

DATA & TRENDS

The association between education and entry into parenthood across origin groups and migrant generations in Belgium: A model-based synthetic life table approach

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ABSTRACT Educational gradients in both the timing of parenthood and the proportion of women having a first child have been well-documented in the literature. It remains unclear, however, to what extent educational gradients in fertility in the general population mask variation in the education-parenthood nexus between population subgroups, particularly those with a migration background. Applying discrete-time hazard models to population-wide register data for Belgium in the 1990–2010 period, this descriptive study compares the association between educational attainment and entry into parenthood between native Belgian women, women who moved to the country before age 18 (1.5 generation) and descendants of migrants who were born in Belgium (second generation). We find that first births are consistently postponed to older ages with increasing levels of education in all groups, with timing differentials being more articulated for several origin groups compared to natives. With respect to the proportion of women having a first child, we find that the negative educational gradient has disappeared among native women, whereas substantial negative gradients emerge in Southern European, Eastern European, Turkish and Maghrebi origin groups. Finally, we find that educational gradients in the second generation with respect to both the timing of parenthood and the proportion of women having a first child are more similar to the gradients found among native women than is the case for women of the 1.5 generation. This paper contributes to the larger body of research on factors that shape unfolding life courses in populations with a migration background, with the aim of enhancing our understanding of the potential implications of such increasing diversity on fertility trends.

KEYWORDS Education • Parenthood • Migration background • Synthetic life table analysis • Belgium

Introduction

The association between educational expansion and women's transition to parenthood since the 1970s has been well-documented (Neels and De Wachter, 2010; Neels et al., 2017; Ní Bhrolcháin and Beaujouan, 2012; Rindfuss et al., 1996). Higher educated women in developed countries have been found to delay the transition to parenthood to later ages compared to their lower educated peers (Gustafsson et al., 2002; Martin, 2000; Mills et al., 2011;

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Rendall et al., 2005). As a result of partial recuperation at later ages, higher educated women initially exhibited higher rates of childlessness by age 50 in most countries (Miettinen et al., 2015; Wood et al., 2014). However, in more recent cohorts, educational gradients in childlessness by age 50 have been decreasing in various settings (Jalovaara et al., 2019; Köppen et al., 2017; Miettinen et al., 2015; Rybinska, 2020). Consequently, a large body of research has concluded that educational attainment has been a differentiating factor with respect to the proportion of women having a first child, but particularly with respect to the timing of motherhood (Lappegard and Ronsen, 2005; Neels and De Wachter, 2010; Ní Bhrolcháin and Beaujouan, 2012). Several mechanisms have been suggested that may shape the association between education, the timing of entry into parenthood and the proportion of women ever having a first child, such as incarceration mechanisms (e.g., enrolment in education and role incompatibility with being a parent), economic mechanisms (e.g., differential earnings trajectories and higher opportunity costs of childrearing in highly educated groups) and ideational factors (e.g., value changes accompanying higher education), with supportive (family) policies playing a moderating role in the association (Becker, 1991; Gustafsson et al., 2002; Lesthaeghe and Van de Kaa, 1986; Wood, 2019; Wood and Neels, 2019; Wood et al., 2020).

An increasing number of studies have documented variation in the educational gradient across time and place. Educational gradients in fertility have changed over time, becoming less negative, neutral or even positive in more recent years (Kravdal, 1992; Kravdal and Rindfuss, 2008; Wood et al., 2020), while educational gradients in first births have also been found to vary by country (Wood et al., 2014) and region (Nisén et al., 2021; Wood et al., 2021). Less attention had been paid, however, to population heterogeneity in the association between education and entry into parenthood, and it remains unclear whether and to what extent educational gradients in fertility at the aggregate level mask variation in these gradients between population subgroups by migration background. This knowledge gap is remarkable in two ways. First, a considerable body of research has examined the position of women with a migration background in specific life domains, such as schooling outcomes, employment or fertility (Belzil and Poinas, 2010; Bernhardt et al., 2007; Crul and Vermeulen, 2003; Dubuc, 2012; Heath et al., 2008; Huschek et al., 2011; Milewski, 2010, 2011; Portes et al., 2005; Portes and Zhou, 1993), but only a limited number of studies have focused on the association of behaviours across different life domains, such as the interplay between work and family life (Maes et al., 2022) or the association between education and parenthood (Krapf and Wolf, 2015; Liu and Kulu, 2023; Pailhé, 2017). Although education is considered an important factor to account for fertility differences between women with and without a migration background, the existing empirical evidence on the association between education and parenthood by migration background is mixed (Dubuc, 2012, 2017; Dubuc and Haskey, 2010; Kulu and Hannemann, 2016; Kulu et al., 2017; Pailhé, 2017). Second, as European populations are becoming more diverse in terms of migration background, the education-parenthood nexuses in migrant groups are expected to play an increasingly important role in shaping overall educational gradients in fertility (Kulu et al., 2019).

To address this gap in the literature, this paper descriptively documents variation by migration background in the association between educational attainment, the timing of a

first birth and the synthetic parity progression ratio to a first birth (i.e., the life table proportion of women having a first child in the period considered). By addressing the research question of whether the education-parenthood nexus is similar for women with and without a migration background, we make two contributions to the literature. First, this study is among the first to assess variation by migrant origin and generation in the education-parenthood nexus using a model-based life table approach. We compare associations between educational attainment and entry into parenthood among women of the 1.5 and second generations of different origin groups, and compare these patterns to those of women without a migration background in Belgium in the 1990–2010 period. Following Mussino et al. (2021) and Krapf and Wolf (2015), we study (dis)similarities in the education-fertility link among the 1.5 and second generations of different origin groups, excluding first generation migrant women. Among first generation migrants, decisions regarding migration and family formation are often highly interrelated, sometimes resulting in elevated fertility shortly after arrival (Castro Martin and Rosero-Bixby, 2011; Milewski, 2010; Mussino and Strozza, 2012; Persson and Hoem, 2014). The decrease in fertility with longer durations of residence among women who migrated at childbearing ages may in those cases be an artefact of this reciprocal association and the selectivity involved, rather than an indication of convergence to the fertility patterns of native women. As the interplay between fertility, education and duration of residence among first generation women requires detailed scrutiny in its own right, the focus of this study is limited to the fertility patterns of 1.5 generation migrants, i.e., women who migrated before the age of 18, at pre-childbearing ages), and second generation migrants (Krapf and Wolf, 2015; Mussino et al., 2021). Most women of the 1.5 and second generations graduate from the educational system in the host country, similar to the majority population. However, for these women, the lived realities associated with a given level of educational attainment tend to differ from the experiences of native women with the same level of education (e.g., in terms of labour market opportunities). Thus, the association between education and fertility among migrant women is expected to differ from that among the majority group, and to vary between migrant generations.

Our second contribution is that this study benefits from using population-wide longitudinal microdata to address the education-parenthood nexus for a wide range of origin groups, including minorities from both high and low fertility contexts, and thus avoids focusing on one or several large migrant groups due to small sample sizes for specific origin groups in the data available (Krapf and Wolf, 2015). Given Belgium's long migration history and relatively large migrant populations, the 2011 census and linked register data allow us to study 1.5 and second generation migrant women originating from Eastern Europe, Southern Europe, Northern and Western Europe, Turkey, Maghreb countries and other non-European countries.

The findings of this study are of international interest, as they indicate whether the associations between education and fertility are similar for women from migrant and majority group populations as they experienced the same educational system, and labour market and policy context, or whether patterns of family formation remain differentiated by migration background among women with the same level of education. In this respect, our findings provide input to forecasters and policy-makers seeking a better understanding of the

potential impact of migration on aggregate-level fertility trends, which depends to a large extent on whether the association between education and fertility is similar for migrants and the majority population.

Background

Although an empirical test of potential mechanisms underlying similarities and differences in the education-parenthood nexus between women with and without a migration background lies beyond the scope of this descriptive study, this section provides essential background information on population heterogeneity by migration background, as well as a discussion of why similarities in the nexus between level of education and the transition to motherhood can(not) be expected.

Population heterogeneity by migration background

The available literature on migrant fertility highlights that (dis)similarities in the fertility patterns of migrants and natives may be driven not only by variation in norms and preferences, but also by variation in (responses to) the opportunity structures and institutional settings of the host society (Andersson and Scott, 2005; Kulu and González-Ferrer, 2014; Kulu et al., 2017, 2019). These factors are likely to differ across migrant groups with different migration histories, which may, in turn, yield variation in the nexus between education and first births.

Belgium has a sizeable and diverse migrant population, the largest share of which originates from neighbouring countries in *Northern and Western Europe* that have fertility levels similar to those in Belgium. A large proportion of this group moved to Belgium for reasons of education or work, rather than union formation (Myria, 2021), and are quite similar to the Belgian majority population in terms of the opportunity structures and labour market outcomes they experience. Other large migrant groups originate from *Southern European countries*.² This origin group has similarities with a number of non-European origin groups (i.e., Turkey and Maghreb countries), as they are all rooted in the labour migration after WWII. However, these Southern European groups differ considerably in terms of their subsequent patterns of migration, as well as in terms of the socio-economic and ideational contexts in which the 1.5 and second generations grew up. Due to economic growth in their origin countries and the free movement within Europe since the 1960s, return migration was common among the predominantly male and low educated Southern European labour migrants. In contrast, Southern European migrants who arrived after 1980 (when Southern European countries first started to experience very low fertility levels) have a more diverse profile in terms of their socio-economic position and gender (Myria, 2016). Today, this migrant group holds an intermediate position regarding labour force

2 In this paper, Southern European countries refer to Cyprus, Greece, Italy, Malta, Portugal, San Marino, Spain.

participation, as they have fewer labour market opportunities and lower employment rates than the Belgian majority population, but more favourable opportunity structures compared to, for example, Maghrebi and Turkish migrant groups (FOD WASO and Unia, 2022). Migrant groups and generations originating from *Eastern European countries*,³ which are generally low fertility contexts (OECD, 2021), did not become more numerous until the 1990s onwards. Up to the present, the migration of these groups is largely driven by employment opportunities and – for migrants from Eastern European countries that are part of the European Union – free movement within the European Union.

