Is Industrialization Conducive to Long-Run Prosperity?

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June 2015

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ABSTRACT

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This research explores the long-run effect of industrialization on the process of development. In contrast to conventional wisdom that views industrial development as a catalyst for economic growth, the study establishes that while the adoption of industrial technology was conducive to economic development in the short-run, it has had a detrimental effect on standards of living in the long-run. Exploiting exogenous source of regional variation in the adoption of steam engines during the French industrial revolution, the research establishes that regions in which industrialization was more intensive experienced an increase in literacy rates more swiftly and generated higher income per capita in the subsequent decades. Nevertheless, intensive industrialization has had an adverse effect on income per capita, employment and equality by the turn of the 21st century. This adverse effect reflects neither higher unionization and wage rates nor trade protection, but rather underinvestment in human capital and lower employment in skilled-intensive occupations. These findings suggest that the characteristics that permitted the onset of industrialization, rather than the adoption of industrial technology *per se*, have been the source of prosperity among the currently developed economies that experienced an early industrialization.

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1   Introduction

The process of development has been marked by reversals as well as persistence in the relative wealth of nations. While some geographical characteristics that were conducive for economic development in the agricultural stage had detrimental effects on the transition to the industrial stage of development, conventional wisdom suggests that prosperity has persisted among societies that experienced an earlier industrialization (Landes, 1998; Maddison, 2001; Galor, 2011).

Regional development within advanced economies, nevertheless, appears far from being indicative of the presence of a persistent beneficial effect of early industrialization. In particular, anecdotal evidence suggests that regions which were prosperous industrial centers in Western Europe and in the Americas in the 19th century (e.g., the Rust Belt in the USA, the Midlands in the UK, and the Ruhr valley in Germany) have experienced a reversal in their comparative development.

These conflicting observations about the long-run effect of industrialization on the prosperity of regions and nations may suggest that factors which fostered industrial development in the Western world, rather than the forces of industrialization *per se*, are associated with the persistence of fortune across these industrial nations. In particular, the delayed industrialization of some currently leading economies suggests that it is not inconceivable that the process of industrialization, despite its earlier virtues, has had detrimental effects on the transition to the post-industrial stage of development.

The research explores the long-run effect of industrialization on the process of development. In contrast to conventional wisdom that views industrial development as a catalyst for economic growth, highlighting its persistent effect on economic prosperity, the study establishes that while the adoption of industrial technology was initially conducive for economic development, it has had a detrimental effect on standards of living in the long-run.

The study utilizes French regional data from the second half of the 19th century until the beginning of the 21st century to explore the impact of the adoption of industrial technology on the evolution of income per capita and human capital formation. It establishes that regions which industrialized more intensively experienced an increase in literacy rates more swiftly and generated higher income per capita in the subsequent decades. Nevertheless, industrialization has had an adverse effect on income per capita, employment and equality by the turn of the 21st century.

The observed relationship between industrialization and economic development may reflect the potential effect of industrialization on economic prosperity, the impact of development on industrialization, as well as the influence of additional factors (e.g., institutional, cultural and human capital characteristics). Thus, the research exploits exogenous regional variations in the adoption of steam engines across France to establish the effect of industrialization on the process of development.

In light of the association between industrialization and the intensity of the use of the steam

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engine (Mokyr, 1990; Bresnahan and Trajtenberg, 1995; Rosenberg and Trajtenberg, 2004), the study takes advantage of historical evidence regarding the regional diffusion of the steam engine (Ballot, 1923; Sée, 1925; Léon, 1976) to identify the effect of regional variations in the intensity of the use steam engine in 1860-1865 on the process of development. In particular, it exploits the distances of each French department from Fresnes-sur-Escaut, where a steam engine was first operated for commercial use in 1732, as exogenous source of variations in industrialization across French regions.

Indeed, in line with the historical account, the distribution of steam engines across French departments is indicative of a local diffusion process from Fresnes-sur-Escaut. Accounting for confounding geographical and institutional characteristics, pre-industrial development as well as distances from major economic centers, if the distance of a department away from Fresnes-sur-Escaut was to increase from the 25th (337 km) to the 75th percentile (680 km) of the distance distribution, this department would experience an aggregate drop of 97 hp (relative to a sample to a sample mean of 655 hp).

The validity of the distance from Fresnes-sur-Escaut as an instrumental variable for the intensity of the adoption of steam engines across France is enhanced by third additional factors. First, conditional on the distance from Fresnes-sur-Escaut, distances between each department and major centers of economic power in 1860-1865 (e.g., Paris, Marseille, Lyon, Rouen, Mulhouse, Bordeaux) are uncorrelated with the intensive use of the steam engine over this period. Second, the distance from Fresnes-sur-Escaut is uncorrelated with economic development across France in the pre-industrial period. Third, it appears that the Nord department had neither superior human capital characteristics nor higher standard of living in comparison to the average department in France.

The study establishes that the horse power of steam engines in industrial production in the 1860-1865 period had a positive and significant impact on income per capita in 1872, 1901 and 1930. In particular, if a department had increased its total horse power of steam engines in 1860-1865 from the 25th to the 75th percentile of the distribution, it would have experienced an increase in GDP per capita of 79.1 percent in 1872, 159.6 percent in 1901 and 66.7 percent in 1930. Nevertheless, industrialization had an adverse effect on income per capita, human capital formation, employment and equality in the post-2000 period. In particular, if a department had experienced a increase in its horse power in 1860-1865 from the 25th to the 75th percentile of the distribution, this increase would have led to a 39.9 percent decrease in GDP per capita in 2001-2010.

It is important to note that the IV estimation reverses the OLS estimates of the relationship between industrialization and the long-run level of income per capita from a positive to a negative one. This reversal suggests that factors which fostered industrial development, rather than industrialization per se, contributed to the positive association between industrialization and long-run development. In particular, once one accounts for the effect of these omitted factors,

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industrialization has an adverse effect on the standard of living in the long-run.

The empirical analysis accounts for a wide range of exogenous confounding geographical and institutional characteristics, as well as for pre-industrial development, which may have contributed to the relationship between industrialization and economic development. First, it accounts for the potentially confounding impact of exogenous geographical characteristics of each of the French departments on the relationship between industrialization and economic development. In particular, it captures the potential effect of these geographical factors on the profitability of the adoption of the steam engine, the pace of its regional diffusion, as well as on productivity and thus the evolution of income per capita in the process of development. Second, it captures the potentially confounding effects of the location of departments (i.e., latitude, border departments, maritime departments, departments at a greater distance from the concentration of political power in Paris, and those that were temporarily under German domination) on the diffusion of the steam engine and the diffusion of development. Third, the analysis accounts for the differential level of development across France in the pre-industrial era that may have affected jointly the process of development and the process of industrialization. In particular, it controls for the effect of pre-industrial development on the adoption of the steam engine and, independently, on the persistence of development.

The research further explores the mediating channels through which earlier industrial development has an adverse effect of the contemporary level of development. It establishes that the adverse long-run effect of industrialization on the formation of human capital, beyond basic literacy skills, is the underlining force that brought about the relative demise of the industrial regions. In contrast, greater unionization, higher wages and trade protection in these industrial regions during their economic prosperity, as well as destruction in the two world wars, did not contribute to their current decline. Moreover, their decline cannot be attributed to variations in employment rates in the service sector, but rather to the detrimental effect on the share of employment in skilled-intensive occupations.

The remainder of this paper is as follows. Section 2 presents our data. Section 3 discusses our empirical strategy. Section 4 presents our main results and our robustness checks. Section 5 assesses the relevance of potential mechanisms for these findings and Section 6 offers concluding remarks.

2   Data and Main Variables

France was among the first countries to industrialize in Europe in the 18th century and its industrialization continued during the 19th century. Nevertheless, by 1914, the living standard in France remained below that of England and of Germany, which had become the leading industrial country in continental Europe. The slower path of industrialization in France has been attributed to the consequences of the French Revolution (e.g., wars, legal reforms and land redistribution), the

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patterns of domestic and foreign investment, cultural preferences for public services, as well as the comparative advantage of France in agriculture vis-a-vis England and Germany (see the discussion in, e.g., Lévy-Leboyer and Bourguignon, 1990; Grantham, 1997; Crouzet, 2003).

This section examines the evolution of industrialization and income across 89 French departments, based on the administrative division of France in the 1860-1865 period, accounting for the geographical and the institutional characteristics of these regions. The initial partition of the French territory in 1790 was designed to ensure that the travel distance by horse from any location within the department to the main administrative center would not exceed one day. The initial territory of each department was therefore orthogonal to the process of development and the subsequent minor changes in the borders of some departments did not reflect the effect of industrialization.

In particular, several departments that were split into smaller units are aggregated into their historical territorial borders and regions that were temporarily removed from the French territory are excluded from the analysis during those time periods.[1] In light of the changes in the internal and external boundaries of the French territory during the period of study, the number of departments that is included in different stages of the analysis varies from 81 to 89. Table A.1 reports the descriptive statistics for the variables in the empirical analysis across these departments.

2.1 Past and Present Measures of Income, Workforce and Human Capital

2.1.1 Income, unemployment and inequality

This study seeks to examine the effect of industrialization on the evolution of income per capita in the process of development. Given that the industrial survey which is the basis for our analysis was conducted between 1860 and 1865, the relevant data to capture the short-run and medium-run effects of industrialization on income per capita are provided at the departmental level prior to WWII for the years 1872, 1886, 1901, 1911 and 1930 by (Combes et al., 2011; Caruana-Galizia, 2013). Thus, for the sake of brevity, and equal spacing between those years, the analysis focuses on income per capita in 1872, 1901 and 1930.

To assess the effects of industrialization on income per capita in the long-run, the analysis is restricted to the 2001-2010 period, since data on income per capita at the departmental level is only available in the post-1995 period and the corresponding data for the other indicators of the standards of living only in the post-2001 period (INSEE - *Institut National de la Statistique et*

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[1]The Parisian region encompassed three departments (Seine, Seine-et-Marne and Seine-et-Oise) before 1968 and it was split into eight (Essonne, Hauts-de-Seine, Paris, Seine-et-Marne, Seine-Saint-Denis, Val-de-Marne, Val d'Oise and Yvelines) afterwards. Likewise, the Corsica department was split in 1975 into Corse-du-Sud and Haute-Corse. The three departments (i.e., Bas-Rhin, Haut-Rhin and Meurthe) which were under German rule between 1871 and 1918 are excluded from the analysis of economic development over that time period. In addition, in the examination of the robustness of the analysis with data prior to 1860, the three departments (i.e., Alpes-Maritimes, Haute-Savoie and Savoie) that were not part of France are excluded from the analysis.

des Etudes Economiques).[2] Moreover, to lessen the potential impact of fluctuations in income per capita, the effect of industrialization in the long-run is captured by its differential impact on the average GDP per capita across departments over the 2001-2010 period.

Furthermore, the analysis examines the effect of industrialization on additional indicators of economic development, unemployment and inequality. The data on unemployment are available across departments over the 2002-2011 period, those on inequality over the 2001-2008 period, and those on the main quartiles of the income distribution over the 2001-2010 period.[3] Hence,to lessen the potential impact of yearly fluctuations, the effect of industrialization on these economic indicators is captured by their average values over the relevant time periods.

2.1.2 Workforce

The effect of industrialization on the sectoral composition of the workforce in the post-1860 period is captured by the impact on the shares of employment in the agricultural, industrial and service sectors. The surveys which capture the short-run and mid-run effects of industrialization are those undertaken in 1872, 1901 and 1930 (Statistique Générale de la France). Similarly, to assess the effects of industrialization on the sectoral composition in the post-WWII period, all available surveys of the French population across departments (i.e., 1968, 1975, 1982, 1990, 1999 and 2010) are used (INSEE - *Institut National de la Statistique et des Etudes Economiques*).

2.1.3 Human capital

The study further explores the effect of industrialization on the evolution of human capital in the process of development. The effect of industrialization on human capital formation in the pre-WWI period is captured by its impact on the literacy rates of French army conscripts (i.e., 20-year-old men who reported for military service in the department where their father lived - *Annuaire Statistique De La France* (1878-1939)). In particular, given the data limitations, the analysis focuses on the share of the literate conscripts over the 1874-1883 and 1894-1903 decades. As reported in Table A.1, 82.0% of the French conscripts were literate over the 1874-1883 period and 94.1% over the 1894-1903 period.[4]

The effect of industrialization on human capital formation in the post-WWII period is captured by its impact on the share of men and women (age 25 and above) who completed high-school as reported in the available surveys of the French population across departments (i.e., 1968, 1975,

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[2]The qualitative results remain unchanged if one considers the average income per capita over the entire sample period available, 1995-2010.

[3]The income data are based on gross income, prior to state benefits, per person in a household.

[4]In line with the historical evidence (e.g., Grew and Harrigan, 1991; Diebolt et al., 2005; Diebolt and Fontvieille, 2001), as reported in Table A.1, a sizeable share of the French population was literate even before the passing of the 1881-1882 laws which made primary school attendance "free"and mandatory for boys and girls until age 13.

1982, 1990, 1999 and 2010). As can be seen in Table A.1, there was a continuous increase in the educational achievements of the French population during this period. Indeed the shares of men and women (age 25 and above) who completed high-school, respectively, rose from 8.8% and 6.0% in 1968 to 36.3% and 39.1% in 2010.

Furthermore, to examine the role of the composition of human capital in the non-monotonic evolution of income per capita, the study explores the impact of industrialization on the evolution of high-, medium- and low-levels of human capital in France after WWII . This composition is captured by the division of the workforce (age 25-54) between executives and other intellectual professions, middle management professionals, and employees, in the available surveys of the French population across departments (1968, 1975, 1982, 1990, 1999 and 2010).

Moreover, to capture the effect of industrialization on human capital formation in the contemporary period, in which school attendance is mandatory until the age of 16, the study explores its impact on the shares of men and women in the 15-17 and 18-24 age categories attending school or any other (post-secondary) learning institution as reported in the 2010 census. As indicated in Table A.1, in 2010, most men and women age 15-17 (respectively 95.5% and 96.7%) attended school but fewer (44.3% and 48.0%) pursued post-secondary studies.

2.2   Steam Engines

The research explores the effect of the introduction of industrial technology on the process of development. In light of the pivotal role played by the steam engine in the process of industrialization, it exploits variations in the industrial use of the steam engine across the French regions during its early stages of industrialization to capture the intensity of industrialization. In particular, the analysis focuses on the horse power of steam engines used in each of the French departments as reported in the industrial survey carried out by the French government between 1860 and 1865.[5]

As depicted in Figure 1, and analyzed further in the discussion of the identification strategy in Section 3, the distribution of the steam engines across French departments in 1860-1865 suggests a regional pattern of diffusion from Fresnes-sur-Escaut (in the Nord department, at the northern tip of continental France) where the first steam engine in France was introduced in 1732.[6] The most intensive use of the steam engine over this period was in the Northern part of France. The intensity diminished somewhat in the East and in the South East, and declined further in the South West.

