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Secularization and low fertility: How declining church membership changes couples' childbearing

Henrik-Alexander Schubert [a,b,c,*], Vegard Skirbekk [d,e], Jessica Nisén [a,f,g]

[a] Max Planck Institute for Demographic Research, Rostock, Germany
[b] Max Planck – University of Helsinki Center for Social Inequalities in Population Health, Rostock, Germany
[c] Max Planck – University of Helsinki Center for Social Inequalities in Population Health, Helsinki, Finland
[d] Centre for Fertility and Health, Norwegian Institute of Public Health, Oslo, Norway
[e] University of Oslo, Oslo, Norway
[f] INVEST Research Flagship, University of Turku, Turku, Finland
[g] University of Helsinki, Helsinki, Finland

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ABSTRACT

Previous studies have shown that secularization altered historical Western fertility patterns, but few studies have addressed the role of religion in the marked fertility declines in recent decades. We examine the relationship between secularization and fertility decline in Finland from a couple perspective, amid a broader trend of declining fertility. We show that secularization can exert a self-reinforcing negative effect on fertility through an interplay of declining church membership and childbearing of religiously mixed and homogeneous couples. Using data from the Finnish administrative registers covering the period from 1995 to 2019, we are able to identify religious affiliation, as measured by church tax payments in the secularized context of Finland. The analysis takes a dyadic perspective to explore the relationships between couples' religious affiliation and their probability of having a first child. We conclude that the accelerated decline in church membership has contributed to the recent fertility decline.

1. Introduction

The contemporary declines in fertility to low levels across Anglo-Saxon, Nordic, and many

Western European countries represent a noteworthy yet inadequately understood social change (Comolli et al., 2021, p. 202; Hellstrand et al., 2022; Kearney et al., 2022; Ohlsson-Wijk and Andersson, 2022). In Finland, the setting of this study, the total fertility rate fell by 30% between 2010 and 2023, from 1.8 children per woman to a historic low of 1.26 children per woman. While the declines in the 2010s remain inadequately understood - given that they occurred across educational levels and geographic regions, and independent of migration background - evidence from Finland, Sweden, and the US shows that this trend stems primarily from reductions in first-time childbearing among couples (Hellstrand et al., 2020a, 2021; Kearney et al., 2022; Ohlsson-Wijk and Andersson, 2022). Fertility declines are consequential, as they can impact population aging and the fiscal sustainability and economic growth of societies (Lee and Zhou, 2017; Preston et al., 2001), as well as climate change adaption and resource use (Jones and Warner, 2016; Molotoks et al., 2021; Scovronick et al., 2017).

* Corresponding author. Max Planck Institute for Demographic Research, Konrad-Zuse Str. 1, 180057, Rostock, Germany.
E-mail address: schubert@demogr.mpg.de (H.-A. Schubert).

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Generally, secularization and religion are key factors in explaining long-term fertility trends and variation (Frejka and Westoff, 2008; Mogi et al., 2022; Westoff and Frejka, 2007). Specifically, rapid changes in religious beliefs, teachings, and practices, including changes in levels of adherence to religious authorities and rapid religious disaffiliation, can affect family formation and childbearing patterns. Classic studies by Coale and Watkins (1986) and by Goldschneider (1971) demonstrated how secularization altered Western patterns of fertility postponement and decline. More recent studies have confirmed the findings of these classical studies (Frejka and Gietel-Basten, 2016; Goldstein and Klüsener, 2014; Peri-Rotem, 2016), and some even suggested that secularization is the main driver of the historical fertility transition (Blanc, 2024). However, only few studies have addressed the role of religion in the marked fertility declines in recent decades (Mogi et al., 2022; Schnabel, 2021). This research gap has persisted despite the evidence that the pace of secularization has accelerated in many countries (R. F. Inglehart, 2021; R. Inglehart, 2021). "[S]ince 2007, things have changed with surprising speed. From about 2007 to 2019, […] 43 out of 49 [middle- and high-income countries] became less religious" (R. Inglehart, 2021, p. 212; Voas and Chaves, 2016). For instance, in the US, the proportion of individuals stating that religion is very important was high (56% to 58%) in the period 2007-2013, but fell rapidly thereafter, reaching a level of 41% in 2021 (Smith, 2021).

We hypothesize that this ongoing acceleration of secularization has played a role in the concurrent fertility declines across a number of high-income countries, and we test this hypothesis for Finland. We argue that secularization affects fertility through two mechanisms. First, the declining share of religious individuals in the overall population leads to lower fertility, because religious individuals generally have higher fertility than non-religious individuals. Second, secularization may also reduce the fertility of the religious individuals because they increasingly partner with non-religious individuals or remain single. Voas (2003a, 2003b) originally discussed this second mechanism, but it has not yet been thoroughly examined. According to it, in a secularizing society, the shrinking pool of potential religious partners increases the likelihood of partnering with a non-religious individual. As a result, religious individuals are more likely to form partnerships with a non-religious individual or remain single. Given that the fertility of religiously mixed couples may be lower than that of homogenously religious couples, such a compositional change of couples is expected to reduce the fertility of religious individuals. Thus, the combination of these two mechanisms is expected to result in a negative, self-reinforcing effect of secularization on fertility: not only does the proportion of religious individuals in a population decline, but their fertility also declines because they are more likely to partner with a non-religious individual.

This study assesses the relationship between secularization and fertility in Finland in the period between 1995 and 2019 using Finnish administrative register data. We measure religiosity in terms of religious affiliation, more specifically membership of the state church. In the main analysis, we use discrete-time survival models and counterfactual simulation to assess how the couple composition with respect to religious affiliation is related to the probability of having a first birth. In particular, we assess the role of male and female religiosity separately, and examine how these individual characteristics interact in determining the probability of having a first birth for a couple. We employ several robustness checks to validate our findings under different assumptions. Moreover, we contextualize this individual-level analysis with an examination of fertility trends by religiosity.

This study contributes to the understanding of the role of secularization in contemporary family-demographic changes. Firstly, it advances theoretical understanding by proposing an individual-level mechanism that connects secularization to fertility decline through the processes of couple formation and joint childbearing decisions. Second, it introduces a dyadic perspective to the study of fertility, moving beyond individual-level analyses to highlight the significance of partner-level dynamics and joint decision-making in reproductive behavior—a shift that aligns with longstanding calls for more relational approaches in family research (Emirbayer, 1997; Voas, 2003a, 2003b). Third, the study innovatively leverages administrative register data to operationalize secularization through state church tax payments, offering a unique, population-wide measure that captures religious affiliation in a way that is both empirically robust and scalable.

