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The Cultural Origins of the Demographic Transition in France

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Abstract

This research shows that secularization accounts for the remarkably early fertility decline in France. The demographic transition, a turning point in history and an essential condition for development, first took hold in France, before the French Revolution and more than a century earlier than in any other country. Why it happened so early is one of the ‘big questions of history’ because it challenges traditional explanations and because of data limitations. Using a novel dataset crowdsourced from publicly available genealogies, I comprehensively document, for the first time, the decline in fertility and its timing with a representative sample of the population. Then, drawing on a wide range of sources and data, I document an important process of secularization in the eighteenth century and find a strong and robust association with the timing of the transition across regions and individuals. Finally, I discuss the persistent impact of the transition on economic growth and explore the drivers of secularization.

JEL codes: N33, O10, Z12

Keywords: fertility, development, secularization

And the race of man cannot, by any efforts of reason, escape from it.

—Thomas Malthus, *An Essay on the Principle of Population* (1798)

1 INTRODUCTION

The demographic transition is a watershed moment in the process of development. Before the transition, and for most of human history, the world was trapped into stagnation. During the nineteenth century, the course of history underwent sweeping transformations with unprecedented technological progress and mass education. Yet, it was the fertility decline during the demographic transition that triggered a dramatic leap away from stagnation

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and towards sustained economic growth, by allowing standards of living to raise above subsistence. The decline in fertility is traditionally attributed to technological advancements and the accumulation of human capital. However, important cultural upheavals also took hold during this period. Did cultural factors play a role in the transition?

This paper uses the earliest fertility transition in history as an experiment to answer this question.¹ The demographic transition began in France, in the eighteenth century, more than a hundred years earlier than in any other country. And yet, in many ways, France was a poor country at the time. Why the historical fertility transition started there first, before the French Revolution and more than a century before the rest of the world, remains a mystery. This event has challenged traditional explanations and the absence of comprehensive data or modern censuses during the transition, until now, has impeded a better understanding of its characteristics and underlying factors. In fact, Darnton (1978) argues that it is one of “the big questions of history” (p. 132), while, according to Sauvy (1962), it is “the most important fact of all her [France] entire history” (p. 13).

Because of the lack of data, the timing of the French fertility decline is still not fully understood. Using a novel crowdsourced genealogical dataset from online family trees on geni.com, I comprehensively document, for the first time, the fertility decline with a representative sample of the population at the time. I show that the transition took hold around 1760, earlier than previously thought. The underlying data spans centuries and contains millions of individuals. Using these lineages, I reconstruct a measure of fertility from the horizontal branches of family trees and merge the data with time-varying municipality-level data on urbanization. To evaluate the degree of selection, I compare the geni data to census data, which is only available in the nineteenth century, and to a wide range of available representative sources or estimates; and show that the genealogies are a representative sample of the population and provide the best available account of the decline in fertility.

Then, I hypothesize that secularization, with the diminished sway of the Catholic Church, brought about the exceptionally early demographic transition in France.

Using a variety of historical sources, including data on the language used in the opening statements of wills, I first document an important process of secularization that occurred at the same time in France. The loss of influence of the Church has been discussed by various authors. According to Tackett (1986), secular beliefs spread “in a veritable flood” (p. 252); de Tocqueville (1856) writes that “irreligion was able to become a general and dominant passion in eighteenth-century France” (Book 3, Chapter 2); and historian Braudel (1986) evokes “the liberation of Frenchmen from the teachings, the restrictions, and the yoke of the Catholic Church”. At the aggregate-level, the data suggests that such a loosening of traditional religious moral constraints had a profound impact on the early decline in fertility. As the Church lost influence, the clergy could not oppose fertility controls anymore. Indeed, according to Noonan (1965), the Catholic Church’s views on marriage evolved at the time of the Counter Reformation, in the face of competition, towards ‘be fruitful and multiply’.

To further establish this, I study the determinants of the transition across *départements*,

¹Throughout the paper, I interchangeably use the terms ‘fertility transition’ and ‘demographic transition’.

using population counts from census data available after the transition, and across individuals, using the crowdsourced genealogical data. I document a large and robust association between the timing of the fertility decline and secularization, captured by the presence of refractory clergy in 1791 (Squicciarini, 2020; Tackett, 1986). The Civil Constitution of the Clergy required all clergy to take an oath of allegiance to the secular revolutionary state and made them civil servants. The presence of refractory clergy captures the process of secularization and is highly correlated with subsequent, more direct measures of the importance of religion in people’s lives, e.g. easter attendance, which is only available in 1966.

Across *départements*, I estimate a strong and robust positive association between the presence of refractory clergy and the timing of the transition using census data available from 1831 to 1961. The regions that secularized experienced a decline in fertility more than a century earlier than those that did not—no other variable has an impact nearly as important. The difference between Provence, a stronghold of secularization, and Brittany, a bastion of Catholicism, is as large as the difference between France and England.

Additionally, I study the heterogeneous effects of the refractory clergy and find that cultural and economic factors played complementary roles. The correlation between secularization and the decline in fertility is larger in more densely populated places, suggesting that the relaxation of moral and social constraints allowed individuals to reach their desired level of fertility—which was lower in more developed regions. I also perform a large number of robustness checks across alternative specifications (including variable selection methods) and account for omitted variables and spatial dependence to show that secularization was the main driving force behind the early decline in fertility.

Drawing on the genealogical data, I find similar results at the individual level. Those born in places with refractory clergy had more children. The effect is large, statistically significant, and robust across specifications and methods. Then, using distribution regressions that estimate the relationship between the cumulative distribution function of fertility and the presence of refractory clergy across all fertility levels, I show that large families likely experienced the largest decline in fertility as secularization took place.

To account for unobserved institutional factors, I rely on a range of empirical strategies applied to this context for the first time. First, I compare individuals born in the same *département* and decade with *département*-by-decade fixed effects to account for time-varying *département*-level institutional unobservables. Second, I compare the coefficient on the refractory clergy before and after the onset of the decline in fertility. I find that the presence of refractory clergy was positively associated with fertility after 1760 but had a null and insignificant effect before. Third, I study second-generation migrants at the time of the decline. I trace historical migrations in the genealogies and compare individuals born in the same district whose parents were born in different districts. I find that the presence of refractory clergy in the district of origin of the parents had a large effect on fertility, which persisted for generations and through migrations.

My findings suggest a causal interpretation. Additionally, they do not imply that institutions and institutional change did not play a role, but rather that, if they did, it was only

through their influence on the process of secularization.

Finally, I explore the persistent impact of the transition on economic growth, at the aggregate level, as well as the roots of secularization. I provide suggestive evidence that the loss of influence of the Catholic Church resulted from a backlash against elites, in particular against religious authorities holding a monopoly on faith and close ties with an absolutist, divine-right monarchy which granted a monopoly to the Counter Reformation centuries before.

This paper makes several contributions. First, I identify the cultural origins of the demographic transition in France and provide evidence that dechristianization and the waning influence of the Catholic Church account for the early transition. Second, I contribute to a literature on the drivers of the transition from stagnation to growth (Galor, 2011, 2022). Third, I contribute to an emerging literature on the role of cultural factors in historical fertility transitions (Beach and Hanlon, 2022; Spolaore and Wacziarg, 2022). Fourth, I contribute to a literature that has documented the cultural and religious origins of the transition to sustained growth (Mokyr, 2016; Squicciarini, 2020), but I empirically establish that cultural change, not persistence, is a determinant of development. Last but not least, I contribute to an emerging literature using genealogies to study individuals in the past in periods without censuses (Galor and Klemp, 2019; Kaplanis et al., 2018). However, I am the first to exploit crowdsourced genealogical data to study fertility.

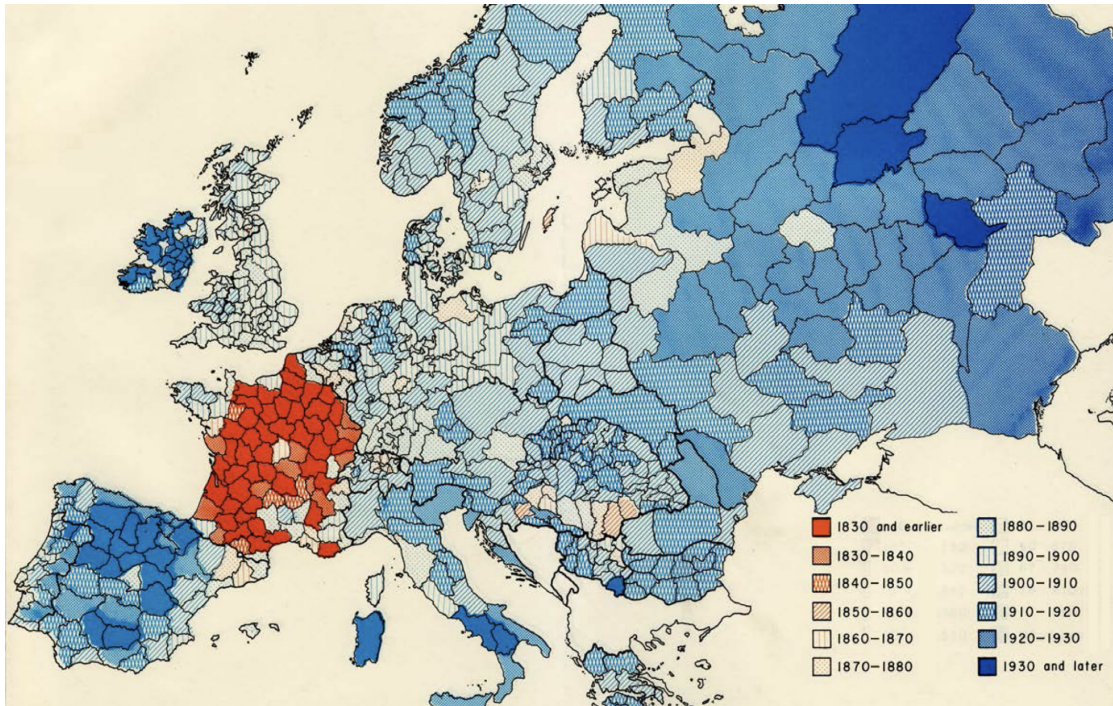
2 HISTORICAL BACKGROUND AND LITERATURE

2.1 The transition from stagnation to growth

Conceptual considerations. Throughout the vast majority of human history, life on earth was *nasty, brutish, and short*, dominated by starvation, poverty, wars, and pandemics. Although occasional innovations emerged, they translated into larger populations rather than improvements in living conditions. For that reason, Malthus (1798) believed that humanity was condemned to enduring stagnation. He was wrong because larger population generated more innovations and selected for traits that were complementary to the process of development, creating a positive feedback loop between technology, population, and education (Galor, 2011, 2022; Galor and Weil, 2000; Galor and Moav, 2002). Galor (2022) argues that these undercurrents “operated relentlessly, if invisibly, throughout the course of human history, and its long economic ice age, gathering pace until, at last, technological advancements in the course of the Industrial Revolution accelerated beyond a tipping point, where rudimentary education became essential for the ability of individuals to adapt to the changing technological environment. Fertility rates started to decline and the growth in living standards was liberated from the counterbalancing effects of population growth, ushering in long-term prosperity that continues to soar in the present day” (p. 6). In a nutshell, education and development are the best contraceptives. After fertility declined, standards of livings were eventually allowed to rise above subsistence in a sustained way, leading to the great enrichment as displayed in Appendix Figure A2.

Figure 1: Timing of the decline in fertility (using modern census data)

Note: This figure displays estimated dates of a sustained decline – defined as a 10 percent decline – in marital fertility across regions of Europe (Coale and Watkins, 1986).