Three departments had no steam engine in 1860-1865 (i.e., Ariège and Lot in the South-West and Hautes-Alpes in the South-East). Potential anomalies associated with these departments are accounted for by the introduction of a dummy variable that represents them. In particular,

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[5]For details on the implementation of this survey, see Chanut et al. (2000).

[6]Mokyr (1990, p.85) documents that a steam engine was first used for industrial purpose in 1712 in England, in a coal mine near Wolverhampton. In the two following decades, steam engines were progressively employed in various parts of continental Europe.
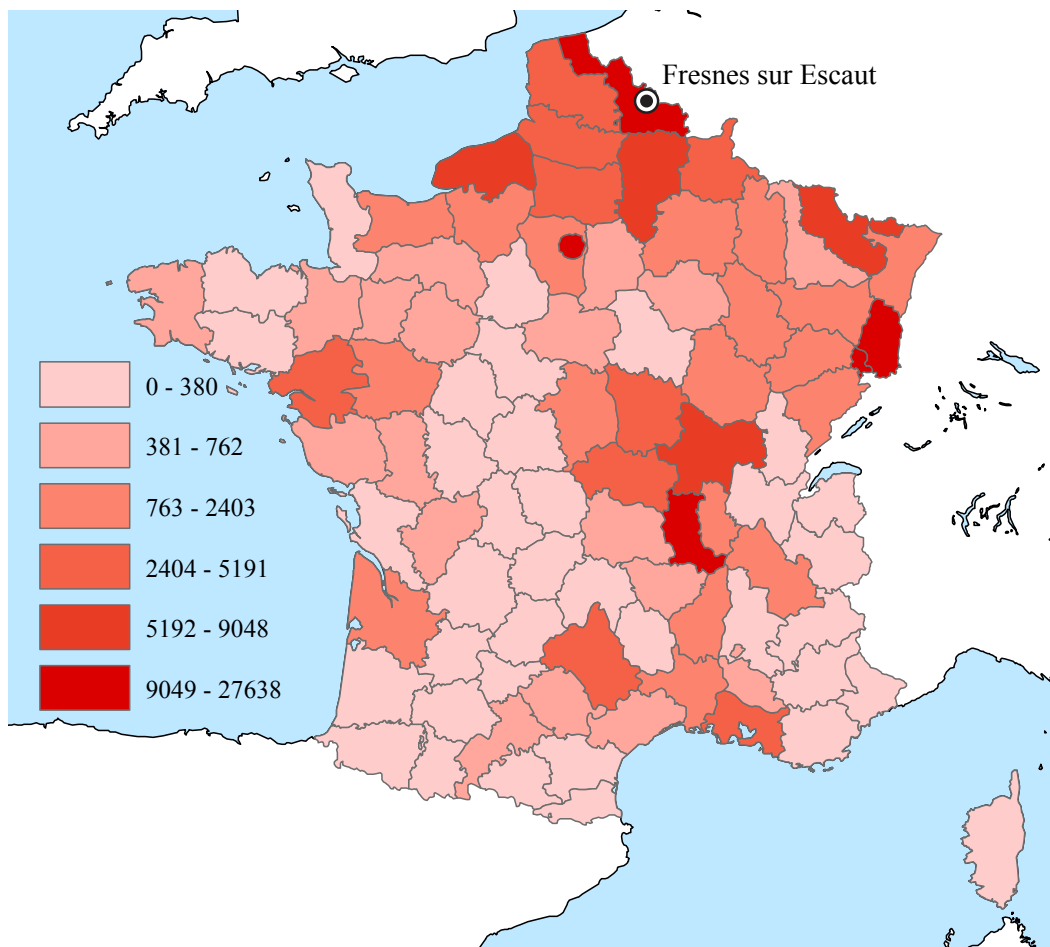
Figure 1: The distribution of the total horse power of steam engines across departments in France, 1860-1865.

potential concerns about the distance of these departments from the threshold level of development that permits the adoption of the steam engines is accounted for by this dummy variable.

2.3   Confounding Characteristics of each Department

The empirical analysis accounts for a wide range of exogenous confounding geographical and institutional characteristics, as well as for pre-industrial development, which may have contributed to the relationship between industrialization and economic development. Institutions may have affected jointly the process of development and the process of industrialization. Geographical characteristics may have impacted the pace of industrialization as well as agricultural productivity and thus income per capita. Moreover, geographical and institutional factors may have affected the process of development indirectly by governing the pace of the diffusion of steam engines across departments. Finally, pre-industrial development may have affected the onset of industrialization and may have had an independent persistent effect on the process of development.

2.3.1 Geographic Characteristics

Land Suitability. Average Rainfall. Average Temperature
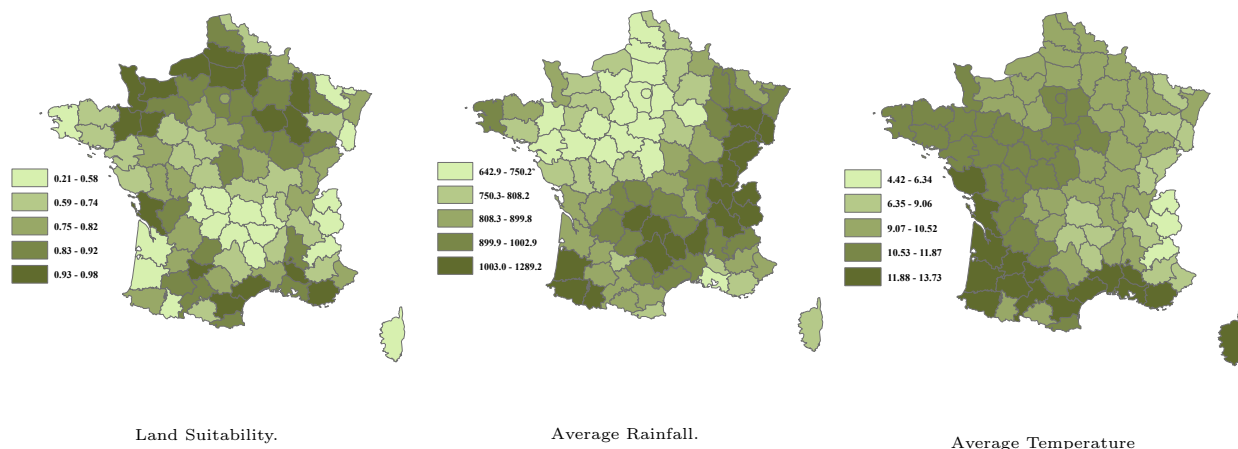
Figure 2: Geographic characteristics of French departments

The empirical analysis accounts for the potentially confounding impact of exogenous geographical characteristics of each of the French departments on the relationship between industrialization and economic development. In particular, it captures the potential effect of these geographical factors on the profitability of the adoption of the steam engine, the pace of its regional diffusion, as well as on productivity and thus the evolution of income per capita in the process of development.

First, the study accounts for climatic and soil characteristics of each department mapped in Figure 2 (i.e., land suitability, average temperature, average rainfall, and latitude (Ramankutty et al., 2002)), that could have affected natural land productivity and therefore the feasibility and profitability of the transition to the industrial stage of development, as well as the evolution of aggregate productivity in each department.

Second, the analysis captures the confounding effect of the location of each department on the diffusion of development from nearby regions or countries, as well as its effect on the regional diffusion of the steam engine. In particular, it accounts for the effect of the latitude of each department, border departments (i.e., positioned along the border with Belgium, Luxembourg, Germany, Switzerland, Italy and Spain), and maritime departments (i.e., positioned along the sea shore of France) on the pace of this diffusion process.

Finally, the research accounts for the potential differential effects of international trade on process of development as well as on the adoption the steam engine. In particular, it captures the potential effect of maritime departments (i.e., those departments that are positioned along the sea shore of France), via trade, on the diffusion of the steam engine and thus on economic development as well as the effect of trade on the evolution of income per capita over this time period.

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2.3.2 Institutional Characteristics

The analysis deals with the effect of variations in the adoption of the steam engine across French departments on their comparative development. This empirical strategy ensures that institutional factors that were unique to France as a whole over this time period are not the source of the differential pattern of development across these regions. Nevertheless, two regions of France over this time period had a unique exposure to institutional characteristics that may have contributed to the observed relationship between industrialization and economic development.

First, the emergence of state centralization in France, centuries prior to the process of industrialization, and the concentration of political power in Paris, may have affected differentially the political culture and economic prosperity in *Paris and its suburbs* (i.e., Seine, Seine-et-Marne and Seine-et-Oise). Hence, the empirical analysis includes a dummy variable for these three departments, accounting for their potential confounding effects on the observed relationship between industrialization and economic development, in general, and the adoption of the steam engine, in particular. Moreover, the analysis captures the potential decline in the grip of the central government in regions at a greater distance from Paris, and the diminished potential diffusion of development into these regions, accounting for the effect of the aerial distance between the administrative center of each department and Paris.

Second, the relationship between industrialization and development in the *Alsace-Lorraine* region (i.e., the Bas-Rhin, Haut-Rhin and the Moselle departments) that was under German domination in the 1871-1918 period may represent the persistence of institutional and economic characteristics that reflected their unique experience.[7] Hence, the empirical analysis includes a dummy variable for these regions, accounting for the confounding effects of the characteristics of the region.

2.3.3 Pre-Industrial Development

The differential level of development across France in the pre-industrial era may have affected jointly the process of development and the process of industrialization. In particular, it may have affected the adoption of the steam engine and it may have generated, independently, a persistent effect on the process of development. Hence, the empirical analysis accounts for the potentially confounding effects of the level of development in the pre-industrial period, more than 150 years prior to the 1860-1865 industrial survey. This early level of development is captured by the degree of urbanization (i.e., population of urban centers with more than 10,000 inhabitants) in each French department in 1700 (Lepetit, 1994).[8]

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[7]Differences in the welfare laws and labor market regulations in Alsace-Lorraine and the rest of France persisted throughout most of the 20th century (see, e.g., Chemin and Wasmer, 2009). The laws on the separation of Church and State are also different, and these differences were reaffirmed by a decision of the Supreme French Constitutional Court in 2013 (Decision 2012-297 QPC, 21 February 2013).

[8]The qualitative analysis remains intact if the potential effect of past population density is accounted for.

3 Empirical Methodology

3.1 Empirical Strategy

The observed relationship between industrialization and economic development is not necessarily indicative of the causal effect of industrialization on economic prosperity. It may reflect the impact of economic development on the process of industrialization as well as the influence of institutional, geographical, cultural and human capital characteristics on the joint evolution of process of development and the onset of industrialization. In light of the endogeneity of industrialization and economic development, this research exploits exogenous regional variations in the adoption of the steam engine across France to establish the effect of industrialization on the process of development.

The identification strategy is motivated by the historical account of the gradual regional diffusion of the steam engine in France during the 18th and 19th century (Ballot, 1923; Sée, 1925; Léon, 1976).[9] Considering the positive association between industrialization and the intensity in the use of the steam engine (Mokyr, 1990; Bresnahan and Trajtenberg, 1995; Rosenberg and Trajtenberg, 2004), the study takes advantage of the regional diffusion of the steam engine to identify the effect of local variations in the intensity of the use of the steam engine during the 1860-1865 period on the process of development. In particular, it exploits the distances between each French department and Fresnes-sur-Escaut (in the Nord department), where the first commercial application of the steam engine across France was made in 1732, as an instrument for the use of the steam engines in 1860-1865.[10]

Consistent with the diffusion hypothesis, the second steam engine in France that was utilized for commercial purposes was operated in 1737 in the mines of Anzin, also in the Nord department, less than 10 km away from Fresnes-sur-Escaut. Furthermore, in the subsequent decades till the French Revolution the commercial use of the steam engine expanded predominantly to the nearby northern and north-western regions. Nevertheless, at the onset of the French revolution in 1789, steam engines were less widespread in France than in England. A few additional steam engines were introduced until the fall of the Napoleonic Empire in 1815, notably in Saint-Quentin in 1803 and in Mulhouse in 1812, but it is only after 1815 that the diffusion of steam engines in France accelerated (Sée, 1925; Léon, 1976).

Indeed, in line with the historical account, the distribution of steam engines across French departments, as reported in the 1860-1865 industrial survey, is indicative of a local diffusion process from Fresnes-sur-Escaut. As reported in Column 1 of Table 1 and shown in Panel A of Figure 3, there is a highly significant negative correlation between the aerial distance from Fresnes-sur-Escaut

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[9]There was also a regional pattern in the diffusion of steam engines in England (Kanefsky and Robey, 1980; Nuvolari et al., 2011) and in the USA (Atack, 1979).

[10]This steam engine was used to pump water in an ordinary mine of Fresnes-sur-Escaut. It is unclear whether Pierre Mathieu, the owner of the mine, built the engine himself after a trip in England or employed an Englishman for this purpose (Ballot, 1923, p.385).

Table 1: The determinants of the diffusion of the steam engine

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) OLS
			Horse Power of Steam Engines			
Distance to Fresnes	-0.005***	-0.008***	-0.009***	-0.008***		-0.013***
	[0.0008]	[0.002]	[0.002]	[0.002]		[0.003]
Distance to Paris					0.001	0.009***
					[0.003]	[0.003]
Average Rainfall		2.017	0.997	1.834	1.592	1.173
		[1.258]	[1.110]	[1.157]	[1.150]	[1.064]
Average Temperature		4.875***	2.003*	2.197**	1.469	2.545**
		[1.328]	[1.109]	[1.018]	[0.983]	[0.983]
Latitude		-4.314	-19.63*	-13.92	23.75**	-6.527
		[9.103]	[11.35]	[10.91]	[10.80]	[10.77]
Land Suitability		-0.773	-0.402	-0.545	-0.0915	-0.743
		[0.710]	[0.667]	[0.643]	[0.600]	[0.590]
Maritime Department			0.790**	0.530	-0.156	0.0136
			[0.377]	[0.353]	[0.403]	[0.400]
Border Department			-0.407	-0.240	-0.166	-0.797*
			[0.417]	[0.408]	[0.485]	[0.442]
Paris and Suburbs			0.225	0.159	0.633	0.956*
			[0.730]	[0.442]	[0.483]	[0.512]
Alsace-Lorraine			1.979***	1.505**	0.907	0.785
			[0.597]	[0.751]	[1.018]	[0.848]
Urban Population in 1700				0.224**	0.283***	0.208**
				[0.094]	[0.098]	[0.091]
Adjusted $R2$	0.326	0.405	0.570	0.583	0.548	0.624
Observations	89	89	89	89	89	89

Note: All regressions, except for the unconditional ones, include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All other explanatory variables except the dummies are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Panel A. Unconditional.
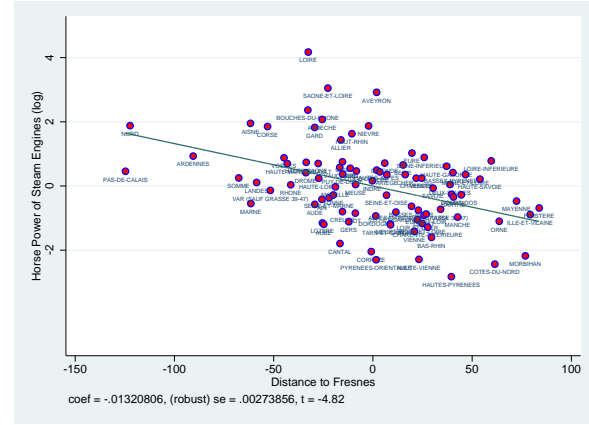
Panel B. Conditional on geography, institutions & distance from Paris.

