Online appendix to: The Cultural Origins of the Demographic Transition in France (Blanc, 2026)

Appendix Table of Contents

Appendix 1– Additional details on robustness

Determinants of the level of marital fertility. I estimate the cross-sectional determinants of I_g from 1831 to 1931 using OLS. Appendix Table A6 reports the results for 1871 (before the onset of the second phase of the fertility decline, and when Paris is included in the data), along with robust standard errors. A 10-percentage-point decrease in the refractory clergy in 1791 is associated with a decrease in the marital fertility index of about 3 percentage points. The marital fertility index in France averaged 0.48 in 1851, about half the Hutterite standard. Appendix Figure A3 displays the standardized beta coefficients over time–as in Table 2–allowing for a more detailed analysis. Without controls, population density first had a positive effect on the level of fertility and the effect became negative after 1846, while urbanization was initially close to zero and became increasingly negative as time passed, somewhat consistent with a Malthusian mechanism or with the idea that overpopulation led to lower fertility in the nineteenth century (Braudel, 1986,*a*). For literacy, the univariate correlation is negative throughout. With controls, I find a pattern broadly consistent with a quantity-quality trade-off: the correlation is positive in the 1830s and mostly negative after 1860, although it becomes slightly positive again in 1931.

Robustness to using alternative fertility indices. Appendix Table A7 re-estimates the regression of the level of marital fertility with two further indices of Coale and Watkins (1986), overall fertility (I_f) and illegitimate fertility (I_h). The indices I_g, I_f, and I_h measure the fertility of married women, all women, and unmarried women, respectively, relative to the Hutterite maximum, and are linked by the identity $I_f = I_m I_g + (1 - I_m) I_h$, where I_m is the proportion married. The coefficient on the refractory clergy remains positive and significant for overall fertility, at about a quarter of its size for marital fertility, as expected since overall fertility weights marital fertility by the proportion married. It is small, negative, and, with controls, at most marginally significant for illegitimate fertility. The effect is therefore concentrated in marital fertility, indicating that secularization lowered fertility through deliberate control within marriage rather than through non-marital childbearing, consistent with the individual-level evidence that the decline came largely from parity-specific stopping (Appendix Figure B4). The same pattern holds in the aggregate: the fall in overall fertility reflects the fall in marital fertility, while the proportion married and illegitimate fertility change little.

Robustness to using alternative definitions of transition date. I estimate Equation 1 for alternative definitions of transition date in Appendix Table A8: 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.

Robustness to controlling for child mortality. Appendix Table A9 further controls for infant and child mortality in the estimation of the determinants of transition date. The coefficients on infant and child mortality are statistically insignificant, and the effect of the refractory clergy is unaffected–consistent with earlier evidence of a limited role for mortality in the fertility decline (van de Walle, 1986), and with unified growth theory (Galor, 2011), which treats the decline in fertility as largely independent of the decline in mortality.

Robustness to controlling for correlates of secularization. Appendix Table A10 controls for three additional, deep-rooted correlates of religiosity before the onset of secularization, introduced and discussed as drivers of secularization in Section 7: the presence of the Holy League in 1590, the value of the *gabelle* in 1770, and the presence of Jansenist clergy in 1725. The coefficient on the refractory clergy is virtually unchanged and remains significant at the 1 percent level, especially after accounting for the full set of controls–consistent with these controls accounting effectively for religiosity before the onset of secularization, and the share of refractory clergy capturing (the absence of) secularization. I then report the reduced form omitting the refractory clergy. The pattern mirrors the results documented in Table 5: the Holy League alone delays the transition by about three decades, the *gabelle* alone has no effect, and their interaction predicts a substantially earlier transition, with a standardized coefficient of -0.72. With the full set of controls, the estimates are not significant, likely due to the limited variation in these variables across *départements* within regions.

Robustness to weighting. In the baseline, observations are weighted by *département* population in 1831 and the refractory clergy is constructed as the population-weighted average of district-level shares. Appendix Tables A11 and A12 re-estimate the determinants of transition date without weighting observations and using an unweighted share of refractory clergy. The estimated coefficients are virtually unchanged and remain significant at the 1 percent level throughout, while the weighted and unweighted estimates are within a few years of one another once the full set of controls is included. These estimates indicate that the results are not sensitive to whether one estimates the relationship for the average *département* or the population-weighted relationship, and that they are not driven by the most populous *départements* (Solon, Haider and Wooldridge, 2015).

Survival analysis. Because the dependent variable is the date of the transition to lower fertility, survival analysis is a natural way to model it. In Appendix Table A13, I use a Cox proportional-hazards model to relate the refractory clergy to the rate of transition, treating the first census where a *département* is observed below the threshold as the discrete event date. The refractory clergy is associated with a significantly lower rate, and hence a later transition, consistent with my baseline results.

Sensitivity of estimates and coefficient bounds. The set of control variables presented in Section 5 was gathered through an extensive process of data collection and accounts for a large number of cultural, economic, and institutional factors. Yet only a particular choice of covariates could be accounted for in the specifications under study, and collinearity or omitted variables could be introduced, which would result in biased and distorted coefficients (Brodeur et al., 2016; Brodeur, Cook and Heyes, 2020*a*; Granger and Uhlig, 1990; Leamer, 1983; Leamer and Leonard, 1983).

I evaluate the robustness of the association across all $65,536$ (2^{16}) combinations of the fourteen controls and the two fixed-effect families. Figure 7 reports the $16,384$ (2^{14}) specifications in which region and *pays*-status fixed effects are included in every regression.[41] The mean estimated coefficient in Figure 7 is 104.43 years, and the minimum is 81.36 years.

Double lasso estimation and variable selection. Since the number of potential variables of interest is large and the determinants of both the decline in fertility and dechristianization are not well understood, I use lasso, a supervised machine-learning technique. Lasso is a regularization and variable selection method introduced by Tibshirani (1996). It is essentially an ℓ_1-penalized least-squares method in which coefficients are estimated by minimizing the sum of squared residuals, as in OLS, but a shrinking process is applied. A tuning parameter λ controls the strength of the penalty and is chosen by k-fold cross-validation to minimize the average mean squared error across out-of-sample predictions. Its purpose is threefold. First, it allows me to flexibly select important covariates of the refractory clergy in 1791 in order to account for pre-existing differences. Second, it selects covariates of the timing of the transition in a context where the decline in fertility cannot be explained by traditional theories. Third, it allows me to understand the relevance of specific predictors by shrinking the regression coefficients to zero.

The determinants of transition date are estimated in Appendix Table A14 with the double-selection lasso estimation method described in Belloni, Chernozhukov and Hansen (2013); Urminsky, Hansen and Chernozhukov (2019). This two-step procedure identifies covariates that predict either the dependent or the independent variable. The variables selected in either step are included in the final regression. This method alleviates biases commonly associated with lasso to the extent that excluding variables with moderate but non-null effects results in omitted-variable bias. In the first column, I report the unweighted OLS coefficient on the refractory clergy with the full set of controls.[42] Specifications 2 to 5 display the double lasso-estimated coefficients. In specifications 3 and 5, in light of the standardized coefficients estimated in Table 2, I force the selection of *Encyclopédie* subscriptions per capita by not penalizing its coefficient. In specifications 4 and 5, I force the selection of fixed effects, otherwise not included in the set of controls. Without forcing the inclusion of the region and *pays*-status fixed effects, only two controls–*Encyclopédie* subscriptions and linguistic distance–are selected by default. Moreover, the variables selected with fixed effects mostly capture cultural traits. Last, but not least, the share of deserters among conscripts, which controls for state legitimacy at the time of the French Revolution in order to capture the effect of religiosity, is selected–which is reassuring. The estimated coefficient on the refractory clergy remains particularly large while, as predicted, lasso reduces variance.

Appendix Figure A5 plots the coefficient paths for the two lassos with fixed effects. The size of each of the coefficients is plotted against the penalty term λ. When λ equals zero, lasso is equivalent to OLS; and all coefficients gradually shrink to zero as it increases. Only limited regularization is needed for the determinants of the refractory clergy in 1791, suggesting that

[41] Appendix Figure A4 reports all $65,536$ specifications, allowing the two fixed-effect families themselves to vary.

[42] Because weighting creates significant issues with lasso, observations are not weighted by population.

few observables explain its distribution with a large or robust effect when region and *pays*-status fixed effects are included. This is consistent with the evidence on Provence suggesting that there were only small differences in religiosity before the onset of secularization within region. As expected, the variable with the largest predictive power is the share of deserters among conscripts–validating its inclusion as a control to account for institutional factors related to the French Revolution. Yet although none of the controls seem to matter for the distribution of religiosity, the refractory clergy itself has a large and robust predictive power for transition date (and, consistent with the standardized beta coefficients estimated previously, so does *Encyclopédie* subscriptions).

Omitted variables. While reverse causality is not an issue, omitted variables may result in bias. Religious areas may place more emphasis on tradition and be less prone to innovation and change, which would bias estimates and be a threat to identification. In what follows, I formally account for unobservables and rely on Altonji, Elder and Taber (2005); Oster (2016) to construct bounds to the true effect of the refractory clergy in 1791. Because the refractory clergy is positively correlated with development after secularization took place (Appendix Table A2), estimates are expected to be downwards biased towards zero.

I estimate a coefficient on religiosity accounting for omitted variables under the assumption of equal selection suggested by Altonji, Elder and Taber (2005); Oster (2016)–that is, that unobservables and observables are equally related to the treatment.[43] Throughout this subsection, I alternatively make the two following assumptions about selection on unobservables: unobservable selection is exactly proportional to selection on observables (Assumption A); unobservable selection is exactly proportional to selection on the diffusion of the Age of Enlightenment (as proxied by $\log 1+$ *Encyclopédie* subscriptions per capita in the period 1776–79) conditional on other observables (Assumption B).

The first assumption is fairly standard, while the other relies on the idea that one can learn about unobservables that explain marital fertility from unobservable determinants of *Encyclopédie* subscriptions per capita, a standard measure to proxy for the diffusion of the Age of Enlightenment (Darnton, 1973; Squicciarini and Voigtländer, 2015). Using this proxy for a different dimension of cultural change allows me to sensibly model unobservables that may have affected marital fertility. Intuitively, although this is an oversimplification, I assume that the Age of Enlightenment affected marital fertility through unobserved factors (for example, libertinage, emphasis on change as opposed to tradition, industrial mindset) that are also correlated with secularization.

Appendix Table A15 reports the results of the regression on the determinants of transition year accounting for unobservable selection. I report Oster's beta for both assumptions, assuming a degree of proportionality of one, and the δ statistics, which reflect how strong selection on unobservables should be to explain away the estimated effect of the refractory clergy. Stan-

[43] Oster (2016) shows that movements in the R^2, and not only coefficient movements, can give information about the direction and the size of the bias arising from omitted variables. The $\beta^*(R^2_{max}, \delta)$ statistic proposed by Oster (2016), with δ the degree of proportionality between selection on unobservables and observables, converges in probability to the true coefficient. If 0 does not lie in the interval between the OLS coefficient and $\beta^*(R^2_{max}, 1)$ (Oster's beta), then one can reject the null that the coefficient of interest is exclusively driven by unobservables. Because of measurement error inherent in historical data, I set $R^2_{max} = .9$ in all specifications.

dard errors bootstrapped over one thousand replications are reported. Results are virtually unaffected by selection on unobservables, and if anything the estimated coefficients under the equal-selection assumption are larger than under OLS. In most specifications, selection on unobservables would have to be stronger than selection on observables–up to 10 times as strong–or act in the opposite direction entirely to drive the estimates to zero.

