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Change and persistence in the age of Modernization: Saint-Germain-d'Anxure, 1730–1895

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ABSTRACT

Using a unique, comprehensive household-level dataset for a single French village, we study the process of modernization during a period of rapid institutional and demographic transformation. We document changes in fertility, mortality, literacy and intergenerational social mobility. The fall in fertility followed the French Revolution and the Age of Enlightenment, and preceded the rise in education by several decades. Rising literacy followed an increase in the supply of schooling due to the Guizot Law. All these changes occurred in the absence of industrialization in and around the village. We conclude that institutional and cultural changes originating outside the village were likely the dominant forces accounting for its modernization.

1. Introduction

The 18th and 19th centuries were times of economic, political and social modernization in Europe. Starting from persistent stagnation in living standards over the previous millennia, this era was characterized by unprecedented waves of change: the demographic transition, defined by lasting reductions in fertility and mortality rates; the rapid accumulation of physical and human capital; the evolution, in fits and starts, away from absolutist monarchy toward more democratic modes of government; sustained technological innovation and structural change from agriculture, toward industry, and later to services; and a sustained take-off in living standards interrelated with all these trends.

These transformations characterize the typical pattern of socioeconomic development. Yet the timing of these various waves and the complex causal mechanisms that link them remain elusive. In part, this is because of lack of good data regarding transformations that occurred two hundred years ago or more. Data comparable in quality to that used today to study developing countries does not typically exist for 18th and 19th century European societies known to have made the successful transition to modernity, hampering our understanding of the links between demographic, economic and institutional change among early modernizers. In sum, we can more easily study the process of development in societies that are still making the transition to modernity than in those that long ago completed this transition. Doing this, however, is essential to fully understand the anatomy of modernization.

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In this paper, we use a unique dataset for a single French village over the 1730–1895 period to make progress in this respect. This dataset, at the individual and household levels, allows us to study the process of change precisely during the time of France's transition to economic, social and political modernity. The time period under study was crucial in French development. It included demographic change, political upheaval, growing literacy, and improving living standards. We study how these and other changes are linked to each other, and how village life evolved over this period of profound transformation. We pay particular attention to issues of change and persistence. We show for instance that despite growing literacy and changing demographic outcomes, there was considerable intergenerational persistence in literacy status, social status and occupations. We also study the timing of change to better understand the forces that underlie economic, social and institutional change in France. For instance did the rise in literacy precede or follow the decline in fertility? Did the French Revolution constitute a structural break in terms of economic and demographic indicators? What role did economic incentives play in the decline in fertility and the rise of literacy? In sum, our goal is to provide a quantitative anatomy of modernization in a village representative of the broader forces affecting French society in a period of rapid transformation.

We study Saint-Germain-d'Anxure, a small rural village in the Mayenne *département* of Western France. We obtained detailed data at the individual and household level from civil records, censuses and tax rolls for this village over a period of 165 years. We digitized nearly 7,000 handwritten birth, death and marriage records - the universe of all births, deaths and marriages recorded in the village over this period. The data contain a wealth of information on intergenerational links, literacy status, profession, social networks, and allow a precise reconstruction of the demographics of the village over the crucial decades that straddle the French Revolution. A unique feature of the dataset is that we can explicitly link individuals across generations. This allows for a detailed analysis of social mobility and intergenerational persistence of various socioeconomic features, such as literacy, social classes, and occupations. These data were supplemented by periodic archival information from censuses, tax rolls, and qualitative sources. While our study concerns a single village, we argue that it was typical of rural French life in the 18th and 19th century. We hope, at any rate, that we gain more in terms of detail, granularity and specificity than what we might forego in terms of generality.

Saint-Germain-d'Anxure (henceforth, SGA) is located near the geographic center of the Mayenne *département*, midway between the region's two major towns, Laval and Mayenne (Figure A1 - historical map of Mayenne). SGA had between 500 and 630 inhabitants at any point in time over the period under study. Major economic activities included agriculture (wheat and barley, chestnuts, some animal husbandry) and textile weaving. The village traces its origins back to the Saxon invasions in the 7th century. Through the centuries that followed the crusades, a single family, the Montgiroux, exercised lordship over much of the village and surrounding lands. In 1656 the Castle of Montgiroux and surrounding lands were sold to the Cardinal de Mazarin, and in 1790 these landholdings were divided and sold to several landowners (Figure A2 presents a map of the SGA municipality as of 1835, and Figure A3 shows historical and contemporary photos of the main village). SGA was largely spared from the violence that surrounded the French Revolution, and the royalist counterrevolution that engulfed nearby locations (the *Chouannerie*) did not reach the village. A full-time schoolteacher paid by the municipality and prefecture was appointed in 1834, a school for boys was built in the village in 1841, following the Guizot Law that boosted boys' primary schooling across France. A school for girls opened in 1859.[1] In many respects, then, SGA was an ordinary village buffeted by the various historical forces that shaped the modernization of France at the end of the 18th Century and throughout the 19th century.

Over the period under study, SGA displays both change and persistence. Modernization took the form of profound change in demographics and human capital. Over the period 1730–1750, literacy rates for males and females averaged, respectively, 11% and 5%. At the end of the sample period, over 1875–1895, literacy for both sexes averaged about 85%. Both gross and net fertility rates declined by over 50%, when comparing the periods 1740–1760 and 1860–1880. Child mortality (the probability of dying before one's fifth birthday) declined from 26% (1740–1760) to 15% (1870–1890), while life expectancy at age 20 climbed from 43 to 62 years between the first and last twenty years of our sample period. The end of feudalism and the slow transition to democracy that occurred over the span of the 19th century were associated with a broader distribution of landholdings: in our database of village households, over 1760–1780, 1% of households are recorded as owning some land, while over 1875–1895 that proportion rises to 7%. Over the period, we witness the transition from feudalism to local democracy, as local lords who previously had dominion over the village sold land to a broader array of landholders, and local municipal institutions supplanted church and nobility as the drivers of local public goods provision. Finally occupational and social class mobility increased over the 165 years that span our study: the proportion of children who were in the same social class as their fathers fell from 84% in the 1780–1800 period to 67% in the 1875–1895 period. At the same time, the village was left untouched by industrialization. The share of the adult male population engaged in agriculture remained stable, at 67% in 1780–1800 and 69% in 1875–1895. SGA's small textile weaving industry declined from 11% to 5% of the adult male population during the same period.

Thus, in this village, modernization proceeded without industrialization. As we argue below, changes in demographic behaviors, human capital accumulation and social relationships coincided with a complex mix of cultural change and institutional upheavals triggered by the Age of Enlightenment and the French Revolution. Absent from the main drivers of demographic trends, however, were any dramatic changes in the returns to human capital and to the structure of the local economy. In fact, the timing of the changes observed at the level of the village suggests that fertility and mortality fell first. This was followed by the rise of human capital as a result of educational mandates - in particular, the Guizot Law of 1833 subsidizing the provision of primary education. The increase in social mobility then followed. In this context, the decline of fertility is unlikely to be the result of changes in the individual or household level trade-off between the quantity and quality of children. Instead, it coincided with changes in cultural attitudes, as well

[1] The information in this paragraph is sourced from Marcadé (1899).

as the decline in child mortality. The accumulation of human capital is also unlikely to be the result of individual decisions stemming from industrialization, as France overall experienced late industrialization and urbanization. The rise in literacy is more plausibly related to changes in national education policies, working largely by raising the supply of educational services at the village level. We see little evidence of structural change away from agriculture during our sample period. In sum, the modernization of demographic behaviors and the accumulation of human capital occur without the backdrop of industrialization, but occur contemporaneously with cultural and institutional upheavals associated with the Age of Enlightenment, the French Revolution and their aftermath.

Our paper is related to a vast literature in demography, history and economics analyzing the advent of modernity in France at the local level. We are not the first to focus on detailed data from a single village. For instance, Gautier and Henry (1958) focus on demographic change in a single village of Normandy in the 17th and 18th centuries, Ganiage (1963) does the same for three villages in the suburbs of Paris in the 18th century, and Weir (1995) examines the demographics of Rosny-Sous-Bois in the mid-18th century. Hadeishi (2003) studies the village of Nuits, in Burgundy, between 1744 and 1779, finding an early decline of fertility and a positive correlation between fertility and income. These contributions (and many others too numerous to cite here) focus almost exclusively on demographic change, whereas we attempt a more comprehensive account of modernization among many other dimensions: not just demographics but also human capital, local institutions, and social mobility.[2]

Our work also relates to a more qualitative literature in the discipline of history. Probably the most famous is LeRoy Ladurie (1975), a detailed study of a village of Southern France from 1294 to 1324 (thus very far removed from our time period). In contrast to this type of narrative study we adopt an explicitly quantitative approach. Another major contribution is Eugen Weber's book on the modernization of rural France between 1870 and 1914 (Weber, 1976). We deal with a somewhat earlier period. Dealing with a more recent period of French modernization, economic historian Jean Fourastié authored a famous study of the 30 years of economic growth that followed the Second World War, opening with a striking narrative describing the transformation of a single village, Douelle in southwestern France, between 1946 and 1975 (Fourastié, 1979). We too document changes taking place in a single village, but at an earlier time.

Finally, our research contributes to a more quantitative literature on French demographic change and modernization. References here are again too numerous to survey comprehensively, so we mention but a few: Louis Henry's comprehensive and path breaking project using parish records to track of the evolution of French demographics prior to 1800 (Henry, 1972a; Henry, 1972b; Henry, 1978; Henry and Houdaille, 1973; Houdaille, 1976, Séguy 2001); Wrigley's (1985) study of the fall of marital fertility in 19th century France; Coale and Watkins' (1986) study of the decline of Fertility in Europe (in particular the extensive material concerning the case of France that this book contains); and more recently Cummins' (2013) study of marital fertility in four villages of rural France between 1750 and 1850.

This paper is organized as follows: Section 2 discusses theoretical considerations and further background information on the history and geography of SGA. Section 3 briefly describes the extensive data-gathering effort that underlies this study. Section 4 examines change and persistence in demographic characteristics over the study period. Section 5 turns to the evolution of literacy and human capital. Section 6 discusses structural transformation and social mobility. Finally, Section 7 concludes by discussing the sequencing of modernization in the village.

2. Conceptual considerations and historical background

2.1. Conceptual considerations

Understanding the factors that led to sustained increases in per capita income has occupied economists since the inception of the discipline. Most accounts of the socioeconomic modernization that occurred in the 18th and 19th centuries consist of articulating causal relationships between four major factors, emphasizing their roles with different degrees of salience. These four factors are: technological progress and the resulting structural transformation; the accumulation of human capital; the demographic transition; and institutional change. We use these categories as a roadmap: our account of the anatomy of modernization in SGA will seek to shed light on the evolution of these four factors in the village over 1730–1895, and to articulate their likely interrelationships. Our setting allows us to look at these changes at the household level rather than in aggregate; it allows us to precisely characterize the sequencing of the various changes; and it allows us to use intergenerational information to examine mobility in socioeconomic status and literacy.

The most ambitious and comprehensive account of the transition from stagnation to modernity is Unified Growth Theory (henceforth UGT: Galor, 2011; Galor and Weil, 2000). This theory provides an integrated articulation of the links between technological progress, human capital accumulation and the demographic transition in order to account for the growth take-off. It is difficult to provide a concise summary of UGT that does justice to its intricacies, but a succinct account would be as follows: societies in Malthusian regimes escape stagnation when technological improvements become sufficiently pronounced to counteract the endogenous positive response of population growth to technological progress. In the post-Malthusian regime, technological progress raises the demand for human capital (and also incentives to *supply* educational services). The more pronounced incentives to accumulate human capital modify the trade-off between the quantity and quality of children, triggering a reduction in fertility and thus a demographic transition.

[2] Smith (1975) studies work habits and social structure in 19th Century Cruzy, a village of Southern France, but once again does not adopt the more comprehensive approach that we pursue. In a more contemporary context, the Palanpur project comprehensively follows the modernization of a single village in Uttar Pradesh, India, since 1957 (Lanjouw and Stern, 1998).