Figure 3: The geographical diffusion of the steam engine − the negative relationship between the distance from Fresnes-sur-Escaut and the intensity in the use of the steam engine.

Note: These figures depict the partial regression line for the effect of the distance from Fresnes-sur-Escaut on the horse power in steam engines in each French department in 1860-1865. Panel A presents the unconditional relationship while Panel B reports the relationship which controls for geographic and institutional characteristics, as well as for pre-industrial development. Thus, the x- and y-axes in Panels A and B plot the residuals obtained from regressing steam engine intensity and the distance from Fresnes, respectively with and without the aforementioned set of covariates.

to the administrative center of each department and the intensity of the use of steam engines in the department. Nevertheless, as discussed in Section 2.3, pre-industrial development and a wide range of confounding geographical and institutional characteristics may have contributed to the adoption of the steam engine. Reassuringly, the unconditional negative relationship remains highly significant and is larger in absolute value when exogenous confounding geographical controls (i.e., land suitability, latitude, rainfall and temperature) (Column 2), as well as institutional factors (Column 3) and pre-industrial development (Column 4), are accounted for. In particular, the findings suggest that pre-industrial development, as captured by the degree of urbanization in each department in 1700 and the characteristics that may have brought this early prosperity, had a persistent positive and significant association with the adoption of the steam engine.[11] Importantly, the diffusion pattern of steam engines is not significantly correlated with the distance between Paris and the administrative center of each department when the distance from Fresnes to each department's administrative center is excluded from the analysis (Column 5). Moreover, Column 6 of Table 1 and Panel B of Figure 3 indicate that there is still a highly significant negative correlation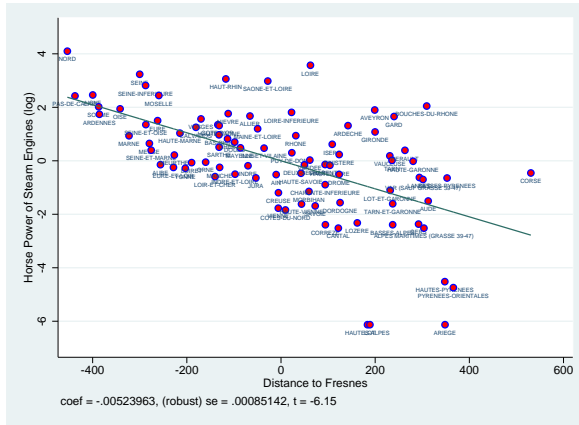 between the distance from Fresnes-sur-Escaut to the administrative center of each department and the intensity of the use of steam engines in the department when the distance to Paris is included. In particular, a 100-km increase in the distance from Fresnes is associated with a 1.33 point decrease in the log of the total horse power of the steam engines in a given department, relative to the departmental average of log horse power of 3.26. Namely, if the distance of a department away from Fresnes was to increase from the 25th percentile (336.6 km) to 75th percentile (680.3 km), this department would experience a 4.57 point decrease in the log of the total horse power of steam engines, i.e., a decrease in the amount of horse power worth 96.6 hp (relative to a sample mean of 655.24 hp).

The highly significant negative correlation between the use of the steam engine in each department and the aerial distance from Fresnes-sur-Escaut to the administrative center of each department is robust to the inclusion of an additional set of confounding geographical, demographic, political and institutional characteristics, as well as to the forces of pre-industrial development, which as discussed in section 4.2, may have contributed to the relationship between industrialization and economic development. As established in Table B.1 in Appendix B, these confounding factors, which could be largely viewed as endogenous to the adoption of the steam engine and are thus not part of the baseline analysis, do not affect the qualitative results.

The validity of the aerial distance from Fresnes-sur-Escaut as an instrumental variable for the intensity of the adoption of steam engines across France is enhanced by third additional factors.

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[11]Conceivably, human capital in the pre-industrial area could have affected the adoption of the steam engine, as well as the subsequent process of development. Nevertheless, in light of the scarcity of data on reliable human capital for the pre-industrial period, the baseline analysis does not account for this confounding factor. Instead, Section 4.2.3 shows the robustness of the results to the inclusion of pre-industrial levels of human capital for a smaller set of departments.

Table 2: The determinants of the diffusion of the steam engine: the insignificance of distances from other major French cities

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) OLS
			Horse Power of Steam Engines			
Distance to Fresnes	-0.00524***	-0.00594***	-0.00533***	-0.00727***	-0.00469***	-0.00451***
	[0.000851]	[0.00113]	[0.000886]	[0.00130]	[0.000970]	[0.000979]
Distance to Marseille		-0.00101				
		[0.00121]				
Distance to Lyon			-0.000771			
			[0.00115]			
Distance to Rouen				0.0024		
				[0.00146]		
Distance to Mulhouse					-0.00122	
					[0.000937]	
Distance to Bordeaux						0.00187
						[0.00115]
Adjusted R^2	0.326	0.324	0.322	0.331	0.328	0.339
Observations	89	89	89	89	89	89

Note: Robust standard errors are reported in brackets. The dependent variable is in logarithm. The aerial distances are measured in kilometers. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

First, Table 2 establishes that, conditional on the distance from Fresnes-sur-Escaut, distances between each department and major centers of economic power in 1860-1865 are uncorrelated with the intensive use of the steam engine over this period. In particular, conditional on the distance from Fresnes-sur-Escaut, distances between each department and Marseille and Lyon (the largest cities in France), Rouen (a major harbor in the north-west where the steam engine was introduced in 1796), Mulhouse (a major city in the east where the steam engine was introduced in 1812), and Bordeaux (a major harbor in the south-west) are uncorrelated with the adoption of the steam engine, lending credence to the unique role of Fresnes-sur-Escaut and the introduction of the first steam engine in this location in the diffusion of the steam engine across France.[12]

Second, the distance from Fresnes-sur-Escaut is uncorrelated with economic development across France in the pre-industrial period. Unlike the highly significant negative relationship between the distance from Fresnes-sur-Escaut and the intensity of the use of the steam engine in 1860-1865, Table 3 and Figure 4 establish that the distance from Fresnes-sur-Escaut was uncorrelated with urban development and human capital formation in the pre-industrial era. In particular, Column 1 in Table 3 shows that urbanization rates in 1700 are uncorrelated with the distance from Fresnes-sur-Escaut. Column 2 establishes that literacy rates in the pre-industrial period, as captured by the share of grooms who could sign their marriage license in 1686-1690, are uncorrelated with the distance from Fresnes-sur-Escaut. Finally, Column 3 demonstrates that there is no significant relationship between the presence of a university in 1700 and the distance from Fresnes-sur-Escaut.[13]

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[12]As reported in Table B.2, the use of an alternative measure of distances based on the time needed for a surface travel between any pair of locations (Özak, 2010) does not affect the qualitative results.

[13]It should be noted that these pre-industrial measures of development are highly correlated with income per-capita in the post-industrialized period. For instance, the urban population in 1700 is positively correlated with all

Table 3: Pre-industrial development and distance from Fresnes-sur-Escaut

	(1) Tobit Urban Population in 1700	(2) OLS Literacy in 1686-1690	(3) Probit University in 1700
Fresnes sur Escaut	-0.004	-0.0219	0.0007
	[0.00499]	[0.0232]	[0.00267]
Average Rainfall	-6.491***	-11.07	-1.564
	[2.455]	[10.73]	[1.155]
Average Temperature	3.722	-44.74**	0.827
	[3.094]	[18.58]	[1.902]
Latitude	-9.320	-1.118	0.324
	[22.13]	[85.55]	[11.76]
Land Suitability	0.819	13.37**	0.863
	[1.474]	[5.738]	[0.756]
σ	2.570***		
	[0.262]		
Pseudo R^2	0.092		0.087
R^2		0.456	
Left-censored observations	44		
Uncensored observations	45		
Observations	89	76	89

Note: The dependent variable is in logarithm. The aerial distance is measured in kilometers. Literacy in 1686-1690 is captured by the share of grooms who signed their marriage license in that period. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

A. Urban population in 1700.   B. Literacy rates in 1686-1690.   C. Universities in 1700.
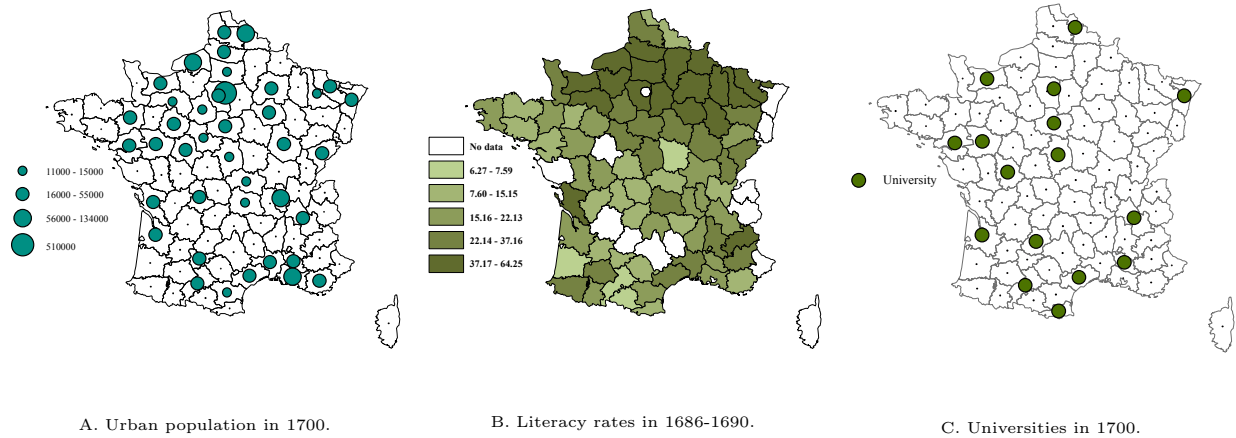
Figure 4: Pre-industrial characteristics of French departments

Note: In Panel B, literacy in 1686-1690 is captured by the share of grooms who signed their marriage license during that period.

Third, it appears that the Nord department had neither superior human capital characteristics nor higher standard of living in comparison to the average department in France. An imperfect measure of literacy (i.e., men who could sign their wedding contract over the 1686-1690 period) prior to the introduction of the first steam engine in 1732, suggests that if anything, Nord's literacy rate was below the French average. Specifically, only 10.45% of men in Nord could sign their wedding contract over the 1686-1690 period while the average for the rest of France was 26.10% (with a standard deviation of 14.86%) (Furet and Ozouf, 1977). Furthermore, using height as an indicator for the standard of living suggests that the standard living in Flanders, the province of the French kingdom prior to 1789 which contained Fresnes-sur-Escaut, was nearly identical to that of the rest of France (Komlos, 2005).[14] As depicted in Figure G.8 in the Appendix, variations in the average height of French army soldiers from Flanders over the 1700-65 period were not different from those of the soldiers from other parts of France.

3.2   Empirical Model

The effect of industrialization on the process of development is estimated using 2SLS. The second stage provides a cross-section estimate of the relationship between the total horse power of steam engines in each department in 1860-1865 to measures of income per capita, human capital formation and other economic outcomes at different points in time;

$$Y_{it} = \alpha + \beta E_i + \boldsymbol{X'_i}\omega + \varepsilon_{it}, \tag{1}$$

where Y_{it} represents one measure of economic outcomes in department i in year t, E_i is the log of total horse power of steam engines in department i in 1860-1865, $\boldsymbol{X'_i}$ is a vector of geographical, institutional and pre-industrial economic characteristics of department i and ϵ_{it} is an i.i.d. error term for department i in year t.

In the first stage, E_i, the log of total horse power of steam engines in department i in 1860-1865 is instrumented by D_i, the aerial distance (in kilometers) between the administrative center of department i and Fresnes-sur-Escaut;

$$E_i = \delta_1 D_i + \boldsymbol{X'_i}\delta_2 + \mu_i, \tag{2}$$

where $\boldsymbol{X'_i}$ is the same vector of geographical, institutional and pre-industrial economic characteristics of department i used in the second stage, and μ_i is an error term for department i.

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our measures of GDP per capita in 1872 (0.451), 1901 (0.293), 1930 (0.551) and 2001-2010 (0.517).

[14]Concerns regarding selection bias suggest that the height of soldiers may not always be representative of the height of the general population (see, e.g., Weir, 1997; Baten, 2000) but there is no reason to think that this selection bias would be more or less intense in Flanders than in the rest of France.

4 Industrialization and the Evolution of Income per Capita

4.1 Baseline Regressions

The study examines the effect of the intensity in the use of steam engines in the 1860-1865 period on the evolution of income per capita in the process of development. As established in Tables 4 and 5, and depicted in Figure 5, consistently with the proposed hypothesis, industrialization was conducive for economic development in the short-run and in the medium-run but had a detrimental effect on standards of living in the long-run.[15] In particular, the horse power of steam engines in industrial production in the 1860-1865 period had a positive and significant impact on income per capita in 1872, 1901 and 1930 but a negative and significant effect on income per capita during the 2001-2010 period.