Finally, Appendix Figure A6 plots the effect of the share of the refractory clergy in 1791 over time after accounting for omitted variables. Panel A displays the estimated OLS and omitted-variable-adjusted coefficients for the refractory clergy from 1831 to 1931. OLS coefficients are biased downwards throughout. Unobserved factors, such as a scientific and industrial mindset and less emphasis on tradition, were likely to play an observable role in the course of development as income per capita took off and the second phase of the demographic transition started, which could explain why the negative bias of OLS is more important after the 1870s. Panel B displays the marital fertility index for France and for England over time, along with a counterfactual index for France, which is imputed by setting the share of refractory clergy to 100 percent under the coefficient bounds suggested by Oster. Secularization seems to account for the majority of the difference between France and England and Wales.

Spatial dependence. The spatial distribution of the refractory clergy and marital fertility is geographically clustered. Although cultural attributes are often spatially clustered, this could lead one to interpret the results as strong and robust, but the interpretation would be erroneous since nearby places are naturally more likely to possess the same attributes. It is possible to account for spatial dependence by reporting adjusted standard errors (Colella et al., 2019; Conley, 1999). Yet Conley and Kelly (2025) show that Conley standard errors are often too small because of low cutoff values, the distance beyond which spatial correlation is assumed to vanish. As a consequence, spatial noise with the same spatial-correlation structure as the data can generate large test statistics even in the absence of a genuine relationship. Following Conley and Kelly (2025), I report Conley standard errors for two different correlation ranges of 250 kilometers (Assumption 1) or 500 kilometers (Assumption 2). Then, I report the p-value of Moran's test for spatial dependence of OLS residuals, a standard spatial-correlation statistic. Last, I report the results of simulations where the dependent and independent variables are alternatively replaced by spatial noise. I run one thousand independent simulations each time and report the fraction of regressions significant at the 0.1 percent level.

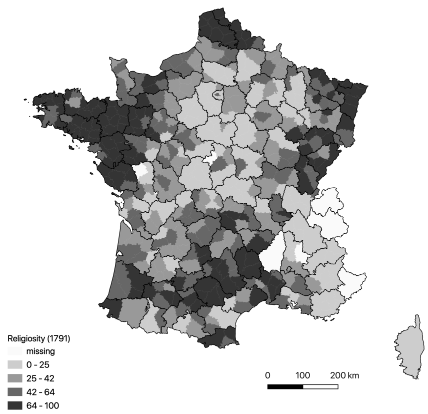
Appendix Table A16 displays the results. Panel A provides the outcome of the simulations and tests for spatial correlation. Moran's test rejects spatial independence in the first two specifications, although in specification 2 the p-value under the 500-kilometer range is 0.02. Spatial noise significantly explains transition date at the 0.1 percent level, typically in less than 10 percent of simulations. Panel B displays the estimated coefficient on the refractory clergy and spatial-correlation-adjusted standard errors. After the inclusion of cultural and institutional controls, including *pays*-status fixed effects, I fail to reject spatial independence under either correlation range. This remains unchanged with region fixed effects and additional controls. With fixed effects, at most 1 percent of simulations return significant results, and Conley standard errors are smaller than conventional standard errors (Case, 1991). These results suggest that the effect of religiosity on transition date is not spurious and cannot be explained by simply fitting spatial noise.

Appendix 2– Supplementary figures

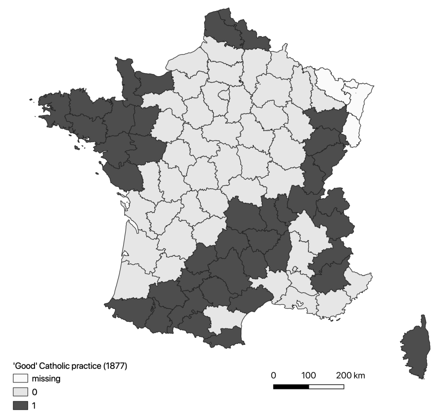
A2.1 Département-level results

Figure A1: Proxies of religiosity

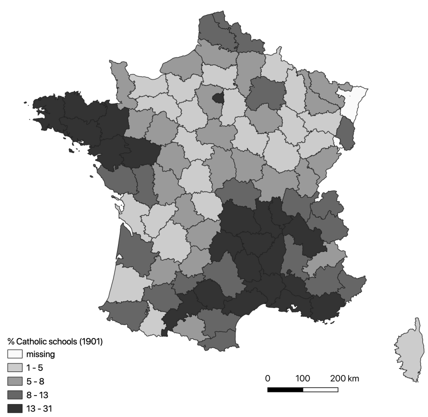
Note: This figure displays the spatial distribution of the refractory clergy in 1791 (Panel A) and of proxies for religiosity in the nineteenth and twentieth centuries: 'good' Catholic practice in 1877 (Panel B), the share of Catholic schools in 1901 (Panel C), Catholic tradition in 1950 (Panel D), Easter attendance in 1966 (Panel E), and the ratio of baptisms to births in 2013 (Panel F). Sources: Tackett (1986) for the refractory clergy; Gadille (1967) for 1877; SGF (1901) for 1901; Boulard (1947) for 1950; Boulard (1966) for 1966; and Vaillant and Dufour (2013) for 2013.



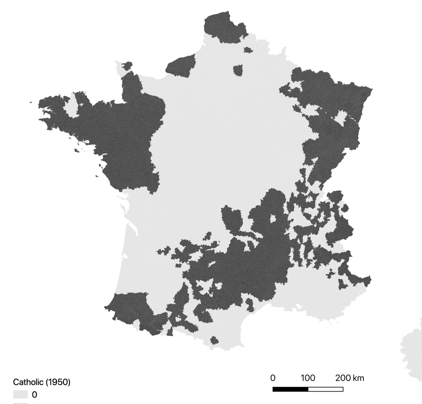
(Panel A) Refractory clergy (1791)



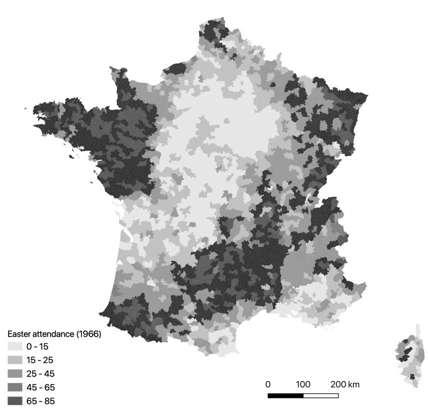
(Panel B) 'Good' Catholic practice (1877)



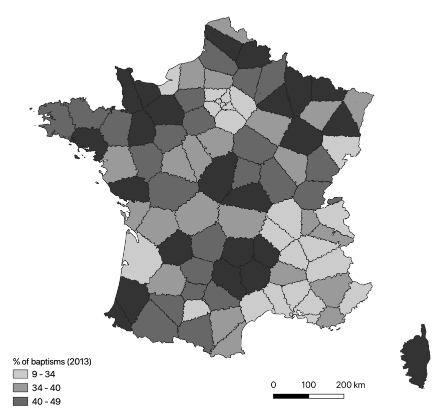
(Panel C) Share of Catholic schools (1901)



(Panel D) Catholic (1950)



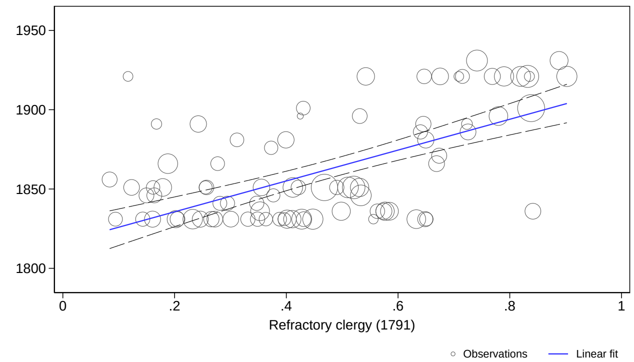
(Panel E) Easter attendance (1966)



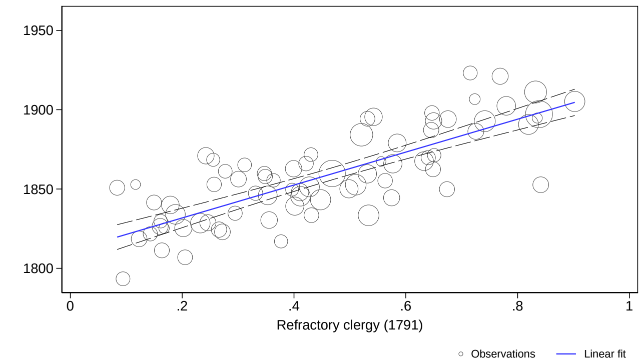
(Panel F) Baptisms/births (2013)

Figure A2: Determinants of transition date

Note: This figure displays the raw scatterplot (Panel A, column 1 of Table 1) and the partial residual plot (Panel B, column 7, after partialling out the full set of controls from Table 1), of transition dates on the population-weighted share of refractory clergy in 1791, estimated by OLS. Sources: Coale and Watkins (1986) for transition date and Tackett (1986) for the refractory clergy.



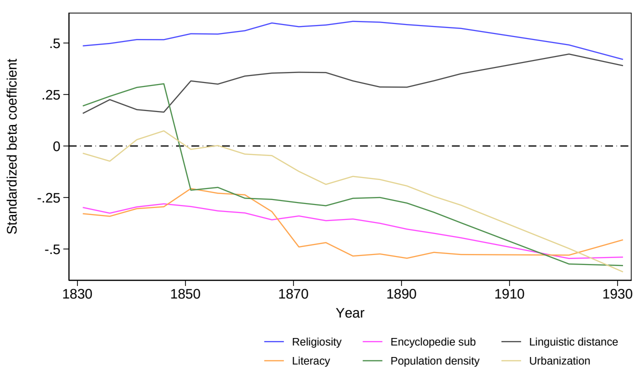
(Panel A) Scatterplot



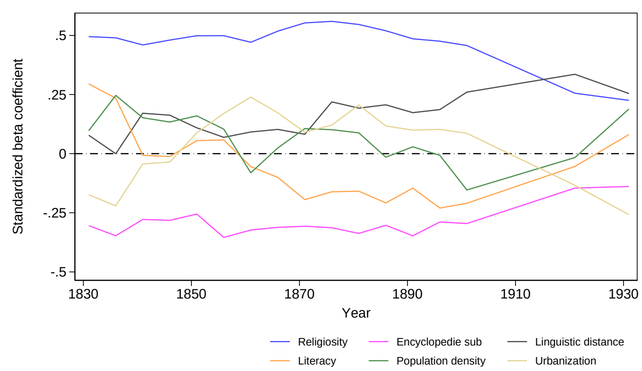
(Panel B) Partial residual plot (full set of controls)

Figure A3: Magnitude and importance of the determinants of marital fertility (1831-1931)

Note: This figure displays standardized beta coefficients from cross-sectional regressions of the marital fertility index I_g in a given year on the variables of interest from Table 2 (the refractory clergy, *Encyclopédie* subscriptions, linguistic distance, literacy, population density, and urbanization), with population measured in the year of observation and literacy measured using the closest available observation. Panel A reports univariate regressions with the listed variable as the only regressor; Panel B plots the coefficients controlling for the full set of controls from Table 1. Observations are weighted by *département* population. Sources: Coale and Watkins (1986) for I_g and, for the regressors, as in Table 1.