Migrant groups from *Maghreb countries*⁴ and *Turkey* also originated from post-WWII labour migration flows, but following the migration stop in the early 1970s, family reunification and family migration (e.g., marriage migration) became (and still are) important migration motives in these migrant groups. While migration and labour market participation were closely linked among Turkish and Moroccan men who migrated in the context of labour migration, the migration of their female partners was not related to employment. This may have affected the labour market opportunities for first generation Turkish and Moroccan women (Surkyn and Reniers, 1997), and might have fostered more traditional gender patterns among groups originating from Turkey and Morocco, which have higher fertility levels than those of Belgium. Women from both Maghrebi and Turkish migrant groups – particularly women of the first generation, but also women of the second generation – are overrepresented in precarious employment, unemployment and inactivity (FOD WASO and Unia, 2022). Finally, migration from *other non-European countries* has also contributed to Belgium's migrant population, particularly as a result of post-colonial migration from Congo, but the origin countries have diversified in recent migration flows (often refugees and asylum seekers). This group is very diverse in terms of the ideational contexts and opportunity structures its members experience, and its 1.5 and second generations are still relatively small. This group is more strongly represented in more recent migration waves from, for example, Syria, Iraq and Afghanistan.

The education-parenthood nexus: Variation by migration background

A large body of literature on the association between education and entry into parenthood has shown that higher educational attainment is associated with postponement of first births, and, in case of partial recuperation at older ages, higher childlessness, due to five underlying mechanisms. Closely related to the fact that the aforementioned origin groups come from specific migration contexts, we argue that these mechanisms are likely to vary by migration background.

First, research has shown repeatedly that first birth rates are substantially lower during periods of *enrolment* in education (Blossfeld and Huinink, 1991; Neels et al., 2017).

3 Eastern European countries include both countries that are part of the European Union (i.e., Bulgaria, Hungary, Croatia, Poland, Romania, Slovenia, Slovakia, Czech Republic, Czechoslovakia) and countries that are not part of the European Union (i.e., Albania, Bosnia and Herzegovina, Yugoslavia, Kosovo, Macedonia, Moldova, Montenegro, Ukraine, Russia, Serbia, Serbia and Montenegro, Soviet Union, Belarus).

4 Maghreb countries include Morocco, Algeria, Tunisia, Libya and Mauritania.

Among the proposed explanations for this pattern are that full-time enrolment in education is incompatible with family responsibilities (Cohen et al., 2011; Gustafsson et al., 2002), and that social norms regarding the sequencing of life course transitions in young adulthood – i.e., finishing education, securing employment and financial independence, union and family formation – discourage childbearing while in education (Oppenheimer, 1994; Robert-Bobée and Mazuy, 2005). As such, higher levels of education are expected to give rise to postponement of parenthood because they require extended enrolment in education. The interplay between enrolment and entry into parenthood can be expected to play out somewhat differently, however, by migration background. Turkish and Maghrebi origin groups in particular exhibit more discontinuities in educational trajectories leading to early drop-out, as well as longer enrolment in education due to grade repeating (Neels, 2000). This implies that the number of years of schooling needed to achieve a given level of education and the length of educational trajectories can be expected to vary more in these origin groups, ranging from short periods of enrolment for women who drop out early and thus have low levels of education, to relatively long educational careers for a selective group of women who attain higher educational levels – albeit with higher probabilities of experiencing discontinuities and grade-repeating during their trajectories.

Second, higher levels of educational attainment are associated with higher *employment probabilities and wage potential*. Given the importance of early career investments for gaining access to long-term career tracks with favourable wages and working conditions (e.g., autonomy, flexibility), family formation shortly after graduation comes with high opportunity costs for highly educated women (Gustafsson et al., 2002), encouraging further postponement of parenthood to older ages (Liefbroer and Corijn, 1999). In case of only partial recuperation of fertility later in the life course, higher levels of education may also entail higher childlessness. When considering differentials by migration background, we expect that the variation in opportunity costs by level of education is more articulated, particularly among origin groups with limited labour market opportunities. The well-documented structurally limited labour market opportunities for women of foreign – and particularly non-European – origin are likely to discourage these women from investing in labour market trajectories, and to encourage them to take up alternative roles that are socially valued, such as motherhood. In contrast, we assume that the small and highly selective group of women with a migration background who attain high levels of education will also be confronted with the high opportunity costs associated with early childbearing. However, in line with micro-economic theories arguing that time investments are path-dependent as they become increasingly efficient, the select group of highly educated women is expected to postpone childbearing more strongly than native women, as they have invested in career development, but are subsequently confronted with persistent barriers in the labour market (e.g., discrimination in combination with sticky floors or glass ceilings).

Third, work-family reconciliation policies potentially reduce the opportunity costs of childrearing. Given that the opportunity costs of childrearing are most elevated for highly educated women, it is likely that these women will benefit most from policies such as formal childcare or parental leave when seeking to realise their fertility

intentions while maximising labour market returns to their educational credentials (Pavolini and Van Lancker, 2018; Van Lancker and Ghysels, 2012; Wood et al., 2023). In addition, policy design features such as high costs of formal childcare or strict employment-related eligibility criteria for parental leave may further exacerbate differential benefits from work-family policies by level of education (Abrassart and Bonoli, 2015; Biegel et al., 2021; Kil et al., 2018; Marynissen et al., 2021; Viitanen, 2005). The available literature has repeatedly shown that there are ethnic gaps in the uptake of formal childcare, with the uptake being particularly low among women with a non-European migration background. These gaps have been linked to a wide range of barriers on both the demand side (e.g., lack of employment stability) and the supply side (e.g., design features) affecting women with a migration background (Biegel et al., 2021). To the extent that such barriers also reduce access to family policies for highly educated women with a migration background, the role of formal childcare in work-family reconciliation may be weakened, further increasing the opportunity costs of childbearing.

Fourth, higher levels of gender equality in the division of unpaid labour within households (e.g., childbearing or household tasks) reduce the opportunity costs of childbearing for women. Allowing for variation across countries, the available literature has repeatedly shown that highly educated women are more likely to experience egalitarian gender role attitudes and divisions of labour within the household (Evertsson et al., 2009; Phinney and Flores, 2002). As such, variation in work-family reconciliation strategies by level of education (e.g., uptake of family policies and egalitarian gender roles within households) are expected to limit postponement and support recuperation of first births among highly educated women. To the extent that highly educated women from different migration backgrounds also face different ideational contexts and contributions to unpaid labour from their male partners, variation in the postponement and recuperation of first births can be expected. The available literature is inconclusive, however, regarding variation in gender norms by migration background. On the one hand, the cultural and institutional climates in the country of origin are geared more towards the male breadwinner model for several origin groups, and parental attitudes and family networks may be expected to act as a source of origin-specific values for women of the 1.5 and second generations (Idema and Phalet, 2007; Marks et al., 2009). On the other hand, women of the 1.5 and second generations do not have any direct experience of their parents' origin country, and empirical evidence shows substantial heterogeneity in gender role attitudes across and within origin groups (Wood, 2022), with migrant-native differentials strongly depending on gender (de Valk, 2008).

Fifth, ideational explanations of fertility patterns suggest that ideational changes regarding the family and the combination of work and family that accompany educational expansion have given rise to shifting norms regarding the timing of childbearing among higher educated women (Gustafsson et al., 2002; Lesthaeghe and Surkyn, 1988; Neels et al., 2017; Van de Kaa and Lesthaeghe, 1986). To the extent that higher levels of education are associated with a stronger emphasis on individual rather than family-related goals, such values can be expected to become drivers of fertility postponement, or even childlessness, among the higher educated in their own right. Depending on whether higher education among

women with a migration background is accompanied by values that support individual self-realisation and postponement of family formation to safeguard their labour market trajectories, or whether these women remain more exposed to alternative ideational frameworks that prescribe other social roles for women, additional variation by migration background in patterns of postponement and recuperation of fertility by level of education can be expected to emerge.

Data and methods

Data

This paper uses population-wide retrospective longitudinal microdata drawn from the Belgian census of 1 January 2011. This was the first census that was fully register-based, and it provides information on country of birth, citizenship at birth, year of immigration and descent. The information on descent links parents to children, and is vital to determine women's migration backgrounds and to reconstruct their maternity histories. The 2011 census was validated against vital registration and provides quasi exact retrospective estimates of the period total fertility rate (period TFR) between 1985 and 2010. As the period TFR is sensitive to shifts in the timing of fertility (Bongaarts and Feeney, 1998), and cohort fertility indicators cannot yet be calculated for origin groups with more recent migration histories, this study adopts a synthetic (period) life table approach to compare the timing of a first birth and the proportion of women entering parenthood across origin groups and migrant generations (Feeney and Yu, 1987; Neels, 2006; Ni Bhrolchain, 1987).⁵ To this end, we observe childless women of Belgian origin and women with a migration background who were exposed to the risk of having their first child between ages 18 and 50 in the 1990–2010 period, thus contributing 16,873,755 person-years of exposure to the construction of the synthetic life tables of entry into parenthood.

Origin group and migrant generation

An individual's *origin group* is determined using information on the citizenship at birth of one's parents, and the citizenship at birth of women themselves.⁶ A woman's origin is considered to be the citizenship at birth of her mother. If this information is missing, or if the citizenship at birth of a woman's mother is Belgian, we consider her father's citizenship at

5 We use a synthetic (period) approach instead of a cohort approach since the latter requires the observation of the full age span of a cohort. Using data from the Belgian 2011 census, this implies that only women born in 1961 or earlier could be included. For the 1.5 and second generations, these cohorts are often (very) small. Given the size and age of these cohorts today, findings using a cohort approach are likely less representative of the education-parenthood nexus in migrant origin groups and generations in more recent periods.

6 We use citizenship at birth of both women and their parents (both time-constant variables) to determine migration background rather than country of birth to avoid misspecification of the origin for Belgian women without a migration background who were born outside Belgium. If we relied on country of birth, the latter would erroneously be considered women with a migration background.

birth to reflect her origin. Subsequently, if information on the citizenship at birth of a woman's father is missing or if it is Belgian, we consider the woman's citizenship at birth to reflect her origin. If there is no information on the citizenship at birth of a woman and her parents, the woman's current citizenship is considered to reflect her origin.⁷ We distinguish seven origin groups: Belgium (BE), Southern Europe (SEU), Eastern Europe (EEU), Northern and Western Europe (NWEU), Turkey (TKY), Maghreb countries (MGB) and other non-European countries (otNEU).

