Long-Term Parity-Specific Fertility Trends among Descendants of Immigrants in the United Kingdom

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Declarations

The ONS Longitudinal Study (LS) contains linked census and life events data for a 1% sample of the population of England and Wales. It contains records on over 500,000 people usually resident in England and Wales at each point in time and it is largely representative of the whole population. The LS is the largest longitudinal data resource in England and Wales. The LS has linked records at each census since the 1971 Census, for people born on one of four selected dates in a calendar year. These four dates were used to update the sample at the 1981, 1991, 2001 and 2011 Censuses.

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1. Introduction

The United Kingdom is experiencing a significant change in population composition, with increasing levels of migration, coinciding with historically low fertility. This study examines the intersection of these two drivers of population change by analysing long-term fertility trends among immigrant descendant women in the United Kingdom, a group who represents a nexus between migration and fertility dynamics.

Many countries in Europe have experienced a pattern of declining fertility, with an initial dip followed by moderate recovery, before the sustained decline observed in recent years (OECD, 2024). These changes have attracted scholarly attention. Some researchers emphasise the role of socio-economic factors (Goldstein, Joshua & Sobotka, 2009; Angela & Thévenon, 2010; Neels & de Wachter, 2010), while others highlight demographic mechanisms (Bongaarts 2002; Sobotka 2003; Bongaarts & Sobotka, 2012), arguing, for example, that the moderate recovery of fertility of the early 2000s may have resulted partly from tempo effects, whereby reduced postponement of childbearing leads to fertility recuperation. The emphasis on tempo effects highlights the need to disaggregate fertility trends by birth order.

In the UK, recent research by Kulu et al. (2025) on long-term fertility trends also underscores the importance of investigating fertility by parity. They reveal that decline in first birth is explained by birth timing, whereas second and third births are driven by changes in quantum. These findings further raise the question of whether the same parity-specific pattern holds for all women, including those with migrant family backgrounds.

Europe has also witnessed major changes in population composition due to immigration, with an increasing number of people with migrant family backgrounds. As of 2020, Europe was home to nearly 87 million international migrants – a 16% increase from 2015 (International Organization for Migration, 2024). The United Kingdom is no exception. By 2021, about 34% of all babies born in England and Wales had at least one foreign-born parent, up from 21% in 2000. Births to foreign-born mothers rose from 11.6% of all births in 1990 to about 28% by 2016 (ONS, 2021). This growing generational diversity makes the United Kingdom a compelling case for examining the fertility of immigrant descendants. Doing so represents an important step toward understanding how the interplay between

majority and minority cultures shapes their fertility behaviour, and how it differs from (or aligns with) that of the majority and immigrant populations.

To the best of our knowledge, no study has investigated fertility trends across recent decades, separately by parity, among immigrant descendants in the UK. This research intends to fill this gap by examining fertility trends of immigrant descendant women in England and Wales between 1990 and 2017. We use register-based data, the Office for National Statistics Longitudinal Study (ONS-LS), and piecewise exponential event-history models to investigate the modern fertility transition of this population.

A key contribution of our study is that we observe long-term fertility trends amongst the daughters of immigrants, providing novel evidence of fertility changes over time. Among fertility research that accounts for immigrant descendants, most examine the relative risks of births among the descendants of immigrants compared with British natives overall, rather than tracking shifts in trends over time. For example, several studies analyse the fertility of immigrant descendants in the UK during pooled periods (Kulu & Hannemann, 2016; Wilson, 2019; Mikolai & Kulu, 2022; Baek et al., 2025). While these works offer valuable insights into fertility convergence or persistence among certain descendant groups across generations, they do not capture how the fertility patterns of the descendants have evolved in the UK.

Additionally, our study examines how changes in fertility timing explain parity-specific trends and whether tempo effects or quantum changes differ amongst the descendants of immigrants. Coleman & Dubuc (2010) is one of the few studies investigating long-term fertility trends among women with migrant backgrounds in the UK. The study, however, did not differentiate between immigrants and their descendants, nor did it determine whether changes in the total fertility rate were driven by first, second, or higher-order births. Our study clarifies whether the parity-specific fertility trends and patterns among descendants of

immigrants resemble those of the majority population, as found in Kulu et al. (2025).

Overall, this study contributes to the existing demographic literature by producing the first systematic evidence of long-term, parity-specific fertility trends among immigrant descendants in the UK. By disentangling tempo and quantum effects, we also advance theoretical understanding of whether mechanisms driving fertility change operate similarly across majority and minority populations. There is potential for broader contributions, by serving as a benchmark for fertility research, as well as helping evolve narrative to show that immigrant descendants are central demographic agents in diverse societies. Finally, it provides a platform for policy debate, particularly around the comparative outcomes of migrants and the majority population, lending to clarity around fertility integration.

2. Background

2.1. Fertility Change in the UK

England and Wales have experienced decline in fertility rates over recent decades. The total fertility rate (TFR) fell to 1.44 children per woman in 2023 from 1.94 in 2012; which is the lowest level since official records began in 1938 (ONS, 2024). Empirical evidence shows that women in England and Wales now start their families later and end up with fewer children than previous cohorts (Kulu et al., 2025; Ní Bhrolcháin & Beaujouan, 2012; Berrigton, Stone & Beaujouan, 2015; ONS, 2023a; ONS, 2023b).

Over almost 30 years, women's age at first birth in the UK has increased – in the early 1990s, the median age at first birth stood at roughly 28 years, and by 2017 it had climbed to around 32 years (Kulu et al., 2025). This postponement has led to a long-term decline in first birth rates in the UK (Kulu et al., 2025). Likewise, the number of children women are having has fallen just as steadily (ONS, 2023). For women born before 1950 in England and Wales, the completed family size was above two children. Women born after 1950 experienced a

decline in completed family size, falling below two children. After reaching the lowest recorded average of 1.89 children for women born in 1972 and 1973, there was a modest rise. However, projections indicate a potential future decline. Girls born in 2025 are expected to have around 1.46 children over their lifetime.

Overall, these tempo and quantum shifts highlight that contemporary fertility change in England and Wales depends not only on *when* women begin childbearing, but also on *whether* they go on to have a second or third child.

Socio-economic developments have played an important role in these fertility trends. In recent years, an increasing number of women have pursued higher education and focused on developing their careers compared to past decades. Only about 40% of women finished secondary school with school-leaving qualifications in 1991, whilst nearly 90% women in 2013 successfully completed secondary school (Farquharson et al., 2022). Similarly, only a minority of women born in the 1960s earned a tertiary degree, whilst nearly half of women born in the 1980s had a university qualification in the UK (Roantree & Vira, 2018).

This educational revolution reflects a major shift in family formation patterns. Highly educated women tend to have children later and often end up with smaller families than those with less education (Ní Bhrolcháin & Beaujouan, 2012; Berrington et al., 2015). The difference in timing and quantum of the birth between high educated and low educated women becomes more apparent amongst more recent cohorts in the UK (Berrington et al., 2015).

However, the strength of the impact of low education on high fertility is not the same across all contexts, as evidence suggests that the impact is more pronounced in countries with low-economic development (Nisén et al., 2021). Further, recent literature suggests that the relationship between education and fertility may be changing among younger cohorts:

Jalovaara, Andersson and Miettinen (2021) observe a polarization of family sizes among the low educated who are either childless or have three or more children, while the high educated predominantly follow the two-child norm (Sobotka & Beaujouan, 2014). This implies that while some lower educated women may face greater socio-economic challenges in forming a family, others may still prioritise childbearing to a greater extent than higher educated women.

Increased female participation in the labour market, and subsequent change in its landscape, has also led to a change in women's childbearing behaviour. Amongst women of working age, the percentage of women in employment increased from about 68% in 1990 to 78% in 2017 (Roantree & Vira, 2018). Many women in modern society are more likely to prioritise personal development, often having professional goals, hence, achieving a stable career and income is often a prerequisite to starting a family, as the Second Demographic Transition theory suggested (Van de Kaa, 1987). Mikolai et al. (2023) shows that employed women are more likely to become first-time mothers than unemployed women in the UK, underscoring that stable employment may facilitate the transition to motherhood. Alongside their career ambitions, they also consider the so-called motherhood penalty, whereby mothers may face disadvantages in opportunity and pay and advancement (Correll, Benard, & Paik, 2007). This implies that women must choose between maintaining their career trajectory and having children. This leads many to work part-time since full-time employment may not be sustainable (Sayer & Gornick, 2012) and contributes to an increasing number of women postponing or opting out of childbearing altogether (Kulu et al., 2025).

In addition to greater economic independence for women, fundamental attitudes toward marriage and childbearing have shifted. It is more socially acceptable to remain childless or to postpone children compared to the past (Berrington, 2017). These factors –

women's rising educational attainment, increased workforce engagement and changing norms – intersect to explain the persistent low fertility.

2.2. Immigration in the UK

The considerable demographic diversity of the contemporary UK population has principally been forged by its colonial past, foreign labour recruitment drives, the EU's freedom of movement, and other policy developments, with immigration to the UK unfolding in several distinct phases.