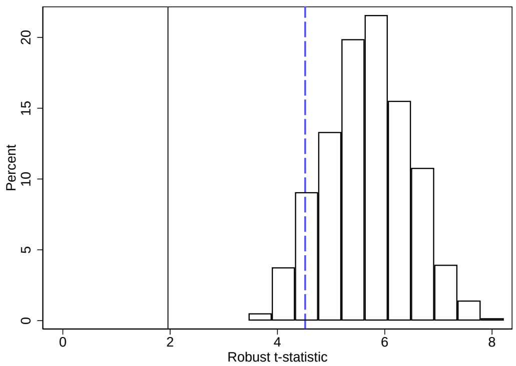
(Panel A) Univariate regressions (no controls)



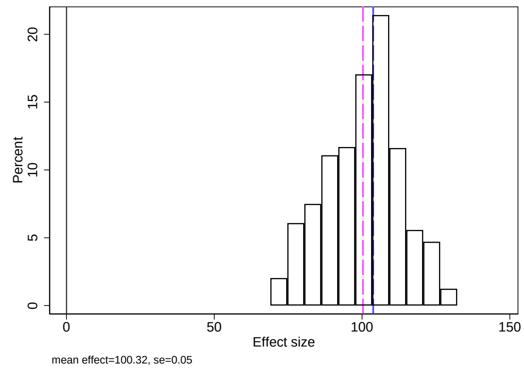
(Panel B) Full set of controls

Figure A4: Determinants of transition date: distribution of estimates and t-statistics across all combinations of controls

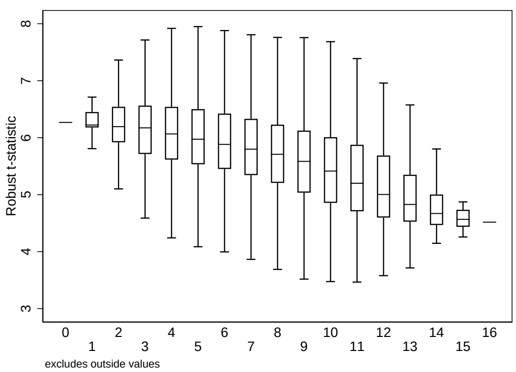
Note: This figure displays the results of $2^{16} = 65,536$ cross-sectional regressions of transition dates on the population-weighted share of refractory clergy and all possible combinations of controls. The upper-left panel displays the distribution of t-statistics and the upper-right panel the distribution of coefficients; the lower panels plot the robust t-statistic and effect size by number of controls. The blue line plots the coefficient estimated in Table 1 with the full set of controls (column 7); the red line plots the average coefficient across all combinations. The main explanatory variable is defined as the population-weighted share of refractory clergy in 1791; transition date is defined as the first year with $I_g \leq .5$. The baseline set of controls from Table 1 is included. Observations are weighted by *département* population in 1831. Robust standard errors are reported. Sources: Coale and Watkins (1986) for transition date and Tackett (1986) for the refractory clergy. This figure was generated using the Stata program provided by Brodeur, Cook and Heyes (2020*b*).



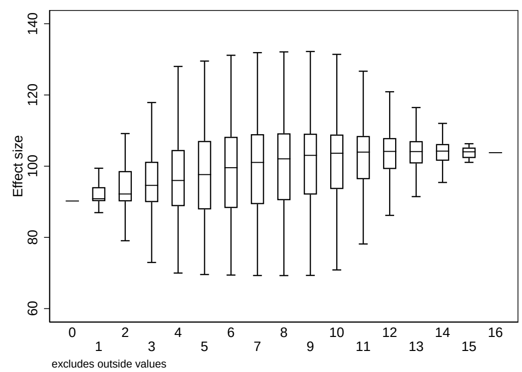
(Panel A) t-statistic curve



(Panel B) Effect curve



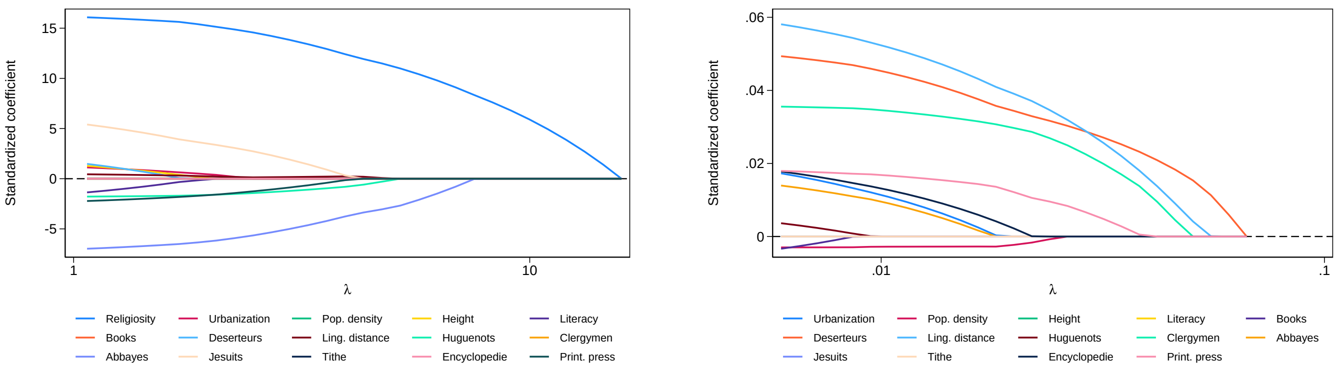
(Panel C) t-statistic by # of controls



(Panel D) Effect size by # of controls

Figure A5: Coefficient path

Note: This figure displays the lasso coefficient paths for the determinants of transition date (Panel A) and the determinants of the refractory clergy in 1791 (Panel B) plotted against the penalty parameter lambda, with region and *pays*-status fixed effects included. To ensure fair penalization, the predictors are standardized, while the dependent variables remain in their original units. Further details are provided in Appendix Table A14. Sources: Coale and Watkins (1986) for transition date and Tackett (1986) for the refractory clergy.

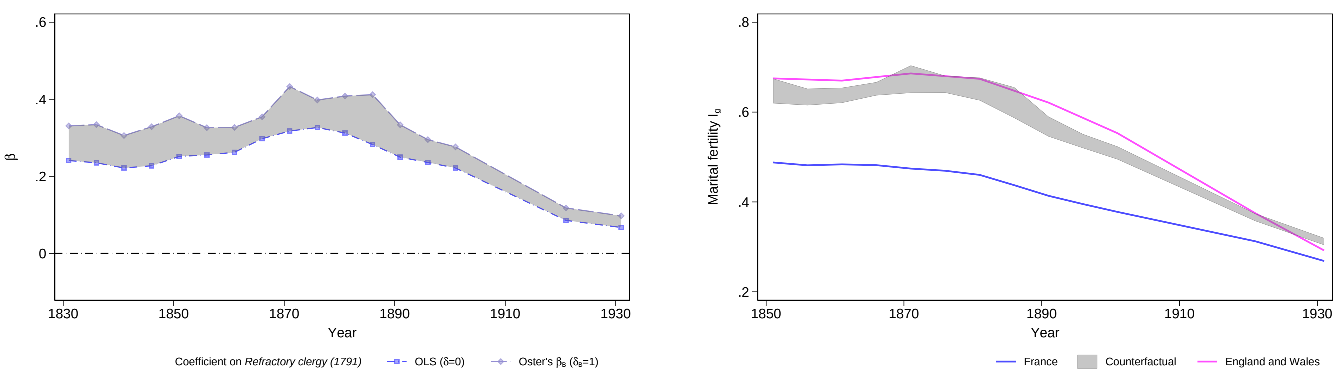


(Panel A) Transition date

(Panel B) Refractory clergy (1791)

Figure A6: Accounting for unobservables (1831-1931)

Note: This figure displays the estimated impact of the population-weighted share of refractory clergy in 1791 on marital fertility over time. Panel A displays the estimated coefficients accounting for the full set of controls under no selection (OLS) and under Assumption B (β_B), which assumes that selection on unobservables is proportional to selection on the diffusion of the Enlightenment, conditional on the other observables. Panel B displays the marital fertility index for France and for England and Wales over time, along with a counterfactual index for France.



(Panel A) Omitted variables-adjusted coefficient

(Panel B) Counterfactual fertility

A2.2 Individual-level results

Figure B1: Lineage and fertility sample

Note: This figure displays the vertical lineage of individual i, tracing back four generations. This tree does not have any horizontal lineage recorded and would therefore not be included in the fertility sample, which includes individuals with at least one ancestor in the four preceding generations recorded as having had more than one child.

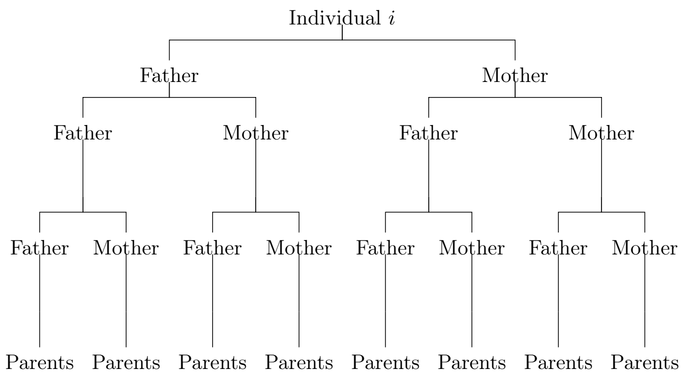
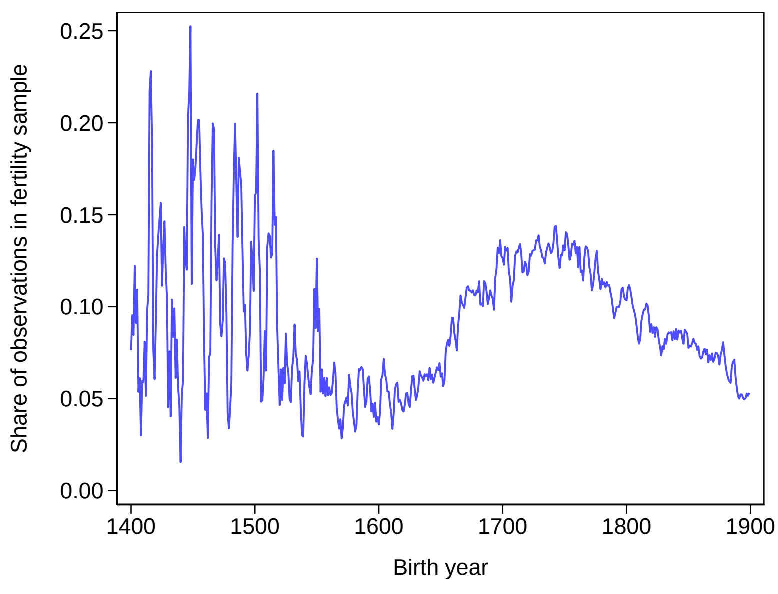
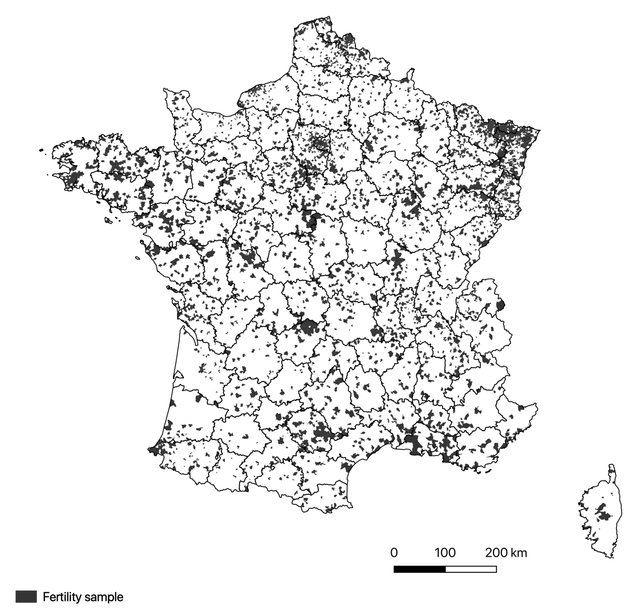


Figure B2: Recording of horizontal lineages (fertility sample) over time and space

Note: This figure displays the fertility sample in the genealogical data for France, over time (Panel A) and space (Panel B). The fertility sample consists of individuals with a recorded horizontal lineage, defined as those with at least one parent in any of the four preceding generations recorded as having more than one child, and contains 31,553 individuals, approximately 10 percent of the main sample. Panel A plots the share of observations in the fertility sample by birth year; Panel B plots the towns in which these individuals are located. Source: geni.com, via Kaplanis et al. (2018).