Historical fertility transition. The decline in fertility took hold in France first, a century before the rest of Europe, in an epoch of stagnation and before the French Revolution. Figure 1 displays the estimated timing of the onset of the decline across European regions using modern census data, available after the 1830s, from Coale and Watkins (1986). Because of the lack of comprehensive data, even the timing of the decline is uncertain. Section 3 discusses this, including the existing data, in greater depth. In the eighteenth century, France lagged one to two centuries behind England, the cradle of the Industrial Revolution. In 1750, literacy in France was half that of England and Wales. France only attained in 1850 the GDP per capita enjoyed by England and Wales in 1750, and it took more than two centuries to achieve the rate of urbanization of 1750 England. And as in the rest of Europe, child mortality was high until the mid-nineteenth century, with about half of children dying before they reached five.²

Did fertility decline because of economic or cultural factors, or because of their interaction?³ In recent research, Spolaore and Wacziarg (2022) provide a fascinating evaluation of the gradual dissemination of the historical fertility transition along cultural and linguistic lines

²Weber (1976) even famously depicted the French as “peasants” and “savages”, while Crouzet (2003) notes that “France remained fundamentally a peasant-based rural economy” (p. 236).

³Coale (1973); Coale and Watkins (1986) argue that three preconditions, reflecting both economic and cultural factors, are necessary: “the acceptance of calculated choice as a valid element in marital fertility, the perception of advantages from reduced fertility, and knowledge and mastery of effective techniques of control” (Coale, 1973, p. 69) in other words *readiness, willingness, and ability*.

from French-speaking regions to other parts of Europe.⁴ Similarly, Beach and Hanlon (2022) provide particularly compelling empirical evidence showcasing changing norms of fertility in England and in English-speaking countries following the Bradlaugh-Besant trial of 1877. A large literature has also studied the historical fertility transition in France, in case studies at the village level, since at least the 1970s.⁵ More recently, Gay, Gobbi and Goñi (2023) provide strong empirical evidence that revolutionary changes in inheritance rules played an important role in sustaining the fertility decline, although it could not have started it, since fertility declined before the French Revolution.

2.2 Contraception and the Catholic Church

Some historical background on the Catholic Church in France. Throughout medieval times, France has been depicted as “the eldest daughter of the Roman Catholic Church,” with its kings holding the title “Rex Christianissimus” or ‘most Christian king’, and its people referred to as “God’s chosen people” (Burleigh, 2005, p. 23). France even hosted seven successive popes in the city of Avignon from 1309 to 1378, further solidifying its close association with the Catholic Church. During the Renaissance, after the reign of Francis I, Protestantism only marginally spread, reaching an estimated 10 percent of the population in the mid-sixteenth century (most of these Huguenots).

In the second half of the sixteenth century, after the Council of Trent initiated the Counter Reformation, French Catholics and Protestants fought a series of civil wars, the French Wars of Religion, culminating with the massacre of thousands of Protestants on Saint Bartholomew’s Day in 1572. In 1593, after fighting against the Catholic League of France, or Holy League, an organization whose aim was to eradicate Protestants from France, Henry IV renounced Protestantism to gain access to the throne and, for the second time, was forced to convert to Catholicism. The promulgation of the Edict of Nantes in 1598 temporarily ended the French Wars of Religion by granting French Protestants substantial rights and freedom of religion but the Counter Reformation remained particularly strong and France overwhelmingly Catholic (Chartier, 1991; Van Kley, 1996). In 1685, Louis XIV revoked the Edict of Nantes with the Edict of Fontainebleau, effectively ending religious toleration. The edict deprived Protestants of all religious and civil liberties and ordered the destruction of Protestant churches as well as policies of persecution and forced conversion.

The Catholic Church’s monopoly gave room to the unchallenged diffusion and consolidation of the Counter Reform, spearheaded by the Jesuits as was the case worldwide, while France witnessed the emergence of Jansenism, a rigorist Catholic movement with Protestant influ-

⁴Similarly, Daudin, Franck and Rapoport (2018) study the diffusion of norms of limited fertility along cultural lines by looking at migrations, while Delventhal, Fernández-Villaverde and Guner (2019) document a temporal decline in the speed of fertility transitions.

⁵Especially following the seminal work of Louis Henry, whose contributions will be elaborated upon in Section 3.1. See Blanc and Wacziarg (2020); Cummins (2012); Knodel and Van de Walle (1979); Weir (1984, 1994); Wrigley (1985a,b). More recent research has weighed the relative importance of economic and cultural forces across regions (see de la Croix and Perrin, 2018; Murphy, 2015; Perrin, 2021). Murphy (2015) argues that the French Revolution was one of many causes of the decline. He examines the cross-sectional determinants of fertility in France and devotes a couple of paragraphs to the effect of the oath across *départements* in 1831. Similarly, González-Bailón and Murphy (2013) study the role of social interactions on fertility following the Revolution.

ences that came from Louvain in 1640. Advocating predestination, limited sacraments, and penitence, Jansenists appealed to the masses by translating the Bible into French, against the Council of Trent's interdiction, challenging the Catholic elites, the Jesuits, and embracing Gallicanism, a movement promoting the separation of the Church of France from the authority of the pope and a divine-right monarchy (Maire, 1998, 2019).

Jansenists faced strong opposition from political and religious elites, with the demolition of the Abbey of Port Royal des Champs, the center of Jansenism in France, in 1709 and the condemnation of 101 Jansenist views in the *Unigenitus* papal bull in 1713, which came into law in 1730. This triggered fierce religious conflicts, with Jesuit bishops and high clergy often denying sacraments and burial in consecrated ground to those who did not provide a proof of submission to the papal bull, *billets de confession*, and local political conflicts, where parliaments, in particular that of Paris, and the low clergy sided with Jansenists against the monarchy and the Jesuits (Friedrich, 2022; Perez, 1999; Van Kley, 1975).

Contraception. How could the French population lower fertility if modern methods of contraception only became widely available well after the onset of the fertility decline?

Early condoms, made of linen or animal intestines and known as *redingotes d'Angleterre* ('English riding coats'), were expensive and not very common, although Casanova reported resorting systematically to them. In the eighteenth-century, the enlightened elites and bourgeoisie of France practiced libertinage, *les plaisirs de la petite oie* ('pleasures of the little goose', to refer to mutual masturbation, see Van de Walle and Muhsam (1995)), and other pleasures alike. The libertine literature was particularly widespread in France (Darnton, 1991), with works such as *Venus in the Cloister or The Nun in her Smock* (1683), *The Indiscreet Jewels* (1748) by Diderot, or *Philosophy in the Bedroom* (1775) by the Marquis de Sade. Other methods, such as chastity, delayed marriage, sodomy, abortion, or infanticide, are not particularly relevant and were not widely known (Van de Walle, 2005).

In contrast to these methods, natural means of contraception, and in particular *coitus interruptus* (withdrawal), have long been known (Himes, 1936). *Coitus interruptus* is mentioned in the Bible (Sin of Onan), but also in "the Talmud and the Muslim tradition" (Van de Walle, 2005). In the eighteenth century, it was "frequently alluded to in libertine literature" (p. 2). In France, referring to it, Jean-Baptiste Moheau (1778) famously argued, in 1778, that "already the fatal secrets *unknown to any animal but man* have penetrated in the countryside: *nature gets cheated* even in the villages," while Goudar (1756) wrote that "It is the same love of ease and convenience that is filling France with bachelors ... men who vanish from the world with all their posterity" (p. 271).

The views of the Catholic Church on contraception. The Catholic Church's position on contraception and sex gradually evolved. The Bible urges, multiple times, the faithful to "be fruitful and multiply and fill the earth" (Genesis 9:1), and the account of the sin of Onan designates both masturbation and unnatural intercourse, including *coitus interruptus*, as evil. However, although "fruitfulness is a divine reward" (Noonan, 1965, p. 31), the pronouncements of the church against contraception were often discrete and indirect (Noonan,

1965). In fact, the sexual morality promoted by the Catholic Church long faced a dilemma between the multiplicative purpose of marriage and the sinful nature of ‘things of the flesh’. Yet, Noonan (1965) argues that “the value placed on human fecundity in the Old Testament as a whole is evident . . . fruitfulness is a divine reward” (p. 31).

In 1439, the multiplicative purpose of marriage “received its strongest official approval” (Noonan, 1965, p. 276) in the *Exultate Deo* papal bull: “Through matrimony [the church] is corporally increased.” After the Council of Trent (1545–63), with the Counter Reformation, the views of the Catholic Church permanently shifted to an increased sacramentality of marriage (Noonan, 1965).⁶ Fourier (1822) argues that “religious dogmas, more severe than in antiquity, forbid the husband certain precautions that prudence dictates: *Interdictio semen effundendi extra vas debitum*” (p.405).

There is mounting evidence that, in the eighteenth century, the clergy understood marriage and sex to be acts of procreation instead of pleasure. According to Van de Walle and Muhsam (1995), “The orthodox position available to French literati in the late sixteenth century [was that] it is considered sinful in marriage to ejaculate outside of the natural receptacle (*ex vas naturale*), and only somewhat less sinful to use ‘unnatural positions’” (p. 269). Not only was *coitus interruptus* sinful, but the purpose of marriage became explicitly multiplicative. In the seventeenth century, notorious clergy members such as Francis de Sales and Pierre de Bourdeilles referred to withdrawal and other contraceptive methods and argued that ‘*marital fertility should not be interfered with*’ (Van de Walle and Muhsam, 1995). For example, in *Les Dames galantes*, published in 1666, “Brantôme concludes that the belief that marriage is instituted for pleasure is wrong and that the greatest blessing God can send in marriage is ‘a good lineage’” (Van de Walle and Muhsam, 1995, p. 269).⁷

3 USING CROWDSOURCED GENEALOGICAL DATA TO DOCUMENT THE FERTILITY DECLINE

3.1 Existing historical data

Modern censuses and aggregate statistics from parish records. The timing of the demographic transition in France remains uncertain because there is no representative data available so long ago; which in turn has hampered efforts to understand its origins. The most representative and reliable sources, modern censuses and the extraction of aggregate statistics from parish records, are not available in most countries until the nineteenth century. In France, the first modern census was only conducted in 1851 (Brambor et al., 2020).⁸

Using population counts from censuses, the Princeton European Fertility Project (Coale and

⁶And more sexual austerity outside of it. Hoffman (1984) argues that “evidence of the new sexual morality appears throughout the Counter Reformation: bans upon nudity in religious art, harsher rules against illegitimacy, prostitution, and concubinage, and more ‘puritanical’ standards of dress and behavior.”

⁷In the early eighteenth century, the sacramentality of marriage was also increasingly criticized by the lay population—especially following the Edict of 1715 forbidding Protestants from marrying and after the controversy of the *billets de confessions* in the 1750s when the Church denied sacraments and burial in consecrated ground to Jansenists (Maire, 2019).

⁸See Appendix Figure A1, which plots data on the timing of adoption of the modern census across countries.

Watkins, 1986) reconstructed series of marital fertility in Europe after the 1830s, long after the onset of the demographic transition in France. Their index of marital fertility I_g measures the fertility of a population relative to the maximum that it might experience without any form of limitation—using the fertility of the Hutterites, an Anabaptist sect without controls—and given a particular age structure.⁹ Because the data relies on modern censuses, Coale and Watkins (1986) only date the onset of the fertility decline to “1830 and earlier”, as displayed in Figure 1.¹⁰

Using their extraction of aggregate statistics of births and marriages, by age, from vital records in more than 400 parishes, Wrigley and Schofield (1981) reconstructed series of total fertility in England as early as in the sixteenth century, which would not have been possible with censuses. Their series provides the best available account of the evolution of fertility over time in a pre-transition society, and captures fertility in both rural and urban places. Unfortunately, such data is not available in France.¹¹ Figure 3, Panel D, displays the time series of the total fertility rate in England throughout the eighteenth and nineteenth centuries using the data provided by Wrigley and Schofield (1981). The series correlate remarkably well with the marital fertility index measured using census data.