The relationship between industrialization and income per capita in the short-run and in the medium-run is presented in Table 4 and in the first five Columns of Table 5. As shown in Columns (1) and (6) in Table 4 and in Column (1) in Table 5, unconditionally, the horse power of steam engines in industrial production in the 1860-1865 period had a highly significant positive association with income per capita in 1872, 1901 and 1930. Moreover, this relationship remains positive, although somewhat smaller and less significant, once one progressively accounts for the confounding effects of exogenous geographical factors (Columns (2) and (7) in Table 4 and Column (2) in Table 5), institutional factors (Columns (3) and (8) in Table 4 and Column (3) in Table 5) and pre-industrial characteristics (Columns (4) and (9) in Table 4 and Column (4) in Table 5). Finally, mitigating the effect of omitted variables on the observed relationship, the IV estimation in Columns (5) and (10) in Table 4 and Column (5) in Table 5 suggests that the horse power of steam engines in 1860-1865 had a positive and significant impact on income per capita in 1872, 1901 and 1930, accounting for the confounding effects of geographical, institutional, and demographic characteristics.[16] A one-percent increase in the total horse power of steam engines in a department in 1860-1865 increased GDP per capita by 0.121 percent in 1872, 0.244 percent in 1901 and 0.102 percent in 1930. As such, if a department had increased its total horse power of steam engines in 1860-1865 from the 25th percentile (227 hp) to the 75th percentile (1711 hp) of the distribution, it would have experienced an increase in GDP per capita of 79.1 percent in 1872, 159.6 percent in 1901 and 66.7 percent in 1930.

The relationship between industrialization and income per capita in the long-run is presented

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[15]Given data limitation on income per capita across departments in the post-industrial survey period (as elaborated in section 2), the short-run effect of industrialization on income per capita is captured by its impact in 1872 and 1901, its medium-run effect by its impact in 1930, while its long-run effect is captured by its impact on the average level of income per capita across departments over the 2001-2010 period.

[16]The F-statistic in the first stage is superior to the critical values reported by Stock and Yogo (2005), thus suggesting that the instrument is not weak. Furthermore, the IV coefficient in each specification is larger than the OLS coefficient, which can probably be attributed to measurement error in the independent variable – the horse power of steam engines.

Table 4: Industrialization and income per capita, 1872 & 1901

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) IV	(6) OLS	(7) OLS	(8) OLS	(9) OLS	(10) IV
	GDP per capita, 1872					GDP per capita, 1901				
Horse Power of Steam Engines	0.070*** [0.012]	0.038* [0.020]	0.035* [0.021]	0.025 [0.018]	0.121** [0.052]	0.053*** [0.013]	0.054** [0.025]	0.055** [0.024]	0.049* [0.027]	0.244*** [0.072
Average Rainfall		-0.613*** [0.214]	-0.420* [0.213]	-0.312 [0.211]	-0.505** [0.239]		-0.584*** [0.215]	-0.471** [0.203]	-0.407* [0.208]	-0.795** [0.338]
Average Temperature		0.283 [0.256]	0.178 [0.285]	0.212 [0.294]	0.109 [0.315]		-0.486 [0.313]	-0.350 [0.320]	-0.330 [0.331]	-0.537 [0.361]
Latitude		0.113 [0.151]	0.150 [0.128]	0.135 [0.126]	0.118 [0.127]		0.358** [0.166]	0.321** [0.148]	0.312** [0.151]	0.279* [0.156]
Land Suitability		0.740 [1.339]	-3.021 [3.266]	-2.623 [3.117]	-4.899 [3.123]		-1.343 [1.409]	-4.362 [3.756]	-4.124 [3.820]	-8.713** [3.849]
Maritime Department			0.113 [0.097]	0.0891 [0.104]	0.108 [0.111]			0.0188 [0.111]	0.00464 [0.119]	0.0438 [0.138]
Border Department			-0.0326 [0.134]	-0.0264 [0.140]	0.006 [0.138]			0.086 [0.127]	0.090 [0.130]	0.155 [0.163]
Distance to Paris			-0.001 [0.0008]	-0.001 [0.0008]	-0.001 [0.0007]			-0.0009 [0.0009]	-0.0009 [0.0009]	-0.001 [0.0008]
Paris and Suburbs			0.040 [0.111]	0.037 [0.114]	-0.016 [0.116]			-0.080 [0.151]	-0.082 [0.159]	-0.189 [0.171]
Urban Population in 1700				0.025 [0.022]	-0.006 [0.030]				0.015 [0.025]	-0.049 [0.039]
Adjusted $R2$	0.174	0.377	0.390	0.395		0.088	0.185	0.173	0.165	
Observations	85	85	85	85	85	85	85	85	85	85

First stage: the instrumented variable is Horse Power of Steam Engines

					(5)					(10)
Distance to Fresnes					-0.012*** [0.003]					-0.012*** [0.003]
F-stat (1st stage)					19.526					19.526

Note: All regressions, except for the unconditional ones, include a dummy variable for the three departments which had no steam engine in 1860-1865. The *Alsace-Lorraine* variable is omitted from the regressions since the Alsace-Lorraine region was not part of France between 1871 and 1914. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, and the dependent variables are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.
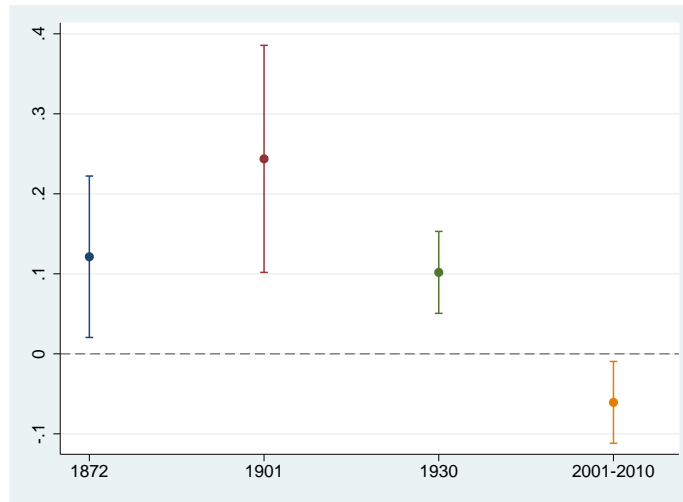
Figure 5: The effect of the horse power of steam engines in 1860-1865 on GDP per capita

Note: This figure displays the estimated coefficients of *Horse Power of Steam Engines* in the IV regressions in Columns 5 and 10 of Tables 4 and 5. Intervals reflect 95%-confidence levels.

Table 5: Industrialization and income per capita, 1930 & 2001-2010

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) IV	(6) OLS	(7) OLS	(8) OLS	(9) OLS	(10) IV
			GDP per capita, 1930				GDP per capita, 2001-2010 average			
Horse Power of Steam Engines	0.063***	0.078***	0.075***	0.060***	0.102***	0.021**	0.031**	0.026**	0.009	-0.061**
	[0.010]	[0.014]	[0.012]	[0.012]	[0.026]	[0.0097]	[0.013]	[0.011]	[0.007]	[0.026]
Average Rainfall		-0.361***	-0.302***	-0.123	-0.211*		-0.250*	-0.150	0.0539	0.164
		[0.106]	[0.095]	[0.105]	[0.125]		[0.126]	[0.094]	[0.089]	[0.128]
Average Temperature		-0.525***	-0.453***	-0.396***	-0.444***		-0.232**	-0.244**	-0.155	-0.0530
		[0.096]	[0.105]	[0.106]	[0.113]		[0.099]	[0.122]	[0.121]	[0.143]
Latitude		0.288***	0.277***	0.249***	0.244***		0.012	0.029	-0.017	-0.024
		[0.053]	[0.047]	[0.050]	[0.049]		[0.055]	[0.054]	[0.057]	[0.066]
Land Suitability		-2.066***	-2.955**	-2.445**	-3.325***		-0.706*	-0.724	0.0547	1.702
		[0.467]	[1.174]	[1.125]	[1.160]		[0.416]	[1.004]	[0.903]	[1.136]
Maritime Department			0.037	0.002	0.007			0.037	-0.011	-0.022
			[0.053]	[0.055]	[0.056]			[0.047]	[0.046]	[0.053]
Border Department			0.077	0.089**	0.102**			0.015	0.039	0.027
			[0.047]	[0.043]	[0.046]			[0.055]	[0.042]	[0.045]
Distance to Paris			-0.0002	-0.0002	-0.0002			0.00003	0.0001	0.0002
			[0.0003]	[0.0003]	[0.0003]			[0.0003]	[0.0002]	[0.0003]
Paris and Suburbs			0.269*	0.259**	0.239***			0.398*	0.393***	0.437***
			[0.145]	[0.101]	[0.0877]			[0.206]	[0.145]	[0.154]
Alsace-Lorraine			0.180**	0.138**	0.0920			0.0474	-0.0334	0.0295
			[0.079]	[0.067]	[0.083]			[0.091]	[0.088]	[0.106]
Urban Population in 1700				0.0403***	0.028**				0.051***	0.071***
				[0.012]	[0.013]				[0.011]	[0.015]
Adjusted R2	0.339	0.499	0.566	0.636		0.059	0.069	0.210	0.415	
Observations	87	87	87	87	87	89	89	89	89	89

First stage: the instrumented variable is Horse Power of Steam Engines		
Distance to Fresnes	-0.013***	-0.013***
	[0.003]	[0.003]
F-stat (1st stage)	20.617	23.261

Note: All regressions, except for the unconditional ones, include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, and the dependent variables are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

in the last 5 columns of Table 5. As shown in Column (6), unconditionally, the horse power of steam engines in industrial production in 1860-1865 has a significant positive association with the average level of income per capita across departments over the 2001-2010 period. Moreover, this relationship remains positive, although smaller and ultimately insignificant, once one progressively accounts for the confounding effects of exogenous geographical factors (Column (7) in Table 5), institutional factors (Column (8) in Table 5) and pre-industrial characteristics (Column (9) in Table 5). However, once the effect of omitted variables is accounted for, the IV estimation in Column (10) in Table 5, suggests that the horse power of steam engines in 1860-1865 had a negative and significant impact on the average level of income per capita across departments over the 2001-2010 period. A one-percent increase in the total horse power of steam engines in 1860-1865 decreased GDP per capita in 2001-2010 by 0.061 percent. In other words, if a department had experienced a increase in its horse power in 1860-1865 from the 25th percentile (227 hp) to the 75th percentile (1711 hp) of the distribution, this increase would have led to a 39.9 percent decrease in GDP per capita in 2001-2010.

It is important to note that the IV estimation reverses the OLS estimates of the relationship between industrialization and the long-run level of income per capita from a positive to a negative one. This reversal suggests that factors which fostered industrial development, rather than industrialization per se, contributed to the positive association between industrialization and long-run development. In particular, once one accounts for the effect of these omitted factors, industrialization has an adverse effect on the standard of living in the long-run.

In particular, as discussed in Section 2.3, the regressions in Tables 4 and 5 account for a large number of confounding geographical and institutional factors. First, the climatic and soil characteristics of each department (i.e., land suitability, average temperature, average rainfall, and latitude) could have affected natural land productivity and therefore the feasibility and profitability of the transition to the industrial stage of development, as well as the evolution of aggregate productivity in each department. Indeed, as predicted, land suitability had a significantly negative association with income per capita in 1901 and 1930 in the IV regressions (Column (10) in Table 4 and Column (5) in Table 5), suggesting that indeed more productive land had an adverse effect on the incentive to adopt the industrial technology. Moreover, the latitude of each department had a positive and significant relationship with income per capita in 1901 and 1930 (Columns (7) to (10) in Table 4 and Columns (2) to (5) in Table 5), capturing characteristics of northern departments which were conducive to economic prosperity.

Second, the location of departments (i.e., latitude, border departments, maritime departments, departments at a greater distance from the concentration of political power in Paris, and those that were temporarily under German domination) could have affected the diffusion of the steam engine and the diffusion of development. However, most of these factors appear orthogonal to the evolution of income per capita, except for the dummy variable for Paris and its suburbs that is significantly associated with income per capita in 1930 and in the 2001-2010 period (Columns (3) to (5) and (8) to (10) in Table 5).

Third, the regressions account for the potentially confounding effects of the level of development in the pre-industrial period, as captured by the degree of urbanization in each department in 1700. The findings suggest that pre-industrial development (and the characteristics that may have brought this early prosperity) had a persistent positive and significant effect on later stages of development, as captured by the level of income per capita in 1930 and 2001-2010 (Columns (4), (5), (9) and (10) in Table 5), but no impact on the early phases of industrialization, as captured by income per capita in 1872 and 1901 (Columns (4), (5), (9) and (10) in Table 4).

Fourth, the regressions account for potential anomalies associated with the three departments that had no steam engine in 1860-1865, as discussed in Section 2.3. Finally, as established in Appendix F, the association between intensity of the steam engines and income per capita in 1872, 1901, 1930 and 2001-2010 is not affected by spatial correlation.

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4.2 Robustness Analysis

This section examines the robustness of the baseline analysis to the inclusion of an additional set of confounding geographical, demographic, political and institutional characteristics, as well as for the forces of pre-industrial development, which may have contributed to the relationship between industrialization and economic development. The analysis focuses on the potential impact of these confounding factors on the baseline IV regressions in Tables 4 and 5, where the dependent variables are income per capita in 1872, 1901, 1930 and 2001-2010. As will become apparent, some of these confounding factors could be viewed as endogenous to the adoption of the steam engine and are thus not part of the baseline analysis.

4.2.1 Population Density

The empirical analysis accounts for a wide range of exogenous confounding geographical and institutional characteristics, as well as for pre-industrial development, which may have contributed to the relationship between industrialization and economic development. Nevertheless, in light of the evidence that steam engines were more likely to be located in urban centers (Rosenberg and Trajtenberg, 2004), it appears plausible that the adoption of the steam engine was influenced by the contemporaneous but potentially endogenous level of population density at the time.

Reassuringly, as established in Table B.3 in Appendix B, the inclusion of population density in each French department in 1801, 1831 and 1861 has no qualitative impact on the estimated effects of industrialization or on the statistical significance of these effects. Accounting for the confounding effects of exogenous geographical, institutional, and pre-industrial characteristics, the horse power of steam engines in industrial production in the 1860-1865 period had a positive and significant impact on income per capita in 1872, 1901 and 1930, and a negative and significant impact on income per capita in the years 2001-2010.

In addition, the qualitative results are robust for the estimation of the effect of steam engine intensity (i.e., horse power of steam engine per labor in 1861) on the process of development.[17] As reported in Table B.4 in Appendix B, accounting for the confounding effects of exogenous geographical, institutional, and pre-industrial characteristics, steam engine intensity in industrial production in the 1860-1865 period had a positive and significant impact on income per capita in 1872, 1901 and 1930, and a negative and significant impact on income per capita in 2001-2010.

4.2.2 Distance from London

In light of the earlier use of the steam engine in England and the intensive trade relationship between France and England, the diffusion of the steam engine in France as well as the process of

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[17]Given the endogeneity of population, these estimates are likely to be biased.

development could have been affected by geographic proximity to England (proxied by the aerial distance between London and the administrative center of each department). As reported in Table B.5 in Appendix B, accounting for the aerial distance from England has largely no qualitative impact on the results. In particular, accounting for the confounding effects of exogenous geographical, institutional, and pre-industrial characteristics, industrialization had an insignificant positive effect on income per capita in 1872, a positive and significant impact on income per capita in 1901 and 1930, and a negative and significant impact on income per capita in 2001-2010.