One of the first major waves was post-colonial migration after World War II. The British Nationality Act 1948 gave citizens of the Commonwealth the right to settle in the UK, leading to significant inflows from countries in the Caribbean, South Asia and Africa in the 1950s-1970s (Panayi, 2010). Another pivotal phase emerged with the expansion of the European Union. After ten Eastern European states joined the EU in 2004, the UK opened its labour market, attracting many Central and Eastern Europeans in search of work. For example, Poland quickly became one of the top origin countries of immigrants and foreign-born mothers in the UK in 2010 (ONS, 2021). Alongside these economic migrants, the UK has also received notable numbers of people with refugee backgrounds through several schemes such as Syrian refugee schemes and Ukrainian family schemes (UK Government, 2015; 2022). Conversely, In the late 2010s, the nature of immigration shifted again; The Brexit referendum in 2016 lead to a sharp decline of EU migration to the UK and an increase in migrant from non-EU countries (Cuibus, 2023).

An outcome of these immigration events is a growing number of UK born descendants of immigrants. Recent evidence suggests that more than a quarter of children in the UK have at least one parent who were born outside of the UK (Fernández-Reino 2022).

2.3. Fertility of Immigrant Descendants in the UK

Recent fertility changes and migrant population increases in the UK warrant an examination of the fertility of women with migrant backgrounds in the UK. In the case of descendants who were born and raised in the host society (from their parents' perspective), investigating whether their childbearing behaviours differ from those of the majority population helps to comprehend the integration process of women with migrant family backgrounds. If differences exist, it is also essential to examine how these differences appear and which particular groups show distinct fertility patterns, in order to understand the nuanced variations among women from different cultural backgrounds.

Coleman and Dubuc (2010) provide one of the first comprehensive estimates of fertility rates for women with migrant family backgrounds in the UK. They show that women from Bangladeshi background in the UK exhibit persistently higher TFR over decades than British natives and often have babies at earlier age. Yet, this work is based on ethnicity, rather than separating immigrants from their UK-born children.

More recently, some research has explored fertility rates amongst women with migrant backgrounds and *has* differentiated between immigrants and their descendants. Wilson (2019) demonstrates fertility assimilation toward British natives over generations amongst certain migrant origins such as Ireland and Jamica, whereas Pakistani and Bangladeshi descendants continue to show distinctive childbearing behaviours. These differences are particularly evident in higher-order births. Even after controlling for sociocultural factors, the fertility rates of Pakistani and Bangladeshi women remain elevated for second or subsequent children (Kulu & Hannemann, 2016).

Mikolai and Kulu (2022) analyse the relationship between partnership and fertility history of immigrants and their descendants, addressing differences in partnership trends and

childbearing behaviours based on each migrant generation group. Among single Caribbean immigrant women, the most common pathway is to have a child before cohabitation or marriage. In contrast, single Caribbean descendant women are almost equally likely to begin cohabiting or to have a child first. Immigrant women from commonly considered conservative cultures, such as those from South Asian countries, typically marry before having children. This tendency, however, weakens among their descendants. These patterns suggest that the family formation behaviours of immigrants diverge more strongly from those of British natives than do the behaviours of their descendants.

Baek et al. (2025) further examine sub-groups of descendants by differentiating between those who were born in the UK to two foreign-born parents (2G) and to one foreign-born parent and one UK-born parent (2.5G). They find that there is no significant fertility convergence toward British natives amongst 2.5G women overall, but some 2.5G women show distinctive fertility levels not observed among 2G. For Caribbean 2.5G women, this is evident in their first birth rate, which is significantly higher than that of both their 2G counterparts and British natives. Similarly, Western 2.5G women exhibit notably higher third-birth rates than British natives, a pattern not observed among their 2G counterparts.

A commonality across previous studies is that some groups – particularly those of Pakistani and Bangladeshi heritage – consistently show higher fertility than British natives over generations. The persistence of higher-order births in these communities could be connected to culturally driven preferences, such as having a strong desire for a son, that can lead to repeated attempts to achieve that outcome, or simply valuing large families in general (Penn & Lambert, 2002; Hennink, Diamond, & Cooper, 1999). As Kulu and Hannemann (2016) show, cultural factors are one of the key drivers of higher fertility rates among certain UK-born ethnic minority groups. Socioeconomic factors, including education and

employment, contribute to understanding fertility differences – particularly among Pakistani, Bangladeshi, and African descendants in relation to first births – though their influence appears minimal for higher-order births (Baek et al., 2025).

Overall, these studies underline that the childbearing behaviours of women across different origins and migrant generations differ not only from those of the majority population but also within each migrant-origin group, highlighting the need for further investigation into their fertility trends.

2.4. Theoretical Mechanisms for Fertility of Immigrant Descendants

Several theoretical mechanisms have been proposed to explain why the fertility behaviour of immigrant descendants can differ from the majority population. One of them is *socialization theory*, which emphasises that the cultural environment encountered during childhood shapes lasting behaviour into adulthood (Goldberg 1959; Wilson & Kuha 2018; Höhn et al., 2024). In the context of fertility among immigrant descendants, this logic can be applied to the life-course events they have learned and witnessed within their immigrant-background families throughout their formative years. For example, if a woman was raised by immigrant parents who have traditional and conservative family values, she might be more inclined to practice those values in childbearing rather than aligning with mainstream culture. Daughters of Pakistani and Bangladeshi immigrants demonstrate the socialised fertility behaviours from their immigrant parents with high fertility levels, showing higher-order birth rates compared to British natives (Kulu & Hannemann, 2016; Baek et al., 2025).

Immigrant descendants may internalise both the norm from mainstream expectations, and the traditions from their immigrant family's country of origin. As mentioned in the interview with an Indian descendant woman in the UK (Thind & Manoharajah, 2024), immigrant descendants may find themselves stuck between *two lives,* where they follow

family traditions at home while also engaging in broader society. This situation can create a unique *subculture* shaped by both the wider society and their heritage, which can influence key life course events, including childbearing. Fertility levels therefore might fall between those of majority population and those of their parents' generation (Sobotka, 2008; Kulu et al., 2017; Krapf & Wolf, 2015; Höhn et al., 2024).

Descendants of immigrants often face structural disadvantages (Meurs, 2018; Zwysen & Demireva, 2018). These can reinforce *minority status* and influence key life decisions for immigrant descendants. Milewski (2010) suggests that some descendants who aims to upward mobility may limit childbearing in order to maintain their lifestyle, or achieve professional goals. In this context, fertility behaviour becomes closely related to strategies of social mobility. As a result, some immigrant descendant groups show lower fertility than both the parental generation and the majority population – a pattern often termed "depressed fertility" (Andersson et al., 2017). That outcome reflects constraints and pressures tied to minority status.

In sum, fertility among immigrant descendants in the UK may not to be uniform, with variations shaped by mechanisms such as socialisation, cultural persistence and branched off subculture, and minority status. These differences suggest that their pathways to childbearing may deviate from those of the native-born majority, producing fertility trends over time that cannot be assumed to align entirely with either immigrant or majority populations.

3. Data and Methods

This study uses data from the Office for National Statistics Longitudinal Study (ONS-LS), a register-based panel dataset that follows 1 percent of people enumerated in the England and Wales censuses. Sample members are selected via four random, and confidential birth dates first identified in 1971. People born in, or migrating to, the UK who share those

dates enter the study, and they stay in it until death or emigration. The ONS-LS combines rich socio-demographic information with administrative life-event records across five decades of follow-up (1971, 1981, 1991, 2001, 2010, and 2021). Approximately 1.2 million individuals have been included to date. From 1991, ethnicity was added to the questionnaire, making it possible to examine fertility differences across ethnic groups (ONS, 2021).

Since ONS-LS includes fertility histories of women from age 15 in 1971, our analysis focuses on women born in 1956 or later. Linked birth histories are available up to 2017, and the oldest women in our cohort reach their mid-30s in the early 1990s. Hence our study window runs from 1990 to 2017, covering the birth parity of most women of reproductive age. Observation is censored when a woman dies, emigrates, or reaches age 50.

We analyse fertility trends by birth order, calendar year, and descendant groups. Parity-specific fertility rates (first, second, and third births) are estimated with hazard regression. For first births we fit proportional-hazard models that control for age, calendar time, and descendant groups. We also estimate separate first birth rates for women aged 15–29, and aged 30 or 30 or older. Median age at first birth by descendant groups and calendar year is calculated to trace timing trends. For second and third births we model parity-specific rates, adjusting for time since the previous birth, woman's age at previous birth, calendar time, and descendant groups. We also examine the time intervals between the first and second births, and between the second and third births, across the two periods (1990-2003 and 2004-2017) to assess whether the timing of subsequent births has changed over time. Finally, we explore fertility patterns by educational attainment and descendant groups to compare parity-specific rates across immigrant descendants within the same education level. To examine the impact of education over time, we further estimate an additional model controlling for education level.

All women in our sample were born in the UK; we classify them into descendant groups according to their self-reported ethnicity. The descendant groups are coded into five categories: White British, White Others, Caribbean, Indian, and Pakistani/Bangladeshi. Considering that majority of British natives – those born in the UK to UK born parents – are ethnically White, we use White British as reference category for our main analysis. White British refers to those who identify themselves as *White: English, Welsh, Scottish, Northern Irish or British,* and White Others are those who choose any *Other White* groups. The category of *Others* in our analysis includes several ethnic groups such as Chinese, Other Asian, White and other Asian mixed, and Other mixed backgrounds. The African group is also included in the analysis, however, due to the wide confidence interval and small sample size, we do not show the estimation for this group in the main charts. Descriptive information of *Others* and African can be found from Table A-13 to A-16 in the appendix.