2. Secularization, couples, and fertility change

2.1. Secularization in Finland

In this study, "*secularization* at the societal level is defined as the gradual distancing of a society from religious values and institutions, while at the individual level secularism refers to people's indifference for religious doctrine or beliefs" (Skirbekk, 2022, p. 291). The country context we focus on – Finland – is regarded as highly secularized. For instance, according to 2011 survey results, monthly church attendance in Finland fluctuates between 4% and 14%, and only 27% of the population believes in a Christian god (Taira, 2017). However, a substantially larger proportion of Finns – 65% – belong to the Evangelical Lutheran state church (see Figure B.1). This cultural model, typical in the Nordic countries, has been described as an attitude of "believing in belonging" (Niemelä, 2015). At the same time, church membership is rare among individuals who identify as non-religious. In a survey in 2015, 12% of such individuals reported belonging to the Evangelical Lutheran church and 2% to another religious community (Taira et al., 2023, p. 20). The high church membership can be understood by considering the strong civic role and the positive perception of the state church, as well as other cultural reasons (ibid.), such as the possibility of holding a church wedding or baptizing a child when at least one of the partners belongs to the church. In this context, where cultural reasons have long supported membership, contemporary church leaving has been argued to reflect, in addition to a lack of faith, an inclination towards less traditional and more individualistic values (Niemelä, 2015; Taira et al., 2023). For young Finns in the early 2000s, church-leaving often means a rejection of traditional, collective religious norms in favor of self-defined beliefs and values (Niemelä, 2015).

Fig. 1 illustrates the decline of the religiously affiliated share of the population in Finland. In line, the proportion of Finns who report identifying as non-religious increased from 25% among cohorts born in the 1960s and 1970s to 34% among the Millennials

(Taira et al., 2023). This decline reflects a change in the cultural model prevalent in Nordic secularized countries, where affiliation with the state church is important for reasons beyond purely religious motivations (Ketola and Salomäki, 2024; Taira et al., 2023). In Finland, the number of church leavers has been exceptionally high since the beginning of the 2000s, driven mainly by the exodus of young adults born since the early 1980s (Niemelä, 2015). By age 25, roughly half of church members but only 8% of church leavers stated that they believed in God, illustrating that the stayers are more religious than the leavers. Notably, non-state church members constitute a distinct group who hold strong secular beliefs, and among young adult Finns today, the majority could be regarded as neither religious nor non-religious, with a "fuzzy" faith that is not central to their lives (Ketola and Salomäki, 2024; Voas, 2008). According to Niemelä (2015), the most significant self-reported reasons for leaving the church among young adults are a lack of a religious identity, a lack of belief in the teachings of the church, and a lack of personal meaning derived from the church as an institution. Today's young Finns generally expect their peers to be non-religious, which may further accelerate a cultural shift away from traditional values and towards more individualized and secularized views (Ketola and Salomäki, 2024).

In Finland, a church tax is levied on members of the Evangelical Lutheran church, the Orthodox church of Finland, and Finnish German church at rates based on taxable income subject to municipal taxation.[1] The tax rates vary between 1% and 2.1% across parishes. Members can formally leave the church by mail or via a personal consultation at an administrative council, becoming exempt from the church tax in the following year.[2] Lyytikäinen and Santavirta (2013) investigated the impact of church tax rates on membership and found some impact, but concluded that "people tend to adhere to the default option regardless of minor changes in the price of membership. However, the advent of technologies such as online opting out may make a difference to the opting-out behavior" (Lyytikäinen and Santavirta, 2013, p. 1192). Websites that translate a simple questionnaire into a termination note demonstrate the low barriers to leaving the church today. Nonetheless, young adults in the early 2000s, in particular, do not emphasize an unwillingness to pay church tax as a reason to leave the church (Niemelä, 2015).

2.2. Religion and fertility

Religiosity and membership in a religious institution can be related to fertility through several pathways (McQuillan, 2004; Skirbekk, 2022; Zhang, 2008). The different mechanisms are not mutually exclusive, and they may also interact with each other in their impact on fertility.

First, the *particularized hypothesis* states that religions influence childbearing through the propagation and teaching of religious doctrines or customs regarding childbearing (Goldschneider, 1971). For example, some religions have developed moral codes or norms regarding reproductive behavior related to the use of contraception, extramarital sexual intercourse, and abortion (Agadjanian et al., 2009; Jerman et al., 2016). These rules affect couple formation and sexual behavior, which may lead to fertility differences between religious and non-religious groups. Moreover, Zhang (2008) showed that the strength of religious beliefs significantly affects childbearing, even after controlling for denomination. The author concluded that religion may guide general behaviors regarding partnership, sexuality, and life goals.

Second, the *interactive hypothesis* highlights the importance of social interactions within communities that are distinguished by their religious beliefs. According to Bongaarts and Watkins (1996), social interaction relates to fertility via three pathways: "the exchange of information and ideas, the joint evaluation of their meaning in a particular context, and social influence that constrains or encourages action" (p. 657, ibid.). Religious communities form social networks that affect the dissemination of ideas, assess their significance, and influence action through the imposition of constraints or the encouragement of action (ibid.). Consequently, religious communities influence the reproductive behavior of their members.

In line with these expectations, existing studies point to a robust relationship between religious denomination and fertility in Finland (Kolk and Saarela, 2024). Using administrative register data, Kolk and Saarela (2024) documented substantial fertility differences across religious denominations, which are more pronounced for women than for men. Across all groups, the unaffiliated have the lowest fertility, with an average of 1.63 children. Among women, Muslims have the highest fertility (2.7 children), followed by other Protestants (2.1 children) and state-church members (two children). Therefore, the gap between the unaffiliated and the state church members is approximately 0.37 children. Among men, the same groups as those for women have particularly high fertility, but other Protestants have the highest number of children, at about two children on average. It is noteworthy that the disparities in childlessness across religious denominations are more pronounced than the differences in overall fertility. Moreover, religious beliefs are associated with higher fertility intentions in Finland (Finnas, 1991; Miettinen and Paajanen, 2003).