In the modern regime, per capita income can rise in a sustained way because technological progress is no longer counteracted by population growth. In a nutshell, the primitive force leading to modernization is technological progress, which itself can be endogenized with respect to some deep geographic, historical and cultural factors (Galor, 2011; Spolaore and Wacziarg, 2013).

Other accounts of the growth take-off emphasize a different mix of triggers and mechanisms. For instance, in Mokyr's historical accounts of the growth take-off, technological progress (knowledge) is at the center of the take-off, and the role of knowledge elites is paramount.[3] A virtuous reinforcement of prosperity brought about by technological progress driven by knowledge elites came from cultural and institutional improvements that protected the fruits of this progress from predatory rent-seeking and redistribution (for instance a general improvement in property rights protection, and the emergence of a culture that valued progress and science). Demographic change and generalized human capital accumulation only came later, at least in the case of England, as by-products of what Mokyr calls "the Industrial Enlightenment".

Yet other accounts place institutional change at the center of the process of modernization (Acemoglu et al., 2011; 2001; Greif, 1993; 2006; North and Weingast, 1989), among many others), arguing that institutions are the prime cause of variation in the wealth of nations and that institutional change was a major trigger for the growth take-off associated with the Industrial Revolution.

Finally, some accounts give demographic factors more prominence. The demographic transition, characterized by reductions in fertility rates, is central to the process of economic and social modernization (Becker et al., 1990; Galor and Weil, 2000). Demographic change has been particularly central to debates about French modernization in the 18th and 19th Centuries. These debates are summarized in de la Croix and Perrin (2018), Daudin et al. (2019) and Spolaore and Wacziarg (2020). They involve two essential distinctions. The first distinction is between economic and cultural factors. Several authors have emphasized the importance of changes in economic conditions as determinants of fertility reductions (see Galor, 2005, p. 224 for a detailed typology). For instance, Diebolt et al. (2017); Diebolt and Perrin (2013) and de la Croix and Perrin, (2018) provide evidence that human capital and female empowerment played a role in the reduction of fertility in France in the 19th century. Others have emphasized cultural factors such as the rise of secular norms (Blanc, 2019). Murphy (2015) argues that both education and secularization explain the cross-section of marital fertility rates across French *dé-partements* in the post-1831 era. The second distinction is between the onset and the diffusion of modern fertility behavior. Contributions in the diffusionist tradition include Coale and Watkins (1986); Spolaore and Wacziarg (2020) and Daudin et al. (2019). In these approaches, both geographic connectedness and cultural relatedness facilitate the diffusion of modern fertility norms.

2.2. Saint-Germain-d'Anxure: background and representativeness

We begin our anatomy of SGA's modernization by providing some general background information on the village, its structure, history, major features, and representativeness in the period under study.[4]

Population.

The population of the village fluctuated between 500 and 630 inhabitants between 1793 and 1891 (Table A1). Putting this in the French context, in 1800, more than half of the population lived in towns of less than 1140 inhabitants (BDCassini, 2017).[5] This is in contrast to England, which was much more highly urbanized in the early 19th century (Bairoch and Goertz, 1986). Until 1850, population dynamics in SGA and in France overall are quite similar (Fig. 1). After 1861, SGA's population starts to decline while the population of France continues to grow. This coincides with the beginning of net out-migration from the village to larger towns, and may account for the differential population trends between SGA and the rest of France. Comparing the population of SGA to that of *rural* France (defined as people living in towns of less than 5000 inhabitants), we find almost identical evolutions, with population growing by about 20% from 1800 to 1850 and declining by about 10% from then to 1890. After 1850, all population growth in France occurs in urban areas, while rural population declines.

Geography and Infrastructure.

SGA was relatively isolated, located in the center of a landlocked *département*, and connected to other villages merely with dirt paths.[6] Two major rivers delineated the Northeastern and Southeastern borders of the municipality: respectively the Anxure and the Mayenne, only the second of which was navigable. The 19th century saw some improvements in infrastructure (a bridge over

[3] Thus Mokyr (2000, p. 254) states: "The key to the Industrial Revolution was technology, and technology is knowledge". See also Mokyr (2005, p.47), : "The argument I propose, that technological progress is driven by a relatively small number of pivotal people, is not a call for a return to the long-defunct "heroic inventor" interpretation of the Industrial Revolution. The great British inventors stood on the shoulders of those who provided them with the wherewithal of tools and workmanship. (...) Below the great engineers came a much larger contingent of skilled artisans and mechanics, upon whose dexterity and adroitness the top inventors and thus Britain's technological success relied. These were the craftsmen, highly skilled clock- and instrument-makers, woodworkers, toymakers, glasscutters, and similar specialists, who could accurately produce the parts, using the correct dimensions and materials, who could read blueprints and compute velocities, understood tolerance, resistance, friction, and the interdependence of mechanical parts." Squicciarini and Voigtländer (2015, 2016) provide strong empirical evidence for a growth take-off spurred by knowledge elites.

[4] The discussion below draws in particular on the Communal Monography of 1899, written by the village schoolteacher E. Marcadé in preparation for the 1900 Paris World Fair (Marcadé, 1899).

[5] SGA also falls in the same population ballpark as the 40 villages in the Enquête Henry, where median population was 474 in 1800.

[6] In this respect also, the village was quite typical of France. Analyzing data on road length per capita in 1793 from the Cassini database (Perret et al., 2015), we found that SGA featured 3.3 m of road per capita (in a 20 km radius from the village boundaries) while the corresponding figure for France overall was 4.1 (including urban areas). SGA's road density is well within one standard deviation of the French mean.

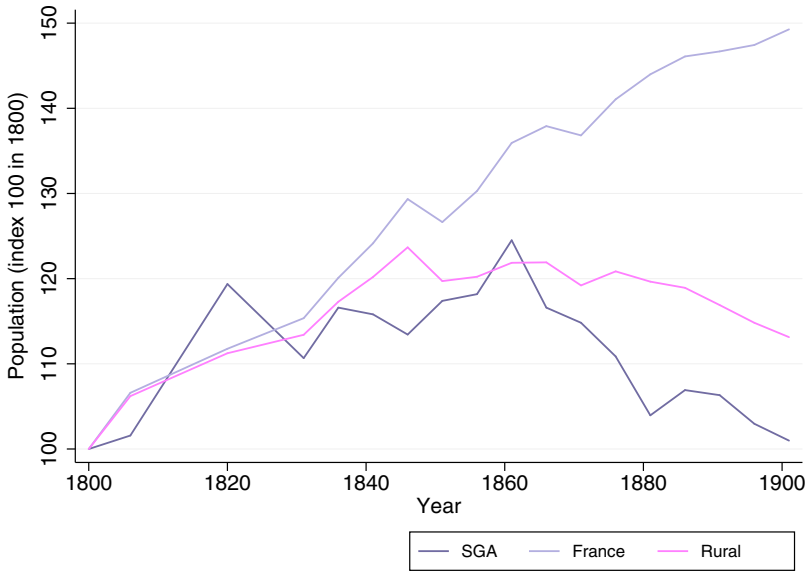


Fig. 1. Population growth, Saint-Germain-d'Anxure and France. *Note*: This figure displays population (index base 100 in 1800) for SGA, France as a whole, and rural France in the 19th century. Rural is defined as less than 5000 inhabitants. The population of SGA in 1800 was 506 inhabitants. The series starts in 1800 due to the dubious quality of the 1793 census. *Source*: BDCassini (2017).

the Mayenne river, a road built for military purposes connecting the village to the nearby town of Mayenne, both built in the early 1830s). A rail line linking Paris to Brest, stopping in Laval, started operating in 1855 (Laval nowadays is 21 km from SGA by the shortest road).

Religiosity.

Apart from its relative isolation, other factors set SGA apart from the rest of France. One of these specificities is the relatively high level of religiosity in the Mayenne *département*. The literature has come to rely on the share of the clergy refusing to take the 1791 oath of ecclesiastical loyalty to the Revolution (the *clergé réfractaire*) as a historical measure of religiosity across *départements* and *districts* of France. This measure was compiled by Tackett (1986), and used for instance in Blanc (2019), González-Bailón and Murphy (2013), Murphy (2015), and Squicciarini (2020). The share of the *clergé réfractaire* in Mayenne was 72.5% (15% of French *départements* had a higher share) and the same share in the *district* where SGA was located was 65.5% (25% of French *districts* had a higher share). We can see the legacy of this high level of historical religiosity in contemporary data: In Mayenne, 62% of children born in 2013 were baptized as compared to an average of 32% in France overall (Besmond de Senneville, 2014). Relatedly, Church attendance in 1966 in Mayenne was in the top quartile of French *départements* (Isambert and Terrenoire, 1980).

Agriculture and land ownership.

The economy was based mostly on agriculture (oat, wheat and barley were the major crops). In this way, the village is representative of the rest of France. Indeed, in 1788, 68% of the working population in France was in the agricultural sector, and this share was still 48% in both 1864 and 1894, at the end of our sample (Morrisson and Snyder, 2000, Table 12). In pre-Revolutionary France in general, agricultural holdings took several forms: *closeries* were small-scale landholdings leased to farmers (*closiers*) through sharecropping arrangements. *Métaieries* were larger landholdings usually owned by nobility, also operated by farmers (*métayers*) under a mix of monetary contracts and sharecropping arrangements. The structure of landholdings changed in the second half of the 18th century and then after the French Revolution, with agrarian reforms leading to enclosures and gradually limiting the use of land by those without property rights, known in France as *vaine pâture,* or common pasture (Rozental, 1956). Contracts increasingly took the form of leases instead of sharecropping arrangements.

After the Revolution, the feudal rights of the nobility were abolished and many *métaieries* were sold for the benefit of the state.[7] This, combined with the abolition of the right of primogeniture in 1789, led to smaller farms. These general trends for France applied with some qualifications to both the Mayenne region and SGA: the impact on the Mayenne region was limited as that region already

[7] Morrisson and Snyder (2000) observe: "The abolishment of the feudal rights of nobles also enhanced the income of the lower class of farmers who no longer were subject to work corvees and other obligations to their seigneurs. Perhaps the most important aspect was the confiscation of church properties and those of many nobles. These were auctioned as *biens nationaux*. While the largest group of buyers were the larger farmers and bourgeois who already possessed land and had the means to acquire more, there were many from the lower ranks of the agricultural hierarchy who were also able to acquire some of the lands auctioned by the government. As a consequence, the structure within the agricultural sector changed dramatically."

had relatively small farms and enclosures prior to the reform period, and was therefore not primarily targeted by these reforms.[8] However, consistent with the national trends, we do see some fractionalization of landholdings in SGA during our sample period, as a result of the declining power of the nobility. The use of day labor (*domestiques* or *journaliers*) on farms was ubiquitous, and these workers represent one of the largest occupational groups in our sample.

Technological progress came late to the agricultural sector in this region. Agricultural lime and manure were the main soil amendments, as phosphate-based fertilizers only came into use after 1880. Major technological innovations, including the generalized use of the Brabant plough and even of steam-powered combine harvester on about 10 of the largest farms, did not occur until the end of the 19th century, at the end of our sample period (Marcadé, 1899).

Textile Sector.

Besides agriculture, there was a small textile sector in the village throughout the 18th and early 19th centuries. Cotton progressively replaced linen as the main textile product over this period. In this industry, small-scale weavers and tailors were the norm, with very limited use of mechanization. The sector employed women disproportionately: in 1850, about 32% of married women work in the textile sector, versus 20% of married men.[9] In the later part of the 19th century the textile industry declined in the village, as the probable consequence of competition from the opening of a textile mill in the nearby town of Andouillé. There was also a stone quarry within the municipality, and a variety of artisans working in the village. As can be seen, therefore, there was no modern industry to speak of in SGA - even the declining textile activity was based on traditional technology. This is in the broader context of the very late industrialization of France, compared to England: not only was SGA relatively isolated from the rest of France until well into the 19th century, France itself was not subject to significant industrialization until the second half of the 19th century (Lévy-Leboyer and Bourguignon, 1985). This is well after the changes in fertility and literacy that we document for SGA, suggesting that these early changes cannot be easily attributable to industrialization outside of SGA.

