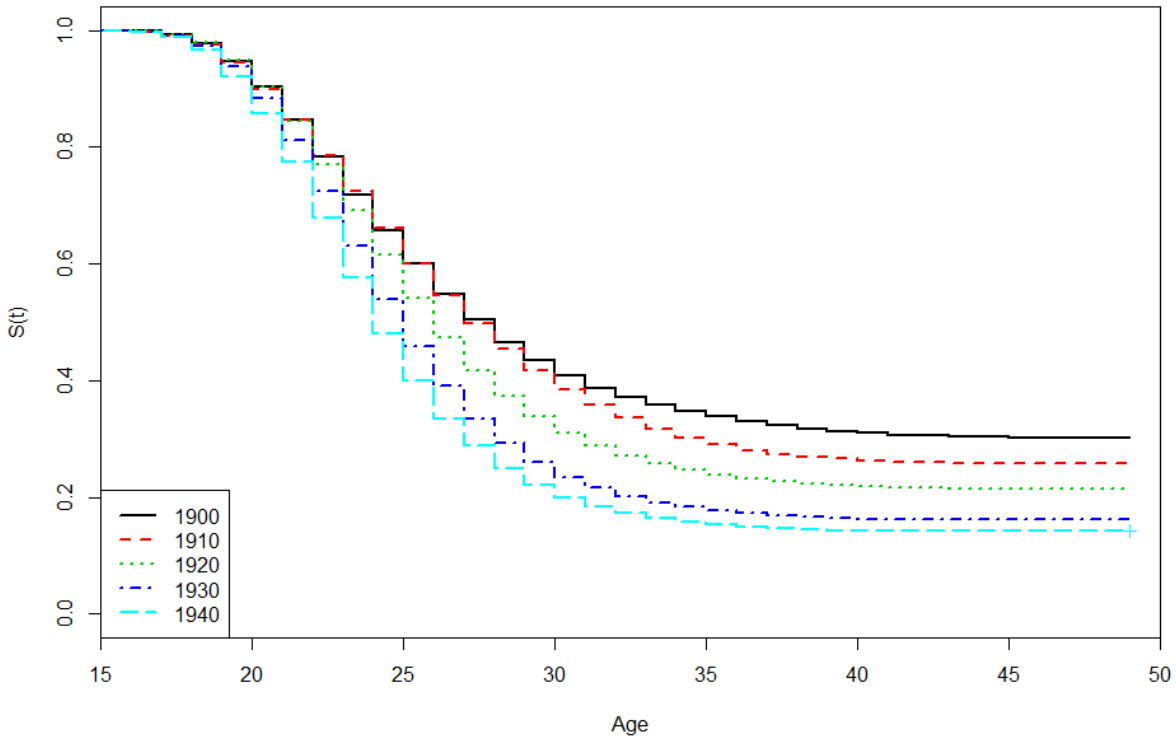
For those who did make the transition to motherhood, Figure 7 shows that the average age at the birth of the first child declined considerably over the cohorts, but only after an initial increase. In the earliest 20th century cohorts, the average age at first childbirth was 25.4 years. This average increased towards 25.8 in the cohorts born in the period 1910-1915. Next, the age at first childbearing declined more or less monotonically towards just above age 24 in the youngest cohorts. In order to verify that the latter trend towards a low age at first childbirth in the youngest cohort cannot be explained by the censoring of late transitions to motherhood after the census date in 1981, Figure 8 presents Kaplan-Meier survival curves for the transition to motherhood for decennial cohorts. The analysis clearly confirms the trend towards a faster transition to motherhood over the cohorts.

Figure 7. Average age at first birth by level of education and birth cohort, for those having at least one birth, 1901-1940 birth cohorts



As before, the differences between the educational groups are larger than the change over time. In contrast to what was found for total fertility and childlessness, there was no convergence between the groups over time. So the convergence in terms of total cohort fertility cannot be explained by the effect of timing on quantum. Hence, the convergence in these indicators needs to be explained by purely quantum components.