Hypothesis 1. (H1) In a modern secularized society such as Finland, fertility is higher among the religiously affiliated than among the religiously unaffiliated.

[1] Orthodox and Finnish German church members represent a small minority in the total groups of all church tax payers (< 1.5% in 2020). From here onward, we refer to these religious communities when using the term state church membership, if not stated otherwise.

[2] The legislation governing church membership was reformed in 2003 (revised law of freedom of conviction, 6.6.2003/453), enabling individuals to terminate their church membership with ease via mail. Prior to this point, the only avenue for leaving the church was through a personal consultation with the administrative council.

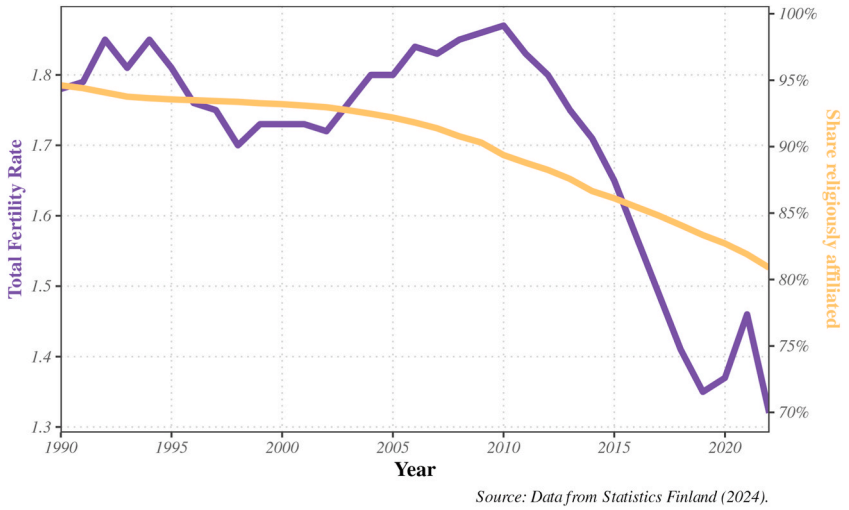

Fig. 1. The total fertility rate (TFR) and the share of the religiously affiliated population in Finland in the 1990-2022 period. The purple line displays the TFR, and the purple-line's values are on the left y-axis. The orange line represents the share of the population who are members of a religious denomination, and the orange line's values are on the right y-axis. (For interpretation of the references to color in this figure legend, the reader is referred to the Web version of this article.)

2.3. Religion and couples' childbearing

We have outlined the mechanisms linking religion and childbearing from an individual perspective, although most childbearing decisions are made at the couple level (Hudde and Engelhardt, 2021; Rijken and Liefbroer, 2009; Vignoli et al., 2012). Given the persistence of gendered roles within households women still tend to do the major share of household chores and childcare (Cotter et al., 2011; England, 2010, p. 200; F. Goldscheider et al., 2015; Mattingly and Sayer, 2006). As women's lives are more directly affected by childbearing than those of men, women may have a greater say in childbearing within couples. Moreover, previous research indicates that the economic provision of the family is still more strongly associated with the domain of the male partner, whereas other categories may be more closely linked to the domain of the female partner (Stein et al., 2014). However, in the Nordic countries, the impact of economic characteristics is relatively similar across genders, which is attributable to the family-policies and cultures in these countries supporting a dual-earner model (G. Andersson and Scott, 2007; Jalovaara, 2013). Overall, the gender roles of partners in Nordic countries tend to be more similar than those in most other countries, yet, they remain differentiated to some extent, especially after the entry into parenthood (Grönlund et al., 2017; Kleven et al., 2019). In summary, we do not expect a gendered impact of religious affiliation on the couple's transition to first birth in the Finnish context.

The religious affiliation of the male and the female partner may interact in their effects on childbearing, in addition to having independent effects. Homogeneous couples may be more inclined to make long-term commitments, such as having a child, because both partners share a significant aspect of their life and beliefs. Importantly, holding similar beliefs may reduce the propensity of a couple to engage in conflict about significant matters, thereby increasing the quality and the stability of their relationship (Hudde and Engelhardt, 2021). Furthermore, all the mechanisms linking religion and fertility that operate at the individual level (see Section 2.1) may be mutually reinforcing in a homogeneous couple. This is because the partners' beliefs and practices are less likely to be a source of conflict, and are thus able to exert their full influence. For instance, a couple's shared religious orientation may influence their religious observance, including attendance at religious services. This could intensify their commitment and increase their fertility. Finally, when both partners are church members in a secularized context such as Finland, they are likely to have similar life values and orientations in a broader sense, which may facilitate their willingness to make long-term commitments.

Hypothesis 2. (H2) In modern secularized societies, religiously homogeneous couples are more likely to have a child than religiously mixed and non-religious couples.

2.4. Fertility decline in Finland

Until recently, fertility in Finland was higher than that in many other European countries. In 2010, the total fertility rate (TFR) was 1.87 compared to 1.57 in the entire European Union (Eurostat, 2025). However, since 2010, the TFR has gradually fallen below 1.4, which is the record low for period fertility in Finland (purple line in Fig. 1). The recent decline in period fertility relates to childbearing postponement, and may result in a decline in the eventual numbers of children born in Finland (Hellstrand et al., 2020a). Importantly, reductions in first births account for the largest part of the decline across the Nordic countries (Hellstrand et al., 2021), which may lead to increases in childlessness despite readily high levels in Finland (Jalovaara et al., 2019; Kreyenfeld and Konietzka, 2017). A fifth of women and more than a quarter of men born in the early 1970s in Finland have remained childless (Jalovaara et al., 2022).