(Panel A) Over time



(Panel B) Over space

Figure B3: Urbanization in the genealogies before 1700

Note: This figure displays the urbanization series over time in the fertility sample of the crowdsourced genealogies in France and in representative data, as in Panel B of Figure 4, but before 1700. Urbanization is defined as the share of the population who had their first child in a given year and were born 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). Year is coded as of the year of birth of the first child. Further details are provided in Figure 4.

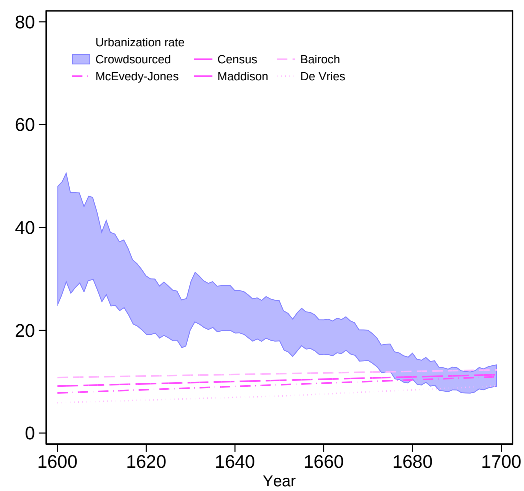
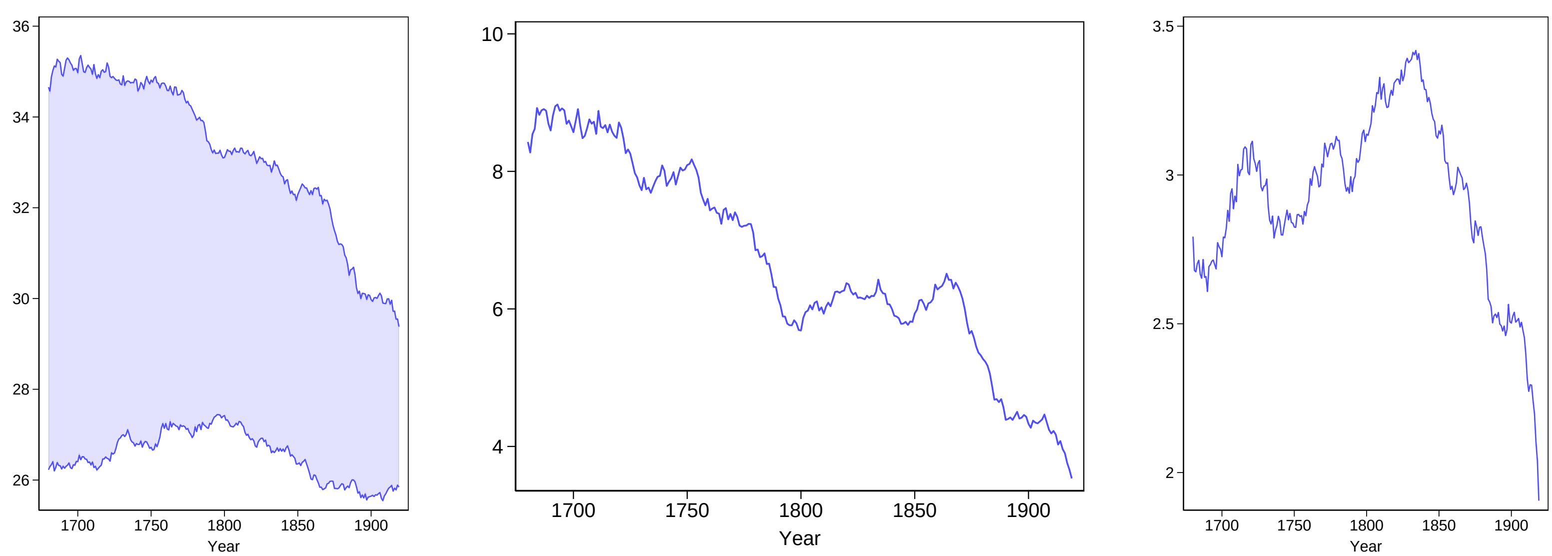


Figure B4: The timing and spacing of childbearing

Note: This figure displays, for women in the fertility sample, age at birth of the first and last child (Panel A), the childbearing span (Panel B), and birth spacing for women with at least two linked children (Panel C). Year is defined as the year of birth of the first child. The childbearing span is defined as the duration between the first and last birth. Birth spacing is defined as the average duration between successive births. Source: geni.com, via Kaplanis et al. (2018).



(Panel A) Age at birth of first and last child

(Panel B) Childbearing span

(Panel C) Birth spacing (years)

Figure B5: Distribution regressions

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

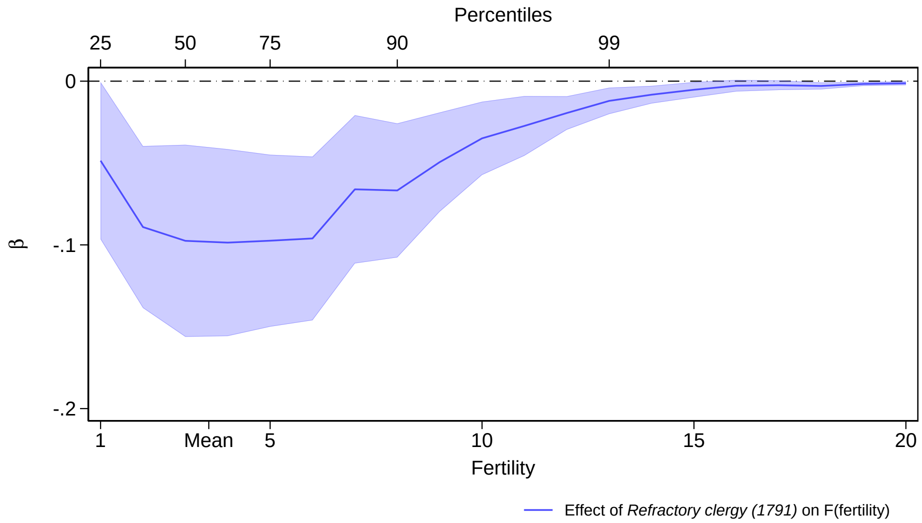
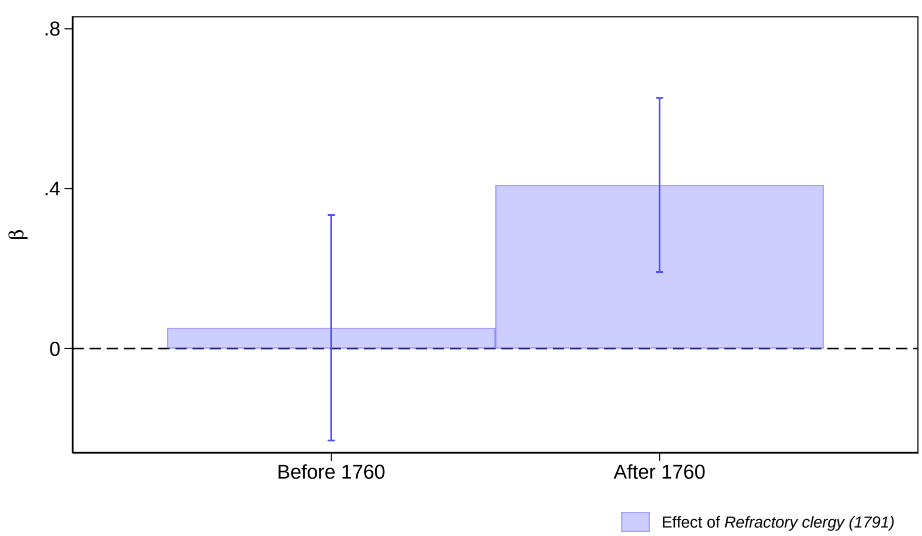


Figure B6: Effect of the refractory clergy over time

Note: This figure plots the effect of the share of refractory clergy in 1791 on the log conditional mean of fertility before and after secularization, along with 90 percent confidence intervals, corresponding to specification (4) in Table 4.



A2.3 Additional results

Figure C1: Timing of adoption of the modern census

Note: This figure is taken from Brambor et al. (2020) (p. 181).

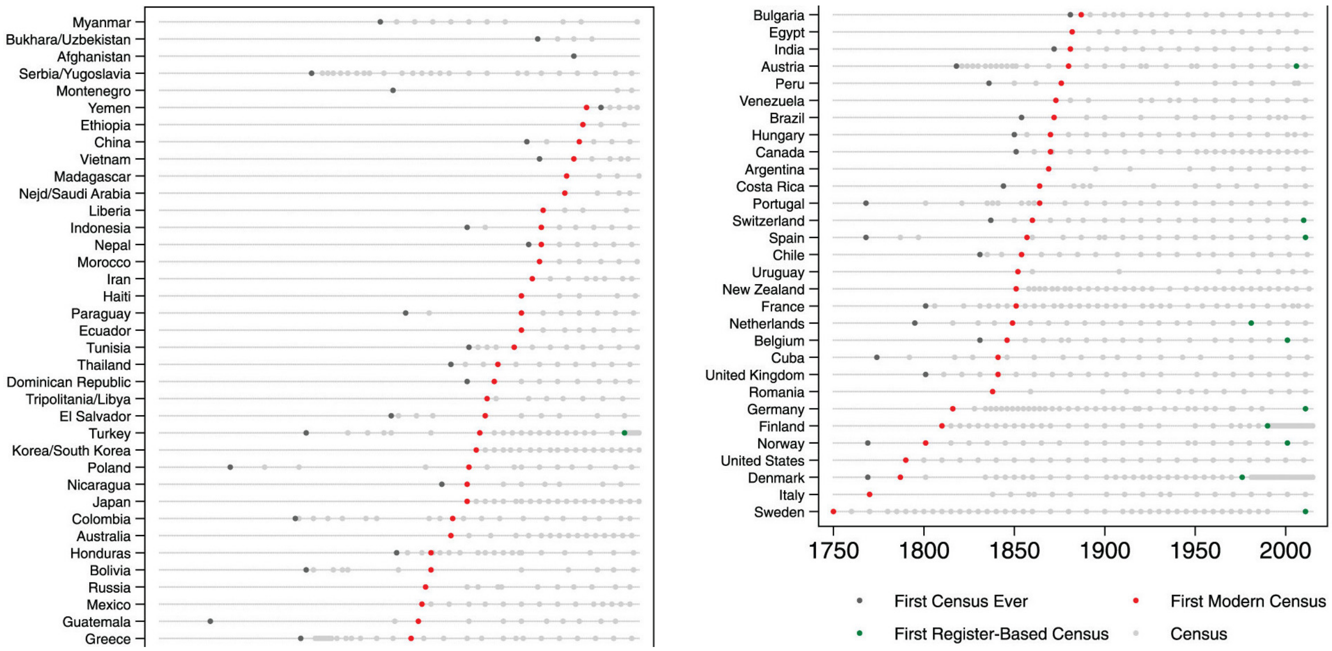
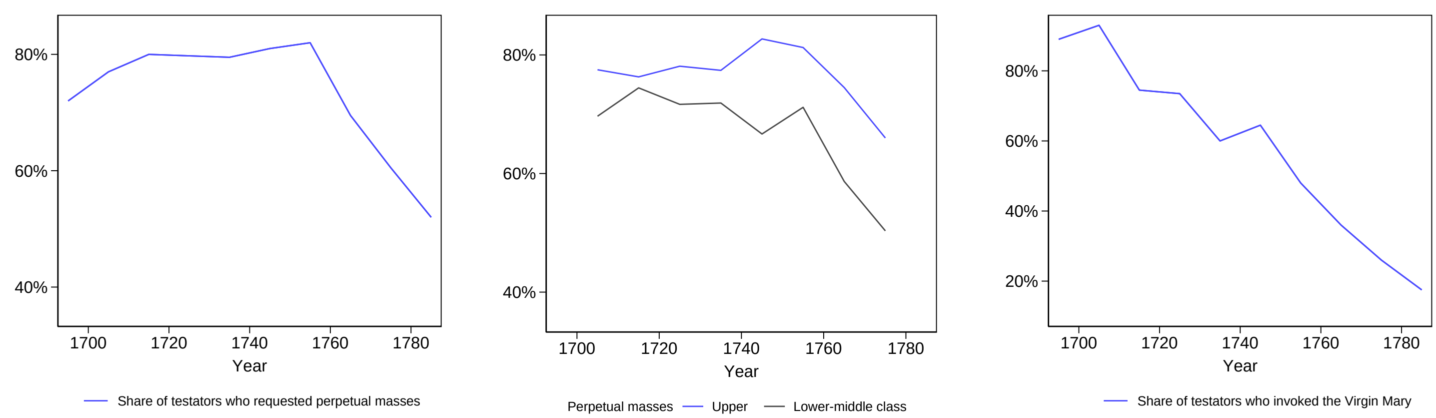