Institutions.

Turning to local institutions, in the pre-Revolutionary period the village was under the authority of the Duchy of Mayenne, controlled by the Cardinal de Mazarin. During the French Revolution, there was a brief period of broad-based suffrage for the election of mayors, which was abolished in 1799. There were no municipal elections during the Bourbon Restoration (1814–1830), as the mayor was appointed by the prefect. During the July Monarchy (1830–1848), the mayor was still appointed, but had to be chosen from among a set of 6–13 municipal councillors, who were elected within the village. Franchise eligibility was based on tax payments above a certain threshold, but in villages of less than a thousand inhabitants, where too few potential voters met this criterion, there was a requirement that 10% of the total population be allowed to vote in municipal elections. Hence, in SGA about 60 male inhabitants were eligible to vote (only 6 of those met the tax criterion for franchise eligibility in 1838). Universal male suffrage became the rule after 1848.

Education.

Prior to 1789, the village priest was in charge of education (Marcadé, 1899), and it is probable that, in addition, higher status households home schooled their children. It is likely that the priest chose a few boys to receive basic literacy instruction. As revealed by the civic records, some of these would make it to the status of vicar (*vicaire*), the priest's deputy.[10] A major event in the educational history of SGA occurs in 1834: according to the municipal budget, a schoolteacher was appointed in that year, following the Guizot Law of 1833 subsidizing primary education for boys.[11]

In 1834, a special tax was passed to finance the cost of the schoolteacher. The special tax levied an annual sum of 99.42 Francs from village taxpayers (for comparison, in 1833 total municipal revenues were 174.65 Francs, so the cost of the schoolteacher in 1834 amounted to 57% of the previous year's revenues). The municipality received an additional education subsidy from the *département* of 160.58 Francs, as per the Guizot Law of 1833. The total was divided into paying for the teacher's lodging (60 Francs) and salary (200 Francs). The share of the subsidy in the total cost is substantial. The boys' school was built in 1841 about 300 m from the village

[8] According to Rozental (1956), "In the West and in the Central Provinces, enclosed smallholdings predominated. The pasture and the meadow remained open to all, but the arable was enclosed by hedges."

[9] In general, the rate of female labor force participation in the village was high, at least in the second half of the 19th century (1850–1895) when female occupation was recorded in marriage records. In our data about 86% of women who marry record a professional occupation corresponding to our nomenclature of professions. This finding is in line with results in Perrin (2014) where the *département* of Mayenne comes out first in France in terms of an index of female empowerment based on education, health and economic status in 1851. Such female empowerment may have contibuted to the fertility transition in SGA (Diebolt et al., 2019), though we lack data on female empowerment for the late 18th century to establish this claim conclusively.

[10] Since we base our pre-Revolution data on parish records, we know the identities of the successive priests and vicars. Remarkably, only two priests were successively in office from 1730 to 1774: Julien Le Saulnier (from 1730 until 1756), then Jean Le Saulnier from 1758 to 1774. These were followed by three priests with shorter tenures until the Revolution and at that stage we lose the ability to identify the priest.

[11] Among other provisions, the Guizot Law: 1) required the construction of a school for boys and the continued employment of a teacher in every municipality with more than 500 inhabitants, 2) allowed for the subsidization of such schools by the *départements*, in case municipalities were unable to finance them on their own (in reality this implied a complex annual bargaining process between the municipality and the *départements*, resulting in a cost sharing outcome), 3) guaranteed free education for poor (male) children. Squicciarini and Voigtländer (2016) show that areas of France with a greater density of subscriptions to Diderot's Encyclopedia, a proxy for the influence of knowledge elites, experienced faster schooling growth over the period 1829–1850. Looking at their data, we found that the *département* of Mayenne had zero subscribers. It is plausible that the construction of the school and hiring of a schoolteacher in SGA was a direct effect of the Guizot Law rather than the indirect effect of local demand for schooling by knowledge elites.

Table 1
Occupational and Social Class Categories. *Note*: This table summarizes our categorization of professions into occupations and occupations into class. Appendix 2.2.1 describes the construction of the class and skill scores. There are 898 observations pertaining to the period after 1780. *Source*: Households Database.

Class Occupations	Professions	Freq.	Class score	Skill score
Upper class				
Bourgeois	Doctor, landowner, mayor, notary, rentier, merchant, large scale farmer (*métayer*), teacher	6.7%	5.58	3.54
Upper-middle class				
Skilled craftsmen	Blacksmith, farrier, miller, veterinary (*hongreur, affranchisseur*)	5.7%	2.99	1.78
Lower-middle class				
Farmers	Cultivator, peasant laborer, cropper and sharecropper (*closier*)	47.2%	0.94	0.84
Textile workers	Tailor (*poupelier, calicotier, fileur*), shoemaker, weaver	12.6%	0.85	1.04
Lower class				
Unskilled craftsmen	Carpenter, clog-maker, joiner, mason, roofer, stone mason, wheelwright, worker	8.3%	0.32	0.57
Day laborers	Day laborer, servant, woodcutter, mole catcher	17.2%	0.15	0.17
Others				
Services	Innkeeper, administrative agent, cart driver, butcher, baker, grocer, postman, bartender, waiter	2.3%	.	.

center. Its cost was 3000 Francs, financed in equal shares by municipal savings as well as from an external subsidy. In 1888, the school moved inside the village. Following the Falloux Law in 1850, a school for girls was established in 1859.

3. The data

3.1. Construction of the database

3.1.1. Records and raw data: births, deaths and marriages

Over the past few years, French prefectures made available scans of handwritten parish and civil records going back as early as the 16th century.[12] After 1793, as a result of the French Revolution and its concurrent process of secularization, the task of maintaining civil records was transferred from the Church to municipal authorities, although the format of the records was little changed. Archives include birth, death and marriage (BDM) records. We digitized 165 years worth of all available village records, for the period 1730–1895, dealing with sometimes hard to decipher handwriting (Fig. A4 being an example of poor handwriting). In total, we digitized 6797 records, including 3315 births or baptisms, 2566 deaths and 919 marriages.

From these records we were usually able to obtain the names and occupations of the parents and witnesses. Using ability to sign one's own name on the record as an indicator of literacy, we could also characterize signatories' literacy status.[13] As an example, Fig. A5 is a baptism record from February 24th, 1780. The information in brackets was coded, and includes the child's date of birth (he was born and baptized on the same day), his parents' occupations and literacy, and the same set of information for both witnesses and godparents. We also noted the name of the person who recorded the act. Appendix 2.1 provides details on the construction and characteristics of the data, and replication files for this paper are available in Blanc and Wacziarg, 2020.

3.1.2. The households database

Creating a database at the household level is useful for three reasons: first, we are interested in analyzing behavior, such as fertility, where decisions are made at the household level; second, we seek to check information across different records in order to limit errors and missing values; third, it allows us address the issue of migration, as discussed in Section 3.2.

The households database includes all couples with at least one child born in SGA, and all marriages.[14] It contains 1650 households. We code the year of household formation as of the year of marriage (if available) or the year of birth of the first child, if we do not observe the marriage. In addition to information on fertility and literacy, the households database also contains information on professions. Table 1 summarizes our categorization of professions into occupations and the categorization of occupations into social classes. A unique feature of the household dataset is the ability to link generations. We link mothers and fathers to both sons and daughters, but in our main analysis we mostly use father to son linkages. Of the resulting 962 intergenerationally linked father and son pairs, we observe literacy status across both generations for 581 pairs. Appendix 2.2 provides more details on the construction of the households database.

We also defined three periods using structural breaks associated with the French Revolution in 1789 and the building of a school for boys in 1841. Thus, Period I runs until 1789, Period II is defined over 1790–1840, and Period III is from 1841 onwards.

[12] These are similar to records used by Fleury and Henry (1956) for their study of *Ancien Regime* populations. The records that form the basis of our database are available at http://www.lamayenne.fr/fr/Archives53/Archives-en-ligne/Etat-civil. Records go back to 1629, but early records contain far less information, are harder to decipher, and records pertaining to 1715–1729 are mostly missing. Thus, we start in 1730.

[13] Using ability to sign to assess literacy is common practice in the literature. See for instance Allen (2003) and Clark (2014), among many others.

[14] A remarriage corresponds to the formation of a new household. Fertility is therefore calculated as household fertility, so-defined. Among all marriage acts, 9% of men and 5% of women are characterized as remarrying. There is almost no time variation in the remarriage rate.

3.1.3. Reporting and measurement error

Various types of reporting biases and measurement error can occur in data of this type. First, the reporting of baptisms may be incomplete, leading to an under-registration of births. The priest recorded the baptism before 1793, and the prefecture of Mayenne is one of the most religious in France, with 62% of children still baptized in 2013 as compared with an average of 32% in France.[15] Baptism was almost universal, so parish records are likely to capture the vast majority of births occurring in the village. Moreover, in the households database, only 1.4% of newborns were not immediately registered after birth (defined as not being registered in the same calendar month as the birth), most often because of various reasons such as the parents marrying after the birth. This rate is stable across time, which indicates that under-reporting of births should be a limited problem.

Second, there is a well-documented issue of under-reporting of infant mortality (Henry and Blum, 1980). Usually, villages with severe under-reporting of infant and child mortality display a rate that is below 5% (Henry, 1972; Fine-Souriac, 1978). On average, in our dataset, about 18% of children die within their first year (before the French Revolution).

3.2. Migration

In and out migration is an important concern in our data, particularly when it comes to the analysis of fertility, since migration can affect the number of recorded births for each household. Migration resulting from marriage (to either spouse's village) is likely the main source of regular migration until the mid-19th century. In the households database, 49% of observations involve one spouse born in SGA while the other was not, 24% involve both spouses born in SGA, while 27% involve neither born in the village. Of those individual spouses not born in SGA, 99% were born in the *département* of Mayenne, and of these, 72% were born in municipalities contiguous to SGA. Thus, there is very little long range migration for the purpose of marriage. Local migration for this purpose implies that some couples married in SGA did not remain there, while some couples not married in SGA settled there. This was the main motive for moving in and out of the village until the mid-19th century.[16] Migration to distant places to pursue greater opportunity came only later, and at least during Periods I and II such expected migration is unlikely to provide incentives to accumulate human capital or reduce fertility. Blanc (2020) further documents these patterns for France overall.

Wars and other events can lead to more occasional spikes in migration. Systematic migration due to economic reasons is not likely to occur very frequently until the second half of the 19th century. The bulk of net migration out of French rural villages occurred in the first half of the 20th century. Indeed, the total population of SGA rises at the same rate as France overall until 1861, and starts to decline thereafter in line with what happens in rural France (Table A1 and Fig. 1). The fall accelerates in the second decade of the 20th century.

Migration creates two sets of challenges for our purposes:

Migration and bias in fertility data.

The first challenge is that migration could bias measures of fertility if we only capture part of a household's fertile years in SGA. We address this issue by creating various migration scores meant to capture the likelihood that a household spent its fertile years in SGA, based on information gathered in the household database. The scores have to reflect in and out-migration while avoiding the issue of selection on the dependent variable. For instance, in fertility regressions we obviously want to avoid scoring on the number of children born in SGA. Appendix 2.4 describes how the migration scores were generated. The algorithm relies on information from the households database on births, marriages and deaths. To summarize, the migration scores are mostly based on information about whether the members of a couple were born and died in SGA and whether they married there. For instance, if a household features at least one member born in SGA and at least one member who died there, this household will be scored as more likely to have stayed.[17]

Figure A6 plots the sensitivity of the fertility series to alternative definitions of the migration score. The dynamics of fertility for the period 1765–1835 do not depend on the specific version of the score. We use our baseline migration score (score B) in the bulk of our empirical analysis of fertility, where we use only households with a migration score greater than 50%. Among the remaining observations, we linearly down-weigh households more likely to have migrated.