While childbearing was strongly connected with marriage in the past, the connection is gradually weakening (Lesthaeghe, 2020; Lesthaeghe and Van de Kaa, 1986). In Finland, the share of all births that are out of wedlock increased from 33% in 1985 to 45% in 2019, and the shares are larger in the case of first births (Hellstrand et al., 2021). Today, approximately two-thirds of first births are born to women in their first coresidential union, and more than 95% of births are to parents in any form of coresidential union (L. Andersson, 2023). One explanation for the trend is the institutionalization of cohabitation, which has led to a partial replacement of marriage (Rotkirch and Miettinen, 2017). Nonetheless, married couples continue to hold higher fertility intentions and more family-oriented attitudes than cohabiting couples. According to Hellstrand et al. (2021) reductions in first births among cohabiting and married couples accounted for the largest share of the fertility decline in Finland. Increases in union dissolutions and, to a lesser extent, decreases in union formation also had some effect. Entry into parenthood has declined substantially among partnered women born from the 1970s onward, and the risk of experiencing union dissolution has increased concurrently (Rahnu and Jalovaara, 2023). It remains unknown whether and how much secularization has contributed to the recent fertility decline.

Hypothesis 3. (H3) Secularization contributed to the recent fertility decline in Finland.

3. Data & methods

We use Finnish administrative register data for the period between 1995 and 2019. The data are a complete record of the registered population residing in Finland at the end of each year. We restrict our sample to individuals living permanently in Finland who either were born in Finland or were born abroad with a Finnish background (95.83% of the total population). We do so, because our indicator for religious affiliation does not capture denominations beyond the state-church. Therefore, migrants, who are often members of other religious denominations, would not be appropriately captured.

We infer religiosity from state church tax payments, which indicate state church membership (see Fig. 2). People paying the church tax belong to the state church (66.8%). However, people who did not pay any church tax, while paying municipality income tax, are not members of the state church (Lyytikäinen and Santavirta, 2013, p. 1184). This approach cannot determine the religious affiliation of those who pay neither church tax nor municipality tax (18.8%). To address missing values and impute religious affiliation for these cases, we employed a step-wise procedure leveraging the available longitudinal data. Initially, when an unidentified spell occurred for an individual with consistent information before and after that spell, we utilized the available information to impute their religious affiliation. This approach enabled us to impute more than 95% of the initially missing data points, with relatively weak assumptions. The remaining cases with missing information (1.5%) were excluded from the analytical data set (see Fig. 2).

The amount of the church tax paid by church members varies across municipalities, but has an average rate of 1.08% of annual individual income, which is about 650€ annually (704.45 US-$ using conversion rates from 07/09/2024). There are several reasons for why this variable is a good indicator for religious affiliation. First, the state church tax involves monetary costs, which makes it a more objective assessment of religious affiliation than survey statements (Brenner et al., 2023; Hout and Fischer, 2014; Lim et al., 2010). Second, the income registers draw on high-quality, population-wide information, reducing measurement error.

Fertility information was derived from the birth registers and the multigenerational registers containing the parent-child links for the entire population. We estimated the timing of births and number of births by linking the demographic information of the parent and the child to the multigenerational register. The difference between the birth year of the child and the birth year of the parent is used as the age at childbirth.

3.1. Fertility trends by religiosity

To contextualize our couple-level analysis, we first explore the temporal dynamics of TFR by religiosity by estimating the annual share of the state church members in Finland of reproductive age in 1996-2019. Second, we estimate the TFR for the affiliated and unaffiliated population and compare their trends over time. The TFR is a period measure of the average number of children a woman would have if the fertility level remained unchanged and she survived through their reproductive period (Preston et al., 2001). Third, we use counterfactual simulation to quantify the impact of declining church membership on fertility (see A.1). Counterfactual simulation is a method used to assess the contribution of a specific component, which is set to a counterfactual value, while the remaining components are included as they were observed. The difference between the observed and counterfactual outcome quantifies the impact of the component being evaluated. We estimate the counterfactual TFR for the scenario in which the population composition in terms of religious affiliation and age remained constant throughout the period, but fertility rates within age- and affiliation-specific groups changed as observed. Any differences between the observed and counterfactual TFR can be attributed to changes in population composition, assuming a correct model specification.

3.2. Regression analysis for couples

In our main analysis, we study the impact of religiosity on childbearing of cohabiting[3] and married couples. We create a set of

[3] The register data set contains information about opposite-sex couples living together at the turn of the year. The coresiding couples are identified based on information from various register sources. For instance, to qualify as a cohabiting couple, the opposite-sex persons need to have lived together for at least 90 days.

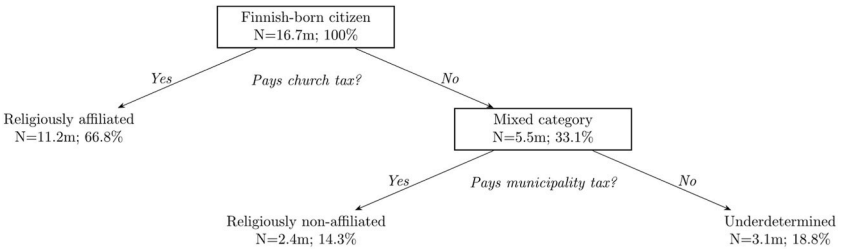

Fig. 2. A tree diagram of the categorization of religiously-affiliated individuals in the Finnish tax register.

annual panel data on childless couples for the 1996-2019 period (for details, see Figure B.2). Based on these data, we estimate the impact of couple composition with respect to religious affiliation on the transition to first childbirth in a discrete-time survival model (Hastie et al., 2009; Wooldridge, 2013). This model harnesses the ordering of events to identify the causal effect. The process-time is union duration in years, modelled with a smoothing spline that interacts with a smoothing spline for age at union formation to allow full flexibility in the hazard distribution (Ellison et al., 2022). The risk set contains all childless spells of coresidential unions in 1996-2019 for women aged 18 or older. Thus, some individuals enter the risk set with multiple unions, and they can enter after the start of the union if it was formed before 1996. The outcome variable is the transition to the first birth. Reasons for right-censoring are union dissolution, death or out-migration of one of the partners, or the end of the observation period, i.e., the year 2019. We include the religious affiliation of the woman, the religious affiliation of the man, and an interactive term to evaluate the impact on childbearing of all variations of couple composition.

$$log\left[\frac{P(Y_{i,t}=1)}{1-P(Y_{i,t}=1)}\right] = \beta_1 + \beta_2 religious^{f}_{i,t-1} + \beta_3 religious^{m}_{i,t-1} + \beta_4 religious^{both}_{i,t-1} + \beta_5 \boldsymbol{X}_{i,t-1}$$

Table 1
Summary statistics of the nominal and ordinal variables in the couple panel data set used in the discrete-time survival model.