Figure C2: Provençal wills

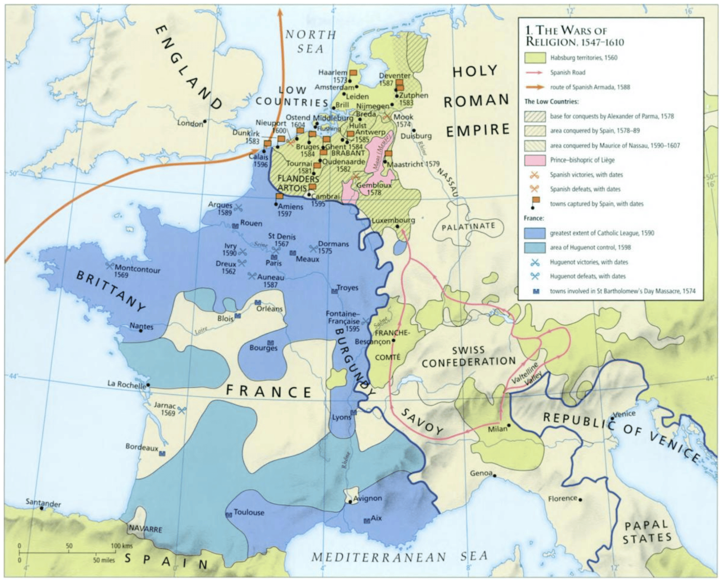
Note: This figure displays the overall share of testators who requested perpetual masses (Panel A), the share by social class (Panel B), and the share of testators who invoked the Virgin Mary in the opening statements of their wills (Panel C), over time in Provence, from 1690 to 1789. Source: Vovelle (1973).



(Panel A) Perpetual masses **(Panel B)** Perpetual masses (by social class) **(Panel C)** Invocations of Virgin Mary

Figure C3: Catholic League, 1590

Note: This figure displays the spatial distribution of the Catholic (Holy) League in 1590 (Black, 1996, p. 57).



Appendix 3– Supplementary tables

A3.1 Département-level results

Table A1: Summary statistics at the *département* level

Note: All observations are weighted by population in 1793.

	Mean	St. dev.	Minimum	Maximum	N
Panel A: Fertility					
Transition date (below .5)	1864.25	35.00	1831.00	1931.00	89
Marital fertility index I_g (1831)	0.56	0.12	0.35	0.81	77
Marital fertility index I_g (1836)	0.54	0.11	0.33	0.78	77
Marital fertility index I_g (1841)	0.52	0.11	0.32	0.76	77
Marital fertility index I_g (1846)	0.51	0.11	0.31	0.73	77
Marital fertility index I_g (1851)	0.49	0.11	0.30	0.75	85
Marital fertility index I_g (1856)	0.49	0.11	0.29	0.74	85
Marital fertility index I_g (1861)	0.49	0.12	0.28	0.78	88
Marital fertility index I_g (1866)	0.49	0.13	0.28	0.77	88
Marital fertility index I_g (1871)	0.49	0.13	0.28	0.81	86
Marital fertility index I_g (1876)	0.48	0.14	0.27	0.84	86
Marital fertility index I_g (1881)	0.48	0.14	0.27	0.82	86
Marital fertility index I_g (1886)	0.45	0.13	0.25	0.80	86
Marital fertility index I_g (1891)	0.43	0.12	0.23	0.77	86
Marital fertility index I_g (1896)	0.41	0.12	0.23	0.74	86
Marital fertility index I_g (1901)	0.40	0.11	0.23	0.72	86
Panel B: Religiosity					
Refractory clergy (1791)	0.49	0.22	0.08	0.90	85
Clergymen per 10,000 inhabitants (1791)	19.07	6.75	3.30	41.23	84
Abbeys (1756)	2.52	2.37	0.00	13.00	89
Tithe (1750)	15.61	6.39	9.00	40.00	87
Huguenots per 10,000 inhabitants (1815)	167.15	443.76	0.16	3424.00	83
Centuries of Jesuit presence (bef. 1763)	1.26	0.69	0.00	2.02	89
Panel C: Cultural and institutional factors					
Books printed (1500)	140.87	583.43	0.00	3264.00	85
Presence of a printing press (1500)	0.43	0.50	0.00	1.00	85
Presence of a university (bef. 1750)	0.31	0.46	0.00	1.00	85
$\log 1 + \text{SubDens}$ (1777-1779)	0.96	0.76	0.00	3.52	86
Pays d'Etat	0.33	0.47	0.00	1.00	89
Pays d'imposition	0.08	0.27	0.00	1.00	89
Share of deserters among conscripts (1798-1805)	26.76	12.56	4.50	54.50	84
Linguistic distance from French (1900)	0.48	0.16	0.00	0.73	87
Panel D: Education and schooling					
Literacy (1829)	45.75	17.47	14.30	82.50	85
Literacy (1835)	53.15	19.48	18.20	91.30	85
Literacy (1840)	56.51	20.28	18.40	97.10	85
Literacy (1845)	59.89	19.32	22.70	97.70	85
Literacy (1850)	63.89	18.51	25.70	97.00	85
Literacy (1855)	66.24	17.95	26.10	96.30	85
Literacy (1860)	69.10	17.02	32.10	96.10	88
Literacy (1865)	73.36	15.59	37.90	97.00	88
Literacy (1870)	78.82	13.53	46.80	98.30	88
Literacy (1875)	82.21	11.04	50.90	98.30	85
Literacy (1881)	86.52	8.87	58.60	98.50	84
Literacy (1886)	89.89	7.01	64.90	98.80	85
Literacy (1891)	92.84	5.56	73.50	99.10	85
Literacy (1896)	94.93	4.21	80.60	99.70	85
Panel E: Pre-industrial development					
Average soldier height (bef. 1760)	-0	1	-1	2	89
Population (1793)	353,555	139,347	36,000	748,030	89
Population (1831)	410,173	181,509	49,929	965,559	87
Population (1836)	433,808	190,525	51,423	1,068,565	86
Population (1841)	443,038	198,335	52,364	1,114,788	87
Population (1846)	452,682	217,157	55,199	1,254,810	89
Population (1851)	459,964	223,171	56,491	1,268,039	86
Population (1856)	465,172	246,278	53,220	1,447,785	88
Population (1861)	494,149	322,159	55,551	2,004,490	88
Population (1866)	500,334	357,101	56,127	2,207,445	89
Population (1871)	499,197	371,956	56,030	2,286,577	89
Population (1876)	515,598	399,923	67,818	2,471,999	89
Population (1881)	532,002	460,649	73,347	2,865,982	89
Population (1886)	542,974	490,648	78,844	3,040,775	89
Population (1891)	548,924	522,411	82,649	3,224,743	89
Population (1896)	556,109	558,329	86,921	3,432,669	89
Population (1901)	568,526	613,202	91,128	3,777,679	89
Panel F: Contemporary development					
Urbanization (1793)	0.18	0.16	0.02	0.86	86
Urbanization (1831)	0.19	0.16	0.02	0.87	85
Urbanization (1836)	0.19	0.16	0.02	0.89	86
Urbanization (1841)	0.19	0.16	0.02	0.88	87
Urbanization (1846)	0.20	0.16	0.03	0.89	87
Urbanization (1851)	0.21	0.17	0.02	0.89	85
Urbanization (1856)	0.22	0.17	0.03	0.91	87
Urbanization (1861)	0.23	0.17	0.04	0.93	88
Urbanization (1866)	0.23	0.17	0.04	0.94	88
Urbanization (1871)	0.24	0.18	0.04	0.95	89
Urbanization (1876)	0.25	0.18	0.05	0.95	89
Urbanization (1881)	0.26	0.18	0.05	0.96	89
Urbanization (1886)	0.27	0.18	0.05	0.96	89
Urbanization (1891)	0.28	0.18	0.05	0.97	89
Urbanization (1896)	0.29	0.18	0.05	0.97	89
Urbanization (1901)	0.30	0.18	0.05	0.97	89

Table A2: Refractory clergy and development

Note: This table displays the results of the cross-sectional regressions of different proxies for development in the eighteenth century on the population-weighted share of refractory clergy in 1791. The main dependent variables include population (BDCassini, 2017), urbanization (BDCassini, 2017), *Encyclopédie* subscriptions per capita (Darnton, 1973), and soldier height before 1760 (Komlos, 2006). All specifications control for the share of deserters among conscripts in the French army between 1798 and 1805. Columns 3 and 4 report average marginal effects from maximum-likelihood estimates. All observations are weighted by population in 1793. Standard errors clustered at the district level are reported. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	log population (1793)		Dummy=1 if urban (1793)		log 1+Encycl. (1776-79)		Soldier height (bef. 1760)	
	OLS		Logit		OLS		OLS	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Refractory clergy (1791)								
Marginal effect	0.923***	0.594***	0.133***	0.083**	0.414**	0.099	0.196*	0.206*
	(0.168)	(0.180)	(0.030)	(0.042)	(0.181)	(0.155)	(0.106)	(0.110)
Controls								
Religiosity (pre-secularization)		Yes		Yes		Yes		Yes
Individual-level controls							Yes	Yes
Observations	32,116	32,116	32,116	32,116	32,116	32,116	12,943	12,943
Clusters (districts)	510	510	510	510	510	510	407	407
R^2	0.02	0.18	.	.	0.01	0.29	0.10	0.10

Table A3: Refractory clergy and religiosity after secularization

Note: This table displays the results of the cross-sectional regressions of different proxies for religiosity in 1877 (Gadille, 1967), 1901 (SGF, 1901), 1950 (Boulard, 1947), 1966 (Boulard, 1966), and 2013 (Vaillant and Dufour, 2013) on the population-weighted share of refractory clergy in 1791. All specifications control for the share of deserters among conscripts in the French army between 1798 and 1805. Specifications 1 and 3 report average marginal effects and are estimated with maximum likelihood. All observations are weighted by *département* population in the year of observation of the outcome variable. Robust standard errors are reported. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	(1) Dummy=1 if 'good' Catholic practice (1877)	(2) Share Catholic Schools (1901)	(3) Dummy=1 if Catholic (1947)	(4) Average Easter attendance (1966)	(5) Share baptized births (2013)
	Logit	OLS	Logit	OLS	OLS
Refractory clergy (1791)					
Marginal effect	1.570***		0.954***		
	(0.197)		(0.106)		
Standardized beta coefficient		0.313***		0.466***	0.418***
		(0.116)		(0.072)	(0.108)
Observations	80	82	503	503	92
R^2	.	0.14	.	0.23	0.18