4.2.3 Access to Waterways

The adoption of the steam engine could have been affected by the trade potential of each department, as captured by the presence of rivers and their main tributaries within the perimeter of the department. Using data on the paths of the Rhine, Loire, Meuse, Rhône, Seine and Garonne rivers as well as of their major tributaries (Dordogne, Charente and Escaut), Table B.6 establishes that a direct access to a river path, and thus to a major port, has no qualitative impact on the estimated effect of industrialization on income per capita.

4.2.4 Human Capital

Considering evidence about capital-skill complementarity as well as the comparative advantage of educated individuals in adopting new technologies (Nelson and Phelps, 1966; Jovanovic and Rousseau, 2005), the diffusion of the steam engine could have been affected by the level of human capital in each department (Becker et al., 2011). Using data on the percentage of French army conscripts who could at least read in 1827-1829, 1831-1835 and 1836-1840 (which could be endogenous the process of industrialization), on the percentage of grooms who could sign their marriage license in 1686-1690, 1786-1790 and 1816-1820 (Furet and Ozouf, 1977), and on the number of universities in 1700 (Bosker et al., 2013), it appears in Tables B.7 to B.9 that these measures of human capital have no qualitative impact on the estimated effects of industrialization. In particular, accounting for the confounding effects of exogenous geographical, institutional, and pre-industrial characteristics, industrialization had a positive and significant impact on income per capita in 1872, 1901 and 1930, and a negative and significant impact on income per capita in 2001-2010.

4.2.5 Share of Jews and Protestants in the Population

In light of the evidence about the importance of the Jewish and the Protestant population for entrepreneurial activities (e.g., Weber, 1930; Becker and Woessmann, 2009; Cantoni, 2015), the adoption of the steam engine in France as well as the process of development could have been affected by the variations in the share of these religious minorities across departments. As shown

in Table B.10 in Appendix B, accounting for the shares of Jews and Protestants in the French population in 1861 (i.e., when the industrial survey was conducted) has no qualitative impact on the effect of industrialization on income per capita in 1872, 1901, 1930 and 2001-2010.

4.2.6 Migrations

Internal as well as international migration in response to the differential impact of industrialization on income per capita across departments could have mitigated the effect of industrialization on income per capita that would have been observed in the absence of internal and external migration. Indeed, as reported in Table B.11, migration mitigated the positive effect of industrialization in the short-run as well as the negative effect of industrialization in the long-run. Accounting for the share of the native population in each department in 1901 and 2001-2010,[18] the positive effect of industrialization on income per capita in the year 1901 is larger and highly significant (i.e., the coefficient on steam engine in Column (2) in comparison to that in Column (1)), whereas the negative effect of industrialization on income per capita in the 2001-2010 period is significant and smaller in absolute value (i.e., the coefficient on steam engine in Column (4) in comparison to that in Column (3)). Moreover, since migration flows are likely to be towards more prosperous departments, a higher percentage of natives in the departmental population is indicative of a less attractive migration destination, and indeed in both time periods higher percentage of native population is associated with lower income per capita (Column (2) and (4)), although the relationship is not significant in the modern period.

4.2.7 The Presence of Raw Material

The diffusion of the steam engine across French departments as well as the process of development could have been affected by the presence of raw material required for industrialization. Nevertheless, as established in Table B.12, accounting for the number of iron forges in 1789 and 1811 in each department (Woronoff, 1997), the effect of industrialization on income per capita in the process of development remains nearly intact, economically and statistically. Moreover, as shown in Table B.13, accounting for the area covered by coal mines in 1837 in each department, the effect of industrialization on income per capita in the process of development remains qualitatively intact.

4.2.8 Economic Integration

The diffusion of the steam engine across French departments as well as the process of development could have been affected by the degree of geographical and economic integration of each department into the French economy. First, as reported in Table B.14, the degree of market integration of each

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[18]The 1872 and 1931 censuses do not provide information on the native population in each department.

department, as captured by the number of its external suppliers in the 1790s (Daudin, 2010), has no qualitative impact on the effect of industrialization on income per capita in the process of development. Second, as reported in Table B.15, accounting for the presence of railroad connection in 1860 (Caron, 1997),[19] the effect of industrialization on income per capita in the process of development remains nearly intact, economically and statistically.

4.2.9   Industrial Concentration

The degree of industrial concentration in each department could have affected the diffusion of the steam engine across French departments as well as the process of development. Nevertheless, as reported in Table B.16, accounting for the degree of industrial concentration in the 1860-1865 period, proxied by the Hirfendahl index of the 16 different industries listed in the 1860-1865 industrial survey (textile, mines, metallurgy, metal objects, leather, wood, ceramics, chemistry, construction, lighting, furniture, clothing, food, transportation, sciences & arts, and luxury goods), the effect of industrialization on income per capita in the process of development remains nearly intact, economically and statistically.[20]

4.3   Industrialization, Employment and Inequality

This section explores the effect of industrialization on the evolution of sectoral employment from 1872 to 2010 and on contemporary levels of inequality.

4.3.1   Industrialization and the Evolution of Sectoral Employment

The effect of the intensity in the use of the steam engine on the evolution of income per capita corresponds to its effect on the share of employment in the industrial sector. As established in the IV regressions in Columns (3), (6), and (9) of Table C.1 in Appendix C, and as depicted in panel A of Figure 6, an intensive use of the steam engine in 1860-1865 had a highly significant positive effect on the share of employment in the industrial sector in 1872, 1901, and 1930. Moreover, as shown in the IV regressions in Column (3), (6), and (9) of Table C.2 in Appendix C, this effect remains positive and highly significant in 1968, 1975, and 1982. However, as established in the IV regressions in Column (12), (15), and (18) of Table C.2 in Appendix C, this effect dissipates in 1990 and 1999 and it becomes significantly negative in 2010. Furthermore, as established in the corresponding IV regressions in Tables C.3 and C.4 in Appendix C, and as depicted in panel B of

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[19]The early network was built around seven lines in order to connect Paris to the main economic centres of the country (Caron, 1997).

[20]The Herfindahl index of industry concentration is defined as, $H_d = \sum_{i=1}^{16} \left(E_{i,d}/E_d \right)^2$, where H_d is the Herfindahl concentration index for department d, $E_{i,d}$ is the horse power of the steam engines in the firms in sector i of department d and E_d is the horse power of the steam engines in the firms of department d.

Panel A. The industrial sector.   Panel B. The service sector.
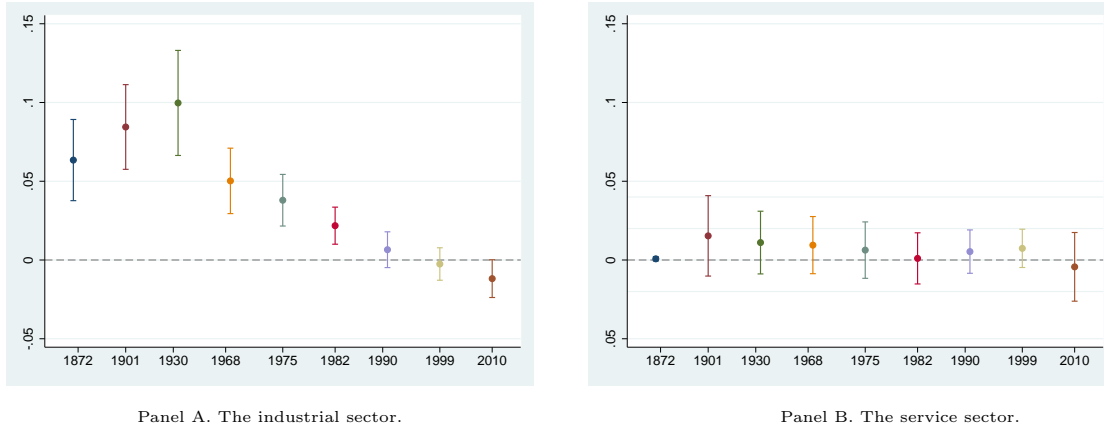
Figure 6: The effect of the horse power of steam engines in 1860-1865 on sectoral employment.

Note: Panel A: the estimated coefficients of *Horse Power of Steam Engines* on the share of the workforce in the industrial sector in the IV regressions in Tables C.1 and C.2. Panel B: the estimated coefficients of *Horse Power of Steam Engines* on the share of the workforce in the service sector in the IV regressions Tables C.3 and C.4. Intervals reflect 95%-confidence levels.

Figure 6, an intensive use of the steam engine in 1860-1865 had an insignificant effect on the share of employment in the service sector over the entire period.

As was the case in the income regressions in Tables 4 and 5, the IV estimate in Column (18) of Table C.2 in Appendix C reverses the OLS estimates of the association between industrialization and the share of employment in the industrial sector in 2010, from a positive to a negative one. Moreover the IV estimate in Column (18) of Table C.4 eliminates the positive effect on employment in the service sector. These (weak) reversals suggest that factors which fostered industrial development, rather than industrialization per se, contributed to the positive association between an intensive past use of steam engines and current employment in the industrial and the service sectors.

The negative effect of an intensive use of the steam engine in 1860-1865 on industrial employment in the long-run, as well as the absence of its effect on employment in the service sector, suggests that the interpretation of the negative effect of industrialization on income per capita in the long-run requires a better understanding of the channels through which industrialization affected the standard of living in the long-run.

4.3.2 The Effect of Industrialization on Contemporary Unemployment and Inequality

The study finds that industrialization has contributed to the level of unemployment and to the degree of inequality across departments in France in the long-run.[21] Accounting for the confounding effects of geographical, institutional and pre-industrial characteristics, the IV estimate in Column (3) of Table 6 suggests that the prevalence of steam power in 1860-1865 had a highly significant positive effect on the average rate of unemployment in the 2002-2011 period.

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[21] As elaborated in section 2, data on these variables are only available for the past decade.

Table 6: Industrialization, unemployment and inequality

	(1) OLS	(2) OLS	(3) IV	(4) OLS	(5) OLS	(6) IV	(7) OLS	(8) OLS	(9) IV
		Unemployment rate 2002-2011 average			Gini coefficient 2001-2008 average			25th Percentile - Fiscal Income per Person in Household, 2001-2010 Average	
Horse Power of Steam Engines	0.019	0.043***	0.156***	0.004	0.010***	0.046***	0.009	-0.007	-0.098***
	[0.012]	[0.013]	[0.039]	[0.003]	[0.003]	[0.009]	[0.010]	[0.008]	[0.025]
Average Rainfall		-0.253*	-0.432**		-0.0798**	-0.137***		0.136	0.281*
		[0.129]	[0.203]		[0.0325]	[0.0493]		[0.0843]	[0.155]
Average Temperature		-0.005	-0.170		-0.0868**	-0.140***		0.127	0.260**
		[0.137]	[0.185]		[0.033]	[0.050]		[0.092]	[0.127]
Latitude		-1.997	-4.667**		-0.580**	-1.434***		-0.0367	2.117*
		[1.222]	[1.893]		[0.242]	[0.458]		[0.730]	[1.142]
Land Suitability		0.168***	0.178**		0.0578***	0.0610**		-0.118**	-0.127*
		[0.061]	[0.089]		[0.015]	[0.026]		[0.048]	[0.070]
Maritime Department		0.119**	0.136*		0.025*	0.031*		-0.025	-0.039
		[0.057]	[0.070]		[0.013]	[0.018]		[0.033]	[0.048]
Border Department		0.160***	0.179**		0.031**	0.037**		0.017	0.002
		[0.059]	[0.075]		[0.014]	[0.017]		[0.040]	[0.048]
Distance to Paris		-0.0002	-0.0003		4.75e-05	7.38e-06		-0.0001	-2.28e-05
		[0.0003]	[0.0004]		[6.71e-05]	[9.99e-05]		[0.0002]	[0.0003]
Paris and Suburbs		-0.152***	-0.224***		0.0821**	0.0594*		0.558***	0.616***
		[0.048]	[0.055]		[0.040]	[0.031]		[0.192]	[0.192]
Alsace-Lorraine		-0.035	-0.137		-0.008	-0.041		0.146	0.229
		[0.081]	[0.103]		[0.020]	[0.032]		[0.137]	[0.183]
Urban Population in 1700		0.005	-0.027		0.007**	-0.003		0.013	0.039**
		[0.010]	[0.018]		[0.003]	[0.005]		[0.011]	[0.017]
Adjusted $R2$	0.030	0.384		0.014	0.507		0.004	0.479	
Observations	89	89	89	89	89	89	89	89	89

		First stage: the instrumented variable is Horse Power of Steam Engines							
Distance to Fresnes			-0.013***			-0.013***			-0.013***
			[0.003]			[0.003]			[0.003]
F-stat (1st stage)			23.261			23.261			23.261

Note: All regressions, except for the unconditional ones, include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, and the dependent variables are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Moreover, as suggested by Column (6) of Table 6, the intensity in the use of steam engines in 1860-1865 had a positive and highly significant effect on the average Gini inequality index in the 2002-2011 period. Similarly, as reported in Column (9) of Table 6, it had a negative and highly significant effect on the income of the individuals at the bottom 25th percentile of the income distribution over the 2001-2010 period.

5   Mechanisms

This section explores potential mechanisms that could have led to the detrimental effect of industrialization on the standard of living in the long-run. First, the study examines the adverse effect of industrialization on the level and composition of human capital in each department and thus on the skill-intensity of its production process in the long-run. Second, it explores the contribution of industrialization to unionization and wage rates and thus the incentive of modern industries to locate in regions where labor markets are more competitive and reflect the marginal productivity of workers. Third, the analysis examines the effect of on trade protection on the decline in competitiveness of each department in the long-run.

5.1   Industrialization and the Long-Run Level Composition of Human Capital

This section explores whether the detrimental effect of industrialization on the standard of living in the long-run could be attributed to the effect of industrialization on the evolution of human capital formation. In particular, the study explores the potential adverse effect of industrialization on the level and composition of human capital in each department and thus on the skill-intensity of its production process in the long-run.

The analysis demonstrates that, while intensive industrialization had a significantly positive effect on human capital formation in the short-run, it had a significantly negative effect in the level and the composition of human capital in long-run.[22] Hence, despite the fact that industrialization had no effect on the share of employment in the service sector in the long-run, it had a detrimental effect on skilled-intensive occupations. Thus, the adverse effect of industrialization on the level of income per capita in the long-run could be partly attributed to the adverse effect of industrialization on the level and the composition of human capital formation in the long-run.