Variable	Expression	Count	% Share
Birth	Childbirth	578,455	5.284
Birth	Censored	10,368,059	94.716
Religious affiliation (female)	unaffiliated	1,368,230	12,499
Religious affiliation (female)	affiliated	9,578,284	87.501
Religious affiliation (male)	unaffiliated	2.067.243	18.855
Religious affiliation (male)	affiliated	8.879.271	81.885
Activity status (female)	employed	8.908.923	81.386
Activity status (female)	unemployed	899.05	8.213
Activity status (female)	education	611.614	5.587
Activity status (female)	other	526.927	4.814
Activity status (male)	employed	9,229,950	84.319
Activity status (male)	unemployed	820,423	7.495
Activity status (male)	education	389,892	3.562
Activity status (male)	other	506,249	4.265
Income quantile (female)	0-25%	1,492,243	13.623
Income quantile (female)	25-50%	2,104,846	19.228
Income quantile (female)	50-75%	4,236,582	38.703
Income quantile (female)	75-100%	3,112,843	28.437
Income quantile (male)	0-25%	1,003,922	9.171
Income quantile (male)	25-50%	1,342,447	12.264
Income quantile (male)	50-75%	2,999,389	27.401
Income quantile (male)	75-100%	5,600,656	51.164
Education (female)	basic	1,685,912	15.144
Education (female)	intermediate	5,001,980	44.924
Education (female)	high	4,445,361	39.932
Education (male)	basic	2,212,150	19.871
Education (male)	intermediate	5,305,261	47.656
Education (male)	high	3,614,960	32.473
Settlement structure	rural	1,714,478	15.662
Settlement structure	intermediate	5,561,172	50.803
Settlement structure	urban	3,670,846	33.353
Period	1995-2000	3,620,765	33.077
Period	2000-2005	2,931,603	26.781
Period	2005-2010	2,101,932	19.202
Period	2010-2015	1,443,848	13.19
Period	2015-2019	488,366	7.75

where Y is the indicator for the occurrence of childbirth to couple i in yeart, $religious^{f}_{i,t-1}$ is a dummy variable for the woman being a state church member, $religious^{m}_{i,t-1}$ is a dummy indicator for whether the man is a member, and $religious^{both}_{i,t-1}$ is the interaction of both partners being members. $\boldsymbol{X}$ is a matrix of control variables, including the income of the woman (quantile), the income of the man (quantile), education of the female and the male partner, the activity status of both partners, and whether the couple lives in an urban, semi-urban, or rural area (for details, see Table 1).

The data for the survival model have a couple-year structure, in which every spell refers to a year nested within a couple. All variables, including the main predictors for religious affiliation, are time-varying and measured at the end of the year. All predictor variables are lagged by one year to reduce any problems arising from reversed causality (Hoem and Kreyenfeld, 2006). Every couple observation consists of a variable that indicates the religious affiliation of the woman and the man. In 73% of couples, the religious composition is constant from the beginning of the coresidential union until the last observed spell. However, changes are rare when regarded as year-to-year transitions (in only 0.5% of the spells).

We further illustrate the implications of the regression-based results for the recent fertility trends by simulating couples' first birth rate in the case that secularization had not occurred, i.e. female and male partners' affiliations had stayed at the level as observed in 2000. This simulation assumes that the coefficients of female and male partners' affiliation, and their interaction, were constant throughout the period.

4. Results

4.1. Fertility trends by religiosity

State church membership in the Finnish population of reproductive age declined from 91% in 1996 to 76% by 2019, and the decline accelerated in the 2010s (see Figure B.1).

Throughout the period, the TFR of the religiously affiliated was substantially higher than the TFR of the unaffiliated population, as displayed in Fig. 3, confirming our Hypothesis 1. The gap between the two groups also widened over time, particularly in the first decade of the century. A key explanation for the widened gap is that the TFR of the religiously unaffiliated population had already been gradually declining since the early 2000s, and even dropped below an average of 1.1 in the year 2019. In contrast, the TFR of the religiously affiliated population remained fairly high, despite a pronounced decline in the most recent period.

The results from the counterfactual simulation (dotted purple line in Figure B.3) indicate that the TFR in Finland would be almost 0.1 points higher in 2019, if the population composition with respect to religion had stayed constant from 2000 onward. The trends of the observed and the counterfactual TFR started to diverge in the late 2000s (see Figure B.3). Therefore, we conclude that the fertility decline was related to the declining church membership. However, the fertility decline was clearly not only the consequence of compositional change with respect to religious affiliation, as it remained even after holding the population composition constant.

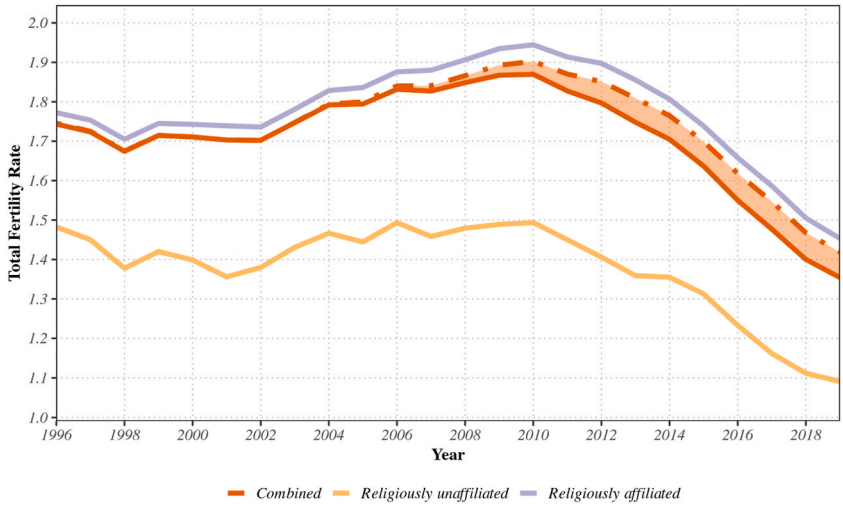

Fig. 3. Time-trend of the TFR of the religious, the non-religious and the entire Finnish population between 1990 and 2019. The dotted line represents the counterfactual trend of the population TFR if the population remained constant with respect to the religiously affiliated share.