Parish records and family reconstitutions. If there is no representative data available at the time, how can we know that fertility declined in France a century before it did everywhere else, in the second half of the eighteenth century and before the Revolution?

Only case studies are available in France, using complete family reconstitution from parish records, the only reliable source of fertility data in the eighteenth century, pioneered by Louis Henry in France (Henry, 1972*a,b*, 1978; Henry and Houdaille, 1973; Houdaille, 1976) and Tony Wrigley in England (Wrigley et al., 1997). Demographers searched through handwritten records of baptism, marriage, and death, which “life consists only of” (Wrigley et al., 1997, p. 12), to study the populations of selected small, rural villages, reconstituting the entire life histories of their inhabitants.

However, there are important issues with these studies (see Alter, 2019; Ruggles, 1999; Schofield, 1972; Séguy, 2001, among others). The efforts required to undertake such data collection are indeed colossal. Henry and Wrigley could only select a handful of small villages, resulting in limited spatial variation, potential issues of representativeness, and migrations being unaccounted for. Additionally, to reconstruct fertility patterns in family reconstitutions, researcher need comprehensive knowledge of horizontal lineages, encompassing all births from

⁹The index is constructed as follows: $(I_g)_i = B_i^m / (\sum_j M_{ij} G_j)$, where B_i^m is the total number of children born to married women in society i , M_{ij} the number of married women in age cohort j , and G_j the rate of fertility of Hutterites for age cohort j .

¹⁰Figure 3, Panels C and D, display the time series of marital fertility in France and in England after 1851 using the data provided by Coale and Watkins (1986). Note that data is available for most regions of France until 1831, with the exception of Paris.

¹¹The aggregate nature of the data renders the process of collection relatively easy in a country such as England, which has a relatively small number of parishes. However, such a representative reconstruction is virtually impossible in France, which contains more than 36,000 municipalities. Blayo (1975*b*); Fleury and Henry (1958) attempted to reconstruct the population of France before 1830 using a survey of about 400 municipalities. However, these were mostly rural municipalities, and they did not attempt to reconstruct marital status, which is essential to measure fertility. Weir (1994) makes a number of assumptions to reconstruct series of fertility using this data. Using econometric analysis to test for structural break in these series, Cummins (2009, 2012) date the onset of the decline in fertility to 1776.

specific parents. However, there are limited clues regarding where and when to find the different records containing this information. Furthermore, historical records often lacked essential details, because of changing names, incomplete or missing age and date of birth, and rounded dates. As a consequence, substantial efforts were necessary to cross-check and validate each piece of information. Last but not least, other challenges that emerged from the quality of early registers are the issues of poor handwriting and dubious reliability. As a result, while family reconstitutions allowed the measurement of fertility in periods without census data, careful interpretation is crucial.

Figure 3, Panels C and D, plot the total fertility rates estimated using the family reconstitutions data of Henry in France and Wrigley in England, based on 40 parishes in France and 26 in England. In both cases, the data suggests a poor correlation in levels with available representative sources. Nevertheless, it is noteworthy that the onset of the fertility decline in France appears to have occurred during the 1770s using this data, approximately aligning with the estimation of Cummins (2009, 2012), who dated it to 1776.

3.2 Crowdsourced genealogical data

The data. To alleviate those issues and comprehensively document the fertility decline, I use a novel individual-level dataset crowdsourced from publicly available genealogies on geni.com. The underlying data, the familinx dataset, was scraped by Kaplanis et al. (2018) from all public profiles on the genealogical website and contains a total of 86 million individuals with direct intergenerational links. Approximately one-fifth were placed into latitude-longitude coordinates, with less than 10 million observed in Europe at some point after 1400. Among these, 370,242 were born, had their first child, or passed away in France.

This data relies on the work of descendants reconstituting their family tree by searching through the same parish records as the ones used by demographers. In France, those records are scanned and available online with unrestricted access from the mid-seventeenth century onward. For example, in the village of Saint-Germain-d'Anxure, they are publicly available starting 1629.¹² Figure 2, Panel A, shows such a record, the baptism of Michel Rousseau on June 12, 1776. His descendants reconstituted their family tree, found this record, and created a profile for Michel Rousseau. Not only they found his baptism record, but also those of his five siblings, Jeanne, Jean, Françoise, Julienne, and Françoise, all born between 1772 and 1788, and associated them to the father Jean Rousseau, whose profile on geni is displayed in Panel B. Panel C shows the observation for Jean Rousseau in the dataset used in this paper, including information about how many children his parents had.

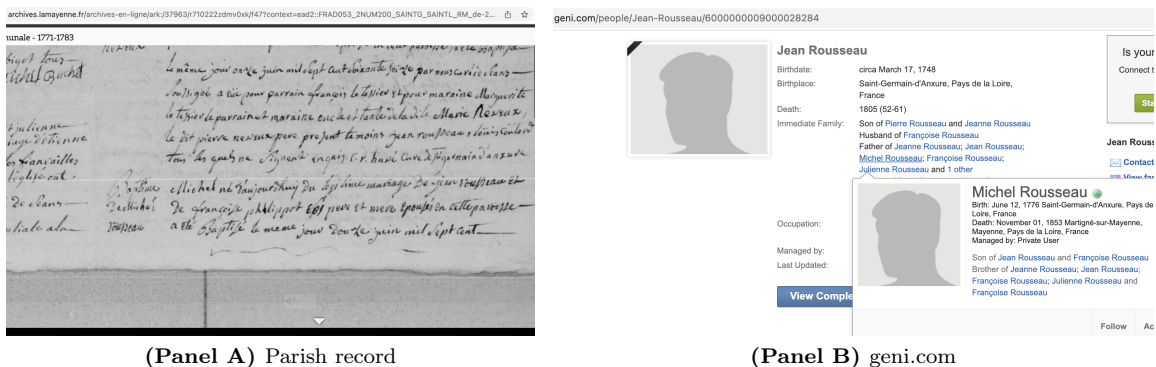
Using the geni.com data, I clean and improve the geocoding of observations and augment the data with information on the urban status of municipalities at the time; construct estimates of fertility by tracing the horizontal lineages in the genealogies; and evaluate selection into the sample by comparing the data to the best available representative data.

I provide a comprehensive and detailed account of each step below. First, to improve

¹²See archives.lamayenne.fr/archives-en-ligne/ark:/37963/r710211zmqbftk/fl.

Figure 2: From parish records to crowdsourced genealogical data

Note: This Figure displays the birth record of Michel Rousseau on June 12, 1776 (Panel A), the page of Jean Rousseau, Michel's father on geni.com (Panel A), and the observation for Jean Rousseau in the main dataset used in this paper (Panel C). Panel A is a screenshot from archives.lamayenne.fr/archives-en-ligne/ark:/37963/r710222zdmv0xk/f47 while Panel B is a screenshot from geni.com/people/Jean-Rousseau/600000009000028284.



Data Editor (Browse) — europe.dta

| id | birth_... | birth_id | birth_date | fert | parent1_id | parent1_birt... | parent2_id | parent2... | fert_par... | |
|---------|-----------|----------|------------|--------|------------|-----------------|------------|------------|-------------|---|
| 1714877 | 36078029 | France | FR_53222 | 1748m3 | 6 | 505404 | 1714m2 | 85554389 | . | 8 |

(Panel C) Data

the geocoding, I merge together different coordinates associated with each location and link them to coordinates of 2016 local administrative units (municipalities) and NUTS statistical regions (*départements* and regions). Then, I merge the data with time-varying estimates of the urbanization of municipalities from Bairoch, Batou and Chèvre (1988) to capture rural-urban differences, account for migrations, and evaluate sample selection.

A caveat is that, almost by definition, family trees predominantly contain vertical lineages, with direct ancestors, rather than horizontal branches, with indirect ancestors (cousins, grand-cousins, etc). Appendix Figure A3 shows such a tree. Because accurately measuring fertility requires counting siblings, found in horizontal lineages, I define the sample with a recorded horizontal lineage as the *fertility sample*, by retaining observations for which at least one parent in any of the four preceding generations is recorded as having more than one child. Throughout the paper, I focus on the 31, 553 individuals in the fertility sample, approximately 10 percent of the main sample. This approach is being adopted and discussed in subsequent papers (see Blanc, 2023; Gay, Gobbi and Goñi, 2023; Omenti, 2023).

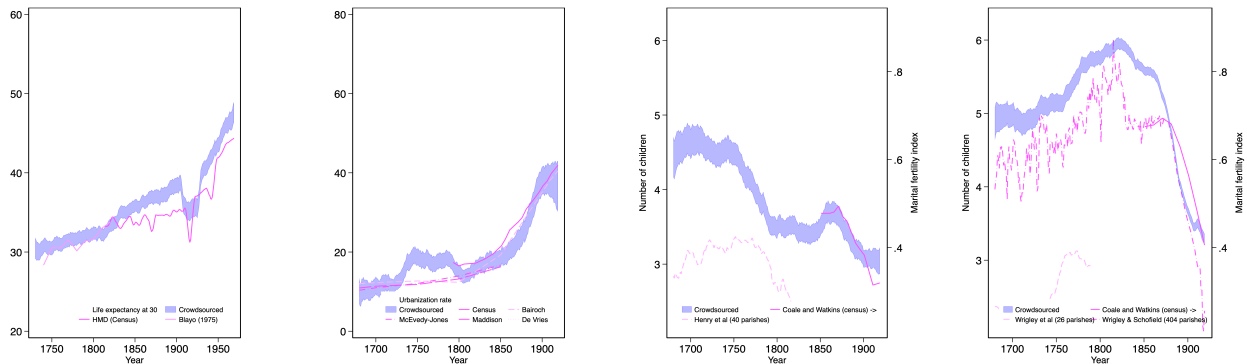
Evaluating selection into the sample. To assess the reliability of the genealogical data and the degree of selection in the fertility sample, I compare the genealogies to the best available representative sources and show that the data is a representative sample of the overall population in the eighteenth and nineteenth centuries. Kaplanis et al. (2018) also find a high correlation with representative data, but only look at longevity, at a much more aggregated level, worldwide, after 1840. I systematically leverage a particularly wide range of representative sources, which I describe below.

For longevity, I collect data on adult life expectancy from the Human Mortality Database (HMD, 2019), which is mostly based on censuses and is available from 1816 to 2017; and from Blayo (1975a,b), which is available from 1740 to 1829.

For urbanization, I collect estimates of the share of the population who lived in municipalities of more than 5,000 inhabitants from population counts (BDCassini, 2017), which are available from 1793 to 1999; and from a diverse array of sources. First, using rates of urbanization constructed by Paul Bairoch and co-authors from estimates of urban population of Bairoch, Batou and Chèvre (1988) and unknown estimates of total population. This data is available from 1500 to 1800 (Bairoch, Batou and Chèvre, 1988, Table B5, p. 259), 1800 to 1910 (Bairoch and Goertz, 1986, Table 3, p. 288), and 1800 to 1980 (Bairoch, 1988, Table 13.4, p. 221). Estimates for a given year sometimes vary widely across different papers. I rely on the average estimate. Second, by combining estimates of urban population of Bairoch, Batou and Chèvre (1988) and estimates of total population of Bolt and van Zanden (2014); Ridolfi (2016). This data is available from 1500 to 1850. Third, using rates of urbanization constructed by Acemoglu, Johnson and Robinson (2005) from estimates of urban population of Bairoch, Batou and Chèvre (1988) and estimates of total population of McEvedy and Jones (1978). This data is available from 1500 to 1850. Finally, using rates of urbanization constructed by de Vries (1984) from estimates of urban population of de Vries (1984) using a 10,000 inhabitants threshold and (unknown) various estimates of total population. This data is available from 1500 to 1850.

Figure 3: Is geni.com a biased sample?