Migrant generation is determined based on women's origin, country of birth and age at migration. If women have a non-Belgian origin, were not born in Belgium and migrated to Belgium before age 18, they are considered to be part of the 1.5 generation (1.5G). If women have a non-Belgian migration background, but were born in Belgium, they are considered to be part of the second generation (2G).

Education

Women's highest level of education is determined using the information on their level of education in the 2011 census, complemented with follow-up register data on level of education up to 2017.⁸ Due to the retrospective design, we have no time-varying information on enrolment and level of education over the life course. The use of a time-constant indicator on the level of education obtained by the 2011 census can introduce bias into the association between education and fertility, however, as the temporal ordering of events – leaving education versus having a first child – cannot be identified (Hoem and Kreyenfeld, 2006).⁹ This limitation should therefore be taken into account when interpreting the association between education and first births documented in this study. The education variable distinguishes three educational groups based on the ISCED 1997 classification: (1) low educated women with no education, primary or lower secondary education (ISCED 0, 1 and 2); (2) medium educated women with higher secondary and post-secondary non-tertiary education (ISCED 3, 3A, 3C and 4); and (3) high educated women with short and long forms of tertiary education (ISCED 5, 5A, 5B and 6). Table 1 shows the distribution of level of education by origin group and migrant generation, as well as the observed synthetic parity progression ratio to a first birth (SPPR1) and the associated synthetic mean age at first birth (SMAC1). Table S.1 in the supplementary material (available online at <https://doi.org/10.1553/p-mf52-3j2z>) additionally documents the distribution of person-years by age (five-year categories), level of education, origin group and migrant generation.

7 This concerns only a very small number of respondents.

8 These follow-up data on level of education allow us to make a relatively accurate assessment of the highest level of education, including for women who were still in education in the last years of the observation period (e.g., an 18-year-old in 2010), since the majority of these women most likely completed their education by 2017 (e.g., the 18-year-old is 25 years old by then).

9 Childbearing may impact enrolment and educational attainment, thereby contributing to the negative association between education and the proportion of women entering parenthood (Cohen et al., 2011). However, the extent to which the end of education coincides with the transition to parenthood is limited, suggesting that reverse causation is limited and that other mechanisms prevail.

Table 1 Distribution of level of education (in 2010), SPPI1 and SMAC1 by origin group and migrant generation, Belgium, 1990–2010, column percentages

	SEU		EEU		WNEU		TKY		MGB		otNEU	
	1.5G	2G	1.5G	2G	1.5G	2G	1.5G	2G	1.5G	2G	1.5G	2G
Low	9.82	25.91	13.60	32.92	19.77	20.32	23.46	14.70	35.49	20.54	17.66	13.07
Medium	29.39	39.86	36.71	45.10	45.23	42.67	42.12	40.00	40.79	44.67	37.13	34.37
High	60.78	34.24	49.69	21.98	35.00	37.01	34.42	45.31	23.72	34.79	45.21	52.56
SPPI1	0.798	0.847	0.803	0.856	0.761	0.816	0.889	0.870	0.897	0.836	0.809	0.757
SMAC1	26.48	26.55	26.67	26.13	26.49	26.83	23.01	24.55	23.93	26.15	26.62	27.65

Notes: [1] SPPI1: synthetic parity progression ratio to a first birth, SMAC1: synthetic mean age at first birth, [2] Origin groups: BE (Belgium), SEU (Southern Europe), EEU (Eastern Europe), WNEU (Western and Northern Europe), TKY (Turkey), MGB (Maghreb countries), otNEU (other non-European countries), 1.5G (1.5 generation), 2G (second generation).

Source: Longitudinal microdata from the 2011 Belgian census, calculations by authors.

Modelling first birth hazards

We model entry into parenthood by following childless women from the age of 18 up to and including the year in which their first child was born, or when censoring occurs as a result of reaching the age of 50 or the end of the observation period on 31 December 2010.¹⁰ Because of the retrospective design, no censoring occurs due to emigration or death.

We use discrete-time hazard models with a complementary log-log link function to model women's conditional probability of having a first birth $q(a)_i^t$ at age a . We estimate three models to examine variation by migrant origin and generation in the education-fertility nexus. These models gradually build up to test whether, in addition to variation in the education-fertility nexus by migrant origin, there is also significant variation by migrant generation. *Model 1* includes age (A_{it}) in years (period difference) centred at the age of 18 (baseline, fourth order polynomial),¹¹ education (E_i), origin group (O_i), the interactions between education, origin group and the linear and quadratic terms of the baseline, and period (P_{it}). We include this categorical variable for period to control for contextual factors that have not explicitly been taken into account in the analyses, as well as compositional differences between origin groups and generations throughout the observation period. This variable distinguishes between periods 1990–1996, 1997–2003 and 2004–2010. *Model 2* additionally includes migrant generation (G_i). Finally, *Model 3* relaxes the proportionality assumption regarding migrant generation by allowing the baseline to vary not only by level of education and origin group, but also by migrant generation (including the four-way interaction in Equation (1)):

$$-\ln[1 - \hat{q}(a)_i^t] = \int_t^{t+1} h(a) da = e^{\hat{\alpha}} \cdot e^{\hat{F}(A_{it})} \cdot e^{\hat{F}(E_i)} \cdot e^{\hat{F}(O_i)} \cdot e^{\hat{F}(G_i)} \cdot e^{\hat{F}(A_{it} * E_i * O_i * G_i)} \cdot e^{\hat{F}(P_{it})} \quad (1)$$

Model comparison indicates that including the four-way interaction between the baseline (age), level of education, origin group and migrant generation in Model 3 entails a significant improvement in model fit (likelihood ratio test with $\chi^2(36) = 96,177$ and $p < 0.001$) over Model 2 (which estimated first birth hazards as a function of the baseline, level of education, period, the three-way interaction between the baseline, level of education and origin group, only controlling for migrant generation). The model for women with a Belgian origin was run separately and includes age in years (period difference) centred at the age of 18 (baseline, fourth order polynomial), education, and the interaction between education and the linear and quadratic terms of the baseline. Table S.2 in the supplementary material provides an overview of the different model specifications.

10 We start observing women from the age of 18 onwards because this is the youngest age for which, with the data at hand, we have accurate information on highest level of education obtained throughout the observation period (see also footnote 5). Furthermore, the number of teen pregnancies (i.e., at ages 15, 16 or 17) are very limited across all origin groups and generations (ranging between 0.004 and 0.019 per cent of all births in the period considered), suggesting that the exclusion of these young ages does not significantly alter the results. Finally, the discussion on the potential bias introduced by using a time-constant indicator of educational attainment (cf. *supra*) also justifies the exclusion of these young age groups.

11 For the 1.5 generation of Southern European, Eastern European, Northern and Western European and other non-European origin, the baseline only has a quadratic specification. Model comparison points out that this specification yields the best fit for these respective origin groups and generations.

Model-based SPPR1 and SMAC1

Using the predicted conditional probabilities of having a first birth generated by these models, we plot first birth schedules by origin group, migrant generation and level of education. Furthermore, consistent with previous research (Neels et al., 2024; Wood et al., 2014), we use estimated first birth hazards to calculate the synthetic parity progression ratio to a first birth (SPPR1) and the corresponding synthetic mean age at first birth (SMAC1) by origin group, migrant generation and level of education (Equations (2) and (3)), in view of comparing educational differentials in postponement, recuperation and final intensity of first births across origin groups and migrant generations:

$$\text{SPPR1} = 1 - \prod_{a=18}^{49} [1 - \hat{q}(a)] \quad (2)$$

$$\text{SMAC1} = \sum_{a=18}^{49} \frac{a(S^a - S_{a+1})}{\text{SPPR1}} \quad (3)$$

The synthetic parity progression ratio to a first birth is the final intensity at age 49 in the period attrition table for progression to a first birth, thus reflecting the life table proportion of women having a first child in the period considered (Feeney and Yu, 1987; Ni Bhrolchain, 1987). Indicators of order-specific fertility drawn from synthetic life tables solely rely on rates of the first kind in their calculation (where women who already had their first child are no longer included in the risk set) and have been shown to provide close approximations of cohort fertility compared to indicators based on rates of the second kind (such as order-specific period total fertility rates), while using the most recent information available (Calot, 2001; Neels, 2006).