Table A4: Refractory clergy and religiosity before the onset of secularization

Note: This table displays the results of the cross-sectional regression of the population-weighted share of refractory clergy in 1791 on different proxies for religiosity before the onset of secularization. The proxies for religiosity before the onset of secularization are described in Section 5.1. All specifications control for the share of deserters among conscripts in the French army between 1798 and 1805. All observations are weighted by population in 1793. Robust standard errors are reported at the *département* level, and standard errors are clustered at the district level in specifications 7 and 8.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	dep var: Refractory clergy (1791)							
	Département level						District level	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Clergymen per 10,000 inhab. (1791)	-0.003					-0.003		
	(0.003)					(0.004)		
Abbeys (1756)		0.006				0.008	-0.011	-0.034
		(0.009)				(0.009)	(0.014)	(0.021)
Tithe (1750)			-0.003			-0.007		
			(0.006)			(0.007)		
Centuries of Jesuit presence (bef. 1763)				0.015		0.017	0.060***	0.040
				(0.037)		(0.041)	(0.018)	(0.070)
Huguenots per 10,000 inhab. (1815)					0.000	0.000		
					(0.000)	(0.000)		
1(Abbeys>0)								0.062
								(0.042)
1(Centuries of Jesuit presence>0)								0.038
								(0.112)
Observations	82	83	82	83	81	79	31,326	31,326
Clusters (districts)	.	.	.	.	.	.	502	502
R^2	0.02	0.01	0.02	0.01	0.01	0.05	0.03	0.04

Table A5: Heterogeneity in the 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 interacted with variables of interest. In all specifications, I also control for the interaction variable. Transition date is defined as the first year with $I_g \leq .5$. Standardized beta coefficients (in the interaction terms, each variable is standardized) and significance levels are reported. All observations are weighted by *département* population.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	dep var: Transition date					
	(1)	(2)	(3)	(4)	(5)	(6)
Standardized beta coefficients						
Refractory clergy (1791)	0.64***	0.61***	0.60***	0.63***	0.74***	0.68***
	(0.09)	(0.10)	(0.09)	(0.09)	(0.10)	(0.09)
____ × log 1 + Encyclopedie (1776-79)		-0.09				
		(0.11)				
____ × Linguistic distance to French (1900)			-0.11			
			(0.13)			
____ × Literacy (1829)				0.00		
				(0.10)		
____ × Population density (1831)					0.69	
					(0.46)	
____ × log 1 + urbanization (1831)						0.01
						(0.10)
Controlling for interaction variable		Yes	Yes	Yes	Yes	Yes
Observations	85	85	83	84	85	83
Adjusted R^2	0.40	0.45	0.38	0.39	0.40	0.41

Table A6: Determinants of I_g

Note: This table displays the results of the cross-sectional regression of the marital fertility index I_g in 1871 on the population-weighted share of refractory clergy in 1791. Controls are described in Section 5. All observations are weighted by *département* population in 1871. Robust standard errors are reported. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	dep var: Fertility index I_g 1871						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Refractory clergy (1791)	0.35***	0.35***	0.26***	0.34***	0.33***	0.33***	0.32***
	(0.06)	(0.06)	(0.05)	(0.08)	(0.08)	(0.08)	(0.09)
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 I_g (1871)	0.48	0.48	0.47	0.47	0.47	0.47	0.47
Observations	82	77	75	75	75	75	75
Adjusted R^2	0.33	0.38	0.53	0.64	0.65	0.63	0.63

Table A7: Determinants of I_g, I_f, and I_h

Note: This table displays the results of the cross-sectional regressions of the marital (I_g), overall (I_f), and illegitimate (I_h) fertility indices in 1871 on the population-weighted share of refractory clergy in 1791. The three indices measure the fertility of, respectively, married women, all women, and unmarried women, each relative to the maximum attainable without any form of limitation (the fertility of the Hutterites). For each index, the first column includes no controls and the second the full set of controls, described in Section 5. All observations are weighted by *département* population in 1871. Robust standard errors are reported. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	I_g (marital)		I_f (overall)		I_h (illegit.)	
	(1)	(2)	(3)	(4)	(5)	(6)
Refractory clergy (1791)	0.35***	0.32***	0.08***	0.09***	-0.00	-0.02*
	(0.06)	(0.09)	(0.03)	(0.03)	(0.01)	(0.01)
No controls	Yes		Yes		Yes	
Full set of controls		Yes		Yes		Yes
Observations	82	75	82	75	82	75

Table A8: Determinants of transition date: alternative definitions

Note: This table displays the results of the cross-sectional regression of transition dates on the population-weighted share of refractory clergy in 1791 with Tobit and alternative definitions of transition date (the first year with I_g below different threshold values). All observations are weighted by *département* population in 1831. Robust standard errors are reported. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	dep var: Transition date				
	(1) $I_g \leq .3$	(2) $I_g \leq .4$	(3) $I_g \leq .5$	(4) $I_g \leq .6$	(5) $I_g \leq .7$
Refractory clergy (1791)	66.80***	86.22***	118.60***	136.69***	83.14**
	(20.61)	(15.33)	(16.90)	(29.38)	(35.05)
Left censored observations (< 1831)	0	6	24	51	70
Right censored observations (> 1961)	35	3	0	0	0
Observations	85	85	85	85	85

Table A9: Determinants of transition date: accounting for infant and child mortality

Note: This table displays the results of the cross-sectional OLS regression of transition dates on the population-weighted share of refractory clergy in 1791, additionally controlling for the infant or child mortality rate in 1855. Transition date is defined as the first year with $I_g \leq .5$. The infant (child) mortality rate is the number of deaths before age 1 (5) per live birth in 1855, computed from the *Statistique générale de la France* (SGF, 2018). Controls are described in Section 5. All observations are weighted by *département* population in 1831. Robust standard errors are reported. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	dep var: Transition date					
	(1)	(2)	(3)	(4)	(5)	(6)
Refractory clergy (1791)	97.23***	103.78***	99.28***	102.54***	99.10***	103.82***
	(13.14)	(22.97)	(13.49)	(23.15)	(13.22)	(23.24)
Infant mortality rate (1855)			0.35	-0.37		
			(0.49)	(0.57)		
Child mortality rate (1855)					0.63	0.01
					(0.43)	(0.47)
Controls						
No controls	Yes		Yes		Yes	
Full set of controls		Yes		Yes		Yes
Observations	85	76	83	76	83	76

Table A10: Determinants of transition date: accounting for additional proxies of religiosity before the onset of secularization

Note: This table displays the results of the cross-sectional OLS regression of transition dates on the population-weighted share of refractory clergy in 1791, additionally controlling for deep-rooted correlates of religiosity before the onset of secularization, aggregated to the *département* level. Columns 5 and 6 report reduced-form specifications omitting the refractory clergy. Transition date is defined as the first year with $I_g \leq .5$. Holy League (1590) is a dummy that equals one in places where the Holy League was present in 1590, taken from Black (1996, p. 57) (see Appendix Figure C3). The value of the salt tax (gabelle) in 1770 is taken from Giommoni and Loumeau (2025). Jansenists (1725) is the inverse hyperbolic sine of the number of Jansenist clergymen in a diocese, taken from Préclin (1929). Controls are described in Section 5. All observations are weighted by *département* population in 1831. Robust standard errors are reported. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	dep var: Transition date					
	(1)	(2)	(3)	(4)	(5)	(6)
Refractory clergy (1791)	97.23***	103.78***	73.72***	94.33***		
	(13.14)	(22.97)	(15.30)	(28.75)		
Holy League (1590)			20.99*	-24.99	33.46**	-36.22
			(11.76)	(22.29)	(14.02)	(23.20)
Salt tax / gabelle (1770)			0.06	-0.07	-0.21	-0.55
			(0.27)	(0.43)	(0.26)	(0.42)
______ × Holy League (1590)			-0.81**	0.33	-1.12***	0.43
			(0.32)	(0.50)	(0.35)	(0.54)
Jansenists (1725)			0.01	0.01	0.02***	0.05
			(0.01)	(0.10)	(0.01)	(0.10)
Controls						
No controls	Yes		Yes		Yes	
Full set of controls		Yes		Yes		Yes
Observations	85	76	84	76	85	77

Table A11: Determinants of transition date: weighting observations

Note: This table displays the results of the cross-sectional OLS regression of transition dates on the population-weighted share of refractory clergy in 1791, with and without weighting observations by *département* population. Transition date is defined as the first year with $I_g \leq .5$. Controls are described in Section 5. Where indicated, observations are weighted by *département* population in 1831. Robust standard errors are reported. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	dep var: Transition date			
	(1)	(2)	(3)	(4)
Refractory clergy (1791)	97.23***	83.79***	103.78***	102.09***
	(13.14)	(15.06)	(22.97)	(23.07)
Controls				
No controls	Yes	Yes		
Full set of controls			Yes	Yes
Observations weighted?	Yes		Yes	
Observations	85	85	76	76

Table A12: Determinants of transition date: weighting refractory clergy

Note: This table displays the results of the cross-sectional OLS regression of transition dates on the share of refractory clergy in 1791, constructed either as the population-weighted average of district-level shares (baseline) or as an unweighted departmental average. Transition date is defined as the first year with $I_g \leq .5$. Controls are described in Section 5. All observations are weighted by *département* population in 1831. Robust standard errors are reported. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	dep var: Transition date			
	(1)	(2)	(3)	(4)
Refractory clergy (1791)	97.23***		103.78***	
	(13.14)		(22.97)	
Refractory clergy (1791) (not weighted)		88.78***		105.04***
		(12.84)		(23.52)
Controls				
No controls	Yes	Yes		
Full set of controls			Yes	Yes
Observations	85	85	76	76

Table A13: Determinants of transition date: survival analysis

Note: This table displays the relationship between the share of refractory clergy in 1791 and the timing of the fertility transition (the first census year with ($I_g \leq .5$)), measured as the duration since 1760. Column 1 reports an OLS regression of the transition date; the estimate is in years, so a positive value indicates a later transition. Column 2 reports a Cox proportional-hazards model; the estimate is a hazard ratio, so a value below one indicates a lower transition rate and hence a later transition. Both columns treat the first census with ($I_g \leq .5$) as the date of transition. All observations are weighted by *département* population in 1831. Robust standard errors are reported. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	dep var: transition to low fertility	
	(1)	(2)
Refractory clergy (1791)	97.23***	0.08***
	(13.14)	(0.04)
Model	OLS	Cox PH
Estimate	Years	Hazard ratio
Observations	85	85

Table A14: Double lasso estimation of the determinants of transition date

Note: This table displays the results of the cross-sectional double lasso regression of transition dates on the population-weighted share of refractory clergy in 1791. Transition date is defined as the first year with $I_g \leq .5$. The tuning parameter λ is chosen by cross-validation. The set of available controls to be chosen by the double lasso procedure is described in Section 5. In specifications 3, 4, and 5, I force the selection of *Encyclopédie* subscriptions (3), region and *pays*-status fixed effects (4), or both (5) as controls. Observations are not weighted by *département* population; therefore specification 1 corresponds to the same specification as in specification 7 of Table 1, estimated without weighting by population. Robust standard errors are reported. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	dep var: Transition date				
		LASSO			
	(1) OLS	(2)	(3)	(4)	(5)
Refractory clergy (1791)	102.09***	74.54***	84.85***	101.00***	103.65***
	(23.07)	(15.85)	(14.42)	(20.88)	(20.26)
Controls always included	All				
Region & pays status FE				Yes	Yes
log 1 + Encyclopedie (1776-79)			Yes		Yes
Controls selected by LASSO					
log 1 + Encyclopedie (1776-79)		Yes	Yes	Yes	Yes
Linguistic distance from French (1900)		Yes		Yes	Yes
Share of deserters among conscripts (1798-1805)				Yes	Yes
Clergymen per 10,000 inhabitants (1791)				Yes	Yes
Tithe (1750)				Yes	Yes
Protestants (1815)				Yes	Yes
Printing press (1500)				Yes	Yes
Books printed (1500)				Yes	Yes
Soldier height (bef. 1760)				Yes	Yes
log 1 + Urbanization (1831)				Yes	Yes
Literacy (1829)					Yes
Number of controls selected		2/14	1/14	12/16	13/16
Observations	76	83	85	76	76
Adjusted R^2	0.56	.	.	.	.