Selective migration.

The second challenge is that selective migration could bias our inferences on the dynamics of various indicators like fertility, literacy and socioeconomic status: households who do not migrate might be different from those that do. For instance, those who migrate may have less access to land or have weaker ties to others in SGA. This is a problem for inferences on the time paths of various indicators of interest to the extent that selection into migration varies through time. We address this concern in two ways:

First, we compare fertility levels and male literacy rates between observations where both household members were born in the village and those where one member is known to have been born outside the village (Table A2). There is higher fertility for households

[15] http://www.la-croix.com/Religion/Actualite/Baptemes-mariages-pretres-l-Eglise-de-France-en-cartes-2014-06-06-1190969

[16] There was no systematic rule for whether grooms came to the bride's village to marry, or vice versa. Looking among marriages where exactly one spouse was born inside the village, 42% of grooms and 58% of brides were born in SGA. So there is a small bias in favor of getting married in the bride's village of birth. There was no rule either on where a couple married in SGA would ultimately settle. Among marriages where exactly one spouse was born in SGA and this couple had at least one child in SGA, the groom was born in SGA in 54% of the cases and the bride in 46% of the cases. So there is a small bias in favor of settling in the groom's village of birth.

[17] Our approach is similar to that in de la Croix, Schneider and Weisdorf (2019), Section 5. These authors create a migration indicator for households in pre-Industrial English parishes, representing their status as in-migrants, out-migrants or stayers, based on life events such as being born, married or deceased in a given parish. They do so in order to see if selective migration affects their findings on the evolution of fertility rates across different social classes. They find that this is not the case.

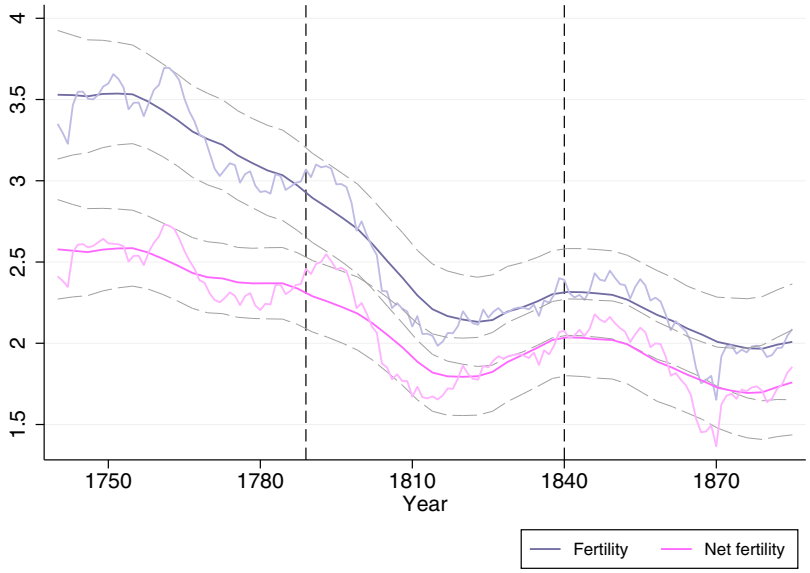


Fig. 2. Fertility. *Note*: Fertility is defined as the total number of births per couple. Net fertility is defined as the average number of children per couple, net of those who died within their first four years. Observations are weighed by final migration score *B* and only households with a migration score higher than 50% are retained (see Appendix 2.4 for the construction of the migration score). The variable is coded as of the year of marriage (if available) or the year of birth of the first child. The dataset is truncated to observations between 1740 and 1885 so as to track all births for each couple. There are 894 observations. *Source*: Households Database.

where both were born in the village, but this difference is stable through time and only statistically significant in Period II. The level of literacy of males belonging to households with one person born outside the village is indistinguishable from that of native couples in all periods. This suggests that there is no selection when it comes to literacy and that selection is constant through time when it comes to fertility.

Second, further evidence on selection is provided throughout the paper by comparing series where the sample of households is observed over several generations (the "intergenerational sample") to the broader sample. The former is composed of households who by definition stayed in the village for at least two generations. Fig. A15 reveals that the path of literacy in the relevant period of the literacy surge (Period III) is seen in both the full sample and the intergenerational sample. Fig. A17 reveals that the time path of the shares of lower class, lower-middle class and upper/upper middle class households is also very similar across both samples.

4. Change and persistence in demographics

4.1. Fertility

4.1.1. Descriptive trends

Our first step in the account of the transition to modernity in SGA starts with demographic change. The demographic transition plays an extensive role in the process of modernization, and the transition from Malthusian to modern growth is characterized first and foremost by a decline in fertility. In this subsection, we analyze trends in fertility rates in the village over the period 1740–1885.

We start by describing how the fertility data was constructed from the underlying civil records. We start from the households database: 1650 couples who were either married in SGA or had any number of children born there. We condition on couples with migration scores above 50% (1019 couples remained) and linearly weigh observations by migration score.[18] We compute average fertility over periods I, II and III. For a more continuous measure, we also constructed 20-year overlapping windows centered on each year, and calculated the average fertility of couples whose first child was born during each window.

Fig. 2 and Table 3 show that fertility declined from an average of 3.29 children per couple in the 1740–1789 period to 2.42 in the 1790–1840 period and to 2.18 from 1841 to 1885.[19] We noted earlier that the region around SGA had relatively high levels of religiosity. Blanc (2019) shows that the degree of religiosity is positively associated with fertility in a cross-section of French *départements*. Indeed, religiosity may have delayed the decline in fertility in SGA, but it is not possible to measure religiosity across

[18] We use score *B* (see Appendix 2.4) as it allows to use migration score outside of the 1765–1835 window. We further remove the first and 10 last years of the sample period, in order to better track total births per household. 894 households remained.

[19] Given our procedure to account for migration, it is important not to give too much weight to the absolute level of fertility during any of these three periods, which is likely to be downward biased, and rather focus on changes across periods.

households within the village.[20] At any rate the data suggests that the fertility decline did reach SGA in the waning years of the 18th century.

Was the timing of the fertility transition in SGA typical of the early fertility decline found in the rest of France? The transition occurs earlier than reported in Coale and Watkins for Mayenne: they date the marital fertility transition - defined as a 10% decline in their measure of marital fertility - as 1845, whereas the bulk of the transition displayed in Fig. 2 occurs between 1789 and 1810. The Coale and Watkins sample starts in 1831, so that they may miss the early part of the transition, that our detailed data allows us to capture.[21] The fertility transition in SGA occurs slightly later than in related studies. Cummins (2009, 2013), using data from the *Enquête Henry*, estimates the start of the transition as 1776. Blanc (2020), using crowdsourced genealogical data, estimates the onset of the decline in fertility in France to the 1750s. Weir (1995) dates the beginning of the transition in Rosny-Sous-Bois (near Paris) to 1789, while Hadeishi (2003) reports that Nuits-Saint-Georges, in Burgundy, started its transition in 1750. Finally, Henry and Houdaille (1973) date the transition to 1770, in the North-West quarter of France. In sum, the timing of the fertility transition in SGA seems roughly in line with many studies looking at fertility dynamics in rural France, if perhaps a bit later. The pattern is consistent with the gradual diffusion of novel fertility behaviors from other parts of France.

4.1.2. Explanations for the fertility decline

A fall in child mortality is often advanced as an important explanation for the decline in gross fertility, although in many models it also leads to an increase in net fertility (see Doepke, 2005).[22] We discuss the relationship between child mortality and fertility in SGA in greater detail when we turn to our discussion of the dynamics of mortality, but for now we observe that net fertility did decline in the village: Table 2 displays figures for net fertility, by period, and Fig. 2 shows the time path of net fertility. Here net fertility is defined as the average number of children per couple, minus the children who died during their first four years of life. The change in net fertility mirrors the fall in gross fertility, although it is about half as pronounced. The fall in net fertility suggests there is still variation to be explained, beyond the role of the decline in child mortality.

By far the most salient and empirically relevant explanation for the decline in fertility is the rise of education, leading to a substitution between quantity and quality of children. This idea has a long pedigree, but recent contributions in this tradition stem from Unified Growth Theory (Galor, 2011; Galor and Weil, 2000, chapter 4). In our data, we confirm a general pattern often documented in the literature on demographic change: at the beginning of the period, high status households had more children than low status households, but this pattern disappears during and after the fertility transition (this is consistent with a Malthusian constraint binding on low status households, see Cummins, 2019; Galor and Moav, 2002). Table 3 and Fig. A7 show trends in fertility by contemporary literacy status of the husband: in households with literate husbands, fertility declines from 3.77 in Period I to 3.38 in Period II and 2.10 in Period III. While households headed by an illiterate husband start with a lower level of fertility, they display a more pronounced early decline: from 3.10 in Period I to 2.10 in Period II and 2.11 in Period III. In sum, we find little evidence in these raw statistics that more literate couples have a particularly pronounced role in the early decline in fertility.

Another explanation for variation in marital fertility is the age of marriage. Figure A4 shows that the age of marriage for males was roughly stable throughout the sample period, while the age of marriage for females first rose by about 3 years between 1790 and 1820, and then fell back down to the initial level after 1850.[23] These dynamics open up the possibility that a later age of marriage for females contributed to the decline in fertility in the final decades of the 18th century.[24]

To further examine the link between literacy and fertility, and to more rigorously assess the role of other determinants of fertility, we turn to regression analysis. Table 3 presents regressions where the dependent variable is a household's number of children. As before, we deal with migration by conditioning on migration score B being greater than 50% and linearly downweigh observations with low scores. We present a number of specifications with different regressors. Column 1 simply replicates the summary statistics from Table 3 showing average fertility by period. Column 2 adds literacy status of the father, showing that fertility is higher for more

[20] Another factor that may have affected the fertility transition are inheritance rules and family types. We discuss these in Appendix 3.2 in relation to land ownership. The region of study was characterized by nuclear egalitarian family types (Bonin and Langlois, 1995; Todd, 1990). The Revolution did not bring changes in inheritance rules for those outside the nobility, since it simply sought to generalize across France customary rules that were already prevalent in SGA and surroundings. regions with egalitarian nuclear family types according to Todd's classification may have had an earlier and more rapid transition to lower fertility. For instance the regions late in transitioning (Brittany, Southern parts of France) did not have nuclear egalitarian family types (see Rotering, 2019 and Spolaore and Wacziarg, 2020, for further details on this point). However, we do not have any variation in family type /inheritance rules within the village and across time (except for the nobility) so we have no basis with which to characterize its effect on SGA's fertility dynamics.

[21] We record the fertility level of a couple as of the year or marriage or the year of birth of their first child, causing our timing of the decline to be possibly anticipated by three or four years.

[22] The fall in child mortality, however, may also lead to a reduction in net fertility if there is a precautionary motive for having children (see Kalemli-Ozcan, 2003).

[23] Breaking down age of marriage by social class, we find convergence. Before 1820, women's age at first marriage is higher for the lower and lower-middle classes (25 years old) than for the upper-middle and upper classes (22.1 years old). After 1820, the age of first marriage is about equal between the two (respectively, 26.1 and 24.5 years old). We find similar results when breaking down age of marriage by literacy status. This suggests that delaying marriage contributed to convergence in fertility between the lower / illiterate and upper / literate classes.

[24] The dynamics of the mother's age at the birth of her first and last child, are also interesting. They are displayed in Table A3. The mother's age at first birth is about 27 years in the first period and rises to about 29 in Periods II and III. The mother's age at the birth of the last child stays constant, around 35 years, across all three periods. A rough calculation suggests that the time interval between births is constant across Periods I and II and rises modestly in Period III. Thus the reduction in fertility is achieved mostly by delaying the first birth.