Note: This figure displays longevity, urbanization, and fertility series over time in the fertility sample of the crowdsourced genealogies in France (and England for fertility) and in representative data. Longevity is defined as the average age at death minus 30 years for individuals who died aged 30 years or older in a given year (in the genealogies), or as the life expectancy at 30 in a given year (in representative data). Urbanization is defined as the share of the population born in a given year in a town coded as urban at the time of their birth (in the genealogies), or as the share of the population living in an urban town in a given year (in representative data). Fertility is defined as the average number of children born to individuals who had their first child in a given year (in the genealogies), or as the marital fertility index in a given year (in representative data). Further information on the representative data is provided in the accompanying text.



(Panel A) Longevity in France **(Panel B)** Urbanization in France **(Panel C)** Fertility in France **(Panel D)** Fertility in England

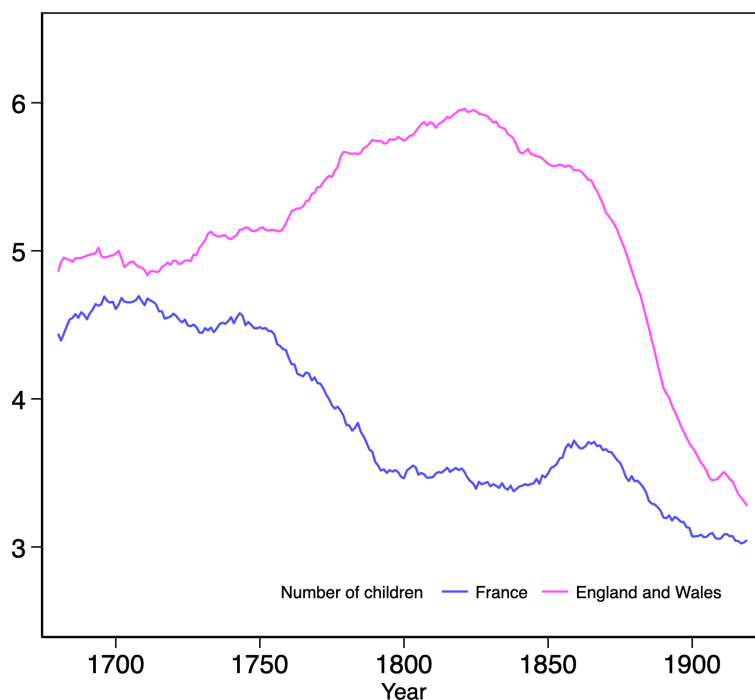
For fertility, I collect the data mentioned in the previous sub-section, on marital fertility from census data (Coale and Watkins, 1986), which is available from 1851 to 1961 in France and in England; on total fertility from the aggregative extractions of vital statistics of Wrigley

and Schofield (1981), which are available from 1541 to 2015 in England; and on total fertility from the family reconstitutions of Henry in France and Wrigley in England, which are available from 1670 to 1819 and 1580 to 1837, respectively.

Figure 3 presents these series and compares them to the genealogies. There are only limited differences and the correlation between the genealogical data and representative series is well above 90 percent, suggesting that selection is limited.¹³ For the study of fertility, the genealogies are particularly consistent with censuses when available and, in England, superimpose almost perfectly with the representative series in the eighteenth century—which are not available in France. In subsequent research, Blanc (2023) systematically extends and standardizes this comparison to thirty European countries and finds similar results. The results suggest that the data is a representative sample of the overall population, allowing to comprehensively document the fertility decline.

Figure 4: The historical fertility transition in France and in England

Note: This figure displays the gross rate of fertility for France and for England and Wales over time using the geni data.



Using crowdsourced genealogical data, I establish that the decline took hold around 1760. Figure 4 plots the number of children per woman in France and in England and Wales over time. There is a particularly strong divergence between the two countries starting 1760, slightly earlier than previously thought but in line with anecdotal evidence (see Braudel,

¹³Outside of the period displayed, there is a high degree of selection into the data. For example, individuals in the genealogies lived predominantly in cities. Results are available upon demand.

1986; Goudar, 1756; Moheau, 1778). In less than forty years, the average number of children per woman in France declined to three and a half, while the average English woman was giving birth to almost six children, reflecting the persistence of the Malthusian mechanism in England, as in the rest of the world, for another century. Despite the Industrial Revolution bringing increased prosperity to England, the additional wealth acquired was primarily allocated towards expanding family size. Before the fertility decline, in 1750, France had a population of approximately 25 million inhabitants, while England had 5.5 million. Had the population of France grown at the same rate as England's, there would be over 250 million French people today.

4 THE LOSS OF INFLUENCE OF THE CATHOLIC CHURCH

Having established the timing of the fertility decline using genealogical data, this section delves into exploring the events or circumstances that might have caused the decline to occur. Using a variety of secondary data sources, I document that a widespread process of secularization, characterized by a waning influence of the Church and strong anti-clericalism, also took hold in France in the mid-eighteenth century. At least since de Tocqueville (1856) wrote on *The Ancien Régime and the French Revolution*, we know that the Catholic Church lost influence exceptionally early in France, at a significantly important scale and scope compared to other countries (see also Braudel, 1986; Tackett, 1986; Todd, 1990).

The best available data on devotion, easter attendance, is only measured in 1966 (Boulard, 1966), two hundred years after the onset of dechristianization. The only otherwise available data is at the cross-sectional level, for example using the presence of refractory clergy in 1791, the presence of particular religious orders at different points in time, or the number of religious schools in the nineteenth century. I detail these measures in Section 5. Apart from these, there is very limited comparable data available to show the evolution of religiosity over time. Although there are good proxies of the devotion of the elites (see Andersen and Bentzen, 2022), such data on the devotion of the *masses* hardly exists and most of the existing evidence is anecdotal.¹⁴

To deal with this, I gather data from the work of historians who have extensively documented the decline of Church influence through case-studies of villages or regions. Throughout the rest of the section, I focus on Provence, which used to be one of the most religious regions of France (Agulhon and Coulet, 2018) and even hosted the papacy in Avignon, yet became a stronghold of dechristianization in the eighteenth century (Vovelle, 1973). The use of wills as an indicator of the intensity of the devotion of those who left them goes back to Ariès (1974); Chaunu (1978). Chaunu (1978) finds remarkably similar results in parts of Paris. Using similar data and approaches, Hoffman (1984), Norberg (1985), and Dinet (1991) also

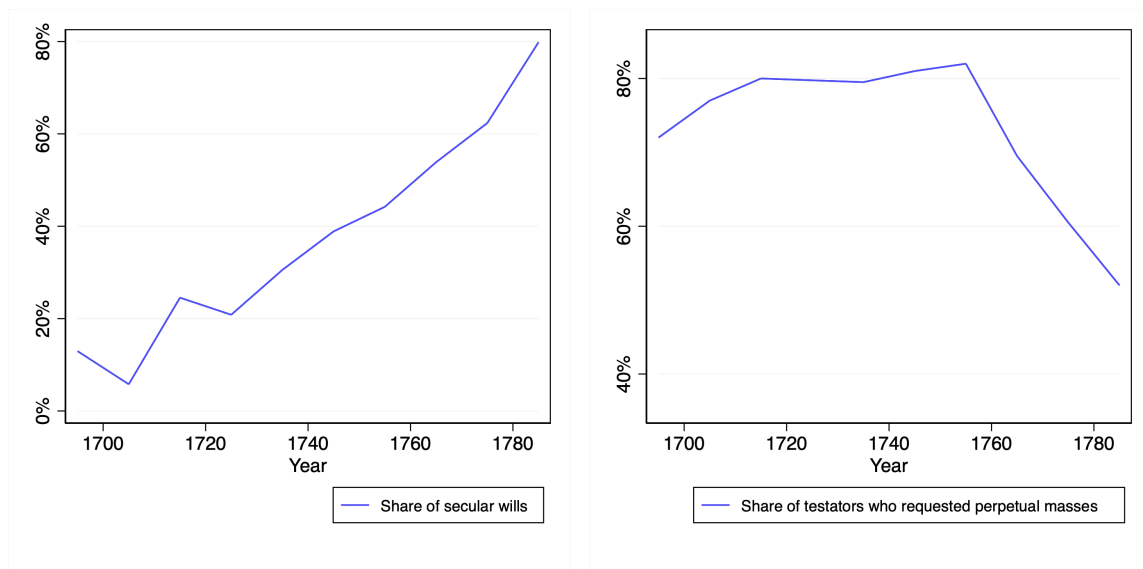
¹⁴Additionally, capturing changes in devotion with changes in the use of religious names, as in Andersen and Bentzen (2022), may result in a number of issues since important variations in devotion are only associated with negligible changes in the use of religious names. This becomes apparent in Figure 5 of Andersen and Bentzen (2022), which shows that the probability of having a religious name increases from 64 to 68 percent when moving from a secular region like Provence (Basses-Alpes) to a religious region like Alsace (Bas-Rhin). Basses-Alpes has about 20 percent refractory clergy, and similar figures for easter attendance, while Bas-Rhin has about 90 percent for both.

find substantial secular changes in the rural parts of the diocese of Lyon, in the diocese of Grenoble, and in Burgundy in the eighteenth century. In Brittany, which remains strongly Catholic, evidence that such a change occurred is indeed much more limited (Bois, 1960; Tingle, 2012).

Case study: Provence. Using data from wills on bequests, legacies for perpetual masses, offerings to the church, and requests for burials in holy places, as well as on the number of invocations of God, Jesus Christ, the Virgin Mary, and various other saints in the wills, Vovelle (1973) documents a transition to secular attitudes (a *mutation de sensibilité collective*) in a path-breaking study of dechristianization in Provence. I exploit this data in order to grasp the magnitude and the timing of secularization across time and space. The data includes the universe of wills during the eighteenth century in a comprehensive sample of villages and cities in Provence. Although wealthier individuals were slightly more likely to leave a will, Vovelle (1973) shows they were left by individuals of all social classes and sometimes by more than 80 percent of the population. If anything, the data is expected to underestimate the loss of influence of the Church since the upper classes remained more devoted (see Vovelle, 1973, and Appendix Figure A4, Panel A).

Figure 5: Secularization in eighteenth-century Provence

Note: This figure displays the share of testators using secular language in the opening clause of their wills (Panel A) and the share of testators who requested perpetual masses (Panel B), over time in Provence, from 1690 to 1789. Source: Vovelle (1973).



(Panel A) Secular language

(Panel B) Perpetual masses

The data reveals that attitudes and beliefs towards death changed radically in the course of the eighteenth century. To illustrate this, Darnton (1978) explains that “In the late seventeenth and early eighteenth centuries, testators consistently described themselves as adherent of the holy, apostolic Roman Catholic Church, who were prepared to meet their Maker, God the

Creator, and Jesus Christ, His Son, by whose death and passion they hoped to be pardoned for their sins and to join the saints and angels in the Celestial Court of Paradise. ... By the 1780s most Provençal wills had reduced the traditional formula to a single clause: ‘*Having recommended his soul to God*’. The Virgin Mary and saintly intercessors were gone, the Celestial Court emptied of angels. Christ himself had receded into the background, while God the Father sometimes took the form of ‘Divine Providence’. Many wills had become totally secularized, and some even described death as ‘*the indispensable tribute that we owe to Nature*’” (p. 126).

Figure 5, Panel A, displays the share of secular wills in Provence over time in the eighteenth century. In the 1690s, only 13 percent of wills used secular language.¹⁵ Interestingly, following the Great Plague of Marseille, which killed as many as 100,000 people in the 1720s, the share of secular wills temporarily decreased in places most affected by the plague. After the 1730s, secularization took hold with a significant increase in the share of secular wills. On the eve of the French Revolution, more than 80 percent of wills were secular. Despite its deeply religious past, Provence had undergone a significant decline in church influence. Historical data, such as wills in the 1690s and the extent of the Holy League in 1590 (from Black, 1996, p. 57), attests to its religious nature in the past. More recent data on Easter attendance in 1966 and the presence of refractory clergy in 1791 (further discussed in the next section) indicates that Provence has become one of the most secular regions in France.