Educational attainment is grouped into three levels. High education includes women with a bachelor's degree or higher (ISCED 5 or higher). Medium education refers to an A-level or equivalent upper-secondary qualification (ISCED 3). Low education covers GCSEs, lower credentials, or no formal qualifications (ISCED 3[1] or below).

Our main model can be formalised as follow:

$$(1)\ \ln \mu_i(t) = \ln \mu_0(t) + \sum_k \alpha_l x_{ik}(t) + \sum_l \beta_l w_{il},$$

$\mu_i(t)$ denotes the hazard of the first, second or third birth for individual *i* at duration t. The term $\ln \mu_0(t)$ represents the baseline log-hazard – or the birth rate – based on the woman's age (for the first birth) or time since the previous birth (for the second and third births). The baseline time intervals are defined as follows. 5-year intervals for first birth: 15-19, 20-24, 25-29, 30-34, and 35-39. For second and third births, the baselines are: 0-23

[1] Although A-levels are above GCSEs in the domestic hierarchy, both are classified as ISCED 3 (OECD, 2024).

months, 24-47 months, 48-71 months, and 72+ months. The model also includes individual-level time-varying covariates x_{ik}, such as education level, and the time-constant variable w_{il}, such as age at previous birth and descendant group. Number of women per descendant group can be found in Table 1 below.

Table *1* Descendant group composition

Descendant group	*Number*	*Per cent*
White British	113,178	89.67
White Others	1,292	1.02
Caribbean	2,550	2.02
Indian	2,381	1.89
PAK/BGD	2,984	2.36
African	942	0.75
Others	2,884	2.29
Total	126,211	100

Source: Author's own calculations based on ONS-LS

Table 2 Person-months and births by descendant group and birth order

Descendant Group	First Birth			Second Birth			Third Birth		
	Person-months	Births	Rate	Person-months	Births	Rate	Person-months	Births	Rate
White British	14136721	58975	0.0042	4823594	45198	0.0094	6256650	17046	0.0027
White Others	162304	497	0.0031	36898	366	0.0099	43954	160	0.0036
Caribbean	278182	1126	0.0040	106877	775	0.0073	83978	324	0.0039
Indian	322356	848	0.0026	46772	591	0.0126	56269	191	0.0034
PAK/BGD	293461	1016	0.0035	45303	770	0.0170	46345	444	0.0096
African	88204	210	0.0024	15303	120	0.0078	8752	57	0.0065
Others	337886	897	0.0027	62344	607	0.0097	57291	226	0.0039
Total	15619114	63569	0.0041	5137091	48427	0.0094	6553239	18448	0.0028

Source: Author's own calculations based on ONS-LS

Table 2 displays person-months and number of births by descendant group and birth order. It shows for first births, 15,619,114 person-months are observed, and amongst these months, 63,569 births are observed. For second births, the person-months are 5,137,091 with 48,427 births recorded. For third births, 6,553,239 person-months are observed, and 18,448 births are observed.

4. Result

4.1. First Birth

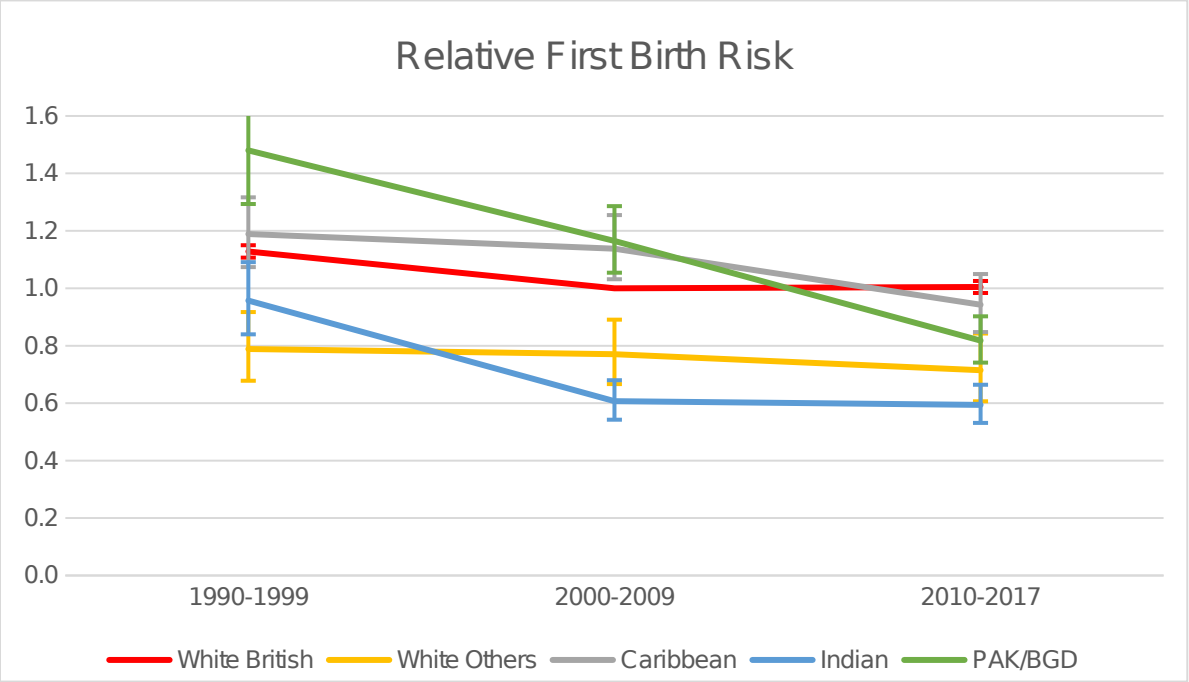
Figure 1 displays the first-birth risk for various descendant groups between 1990 and 2017, standardised by women's age and presented relative to White British in 2000–2009.

The White British group exhibits a moderate change in first birth rates over time. They show a slight drop in first births between 1990–1999 and 2000–2009, but remain stable between 2000–2009 and 2010–2017. White Other and Indian descendants display lower first-birth rates than White British over time, whilst Caribbean and PAK/BGD descendants start with higher first birth rates in 1990–1999 but fall below that of White British in 2010–2017.

All groups show a decline in first-birth risk from the 1990s to the 2010s. For Indian descendants, their first-birth pattern is similar to that of White British: the drop is more apparent between the 1990s and 2000s, but the rate remains flat between the 2000s and 2010s (although there are some decreases within smaller periods, as shown in Table A-13 in the appendix). By contrast, Caribbean descendants experience little change between the 1990s and 2000s but a sharper decline between the 2000s and 2010s.

Among Pakistani/Bangladeshi (PAK/BGD) descendants, the first-birth risk declines rapidly. It is higher than that of any other group in the 1990s but drops below that of White British by the 2010s. White Other descendants, in contrast, maintain consistently lower and more stable first-birth risks than the rest throughout 1990–2017.

Figure 1 Relative first birth rates by descendant group between 1990 and 2017



Source: Author's own calculations based on ONS-LS

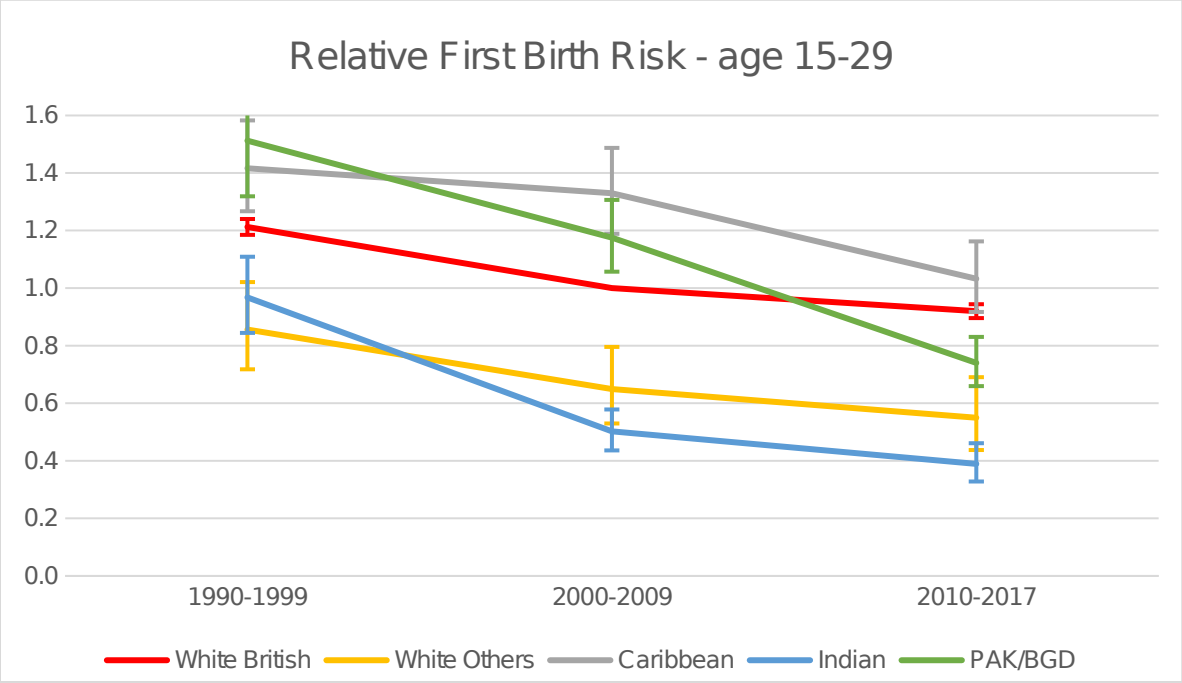
To assess whether the first-birth decline reflects childbearing postponement or not, we examine first-birth risks by two age cohorts and descendant groups (Figure 2 and 3). Among women aged 15–29, White British show a gradual decline in first births over time. Compared to White British, both White Others and Indian descendants consistently show lower first-birth risk among ages 15–29, whilst Caribbean descendants display a consistently higher first-birth risk in the same age group. Interestingly, PAK/BGD descendants exhibit higher first-birth risk in the same age group between 1990–1999 and 2000–2009 but rapidly drop below that of White British in 2010–2017. This trend closely aligns with the overall first-birth rate across all age groups, suggesting that the decline in first births can be attributed to the increasing postponement of childbearing over time.