4.2. Regression analysis for couples

The results from the couple discrete-time survival model indicate the impact of religious affiliation of the female, male and both partners combined on the transition to first birth and are displayed in Table 2. The results are presented as odds ratios, so that a value above one indicates a positive association with the transition to first birth, and a value below one correspondingly a negative association (for average marginal effects, see Table C.5). Model 1 includes only female religiosity, model 2 only male religiosity, model 3 the religious affiliation of both partners, and model 4 the interaction of partners' affiliations. We find that both the independent and the interactive terms of religiosity improve the model performance, as the coefficients are significant and the Akaike's Information Criterion is maximized in the model including all terms (see bottom panel of Table 2). Moreover, the log-likelihood ratio test confirms the improved performance of the model including the interaction term for male religiosity and female religiosity over the model without interaction term ($\chi 2 = 41.224$, df = 2,547,006, $p < .001$). Therefore, both partners' religiosity and their combined religiosity are associated with the couple's fertility (see Fig. 4).

Across all models, we find that the religious affiliation of either partner is positively and robustly associated with subsequent childbearing. Religious affiliation has a positive effect on fertility irrespective of gender. The affiliation of the male partner has only a slightly weaker association with the first birth risk than that of the female partner. Moreover, homogamous religiously affiliated couples have the highest risk of transitioning to first birth, given the significantly positive interaction term. The odds of a first childbirth are 4.3% higher in couples in which both partners are religiously affiliated than in other types of couples. This demonstrates that the combined effect is more than the sum of the individual effects. Fig. 4 further illustrates the high risk of having a first birth for couples in which both partners are religiously affiliated. It shows that the homogeneous religious couples have both an earlier onset and higher intensities of first-time childbearing.

We further illustrate the implications of these results for the recent fertility trends in Fig. 5. It shows the impact of the changing couple composition with respect to religiosity on the time-trend of the couple first birth rate (TFR1) using counterfactual simulation. The simulation indicates that the couple TFR1 would have declined less and remained higher after 2007 if the couple composition had not changed since 2000 (purple dashed line). If only the religious affiliation of one of the partners had remained constant over the observation period (dashed orange and dashed purple line) the couple fertility would not deviate as much from the observed pattern as is the case if both partners' affiliations had remained constant. In the last observed years, changes in female affiliation had a larger impact than respective chances in men. Overall, the decline in the couple TFR in the counterfactual scenario corresponds to 5% of the observed total TFR decline. Figure B.4 in the Appendix shows how the couple composition with respect to religiosity has changed and may have contributed to couple fertility trends, showing increasing singlehood and non-affiliated partners among those religiously

Table 2
Results from a discrete-time survival analysis of the couple's transition to first childbirth. Results are displayed as odds ratios. The couple composition with respect to religious affiliation is time-varying. The age splines (at couple formation), the couple duration splines, and the interactive age-duration splines were omitted for readability.

Variable	Model 1	Model 2	Model 3	Model 4
Religiously affiliated female	1.239***		1.17***	1.144***
Religiously affiliated male		1.21***	1.152***	1.116***
Both religiously affiliated				1.043***
Activity: unemployed	0.761***	0.761***	0.762***	0.762***
Activity: education	0.659***	0.657***	0.658***	0.658***
Activity: other	1.474***	1.473***	1.474***	1.474***
Activity male: unemployed	1.006	1.008	1.008	1.009
Activity male: education	0.809***	0.81***	0.809***	0.809***
Activity male: other	0.844***	0.844***	0.845***	0.845***
Education: medium	0.961***	0.964***	0.961***	0.961***
Education: high	1.597***	1.605***	1.596***	1.596***
Education male: medium	0.905***	0.904***	0.904***	0.904***
Education male: high	1.075***	1.071***	1.072***	1.072***
Income quantile: 2	0.916***	0.917***	0.914***	0.914***
Income quantile: 3	0.651***	0.653***	0.649***	0.649***
Income quantile: 4	0.502***	0.503***	0.501***	0.501***
Income quantile male: 2	1.282***	1.283***	1.281***	1.281***
Income quantile male: 3	1.584***	1.588***	1.581***	1.581***
Income quantile male: 4	1.744***	1.758***	1.747***	1.747***
Settlement: intermediate	1.489***	1.489***	1.481***	1.481***
Settlement: rural	1.555***	1.548***	1.536***	1.535***
Period: 2000-2004	1.166***	1.164***	1.166***	1.166***
Period: 2005-2009	1.293***	1.292***	1.298***	1.298***
Period: 2010-2014	1.232***	1.235***	1.248***	1.249***
Period: 2015-2019	1.032***	1.037***	1.053***	1.053***
Intercept	0.011***	0.012***	0.011***	0.011***
N	5047249	5047249	5047249	5047249
R^2	0.083	0.083	0.083	0.083
AIC	2,546,997	2,546,944	2,546,056	2,546,043

*p < .05; **p < .01; ***p < .001.