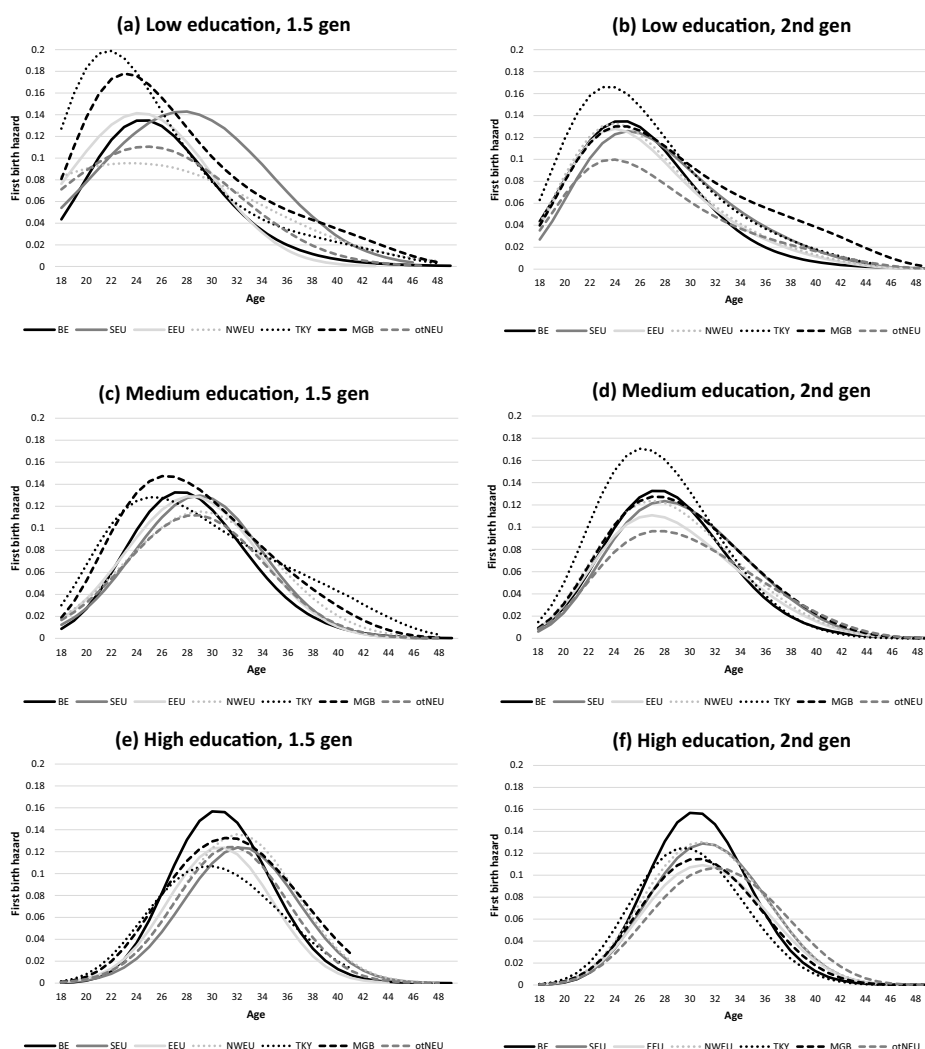
Results

Descriptive results: First birth schedules by level of education, origin and generation

Figures 1(a)–1(f) show the estimated conditional first birth probabilities from Model 3 by age and origin group for the six combinations of educational attainment (low, medium, high) and migrant generation (1.5G versus 2G). Table 2 reports the corresponding synthetic parity progression ratios to a first birth (SPPR1, Panel 1) and the synthetic mean ages at first birth (SMAC1, Panel 2) by migrant generation, origin group and level of education, which are also represented graphically in Figure 2. Coefficients of variation (standard deviation divided by the mean) were additionally reported in Table 2 to measure variation in SPPR1 and SMAC1 across origin groups (both overall and within ISCED levels), as well as variation in SPPR1 and SMAC1 across ISCED levels within origin groups.

As expected and in line with previous literature, Figures 1(a)–1(f) show that the schedules of conditional first birth probabilities in all groups consistently shift to older ages with

Figure 1 Estimated conditional first birth probabilities by age, origin group, migrant generation and level of education, Belgium 1990–2010, Model 3



Note: Origin groups: BE – Belgium, SEU – Southern Europe, EEU – Eastern Europe, NWEU – Western and Northern Europe, TKY – Turkey, MGB – Maghreb countries, otNEU – other non-European countries.
Source: Longitudinal microdata from the 2011 Belgian census, calculations by authors.

increasing levels of education, while the first birth schedules of women with a migration background also show variation around the schedule of native women with the same level of education (the black line in Figures 1(a)–1(f)), giving rise to variation in SMAC1 and SPPI1 across origin groups and migrant generations compared to native women

Table 2 Synthetic parity progression ratios to a first birth (SPPR1) and synthetic mean ages at first birth (SMAC1) by origin group, migrant generation and level of education, Belgium 1990–2010, Model 3

1. Synthetic parity progression ratio to a first birth (SPPR1)										
Origin group	1.5 Generation (vs Belgian origin)					2nd Generation (vs Belgian origin)				
	Total	Isced 0–2	Isced 3–4	Isced 5–6	CVar (isced)	Total	Isced 0–2	Isced 3–4	Isced 5–6	CVar (isced)
BE	0.798	0.821	0.810	0.813	0.007	0.798	0.821	0.810	0.813	0.007
SEU	0.847	0.911	0.819	0.768	0.087	0.803	0.834	0.823	0.790	0.028
EEU	0.856	0.846	0.826	0.738	0.072	0.761	0.816	0.785	0.745	0.046
WNEU	0.816	0.838	0.824	0.807	0.019	0.804	0.832	0.821	0.802	0.019
TKY	0.889	0.927	0.892	0.753	0.107	0.870	0.897	0.885	0.762	0.088
MGB	0.897	0.933	0.894	0.832	0.057	0.836	0.887	0.842	0.751	0.084
otNEU	0.809	0.827	0.792	0.761	0.042	0.757	0.763	0.772	0.759	0.009
CVar(origin)	0.046	0.057	0.048	0.045	–	0.049	0.054	0.046	0.035	–

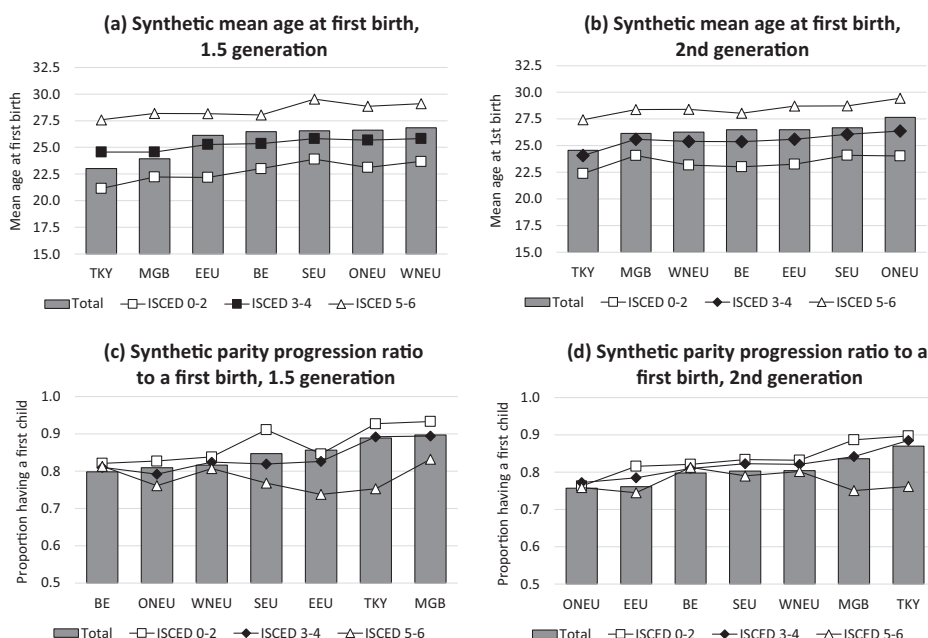
2. Synthetic mean age at first birth (SMAC1)										
	1.5 Generation (vs Belgian origin)					2nd Generation (vs Belgian origin)				
	Total	Isced 0–2	Isced 3–4	Isced 5–6	CVar (isced)	Total	Isced 0–2	Isced 3–4	Isced 5–6	CVar (isced)
BE	26.48	23.01	25.36	28.04	0.099	26.48	23.01	25.36	28.04	0.099
SEU	26.55	23.89	25.82	29.54	0.109	26.67	24.08	26.06	28.72	0.089
EEU	26.13	22.18	25.28	28.17	0.119	26.49	23.25	25.59	28.71	0.106
WNEU	26.83	23.68	25.83	29.10	0.104	26.27	23.18	25.39	28.40	0.102
TKY	23.01	21.15	24.56	27.59	0.132	24.55	22.38	24.06	27.42	0.104
MGB	23.93	22.23	24.57	28.19	0.120	26.15	24.07	25.60	28.38	0.084
otNEU	26.62	23.12	25.68	28.86	0.111	27.65	24.03	26.36	29.44	0.102
CVar(origin)	0.060	0.042	0.022	0.024	–	0.035	0.028	0.029	0.022	–

Notes: [1] Origin groups: BE (Belgium), SEU (Southern Europe), EEU (Eastern Europe), WNEU (Western and Northern Europe), TKY (Turkey), MGB (Maghreb countries), otNEU (other non-European countries). [2] CVar (isced): coefficient of variation (st.dev./mean) across ISCED levels within origin groups. [3] CVar(origin): coefficient of variation (st.dev./mean) across origin groups, both overall and within ISCED levels.

Source: Longitudinal microdata from the 2011 Belgian census, calculations by authors.

(Table 2 and Figure 2). A fairly consistent pattern emerges with respect to educational differentials in the synthetic mean age at first birth: the mean age at first birth increases with higher levels of education, and although variation across origin groups in the timing of the first birth is smaller when considering women with the same level of education (CVar(origin), Table 2), educational differentials in the mean age at first birth are typically somewhat more articulated among women with a migration background than among natives, particularly in the 1.5 generation (CVar(isced), Table 2). The picture is less uniform, however, when considering educational gradients in the life table proportion of women

Figure 2 Synthetic mean age at first birth (SMAC1) and synthetic parity progression ratio to a first birth (SPPR1) by level of education, origin group and migrant generation, Belgium, 1990–2010, Model 3



Note: Origin groups: BE (Belgium), SEU (Southern Europe), EEU (Eastern Europe), WNEU (Western and Northern Europe), TKY (Turkey), MGB (Maghreb countries), otNEU (other non-European countries).

Source: Longitudinal microdata from the 2011 Belgian census, calculations by authors.

having a first child: whereas the educational gradient has virtually disappeared among native women, pronounced negative gradients do emerge in several origin groups for both the 1.5 and the second generation.

The largest variation in both the timing and the proportion of women having a first child emerges among women of the *1.5 generation* (Figures 1(a), 1(c) and 1(e)), and particularly among lower educated women. Lower educated women of the Turkish and Maghrebi 1.5 generation show high first birth hazards at relatively young ages, resulting in lower SMAC1 (resp. 21.15 and 22.23), but also higher SPPR1 (resp. 0.927 and 0.933), compared to lower educated women of Belgian origin (SPPR1 of 0.821 and SMAC1 of 23.01). Lower educated women originating from Eastern Europe also have an earlier fertility schedule than lower educated native women, and a somewhat higher proportion of these women have a first child, whereas lower educated women of Southern European origin combine somewhat later fertility with higher synthetic parity progression ratios to a first birth compared to lower educated natives. Finally, lower educated women of the 1.5 generation of Northern and Western European origin as well as of other non-European origin combine later fertility schedules with somewhat higher synthetic parity progression ratios to a first child compared to lower educated natives. Compared to lower educated women, variation

in first birth timing across origin groups is more limited among medium educated women of the 1.5 generation, with the proportion of women having a first child being similar to that among native women, with the exception of women of Turkish and Maghrebi origin. This pattern is even more articulated for higher educated women, among whom all origin groups have similar or later mean ages at first birth compared to those of native women, albeit with lower proportions of women having a first child (again, with the exception or women of Maghrebi origin, among whom the proportion is similar to that of natives).