Figure 8. Kaplan-Meier survival curve for the transition to first childbirth, by decennial cohorts



Quantum distribution

As shown above, declining and converging levels of childlessness are an important part of the story of convergence of total fertility by level of education. Figure 9 shows that two other factors also play an important part. First, the proportion of single child families declined among the low educated while it remained stable among the highly educated. Second, the proportion of two-child families went up in all educational groups but particularly among the highly educated.

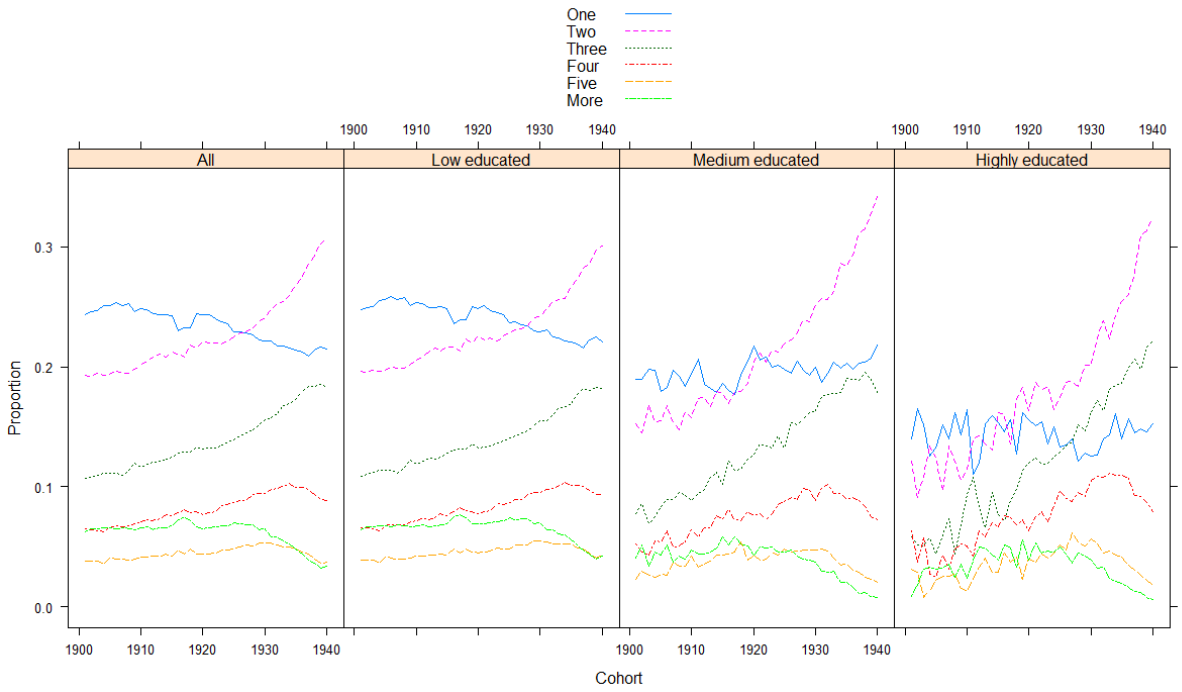
Generally, the modal number of live births among the cohorts born during the first two decades of the twentieth century, was just one: about a quarter of all women had just one child. I assume that, if part of the high proportion of single child families in the oldest cohorts can be explained by the U-shaped correlation between mortality and fertility, this is only a small part of it – an assumption that I will be able to investigate once the 1961 census data become available.

The proportion of single child women declined from the initial one in four towards one in five in the youngest cohorts. Two children became the modal family size only in the 1930s cohorts, even if the proportion of women with two children was on the rise since the earliest cohorts: in the oldest cohorts, only one in five had two children, by the early 1930s, this was a quarter. Over time, the dominance of the two-child family accelerated, towards 30% of all

women in the late 1930s cohorts. The evolution was most spectacular among the highly educated: from around 10% in the 1900s cohorts toward 32% in the 1940 cohort.