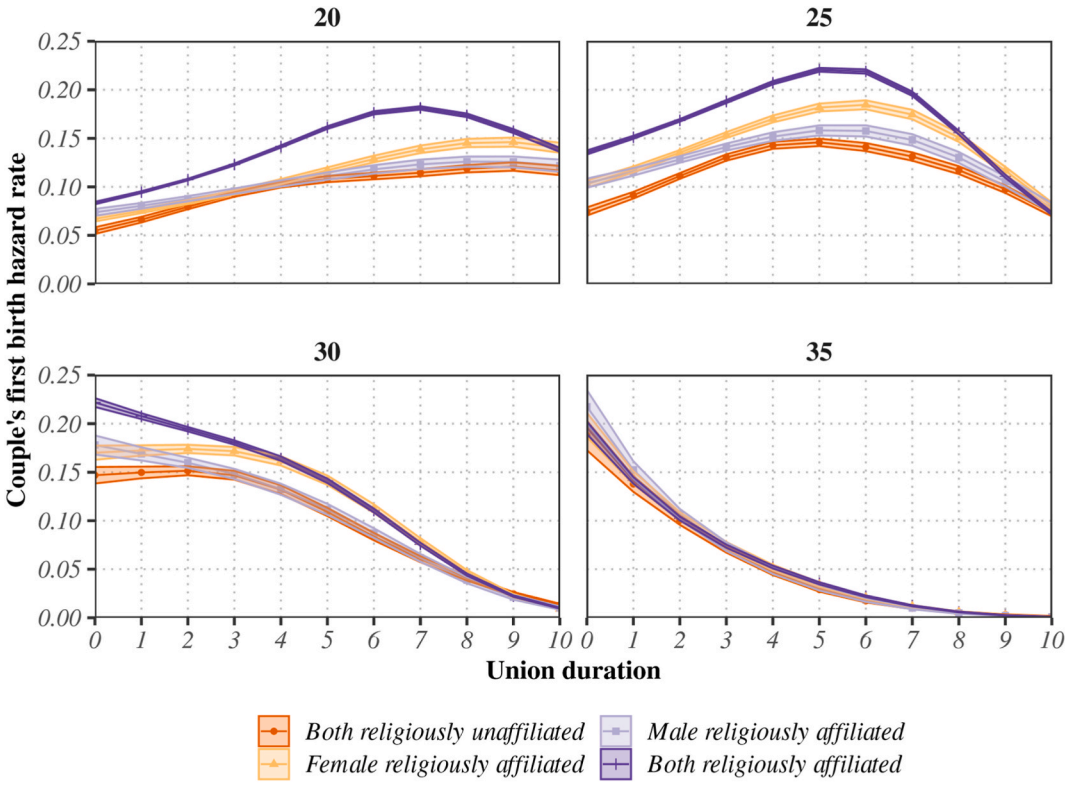

Fig. 4. Predicted first birth rates for childless couples with different religious compositions using age-splines in a logistic-binomial regression. The different panels show the different starting ages of the union; the x-axis shows the union duration; the colors indicate the religious composition of the couple; and the y-axis shows the risk of having a first birth. (For interpretation of the references to color in this figure legend, the reader is referred to the Web version of this article.)

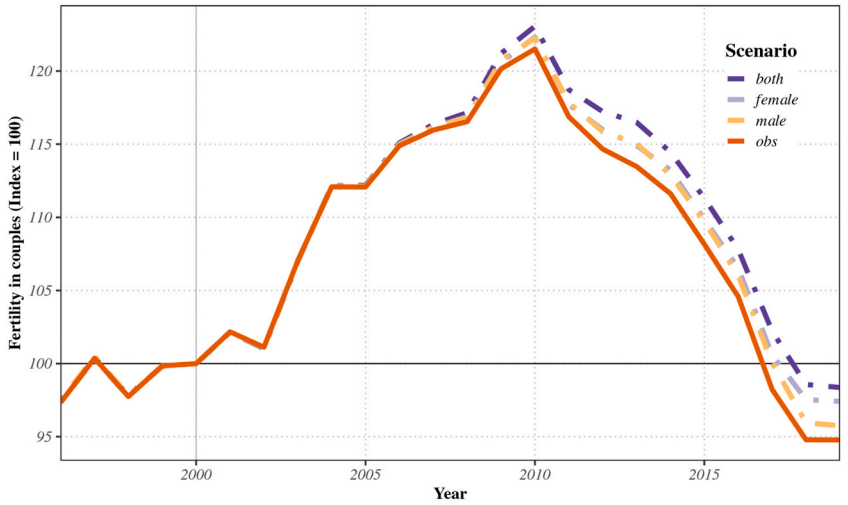

Fig. 5. Observed and counterfactual development of couple TFR1 in 1995-2019, with the 2000 value scaled to 100. The counterfactual simulation draws on age-specific and religiously specific couple first birth rates and the counterfactual couple composition, which holds the female share, the male share, or the overall couple composition with respect to religious affiliation constant from 2000 onward.

affiliated individuals.

4.3. Robustness checks

We performed several robustness checks to ensure the stability of the results and to better understand the underlying process. The findings of the discrete-time survival model were robust to changing the process time and including the regional tax rate as a control variable. The latter eliminates any bias from differential incentives to leave the church across regions. However, measuring religious affiliation as a time-constant characteristic from the beginning of the union does not show a positive interactive effect of religious affiliation on childbirth (see next paragraph and Table C.4).

We held the couple composition constant from the first observation of the couple to reduce reversed causality that may rise from some couples that join the church in anticipation of childbirth or marriage in order to be able to baptize a child or to have a church wedding. In this model specification, the interactive term is just below one, as opposed to a positive effect observed in the main results measuring religious affiliation as a time-varying characteristic. This discrepancy largely stemmed from heterogenous religiously affiliated couples, who seek to harmonize their affiliation before childbearing for the purpose of a church wedding.

Moreover, the self-reinforcing mechanism is tested with twin fixed effects. We use twin fixed effects models to account for selection in couple formation. Our analysis exploits discordant twins with respect to religiosity, examining the relationship between state church membership and the transition to first birth after five years of union formation. By comparing twin pairs who experience changes in religiosity, we can isolate the effect of religiosity while accounting for family background and inheritance of state church membership. This is important because state church membership is often inherited, which can lead to selection bias in group comparisons. The results suggest that being religiously affiliated is associated with a higher probability of having a child within five years of union formation (Tables C.8 and C.9). Specifically, the results indicate a positive association between joint religiosity and the transition to first birth, with a 1-5% increase in the probability of having a child within five years of union formation.

Finally, we ensure the robustness of our main findings by exploiting the regional variation in the progress of secularization in Finland using a panel data set that consists of 69 regions observed over the 1995-2020 period. We estimated several panel regression models (including region fixed effects and two-way fixed effects models) of the regional TFR on the change in the share of the religiously affiliated in the population in the year before. A reduction in the share of the affiliated is associated with a decline in the TFR in the year across the models that rule-out time-constant regional confounding (Table C.6). According to results from the first-difference model (Model 2), a decline of 10 percentage points in the share of the religiously affiliated is associated with a decline in the TFR of 0.28 children per women (CI: 0.15 and 0.42). Moreover, to evaluate our claim about the indirect effect, we changed the outcome to the TFR of the religiously affiliated population only (Table C.7). If there remains an effect, the reduction in the TFR is not solely related to the changing population composition, but also to changes in the fertility behavior of the religiously affiliated population, which aligns with the self-reinforcing effect. The effect of the changing population share persists even among the religiously affiliated only.