Table 2
Fertility. *Note*: Panel A displays mean fertility and net fertility by period. Panel B displays mean fertility by literacy status and period. Standard errors are displayed in parentheses, and the number of observations in brackets. Fertility is defined as the total number of births per couple. Net fertility is defined as the average number of children per couple, net of those who died within their first four years. Observations are weighed by final migration score *B* and only households with a migration score higher than 50% are retained (see Appendix 2.4 for the construction of the migration score). The variable is coded as of the year of marriage (if available) or the year of birth of the first child. The dataset is truncated to observations between 1740 and 1885 in Panel A (so as to track all births for each couple) and between 1745 and 1880 in Panel B (because of too few literate observations at the beginning of our sample period and too few illiterates at the end). There are 894 observations in Panel A and 822 in Panel B. *Source*: Households Database.

	Fertility	Net fertility
1740–1789	3.29	2.43
	(0.15) [361]	(0.12) [361]
1790–1840	2.42	2.03
	(0.14) [305]	(0.12) [305]
1841–1885	2.18	1.90
	(0.14) [228]	(0.13) [228]
(Panel A) Fertility and net fertility		

	Illiterate	Literate	Total
1745–1789	3.10	3.77	3.25
	(0.17) [255]	(0.41) [69]	(0.16) [324]
1790–1840	2.10	3.38	2.42
	(0.14) [236]	(0.37) [69]	(0.14) [305]
1841–1880	2.11	2.10	2.10
	(0.22) [70]	(0.20) [123]	(0.15) [193]
(Panel B) Fertility, by literacy status			

Table 3
Fertility regressions. *Note*: This table displays weighed regressions for household fertility. Robust standard errors are reported in parentheses. Main specification is column (6). Fertility is defined as the total number of births per couple. Observations are weighed by migration score B and only households with a migration score higher than 50% are retained (see Appendix 2.4 for the construction of the migration score). To capture all births, we retain only years between 1740 and 1885. *Source*: Households Database.

	(1)	(2)	(3)	(4)	(5)	(6)
1790–1840 dummy	−0.865***	−0.881***	−0.886***	−1.475***	−1.739***	−1.566***
	(0.218)	(0.215)	(0.215)	(0.346)	(0.349)	(0.466)
1841–1895 dummy	−1.110***	−1.438***	−0.999***	−1.569***	−1.508***	−1.302**
	(0.218)	(0.247)	(0.270)	(0.391)	(0.454)	(0.575)
Literacy		0.691***	0.901***	1.110***	1.131***	1.691***
		(0.229)	(0.296)	(0.376)	(0.410)	(0.482)
Literacy × 1841–1895			−0.763*	−1.232***	−2.155***	−2.816***
			(0.411)	(0.473)	(0.579)	(0.642)
Lower-middle class dummy				0.771***		0.704**
				(0.222)		(0.335)
Upper-middle class dummy				0.758		0.202
				(0.484)		(0.637)
Upper class dummy				0.943*		0.592
				(0.500)		(0.638)
Mother's marriage age (standardized)					−0.516***	−0.436**
					(0.146)	(0.171)
Father's marriage age (standardized)					−0.201	−0.202
					(0.176)	(0.174)
Constant	3.289***	3.130***	3.081***	3.245***	3.815***	3.183***
	(0.160)	(0.162)	(0.165)	(0.341)	(0.294)	(0.462)
Observations	894	894	894	592	410	318
R^2	0.03	0.05	0.05	0.13	0.23	0.27

Robust standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

literate couples. Column 3 shows that this relationship disappears after 1841, after the bulk of the fertility transition has occurred. In column 4, we add indicators for the social status of the household, finding that on average higher status households tended to have more children (the excluded social status category is lower class households). In column 5, we include the mother's and father's age at marriage. We find, as expected, that a later age of marriage for the mother is associated with lower fertility, while the coefficient on father's age at marriage is also negative but statistically insignificant. Finally, in column 6 we add all these variables together. Despite the smaller sample (318 households), the estimated coefficients are stable when compared to those in the other columns.[25] Moreover, estimates on the period dummies continue to show an average fall in household fertility after 1790, even after controlling for a number of observable determinants of fertility.

We conducted several extensions. First, we considered a Poisson estimator for the number of children, in order to provide an analysis that is better suited to count data (Table A4). We find results qualitatively very similar to the baseline. Second, we examined the main margin of reduction of fertility, finding that it was not mainly due to a rise in childlessness but to parity-specific limitations past the second child (Coale and Watkins, 1986).[26] Third, in Figures A9 to A13, we explore sensitivity to different cutoffs for the migration score. Estimates on the main variables of interest are very stable. Fourth, we examined sensitivity to the definitions of periods, by shifting the cutoff years by plus or minus 10 years, and considering all nine possible combinations of these period definitions (Table A5). These shifts in period definitions do not materially change our conclusions, and do not result in fertility differences between periods that are markedly different from those in the baseline. The break in fertility between Period I and Period II is maximized when the cutoff year between the two series is 1800 rather than 1790, but the difference is not statistically significant (in the conclusion, we estimate that the fertility transition date, defined as the first sustained 10% decrease in fertility, occurred between 1794 and 1803). Fifth, we also included periods dummies defined over 20-year intervals starting in 1740, leading to no material changes in the estimates on the determinants of fertility (Table A6). The first period dummy to turn significantly negative is the one for 1780–1800.

In sum, these regressions reveal 1) a positive relationship between literacy and fertility, which disappears after 1840; 2) a negative relationship between the mother's age of marriage and fertility; 3) evidence that even after these factors are accounted for, fertility declined for independent reasons around the time of the French Revolution. Combining these results with the trends in marriage age, child mortality and literacy, we can conclude that a later age of marriage and declining child mortality were possible contributing factors to the decline in fertility, since the period of declining fertility in SGA coincides with rising female age of marriage and declining child mortality.[27] On the other hand, the bulk of the fertility transition occurs before the major increase in literacy. The data reveals that most of the fertility decline occurred within the two decades that followed the French Revolution, suggesting that the social turmoil and cultural change around this momentous event was associated with changing fertility norms.[28]

4.2. Mortality

4.2.1. Infant and child mortality

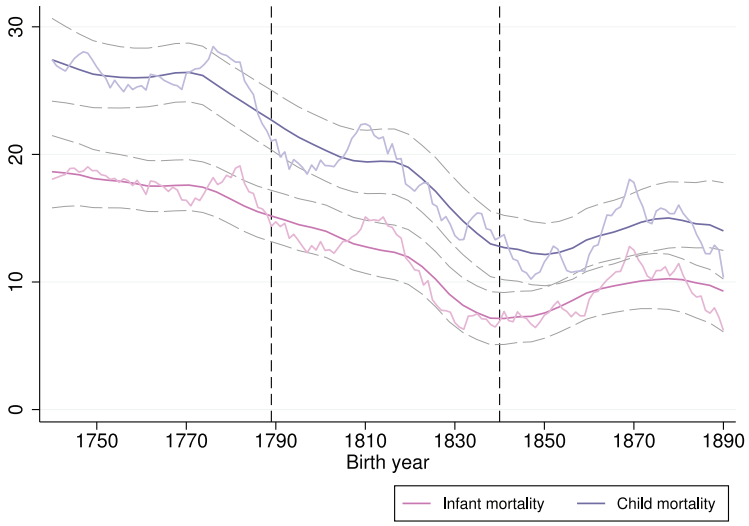
Fig. 3 displays the time path of infant and child mortality, using the households database. The series show a pronounced decline in both series. Child mortality falls from about 25.4% in the Period I to 12.9% in Period III. Most of the decline occurs during the period 1775 to 1840. While we do see a decline in mortality for ages 1 through 4, most of the decline in child mortality is attributable to the decline in infant mortality. Interestingly, the decline in infant and child mortality is similar across literacy levels and social classes. For instance, in Period I, child mortality was 25.0% for lower class, 24.4% for the lower-middle class and 25.6% for the upper-middle

[25] We also included ambient child mortality in the regression. This variable is the village-wide average probability that a child dies before reaching age 5 in SGA. We found that a lower probability of child death decreases gross fertility, in line with findings in the literature on the fertility decline. However, the coefficient on ambient child mortality was sensitive to the inclusion of a time trend or period specific trends (unlike the other estimates in Table 3).

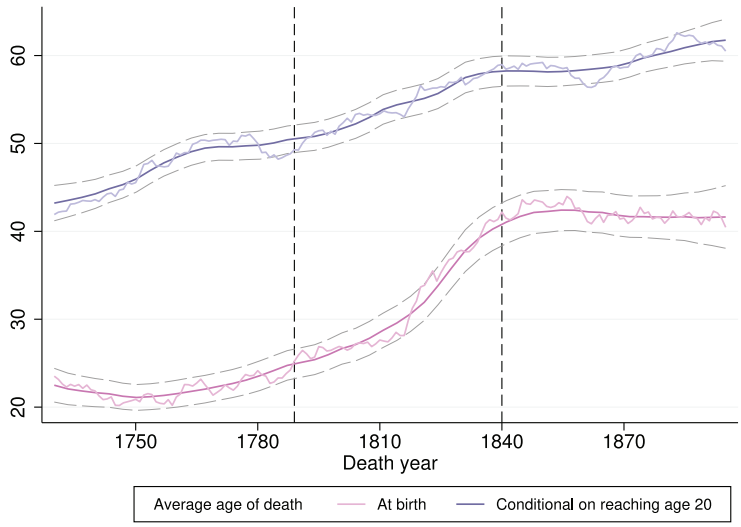
[26] We find that 87% of couples were not childless in period 1 and 82% in period 2 (this difference is insignificant at the 5% level, in a sample of 666 observations). Conditional on having a first child, 68% of couples had at least a second child in period 1 and 59% had at least a second child in period 2 (in a sample of 556 observations). Conditional on having had two children, the probability of having at least a third falls from 86% in period 1 to 76% in period 2 (in a sample of 337 observations). The difference between periods 1 and 2 increases past the fourth child.

[27] Brée and De la Croix (2019) argue that the evolution of childlessness during the fertility transition can help discriminate between theories of the fertility transition that emphasize female empowerment, a rise in materialism or changes in the returns to human capital. The latter hypothesis implies a fall in childlessness while the first two would imply a rise in childlessness. Using data from Bardet (1983), they show that the fertility transition in the city of Rouen in Normandy was associated with a rise in childlessness. In our village, we also find a rise in the childlessness rate in the first decades of the 19th century, after conditioning on migration score $s_1 = 1$ (indicating a low probability of migration for the household – see Appendix 2.4). This is consistent with stories that emphasize changes in norms such as a rise in materialism and a rise in female empowerment – both of which could be the product of the age of Enlightenment and the French Revolution.

[28] This is consistent with approaches that emphasize the cultural diffusion of fertility behaviors, such as Spolaore and Wacziarg (2020) or Daudin et al. (2019).



(Panel A) Infant and child mortality



(Panel B) Life expectancy

Fig. 3. Mortality. *Note*: Panel A displays infant and child mortality over time. Infant mortality is defined as the percentage of children dying before the age of one and child mortality the percentage dying within the first four years of their life. For each birth, we track any death record following within the next 1 or 4 years and conclude that the child survived if there was no death record. The variable is coded as of the year of birth. The figure is truncated due to poor data before 1740 (first names poorly recorded). There are 2862 observations. Panel B displays life expectancy at birth and at age of 20 over time. Life expectancy is defined as the average age of death. There are 1313 observations for life expectancy at 20 and 2491 for life expectancy at birth. Sources : Households Database (Panel A) and Deaths Database (Panel B).

and upper classes. In Period III, the corresponding numbers are 14.1%, 11.3% and 16.8%.[29] None of these differences are statistically significant.[30]

[29] In Period I, child mortality was 24.0% for households with illiterate husbands, and 31.1% for literate households. In Period III these averages were 10.0% and 14.7%, respectively. These differences are not statistically significant.

[30] The beginning-of-period numbers line up well with those in Houdaille (1984): he reports an infant mortality rate of 22.9% in the Northwestern part of France in the late 18th century while our figure for SGA is 18%. for Period I. The end-of-period numbers for SGA line up well with those in Barbieri (1998), who gives a child mortality rate of 14.5% for France overall in 1901.