While women aged 15–29 show a clear decline in first births across all groups, the first-birth risk for women aged 30 or older shows a slight increase over time among most groups, apart from Caribbean descendants. Despite their significantly higher first-birth risk at

ages 15–29, Caribbean women aged 30 or older consistently exhibit lower first-birth rates than White British women. Moreover, the first-birth rates of Caribbean women aged 30 or older slightly declined between 2000–2009 and 2010–2017, in contrast to the rising pattern observed among White British women of the same age group.

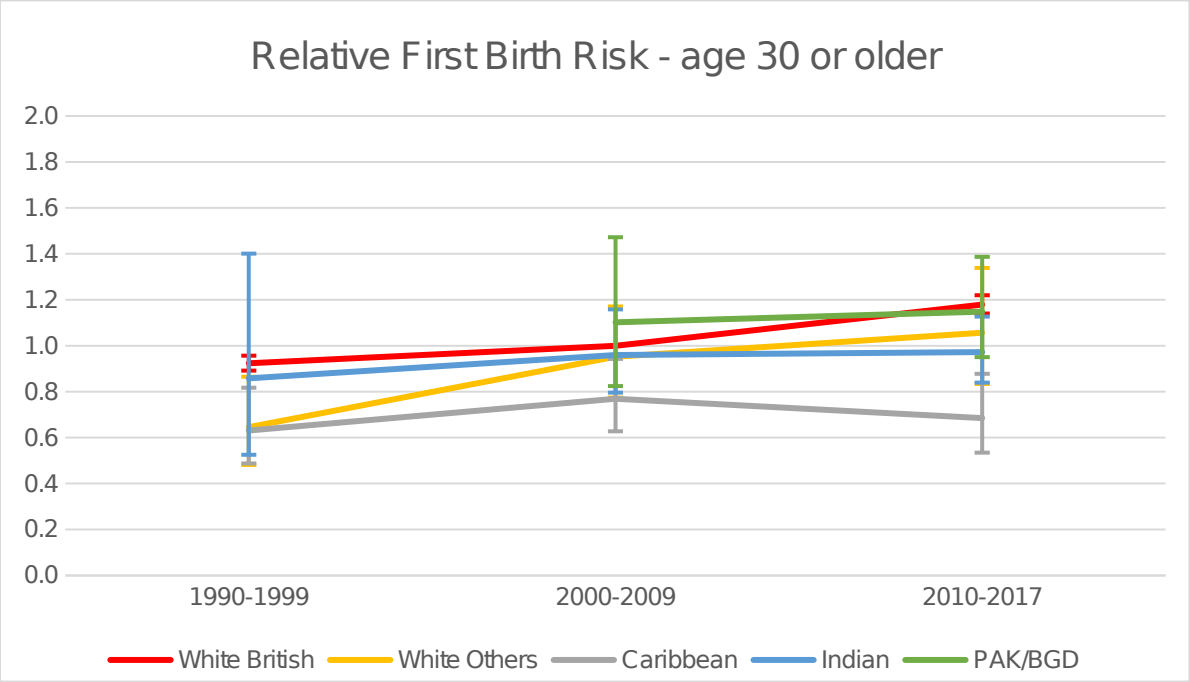
Overall, the falling first-birth risk among 15–29-year-olds and the rising risk among most 30-plus women point to growing postponement of childbearing in most groups and partly explain the overall first-birth decline. For Caribbean descendants, however, postponement accounts for less of the drop: between 2000 and 2017, first-birth risk falls across all ages.

Figure 2 Relative first birth rates by descendant group age 15-29 between 1990 and 2017



Source: Author's own calculations based on ONS-LS

Figure 3 Relative first birth rates by descendant group age under 30 between 1990 and 2017



Source: Author's own calculations based on ONS-LS
*Note: The birth risk for the PAK/BGD group in 1990–1999 was removed from the graph due to a wide confidence interval. Estimates for this period are provided in Table A-12 in the appendix.

Table 3 shows the median age at first birth by group over time. White British exhibit a trend of increasing median age at first birth by about 2 years, from 28.3 to 30.3, between 1990–1999 and 2010–2017. White Others and Caribbean descendants similarly show a rise of about 2 years during the same period. However, South Asian groups, including Indian and PAK/BGD descendants, display a significant increase of about 5–6 years during the same period. In particular, the median age of PAK/BGD descendants was almost 3 years younger than that of White British in 1990–1999, but became the same as White British in 2010–2017. Taken together, the increasing median age at first birth also reflects declining first-birth rates among women aged 15–29.

Table 3 Median age at first birth by descendant group between 1990-2017

Group	*Year*	*median age*	*95% CI lower*	*95% CI Upper*
White British	1990	28.3	28.3	28.5
	2000	29.9	29.8	30.0
	2010	30.3	30.2	30.4

	Total	**29.4**	**29.3**	**29.4**
White Others	1990	31.4	29.5	34.3
	2000	32.6	31.3	34.3
	2010	33.7	32.3	35.3
	Total	**32.8**	**31.9**	**33.9**
Caribbean	1990	26.5	25.7	27.8
	2000	27.7	26.3	29.2
	2010	29.7	28.5	30.8
	Total	**28.1**	**27.5**	**28.8**
Indian	1990	28.8	27.9	30.0
	2000	33.3	32.5	33.8
	2010	34.5	33.8	35.6
	Total	**32.9**	**32.3**	**33.5**
PAK/BGD	1990	25.7	24.9	26.6
	2000	28.0	27.3	28.8
	2010	30.3	29.5	30.7
	Total	**28.8**	**28.3**	**29.2**

Source: Author's own calculations based on ONS-LS

4.2. Second Birth

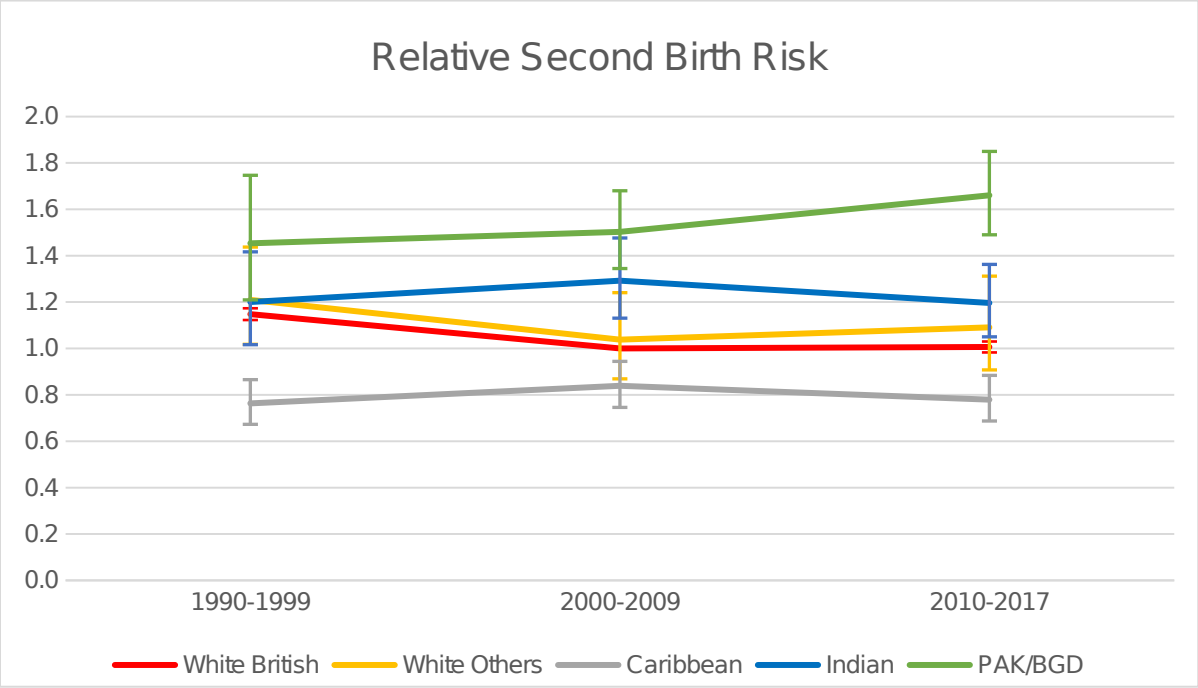
Figure 4 presents second-birth risks across various descendant groups between 1990 and 2017. The rates are standardised by time since first birth and women's age at first birth, and are shown relative to White British women in 2000–2009.