The proportions of women having three or four live births were also strongly on the rise in all educational groups: from 10 to 18% (three births) and from 6 to 10% (four births), respectively. However, there is already a hint of a downward twist towards the very end of the curve for three births, notably among the low and medium educated, and the increasing trend in the curve for four births halted and reversed already among the cohorts born in the 1930s. The curves for five and more births are relatively stable at a low level for the cohorts born during the first 25 years of the century, but then they bend down as well. Assuming that the cohorts of the 1930s would have had their third, fourth and fifth children mostly after 1965, these figures strongly suggest that there is a connection with the diffusion of modern hormonal contraception (Van Bavel & Reher 2012; see also Ryder 1978). The pill became available in Belgium from the mid-1960s and was adopted by rapidly growing proportions of the female population (Cliquet 1969; Lodewijckx & Cliquet 1988). Future analysis will look at this more in detail.

Figure 9. Relative parity distributions for women by level of educational attainment and cohort: proportions reaching exactly parity one, two,... to six or more



5. The timing and likelihood of marriage and extra-marital childbearing

Figure 10 shows that educational differentials in the timing and likelihood of marriage are very similar to the ones observed for the transition to motherhood (Figure 5), although marriage comes at a somewhat earlier age than the first birth, as implied by the fact that most births occurred within wedlock for these cohorts. This figure also confirms that we lose very little information when we collapse the lowest three and the highest two levels of education. The former married the earliest and the most, the latter at the highest age and remained single most often; women with upper secondary as their highest degree were in between. Figure 11 gives the proportion of women who did not marry before age 41. (Age 41 was used as a common censoring age because the youngest cohort was censored at that age at the time of the 1981 census). The figure mirrors the equivalent figure for childlessness (Figure 6): the proportions not marrying declined in all educational groups and there is very clear evidence of convergence between the educational groups because marriage became more common among more highly educated women. The difference between the nuptiality and the childlessness figure is that the percentage childless is somewhat higher in all groups and cohorts, which is a logical implication of the prevalence of couple sterility.

Figure 10. Kaplan-Meier survival curves for entry into first marriage by level of education, all cohorts 1901-1940 combined

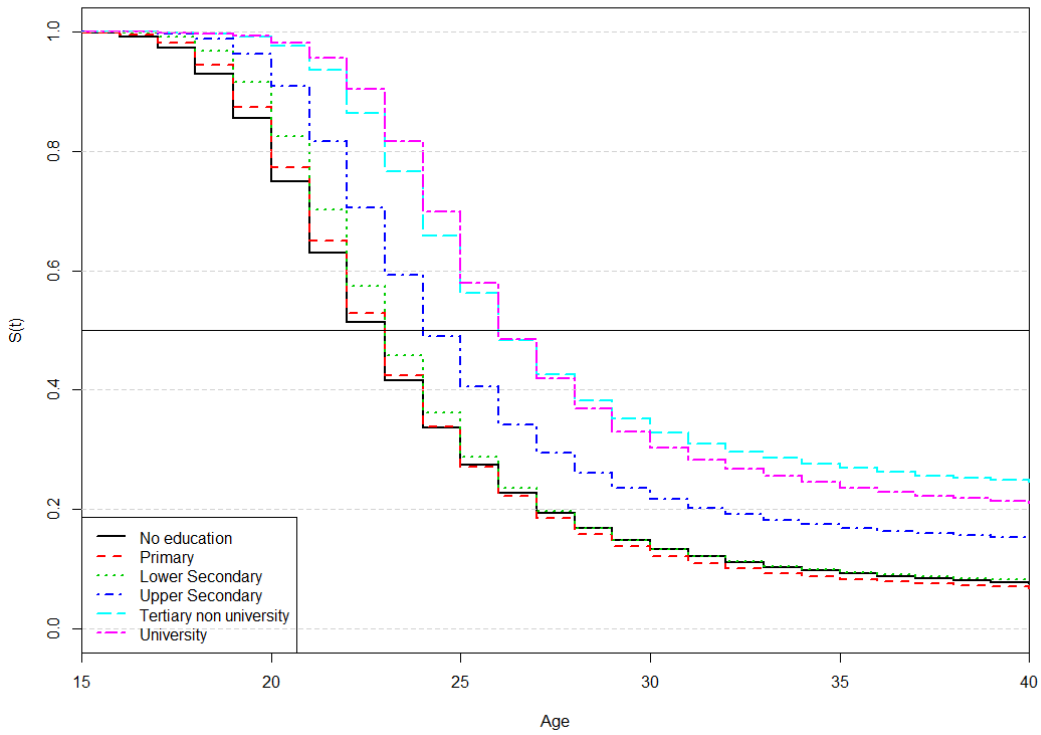


Figure 11. Proportion of women who did not marry before age 41 by cohort and level of education