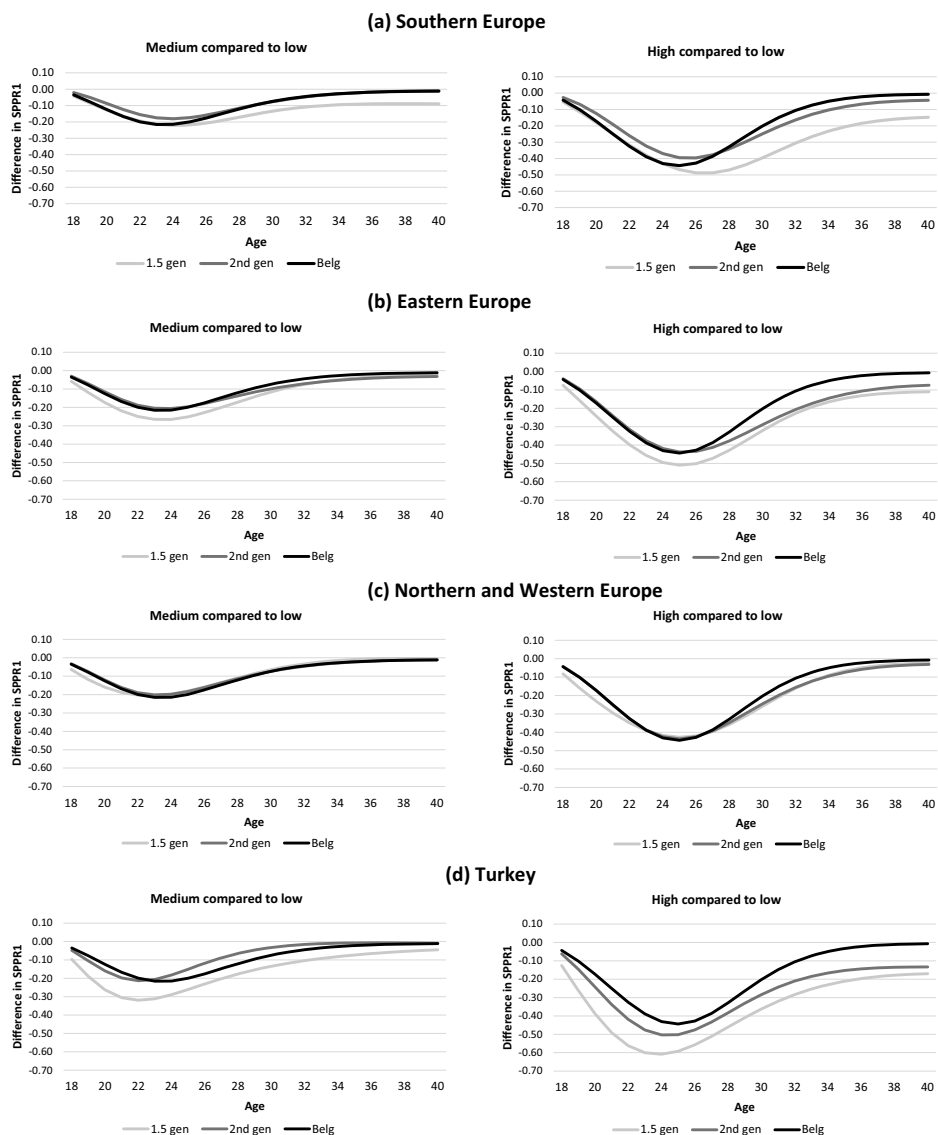
Among women of the *second generation*, variation in the timing of a first birth across origin groups is limited when considering women with the same level of education, as the highest first birth hazards are located at similar ages in all origin groups (Figures 1(b), 1(d) and 1(f)). Variation across origin groups is more substantial, however, when considering the life table proportion of women having a first child. Among lower and medium educated women, only second generation women of Turkish origin stand out as having somewhat higher first birth hazards at younger ages than other origin groups, which are combined with a higher synthetic parity progression ratio to a first birth. Moreover, among lower and medium educated second generation women of Southern European, Northern and Western European and Maghreb origin, somewhat higher percentages have a first child than among lower and medium educated native women. However, when considering higher educated women in different origin groups, we see that second generation women consistently have lower synthetic parity progression ratios to a first birth compared to native women.

The educational gradient of postponement and recuperation: Variation across origin groups and migrant generations

A convenient way of comparing the postponement and recuperation of first births across groups is to calculate differences between the cumulative proportions of women who already have a first child at different ages between 18 and 49 (Neels, 2006). Based on Model 3, Figures 3(a)–3(f) show differences in the cumulative proportion of women who have at least one child by age, comparing (i) women with medium versus low levels of education (left panel) and (ii) women with high versus low levels of education (right panel) for each of the six origin groups considered. Each figure shows educational differentials for both the 1.5 and the second generation, and includes the curve for Belgian origin women as a reference, with the aim of answering the main research question: i.e., whether and to what extent the education-parenthood nexus is similar across origin groups and migrant generations.

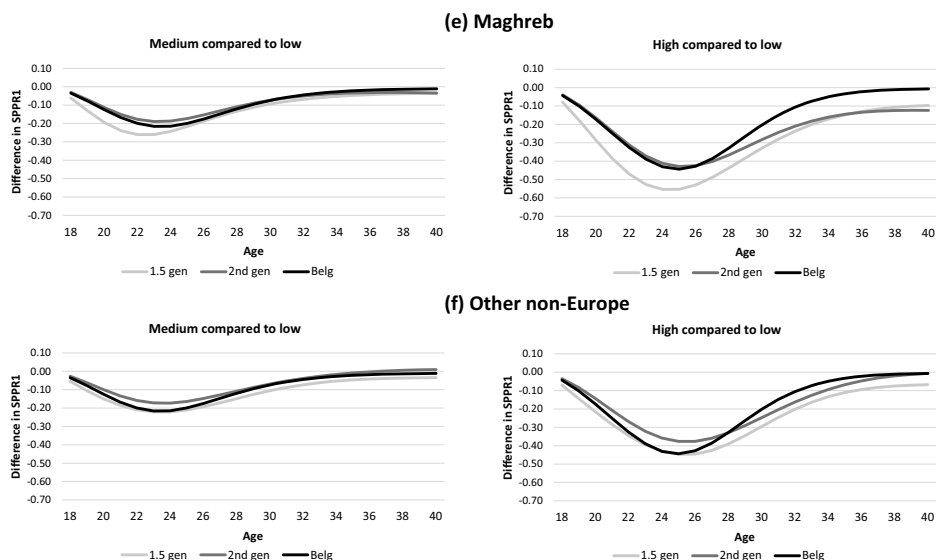
In all origin groups and generations, the typical pattern of education-induced postponement of fertility emerges, with medium and higher educated women incurring fertility deficits at younger ages compared to their lower educated peers, while the differentials grow smaller at older ages as a result of catching-up among medium and higher educated women. The remaining differentials at age 49 reflect the previously discussed educational differentials in the synthetic parity progression ratio to a first birth. Our results suggest that the patterns of postponement and recuperation for second generation women are generally

Figure 3 Age-specific differences in the cumulative proportion of women who have at least one child, comparing medium education to low education (left panel) and high education to low education (right panel), by migrant generation and origin group, Belgium 1990–2010, Model 3



(figure continues)

Figure 3 (continued)



Note: From age 40 onwards, the age-specific differences in the proportions of women who have at least one child between women with low, medium and high levels of education remain constant.

Source: Longitudinal microdata from the 2011 Belgian census, calculations by authors.

closer to the patterns found among native women than is the case for women of the 1.5 generation, although differences exist between origin groups, particularly depending on whether postponement, recuperation or the final intensity is considered.

Education and postponement of parenthood in the 1.5 and second generations

A comparison of the cumulative fertility schedules of medium and higher educated women to that of lower educated women in each of the origin groups indicates that postponement of first births with increasing education is generally *more pronounced* among migrant origin women than it is among native women. In addition, there is also clear variation across migrant generations, with the educational differentials in the timing of a first birth typically being largest among women of the 1.5 generation, whereas the differentials among second generation women are more similar to the patterns found among natives.

A comparison of the educational differentials in the postponement of fertility across origin groups indicates that women of *Western European and Northern European origin* have educational differentials in the timing of parenthood that are most similar to those among natives, followed by women of *other non-European origin*. In contrast, education is associated with stronger differentiation in the timing of parenthood compared to that among native women (i.e., stronger postponement with increasing education) among

women of *Southern and Eastern European origin*, and particularly among women of *Turkish* and *Maghrebi origin*, where the educational differentials in the timing of a first birth are most articulated for women of the 1.5 generation, but diminish and converge to the pattern among native women for women of the second generation. This pattern of convergence clearly occurs in the Turkish and Maghrebi origin groups, with postponement being less articulated among medium and highly educated women of the second generation than of the 1.5 generation. Similar results are found in the Eastern European origin group, where the strong educational differentials observed in the 1.5 generation do not occur in the second generation. Similarly, within groups originating from Southern Europe, postponement of the first birth with increasing education is more prevalent among the 1.5 generation than among native women, whereas the fertility postponement pattern among the second generation more closely approximates that among highly educated women in the Belgian origin group.

Education and recuperation of first births in the 1.5 and second generations

Within the Belgian origin group, the deficits at younger ages in the proportions of medium and highly educated women who already have their first child converge to zero by the age of 40, indicating that the postponement of the first birth with higher levels of education is (quasi) fully recuperated at older ages. This is not the case in the majority of other origin groups: a comparison of the recuperation of first births and the final intensities among medium and highly educated women vis-à-vis their lower educated age mates shows articulated negative educational gradients in the proportion of women having a first child, which vary strongly across the origin groups and migrant generations considered.