We lack data to evaluate the causes of the decline in child mortality, but the uniformity of the decline across literacy status and classes suggests that generalized improvements in health, hygiene and nutrition might be leading causes.[31] These causes include improved nutrition, receding infectious diseases (including tuberculosis and smallpox) and improvements in medical treatment and public health measures. Additional causes like vaccination and urbanization are not major factors in our context: the advent of vaccination happened after the bulk of the decline of mortality in SGA, and urbanization obviously could not have been a direct factor at the village level.

The decline in child mortality is likely to have had wide-ranging consequences. A major possible consequence is on fertility behavior.[32] Van De Walle (1986, Chapter 4) argues there is no dispositive evidence that the decline in mortality and fertility in France were related, despite theories emphasizing the link. Her data on child mortality starts around 1830, after the start of the fertility transition in France. As Wrigley (1985) also emphasizes, there is not much data on child mortality in 18th Century France. In this context, our village-level evidence is noteworthy as the timing of the declines in fertility and child mortality is suggestive of a link between the two. The decline in child mortality might also have affected investment in child quality, and thereby played a role in the gradual improvement in education and human capital in SGA documented in the next section. Kalemli-Ozcan et al. (2000), for instance, show that lower mortality raises the relative return to investing in child quality rather than quantity, by lengthening the horizon over which the returns are realized.

4.2.2. Adult life expectancy

Beyond child mortality, progress in life expectancy was steady in SGA over our period of analysis. Average age of death conditional on reaching age 20 (our measure of life expectancy at 20) is displayed in Fig. 3.[33] For both males and females, this variable rises steadily from about 45 in 1750 to over 60 in 1880 (Fig. A14). There is no statistically significant difference in the levels and dynamics of life expectancy for males and females. We looked more closely at a rough measure of maternal mortality: in the households database, the ratio of women who died within 6 months of giving birth to the number of live births in a given period falls from 2.05% in Period I to 1.85% in Period II and 1.42% in Period III.[34]

Fig. 3 compares average age of death conditional on reaching age 20 with average age of death, without conditionality (i.e., life expectancy at birth). The latter is much lower, by about 20 years on average, largely reflecting the high incidence of child mortality.[35] There was some convergence between the two series as reductions in child mortality were more pronounced than reductions in overall mortality over the period under scrutiny. Life expectancy at birth rose particularly fast in the three decades after 1810. As was the case with child mortality, the increase in adult life expectancy is likely to have had important effects on a variety of outcomes by lengthening the horizon over which the returns to investment in human and physical capital are realized (Ben-Porath, 1967; Lorentzen et al., 2008).

5. Change and persistence in literacy

5.1. Trends in literacy

Fig. 4 displays the time path of literacy, based on the households database. Literacy in Period I is at a very low level of about 20% for males, and lower for females. We see a slightly rising pattern of male literacy at the end of Period I, a dip in literacy immediately after the Revolution, and a steep take-off in Period III - coinciding with the increased supply of educational services triggered by the school construction and hiring of a full time schoolteacher.[36] Literacy reached 85% for females and 86.25% for males on average in the last 20 years of our sample period (1875–1895). These numbers are completely in line with literacy levels and trends in Mayenne overall (Furet and Ozouf, 1977; Statistiques Générales de la France, 2011).

[31] For an in-depth treatment of the causes of the decline in mortality, both in historical contexts and for currently developing countries, see Cutler et al. (2006).

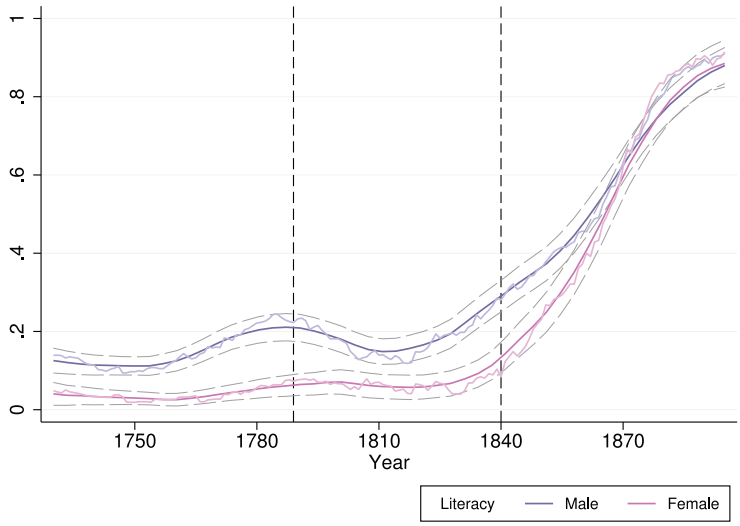
[32] In his classic book, Preston (1978) outlined four major mechanisms linking child mortality and fertility: (1) the child replacement effect, whereby households wish to replace deceased children ex post; (2) the insurance effect, whereby households may ex ante overshoot their target number of children to make sure the desired number survive; (3) the physiological effect, whereby the death of a child results in a shorter post-delivery period of infertility (due to the interruption of breastfeeding); (4) the societal effect, which is less clearly defined, but refers generally to the effect of high child mortality on marriage age and other societal norms with a bearing on fertility. These mechanisms are well summarized in Van De Walle (1986) and Palloni and Rafalimanana (1999).

[33] Additionally, we present a life table in Table A7. It looks quite similar to the life table for all of France between 1740 and 1829 presented in Blayo (1975, p.139). Note in particular the elevated probabilities of dying between 0–1 and 1–5 years of age for early birth cohorts.

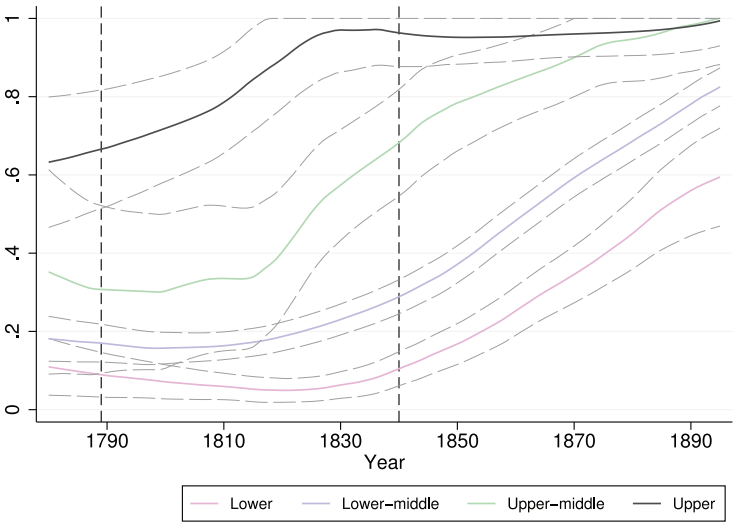
[34] We found no differences in the dynamics of life expectancy across social classes: lower and lower-middle classes have lower life expectancy than upper-middle and upper classes (by about 4.5 years on average over the sample period), but both categories show similar improvements over time.

[35] Average age of death in SGA was 20.4 in the 1740s and 35.9 in the 1820s. These numbers are comparable to those obtained from a broader sample of French villages and towns in Blayo (1975): in that sample, male life expectancy at birth in the decade starting in 1740 was 23.8, and 25.7 for females. It rises to 38.3 (males) and 39.3 (females) in the 1820s. In both Blayo (1975) and our sample, there is a rise in life expectancy at age 20 – by about 5 years in Blayo and about 9 years in SGA.

[36] One needs to be careful in making statements about the timing of the rise in literacy. In Fig. 4, literacy is recorded as of the date of marriage or birth of the first child, which tends to be about 10–15 years after the bulk of schooling is obtained. A statistically significant take-off in literacy is observed after 1850, and the hiring of the full-time schoolteacher occurred in 1834. So the rise is schooling is roughly congruent with the coded timing of literacy in the data.



(Panel A) By gender



(Panel B) By class

Fig. 4. Literacy. *Note*: Panel A displays the rate of literacy by gender, Panel B displays the rate of literacy by class. Literacy is defined as in Section 3. The variable is coded as of the year of marriage (if available) or the year of birth of the first child. In Panel A, there are 1636 observations for males and 901 for females. In Panel B, we use men's literacy and there are 894 observations: 226 lower class, 535 lower-middle class, 51 upper-middle class and 60 upper class. Occupations were poorly reported before 1780, so the figure only displays data post 1780. *Source*: Households Database.

Fig. 4 also breaks literacy down by social class. The figure reveals several interesting facts: literacy rises early for the upper classes, reaching a level close to 100% by 1830. Literacy also rises early for skilled craftsmen (who comprise all of the socioeconomic class that we label as "upper middle"), with a structural break roughly in 1820, rising from 40% prior to that date to about 80% in 1850. Finally the lower and lower-middle classes are those most likely to see their literacy affected by the hiring of a schoolteacher and construction of the school: for them, literacy takes off more ste=eply after 1840. Convergence in literacy status between classes is substantial but the lower class still lags behind by the end of our sample period.

5.2. The intergenerational transmission of literacy

A unique feature of our data is the ability to link outcomes across generations. In this subsection we examine the extent of the intergenerational linkages in literacy status. We can thereby assess the degree of persistence in literacy status across generations.

Table 4
Transition matrix for literacy, by period. *Note*: This table displays the literacy status of the son conditional on the father's literacy status. For example, in Panel A, first row, second column reads: overall, 27.59% of those with a literate father are illiterate. Literacy is defined as in Section 3. We use men's literacy. Panel A displays the transition matrix for the whole period. In Panels B, C and D we break down the sample by period. The variable is coded as of the year of marriage (if available) or the year of birth of the first child. *Source*: Households Database .

Literacy t ↓ | t-1 →	0	1	Total	Literacy t ↓ | t-1 →	0	1	Total
0	71.10	27.59	60.24	0	81.76	40.00	72.87
	(310)	(40)	(350)		(121)	(16)	(137)
1	28.90	72.41	39.76	1	18.24	60.00	27.13
	(126)	(105)	(231)		(27)	(24)	(51)
Total	100.00	100.00	100.00	Total	100.00	100.00	100.00
	(436)	(145)	(581)		(148)	(40)	(188)
(Panel A) Whole sample (1730 - 1895)				**(Panel B)** 1730 - 1789			
Literacy t ↓ | t-1 →	0	1	Total	Literacy t ↓ | t-1 →	0	1	Total
0	84.76	43.18	75.96	0	40.32	8.20	29.73
	(139)	(19)	(158)		(50)	(5)	(55)
1	15.24	56.82	24.04	1	59.68	91.80	70.27
	(25)	(25)	(50)		(74)	(56)	(130)
Total	100.00	100.00	100.00	Total	100.00	100.00	100.00
	(164)	(44)	(208)		(124)	(61)	(185)
(Panel C) 1790 - 1840				**(Panel D)** 1841 - 1895			

Table 4 provides the literacy transition matrix for the overall sample period.[37] We see a substantial degree of intergenerational persistence in literacy status. 71.1% of those whose father was illiterate are illiterate themselves, while 72.4% of those with a literate father are literate.

Table 4 also breaks down these transition probabilities by period. As implied by the rising literacy trend, intergenerational literacy mobility rises from period to period, with the greatest contrast occurring between Period II and Period III, i.e. before and after the hiring of a full time schoolteacher and construction of the school. In Periods I and II, over 82–85% of those with an illiterate father remain illiterate, so only 15–18% of those with an illiterate father become literate. The reversion rate to illiteracy is high, at around 40%. In Period III, only 40.3% of those with an illiterate father remain illiterate, and over 90% of those with a literate father remain literate. Early in the sample period, then, literacy was confined to a small share of the population and passed on from one generation to the next. Later, the rising literacy trend reduced the intergenerational transmission of illiteracy.