Other indicators of secularization, such as requests for requiem masses (perpetual masses for the dead), bequests, offerings to the church, invocations of the Virgin Mary, or even average weight of funeral candles, all declined significantly (Vovelle, 1973). For example, Figure 5, Panel B, shows a significant decline in requests for perpetual, requiem masses in the mid-eighteenth century. Appendix Figure A4, Panel A, shows that this change was more important for the lower classes than for the elites (Appendix Section A1.1 documents this further); while Panel B shows a similar decline in invocations of the Virgin Mary—who was of particular importance in Provence.

Vovelle (1973) argued that these declines indicate a *mutation of collective sensibility*, or a loosening of traditional religious moral constraints. He also uses the word ‘dechristianization’, which generated extensive discussions in the history literature. For example, Tackett (2005) argues that, although “there can be doubt that there was indeed a decline in the intensity of commitment to Christianity” (p. 149), this may have resulted from “intense anti-clericalism” (p. 150) rather than a full-blown criticism of the Christian religion. However, the fact that a significant change in attitudes towards the Church took hold, in multiple regions, before the French Revolution and around the same time as the decline in fertility suggests that it played an important role in the fertility decline.

Comparative evidence. To the best of my knowledge, although there is extremely scarce harmonized data on devotion in the eighteenth century, there is no work documenting such a loss of influence of the Church in other countries in Europe then. Some regions

¹⁵This figure is likely underestimating devotion before dechristianization since, as Vovelle (1973) argues, it is mostly the result of illiteracy or clergy members deeming references to their faith too obvious.

experienced legal secularization following the spread of Protestantism (see Cantoni, Dittmar and Yuchtman, 2018) but France was the first country to secularize at such a scale, with a move away from the teachings of the Church and strong anti-clericalism (see Todd, 1990).

According to Todd (1990), the South of Italy and some parts of Spain were temporarily affected by some degree of secularization in the eighteenth and in the nineteenth centuries. However, not as much as France was, and these episodes were short-lived, contrary to France, where the French Revolution took place and a program of dechristianization was implemented. Additionally, these were much poorer than France at the time and did not experience an early and sustained decline in fertility, consistent with my findings on mechanisms in Section 5.2, where I show an interaction between economic forces and secularization.

5 MAIN FINDINGS AT THE DÉPARTEMENT LEVEL

5.1 The data

The oath. The main explanatory variable throughout the rest of the paper is the population weighed share of refractory clergy in 1791.¹⁶ In July 1790, during the French Revolution, the National Constituent Assembly passed the Civil Constitution of the Clergy, which required all clergymen to swear an oath of loyalty to the secular state. The oath had to be taken “on a Sunday at the conclusion of the mass” (Decree on the clerical oath). I use the share of clergymen that did not take the oath, known as refractory clergy, in 1791 to proxy for religiosity. According to Tackett (1986), “the regional reactions of clergymen in 1791 can be revealing of the attitudes and religious options of the lay population with which the clergymen lived” (p. xvi). The data on the oath is constructed from the choices of more than fifty thousand parish clergymen, who made up more than 90 percent of all priests and vicars holding posts (Tackett, 1986, p. 39). I implicitly assume that, before secularization, the clergy would not have sworn an oath of allegiance to a secular government. Appendix Section A1.2 provides further suggestive evidence, in line with Section 4, that the presence of refractory clergy captures secularization rather than pre-existing differences. I also document a correlation between the share of refractory clergy in 1791 and the secularization of wills in eighteenth-century Provence, but not with pre-existing differences, as captured by the share of secular wills in the 1690s.

The share of refractory clergy is measured before the August 1792 decree that ordered all non-jurors to leave the country and before the War in Vendée, the Paris Commune, the Reign of Terror, and the establishment of anticlerical cults (the Cult of Reason and the Cult of the Supreme Being, among others). Moreover, before the 1792 decree, according to Tackett (1986), “the National Assembly ... allowed the continued presence of the refractory clergy.” Hence, the refractory clergy in 1791 does not capture the effect of the main revolutionary events and policies of dechristianization but rather religious attitudes on the eve of the French

¹⁶Because it is measured at the district level, I use the district population-weighted average of the district-level share of refractory clergy in the analysis at the *département* level. I generate district boundaries with Thiessen polygons using the district capitals from Tackett (1986).

Revolution. Additionally, throughout this section, in order to account for state legitimacy at the time of the French Revolution, I control for the share of deserters among conscripts in the French army between 1798 and 1805 (Forrest, 1989).

The oath has been used as a proxy for devotion on the eve of the French Revolution (see Franck and Johnson, 2016; Squicciarini, 2020). According to Tackett (1986), “The map of clerical reactions in 1791 was remarkably similar to the map of religious practice in the middle of the twentieth century” (p. xv). Appendix Table A1 and Appendix Figure A6 establish the relevance to the refractory clergy as a proxy to religiosity after secularization. I compare the spatial distribution of the refractory clergy in 1791 with different measures of the intensity of religious beliefs in the nineteenth and twentieth centuries: a dummy variable that equals one if Catholic practice in a *département* was deemed ‘good’ by the local administration in 1877 (Gadille, 1967) or if a district was coded as Catholic in 1947 (Boulard, 1947), the share of Catholic schools in 1901 (SGF, 1901), easter attendance in 1966 (Boulard, 1966), and the share of baptized births in 2013 (Vaillant and Dufour, 2013). These are more direct measures of devotion, although they are only available much later. The presence of refractory clergy is highly correlated with these.

Marital fertility. The main dependent variable at the *département* level is the year of transition to a marital-fertility index below 50 percent of the fertility of the Hutterites.¹⁷ Section 3.1 describes the marital-fertility index of Coale and Watkins (1986). Table A1, Panel A presents summary statistics for the index of marital fertility. The index is available for nineteen years from 1831 to 1961, averages 0.56 in 1831 and decreases to 0.33 in 1961. In pre-transition societies like England, marital fertility averages roughly two thirds of the fertility of the Hutterites. Since some *départements* had already experienced a sustained decline in fertility below .5 by 1831, the date of transition is truncated and I use OLS as well as Tobit regressions.

Controls. Throughout the paper, I account for proxies for religiosity before secularization to capture pre-existing differences. At the *département* level, the proxies for religiosity before secularization include the number of clergymen per capita (Tackett, 1986), the average rate of the tithe (Gagnol, 1911), the number of abbeys (BDCassini, 2017; Franck and Michalopoulos, 2017), the duration of Jesuit presence in centuries (Grendler, 2017), and the share of Protestants after the revocation of the Edict of Nantes (Mours, 1958).¹⁸

In addition to the proxies for religiosity before secularization, I also account for potential determinants of the decline in fertility. I control for broadly defined cultural factors with a dummy that measures the presence of a printing press in 1500 (Clair, 1976; Febvre and

¹⁷I focus on marital fertility rather than overall fertility because it is the standard measure to detect the presence of fertility control achieved through parity-specific means (Coale and Watkins, 1986).

¹⁸The number of clergymen per capita is measured in 1791 since this is the earliest available data point. Because it is a stock, it is unlikely to decline immediately following the decline in religiosity. If it did, it would drive the coefficient on the share of refractory clergy to zero—indeed, point estimates are larger in most regressions without adding this control. The rate of the tithe is measured in 175, the number of abbeys in 1756, and the duration of Jesuit presence in 1763, at the time of their expulsion. The share of protestants is measured in 1815 because the only other available year for this variable is 1670, which would not capture the effect of their expulsion in 1685. Additionally, there was very limited change in the share of protestants between 1750 and 1815.

Martin, 1958), the number of books printed in 1500 (ISTC, 2008), the log of *Encyclopédie* subscriptions per capita in the period 1776–79 as a proxy for the diffusion of the Enlightenment (using the raw data from Darnton, 1973), and linguistic distance from French in 1901 (Blanc and Kubo, 2022). I also control for institutional factors with fixed effects for *pays* status (fiscal regions in *ancien régime* France which may capture pre-existing differences in state capacity and democratization, from Wikipedia), and the share of deserters among conscripts in the French army between 1798 and 1805 (Forrest, 1989). I further control for education using the literacy rate of conscripts in the year of observation (SGF, 1878). In order to control for pre-industrial development, I include *département*-level population density (a standard proxy for development in the pre-industrial era—see Ashraf and Galor (2011)) (BDCassini, 2017) and average soldier height before 1760 (Komlos, 2006). Finally, I control for contemporary development with the log rate of urbanization (BDCassini, 2017), defined as the share of the population living in towns with more than five thousand inhabitants. Appendix Figure A7 displays the spatial distribution of some variables of interest.

5.2 Baseline results

Determinants of year of transition. I study the cross-sectional determinants of transition date, the first year in which marital-fertility declined below .5. I estimate Equation 1 with OLS and a Tobit model (by maximum likelihood) in order to account for the left-censoring nature of the data since about a quarter of *départements* had already transitioned in 1831. The main variable of interest is the share of refractory clergy in 1791.

$$(1) \quad (\text{Transition date})_i = \beta \times \text{Ref. clergy}_{i,1791} + \mathbf{X}'_i \delta + \varepsilon_i$$

Table 1 reports the results, along with robust standard errors. Appendix Figure A9 plots the scatterplot and partial residual plot. A 10-percentage-point increase in the share of refractory clergy is associated with a delay in the year of transition of more than ten years. This is a particularly large effect: moving from the 25th to the 75th percentile of the distribution of refractory clergy is associated with a delay in the demographic transition of more than a standard deviation.

The estimates are stable and significant at the 1 percent level across all specifications. Specification 2 controls for proxies for religiosity before secularization in order to capture the effect of secularization. These controls include, notably, the number of clergymen per capita, the number of abbeys, and the average rate of the tithe collected by the church. Specification 3 controls for observed cultural and institutional factors. In particular, the share of deserters in the army during the French Revolution and fiscal status (*pays d'élection*, *d'Etat*, or *d'imposition*) in the *ancien régime* allow me to capture religiosity and not state legitimacy with the refractory-clergy measure. The specification also controls for linguistic distance to French (in order to capture the diffusion and adoption of new cultural norms (Spolaore and Wacziarg, 2022)) and *Encyclopédie* subscriptions (in order to capture the diffusion of the Enlightenment and the presence of local knowledge elites, who may have had an impact on

Table 1: Determinants of transition date

Note: This table displays the results of the cross-sectional regression of transition dates on the population-weighted share of refractory clergy in 1791. Transition date is defined as the first year with $I_g \leq .5$. Controls are described in Section 5. All observations are weighed by *département* population in 1831. Robust standard errors are reported. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

| | <i>dep var:</i> Transition date | | | | | | |
|------------------------------------|---------------------------------|----------------------|---------------------|----------------------|----------------------|----------------------|----------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Refractory clergy (1791) | | | | | | | |
| Ordinary Least Squares | 97.23*** (13.14) | 98.29*** (13.42) | 83.99*** (13.05) | 101.07*** (22.54) | 101.39*** (21.72) | 101.27*** (22.49) | 103.78*** (22.97) |
| Tobit (Maximum likelihood) | 118.60*** (16.90) | 117.55*** (16.74) | 94.30*** (15.52) | 113.16*** (24.19) | 112.13*** (23.35) | 111.65*** (24.08) | 115.26*** (24.70) |
| Controls | | | | | | | |
| Religiosity (pre-secularization) | | Yes | Yes | Yes | Yes | Yes | Yes |
| Cultural and institutional factors | | | Yes | Yes | Yes | Yes | Yes |
| Region fixed effects | | | | Yes | Yes | Yes | Yes |
| Education and schooling | | | | | Yes | Yes | Yes |
| Pre-industrial development | | | | | | Yes | Yes |
| Contemporary development | | | | | | | Yes |
| Mean of dep var | 1863 | 1862 | 1861 | 1861 | 1861 | 1861 | 1861 |
| Left censored observations | 24 | 24 | 23 | 23 | 23 | 23 | 23 |
| Observations | 85 | 80 | 77 | 77 | 77 | 77 | 76 |
| Adjusted R^2 (OLS) | 0.40 | 0.40 | 0.55 | 0.61 | 0.63 | 0.61 | 0.60 |
| Log likelihood (Tobit) | -322.3 | -293.6 | -267.9 | -254.2 | -253.0 | -252.9 | -248.6 |

cultural change and the modernization of society as a whole). Specification 4 adds twelve region fixed effects to account for unobserved cultural or economic factors that might confound the effect of the refractory clergy. For example, ancestry may have an effect on the diffusion of modernization, while the presence of nuclear family structure might influence on fertility (Todd, 1990).¹⁹ Specification 5 controls for literacy to account for the quantity-quality trade-off, while specifications 6 and 7 account for development. The results remain virtually unaffected.