Table A15: Determinants of transition date: selection on unobservables

Note: This table displays the results of the cross-sectional regression of transition dates on the population-weighted share of refractory clergy in 1791 after accounting for omitted variables using the methodology introduced by Oster (2016). Transition date is defined as the first year with $I_g \leq .5$. Controls are described in Section 5. I report Oster's β under two assumptions: that unobservable selection is proportional to observable selection, and that it is proportional to selection on the diffusion of the Enlightenment, as discussed in the text. Negative values of δ indicate that unobservable selection would have to act in the opposite direction to the observed controls to drive the coefficient to zero. All observations are weighted by *département* population in 1831. Bootstrapped standard errors over 1,000 replications are reported. Because the bias adjustment always has two solutions, the bootstrap only retains replications in which Oster's sign restriction and nearest-root heuristic select the same one. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	dep var: Transition date						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Assumption A: *Unobservable selection prop. to observable*; **B**: $\propto$ *diffusion of Enlightenment*							
Refractory clergy (1791)							
Oster's β: $\beta_{\mathbf{A}}$	.	139.68***	73.05**	175.66***	146.22***	150.99***	158.53***
	.	(47.69)	(29.51)	(55.25)	(45.74)	(50.32)	(48.61)
Oster's β: $\beta_{\mathbf{B}}$	.	.	78.19**	126.13***	117.64***	120.31***	115.30***
	.	.	(32.92)	(42.93)	(35.90)	(36.48)	(42.01)
Oster's δ: $\delta_{\mathbf{A}}$	.	2.62	2.05	1.08	1.17	1.15	1.15
Oster's δ: $\delta_{\mathbf{B}}$	.	.	10.08	-3.08	-4.04	-4.20	-6.62
Max R^2	0.90	0.90	0.90	0.90	0.90	0.90	0.90

Table A16: Accounting for spatial dependence in the 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 and various tests to assess the extent of spatial dependence. Transition date is defined as the first year with $I_g \leq .5$. Controls are described in Section 5. All observations are weighted by *département* population in 1831. Assumption 1 (2) assumes a correlation range of 250 (500) kilometers. Results under Assumption 2 are displayed in parentheses. Moran statistics are computed from the residuals of each corresponding transition-date regression using an inverse-distance spatial weighting matrix. Conley standard errors are computed using the Stata program provided by Hsiang (2010), and assuming a linearly declining spatial weighting kernel. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	dep var: Transition date						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel A: *Testing spatial correlation on OLS residuals*						
	Assumption 1: 250 kilometers correlation range ; **2**: 500 kms (in parenthesis)						
p-val of Moran's test for spatial dependence (H_0: error is iid)	.00 (.01)	.01 (.02)	.47 (.93)	.24 (.27)	.21 (.24)	.19 (.22)	.19 (.21)
Fraction of simulations with significant (p=.001) spatial noise	5% (5%)	4% (5%)	1% (2%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)
Fraction of simulations where independent variable explains (p=.001) noise	7% (8%)	8% (10%)	6% (14%)	0% (0%)	0% (0%)	1% (0%)	0% (0%)
	Panel B: *Spatial correlation-adjusted standard errors*						
Refractory clergy (1791)	97.23	98.29	83.99	101.07	101.39	101.27	103.78
Non-adjusted standard errors	(12.97)***	(13.68)***	(13.59)***	(19.68)***	(19.21)***	(20.01)***	(20.70)***
Conley standard errors (Assumption **1**)	⟨21.12⟩***	⟨16.84⟩***	⟨11.61⟩***	⟨16.79⟩***	⟨16.72⟩***	⟨16.32⟩***	⟨16.98⟩***
Conley standard errors (Assumption **2**)	[24.31]***	[20.23]***	[7.76]***	[12.67]***	[10.99]***	[7.66]***	[10.10]***

A3.2 Individual-level results

Table B1: Representativeness of the genealogical data

Note: This table reports the correlation between fertility, longevity, and urbanization in the fertility sample of the crowd-sourced genealogies in France and in representative data, over the years in which both series are observed. Fertility is defined as the average number of children born to individuals who had their first child in a given year in the genealogies, and as the census marital fertility index I_g in a given year in the 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, and as adult life expectancy at 30 (from the Human Mortality Database) in a given year in the representative data. Urbanization is defined as the share of individuals who had their first child in a given year and were born in a town coded as urban at the time of their birth in the genealogies, and as the share of the population living in municipalities of more than 5,000 inhabitants from population counts in a given year in the representative data. Year is therefore coded, in the genealogical data, as the year of birth of the first child for fertility and urbanization, and as the year of death for longevity. These series are displayed, together with additional representative sources, in Figure 4. Sources: authors' calculations for the genealogies; Coale and Watkins (1986) for the marital fertility index; HMD (2019) for life expectancy at 30; BDCassini (2017) for the urbanization rate.

	Correlation
Marital fertility	0.937
Longevity	0.907
Urbanization	0.976

Table B2: Representativeness of the geni data across and within département

Note: This table reports individual-level OLS regressions of the number of children ever born (Panel A) or a dummy for being born in an urban town, as defined by Bairoch, Batou and Chèvre (1988) (Panel B), in the genealogies, on the census marital fertility index I_g (Panel A), and census urbanization rate (Panel B) of the individual's *département*, to evaluate whether the genealogical data tracks the census both across *départements* and over time. I_g is available every five years from 1831 to 1901 and in 1911 and 1921 (Panel A), the urbanization rate in those same years together with 1793, 1800, 1806, 1820, and 1906 (Panel B). The index I_g measures marital fertility relative to the maximum attainable without any form of limitation (the fertility of the Hutterites) and is reconstructed from census data by the Princeton European Fertility Project; the urbanization rate is the share of a *département*'s population living in municipalities of more than 5,000 inhabitants. In Panel A, year is defined as the year of birth of the first child, and each individual is assigned the I_g of the *département* in which their first child was born; in Panel B, year is defined as the year of birth, and each individual is assigned the urbanization rate of the *département* in which they were born. In columns 1–3, the sample is restricted to individuals observed in a census year. In columns 4–5, I linearly interpolate the census measure between surrounding censuses. As in Table 3, I only consider individuals in the fertility sample, and all specifications control for a male dummy, a quadratic in the age at birth of the first child interacted with the male dummy, and (in Panel A) a dummy for the urban status of the town of birth. Standard errors are clustered by the *département* of the first child in Panel A and the *département* of birth in Panel B. Sources: geni.com, Coale and Watkins (1986) (for I_g), and BDCassini (2017) (for urbanization rates). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	dep var: fertility (geni)				
	(1)	(2)	(3)	(4)	(5)
Marital fertility I_g (census)	2.63***	3.16***	0.35	2.95**	3.05**
	(0.91)	(0.90)	(3.81)	(1.38)	(1.39)
Refractory clergy (1791)					0.70
					(0.50)
Effect of I_g relative to mean	0.83	0.99	0.11	0.97	1.00
Exact census-year match	Yes	Yes	Yes		
Linear interpolation				Yes	Yes
Year FE		Yes	Yes	Yes	Yes
Département FE			Yes	Yes	Yes
Observations	713	713	700	3,389	3,389

(Panel A) Fertility

	dep var: Born in urban (geni)				
	(1)	(2)	(3)	(4)	(5)
Urbanization rate (census)	0.95***	1.00***	0.36	0.56**	0.55***
	(0.05)	(0.05)	(0.36)	(0.21)	(0.20)
Refractory clergy (1791)					0.23
					(0.35)
Exact census-year match	Yes	Yes	Yes		
Linear interpolation				Yes	Yes
Birth-year FE		Yes	Yes	Yes	Yes
Département FE			Yes	Yes	Yes
Observations	1,093	1,093	1,088	6,867	6,867

(Panel B) Urbanization

Table B3: Selection into the fertility sample and religiosity

Note: This table displays the results of individual-level regressions testing whether selection into the fertility sample and the recording of ancestry are correlated with religiosity, measured by the population-weighted share of refractory clergy in 1791 in the district of birth. In columns 1–4, the dependent variable is a dummy equal to one if the individual belongs to the fertility sample. Columns 1–3 restrict the sample to profiles for which the ancestral information needed to construct the fertility sample is observed, while column 4 includes profiles with missing ancestry. In columns 5–6, the dependent variable is a dummy equal to one if this ancestral information, spanning up to four generations, is observed. Columns 4 and 6 test whether these relationships differ before and after 1760. All specifications include the main individual-level controls, and the sample is restricted to profiles already appearing in geni. Standard errors are two-way clustered at the couple and district levels. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

	Dummy = 1 if individual is in fertility sample				= 1 if ancestry is observed	
	(1)	(2)	(3)	(4)	(5)	(6)
Refractory clergy (1791)	0.135***	0.088	0.096	0.080	-0.029	-0.048
	(0.050)	(0.062)	(0.060)	(0.075)	(0.043)	(0.050)
Refractory clergy (1791) × Post-1760				-0.033		0.019
				(0.056)		(0.047)
Sample period	1760–1919	1760–1919	1760–1919	1680–1919	1760–1919	1680–1919
Includes individuals with missing ancestry				Yes	Yes	Yes
Département fixed effects		Yes	Yes	Yes	Yes	Yes
Département x decade fixed effects			Yes	Yes	Yes	Yes
Observations	19,148	19,148	19,024	44,897	27,415	44,897

Table B4: Does the number of children in the geni data capture gross or net fertility?