5.3. Regression analysis of the literacy transition

We conclude this section with a discussion of the econometric correlates of the rise in literacy. Table 5 displays marginal effects from probit regressions of literacy status on a set of determinants. The first three columns are for a sample of males that includes at least one intergenerational link, in order to observe the father's literacy. The first row reports a robust, highly significant effect of the previous generation's literacy status on literacy: the father's literacy status is associated with a 0.27–0.43 difference in the probability of being literate. Dummies for Period II and III are included in columns 2–4, showing that the increase in literacy becomes significant only after the establishment of a permanent school in 1841.[38] This again suggests the important role of educational supply factors. Column 3 includes dummies for socioeconomic class (the omitted category is lower classes). The marginal effects are all sizable and positive and higher class status is associated with higher literacy levels, replicating the findings obtained from simple averages in Fig. 4. Finally in column 4 we include females, roughly doubling the sample. All of the previous estimates remain robust, and additionally we document a significant 10.7 percentage point difference in the probability of being literate between males and females, on average over the sample period.[39]

[37] The sample for which we observe literacy status for more than one generation is smaller than the sample for which we observe literacy overall in the households database. To address the possibility of sample selection, Fig. A15 displays the path of literacy for the whole sample and for the subsample with observations for more than one generation. The two series overlap nearly perfectly.

[38] We considered two extensions regarding the timing of the rise in literacy: 1) Table A8 runs a probit regression of literacy on the father's literacy separately for each of periods I, II and III. The coefficient on the father's literacy status is steady across the first two periods (at 0.42) and falls significantly (to 0.32) in Period III. This is as one would expect since the bulk of the rise in literacy occurs in the third period. 2) We considered the same alternative definitions of time periods as we did for the fertility regressions - varying the cutoff years and including 20-year dummies. We found no significant changes in the estimated timing of the major change in literacy, or on the effect of the father's literacy (Tables A9 and A10).

[39] We also added a control for life expectancy at 20 at the village-wide level, to capture the effects of longevity on human capital investment (Ben-Porath, 1967). A longer life expectancy had a positive though insignificant effect on literacy, and the estimate was sensitive to the inclusion of a time trend.

Table 5
Literacy regressions. *Note*: The dependent variable is literacy status. We use men's literacy in columns (1) to (3), and all genders in column (4) (in this column we omit class dummies since they are not coded for females before Period III). All specifications are probit regressions and we report marginal effects (at zero for dummy variables). Robust standard errors are reported in parentheses. Main specification is column (4). Literacy is defined as in Section 3. *Source*: Households Database.

	(1)	(2)	(3)	(4)
Father's literacy (t-1)	0.435***	0.421***	0.270***	0.238***
	(0.043)	(0.050)	(0.077)	(0.034)
1790–1840 dummy		−0.027	−0.040	−0.002
		(0.036)	(0.028)	(0.010)
1841–1895 dummy		0.413***	0.276***	0.363***
		(0.048)	(0.056)	(0.034)
Lower-middle class dummy (t)			0.183***	
			(0.046)	
Upper-middle class dummy (t)			0.322**	
			(0.129)	
Upper class dummy (t)			0.639***	
			(0.117)	
Male dummy				0.107***
				(0.019)
Observations	581	581	436	1060
Pseudo R-squared	0.11	0.24	0.29	0.32

Robust standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

6. Change and persistence in socioeconomic status

6.1. Occupational and class mobility

In contrast to the profound changes experienced in terms of demographics and literacy, there is a high degree of persistence in occupational and class structure in SGA over our sample period. Fig. 5 provides information for social classes. The shares of various classes barely changes during the entire time period under study. For males, about 60% of observations belong to the lower-middle class, and another 20–25% to the lower class. There is a slight increase in the shares of the upper middle class (skilled craftsmen) and upper class (bourgeois) after 1840, but none of these changes are statistically significant. For females, a high degree of social stability is also observed. We see about 75% of females in the lower-middle class throughout, and another 15–20% in the lower class.

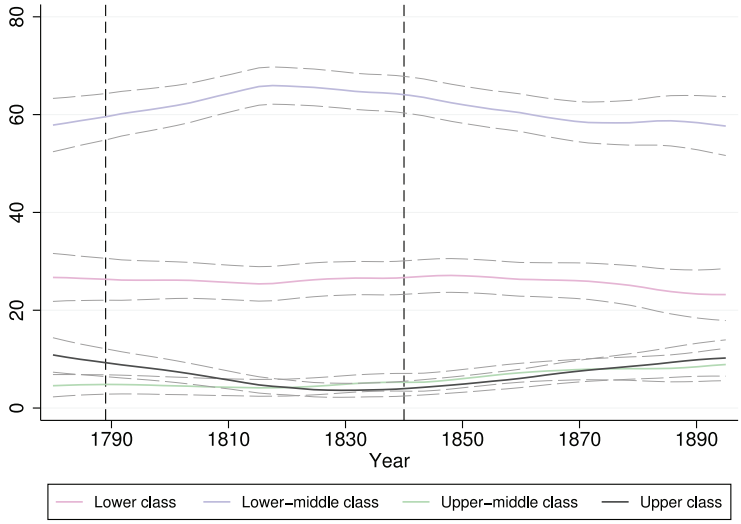
The Appendix contains detailed information on changes in occupational structure, showing a lot of stability through time in the shares of various occupations (Fig. A16).[40] For males, by far the most prevalent occupation is farmer, which encompasses about 50% of the population throughout. There is a small textile industry in the village, and about 15–20% of male employment is in this industry, but it declines after 1840 to about 5%. As a result, the share of farmers actually increases slightly, late in the sample period. Shares of the other occupations display a high degree of stability throughout the period for which occupation data is available (1780–1895 for males). For females, we also see considerable stability, except for a more pronounced decline of occupations in the textile industry and a correspondingly steeper increase in the share of day laborers.[41] In sum, there is virtually no sign of structural transformation in the village.

Turning to intergenerational mobility, there is substantial stability in the transmission of class and occupation in SGA. We rely on observations from the households database for which occupation and class are recorded for more than one generation.[42]

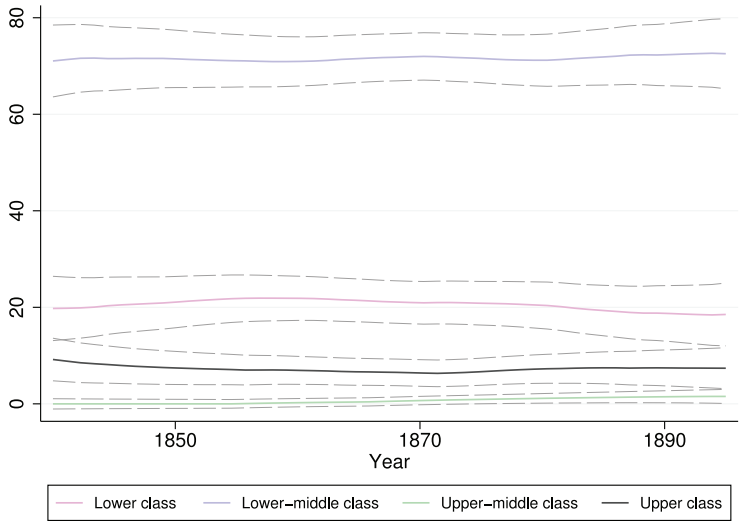
[40] We lack time series data on income for various occupations but Table A11 provides a snapshot for 1852, for which several sources allow us to reconstruct the cross section of occupational incomes. A dress maker (lower-middle class) made 75 centimes per day, which is anywhere from $183 to $256 per month (depending on assumptions about the number of days worked). A day laborer (lower class) made $122–$171 per month. The village schoolteacher made $246 per month, but this more than doubled after 1852. These occupational incomes line up well with our categorization of occupations into classes.

[41] Female occupations and male occupations are closely related. In 51% of the cases, the occupation recorded for the two members of a couple is the same (e.g. both are recorded as farmers). When the two deviate, the most frequent case is that the wife is employed in textiles, while the husband is a farmer. While male and female occupations are not perfectly aligned, for 72% of couples, wives and husbands belong to the same social class. For the remainder, it is usually the case that one belongs to the lower class and the other to the lower-middle class. Thus, there is a high degree of assortative mating, both in terms of occupations and social classes.

[42] The sample for which we observe occupation / class status for more than one generation is smaller than the sample for which we observe occupation / class overall in the households database. To address the possibility of sample selection, Figure A17, compares the time path of various series for the whole sample and for the subsample with observations for more than one generation. The series are: 1) the share of the lower class, 2) the share of the lower-middle class, 3) the share of the upper middle and upper classes, and 4) the literacy rate. In all four cases, the local polynomials are always inside each others' confidence intervals, suggesting that the sample of households for which occupational / class status is available for more than one generation is representative of the overall sample.



(Panel A) Male



(Panel B) Female

Fig. 5. Class structure over time. *Note*: Figure A (B) displays the time evolution of the average percentage of males (females) by class. Year of observation is the year of marriage or of first child. There are 876 observations in Panel A and 313 in Panel B. Panels A and B are truncated due to poor data, before 1780 for Panel A and before 1840 for Panel B: occupations not recorded. *Source*: Households Database.

Fig. A18 plots the share of sons with the same occupation or social class as their fathers. For occupations, the share fluctuates between 50% and 75% and remains stable around 60% throughout the period 1780–1895. There is an increase in mobility after the French Revolution and a stabilization thereafter. We find similar patterns for class mobility, though the increase in mobility after 1789 is less pronounced than for occupations.

Table 6 (Panel A) provides a transition matrix for the four classes, arraying occupations of the father (row 1) and of the son (column 1). Cells at or near the diagonal have high entries. For instance the probability of being in the lower middle class conditional on having a father in the lower middle class is 81% (an additional 15.6% of those with fathers in the lower-middle class have sons in the lower class). Transitions from lower to upper classes are very uncommon. Only 2 individuals with fathers in the lower class, out of 61, ended up in the upper class. Transitions in the other direction are more common, as about 39.4% of those with fathers in

Table 6
Transition matrix for social class. *Note*: This table displays the class of the father in columns and the class of his son in rows. Occupations are defined in Appendix 2.2.1. We only use males' occupations, after 1780 (Panel A). In Panels B and C, we break down the sample into two periods. The variable is coded as of the year of marriage (if available) or the year of birth of the first child. We de not display the matrix for Period I because of poor data before 1780 (occupations poorly recorded). *Source*: Households Database.

Class in t ↓ | t-1 →	Lower	Lower-middle	Upper-middle	Upper	Total
Lower	52.46	15.64	0.00	6.06	20.94
	(32)	(33)	(0)	(2)	(67)
Lower-middle	42.62	81.04	20.00	39.39	66.56
	(26)	(171)	(3)	(13)	(213)
Upper-middle	1.64	1.42	80.00	0.00	5.00
	(1)	(3)	(12)	(0)	(16)
Upper	3.28	1.90	0.00	54.55	7.50
	(2)	(4)	(0)	(18)	(24)
Total	100.00	100.00	100.00	100.00	100.00
	(61)	(211)	(15)	(33)	(320)
(Panel A) Whole sample (1780 - 1895)					
Class in t ↓ | t-1 →	Lower	Lower-middle	Upper-middle	Upper	Total
Lower	64.29	12.24	0.00	0.00	16.67
	(9)	(12)	(0)	(0)	(21)
Lower-middle	21.43	85.71	40.00	55.56	74.60
	(3)	(84)	(2)	(5)	(94)
Upper-middle	7.14	1.02	60.00	0.00	3.97
	(1)	(1)	(3)	(0)	(5)
Upper	7.14	1.02	0.00	44.44	4.76
	(1)	(1)	(0)	(4)	(6)
Total	100.00	100.00	100.00	100.00	100.00
	(14)	(98)	(5)	(9)	(126)
(Panel B) 1790 - 1840					
Class in t ↓ | t-1 →	Lower	Lower-middle	Upper-middle	Upper	Total
Lower	43.90	18.28	0.00	13.33	23.42
	(18)	(17)	(0)	(2)	(37)
Lower-middle	53.66	77.42	11.11	40.00	63.92
	(22)	(72)	(1)	(6)	(101)
Upper-middle	0.00	1.08	88.89	0.00	5.70
	(0)	(1)	(8)	(0)	(9)
Upper	2.44	3.23	0.00	46.67	6.96
	(1)	(3)	(0)	(7)	(11)
Total	100.00	100.00	100.00	100.00	100.00
	(41)	(93)	(9)	(15)	(158)
(Panel C) 1841 - 1895					

the upper class end up in the lower middle class. Table 6 also provides two separate transition matrices for 1790–1840 (Panel B) and 1841–1895 (Panel C). There is not much change in the degree of social mobility between these two periods.[43]

Appendix 3 provides further evidence on socioeconomic persistence. We document the persistence of prominent last names in the village, particularly the last names of landowners and of local leaders: the same last names recur through time among families that own land or that sit on the municipal council. We also examine two specific lineages in greater detail, illustrating the high degree of intergenerational persistence in professions and social status.