Finally, I estimate Equation 1 for alternative definitions of transition date in Appendix Table A5: below 30, 40, 50, 60, and 70 percent of the fertility of the Hutterites. The coefficient on the refractory clergy is largest for the first year in which marital fertility dropped below 0.6, which is a level corresponding to a 10 percent decline from the average marital fertility in pre-transition Europe (about 0.65), while a decline in marital fertility below 0.5 corresponds to a drop of about 25 percent.

Magnitude. Table 2 presents standardized beta coefficients for selected determinants of transition date. I evaluate and compare the magnitude of a number of factors that may have played a role in the early demographic transition in France, including religiosity but also Encyclopedie subscriptions, linguistic distance from the French language, literacy, and development. I report the results without any controls but also, in the last column, after accounting for the full set of controls.

¹⁹After including fixed effects for family structure, the estimated OLS coefficient is 95.19, still significant at the one percent level.

The first column corresponds to the first specification of Table 1. In column (2), I evaluate the role of cultural attributes and find a large and significant correlation with subscriptions to Diderot and d’Alembert’s *Encyclopédie*. Decreasing the number of subscriptions per capita by one standard deviation is predicted to delay the transition date by one-third of a standard deviation, with or without controls. This is the second-largest effect after the refractory clergy in 1791 and is consistent with the pattern documented by Squicciarini and Voigtländer (2015, 2016). Yet, it is unlikely that it played a major role in the French demographic transition because Enlightenment ideas diffused throughout most of Western Europe and especially England and Scotland.

Table 2: Magnitude of the determinants of transition date

Note: This table displays the results of the cross-sectional OLS regression of transition dates on a set of variables of interest. Transition date is defined as the first year with $I_g \leq .5$. Standardized beta coefficients are reported. All observations are weighed by *département* population.
⁺ $p < 0.2$, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

| | <i>dep var:</i> Transition date | | | | | | |
|---------------------------------------|---------------------------------|-------------------|------------------|-----------------|-----------------|-----------------|-------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Standardized beta coefficients | | | | | | | |
| Refractory clergy (1791) | 0.64*** (0.09) | | | | | | 0.69*** (0.15) |
| log 1 + Encyclopedie | | -0.28** (0.11) | | | | | -0.30** (0.13) |
| Linguistic distance to French | | | 0.23** (0.09) | | | | 0.02 (0.21) |
| Literacy | | | | -0.13 (0.11) | | | 0.34+ (0.20) |
| Population density | | | | | -0.03 (0.04) | | -0.08 (0.23) |
| log 1 + urbanization | | | | | | -0.03 (0.09) | -0.10 (0.11) |
| Full set of controls | | | | | | | Yes |
| Observations | 85 | 87 | 85 | 86 | 88 | 86 | 76 |
| Adjusted R^2 | 0.40 | 0.07 | 0.04 | 0.01 | -0.01 | -0.01 | 0.60 |

Then, because religiosity could capture barriers to the diffusion of norms favoring limited fertility, rather than a direct effect of cultural differences, I look at linguistic distance from French in 1900 in (3).²⁰ Without controls, the effect is large and significant yet the standardized beta coefficient is more than four times smaller than that of the effect of the refractory clergy, suggesting that the main independent variable is capturing a direct effect of religiosity rather than barriers. After accounting for the full set of controls, the estimated coefficient becomes null and statistically not different from zero. Finally, neither literacy, nor population density, or urbanization had a significant or large effect on the timing of transition.

²⁰I use data from Blanc and Kubo (2022) to leverage granular variation in linguistic distance within linguistic areas. Results are similar when using the data from Spolaore and Wacziarg (2022).

These results suggest that the accumulation of human capital, pre-industrial, or contemporary development were not drivers of the transition in France, in line with the evidence at the macroeconomic level.

Mechanisms. Appendix Table A6 shows the heterogeneous effect of religiosity in order to understand some of the mechanisms that could have played a role in the transition to low fertility. I interact the share of refractory clergy in 1791 with the same selected determinants used in the table above, and all variables are standardized—therefore the baseline coefficient for the refractory clergy in 1791 corresponds to the case where the interacted variable is evaluated at its mean. The first column corresponds to the first specification of Table 1. In (2), I estimate the heterogeneous effect of religiosity with respect to subscriptions to the *Encyclopédie*. It is possible that local elites allowed secularization to impact fertility, for example through the diffusion of the libertine literature to the general population. Yet, the effect is small and not significant. Similarly, the effect of linguistic distance and literacy is close to zero and not significant.

Finally, I find an important interaction between cultural and economic factors in column (5). The effect of the refractory clergy is twice as large when population density is one standard deviation above its mean, suggesting that pre-industrial development was a necessary condition for the decline in fertility and that, before dechristianization, individuals had more offsprings than their desired level of fertility because of the constraints imposed by the Church. Moorthy (2022) further documents this in France in a recent paper, and Coale and Watkins (1986); Spolaore and Wacziarg (2022) find a similar pattern in Europe as a whole. My results also suggest that overpopulation could have played a role, as suggested by Braudel (1986). I do not find the same pattern when looking at urbanization, another traditional proxy for development. The absence of heterogeneous effect could be explained by the fact that urbanization is only a proxy of development in the post-malthusian era, after the onset of the demographic transition, or it could be that the result above is really about overpopulation and not about some interaction between economic and cultural factors.

5.3 Robustness, sensitivity, variable selection, selection, and spatial correlation

Appendix 2 discusses a number of robustness tests. I first show that the refractory clergy is also associated with levels of marital fertility I_g over time. Second, I estimate bounds on the correlation across all 131,072 combinations of controls using sensitivity analysis (Brodeur, Cook and Heyes, 2020). There is not a single specification that returns a coefficient either statistically or economically insignificant. Third, since the roots of secularization in France are not well understood, I rely on variable selection with double-lasso, a supervised machine-learning technique, and show that the refractory clergy is the variable that plays the most important role. Fourth, I run thousands of simulations by replacing the independent and dependent variables with spatially correlated noise (see Kelly, 2019) and find that only a negligible portion of these regressions returns significant coefficients. Finally, I estimate coefficients adjusted for selection on unobservables, with standard errors bootstrapped over

thousands of replications (Oster, 2016). The results suggest that the OLS coefficient is biased downward, in line with the evidence suggesting that secularization hit poor and rural areas disproportionately and was separate from the Enlightenment.

6 INDIVIDUAL-LEVEL RESULTS

6.1 The data

The dataset, described in Section 3, is a nationally representative sample from 1680 to 1920. All observations contain geocoded places of birth, marriage, and death, which allows me to match individuals with the refractory clergy in 1791 at the level of their district of birth. Figure A14 displays the towns of birth included in the fertility sample. Appendix Table A11 shows summary statistics.

6.2 Baseline results

Empirical strategy. I model the conditional mean of fertility in Equation 2, where $fert_{i,t}$ is the completed fertility of individual i in decade t . I exploit cross-sectional variation in fertility with decade fixed effects λ_t . Each individual is assigned the share of refractory clergy in 1791 of her district of birth $b(i)$. To account for the count nature of the dependent variable and to robustly estimate the conditional mean of fertility, I assume that fertility follows a Poisson distribution and that the log of the conditional mean of fertility is a linear function of observables. Equation 2 is estimated with maximum likelihood, using Poisson regressions, in the bulk of the analysis.

$$(2) \quad \log \lambda_{i,t} = \beta \times \text{Ref. clergy}_{b(i),1791} + \mathbf{X}'_{i,t} \delta + \lambda_t \equiv \mathbf{z}'_{i,t} \gamma$$

with $fert_{i,t} \sim \mathcal{P}(\lambda_{i,t})$ and $\lambda_{i,t} = \lambda(\mathbf{z}_{i,t}) \equiv \mathbb{E}(fert_{i,t} | \mathbf{z}_{i,t})$

The vector of controls includes a quadratic in the age of birth of the first child, in order to not capture delayed marriage but rather active, parity-specific controls; the number of abbeys and the duration of Jesuit presence at the district level, in order to account for religiosity before secularization; and a dummy that equals one if an individual's place of birth was coded as urban at the time, and the log of Encyclopedie subscriptions per capita in a 50 kilometers radius of the individual's place of birth, in order to account for cultural factors and development. Finally, since the dataset does not always contain both spouses, I include the two whenever possible and cluster all regressions at the couple level, thereby accounting for couples fully recorded, and I use a male dummy in order to account for possible differences in gender.

Main results. Table 3 presents the baseline results at the individual level for observations after 1760, when dechristianization and the decline in fertility started. The estimated coefficient is particularly large and stable throughout specifications, with the marginal effect

of the refractory clergy in 1791 on fertility estimated to be about one. This means that individuals born in a place with only refractory clergymen are predicted to have about one more child than those born in a place without any. This is roughly the size of the decline in fertility during the second half of the eighteenth century, when the number of children ever born went from 4.5 to 3.5 in about forty years (Figure 1).

Table 3: Determinants of fertility at the individual level

Note: This table displays the results of the individual-level regression of the log total number of children ever born on the share of refractory clergy in 1791. The main explanatory variable is defined as the population-weighted share of refractory clergy in 1791, at the district-of-birth level. All specifications include a male dummy and decade fixed effects. Individual-level controls include a quadratic in the age of marriage interacted with the male dummy. Religiosity (pre-secularization) controls include the number of abbeys in 1756 and the duration of Jesuit presence until 1763 (both at the district-of-birth level; plus dummies). Development and Enlightenment controls include the urban status of the town of birth in the year of birth and the log of *Encyclopédie* subscriptions in 1777 – 79 at the district level (plus a dummy for nonzero subscriptions). Two-way clustered standard errors (at the couple and district levels) are reported. Average marginal effects are reported. The results were generated using the Stata program provided by Correia, Guimarães and Zylkin (2020). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

| | <i>dep var:</i> log fertility | | | |
|--|-------------------------------|---------------------|---------------------|---------------------|
| | (1) | (2) | (3) | (4) |
| Refractory clergy (1791) | 0.252*** (0.083) | 0.297*** (0.084) | 0.281*** (0.090) | 0.233*** (0.075) |
| Marginal effect of ref. clergy on fertility | 0.893*** | 1.055*** | 0.997*** | 0.829*** |
| Controls | | | | |
| Individual-level | | Yes | Yes | Yes |
| Religiosity (pre-secularization) | | | Yes | Yes |
| Cultural factors and development | | | | Yes |
| Observations | 11,887 | 11,728 | 11,728 | 11,727 |
| Clusters (couples) | 10,358 | 10,228 | 10,228 | 10,227 |
| Clusters (districts) | 440 | 440 | 440 | 440 |
| Pseudo R^2 | 0.01 | 0.06 | 0.06 | 0.06 |

All specifications include a male dummy and decade fixed effects. Standard errors are two-way clustered at the district-of-birth and couple levels.²¹ In specification 2, individual-level controls are included with a quadratic in the age at birth of the first child interacted with the male dummy: the reduction in fertility was not achieved by delayed age of marriage but rather through parity-specific controls.²² Specification 3 adds proxies for religiosity before secularization at the district level: the presence (dummy) and number of abbeys in 1756, and the presence (dummy) and duration of Jesuit presence before 1763. In the last column, I control for a (time varying) dummy capturing the urban status of the town of birth at the time and I control for the presence (dummy) and number of knowledge elites by using *Encyclopédie* subscriptions at the district level.²³ The results are statistically significant and

²¹Information about both parents is not always available—only about 10 percent of individuals have spouses also included in the regressions.