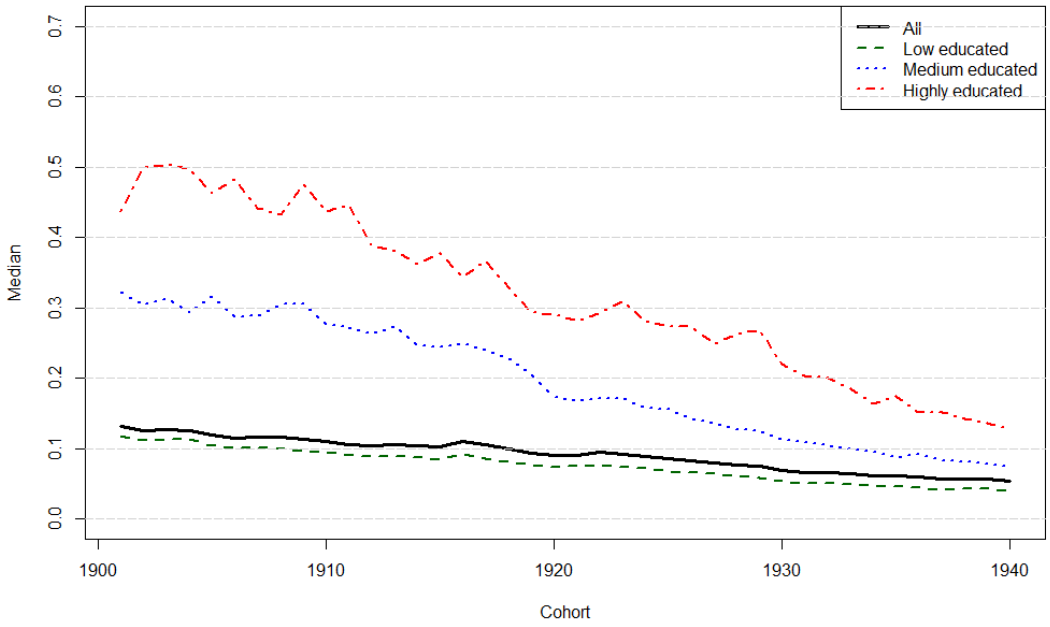


Figure 12 for the age at marriage also mirrors very strongly what was observed for age at first birth, with differences between educational groups remaining consistent (the most highly educated marry about three years later, on average, than the ones with lowest level of education), and ages declining in the more recent cohorts. Across all educational groups, the average age at marriage declined from 24 to 22. However, most of the decline happened for the cohorts born after 1920. Looked from a period perspective, these are the cohort marrying mostly from the later 1940s onwards, i.e. after the Second World War. Future analysis will look in detail at the the role played by the War.

Figure 12. Mean age at marriage for women marrying before age 41, by cohort and level of education