Compared to first-birth risks, second-birth risks appear more stable across all descendant groups. White British show a slight decrease in second-birth rates between the 1990s and 2000s and remain stable thereafter. White Other descendants display a very similar pattern and fertility levels to White British.

Indian and PAK/BGD descendants show consistently higher second-birth rates than White British, but with different patterns. PAK/BGD descendants show a moderate but gradual increase in their second-birth rates, which is not observed among Indian descendants. Meanwhile, Caribbean descendants display consistently lower second-birth rates than British natives.

Elevated rates among Indian descendants suggest that although their first-birth risks are consistently lower than those of White British, once they have a child, they are more likely to progress to a second birth. By contrast to Indian descendants, Caribbean descendants demonstrate consistently lower second-birth rates than White British, despite having had one of the highest first-birth rates over time.

Figure 4 Relative second birth rates by descendant group between 1990 and 2017

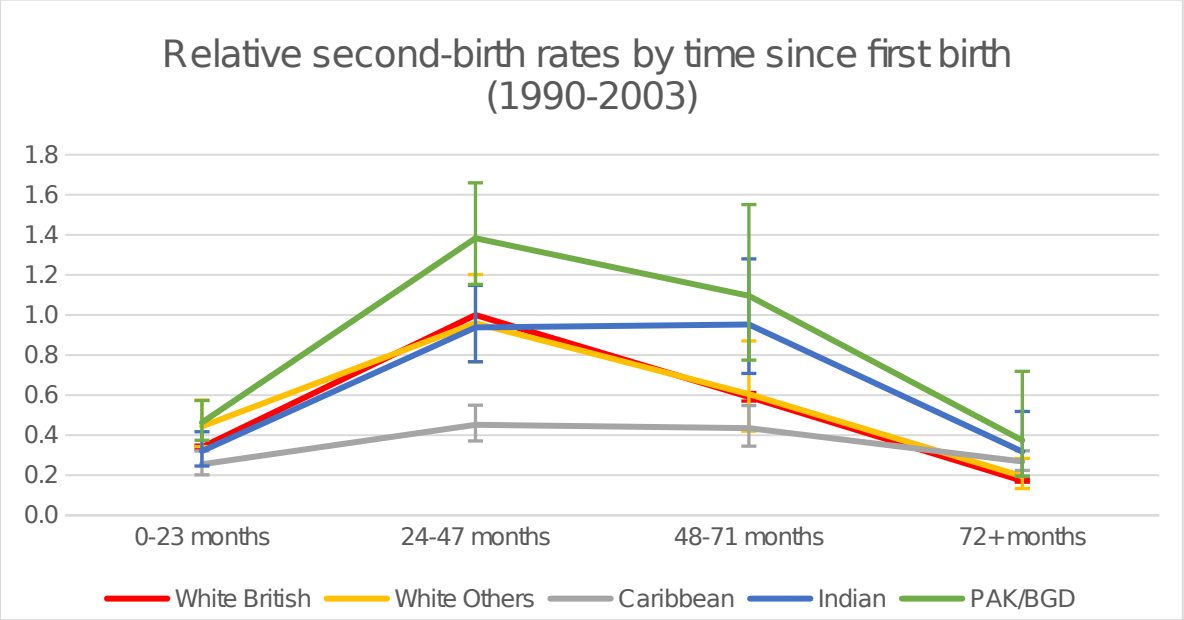


Source: Author's own calculations based on ONS-LS

We also investigate the interval between first and second births for all immigrant descendant women, comparing 1990–2003 with 2004–2017 to explore the timing of second births and the changes between the two periods (Figure 5). White British women most commonly proceed to a second birth 24–47 months after their first birth. Thereafter, the risk of transitioning to a second birth decreases over the following months. This pattern is the same in both periods, 1990–2003 and 2004–2017.

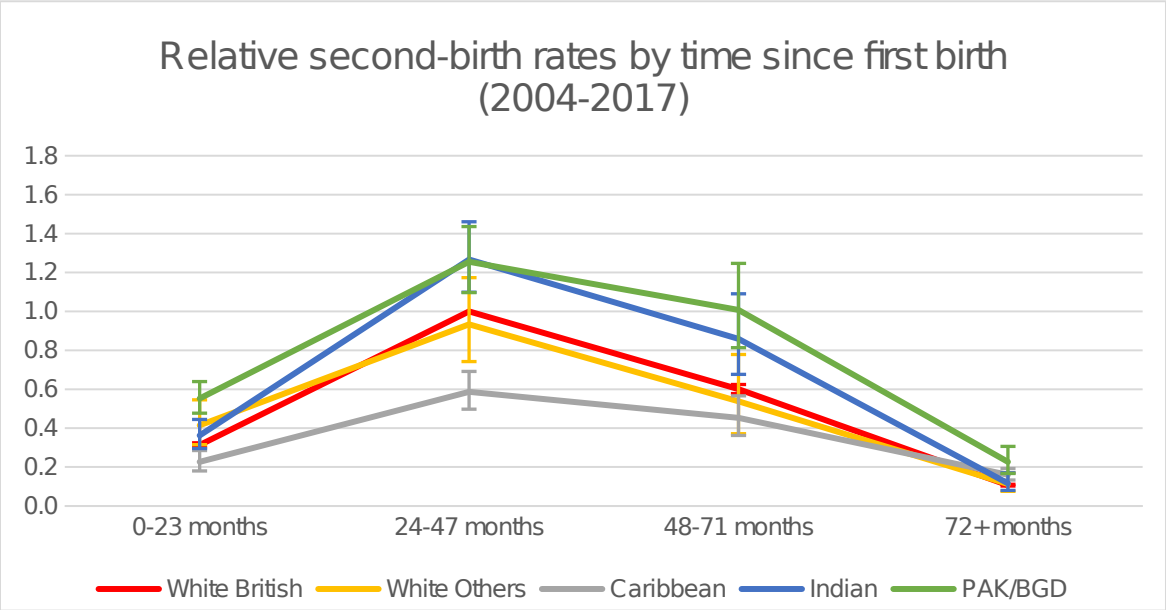
Apart from the Indian group, most descendant groups show similar second-birth timing between the two periods. Their second births happen more quickly after their first birth in 2004–2017 than in 1990–2003. However, second birth rates after 2005 for Indian descendants consistently decline (see Table A-13 in the appendix). This indicates that among Indian descendants during this period, although there is a trend toward having a second child quicker, the likelihood of having a second child slightly decreases. Nonetheless, the confidence intervals are wide, so these results should be interpreted with caution.

Figure 5 Relative second-birth rates by time since first birth by descendant group between 1990-2003



Source: Author's own calculations based on ONS-LS

Figure 6 Relative second-birth rates by time since first birth by descendant group between 2004-2017



Source: Author's own calculations based on ONS-LS

4.3. Third Birth

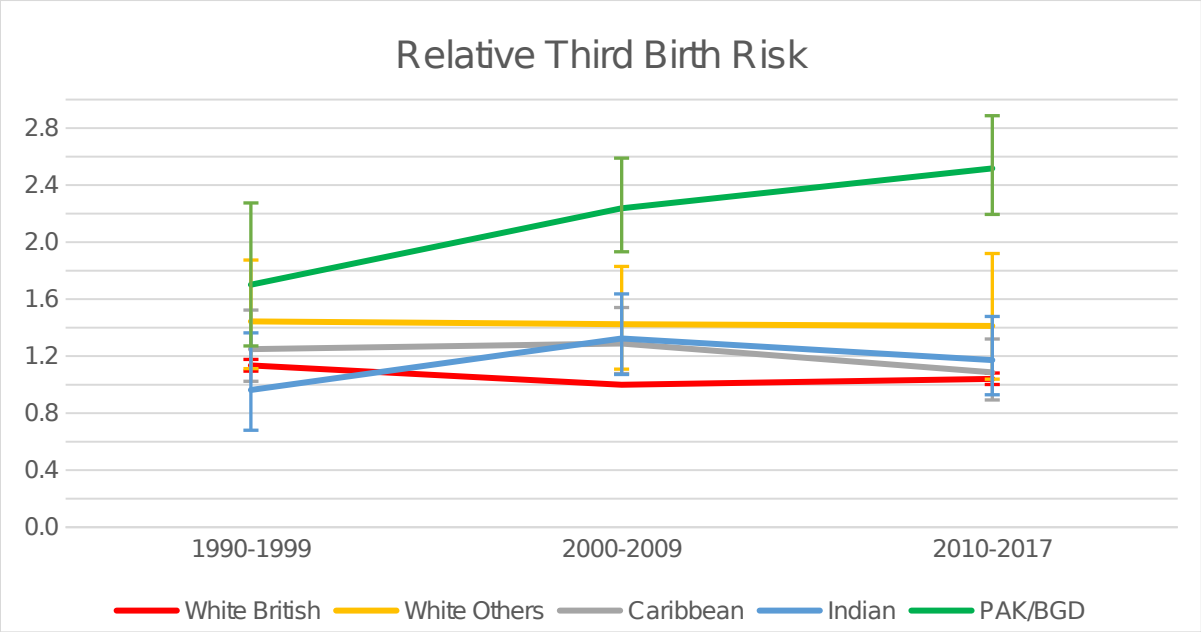
Figure 5 exhibits third-birth risks among various immigrant descendant women between 1990 and 2017. The rates are standardised by time since second birth, woman's age at second birth, and are expressed relative to White British in 2000–2009.