[43] Table A12 displays the transition matrix for occupations. Several things stand out. First, entries at or close to the diagonal once again contain high percentages. For instance 73.8% of sons whose father was a farmer were also farmers. Most of the rest (14.8%) were day laborers. Similarly 59.4% of those with a father working in the textile industry also worked in the textile industry. Second, there are very few entries farther from the diagonal, indicating that it was very unusual for someone with a father with low skill / low status profession to move substantially up the ladder (and similarly for downward mobility). One exception is that we see a few examples (11) of bourgeois fathers whose sons were farmers. Given the high degree of stability in occupational structure over time, there is not much scope for net upward or downward mobility. Overall, this table paints the picture of a village with a very high rate of intergenerational transmission of occupations. Table A12 also displays occupational transition matrices at two different dates (where dates correspond to the date of formation of households): Panel B for the period 1790–1840 and Panel C for 1841–1895. Results should be taken cautiously because there are not many observations in many of the cells, but overall we do not see any dramatic changes in the degree of intergenerational occupational mobility between periods. Diagonal or close to diagonal entries are large in both periods. We see relatively high rates of mobility for sons whose fathers were bourgeois, in both periods.

Table 7
Regression analysis of intergenerational class mobility. *Note*: This table displays regressions explaining intergenerational class mobility. t-statistics are reported in parentheses. The dependent variable is class rank for generation *t*. The explanatory variable class rank in $t-1$ is the class rank of the father. Class rank is 1 for the lower class, 2 for the lower-middle class, 3 for the upper-middle class and 4 for the upper class. All specifications include period dummies. In all specifications, we drop observations before 1780 due to poor data quality (occupations poorly recorded). *Source*: Households Database.

	(1)	(2)	(3)	(4)	(5)	(6)
Father's class rank (t-1)	0.494***	0.454***	0.393***	0.390***	0.438***	0.433***
	(0.069)	(0.071)	(0.076)	(0.125)	(0.066)	(0.068)
Literacy (t)		0.225***	0.279***	0.279***	0.254***	0.252***
		(0.080)	(0.081)	(0.080)	(0.073)	(0.073)
Class rank (t-1) × Period III				0.004		
				(0.153)		
Gender dummy (1=female)					−0.067	
					(0.100)	
Class rank (t-1) × Gender dummy						−0.002
						(0.053)
Sample includes daughters	No	No	No	No	Yes	Yes
Period I excluded	No	No	Yes	Yes	Yes	Yes
Observations	312	312	284	284	352	352
R^2	0.29	0.31	0.26	0.26	0.29	0.29

Robust standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

6.2. Determinants of social class

To analyze the determinants of social class, we conduct a regression analysis of generation *t*'s social class rank, using the households database.[44] Regression results are presented in Table 7. The independent variables include the class score of generation t-1 as well as the literacy status of generation *t*. The sample is limited to sons for columns 1–4 and includes daughters in columns 5 and 6. The results suggest a high degree of intergenerational class persistence. Across all specifications, a 1 unit difference in generation t-1's class rank is associated with a difference in generation *t*'s class rank of anywhere between 0.4 and 0.5. Not surprisingly, generation *t* literacy positively affects the class rank. Column 4 shows no evidence of a change in the autoregressive coefficient on class rank between Period II and Period III, indicating stability in intergenerational mobility between periods (Period I is excluded from the specifications of columns 3–6: there are only 28 observations in Period I, since we use class and occupations data starting in 1780). Finally, these findings do not differ between sons and daughters.

To ease interpretation, we also ran linear probability models to explain either lower class status or upper / upper middle class status (Tables A13 and A14). In the first case, the dependent variable takes on a value of one if generation *t* is lower class, zero otherwise, and in the second case the class indicator is one if generation *t* is either upper middle or upper class, zero otherwise. These regressions also display a large degree of intergenerational class persistence. For instance, for every unit increase in the father's class rank, the probability of generation *t* being in the lower class falls by anywhere between 10% and 15%, depending on the specification. Similarly, for every unit increase in the father's class rank, the probability of generation *t* being in the upper or upper-middle class rises by anywhere between 13% and 20%. In addition, generation *t* literacy predicts class status positively.

To summarize, our regression analysis of the class rank of generation *t* confirms a very high degree of intergenerational class persistence in SGA over the period 1780–1895. Social mobility did not change materially between Periods II and III.[45]

7. Conclusion

What was the sequencing of modernization in SGA? Table 8 and Fig. 6 combine the facts documented in the previous sections concerning institutional change, the demographic transition, the accumulation of human capital and changes in social mobility.[46] Demographic change came first. The increase in life expectancy at age 20 first experienced a sustained 10% increase in the decade following 1742. The corresponding dates for decreases in child mortality and fertility are the decades starting in 1783 and 1794, respectively. Fig. 6 shows that by 1810, the bulk of the fertility transition had already occurred. The rise in literacy occurs at least two decades later: we date the first sustained 75% increase in the literacy rate to the decade 1829–1838 – which includes the opening of the school. Finally, we do not observe a transition in class structure during the sample period. These trends at the village level are

[44] For ease of interpretation, the dependent variable used in Table 7 is based on class ranks, not on the class scores discussed in Appendix 2.2: Lower class is coded as 1, lower middle class is coded as 2, upper middle class is coded as 3 and upper class is coded as 4.

[45] If we compare social mobility using households formed between 1780 and 1810 to those formed between 1865 and 1895, we also find no statistically significant difference in the extent of social mobility.

[46] Table 8 lists the dates of the first sustained decrease or increase for fertility, child mortality, life expectancy, literacy and class immobility, in the order of the dates of transition. We present the dates as ten-year intervals, reflecting uncertainty on the precise timing of the transitions. Fig. 6 presents the full time series of literacy, class immobility, fertility and net fertility, as defined in the preceding sections.

Table 8
Estimated years of transition *Note*: This table presents estimated periods of first sustained increase or decrease for a set of variables of interest. For any date t, we define $Y(B_t)$ as the average value of variable y during the 10 years before t (excluding t) and $Y(A_t)$ its average value during the 10 years after t (including t). A x% increase or decrease is defined to be *sustained* if and only if $\left|Y(A_{t+j})/Y(B_t) - 1\right| > |x|$ for any $j = 0, \cdots, 19$. That is, if the increase or decrease with respect to the period before time t is greater than $|x|$ in absolute value even as we forward the "after" period 20 times. Choosing left or right windows of 10 years ensures that the series is sufficiently smoothed and that we will not reject a true transition date because there was too much variance in the series. The comment "*not in sample*" means that the transition criteria were not satisfied during the sample period. Year of observation is defined as year of marriage or of first child for all series except for life expectancy, where year of observation is defined as year of death. *Source*: Households and Deaths Database.

	Interval date of transition
Life expectancy at 20	
First *sustained* 10% increase	[1742,1751]
First *sustained* 25% increase	*not in sample*
Child mortality rate	
First *sustained* 10% decrease	[1783,1792]
First *sustained* 25% decrease	[1817,1826]
Fertility & net fertility	
First *sustained* 10% decrease	[1794,1803]
First *sustained* 25% decrease	[1797,1806]
Literacy rate	
First *sustained* 75% increase	[1829,1838]
First *sustained* 150% increase	[1841,1850]
Class immobility	
First *sustained* 10% change	*not in sample*
First *sustained* 25% change	*not in sample*

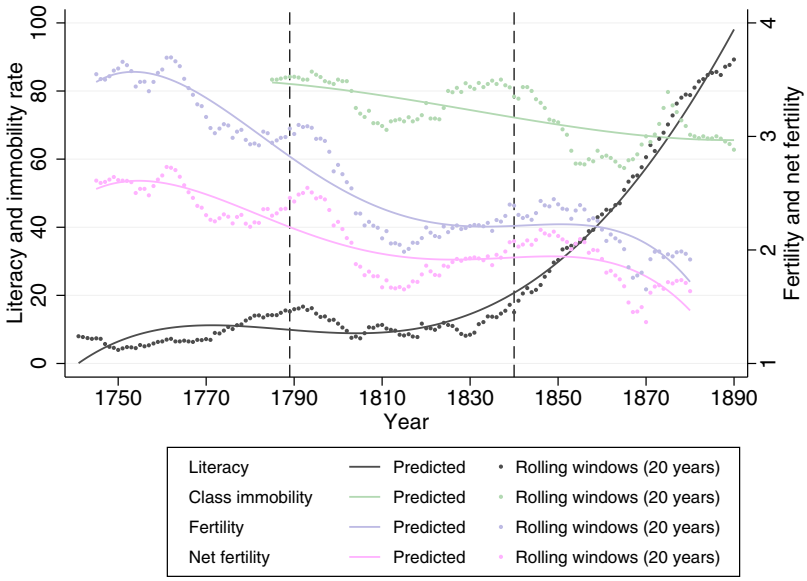


Fig. 6. Time series plots. *Note*: This figure plots average literacy, class immobility, fertility and net fertility across time, computed on 20-year rolling windows. We also plot 5th degree fractional polynomial on the time series. The left axis is for the rates of mobility and literacy, while fertility and net fertility are on the right axis. We do not plot life expectancy at 20 because it it is on a different scale and it is increasing at a constant rate throughout the period. *Source*: Households Database.

reflected at the level of specific household lineages, as revealed by a detailed analysis of two such illustrative lineages in Appendix 3.3.

Our main conclusion is that modernization in SGA was associated most plausibly with the cultural changes that accompanied the Age of Enlightenment and the institutional upheaval that resulted from the French Revolution. The fertility transition preceded by a long time major changes in the trade-off between the quality and the quantity of children. We find no evidence that, at early stages, modernization was accompanied by technological innovation or structural change: from generation to generation, households carry

out similar productive activities and maintain similar positions on the social ladder. The village, instead, was buttressed by external forces such as the diffusion of new demographic modes of behavior and educational mandates from the national government that led to both reduced fertility and increased literacy. SGA was a small, isolated, rural village, in a region with a relatively high level of religiosity. Yet, it was both geographically and linguistically close to Paris, the epicenter of institutional and demographic change in late 18th century France, and this may have facilitated the diffusion of new behaviors and institutions.

Our detailed analysis of a single village illustrates how it is possible to conduct a quantitative microeconomic analysis of a historical process of economic development in a country that successfully modernized. Generalizing these methods beyond a single village would allow economic historians to trace household movements across villages, as the result of marriage and other causes of local migration. As more and more civil records are digitized and made available, a systematic coding of all available information for France and beyond should become possible. Such a task would represent a vast undertaking, yet it would allow social scientists to apply methods of analysis currently reserved to contemporary developing countries to settings where societies successfully transitioned from stagnation to modernity. It is likely that, in the process of carrying out this task, multiple paths to development and modernity will emerge. The English path most plausibly conformed to a pattern whereby technological innovation and the changing returns to human capital, followed by demographic change, drove modernization. In contrast, France achieved roughly the same standards of living by putting demographics first, education second, and industrialization last.

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Supplementary material

Supplementary material associated with this article can be found, in the online version, at 10.1016/j.eeh.2020.101352

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