²²Appendix Figure A15 plots the average timespan between the births of the first and last child (Panel A) and average duration between births of children (Panel B). Lower fertility was indeed achieved mostly through parity-specific controls: there is no significant change in duration, and age of marriage only increases slightly. A previous version of the paper also included the log fertility of parents. Estimates were smaller because the fertility of parents is obviously collinear with the refractory clergy for non-migrants.

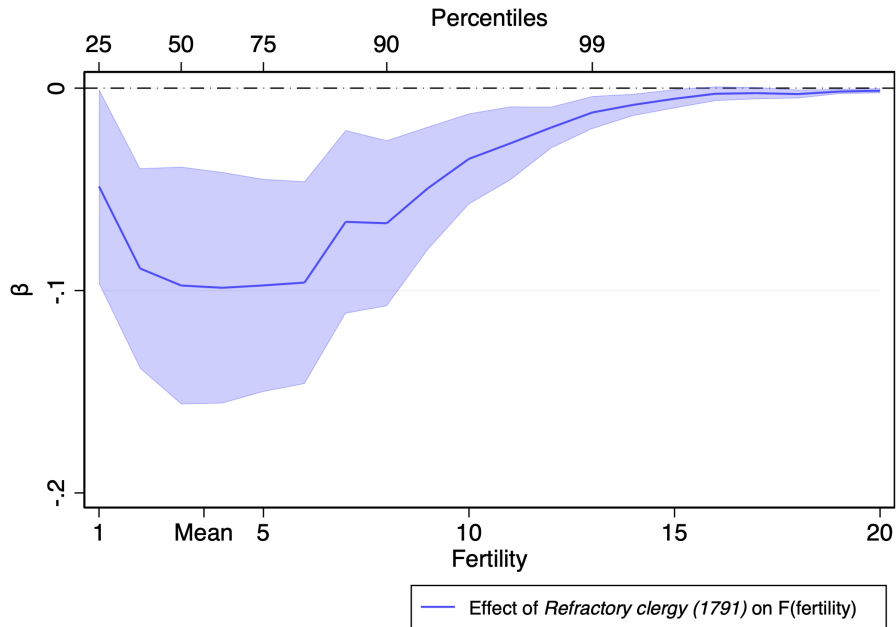
²³It is also possible to control for soldier height before 1760, at the town-of-birth level, as a proxy for development: this increases the point estimate of the share of refractory clergy in 1791 but decreases the number of observations by

stable throughout.

Robustness to method of estimation. Poisson regressions are appropriate for non-negative count dependent variables, yet they rely on the assumption of equality of the mean and variance. That said, the fact that the Poisson distribution is specified by only one parameter is attractive to the extent that, in the post-Malthusian period, it is likely that there was less variance as the mean fertility declined. As a result, the standard error of the estimated coefficient may be too small and significance could be overestimated. Hence, in order to evaluate the robustness of the results and to account for overdispersion, Appendix Table A12 estimates Equation 2 with OLS, overdispersed Poisson, and negative-binomial regressions. In overdispersed Poisson, the conditional variance is scaled by a parameter $\phi \equiv \chi^2_{Pearson}/p$ in order to directly account for the observed overdispersion. In negative-binomial regression, heterogeneity among individuals is accounted for by assuming that the outcome follows a negative-binomial distribution, hence adding variability that Poisson regression does not allow for. Results are essentially unchanged.

Figure 6: Distribution regressions

Note: This figure displays the estimated coefficient of the regression of the the cumulative distribution function of fertility on the population-weighted share of refractory clergy in 1791, with robust standard errors, for all levels of fertility up to twenty children.



one-third; hence the result is not reported here. Similarly, I can control for age at death since adult longevity may confound the effect of religiosity on fertility. Yet evidence suggests that religiosity declines with age (Lechler and Sunde, 2020), which would bias the estimates of the impact of religiosity on fertility downward. When I include age at death (which also results in a significant drop in the number of observations), point estimates are virtually unaffected. Results are available upon request.

Distribution regression. Is the effect of higher religiosity uniform at all levels of fertility? I run a distribution regression in order to trace out the effect of the refractory clergy on the cumulative distribution function (CDF) of fertility, following Chernozhukov, Fernández-Val and Melly (2013). This method allows to estimate the entire conditional distribution, and, importantly, it does not require the outcome to have a smooth conditional density as in quantile regressions. Therefore it is more adapted to the study of fertility, which is a discrete outcome. I evaluate the effect of the refractory clergy on the cumulative distribution of fertility for all observed levels, and I estimate Equation 3 with OLS, where $\mathbb{1}_{fert_{i,t} \leq f}$ is a dummy that equals one if individual i had less than f children.

$$(3) \quad \mathbb{1}_{fert_{i,t} \leq f} = \beta_f \times \text{Ref. clergy}_{b(i),1791} + \mathbf{X}'_{i,t} \delta + \lambda_i + \lambda_t + \epsilon_{i,t}$$

Figure 6 plots the results at different levels of fertility.²⁴ Increasing the share of refractory clergy in 1791 is always associated with a decrease in the number of children—but the shift in the CDF is larger for large families. The effect is indeed maximized when fertility is above the mean and median. For example, decreasing the share of refractory clergy by 100 percentage points (full secularization) is predicted to increase the probability of having less than six children by about 10 percentage points. Additionally, a property of distribution regressions is that the estimated coefficients on the CDF (with the linear-probability model) sum up to the OLS coefficient of the effect of the refractory clergy on fertility in Appendix Table A12. Hence, the distribution of coefficient fully characterizes the average effect of the refractory clergy on fertility.

6.3 Accounting for unobservables

Thus far, the results were only suggesting that secularization played an important role. Using the crowdsourced genealogical data allows me to employ three different strategies to account for unobserved pre-existing, geographic, cultural, and institutional differences to establish that secularization, not institutional changes or other factors, caused the decline in fertility. To the best of my knowledge, this is the first time any of these strategies are used in a historical context or for the study of the decline in fertility in France.

First, it is possible to study within-*département* variation using fixed effects. In particular, *département*-by-decade fixed effects account for time-invariant *and* time-varying unobservables at the *département* level. This is particularly important to the extent that *départements* are the main administrative units, hence exploiting within-*département* variation allows to account for most institutional differences. For example, some *départements* may have been more affected by the French Revolution than others (for example, during the War in the Vendée or during the Reign of Terror), or the crowdsourced data may be of higher quality in some periods in some *départements* in earlier years since the records are kept in online *départemental*

²⁴In order to visualize the effect of secularization on the CDF of fertility, I generate a counterfactual distribution by setting religiosity to the maximum level everywhere in Appendix Figure A16.

archives, which would bias the results.²⁵

Second, by extending the sample to individuals observed before dechristianization took place, it is possible to compare the effect of the refractory clergy in 1791 before and after the onset of the transition and secularization using a strategy similar to a difference-in-differences framework with continuous treatment. The effect of secularization can be identified by differencing the coefficient after the decline in fertility from that before, using 1760 as the cutoff for the onset of the decline in fertility, to show that, before the decline, places that would become secular did not differ from those that would not.

The true date of the decline in fertility is an unknown parameter that is neither discontinuous or clear-cut nor identical across space, and the distribution of religiosity before secularization is unknown. Therefore, this strategy cannot strictly be interpreted as difference-in-differences. Nevertheless, the fact that secularization and the decline in fertility were a smooth process would likely result in the underestimation of the true effect since some places were likely already treated before 1760 and difference-in-differences would rely on the assumption that it was not the case. Furthermore, by estimating the effect of the refractory clergy in 1791 on fertility before secularization, it is possible to further draw inferences about whether it captures pre-existing differences or the extent of secularization.

Finally, it is possible to study the fertility decisions of second-generation migrants while holding constant unobserved institutional characteristics of places of arrival, following Algan and Cahuc (2010); Fernández (2011); Guiso, Sapienza and Zingales (2004). This allows me to separate the effect of religious beliefs and norms passed through generations from that of confounding institutional and geographical characteristics that are location-specific. What is particularly novel in this setting is both the historical dimension and the fact that it accounts for institutional and cultural variation within the country. Indeed, the traditional approach only uses migrants surveyed recently, leverages between-country variation in place of origin, and assumes that there is no institutional variation within country in either place of origin or place of arrival. Here I leverage variation in the refractory clergy at the district-of-origin level, holding constant district-of-birth characteristics.²⁶

Table 4 displays the results. The first column displays the baseline results with the full set of controls at the individual, town, and district-of-birth levels. In the second and third columns, I add, respectively, fixed effects for *département* of birth and *département* of birth by decade. Point estimates increase, as suggested by the analysis in the rest of the paper, and the marginal effect of the refractory clergy on fertility is estimated to be between 1 and 1.3 children. All results are significant at the 1 percent level. In the fourth specification, I extend the sample to all individuals observed between 1680 and 1920. Interacting the refractory clergy in 1791 with a dummy that equals one if the individual was observed after the onset of the transition in 1760 allows me to show that the results do not capture unobserved pre-

²⁵This issue is known and has been acknowledged—for example, in Blanc and Wacziarg (2020); Henry (1972*a,b*, 1978); Henry and Houdaille (1973); Houdaille (1976); Séguy (2001). As a result, one would erroneously find that religious *départements* had higher fertility in the earlier years of the sample, before the Revolution, while they simply had less destruction during the French Revolution, or more thorough record-keeping.

²⁶In order to account for correlation among parents (less than a third of second-generation migrants had parents born in different districts from each other), I also implement multiway clustered standard errors at the parents and districts of birth of parents levels.

Table 4: Determinants of fertility at the individual level: accounting for unobservables

Note: This table displays the results of the individual-level regression of the log total number of children ever born on the population-weighted share of refractory clergy in 1791 at the district-of-birth level (except in specification 5, in which it is evaluated at the district-of-birth-of-parents level and corresponds to the average level for the two parents, which ensures that individuals with a missing parent are not dropped). All specifications include the full set of controls. The baseline specification corresponds to the last specification in Table 3. Two-way clustered standard errors (at the couple and district levels) are reported in all specifications but the last. In specification 5, standard errors are four-way clustered at the district-of-birth-of-parents and parents levels (in this specification, the number of districts reported in the table is for the first parent; for the sake of simplicity I don't report the fact that there are 1,148 second parents originating from 237 districts). Average marginal effects are reported. The results were generated using the Stata program provided by Correia, Guimarães and Zylkin (2020). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

| | <i>dep var:</i> log fertility | | | | |
|--|-------------------------------|---------------------|---------------------|--------------------|--|
| | (1) Baseline specification | (2) Fixed Effects | (3) Time-varying FE | (4) Diff-in-diff | (5) ^{a,b} Second gen migrants |
| Refractory clergy (1791) ^a | 0.233*** (0.075) | 0.327*** (0.118) | 0.363*** (0.125) | 0.052 (0.171) | 0.210** (0.096) |
| _____ × After 1760 | | | | 0.357** (0.166) | |
| Marginal effect of ref. clergy on fertility | | | | | |
| Between 1680 and 1759 | | | | 0.175 | |
| Between 1760 and 1919 | 0.829*** | 1.161*** | 1.290*** | 1.718*** | 0.753** |
| Sample | | | | | |
| Observed between 1680 and 1919 | | | | Yes | |
| Observed between 1760 and 1919 | Yes | Yes | Yes | | Yes |
| Controls | | | | | |
| Baseline controls | Yes | Yes | Yes | Yes | Yes |
| Département of birth fixed effects | | Yes | Yes | Yes | |
| Département of birth by decade fixed effects | | | Yes | Yes | |
| District of birth fixed effects | | | | | Yes |
| Observations | 11,727 | 11,727 | 11,525 | 16,503 | 1,438 |
| Clusters (couples) ^b | 10,227 | 10,227 | 10,042 | 14,283 | 1,151 |
| Clusters (districts) ^b | 440 | 440 | 429 | 451 | 235 |
| Pseudo R^2 | 0.06 | 0.08 | 0.11 | 0.13 | 0.14 |

^adistrict of birth of parents in (5), ^bmore details in table notes

existing differences. I find that the refractory clergy had a null and statistically insignificant effect on log fertility before 1760. Only after it becomes associated with increased fertility, consistent with the evidence showing that the presence of refractory clergy is uncorrelated to pre-existing differences in religiosity and that places with few refractory clergy also had high fertility before.²⁷ For example, most French migrants to Quebec left in the seventeenth century from the regions around Paris, where most clergy later took the oath, and where fertility became lower. Yet, at the time of their arrival, these migrants were known for their high fertility (e.g., see Galor and Klemp, 2019).