Note: This table reports individual-level OLS regressions of the number of children ever born observed in the genealogies for individuals whose first linked child was born from 1805 through 1904 on infant and child mortality rates in the individual's *département* (from the census) and, in some specifications, the census marital fertility index I_g, to evaluate the under-reporting of infant and child deaths in the measurement of fertility. The infant (child) mortality rate is the number of deaths before age 1 (5) per live birth in 1855. The index I_g measures marital fertility relative to the maximum attainable without any form of limitation (the fertility of the Hutterites) and is reconstructed from census data by the Princeton European Fertility Project. Each individual is assigned the I_g of the *département* in which their first child was born, linearly interpolated between the two surrounding censuses. As in Table 3, I only consider individuals in the fertility sample, and all specifications control for a male dummy, a quadratic in the age at birth of the first child interacted with the male dummy, and a dummy for the urban status of the town of birth. Standard errors are clustered at the *département* level. Sources: geni.com, (SGF, 2018) (for infant and child mortality), and Coale and Watkins (1986) (for I_g). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	dep var: fertility							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Marital fertility I_g (census, linearly interpolated)		1.96***		2.08***		2.09***		2.22***
		(0.57)		(0.58)		(0.53)		(0.55)
Infant mortality rate (census, 1855)	-0.03	-0.03***			-0.03	-0.03***		
	(0.02)	(0.01)			(0.02)	(0.01)		
Child mortality rate (census, 1855)			-0.01	-0.01			-0.01	-0.01
			(0.01)	(0.01)			(0.01)	(0.01)
Year FE					Yes	Yes	Yes	Yes
Observations	5,834	3,236	5,834	3,236	5,834	3,236	5,834	3,236

Table B5: Summary statistics at the individual and district levels

	Mean	St. dev.	Minimum	Maximum	N
Panel A: Fertility					
Number of children	3.84	3.24	1.00	36.00	17,358
Age at birth of first child	29.14	6.91	15.00	64.58	16,995
Male dummy	0.61	0.49	0.00	1.00	17,358
Panel B: Religiosity (district level)					
Refractory clergy (1791)	0.59	0.29	0.00	1.00	17155
Abbeys (1756)	0.44	0.79	0.00	7.00	17357
Centuries of Jesuit presence (bef. 1763)	0.59	0.76	0.00	2.02	17357
Panel C: Development and Enlightenment (town and district level)					
Urbanization (year of observation)	0.21	0.41	0.00	1.00	17358
$\log 1+$ Encyclopedie per 10,000 inhabitants (1776-1779)	0.81	0.75	0.00	3.14	17357

Table B6: Determinants of fertility at the individual level, robustness to controlling for soldier height and age at death

Note: This table displays the results of individual-level Poisson regressions of the 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 the full set of controls used in Table 3. Column (1) reproduces the baseline specification from column 4 of Table 3. Column (2) adds a control for soldier height (residuals), measured before 1760 (Komlos, 2006). Column (3) adds a control for age at death. 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). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	dep var: fertility		
	(1)	(2)	(3)
Refractory clergy (1791)	0.233***	0.260***	0.216***
	(0.075)	(0.094)	(0.069)
Marginal effect of religiosity on fertility	0.829***	0.930***	0.812***
Controls			
Baseline controls	Yes	Yes	Yes
Soldier height (before 1760)		Yes	
Age at death			Yes
Observations	11,727	9,641	8,451
Clusters (couples)	10,219	8,431	7,466
Clusters (districts)	440	350	425
Pseudo R^2	0.06	0.07	0.08

Table B7: Determinants of fertility at the individual level: robustness to estimation method

Note: This table displays individual-level estimates of the relationship between fertility and the share of refractory clergy in 1791. Column 1 reports OLS estimates using the log of the total number of children ever born as the dependent variable. Columns 2–4 report count-data models using the total number of children ever born as the dependent variable; in these models, coefficients are effects on the log conditional mean of fertility. All specifications include the full set of controls used in Table 3. Two-way clustered standard errors (at the couple and district levels) are reported. Average marginal effects (AME) are reported (in column 1, the AME is simply the coefficient of a separate OLS regression of fertility on religiosity). These results were generated using the Stata programs provided by Correia, Guimarães and Zylkin (2020); Correia (2014); Gu and Yoo (2019). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	dep var: fertility			
	(1) OLS	(2) Poisson	(3) Overdis. Poisson	(4) Negative Binomial
Refractory clergy (1791)	0.184***	0.233***	0.233**	0.219***
	(0.065)	(0.075)	(0.107)	(0.069)
Marginal effect of religiosity on fertility	0.840***	0.829***	0.829**	0.778***
Controls				
Baseline controls	Yes	Yes	Yes	Yes
Shape parameter = α		0	0	0.26
Scale parameter = $\sqrt{\phi}$		1	1.44	1
Observations	11,727	11,727	11,727	11,727
Clusters (couples)	10,219	10,219	10,219	10,219
Clusters (districts)	440	440	440	440
(Pseudo) R^2	0.12	0.06		0.03

Table B8: Determinants of fertility at the individual level: secularization and fertility

Note: This table displays the results of individual-level Poisson regressions of the total number of children ever born on the secularization of the patron-saint religious-name index (RNI) in the individual's municipality of birth. Secularization is the proportional decline in the RNI between 1700–1750 and 1850–1900, computed as minus the change in the RNI over the period divided by its 1700–1750 baseline; positive values denote a fall in religious naming. Patron-saint RNI (year of first child) is the level of the index in the individual's municipality of birth in the year of birth of their first child. The RNI is constructed in Section 4. The sample consists of individuals in the fertility sample who were born in a municipality covered by the familysearch data and whose first child was born from 1760 to 1920. All specifications include decade and *département*-of-birth fixed effects. Reported coefficients are Poisson estimates, generated using the Stata program provided by Correia, Guimarães and Zylkin (2020); the marginal effect of secularization on fertility is its average marginal effect on the number of children. Standard errors are two-way clustered at the couple and municipality levels. Sources: geni.com, via Kaplanis et al. (2018), for fertility; familysearch (Ardennes, Dordogne, Eure-et-Loir, Indre, Isère, Landes, Mayenne, Meurthe-et-Moselle, Nord, Saône-et-Loire, Vosges) for first names; and Buringh et al. (2020) for the patron saints of medieval churches. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	dep var: fertility		
	(1)	(2)	(3)
Secularization (1700-50 to 1850-1900)	-0.596*	-0.721**	-0.555*
	(0.340)	(0.347)	(0.305)
Patron-saint RNI (year of first child)		0.115	0.085
		(0.500)	(0.421)
Marginal effect of secularization on fertility	-1.882*	-2.300**	-1.765*
Individual-level controls			Yes
Clusters (couples)	463	414	405
Clusters (municipalities)	149	136	133
Observations	514	462	450

Table B9: Determinants of fertility at the individual level: cultural versus institutional (second-generation migrants)

Note: This table displays the results of individual-level Poisson regressions of the total number of children ever born on the share of refractory clergy in 1791, at the district-of-birth as well as the district-of-birth-of-parents levels, for the sample of second-generation migrants observed after 1760. Specification 1 corresponds to the last specification of Table 4 and includes district-of-birth fixed effects; specification 2 drops the district-of-birth fixed effects and includes both measures. All specifications include the full set of controls used in the last specification of Table 3. Standard errors are four-way clustered at the district-of-birth-of-parents and parents levels. The table reports the counts for the first parent; for the second parent, there are 1,153 parent clusters and 238 birthplace clusters, including 237 observed districts and one "abroad or missing" category. Coefficients, not average marginal effects, are reported. The results were generated using the Stata program provided by Correia, Guimarães and Zylkin (2020). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	dep var: fertility	
	(1)	(2)
Refractory clergy (1791)		
in district of birth of parents	0.210**	0.215**
	(0.096)	(0.109)
in district of birth		-0.057
		(0.060)
Migrants sample	Yes	Yes
Baseline controls	Yes	Yes
District of birth fixed effects	Yes	No
Observations	1,438	1,438
Clusters (couples)	1,151	1,151
Clusters (districts)	235	235
Pseudo R^2	0.14	0.07

A3.3 Additional results

Table C1: Selection into the familysearch sample

Note: This table compares the municipalities covered by the familysearch sample to all French municipalities to assess representativeness. Columns 1 and 2 report the mean of each variable across all French municipalities and across the familysearch municipalities, respectively, with standard errors in parentheses; column 3 reports the difference (familysearch minus France) and column 4 the p-value of a test of the null that it is zero. Population in 1793 is from BDCassini (2017), Easter attendance in 1966 from Boulard (1966), and Encyclopédie subscriptions per capita in 1776–79 from Darnton (1973); distance to Paris is measured in kilometers. All observations are weighted by population in 1793. Standard errors are robust, except for Easter attendance and Encyclopédie subscriptions, which are clustered at the district level.

	France (1)	FamilySearch (2)	Difference (3)	p-value (4)
Population (1793)	20,196	967	-19,229	0.192
	(14,748)	(19)	(14,748)	
Distance to Paris (km)	331.6	280.8	-50.8	< 0.001
	(8.3)	(3.1)	(8.8)	
Easter attendance (1966)	0.441	0.447	0.005	0.880
	(0.017)	(0.036)	(0.036)	
Encyclopédie subscriptions per capita (1776–79)	0.571	0.548	-0.023	0.880
	(0.066)	(0.155)	(0.154)	
Municipalities	36,570	2,234		

Table C2: Secularization and the refractory clergy

Note: This table displays the results of the municipality-level OLS regression of the district-level share of refractory clergy in 1791 on the secularization of the patron-saint religious-name index (RNI) from 1700–1750 to 1850–1900. The share of refractory clergy in 1791, measured at the district level, is defined as the share of parish clergy who refused the oath of loyalty to the secular state required by the Civil Constitution of the Clergy. Secularization is the proportional decline in the religious-name index between 1700–1750 and 1850–1900, computed as minus the change in the RNI over the period divided by its 1700–1750 baseline. Positive values denote a fall in religious naming. The RNI is constructed in Section 4. The controls, added cumulatively across columns, are the log of Encyclopédie subscriptions per capita at the district level in 1776–79 (columns 2 to 6), the value of the salt tax (gabelle) in 1770 (columns 3 to 6), the duration of Jesuit presence before 1763 together with the number of Jansenist clergymen in a diocese in 1725 and a dummy for the presence of the Holy League in 1590 (columns 4 to 6), the interaction of the gabelle and the Holy League (columns 5 and 6), and the patron-saint RNI averaged over the 1700–1750 birth cohort (column 6). The sample consists of municipalities included in the familysearch data. Observations are weighted by population in 1793, and all regressions include *département* fixed effects to account for different archival availability and quality across *départements*. Standard errors are clustered at the district level. Sources: Tackett (1986) for the refractory clergy; familysearch (Ardennes, Dordogne, Eure-et-Loir, Indre, Isère, Landes, Mayenne, Meurthe-et-Moselle, Nord, Saône-et-Loire, Vosges) for first names; Buringh et al. (2020) for the patron saints of medieval churches; Darnton (1973) for Encyclopédie subscriptions; Giommoni and Loumeau (2025) for the salt tax; Grendler (2017) for Jesuit presence; Préclin (1929) for Jansenist clergymen; Black (1996) for the Holy League; and BDCassini (2017) for population. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	dep var: Refractory clergy (1791)					
	(1)	(2)	(3)	(4)	(5)	(6)
Secularization (1700-50 to 1850-1900)	-0.06	-0.08**	-0.09***	-0.10***	-0.10***	-0.07**
	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)
Encyclopedie subscriptions (1776–79)		0.04***	0.04**	0.03**	0.03**	0.03**
		(0.02)	(0.02)	(0.01)	(0.01)	(0.01)
Controls						
Salt tax / gabelle			Yes	Yes	Yes	Yes
Jesuits, Jansenists, and Holy League				Yes	Yes	Yes
Salt tax / gabelle × Holy League					Yes	Yes
Patron-saint RNI (1700-50)						Yes
Districts	68	68	68	68	68	68
Observations	2,214	2,214	2,214	2,214	2,214	2,214

Table C3: Deep-rooted correlates of religiosity (using refractory clergy in 1791)

Note: This table displays the results of the municipality-level cross-sectional regression of the district-level share of refractory clergy in 1791 on deep-rooted factors. The refractory clergy in 1791 is taken from Tackett (1986). 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 C3). The value of the salt tax in 1770 is taken from Giommoni and Loumeau (2025). 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 weighted by population in 1793. All specifications control for the log population in 1793 and latitude and longitude. Standard errors are clustered at the district and/or diocese levels. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	dep var: Refractory clergy (1791)				
	(1)	(2)	(3)	(4)	(5)
Standardized beta coefficients					
Holy League (1590)	-0.16***		0.14**		0.13
	(-2.95)		(1.98)		(1.25)
Salt tax / gabelle (1770)		-0.48***	-0.38***		-0.32***
		(-11.29)	(-5.83)		(-3.26)
______ × Holy League (1590)			-0.21**		-0.20
			(-2.55)		(-1.61)
Jansenists (1725)				-0.33***	-0.14**
				(-4.15)	(-2.05)
Observations	32,116	32,015	32,015	32,116	32,015
Clusters (districts)	510	509	509	510	509
Clusters (dioceses)				132	132
Adjusted R^2	0.10	0.27	0.28	0.17	0.29

Appendix 4– Appendix references

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