5.1.1   Industrialization and the Evolution of Human Capital

This subsection examines the effect of industrialization on the time path of human capital formation. As reported in Column (3) of Table 7, the horse power of steam engines in industrial production in 1860-1865 had a highly significant positive effect on the literacy of the French army conscripts in the years 1874-1883. However, due to the establishment of 1881-1882 education laws that made primarily schooling compulsory and free till the age of 13, the effect is insignificant in the years 1894-1903 (Column (6)).

In contrast, as reported in Column (3) and (6) of Table 8, the horse power of steam engines in industrial production in 1860-1865 had a highly significant negative effect on the shares of men

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[22]The positive effect of industrialization on human capital formation is prevalent over the phase of industrialization in the late 19th century (Galor and Moav, 2006).

Table 7: Industrialization and the literacy of conscripts, 1874-1883 & 1894-1903

	(1) OLS	(2) OLS	(3) IV	(4) OLS	(5) OLS	(6) IV
	Share of Literate Individuals Among Conscripts, 1874-1883 average			Share of Literate Individuals Among Conscripts, 1894-1903 average		
Horse Power of Steam Engines	0.008*	0.011	0.050***	0.005**	0.008**	0.009
	[0.005]	[0.008]	[0.016]	[0.002]	[0.004]	[0.006]
Average Rainfall		0.053	-0.013		-0.001	-0.004
		[0.074]	[0.071]		[0.033]	[0.032]
Average Temperature		-0.253***	-0.323***		-0.145***	-0.147***
		[0.079]	[0.070]		[0.030]	[0.030]
Latitude		-0.657	-1.815**		-0.634**	-0.680**
		[0.792]	[0.768]		[0.268]	[0.290]
Land Suitability		0.153***	0.161***		0.069***	0.069***
		[0.042]	[0.041]		[0.014]	[0.013]
Maritime Department		-0.037	-0.022		-0.012	-0.011
		[0.027]	[0.029]		[0.012]	[0.011]
Border Department		0.044*	0.046		-0.001	-0.001
		[0.024]	[0.030]		[0.011]	[0.010]
Distance to Paris		-8.63e-05	-0.0002		-8.72e-05	-9.11e-05
		[0.0002]	[0.0002]		[6.96e-05]	[6.55e-05]
Paris and Suburbs		0.0917***	0.0630		0.0153	0.0142
		[0.034]	[0.041]		[0.013]	[0.013]
Urban Population in 1700		0.004	-0.008		0.002	0.002
		[0.007]	[0.009]		[0.003]	[0.003]
Adjusted $R2$	0.018	0.312		0.048	0.344	
Observations	87	87	87	87	87	87
First stage: the instrumented variable is Horse Power of Steam Engines						
Distance to Fresnes			-0.013***			-0.013***
			[0.003]			[0.003]
F-stat (1st stage)			22.612			22.612

Note: All regressions, except for the unconditional ones, include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, are in logarithm. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

age 15-17 and 18-24, respectively, who attended school in 2010. In particular, given that school is mandatory in France until age 16, these regressions indicate that a smaller fraction of men age 15-17 remain in high-school, and a smaller fraction of men age 18-24 are present in institutions of higher learning, in departments which utilized the steam engine more intensively. [23]

Moreover, as reported in the IV regressions in Columns (3),(6),(9),(12),(15) and (18) in Table 9, the horse power of steam engines in industrial production in 1860-1865 had a progressively larger adverse effect on the share of men age 25 and above who had at least high-school degree in 1968, 1975, 1982, 1990, 1999 and 2010. These adverse effects are statistically significant in the years 1990, 1999 and 2010.[24]

As was the case in the income regressions in columns (6)-(10) in Table 5, the IV estimation in Table 9 reverses the OLS estimates of the relationship between industrialization and education attainment from a positive to a negative one. This reversal suggests that factors which fostered industrial development, rather than industrialization per se, contributed to the positive association between industrialization and education. In particular, once one accounts for the effect of these

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[23]Similar results are found for school enrollment rates of women age 15-17 and 18-24 in 2010, as reported in Table D.1 in Appendix D.

[24]Similar results are found for school enrollment rates of women as well, as reported in Table D.2 in Appendix D.

Table 8: Industrialization and male school enrollment in 2010

	(1) OLS	(2) OLS	(3) IV	(4) OLS	(5) OLS	(6) IV
	School Enrollment of Men Age 15-17 in 2010			School Enrollment of Men Age 18-24 in 2010		
Horse Power of Steam Engines	-0.029	-0.116	-1.046***	-0.0424	-0.0709	-0.818***
	[0.055]	[0.0747]	[0.241]	[0.052]	[0.062]	[0.192]
Average Rainfall		2.767***	4.248***		1.301*	2.490**
		[0.734]	[1.299]		[0.736]	[1.166]
Average Temperature		0.813	2.179*		0.0831	1.181
		[0.878]	[1.272]		[0.765]	[1.138]
Latitude		24.45***	46.54***		19.02***	36.77***
		[6.720]	[11.81]		[6.288]	[10.08]
Land Suitability		-0.882**	-0.967		-0.796**	-0.864
		[0.402]	[0.660]		[0.364]	[0.547]
Maritime Department		-0.642*	-0.787		-0.514	-0.630
		[0.361]	[0.506]		[0.341]	[0.460]
Border Department		-0.688*	-0.842*		-0.587*	-0.711*
		[0.377]	[0.490]		[0.331]	[0.426]
Distance to Paris		0.005***	0.006**		0.004**	0.005**
		[0.002]	[0.003]		[0.002]	[0.002]
Paris and Suburbs		1.404***	1.992***		1.402***	1.875***
		[0.288]	[0.462]		[0.319]	[0.488]
Alsace-Lorraine		-0.744	0.100		-0.583	0.09
		[0.571]	[0.997]		[0.450]	[0.764]
Urban Population in 1700		0.119*	0.382***		0.028	0.240**
		[0.07]	[0.131]		[0.058]	[0.107]
Adjusted $R2$	-0.008	0.239		-0.002	0.218	
Observations	89	89	89	89	89	89
First stage: the instrumented variable is Horse Power of Steam Engines						
Distance to Fresnes			-0.013***			-0.013***
			[0.003]			[0.003]
F-stat (1st stage)			23.261			23.261

Note: All regressions, except for the unconditional ones, include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

omitted factors, industrialization has an adverse effect on education in the long-run.

5.1.2 Industrialization in the Long-Run and the Composition of Human Capital

This subsection explores the effect of industrialization on the long-run composition of human capital as reflected by the share of executives, middle management professions, and employees (i.e., individuals with high, medium, and low levels of human capital) in the labor force. It demonstrates that it had a detrimental effect on employment in skilled-intensive occupations, although industrialization had no effect on the share of employment in the service sector in the long-run (Panel B of Figure 5).

As depicted in Panels A–C of Figure 7 based on the IV regression in Tables C.5–C.7 in Appendix C, the horse power of steam engines in industrial production in 1860-1865 had a significant negative effect on the share of executives and other intellectual professions, as well as on the share of middle management professions, among individuals age 25-54 in the years 1999 and 2010. In contrast, the effect on the share of employees is significantly positive in 1999 and 2010.[25]

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[25]The control group is made of farmers, artisans and other self-employed individuals.

Table 9: Long-run effects of industrialization on human capital: male high-school and college graduates, 1968-2010

	(1) OLS	(2) OLS	(3) IV	(4) OLS	(5) OLS	(6) IV	(7) OLS	(8) OLS	(9) IV
	Share of Men Age 25 and above with a Secondary or Post-Secondary Degree, 1968			Share of Men Age 25 and above with a Secondary or Post-Secondary Degree, 1975			Share of Men Age 25 and above with a Secondary or Post-Secondary Degree, 1982		
Horse Power of Steam Engines	0.003**	0.002*	-0.002	0.003*	0.002	-0.003	0.002	0.001	-0.007
	[0.001]	[0.001]	[0.003]	[0.002]	[0.001]	[0.004]	[0.002]	[0.002]	[0.005]
Average Rainfall		0.019	0.025*		0.011	0.020		0.018	0.031
		[0.014]	[0.014]		[0.017]	[0.017]		[0.018]	[0.019]
Average Temperature		-0.031*	-0.026		-0.043*	-0.035		-0.047**	-0.035
		[0.018]	[0.017]		[0.022]	[0.022]		[0.023]	[0.024]
Latitude		-0.142	-0.053		-0.150	-0.012		-0.0006	0.194
		[0.119]	[0.131]		[0.165]	[0.180]		[0.209]	[0.229]
Land Suitability		0.0122	0.0118		0.0141	0.0135		0.0132	0.0125
		[0.009]	[0.008]		[0.011]	[0.011]		[0.012]	[0.012]
Maritime Department		0.003	0.002		0.006	0.005		0.004	0.003
		[0.006]	[0.006]		[0.008]	[0.008]		[0.008]	[0.009]
Border Department		0.013**	0.012***		0.016**	0.015**		0.013	0.012
		[0.005]	[0.005]		[0.007]	[0.006]		[0.008]	[0.008]
Distance to Paris		2.12e-05	2.54e-05		3.71e-05	4.34e-05		7.96e-05	8.87e-05*
		[3.29e-05]	[3.10e-05]		[4.47e-05]	[4.22e-05]		[5.55e-05]	[5.15e-05]
Paris and Suburbs		0.072***	0.075***		0.099***	0.103***		0.115***	0.120***
		[0.012]	[0.012]		[0.013]	[0.012]		[0.011]	[0.011]
Alsace-Lorraine		0.025**	0.029**		0.025	0.030*		0.020	0.027
		[0.012]	[0.012]		[0.016]	[0.016]		[0.018]	[0.018]
Urban Population in 1700		0.007***	0.0082***		0.009***	0.011***		0.010***	0.012***
		[0.001]	[0.002]		[0.002]	[0.002]		[0.002]	[0.002]
Adjusted $R2$	0.037	0.621		0.025	0.615		0.004	0.592	
Observations	89	89	89	89	89	89	89	89	89

First stage: the instrumented variable is Horse Power of Steam Engines

			(3)			(6)			(9)
Distance to Fresnes			-0.013***			-0.013***			-0.013***
			[0.003]			[0.003]			[0.003]
F-stat (1st stage)			23.261			23.261			23.261

	(10) OLS	(11) OLS	(12) IV	(13) OLS	(14) OLS	(15) IV	(16) OLS	(17) OLS	(18) IV
	Share of Men Age 25 and above with a Secondary or Post-Secondary Degree, 1990			Share of Men Age 25 and above with a Secondary or Post-Secondary Degree, 1999			Share of Men Age 25 and above with a Secondary or Post-Secondary Degree, 2010		
Horse Power of Steam Engines	0.002	0.001	-0.010*	0.002	0.001	-0.0122*	0.0003	2.38e-05	-0.018**
	[0.002]	[0.002]	[0.006]	[0.003]	[0.002]	[0.006]	[0.003]	[0.002]	[0.008]
Average Rainfall		0.013	0.030		0.022	0.043		0.037	0.066**
		[0.022]	[0.024]		[0.023]	[0.027]		[0.028]	[0.033]
Average Temperature		-0.048*	-0.032		-0.039	-0.019		-0.030	-0.003
		[0.028]	[0.030]		[0.030]	[0.034]		[0.036]	[0.041]
Latitude		0.0595	0.324		0.163	0.480		0.261	0.695*
		[0.266]	[0.288]		[0.303]	[0.325]		[0.340]	[0.371]
Land Suitability		0.011	0.010		0.005	0.004		-0.006	-0.007
		[0.014]	[0.015]		[0.015]	[0.016]		[0.017]	[0.019]
Maritime Department		0.004	0.002		0.002	-0.0004		0.005	0.002
		[0.010]	[0.011]		[0.012]	[0.013]		[0.014]	[0.015]
Border Department		0.013	0.011		0.016	0.014		0.016	0.013
		[0.011]	[0.011]		[0.013]	[0.012]		[0.016]	[0.016]
Distance to Paris		0.0001*	0.0001**		0.0002**	0.0002***		0.0002**	0.0002***
		[6.95e-05]	[6.43e-05]		[7.74e-05]	[7.20e-05]		[8.67e-05]	[8.18e-05]
Paris and Suburbs		0.145***	0.152***		0.171***	0.179***		0.190***	0.201***
		[0.015]	[0.016]		[0.021]	[0.023]		[0.020]	[0.022]
Alsace-Lorraine		0.0097	0.0198		-0.001	0.011		-0.018	-0.002
		[0.022]	[0.024]		[0.023]	[0.025]		[0.022]	[0.029]
Urban Population in 1700		0.012***	0.015***		0.016***	0.019***		0.019***	0.024***
		[0.002]	[0.003]		[0.003]	[0.003]		[0.003]	[0.004]
Adjusted $R2$	-0.006	0.590		-0.007	0.613		-0.011	0.603	
Observations	89	89	89	89	89	89	89	89	89

First stage: the instrumented variable is Horse Power of Steam Engines

			(12)			(15)			(18)
Distance to Fresnes			-0.013***			-0.013***			-0.013***
			[0.003]			[0.003]			[0.003]
F-stat (1st stage)			23.261			23.261			23.261

Note: All regressions, except for the unconditional ones, include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, and the dependent variables are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

A. Executives in workforce.　　B. Intermediary professionals in workforce.　　C. Employees in workforce.

Figure 7: The effect of the horse power of steam engines in 1860-1865 on the share of executives, intermediary professionals and employees in the workforce (age 25-54) after WWII

Note: This figure displays the estimated coefficients of *Horse Power of Steam Engines* in the IV regressions in Tables C.5 – C.7. Intervals reflect 95%-confidence levels.