The patterns of education-related postponement and recuperation among women from the *Northern and Western European* origin groups vary little from those of native women, resulting in small differences in SPPR1 compared to natives, and a virtually neutral educational gradient in the proportion of women having a first child. Also 1.5 and second generation women originating from *other non-European countries* show limited educational gradients in the synthetic parity progression ratio to a first birth by the age of 35, with the fertility of higher educated women typically being somewhat lower than that among native women. In contrast, the results for women of *Southern European origin* indicate that the levels of recuperation are partial among medium and highly educated women of the 1.5 generation, resulting in these women having lower first birth intensities at age 40 than their lower educated age mates. Among second generation women of Southern European origin, however, the patterns of fertility postponement and recuperation at older ages are more similar to those among native women, resulting in a decline of the negative educational gradient in the proportion of women having a first child. Similar findings are observed for the *Turkish origin* group: educational differentials in the postponement and recuperation of first births among second generation women more closely approximate the patterns among native women than those among women of the 1.5 generation. Although medium educated women in the 1.5 and second generations still manage to catch up to lower educated women, a substantial deficit of first births relative to the levels among lower

educated women persists among higher educated women of both the 1.5 and the second generation. A similar pattern emerges among higher educated women of *Maghrebi* and *Eastern European* origin: education-related postponement among the 1.5 and second generations is not compensated for by recuperation at higher ages, resulting in stronger negative educational gradients in the proportion of women having a first child compared to those among the Belgian origin group. Unlike in the Southern European origin groups, the fertility deficit of higher educated women compared to lower educated women is not smaller in the second generation than in the 1.5 generation in the Turkish, Maghrebi and Eastern European origin groups.

Discussion

The associations between level of education on the one hand and the timing of the first birth and the proportion of women entering parenthood on the other have been well-documented for general populations, but these associations have been less studied among population subgroups with a migration background, let alone among different migrant generations. This is unfortunate considering the increasing heterogeneity of European populations in terms of migration background. The implications of this heterogeneity for future fertility trends in European countries will, to a considerable extent, depend on i) trends in educational attainment among subgroups with a migration background, and ii) whether the association between education, fertility postponement (timing) and fertility recuperation (synthetic parity progression ratios) are similar to the patterns found in the native population. Using a model-based synthetic life table approach (Ni Bhrolchain, 1987), this study addressed the research question of *whether, and to what extent, the education-parenthood nexus is similar across origin groups and migrant generations*.

Our findings indicate that increasing education is consistently associated with postponement of the first birth in all groups considered, with educational differentials in the timing of parenthood being somewhat more articulated among Southern European, Eastern European, Turkish and Maghrebi origin groups compared to those among natives. With respect to recuperation of first births at older ages and the proportion of women who have at least one child by the end of their reproductive lifespan, we find that the historical negative educational gradient has disappeared among native women, whereas there are pronounced negative educational gradients among several origin groups and migrant generations. These results are, however, partially driven by the larger variation of SPPR1 and SMAC1 across lower educated women of different origin groups compared to that among medium and highly educated women in these origin groups. The latter finding is consistent with earlier research on the association between education and fertility among 1.5 and second generation migrants of Turkish and Maghrebi origin in Germany and France (Krapf and Wolf, 2015; Pailhé, 2017). These authors concluded that differences between origin groups become smaller with higher levels of education, suggesting that education has an equalising effect (Krapf and Wolf, 2015; Pailhé, 2017).

Patterns of both postponement and recuperation are, however, subject to variation across origin groups and migrant generations. While women originating from *Northern and Western European countries* as well as from *other non-European countries* show the familiar patterns of education-induced postponement and subsequent recuperation at older ages, only limited differences exist between the 1.5 generation, the second generation and the native Belgian origin group. Among women originating from *Southern Europe, Eastern Europe, Turkey and Maghreb countries*, the educational gradients in the timing of parenthood, and particularly the proportions of women who have a first child, are typically larger among women of the 1.5 generation than among native women, with the patterns among second generation women more closely approximating those among native women. Potential explanations for these findings point in the direction of women with the same educational attainment levels having different lived realities (e.g., greater heterogeneity in the length of educational careers). In addition, different (typically lower) labour market returns to educational credentials – in particular among 1.5 generation women originating from Turkey and Maghreb countries – may discourage women from investing in educational credentials and/or steer them towards other socially rewarded roles (i.e., investing in family formation instead of investing in a career), resulting in patterns of earlier childbearing among (these larger groups of) low educated women (Kreyenfeld and Andersson, 2014; Wood and Neels, 2017). Similarly, for the select group of women in these migrant populations who attain medium or higher education, more limited returns to education in the labour market (compared to those for native women) may provide an incentive to postpone or even forgo parenthood with the aim of acquiring or safeguarding a stable labour market position.

With regard to the recuperation of first births at older ages and the proportions of women who have a first child (synthetic parity progression ratios to a first birth), we find that among medium and highly educated women of the 1.5 and the second generation in the Southern European, Eastern European, Turkish and Maghrebi origin groups, recuperation does not enable them to catch up to the first birth rates of lower educated women, resulting in clear negative educational gradients in the transition to parenthood. Potential explanations for the partial recuperation of first births are potentially related to differences across groups in the compatibility of work and family in women's life courses at older ages. Limited access to and limited uptake of work-family reconciliation policies, such as parental leave and formal childcare, may explain the absence of a stronger recuperation of postponed births among both the 1.5 and the second generation in some origin groups (Biegel et al., 2021; Marynissen et al., 2021; Mills et al., 2011). In addition, differences in the degree of gender equality within households in the sharing of household and childcare responsibilities may partially explain these patterns (Evertsson et al., 2009).

The results in this paper contribute to the larger discussion on the factors that shape the unfolding of life courses in migrant populations (Belzil and Poinas, 2010; Bernhardt et al., 2007; Crul and Vermeulen, 2003; Milewski, 2011). This study complements the large body of research that considers variation by migrant origin and migrant generation in a specific life domain (e.g., education or fertility) by adopting a cross-domain approach that considers the association between different life domains (education and fertility), in line with the well-established tradition of life course research in general populations (Jalovaara et al., 2019; Köppen et al., 2017; Wood et al., 2021). Given that education is often viewed

as a primary engine of assimilation and economic progress for migrants, and particularly for their children (Baert et al., 2016), examining the link between education and entry into parenthood provides a particularly relevant perspective to enhance our understanding of (dis)similarities in fertility patterns by migration background, and of how increasing population diversity in terms of migration background may shape fertility trends. In the absence of educational expansion in migrant groups, patterns of family formation at younger ages may remain largely preserved, whereas educational expansion in migrant groups is likely to set off a postponement transition in these groups as well, potentially affecting educational gradients in the proportion of women entering parenthood (Kulu et al., 2019).

Despite the use of population-wide microdata and a synthetic life table approach, our study is subject to several limitations that may provide paths for future research. *First*, our study faced several data limitations. Further disaggregating the 1.5 generation by age at migration proved impossible since low cell counts quickly entailed unstable results. In addition, the use of a time-constant indicator of level of education may bias the association between education and first childbirth (Hoem and Kreyenfeld, 2006), and should ideally be replaced by time-varying information on educational trajectories in future research. The fact that the data are relatively outdated also calls for follow-up studies using more recent information. *Second*, the discussion of the results refers to different mechanisms linking education and entry into parenthood, but the paper remains largely descriptive, as potential explanations for the varying associations across origin groups and migrant generations are not tested empirically. Follow-up studies looking into potential explanations would ideally consider a wide range of covariates and mechanisms (e.g., marital status, place of residence, religion, labour market potential and trajectories, gender norms, access to work-family policies), although this is likely to create new challenges with respect to endogeneity and selection in terms of unobservables (Lillard et al., 1995; Lillard and Waite, 1993). *Third*, while the results presented in this study hint at the potential impact of educational expansion (or lack thereof) in migrant populations on fertility trends, allowing for variation in the association between education and entry into parenthood by migrant background, a formal quantification of this potential impact would require additional analyses to those presented in this paper, such as the development of dynamic microsimulation models that can simultaneously account for changes in population composition and variation in profile-specific patterns of entry into parenthood (Billari, 2015). *Fourth*, whereas the focus of this study is limited to entry into parenthood, a joint modelling approach considering both entry into parenthood and progression to second and higher order births would provide additional opportunities to assess selectivity in subsequent fertility transitions (Wood et al., 2014). In addition, a joint model of successive fertility transitions would allow us to quantify how variation in the age at entry into parenthood entails variation in the timing and intensity of progression to second and higher order births. Stronger postponement may, for example, entail faster transitions to higher order births (i.e., time squeeze) in order to realise the desired number of children (Kreyenfeld, 2002), which, in turn, has policy implications, since having multiple young children presumably means more demand for childcare if parents are to continue to participate in the labour force. Hence, expanding this research to second and higher order births is an additional path for future research.