White British women display a stable third-birth risk over time, with a slight decrease between the 1990s and 2000s. Third-birth rates for White Other, Indian, and Caribbean descendants are comparable to those of White British, though there are slight differences. For the Indian group, the third-birth rate increases slightly between the 1990s and 2000s and then changes little.

Meanwhile, third-birth rates for PAK/BGD descendants are higher than those of White British women throughout the whole period, and they exhibit a slight increase over time. Considering that they show a rapid decline in first-birth risk and a significant postponement of motherhood, the findings from the third births point to a selection effect,

where those who proceed to have further children are more likely to show increasing third-birth risks than White British women over time.

Figure 7 Relative third birth rates by descendant group between 1990 and 2017

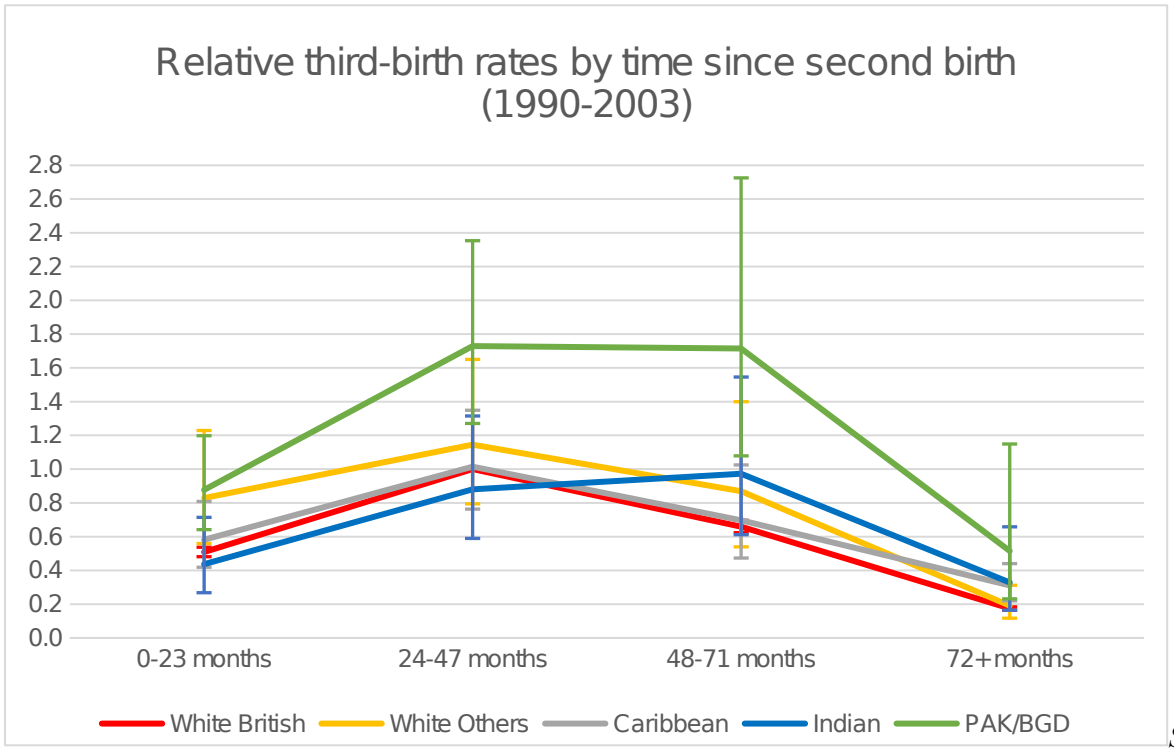


Source: Author's own calculations based on ONS-LS

Next, we examine the interval between second and third births, again comparing 1990–2003 with 2004–2017. Similar to the second-birth rates by time since first birth, the third-birth rates by time since second birth for White British women show no significant difference between the 1990–2003 and 2004–2017 rates. They most commonly proceed to a third birth 24–47 months after their second birth, and thereafter, the risk of transitioning to a third birth decreases over the following months.

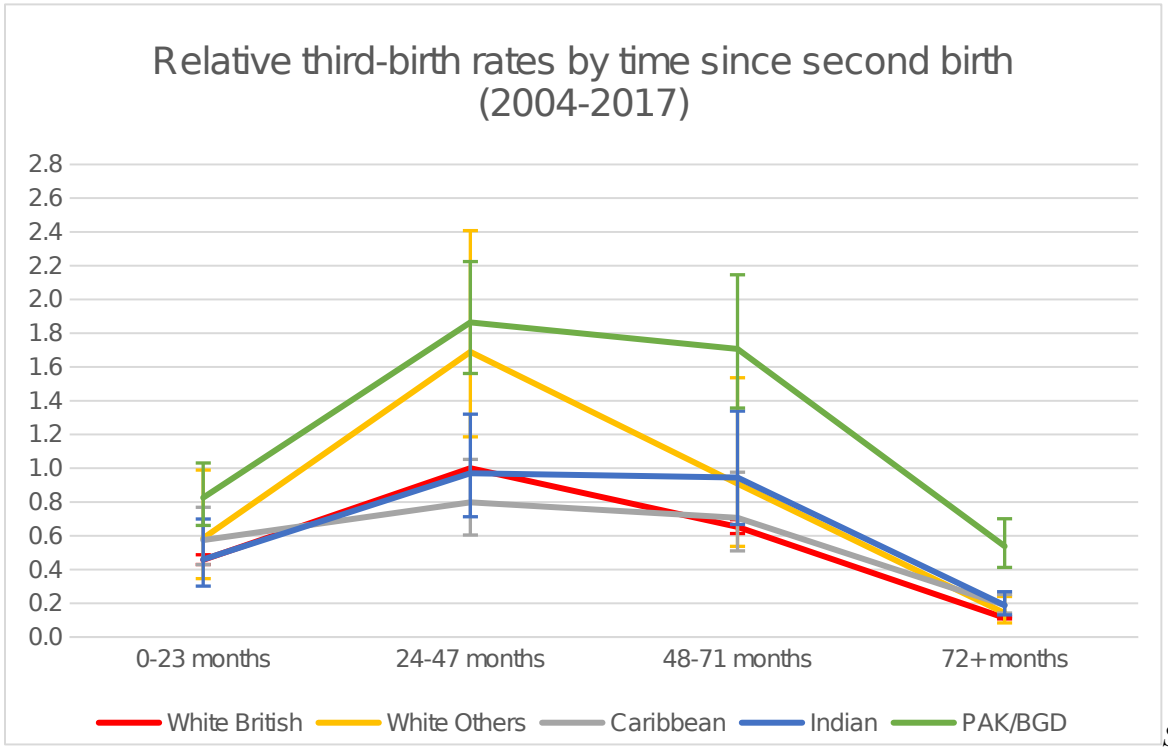
Most descendant groups exhibit similar patterns, without a notable change between 1990–2003 and 2004–2017. However, the confidence intervals are wide, making it difficult to interpret the rates by time since second birth.

Figure 6-8 Relative third-birth rates by time since second birth by descendant group between 1990-2003



Source: Author's own calculations based on ONS-LS

Figure 9 Relative third-birth rates by time since second birth by descendant group between 2004-2017



Source: Author's own calculations based on ONS-LS

4.4. Education

To investigate the impact of education on birth risks over time, we compare two models – with and without adjusting for the education.

The first model controls for age, calendar time, age at previous births and time since previous births (for the second and third births), as well as descendant groups. The second model additionally controls for education levels to assess whether education influences fertility rates, using White British women in the 2000s as the reference group. From figure 11 for example, *White British 1* shows the estimation from the first model, without controlling for education level, while *White British 2* indicates the estimation from the second model, controlling for the education levels.