5.2　The Contribution of Industrialization to Unionization and Wages

The adverse effect of industrialization on income per capita in the long-run may reflect the adverse effect of industrialization on the competitiveness of the labor market in the long-run. In particular,

Table 10: Industrialization and GDP per capita in 2001-2010: the union channel

	(1) OLS	(2) IV	(3) IV
	Share of unionized workers, 1901	GDP per capita, 2001-2010	
Horse Power of Steam Engines	0.007***	-0.061**	-0.010**
	[0.002]	[0.026]	[0.045]
Share of unionized workers, 1901			3.508***
			[1.122]
Average Rainfall	-0.0417*	0.164	0.313
	[0.022]	[0.13]	[0.191]
Average Temperature	-0.022	-0.053	0.039
	[0.021]	[0.143]	[0.173]
Latitude	0.0134	-0.0236	-0.0725
	[0.011]	[0.066]	[0.067]
Land Suitability	-0.147	1.702	2.686*
	[0.159]	[1.136]	[1.407]
Maritime Department	-0.015	-0.022	0.022
	[0.009]	[0.05]	[0.064]
Border Department	0.003	0.027	0.015
	[0.008]	[0.045]	[0.060]
Distance to Paris	5.78e-06	0.0002	0.0002
	[5.07e-05]	[0.0003]	[0.0003]
Paris and Suburbs	-0.014	0.437***	0.493***
	[0.020]	[0.154]	[0.107]
Alsace-Lorraine		0.0295	
		[0.106]	
Urban Population in 1700	0.003	0.071***	0.067***
	[0.002]	[0.015]	[0.017]
Adjusted $R2$	0.257		
Observations	86	89	86

First stage: the instrumented variable is Horse Power of Steam Engines			
Distance to Fresnes		-0.013***	-0.011***
		[0.003]	[0.003]
F-stat (1st stage)		23.261	13.151

Note: All regressions include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, and the dependent variables are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Table 11: Industrialization and GDP per capita in 2001-2010: the wage channel

	(1) OLS	(2) IV	(3) IV
	Average male wage, 1901	GDP per capita, 2001-2010	
Horse Power of Steam Engines	0.023**	-0.061**	-0.010***
	[0.010]	[0.026]	[0.028]
Average male wage, 1901			0.956***
			[0.194]
Average Rainfall	-0.004	0.164	0.200
	[0.073]	[0.128]	[0.158]
Average Temperature	-0.136	-0.053	0.083
	[0.088]	[0.143]	[0.171]
Land Suitability	0.063	-0.024	-0.057
	[0.044]	[0.066]	[0.067]
Latitude	-1.346	1.702	3.366**
	[0.839]	[1.136]	[1.353]
Maritime Department	0.022	-0.022	-0.039
	[0.036]	[0.053]	[0.060]
Border Department	0.089***	0.027	-0.051
	[0.031]	[0.045]	[0.060]
Distance to Paris	-0.0004*	0.0002	0.0006**
	[0.0002]	[0.0003]	[0.0003]
Paris and Suburbs	0.193***	0.437***	0.268**
	[0.059]	[0.154]	[0.113]
Alsace-Lorraine		0.0295	
		[0.106]	
Town Population in 1700	0.015	0.071***	0.066***
	[0.009]	[0.015]	[0.016]
Adjusted $R2$	0.502		
Observations	84	89	84

First stage: the instrumented variable is Horse Power of Steam Engines

Distance to Fresnes		-0.013	-0.012
		[0.003]***	[0.002]***
F-stat (1st stage)		23.261	23.145

Note: All regressions include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, and the dependent variables are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

the growth of the industrial sector may have led to the establishment of labor unions, which deterred new industries from locating in regions characterized by higher wages and possibly lower productivity.[26]

Indeed, as reported in Column (1) of Table 10, the degree of industrialization in the year 1860-1865 is positely correlated with the share of unionized workers in the workforce in 1901. However, in Column (3), the degree of unionization is in fact positively related to the level income per capita in the long-run. Moreover, when comparing Columns (2) and (3), the effect of industrialization on the long-run level of income per capita is shown to be even larger and to remain statistically significant, once the potential confounding effect of unionization is accounted for.

Similarly, in Column (1) of Table 11, the relation between industrialization in 1860-1865 and the average male wage in each department in 1901 is positive and statistically significant. Nevertheless, the average male wage in 1901 is positively related to income per capita in the long-run in Column (3). In addition, as reported in Columns (2) and (3), the effect of industrialization

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[26]Unions were given a legal existence in France in 1884. It is worth noting that in France, unlike in the USA for instance, labor regulations are identical throughout the country. Nevertheless, unions could have negotiated higher salaries in specific firms.

on the long-run level of income per capita is even larger and still significant statistically, once the potential confounding effect of higher wages in the past is accounted for. Thus, the adverse effect of industrialization on income per capita in the long-run cannot be attributed to the effect of industrialization on unionization and wages.

5.3 Trade Protection and Competitiveness in the Long-Run

This section explores whether the detrimental effect of industrialization on the standard of living in the long-run could be attributed to the adverse effect of trade protection on the competitiveness of each department in the long-run.

Table 12: Industrial and GDP per capita in 1930 & 2001-2010, acccounting for sectoral tariff protection

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV	(6) IV	(7) IV	(8) IV	(9) IV	(10) IV
	GDP per capita, 1930					GDP per capita, 2001-2010 average				
Horse Power of Steam Engines	0.102*** [0.026]	0.101*** [0.026]	0.103*** [0.027]	0.102*** [0.026]	0.105*** [0.027]	-0.0607** [0.026]	-0.062** [0.026]	-0.061** [0.026]	-0.061** [0.025]	-0.064** [0.029]
Weighted tariffs across sectors, 1865		0.019 [0.051]					-0.042 [0.075]			
Weighted tariffs across sectors, 1872			-0.036 [0.050]					-0.020 [0.070]		
Weighted tariffs across sectors, 1901				-0.013 [0.057]					-0.113** [0.058]	
Weighted tariffs across sectors, 1924					0.073 [0.067]					-0.050 [0.077]
Average Rainfall	-0.211* [0.125]	-0.215 [0.131]	-0.268* [0.146]	-0.242* [0.134]	-0.228 [0.139]	0.164 [0.128]	0.158 [0.134]	0.164 [0.140]	0.109 [0.129]	0.186 [0.142]
Average Temperature	-0.444*** [0.113]	-0.428*** [0.124]	-0.453*** [0.129]	-0.442*** [0.127]	-0.419*** [0.125]	-0.053 [0.143]	-0.034 [0.166]	-0.031 [0.171]	-0.092 [0.155]	-0.030 [0.165]
Land Suitability	0.244*** [0.049]	0.234*** [0.049]	0.242*** [0.048]	0.238*** [0.049]	0.212*** [0.056]	-0.024 [0.066]	-0.007 [0.069]	-0.014 [0.070]	-0.005 [0.065]	0.002 [0.072]
Latitude	-3.325*** [1.160]	-3.309*** [1.143]	-3.457*** [1.174]	-3.366*** [1.143]	-3.356*** [1.125]	1.702 [1.136]	1.603 [1.166]	1.630 [1.151]	1.530 [1.135]	1.710 [1.226]
Maritime Department	0.007 [0.056]	0.004 [0.056]	0.008 [0.055]	0.007 [0.055]	-0.0006 [0.057]	-0.022 [0.053]	-0.022 [0.053]	-0.023 [0.053]	-0.010 [0.050]	-0.021 [0.054]
Border Department	0.102** [0.046]	0.112** [0.049]	0.122** [0.051]	0.117** [0.048]	0.107** [0.048]	0.027 [0.045]	0.037 [0.046]	0.034 [0.045]	0.039 [0.045]	0.035 [0.048]
Distance to Paris	-0.0002 [0.0003]	-0.0002 [0.0003]	-0.0002 [0.0003]	-0.0002 [0.0003]	-0.0002 [0.0003]	0.0002 [0.0003]	0.0002 [0.0003]	0.0002 [0.0003]	0.0002 [0.0003]	0.0002 [0.0003]
Paris and Suburbs	0.239*** [0.0877]	0.235*** [0.0903]	0.236*** [0.0846]	0.238*** [0.0861]	0.226** [0.0931]	0.437*** [0.154]	0.442*** [0.152]	0.435*** [0.151]	0.433*** [0.141]	0.445*** [0.155]
Alsace-Lorraine	0.0920 [0.0831]	0.0841 [0.0835]	0.0855 [0.0848]	0.0861 [0.0838]	0.0611 [0.0955]	0.0295 [0.106]	0.0321 [0.109]	0.0279 [0.108]	0.0214 [0.120]	0.0361 [0.116]
Urban Population in 1700	0.0287** [0.013]	0.028** [0.013]	0.028** [0.013]	0.028** [0.013]	0.026* [0.014]	0.071*** [0.015]	0.071*** [0.015]	0.071*** [0.015]	0.072*** [0.015]	0.072*** [0.016]
Observations	87	84	84	84	84	89	86	86	86	86
	First stage: the instrumented variable is Horse Power of Steam Engines									
Distance to Fresnes	-0.013*** [0.003]	-0.013*** [0.003]	-0.012*** [0.003]	-0.013*** [0.003]	-0.012*** [0.003]	-0.013*** [0.003]	-0.013*** [0.003]	-0.013*** [0.003]	-0.013*** [0.003]	-0.012*** [0.003]
F-stat	20.617	20.116	20.412	20.852	17.191	23.261	22.555	23.343	23.042	18.601

Note: All regressions, except for the unconditional ones, include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, and the dependent variables are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

In light of the departmental variation in the composition of the 16 sectors that constituted the industrial sector in 1860-1865, the imposition of tariffs on import by the national government could

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have affected each department differentially. In particular, the degree of competitiveness in the most advanced industrial sectors could have diminished and may have thus led to their economic decline in the long-run.

Nevertheless, as reported in Column (6)-(10) in Table 12, while tariff rates in the years 1865, 1872, 1901 and 1924 (Dormois, 2006, 2009) had a negative but mostly insignificant association with income per capita in the years 2001-2010, those tariff rates in the past had neither an economic impact nor statistical one on the effect of industrialization on income per in the long-run.[27] Thus, the adverse effect of industrialization on income per capita in the long-run cannot be attributed to the effect of industrialization on trade protection.

5.4 World War I and World War II

Table 13: Industrialization and income per capita, accounting for the number of buildings destroyed in the World Wars

	(1) OLS Destroyed Buildings WWI	(2) OLS Destroyed Buildings WWII	(3) IV GDP per capita, 1930	(4) IV GDP per capita, 1930	(5) IV GDP per capita, 2001-2010	(6) IV GDP per capita, 2001-2010
Horse Power of Steam Engines	0.429**	0.385**	0.102***	0.117***	-0.0607**	-0.0668**
	[0.182]	[0.187]	[0.0261]	[0.0362]	[0.0261]	[0.0262]
Destroyed Buildings WWI				-0.00351		
				[0.00655]		
Destroyed Buildings WWII						0.0358***
						[0.0131]
Average Rainfall	-0.933	-7.407***	-0.211*	-0.239	0.164	0.401**
	[2.360]	[1.432]	[0.125]	[0.151]	[0.128]	[0.161]
Average Temperature	1.553	-5.077***	-0.444***	-0.450***	-0.0530	0.113
	[2.553]	[1.508]	[0.113]	[0.120]	[0.143]	[0.169]
Latitude	0.537	1.755**	0.244***	0.242***	-0.0236	-0.0877
	[1.185]	[0.784]	[0.0491]	[0.0521]	[0.0662]	[0.0778]
Land Suitability	68.67***	20.98	-3.325***	-3.458***	1.702	0.870
	[24.67]	[12.97]	[1.160]	[1.257]	[1.136]	[1.057]
Maritime Department	-0.906	1.526***	0.00656	0.00853	-0.0215	-0.0800
	[1.089]	[0.538]	[0.0559]	[0.0597]	[0.0527]	[0.0546]
Border Department	3.386***	0.842	0.102**	0.119**	0.0269	-0.000769
	[1.061]	[0.572]	[0.0464]	[0.0547]	[0.0448]	[0.0372]
Distance to Paris	0.00865	0.00223	-0.000211	-0.000211	0.000215	0.000156
	[0.00601]	[0.00323]	[0.000289]	[0.000319]	[0.000280]	[0.000252]
Paris and Suburbs	-2.570**	0.799*	0.239***	0.221**	0.437***	0.400***
	[1.154]	[0.458]	[0.0877]	[0.0914]	[0.154]	[0.153]
Alsace-Lorraine				0.0920	0.0295	
				[0.0831]	[0.106]	
Urban Population in 1700	0.0745	-0.000931	0.0277**	0.0229	0.0707***	0.0709***
	[0.203]	[0.131]	[0.0132]	[0.0147]	[0.0149]	[0.0148]
Adjusted R2	0.408	0.659				
Observations	86	86	87	85	89	86
First stage: the instrumented variable is Horse Power of Steam Engines						
Distance to Fresnes			-0.0127***	-0.0167***	-0.0132***	-0.0124***
			[0.00279]	[0.00477]	[0.00274]	[0.00253]
F-stat (1st stage)	4.127	19.859	20.617	12.214	23.261	23.876

Note: All regressions include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, and the dependent variables are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

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[27] As reported in the rest of Table 12 and in Table E.1 in the appendix, there is no significant relationship between tariff and income per capita in the years 1872, 1901, and 1930 and the tariff rate in the past has neither an economic impact nor statistical one on the effect of industrialization on income per capita in 1872, 1901 and 1930.

Table 14: Industrialization and income per capita, accounting for the number of military casualties in the World Wars

	(1) OLS WWI deaths	(2) OLS WWII deaths	(3) IV GDP per capita, 1930	(4) IV	(5) IV GDP per capita, 2001-2010	(6) IV
Horse Power of Steam Engines	0.0901***	0.101***	0.102***	0.103***	-0.0607**	-0.0571**
	[0.0250]	[0.0321]	[0.0261]	[0.0258]	[0.0261]	[0.0255]
WWI deaths				-0.00291		
				[0.0682]		
WWII deaths						0.0883
						[0.0606]
Average Rainfall	0.612**	0.105	-0.211*	-0.207*	0.164	0.135
	[0.243]	[0.680]	[0.125]	[0.122]	[0.128]	[0.130]
Average Temperature	0.930**	1.465***	-0.444***	-0.440***	-0.0530	-0.201
	[0.378]	[0.497]	[0.113]	[0.127]	[0.143]	[0.152]
Latitude	-0.491**	-0.669**	0.244***	0.241***	-0.0236	0.0367
	[0.190]	[0.299]	[0.0491]	[0.0623]	[0.0662]	[0.0697]
Land Suitability	7.835***	15.77***	-3.325***	-3.382***	1.702	0.0126
	[2.114]	[2.918]	[1.160]	[1.250]	[1.136]	[1.375]
Maritime Department	0.209**	0.224*	0.00656	0.00986	-0.0215	-0.0393
	[0.0982]	[0.132]	[0.0559]	[0.0575]	[0.0527]	[0.0502]
Border Department	-0.0274	0.280	0.102**	0.103**	0.0269	0.00424
	[0.109]	[0.173]	[0.0464]	[0.0461]	[0.0448]	[0.0399]
Distance to Paris	0.0008	0.0023***	-0.0002	-0.0002	0.0002	-0.00001
	[0.0005]	[0.0008]	[0.0003]	[0.0003]	[0.0003]	[0.0003]
Paris and Suburbs	0.656**	0.947**	0.239***	0.239***	0.437***	0.345***
	[0.320]	[0.406]	[0.0877]	[0.0859]	[0.154]	[0.128]
Alsace-Lorraine		-0.601***	0.0920		0.0295	0.0712
		[0.187]	[0.0831]		[0.106]	[0.0970]
Urban Population in 1700	0.0581**	0.0975***	0.0277**	0.0270**	0.0707***	0.0585***
	[0.0250]	[0.0317]	[0.0132]	[0.0129]	[0.0149]	[0.0132]
Adjusted R2	0.632	0.502				
Observations	86	89	87	85	89	89

First stage: the instrumented variable is Horse Power of Steam Engines						
Distance to Fresnes			-0.0127***	-0.0128***	-0.0132***	-0.0135***
			[0.00279]	[0.00293]	[0.00274]	[0.00280]
F-stat (1st stage)			20.617	19.105	23.261	23.457

Note: All regressions include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, and the dependent variables are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

World War I and World War II, and the associated destruction of physical capital, may have affected disproportionately industrial centers, potentially leading to their decline in the long-run. Nevertheless, accounting for the destruction of physical and human capital does not affect the qualitative results.