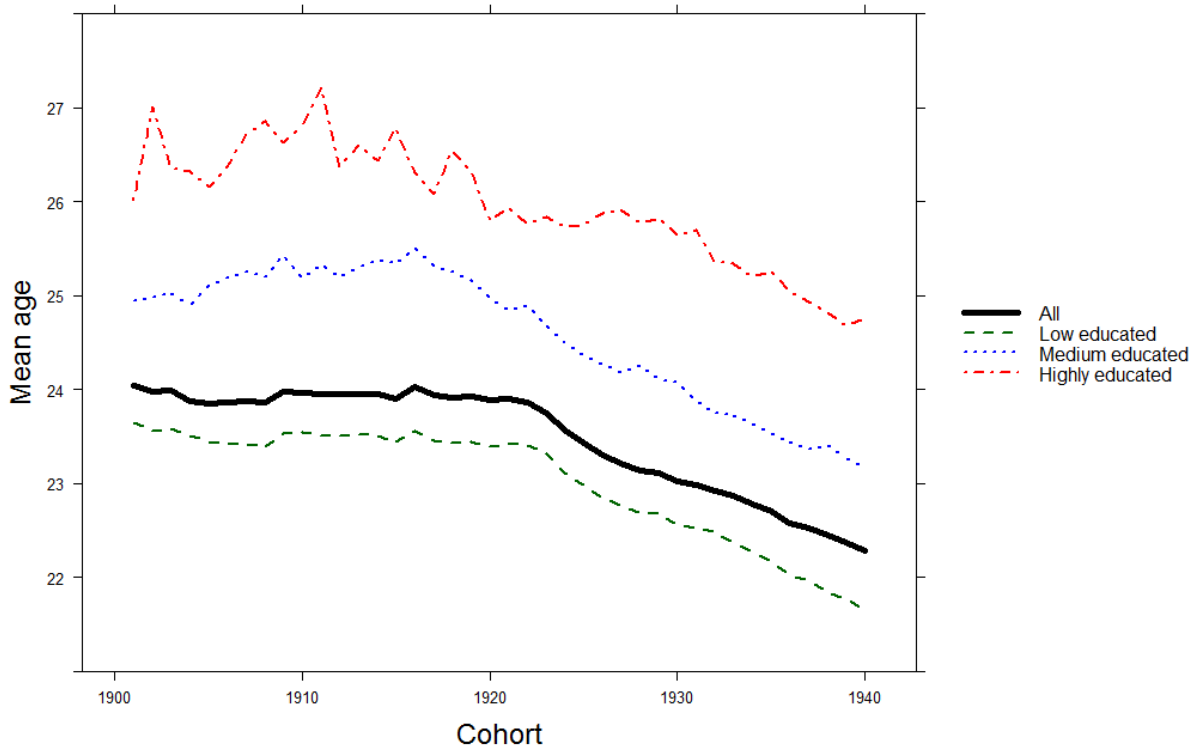
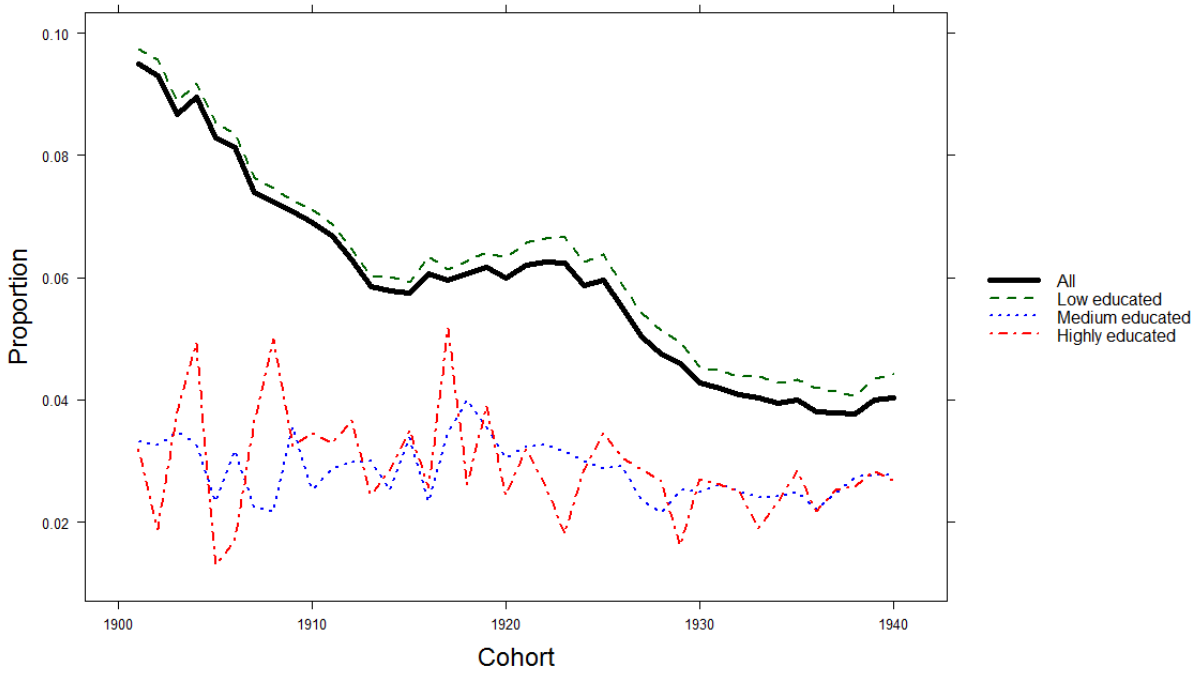