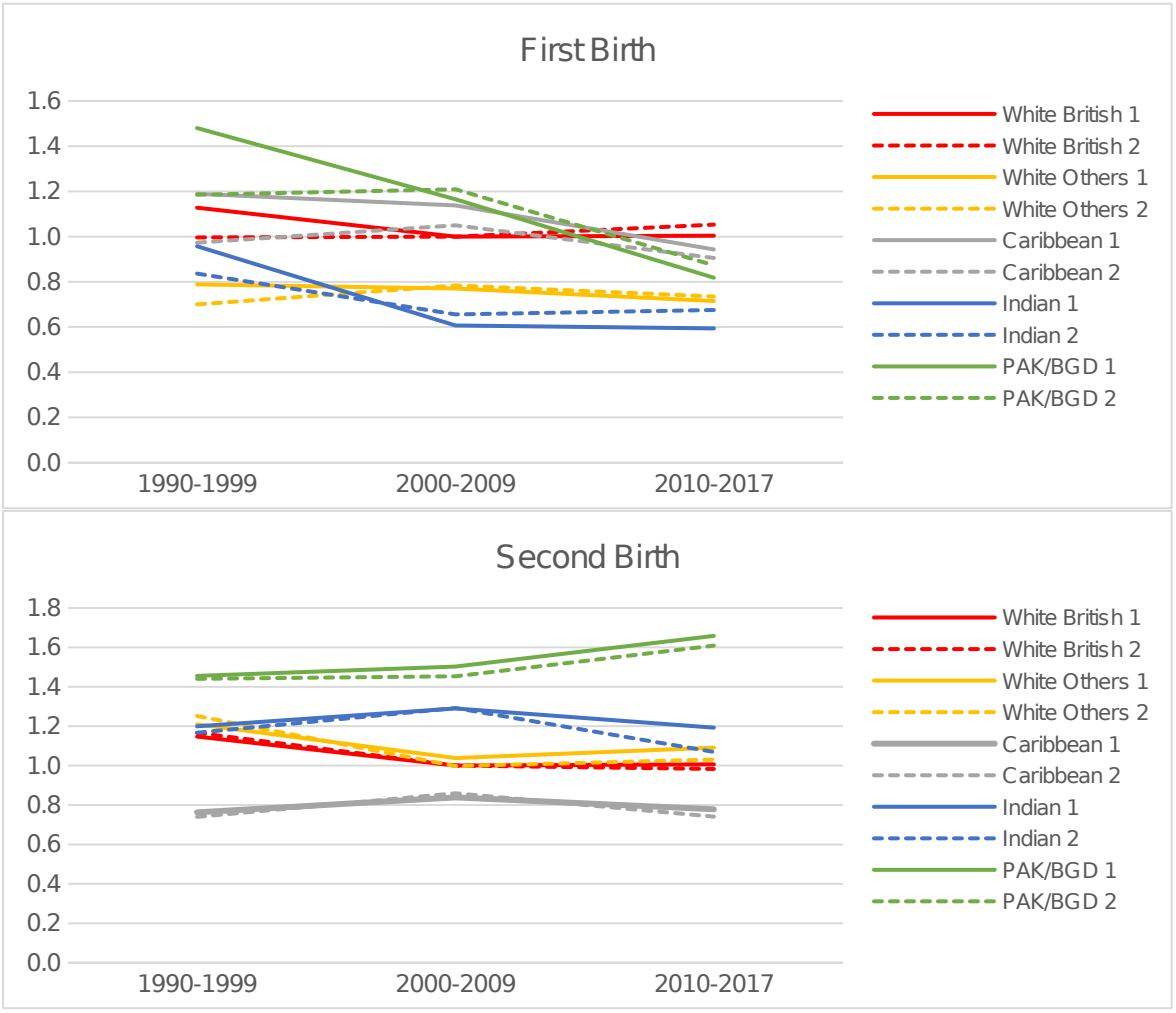
Figure 11 shows that controlling for education results in different fertility estimates across periods and birth parities. For first births, Model 2 produces marginally lower fertility rates among White British than Model 1 in the 1990s. This pattern is consistent across all descendant groups, with Pakistani and Bangladeshi descendants showing a more pronounced gap between the two models. During 2010-2017, however, the rates among White British in Model 2 become slightly higher than those in Model 1, and all descendants follow this pattern.

The lower first-birth rates from Model 2 in the 1990s indicate that omitting education levels overestimates first-birth rates. One possible explanation is that there were more low-educated women in the 1990s than in the 2000s (Roantree & Vira, 2018), and lower educational attainment is generally associated with higher first-birth rates (as shown in Figure 12 below). Therefore, when education is accounted for, the estimated rates may appear lower. In contrast, the slightly higher first-birth rates from Model 2 in the 2010s could indicate that a greater share of highly educated women, who tend to have lower first-birth rates, were

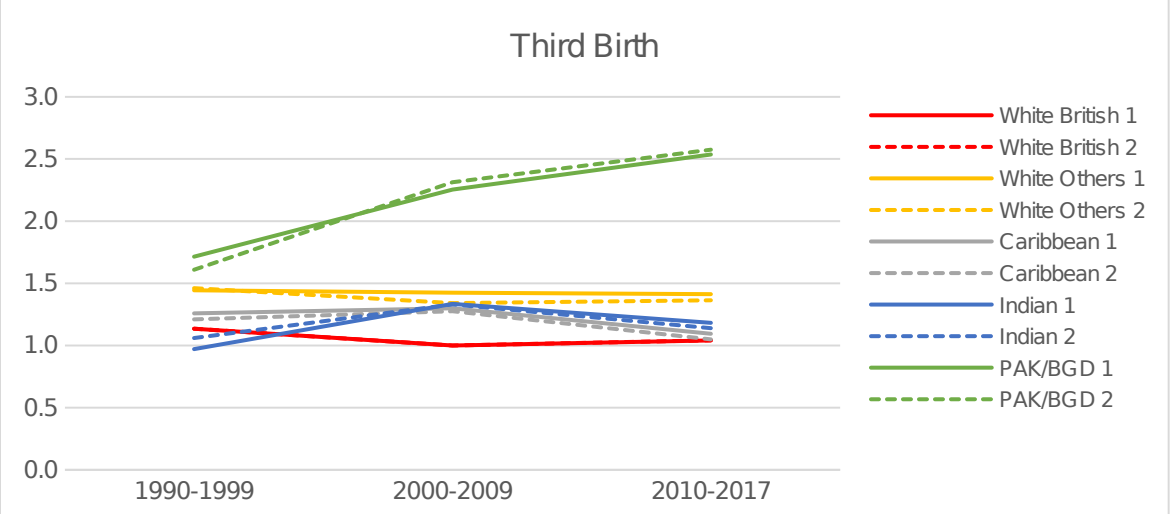
present in this period, therefore education partly explain a lower first-birth rate in recent years.

For second and third births, the gaps between the models are minimal for all groups, unlike the pattern for first births.

Figure 11 A comparison between education adjusted and unadjusted models



Source: Author's own calculations based on ONS-LS



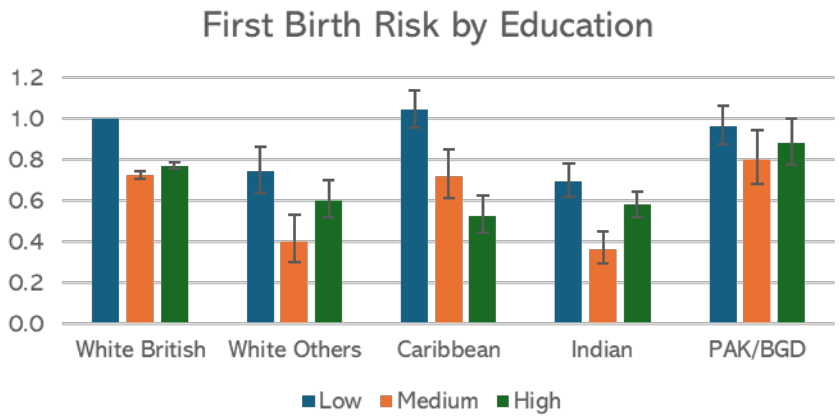
Next, we examine birth rates by education and descendant group. Figure 12 exhibits first, second, and third birth rates by education and descendant group during the pooled period of 1990-2017. Regarding first births, White British women with the lowest levels of education have the highest birth rates within their group. Medium- and highly-educated White British women show similar first-birth rates, with highly-educated women having a slightly higher first-birth rate than medium-educated women. While White Other and Indian descendants follow this trend, Caribbean descendants demonstrate a different pattern: for them, highly-educated women show a notably lower first-birth rate than medium-educated women, unlike the case of highly-educated White British women.

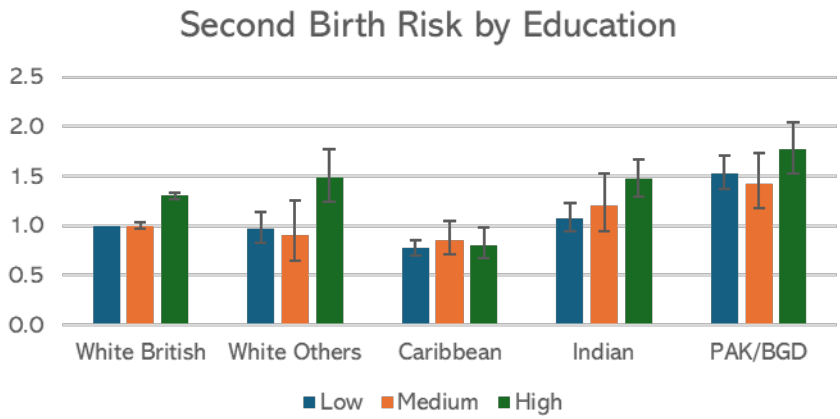
In terms of second births, highly-educated White British women show the highest second-birth rates, and White Other and Indian groups show similar patterns. However, for Caribbean and PAK/BGD descendants, the differences between education levels are minimal.

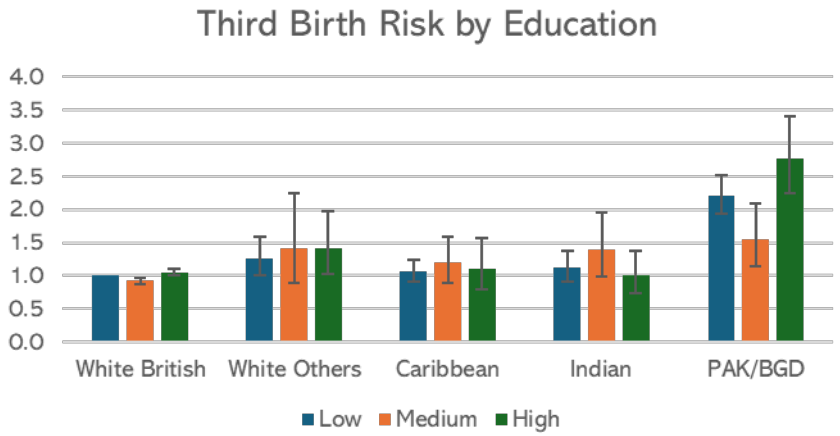
When it comes to third births, there is little variation across education levels for White British women as well as for most descendant women, except for the PAK/BGD group. Among PAK/BGD women, those with higher education show the highest third-birth rates, while those with medium education show the lowest.