5. Discussion

This study examined the role of secularization, as indicated by the decline in state church membership, for the recent fertility decline in Finland. State church membership gradually declined between 1995 and 2019, with the decline accelerating after 2008, although it remained at high levels (76% in 2019). We showed that fertility levels remained significantly higher among state church members than among non-members throughout this period. Overall fertility would have been higher in 2019 if the proportion of church members had not declined. In our main analysis, which focused on couples, we demonstrated that the religious affiliations of both partners were associated with the transition to the first birth. This finding is especially significant, as the decline in first births among couples represents the primary driver of recent fertility declines (Hellstrand et al., 2020b). We conclude that the church membership decline is a relevant factor behind the recent fertility decline, but other factors played a role as well.

State church membership remains high in Finland, although it has declined since 1995, with an acceleration from 2005 onward. Inglehart (2021) and Hout and Fischer (2014) suggested similar accelerating trends in the United States based on survey results. We found that fertility was higher among the religiously affiliated (confirming Hypothesis 1), and that the gap to the unaffiliated widened over time from 0.3 in 1996 to 0.5 in 2019. The TFR of the affiliated fell from 1.9 in 1996 by only 0.3 points to 1.6 in 2019, while the TFR among the non-affiliated dropped respectively from 1.6 to 1.1. According to our counterfactual estimation, about five per cent of the overall TFR decline in 2000–2019 could be attributed to the declining share of religiously affiliated individuals in the population. However, this may underestimate the total impact of secularization, given that secularization makes religious individuals more likely to have a non-religious partner, which can lower their fertility (see Figure B.4 in the Appendix).

We found that the composition of couples had an impact on their childbearing that extended beyond the sum of the individual characteristics of the partners. This is consistent with the relational approach (Doepke and Kindermann, 2019; Hudde and Engelhardt, 2021; Rijken and Liefbroer, 2009; Vignoli et al., 2012). While previous couple-level studies have largely focused on the extent to which the influence of labor market attachment on childbearing is gendered, our study is novel in that it used a dyadic perspective to examine the influence of religion. Our findings highlight a relatively gender-neutral impact of religious orientation on childbearing in the Nordic context. Future research may also investigate gender differences in the strength of religiosity and the implication for fertility, as a study showed stronger religiosity among women and a weaker effect of religiosity on fertility intentions in the gender-equal contexts of Norway and Sweden (Bein et al., 2021). Additionally, we observed that religiously homogeneous couples had the highest probability of childbearing and even higher than the additive contribution of both partners (confirming Hypothesis 2). Yet, some caution is needed in interpreting this finding because the interactive term of partners' affiliations was sensitive to different model specifications, i.e. it

declined in the model using the couple's religious composition as a time-constant measure.

Our study proposes that religious affiliation continues to exert a significant influence on fertility levels and trends (confirming Hypothesis 3). Specifically, we showed that the diminishing proportion of church members was associated with the overall decline in fertility in Finland. Moreover, our results suggest that secularization may have had a self-reinforcing non-linear negative effect on fertility. This occurs through the changing composition of couples and the higher likelihood of childbearing of religiously homogamous as compared to religiously mixed couples. Couples in which the partners have different religious orientations may generally differ in their life values and preferences for having children, which may lead to unrealized fertility desires for one of the partners. While existing research has predominantly focused on the individual effects of religious affiliation (Frejka and Westoff, 2008; C. Goldscheider and Uhlenberg, 1969; McQuillan, 2004; Skirbekk, 2022; Westoff and Frejka, 2007; Zhang, 2008), our unique dyadic perspective provides novel insights. This approach helps us to better understand the recent decline in fertility in Finland, and potentially sheds light on similar trends in the United States and other high-income countries. Regardless, the relationship between secularization and fertility is complex, there might be a common antecedent factor or it may even go both ways (Voas, 2022), such that fertility decline may also accelerate secularization (Jenkins, 2020; Voas, 2023).

While our findings highlight the impact of secularization – an aspect of ideational and cultural change – on the declining fertility rates in Finland, other factors have likely contributed to this trend too. Various alternative explanations for the recent fertility declines merit consideration, including the influences of more negative economic outlooks (Hellstrand et al., 2024; Vignoli et al., 2020) and broader global uncertainty (Comolli et al., 2021), weakened preferences for having children (Golovina et al., 2023; Kearney et al., 2022), as well as increased union instability (Lesthaeghe, 2020; Rahnu and Jalovaara, 2023). Further research is needed to assess the relative importance of these and possible other factors for the fertility declines in Finland and beyond.

5.1. Limitations and strengths

We inferred religious affiliation from state church membership as measured by the payment of state-church taxes. This approach has both limitations and strengths. First, measurement error may occur as individuals may or may not pay taxes for reasons other than their religious beliefs, such as thriftiness or civic engagement. Second, the use of state church tax payments somewhat restricts the generalizability of the results, as it necessitated the exclusion of migrants (2.8%) from the study sample. Third, the indirect measure of religiosity is conceptually simplistic, capturing only religious affiliation and no other dimensions of religiosity, such as strength of beliefs, religious practices, and membership in a like-minded community. This weakness might be relevant for the gendered impact of religiosity on fertility, as a study has shown a weakened association between religiosity strength and fertility intention in gender-equal contexts among men (Bein et al., 2021). Fourth, a strength is that the financial component of state church taxes links the membership to costs, which incentivizes individuals to leave the church when they have lost their faith. Compared to surveys on religiosity, our measure is also less affected by social desirability, by misreporting (e.g., recall bias), or by non-response and attrition. Finally, the longitudinal character of the register data allowed us to conduct analyses that considered the timing of events. A unique strength is our ability to follow co-residential couples not limited to marriages, and to measure both partners' religious affiliation.

CRediT authorship contribution statement

Henrik-Alexander Schubert: Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Vegard Skirbekk:** Writing – review & editing, Visualization, Investigation, Conceptualization. **Jessica Nisén:** Writing – review & editing, Writing – original draft, Visualization, Supervision, Project administration, Methodology, Data curation, Conceptualization.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ssresearch.2026.103371.

Data availability

The Finnish administrative register data used in this analysis were obtained from Statistics Finland under special contractual arrangements, permission TK-53-1119-17. These data are not available from the authors. Persons interested in obtaining the data should contact Statistics Finland at tutkijapalvelut@stat.fi. The code is available under https://osf.io/m6ydt/overview?view_only=b0d48477bdd2426abed9f9c26475766d.

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