Figure 13 indicates that the proportion of first births occurring out of wedlock was low. Since we do not know the month of birth and since there was no explicit question about out of wedlock births, these proportions were estimated as the share of first births occurring in a year preceding the year of marriage, if any marriage occurred at all. Births occurring to newer-wed mothers were of course counted among the out-of-wedlock. The estimated proportion was almost 10% for low educated women in the earliest cohorts, and only around 3% for the two other groups. Among the low educated, the proportion of out-of-wedlock births dropped, first, towards around 6% in the cohorts born in the 1910s, then increased a bit, before further declining towards just above 4% in the 1930s cohorts. Since extramarital fertility was dominated by the low educated, the overall trend followed the same pattern. Anyway, it is clear that out of wedlock childbearing did not play any role in the Baby Boom.

Figure 13. Proportion of first births occurring before marriage, if marriage occurred at all, by cohort and level of education



6. Conclusions

Our analysis has revealed that the recovery of total cohort fertility during the baby boom era was caused by decreasing proportions of childless women as well as decreasing proportions of women with just a single child, while the share of women having two, three, or four live births increased. The average age at first birth declined in all educational groups.

From earlier studies, we know that there has generally been a negative association between female education and fertility: more educated women tend to have their first child later and tend to have lower total fertility than less educated women. The question raised in this paper has been how this can be reconciled with the fact that, in Belgium as elsewhere in the West, the proportion of more highly educated women was on the rise during the baby boom era. In cohort terms, only 2% of women born in the beginning of the twentieth century were college or university educated. In the cohorts that produced the baby boom, this percentage rose to 5% in the cohorts born in the 1920s and 10% in the cohorts born in the late 1930s.

This paper has shown that the baby boom was not the result of the fact that the higher fertility of low educated women outweighed the low fertility of a growing proportion of highly educated women, but rather that the fertility of highly educated women was on the rise. In the oldest cohorts of the 20th century, differences between educational groups were very large, but

the differences diminished over time. This was the result of strongly decreasing proportions of childless women among the highly educated, as well as strongly rising proportions having two kids. Two- as well as three- (and to some extent even four-) child families grew in all educational groups, but more among the highly educated than among the other groups. All these differences are too large to be explainable by the bias inherent in using retrospective census data, i.e. mostly the bias due to selective survival.

For the youngest cohorts included in our analysis, the proportions of high parity women started to decline. From a period perspective, this probably happened at a time when efficient contraception became available. Future analysis will look at this with more detail.

It is well known that the Baby Boom was to a large extent a marriage boom. Our analysis confirms this. However, from an international time series analysis, it was suggested that rising marital fertility must also have played an important role (Van Bavel & Reher 2012). Our analysis so far strongly suggests that marital fertility was on the rise in Belgium as well, with more and more married couples having three or more births during the baby boom ear. Future analyses will therefore best focus on marital fertility.

The most important finding from this paper is that decreasing childlessness and rising total fertility among highly educated women were crucial for the baby boom in Belgium. This suggests that highly educated women were becoming a less exceptional, less selective group in Belgium in the middle of the twentieth century. The graduate pioneers of the older cohorts were probably strongly career-oriented, an attitude that did not fit with the breadwinner-homemaker gendered division of labour that dominated family life. This interpretation also fits well with the account given by Claudia Goldin about the rearrangement of life course transitions made across cohorts of college educated women in the USA. Women who graduated during the first two decades of the twentieth century were forced to choose between either family or career. The cohorts who graduated during the interwar period had a job first, then a family. The cohorts that produced the baby boom chose to have a family first, and looked for a job only having established a family (Goldin 2004).

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