Overall, Figure 12 suggests that, among the majority population, low-educated women are the most likely to have a first child, whereas highly educated women are more likely to progress to a second birth. Education does not appear to have a significant impact on third births. White Other and Indian descendants largely follow this trend, whereas Caribbean and PAK/BGD descendants show some distinctions in the impact of education on parity-specific fertility rates.

Figure 12 First, second, and third births by education and descendant groups







Source: Author's own calculations based on ONS-LS

Taken together, the two education-related estimates suggest that the overall impact of education is more pronounced for first-birth rates than for second- and third-birth rates, a finding also supported by Kulu et al. (2025). While subtle differences exist across descendant groups, the trend appears largely universal.

5. Conclusion

This study examines long-term fertility trends among the immigrant descendants by utilising register-based data for England and Wales covering 1990–2017. This article makes several contributions by being one of the first studies to investigate long-term parity-specific fertility trends among immigrant descendants in the UK, using register-based data. Additionally, by focusing on various descendant groups rather than treating all women as a single group, it provides a more delicate understanding of heterogeneity in fertility behaviours.

Two common findings emerge across descendant groups as reported by Kulu et al. (2025). First, there is a universal postponement of first births. All groups enter motherhood later, supporting the tempo-driven decline in first-birth rates. Second, in contrast to first births, higher-order births are relatively stable. Second- and third-birth rates change only marginally for most groups over time. Alongside these shared trends, we identify group-specific differences in parity patterns.

Regarding the first births, some descendant groups show distinct tendencies. Pakistani and Bangladeshi descendant women follow the overall decline and postponement but exhibit one of the sharpest declines and fastest postponements. In other words, they are not only aligning with mainstream fertility behaviour but are adapting their timing of childbearing even more markedly over time. This represents a novel finding, as these groups have been mostly highlighted for their higher fertility at later parities (Kulu & Hannemann, 2016; Baek et al., 2025) or higher completed fertility overall (Wilson, 2019) than other groups. Although the decline is concentrated only in first births, this trend has not been observed in previous research, which does not examine parity-specific changes over time.

Why do we see such an unexpected result? One possible explanation may relate to

partnership formation. A recent trend in the British society shows that many women postpone marriage partly due to higher educational attainment or economic insecurity (Berrington & Stone, 2014), which can also influence Pakistani and Bangladeshi communities. For them, the impact of marriage postponement on fertility may be greater than for other descendant groups, as they are less likely to have a child outside of marriage (Mikolai & Kulu, 2022; Hannemann & Kulu, 2015). This suggests that delayed marriage in recent years may be leading to later entry into motherhood for Pakistani and Bangladeshi descendants, contributing to the recent decline in first-birth rates.

Among Caribbean descendants, first-birth rates in the younger cohorts remain among the highest over time, while those in the older cohorts consistently remain the lowest. This suggests that earlier entry into motherhood is more common in this group compared to all other descendant groups, even though it has declined slightly. For Caribbean descendants, marriage does not tend to be prerequisite for becoming a mother (Mikolai & Kulu, 2022), meaning they do not feel they need to wait until forming a legal partnership to have a child. By bypassing certain traditional processes, they may enter motherhood earlier than other descendant groups.

Findings from Pakistani, Bangladeshi, and Caribbean descendants challenge the role of cultural characteristics that are established in prior research. Previous studies often viewed cultural factors, such as traditional beliefs or strong religiosity (Clifford, 1971; Goldscheider, 2006; Zhang, 2008; Kulu & Hannemann, 2016), as variables that enhance fertility levels. However, our findings suggest that cultural values may not shape fertility in a uniform way. Among Pakistani and Bangladeshi descendants, the strong association between marriage and motherhood may have contributed to decreasing first-birth rates in recent years, especially as the postponement of marriage has increased. In contrast, nonmarital childbearing patterns in

Caribbean communities are linked to relatively higher early fertility, accelerating the timing of births.

Findings for second-birth rates reveal a pattern distinct from those of first births. Overall, second-birth rates remain fairly stable, with some groups showing higher or lower relative levels. Indian descendants consistently record higher second-birth rates than White British (despite being among the lowest for first births), whereas Caribbean descendants consistently record lower second-birth rates (despite being among the highest for first births). This implies that Indian descendants, although they may take longer to have their first child, still wish to build larger families, while Caribbean descendants are more likely to stop at one child. The lower second-birth rates among Caribbean descendants may also reflect the disruptive effect of higher rates of partnership dissolution on fertility (Christison et al., 2024; Fostik et al., 2023)

Third-birth rates also remain steady over time for most descendant groups. White Others, Caribbean, and Indian descendants display similar third-birth levels to White British, whereas Pakistani and Bangladeshi descendants consistently record higher, and slightly increasing rates. One of the reasons for this distinction among the Pakistani and Bangladeshi groups could be a selection effect. The findings for the first-birth rates show that Pakistani and Bangladeshi descendant women display significantly decreasing rates over time. These parity-specific findings imply that there may be some polarization within this group: once they enter motherhood, their propensity to progress to a second or third child rises, indicating that rising second- and third-birth rates may be concentrated within a particular subgroup, creating a pattern of polarization rather than reflecting the behaviour of the group as a whole.

Some parity-specific fertility trends underline potential structural constraints. The first-birth pattern among Caribbean women, for example, reflect an early and often single

motherhood, where childbearing begins early but seldom progresses to larger families. This pattern has been consistent over decades among the Caribbean community in the UK (Berrington, 1994; Robson & Berthoud, 2006). Peri-Rotem and Scott (2017) point out that birth outside of partnership is often associated with structural disadvantage such as low education level. Additionally, single motherhood can lead to further socio-economic burdens for mothers (Härkönen, Lappalainen, & Jalovaara, 2023). This highlights the need for tailored support for lone parents in this group, who may face both early entry into motherhood and limited opportunities for subsequent family building.

We further examine parity-specific fertility rates by education level and descendant group, using education as a key explanatory variable for fertility trends. We find that low-educated women are distinctly more likely to have a first child than women with higher education across almost all descendant groups. In contrast, highly educated women are more likely to progress to a second birth. This indicates that education has become a resource that supports continued family building rather than a barrier to having additional children. These are also demonstrated by Kulu et al. (2025). When disaggregating by descendant group, we observe that White Others and Indian descendants are more likely to follow this mainstream trend, whereas Caribbean and PAK/BGD descendants display moderate differences in the way education shapes parity-specific fertility behaviour.

While this paper makes several contributions, certain limitations remain. First, the study cannot disentangle fertility differences across immigrant generations including foreign-born adults, foreign-born child migrants (1.5 generation), and UK-born descendants, due to the insufficient sample size. This limitation makes it difficult to trace how fertility behaviours evolve across generations within the same origin group. Table A-14 in the appendix addresses this limitation by showing the parity-specific birth risks among 1.5G women, although the

confidence intervals are wide. The analysis suggests that there is no significant difference between 1.5G and descendants in fertility levels.

Moreover, the lack of information on parents' country of birth forces us to rely on self-reported ethnicity, limiting categorisation of migrant backgrounds based on the country of origin. Focusing solely on UK-born descendant groups, however, helps us avoid treating all women with migrant backgrounds as a single ethnic minority group.

Additionally, the small sample size does not allow us to show detailed fertility changes over time – the period in the main analysis is measured per decade, which may neglect more nuanced shifts within each decade. Although parity-specific fertility rates within a shorter period is presented in Table A-13 in the appendix, the paper acknowledges that identifying statistically significant changes within such a narrow window is challenging with the current sample size.

Using White British as the reference group raises another concern. Once that group is treated as the baseline, readers may assume it represents "the correct norm," and the distinction from them reflects a lack of integration. However, integration is multi-dimensional – social, cultural, economic, and more (Harder et al., 2018) – and it cannot be defined by convergence on a single indicator. Nor should integration be framed only as minorities moving towards a majority level, since this perspective risks overlooking processes of mutual adaptation. Although comparisons with the majority population are useful and practical to differentiate between groups, the distinction between the majority and other groups should not be taken as evidence of integration failure.

This paper opens several avenues for future research. The consistently higher second- and third-birth rates among Pakistani and Bangladeshi descendants raise important questions about the relationship between fertility and other life course events such as career trajectories

or partnership dissolution. Although some studies have addressed these (e.g., Mikolai et al., 2023 for fertility-employment links for immigrants and their descendants; Mikolai & Kulu, 2025 for partnership dissolution), the long-term trends of these life-course events remain unclear. Conversely, the persistently lower second- and third-birth rates among Caribbean women require future researchers to examine whether this reflects voluntary preferences or barriers that hinder family expansion.

In sum, fertility trends across different immigrant descendant women in the UK reveal distinctions across descendant groups in different birth parities. Motherhood postponement is universal, but parity-specific responses diverge. This variation might have been treated as a single generalised pattern without such categorisation. The findings also suggest that while universal interventions may be needed for all women – such as addressing motherhood postponement in workplaces, healthcare, and policymaking – there should also be attention to group-specific considerations within these areas.

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