Last, but not least, a major concern is that local institutions caused both secularization and

²⁷Appendix Figure A17, Panel A displays the difference-in-differences result graphically. In Panel B, I estimate the effect with forty-year periods. In the first period, 1680–1720, when secularization had likely not started anywhere, the estimated effect of the refractory clergy is virtually null, slightly negative, and not statistically significant. Then, in the period that immediately precedes the aggregate decline in fertility, the effect increases slightly and becomes positive, which is consistent with a smooth and heterogeneous-across-space process of secularization and with some places experiencing dechristianization earlier. The effect remains statistically insignificant before 1760. After 1760, which marks the onset of dechristianization and of the decline in fertility at the aggregate level, the refractory clergy had a positive and statistically significant effect. The size of the effect increases at the time of the second wave of decline in fertility (during industrialization) and then decreases, consistent with a process of diffusion (Spolaore and Wacziarg, 2022) or of interaction between cultural and economic forces as documented by Squicciarini (2020).

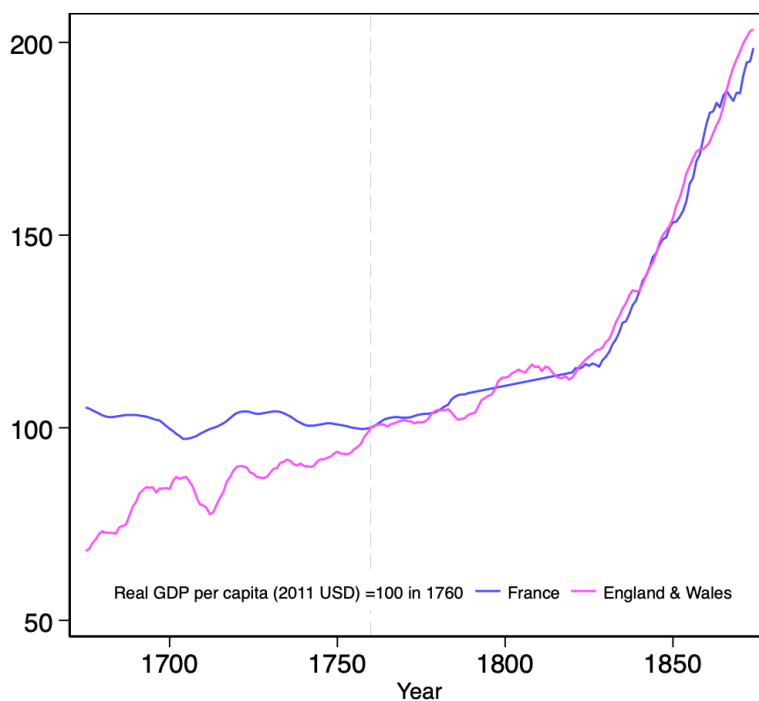
the decline in fertility. To account for such unobserved geographic and institutional factors that may confound the analysis, the last column restricts the sample to second-generation migrants and includes district-of-birth fixed effects. I find that the refractory clergy in the district of the parents has a persistent and significant effect on fertility that was not location-specific, but rather related to beliefs and preferences since it transmitted intergenerationally despite a different environment. This suggests that secularization, not democratization or some institutional or legal factors, accounts for the early decline in fertility in eighteenth-century France. Importantly, it does not imply that institutions did not play a role, but rather that, if they did, it was only through the channel of secularization.

7 CONCLUDING REMARKS

When and why fertility declined in France more than a century before the rest of Europe remain questions of enormous importance. I comprehensively document the transition, date its onset to the 1760s, and establish that secularization accounts for most of it. More generally, this paper seeks to address the role of ideas, preferences, and culture in shaping development. My findings support the hypothesis that the transition from tradition to modernity played an important role in the transition from stagnation to growth.

Figure 7: Accumulated economic growth in France and in England

Note: This figure displays real GDP per capita over time in France and in England and Wales, indexed to = 100 in 1760 to show the cumulative rate of growth over time. Sources: Bolt and van Zanden (2014); Broadberry et al. (2015); Ridolfi (2016)



The fertility decline in France was a turning point in human history. It marks the first time mankind escaped Malthusian stagnation. It was also a turning point for France. Braudel (1986) argues that “the entire course of French history since then has been influenced by something that happened in the eighteenth century” and asks “did France cease to be a great power not, as is usually thought, on 15 June 1815 on the field of Waterloo, but well before that, during the reign of Louis XV when the natural birth-rate was interrupted?” (p. 190). Indeed, France was no longer the China of Europe and the dominant power in the world. Yet, Figure 7 shows that, although England was the birthplace of the industrial revolution, the French achieved the same growth in income per capita after 1760, simply by challenging the authority of the Church and reducing fertility, therefore limiting the increase in the denominator.

What remains an open question is what caused secularization. According to the case studies of Bois (1960); Chaunu (1978); Dinet (1991); Hoffman (1984); Norberg (1985); Tingle (2012); Vovelle (1973) and the more systematic cross-sectional work of Boulard (1966); Tackett (1986), secularization took hold in the Parisian region and in Provence. These were some of the most religious places in France historically, and although Paris itself was rich, its surrounding region was not particularly wealthy while Provence was one of the poorest regions of France, speaking a different language and under different fiscal rules, suggesting that neither development nor legal factors caused the decline in Church influence. Instead, some historians hint at the idea that secularization could have been a backlash against religious powers that had both a monopoly on faith and a close connection to the monarchy and absolutism (Van Kley, 1996).

For example, Braudel (1986) argues that “the drama played out in the eighteenth century was a sort of revenge on the part of the Reformation. Having hesitated, two centuries earlier, between Rome and Luther, or rather between Rome and Calvin, France had chosen Rome, but the choice backfired” (p. 200).²⁸ This process appears to have taken place in close connection with a rejection of absolutism and divine-right monarchy that prefigured the French Revolution. According to Friedrich (2022), “the power struggle between parlements and the king had become amalgamated with the old fight over Jansenism. The Parlement of Paris in particular leaned in favor of the Jansenists and stubbornly resisted a series of anti-Jansenist measures taken by Rome and Paris in 1750, which it depicted as a tyrannical abuse of power by the king, the Jesuits, and the pope.” In fact, according to Van Kley (1996), “if the Revolution could, with an astonishing facility, destroy the throne and the altar, it is because Jansenism, for more than a century, had destroyed the foundations of both” (p. 505).

Table 5 provides evidence of this.²⁹ The first column shows that places where the Counter Reformation was dominant during the French Wars of Religion, as proxied by the presence of the Holy League in 1590, also had less easter attendance in 1966, further documenting the reversal in religiosity and suggesting a backlash against the Counter Reformation. The

²⁸Similarly, Tackett (1986) argues that “a whole series of affaires and causes célèbres, from the repression of the convulsionnaires in the 1730’s through the billets de confessions in the 1750’s and the expulsion the Jesuits in the 1760’s, had contributed in broadly publicizing and intensifying grievances toward the clergy” (p. 257); while Hoffman (1984) writes that “the Counter Reformation’s austere morality was imposed in full force ... not surprisingly, it was rejected by people who saw nothing wrong in combining devotion and gaiety” (p. 138) and that it “had the support of the royal government and of the urban elites, who had in the past tolerated a great deal more sexual license.”

²⁹Appendix Table A13 documents similar patterns using the presence of refractory clergy in 1791.

Table 5: Deep-rooted correlates of secularization

Note: This table displays the results of the municipality-level cross-sectional regression of easter attendance in 1966 on deep-rooted factors. Easter attendance (1966) is taken from Boulard (1966). Holy League (1590) is defined as a dummy that equals one in places where the Holy League was present in 1590, taken from (Black, 1996, p. 57) (see Appendix Figure A5). The value of the salt tax (*gabelle*) in 1770 is taken from Giommoni and Loumeau (2023). Jansenists (1725) is the inverse hyperbolic sine of the number of Jansenist clergymen in a diocese, taken from Préclin (1929). Standardized beta coefficients are reported. All observations are weighed by population in 1961. All specifications control for the log population in 1961 and latitude and longitude. Standard errors are clustered at the district and/or at the diocese level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

| | <i>dep var:</i> Easter attendance (1966) | | | | |
|---------------------------------------|--|---------------------|---------------------|---------------------|---------------------|
| | (1) | (2) | (3) | (4) | (5) |
| Standardized beta coefficients | | | | | |
| Holy League (1590) | -0.16*** (-2.76) | | 0.38*** (4.02) | | 0.38*** (3.21) |
| Salt tax / <i>gabelle</i> (1770) | | -0.40*** (-6.34) | -0.08 (-0.97) | | -0.02 (-0.15) |
| _____ × Holy League (1590) | | | -0.65*** (-5.68) | | -0.62*** (-4.00) |
| Jansenists (1725) | | | | -0.38*** (-3.58) | -0.18* (-1.87) |
| Observations | 33,756 | 33,295 | 33,295 | 33,756 | 33,295 |
| Clusters (districts) | 513 | 511 | 511 | 513 | 511 |
| Clusters (dioceses) | | | | 133 | 132 |
| Adjusted R^2 | 0.14 | 0.26 | 0.31 | 0.22 | 0.33 |

second column shows a particularly large negative correlation between extractive institutions in the *ancien régime* and easter attendance, supporting the hypothesis that secularization was also a backlash against absolutism and divine-right monarchy. The extractiveness of institutions is measured using the *gabelle*, a system of forced taxation of salt, with a tax rate that varied widely across space (sometimes by a factor of sixty), as in Giommoni and Loumeau (2023). This tax was particularly criticized in the *cahiers de doléance* during the French Revolution (Shapiro and Markoff, 1998). Giommoni and Loumeau (2023) also find results suggesting that areas with high taxation developed particular cultural, secular norms that later persisted. The third column includes the previous variables together as well as their interaction. The sign of the coefficient on the Holy League reverses and the correlation with the *gabelle* is no longer significant, while the coefficient on the interaction term is large, negative, and statistically significant, suggesting a particularly important interplay between these two factors. In regions where the Counter Reformation held sway during the French Wars of Religion, but institutions were not extractive, e.g. Brittany, contemporary Easter attendance is higher. However, it is lower in regions where the counter-reformers led extractive institutions, e.g. Paris and Provence. Finally, I document that regions with a higher number of Jansenist clergy in 1725 displayed lower religious adherence in 1966. When accounting for the interaction of the extent of the Holy League and extractive institutions, both coefficients decrease in magnitude, supporting the historical hypothesis that Jansenism played a crucial role in the backlash against the Church and monarchy.

These results are only intended to spur a discussion on the drivers of secularization, and should hopefully provide avenue for future research addressing this question.

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