Supplementary material

Available online at <https://doi.org/10.1553/p-mf52-3j2z>

Supplementary file 1. Tables S.1–S.2



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References

- Abbrassart, A., and Bonoli, G. (2015). Availability, cost or culture? Obstacles to childcare services for low-income families. *Journal of Social Policy*, 44(4), 787–806. <https://doi.org/10.1017/S0047279415000288>
- Andersson, G., and Scott, K. (2005). Labour-market status and first-time parenthood: The experience of immigrant women in Sweden, 1981–97. *Population Studies*, 59(1), 21–38. <https://doi.org/10.1080/0032472052000332683>
- Baert, S., Heiland, F. W., and Korenman, S. (2016). Native-immigrant gaps in educational and school-to-work transitions in the 2nd generation: The role of gender and ethnicity. *De Economist*, 164(2), 159–186. <https://doi.org/10.1007/s10645-016-9273-4>
- Becker, G. (1991). *A treatise on the family*. Harvard University Press.
- Belzil, C., and Poinas, F. (2010). Education and early career outcomes of second-generation immigrants in France. *Labour Economics*, 17(1), 101–110. <https://doi.org/10.1016/j.labeco.2009.07.008>
- Bernhardt, E., Goldscheider, F., and Goldscheider, C. (2007). Integrating the second generation: Gender and family attitudes in early adulthood in Sweden. *Zeitschrift für Familienforschung*, 19(1), 55–70. <https://doi.org/10.20377/jfr-337>
- Biegel, N., Wood, J., and Neels, K. (2021). Migrant-native differentials in the uptake of (in) formal childcare in Belgium: The role of mothers' employment opportunities and care availability. *Journal of Family Research*. <https://doi.org/10.20377/jfr-463>
- Billari, F. C. (2015). Integrating macro- and micro-level approaches in the explanation of population change. *Population Studies—A Journal of Demography*, 69, S11–S20. <https://doi.org/10.1080/00324728.2015.1009712>
- Blossfeld, H.-P., and Huinink, J. (1991). Human capital investments or norms of role transition? How women's schooling and career affect the process of family formation. *American Journal of Sociology*, 97(1), 143–168. <https://doi.org/10.1086/229743>
- Bongaarts, J., and Feeney, G. (1998). On the quantum and tempo of fertility. *Population and Development Review*, 24(2), 271–291. <https://doi.org/10.2307/2807974>
- Calot, G. (2001). Demographic techniques: Rates of the first and second kind. In N. Smelser and P. Baltes (Eds.), *International encyclopedia of the social and behavioural sciences*. Elsevier. <https://doi.org/10.1016/B0-08-043076-7/02204-X>

- Castro Martin, T., and Rosero-Bixby, L. (2011). Motherhood and transnational borders immigrants' women fertility in Spain. *Revista Internacional De Sociologia*, 69, 105–137. <https://doi.org/10.3989/ris.2011.iM1.388>
- Cohen, J. E., Kravdal, Ø., and Keilman, N. (2011). Childbearing impeded education more than education impeded childbearing among Norwegian women. *Proceedings of the National Academy of Sciences*, 108(29), 11830–11835. <https://doi.org/10.1073/pnas.1107993108>
- Crul, M., and Vermeulen, H. (2003). The second generation in Europe. *International Migration Review*, 37(4), 965–986. <https://doi.org/10.1111/j.1747-7379.2003.tb00166.x>
- de Valk, H. (2008). Parental influence on work and family plans of adolescents of different ethnic backgrounds in the Netherlands. *Sex Roles*, 59(9), 738–751. <https://doi.org/10.1007/s11199-008-9464-9>
- Dubuc, S. (2012). Immigration to the UK from high-fertility countries: Intergenerational adaptation and fertility convergence. *Population and Development Review*, 38(2), 353–368. <https://doi.org/10.1111/j.1728-4457.2012.00496.x>
- Dubuc, S. (2017). Fertility and education among British Asian women: A success story of social mobility? *Vienna Yearbook of Population Research*, 15, 269–291. <https://doi.org/10.1553/populationyearbook2017s269>
- Dubuc, S., and Haskey, J. (2010). Ethnicity and fertility in the United Kingdom. *Ethnicity and Integration*. In Stillwell, J., van Ham, M. (Eds.) *Understanding population trends and processes* (Vol. 3, pp. 63–81), https://doi.org/10.1007/978-90-481-9103-1_4
- Evertsson, M., England, P., Mooi-Reci, I., Hermesen, J., de Bruijn, J., and Cotter, D. (2009). Is gender inequality greater at lower or higher educational levels? Common patterns in the Netherlands, Sweden, and the United States. *Social Politics: International Studies in Gender, State & Society*, 16(2), 210–241. <https://doi.org/10.1093/sp/jxp008>
- Feeney, G., and Yu, J. (1987). Period parity progression measures of fertility in China. *Population Studies*, 41, 77–102. <https://doi.org/10.1080/0032472031000142546>
- FOD WASO, and Unia. (2022). *Socio-economische monitoring 2022: Arbeidsmarkt en origine* FOD WASO, Unia.
- Gustafsson, S., Kenjoh, E., and Wetzels, C. (2002). The role of education on postponement of maternity in Britain, Germany, the Netherlands and Sweden. In Ruspini, E. and Dale, A. (Eds.) *The gender dimension of social change: The contribution of dynamic research to the study of women's life courses* (pp. 55–80). Policy Press. <https://doi.org/10.56687/9781847425478-008>
- Heath, A. F., Rothon, C., and Kilpi, E. (2008). The second generation in Western Europe: Education, unemployment, and occupational attainment. *Annual Review of Sociology*, 34(1), 211–235. <https://doi.org/10.1146/annurev.soc.34.040507.134728>
- Hoem, J. M., and Kreyenfeld, M. (2006). Anticipatory analysis and its alternatives in life-course research. Part 1: The role of education in the study of first childbearing [Article]. *Demographic Research*, 15, 461–484. <https://doi.org/10.4054/DemRes.2006.15.16>
- Huschek, D., de Valk, H. A. G., and Liefbroer, A. C. (2011). Gender-role behavior of second-generation Turks: The role of partner choice, gender ideology and societal context. *Advances in Life Course Research*, 16(4), 164–177. <https://doi.org/10.1016/j.alcr.2011.09.005>
- Idema, H., and Phalet, K. (2007). Transmission of gender-role values in Turkish-German migrant families: The role of gender, intergenerational and intercultural relations. *Zeitschrift für Familienforschung*, 19(1), 71–105. <https://doi.org/10.20377/jfr-338>
- Jalovaara, M., Neyer, G., Andersson, G., Dahlberg, J., Dommermuth, L., Fallesen, P., and Lappegård, T. (2019). Education, gender, and cohort fertility in the Nordic countries. *European Journal of Population*, 35(3), 563–586. <https://doi.org/10.1007/s10680-018-9492-2>
- Kil, T., Wood, J., and Neels, K. (2018). Parental leave uptake among migrant and native mothers: Can precarious employment trajectories account for the difference? *Ethnicities*, 18(1), 106–141. <https://doi.org/10.1177/1468796817715292>
- Köppen, K., Mazuy, M., and Toulemon, L. (2017). Childlessness in France. In M. Kreyenfeld and D. Konietzka (Eds.), *Childlessness in Europe: Contexts, causes, and consequences* (pp. 77–95). Springer International Publishing. https://doi.org/10.1007/978-3-319-44667-7_4

- Krapf, S., and Wolf, K. (2015). Persisting differences or adaptation to German fertility patterns? First and second birth behavior of the 1.5 and second generation Turkish migrants in Germany [Article]. *Kolner Zeitschrift für Soziologie Und Sozialpsychologie*, 67, 137–164. <https://doi.org/10.1007/s11577-015-0331-8>
- Kravdal, O. (1992). The emergence of a positive relation between education and third birth rates in Norway with supportive evidence from the United States. *Population Studies*, 46(3), 459–475. <https://doi.org/10.1080/0032472031000146456>
- Kravdal, O., and Rindfuss, R. R. (2008). Changing relationships between education and fertility: A study of women and men born 1940 to 1964. *American Sociological Review*, 73(5), 854–873. <https://doi.org/10.1177/000312240807300508>
- Kreyenfeld, M. (2002). Time squeeze, partner effect or self-selection?: An investigation into the positive effect of women's education on second birth risks in West Germany. *Demographic Research*, 7(2), 15–48. <https://doi.org/10.4054/DemRes.2002.7.2>
- Kreyenfeld, M., and Andersson, G. (2014). Socioeconomic differences in the unemployment and fertility nexus: Evidence from Denmark and Germany. *Advances in Life Course Research*, 21, 59–73. <https://doi.org/10.1016/j.alcr.2014.01.007>
- Kulu, H., and González-Ferrer, A. (2014). Family dynamics among immigrants and their descendants in Europe: Current research and opportunities. *European Journal of Population*, 30(4), 411–435. <https://doi.org/10.1007/s10680-014-9322-0>
- Kulu, H., and Hannemann, T. (2016). Why does fertility remain high among certain UK-born ethnic minority women? *Demographic Research*, 35, 1441–1488, Article 49. <https://doi.org/10.4054/DemRes.2016.35.49>
- Kulu, H., Hannemann, T., Pailhé, A., Neels, K., Krapf, S., González-Ferrer, A., and Andersson, G. (2017). Fertility by birth order among the descendants of immigrants in selected European countries. *Population and Development Review*, 43(1), 31–60. <https://doi.org/10.1111/padr.12037>
- Kulu, H., Milewski, N., Hannemann, T., and Mikolaj, J. (2019). A decade of life-course research on fertility of immigrants and their descendants in Europe. *Demographic Research*, 40, 1345–1374, Article 46. <https://doi.org/10.4054/DemRes.2019.40.46>
- Lappegard, T., and Ronsen, M. (2005). The multifaceted impact of education on entry into motherhood. *European Journal of Population*, 21(1), 31–49. <https://doi.org/10.1007/s10680-004-6756-9>
- Lesthaeghe, R., and Surkyn, J. (1988). Cultural dynamics and economic theories of fertility change. *Population and Development Review*, 14(1), 1–45. <https://doi.org/10.2307/1972499>
- Lesthaeghe, R., and Van de Kaa, D. J. (1986). Twee demografische transitities. *Bevolking: groei en krimp*, 9–24.
- Liefbroer, A. C., and Corijn, M. (1999). Who, what, where, and when? Specifying the impact of educational attainment and labour force participation on family formation. *European Journal of Population/Revue Européenne de Démographie*, 15(1), 45–75. <https://doi.org/10.1023/A:1006137104191>
- Lillard, L. A., Brien, M. J., and Waite, L. J. (1995). Premarital cohabitation and subsequent marital dissolution – a matter of self-selection. *Demography*, 32(3), 437–457. <https://doi.org/10.2307/2061690>
- Lillard, L. A., and Waite, L. J. (1993). A joint model of marital childbearing and marital disruption. *Demography*, 30(4), 653–681. <https://doi.org/10.2307/2061812>
- Liu, C., and Kulu, H. (2023). Competing family pathways for immigrants and their descendants in Germany. *International Migration Review*, 33. <https://doi.org/10.1177/01979183231161600>
- Maes, J., Wood, J., Marynissen, L., and Neels, K. (2022). The gender division of paid work over family formation: Variation by couples' migration background. *Advances in Life Course Research*, 53, 100497. <https://doi.org/10.1016/j.alcr.2022.100497>
- Marks, J., Chun Bun, L., and McHale, S. M. (2009). Family patterns of gender role attitudes. *Sex Roles*, 61(3–4), 221–234. <https://doi.org/10.1007/s11199-009-9619-3>
- Martin, S. P. (2000). Diverging fertility among U.S. women who delay childbearing past age 30. *Demography*, 37(4), 523–533. <https://doi.org/10.1353/dem.2000.0007>
- Marynissen, L., Wood, J., and Neels, K. (2021). Mothers and parental leave in Belgium: Social inequalities in eligibility and uptake. *Social Inclusion*, 9(2), 325–337. <https://doi.org/10.17645/si.v9i2.3834>
- Miettinen, A., Rotkirch, A., Szalma, I., Donno, A., and Tanturri, M.-L. (2015). Increasing childlessness in Europe: Time trends and country differences. *Families and Societies. Working paper series*, 3.

- Milewski, N. (2010). *Fertility of immigrants: A two-generational approach in Germany*. Springer Science & Business Media.
- Milewski, N. (2011). Transition to a first birth among Turkish second-generation migrants in Western Europe. *Advances in Life Course Research*, 16(4), 178–189. <https://doi.org/10.1016/j.alcr.2011.09.002>
- Mills, M., Rindfuss, R. R., McDonald, P., te Velde, E. on behalf of the ESHRE Reproduction and Society Task Force. (2011). Why do people postpone parenthood? Reasons and social policy incentives. *Human Reproduction Update*, 17(6), 848–860. <https://doi.org/10.1093/humupd/dmr026>
- Mussino, E., and Strozza, S. (2012). The fertility of immigrants after arrival: The Italian case. *Demographic Research*, 26, 99–130. <https://doi.org/10.4054/DemRes.2012.26.4>
- Mussino, E., Wilson, B., and Andersson, G. (2021). The fertility of immigrants from low-fertility settings: Adaptation in the quantum and tempo of childbearing? *Demography*, 58(6), 2169–2191. <https://doi.org/10.1215/00703370-9476273>
- Myria. (2016). 70 jaar Italiaanse immigratie... en meer! <https://www.myria.be/nl/publicaties/myriatics-5-70-jaar-italiaanse-immigratie-en-meer>
- Myria. (2021). Bevolking en migratiebewegingen. https://www.myria.be/files/2021_Bevolking_en_migratiebewegingen.pdf
- Neels, K. (2000). *Education and the transition to employment: Young Turkish and Moroccan adults in Belgium* (Vol. 36). NIDI-CBGS Publications.
- Neels, K. (2006). *Reproductive strategies in Belgian fertility: 1930–1990*. (Vol. 38). NIDI-CBGS Publications. <https://doi.org/10.13140/2.1.4014.1449>
- Neels, K., and De Wachter, D. (2010). Postponement and recuperation of Belgian fertility: How are they related to rising female educational attainment? *Vienna Yearbook of Population Research*, 8, 77–106. <https://doi.org/10.1553/populationyearbook2010s77>
- Neels, K., Marynissen, L., and Wood, J. (2024). Economic cycles and entry into parenthood: Is the association changing and does it affect macro-level trends? Micro-level hazard and simulation models of Belgian fertility trends, 1960–2010. *European Journal of Population, online first*. <https://doi.org/10.1007/s10680-024-09695-6>
- Neels, K., Murphy, M., Ní Bhrolcháin, M., and Beaujouan, É. (2017). Rising educational participation and the trend to later childbearing. *Population and Development Review*, 43(4), 667–693. <https://doi.org/10.1111/padr.12112>
- Ni Bhrolchain, M. (1987). Period parity progression ratios and birth intervals in England and Wales, 1941–1971. A synthetic life table analysis. *Population Studies*, 41(1), 103–125. <https://doi.org/10.1080/0032472031000142556>
- Ní Bhrolcháin, M., and Beaujouan, É. (2012). Fertility postponement is largely due to rising educational enrolment. *Population Studies*, 66(3), 311–327. <https://doi.org/10.1080/00324728.2012.697569>
- Nisén, J., Klüsener, S., Dahlberg, J., Dommermuth, L., Jasilioniene, A., Kreyenfeld, M., Lappegård, T., Li, P., Martikainen, P., Neels, K., Riederer, B., te Riele, S., Szabó, L., Trimarchi, A., Vician, F., Wilson, B., and Myrskylä, M. (2021). Educational differences in cohort fertility across sub-national regions in Europe. *European Journal of Population*, 37(1), 263–295. <https://doi.org/10.1007/s10680-020-09562-0>
- OECD. (2021). Fertility rates (indicator). Retrieved 28 May 2021, <https://doi.org/10.1787/8272fb01-en>
- Oppenheimer, V. K. (1994). Women's rising employment and the future of the family in industrial societies. *Population and Development Review*, 20(2), 293–342. <https://doi.org/10.2307/2137521>
- Pailhé, A. (2017). The convergence of second-generation immigrants' fertility patterns in France: The role of socio-cultural distance between parents' and host country. *Demographic Research*, 36, 1361–1398. <https://doi.org/10.4054/DemRes.2017.36.45>
- Pavolini, E., and Van Lancker, W. (2018). The Matthew effect in childcare use: A matter of policies or preferences? *Journal of European Public Policy*, 25(6), 878–893. <https://doi.org/10.1080/13501763.2017.1401108>
- Persson, L., and Hoem, J. M. (2014). Immigrant fertility in Sweden, 2000–2011: A descriptive note. *Demographic Research*, 30, 887–897, Article 30. <https://doi.org/10.4054/DemRes.2014.30.30>
- Phinney, J. S., and Flores, J. (2002). “Unpackaging” acculturation: Aspects of acculturation as predictors of traditional sex role attitudes. *Journal of Cross-Cultural Psychology*, 33(3), 320–331. <https://doi.org/10.1177/0022022102033003007>

- Portes, A., Fernández-Kelly, P., and Haller, W. (2005). Segmented assimilation on the ground: The new second generation in early adulthood. *Ethnic and Racial Studies*, 28(6), 1000–1040. <https://doi.org/10.1080/01419870500224117>
- Portes, A., and Zhou, M. (1993). The new second generation: Segmented assimilation and its variants. *The ANNALS of the American Academy of Political and Social Science*, 530(1), 74–96. <https://doi.org/10.1177/0002716293530001006>
- Rendall, M., Couet, C., Lappégard, T., Robert-Bobée, I., Rønsen, M., and Smallwood, S. (2005). First births by age and education in Britain, France and Norway. *Population trends*, 121, 27–34.
- Rindfuss, R. R., Morgan, S. P., and Offutt, K. (1996). Education and the changing age pattern of American fertility: 1963–1989. *Demography*, 33(3), 277–290. <https://doi.org/10.2307/2061761>
- Robert-Bobée, I., and Mazuy, M. (2005). Calendriers de constitution des familles et âge de fin des études. *Histoires de familles, histoires familiales: Les résultats de l'enquête famille de 1999(156)*, 175. <https://doi.org/10.4000/books.ined.5987>
- Rybinska, A. (2020). A research note on the convergence of childlessness rates between women with secondary and tertiary education in the United States. *European Journal of Population-Revue Européenne De Démographie*, 36(5), 827–839. <https://doi.org/10.1007/s10680-019-09550-z>
- Surkyn, J., and Reniers, G. (1997). Selecte gezelschappen: Over de migratiegeschiedenis en de interne dynamiek van migratieprocessen. In R. Lesthaeghe (Ed.), *Diversiteit in sociale verandering: Turkse en Marokkaanse vrouwen in België* (pp. 41–72). VUB Press.
- Van de Kaa, D., and Lesthaeghe, R. (1986). *Bevolking, groei en krimp*. Van Loghum Slaterus. <https://books.google.be/books?id=QZbuAAAAAAAJ>
- Van Lancker, W., and Ghysels, J. (2012). Who benefits? The social distribution of subsidized childcare in Sweden and Flanders. *Acta Sociologica*, 55(2), 125–142. <https://doi.org/10.1177/0001699311433428>
- Viitanen, T. K. (2005). Cost of childcare and female employment in the UK. *LABOUR*, 19, 149–170. <https://doi.org/10.1111/j.1467-9914.2005.00325.x>
- Wood, J. (2019). Social differentials in the effect of formal childcare on the transition to parenthood?: An assessment of varying effects by education, working hours and migration background. *Advances in Life Course Research*, 42, 100309. <https://doi.org/10.1016/j.alcr.2019.100309>
- Wood, J. (2022). Childcare ideals among second generation Muslim Moroccan immigrants in Flanders. *Community, Work & Family*, 27(2), 170–187. <https://doi.org/10.1080/13668803.2022.2086036>
- Wood, J., Klüsener, S., Neels, K., and Myrskylä, M. (2020). Shifting links in the relationship between education and fertility. *Population, Space and Place*, e2342. <https://doi.org/10.1002/psp.2342>
- Wood, J., Marynissen, L., Nisén, J., Fallesen, P., Neels, K., Trimarchi, A., Dommermuth, L., Van Gaalen, R., Kolk, M., and Martikainen, P. (2021). Regional variation in women's education-fertility nexus in Northern and Western Europe. *Max Planck Institute for Demographic Research*. <https://doi.org/10.4054/MPIDR-WP-2021-021>
- Wood, J., and Neels, K. (2017). First a job, then a child? Subgroup variation in women's employment-fertility link. *Advances in Life Course Research*, 33, 38–52. <https://doi.org/10.1016/j.alcr.2016.09.003>
- Wood, J., and Neels, K. (2019). Local childcare availability and dual-earner fertility: Variation in childcare coverage and birth hazards over place and time. *European Journal of Population*. <https://doi.org/10.1007/s10680-018-9510-4>
- Wood, J., Neels, K., and Kil, T. (2014). The educational gradient of childlessness and cohort parity progression in 14 low fertility countries. *Demographic Research*, 31, Article 46. <https://doi.org/10.4054/DemRes.2014.31.46>
- Wood, J., Neels, K., and Maes, J. (2023). A closer look at demand-side explanations for the Matthew effect in formal childcare uptake in Europe and Australia. *Journal of European Social Policy*, 33(4), 451–468. <https://doi.org/10.1177/09589287231186068>