While the physical destruction in industrial intensive departments was indeed larger, it had no impact on the adverse effect of industrialization and income per capita in 2001-2010. In particular, accounting for the number of buildings destroyed in each department in WWI and WWII, the destruction of physical capital in both wars has no qualitative impact on the effect of industrialization on income per capita in 1930 and 2001-2010 (Table 13) as well as on the share of employment in the industrial sector (Table B.17 in Appendix B). Interestingly, the number of buildings destroyed during WWII is even found to be positively and significantly correlated with GDP per capita in 2001-2010 in Table 13 and with the share of the workforce in industry in 1990, 1999 and 2010 in Table B.17. This result suggests that the public spending which was geared towards the regions that suffered from more devastation during WWII, mitigated the negative effect of industrialization in

the long-run. Similarly, the destruction of human capital (measured by the number of soldiers from each department who died in each war) has no qualitative impact on the effect of industrialization on income per capita in the long-run (Table 14) and on the share of employment in the industrial sector (Table B.18 in Appendix B).

6   Concluding Remarks

This research explores the long-run effect of industrialization on the process of development. In contrast to conventional wisdom that views industrial development as a catalyst for economic growth, highlighting its persistent effect on economic prosperity, the study establishes that while the adoption of industrial technology was initially conducive for economic development, it has had a detrimental effect on standards of living in the long-run.

The study exploits exogenous source of regional variation in the adoption of steam engines during the French industrial revolution to establish that regions which industrialized more intensively experienced an increase in literacy rates more swiftly and generated higher income per capita in the subsequent decades. Nevertheless, industrialization had an adverse effect on income per capita, employment and equality by the turn of the 21st century.

The research explores potential mechanisms that could have led to the detrimental effect of industrialization on the standard of living in the long-run. First, the study examines the adverse effect of industrialization on the level and composition human capital and thus on the skill-intensity of the production process in the long-run. Second, it explores the contribution of industrialization to unionization and wage rates and thus the incentive of modern industries to locate in regions where labor markets are more competitive. Third, the analysis examines the effect of on trade protection on the decline in competitiveness of each department in the long-run. Fourth, it examines the effect of intensive industrialization on destruction during WWI and WWII and its persistent effect on economic development. The findings suggest that the adverse effect of industrialization on income per capita in the long-run reflects neither greater unionization rates and higher wages nor trade protection, but rather underinvestment in human capital, beyond basic literacy skills, and lower employment in skilled-intensive occupations.

The study thus suggests that the characteristics that permitted the onset of industrialization, rather than the adoption of industrial technology *per se*, have been the source of prosperity among the currently developed economies that experienced an early industrialization.

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Online Appendix

Appendix A. Descriptive Statistics

Table A.1: Descriptive statistics

	Obs	Mean	Std. Dev.	Min	Max
Dependent Variables					
Income					
GDP per capita, 1872	85	655.24	198.13	235.60	1197.00
GDP per capita, 1901	85	862.91	270.96	255.30	1816.40
GDP per capita, 1930	87	6464.61	1500.21	4033.47	14109.92
GDP per capita, 2001-2011 average	89	23.39	4.71	17.87	56.00
Unemployment, Gini Coefficient and 25th Percentile of the Income Distribution, Post 2000					
Unemployment rate, 2002-2011 average	89	8.38	1.58	5.05	12.59
Gini coefficient, 2001-2008 average	89	0.36	0.02	0.33	0.44
1st Quartile Fiscal Income per Person in Household, 2001-2010 Average	89	7125.19	1411.45	5292.10	15686.58
Workforce, Pre-WWII					
Share of Workforce in Industry, 1872	87	0.21	0.10	0.05	0.49
Share of Workforce in Industry, 1901	87	0.27	0.10	0.10	0.57
Share of Workforce in Industry, 1930	89	0.33	0.13	0.12	0.66
Share of Workforce in Services, 1872	87	0.01	0.01	0.00	0.03
Share of Workforce in Services, 1901	87	0.24	0.08	0.12	0.53
Share of Workforce in Services, 1930	89	0.21	0.06	0.12	0.47
Workforce, Post-WWII					
Share of Workforce in Industry, 1968	89	0.37	0.09	0.18	0.55
Share of Workforce in Industry, 1975	89	0.36	0.08	0.18	0.55
Share of Workforce in Industry, 1982	89	0.34	0.07	0.20	0.49
Share of Workforce in Industry, 1990	89	0.31	0.06	0.15	0.44
Share of Workforce in Industry, 1999	89	0.26	0.06	0.14	0.36
Share of Workforce in Industry, 2010	89	0.23	0.03	0.14	0.33
Share of Workforce in Services, 1968	89	0.40	0.07	0.28	0.60
Share of Workforce in Services, 1975	89	0.46	0.07	0.33	0.65
Share of Workforce in Services, 1982	89	0.53	0.07	0.40	0.71
Share of Workforce in Services, 1990	89	0.60	0.07	0.47	0.76
Share of Workforce in Services, 1999	89	0.68	0.06	0.57	0.85
Share of Workforce in Services, 2010	89	0.53	0.09	0.37	0.86
Share of Executives in Workforce (age 25-54), 1968	89	0.041	0.013	0.02	0.114
Share of Executives in Workforce (age 25-54), 1975	89	0.066	0.02	0.034	0.143
Share of Executives in Workforce (age 25-54), 1982	89	0.073	0.022	0.043	0.17
Share of Executives in Workforce (age 25-54), 1990	89	0.093	0.028	0.059	0.229
Share of Executives in Workforce (age 25-54), 1999	89	0.095	0.029	0.062	0.249
Share of Executives in Workforce (age 25-54), 2010	89	0.114	0.04	0.07	0.319
Share of Intermediary Professionals in Workforce (age 25-54), 1968	89	0.153	0.032	0.083	0.299
Share of Intermediary Professionals in Workforce (age 25-54), 1975	89	0.218	0.034	0.147	0.315
Share of Intermediary Professionals in Workforce (age 25-54), 1982	89	0.237	0.026	0.18	0.312
Share of Intermediary Professionals in Workforce (age 25-54), 1990	89	0.263	0.022	0.224	0.321
Share of Intermediary Professionals in Workforce (age 25-54), 1999	89	0.297	0.021	0.257	0.36
Share of Intermediary Professionals in Workforce (age 25-54), 2010	89	0.283	0.022	0.244	0.369
Share of Employees in Workforce (age 25-54), 1968	89	0.041	0.013	0.02	0.114
Share of Employees in Workforce (age 25-54), 1975	89	0.066	0.02	0.034	0.143
Share of Employees in Workforce (age 25-54), 1982	89	0.073	0.022	0.043	0.17
Share of Employees in Workforce (age 25-54), 1990	89	0.093	0.028	0.059	0.229
Share of Employees in Workforce (age 25-54), 1999	89	0.095	0.029	0.062	0.249
Share of Employees in Workforce (age 25-54), 2010	89	0.114	0.04	0.07	0.319
Education Measures, Pre-WWI					
Average Share of Literate Individuals Among Conscripts, 1874-1883 Average	87	0.82	0.10	0.53	0.97
Average Share of Literate Individuals Among Conscripts, 1894-1903 Average	87	0.94	0.04	0.82	0.99
Education Measures, Post-WWII					
Share of Men Age 25 and Above with a Secondary or Post-Secondary Degree, 1968	89	0.09	0.02	0.06	0.19
Share of Men Age 25 and Above with a Secondary or Post-Secondary Degree, 1975	89	0.12	0.03	0.07	0.24
Share of Men Age 25 and Above with a Secondary or Post-Secondary Degree, 1982	89	0.16	0.03	0.10	0.28
Share of Men Age 25 and Above with a Secondary or Post-Secondary Degree, 1990	89	0.20	0.04	0.14	0.36
Share of Men Age 25 and Above with a Secondary or Post-Secondary Degree, 1999	89	0.25	0.05	0.18	0.46
Share of Men Age 25 and Above with a Secondary or Post-Secondary Degree, 2010	89	0.36	0.06	0.27	0.58
Share of Women Age 25 and Above with a Secondary or Post-Secondary Degree, 1968	89	0.05	0.02	0.03	0.13
Share of Women Age 25 and Above with a Secondary or Post-Secondary Degree, 1975	89	0.10	0.03	0.06	0.21
Share of Women Age 25 and Above with a Secondary or Post-Secondary Degree, 1982	89	0.14	0.03	0.09	0.25
Share of Women Age 25 and Above with a Secondary or Post-Secondary Degree, 1990	89	0.19	0.04	0.13	0.36
Share of Women Age 25 and Above with a Secondary or Post-Secondary Degree, 1999	89	0.28	0.05	0.20	0.49
Share of Women Age 25 and Above with a Secondary or Post-Secondary Degree, 2010	89	0.41	0.06	0.31	0.62
School Enrollment of Men Age 15-17 in 2010	89	95.55	1.03	93.10	97.70
School Enrollment of Women Age 15-17 in 2010	89	96.68	0.88	94.40	98.10
School Enrollment of Men Age 18-24 in 2010	89	44.25	7.11	30.80	61.50
School Enrollment of Women Age 18-24 in 2010	89	48.02	8.35	35.90	66.90
Explanatory Variables					
Horse Power of Steam Engines	89	1839.35	3855.33	0	27638
Average Rainfall	89	878.03	156.42	642.90	1289.24
Average Temperature	89	10.45	1.69	4.42	13.73
Latitude	89	0.74	0.19	0.21	0.98
Land Suitability	89	46.49	2.15	41.86	50.49
Maritime Department	89	0.27	0.45	0	1
Border Department	89	0.24	0.43	0	1
Distance to Paris	89	365.88	188.95	1	918.86
Paris and Suburbs	89	0.03	0.18	0	1
Alsace-Lorraine	89	0.03	0.18	0	1
Urban Population in 1700 (thousand of inhabitants)	89	20.79	57.78	0	510
Instrumental Variable					
Distance to Fresnes sur Escaut	89	496.60	221.88	42.88	1027.22

Table A.2: Descriptive statistics: variables for robustness analysis.

	Obs	Mean	Std. Dev.	Min	Max
Education before 1840					
Grooms who Signed their Marriage License, 1686-1690	76	25.90	14.87	6.27	64.25
Grooms who Signed their Marriage License, 1786-1790	79	42.35	23.94	5.24	92.18
Grooms who Signed their Marriage License, 1816-1820	78	50.61	22.14	13.35	96.28
Percentage of conscripts who could read, 1827-1829	89	15.11	14.90	0.90	61.70
Percentage of conscripts who could read, 1831-1835	89	18.68	16.01	1.60	71.30
Percentage of conscripts who could read, 1836-1840	87	23.90	17.50	1.50	77.70
University	89	0.18	0.39	0	1
Economic development before 1815					
Area covered by mines in department	89	0.008	0.015	0.00009	0.086
Iron forges in 1789	89	2.15	8.76	0	52.00
Iron forges in 1811	89	2.53	11.09	0	79.00
Market integration during the French Revolution	86	132.71	106.95	21.00	732.00
Presence of iron forges in 1789	89	0.10	0.30	0	1
Presence of iron forges in 1811	89	0.10	0.30	0	1
Railroad connection					
Railroad connection to Paris in 1860	89	0.73	0.45	0	1
Population density					
Population density 1801	85	0.74	1.55	0.19	13.17
Population density 1831	86	0.91	2.18	0.22	19.50
Population density 1861	89	1.20	4.32	0.21	40.74
Religious minorities					
Jews in population, 1861	89	0.002	0.005	0	0.04
Protestants in population, 1861	89	0.021	0.053	0.00003	0.31
Horse Power of Steam Engines per inhabitant in 1861					
Horse Power of Steam Engines per inhabitant in 1861	89	0.003	0.005	0	0.03
Share of the native population					
Share of the native population in each department, 1901	87	0.85	0.09	0.47	0.98
Share of the native population in each department, 2010	89	0.57	0.11	0.25	0.78
World War I and World War II					
Destroyed Buildings WWI	86	10802.81	38701.6	0	280175
Destroyed Buildings WWII	86	13530.36	24260.73	0	122285
WWI deaths	86	14677.21	10247.99	4226	80591
WWII deaths	89	1568.236	1659.00	18	13218
Access to Waterways					
Rivers and Tributaries	89	0.562	0.499	0	1
Distance from French cities - aerial distance					
Distance from Marseille	89	472.93	215.91	1	902.67
Distance from Lyon	89	330.99	152.35	1	723.27
Distance from Rouen	89	420.42	210.31	1	1025.71
Distance from Mulhouse	89	453.74	187.57	36.61	853.41
Distance from Bordeaux	89	408.59	176.16	1	820.3
Distance from French cities - weeks of travel					
Distance from Fresnes (weeks of travel)	89	0.480	0.187	0.045	0.895
Distance from Paris (weeks of travel)	89	0.404	0.180	0.003	0.925
Distance from Marseille (weeks of travel)	89	0.422	0.226	0.029	0.960
Distance from Lyon (weeks of travel)	89	0.497	0.233	0.041	0.999
Distance from Mulhouse (weeks of travel)	89	0.626	0.295	0.012	1.126
Distance from Rouen (weeks of travel)	89	0.2	0.218	0.022	1.037
Distance from Bordeaux (weeks of travel)	89	0.532	0.273	0.002	1.125
Distance to London					
Distance to London (km)	89	636.23	229.93	242.93	1261.78
Soldier deaths in World Wars					
Soldier deaths in World War I	89	14245.46	10339.62	893	80591
Soldier deaths in World War II	89	1568.24	1659.00	18	13218
Share of unionized workers in workforce					
Share of unionized workers in workforce, 1901	87	0.06	0.03	0.00	0.14
Average wage, 1901 (in French Francs)					
Average male wage, 1901	84	4.23	0.73	2.66	7.61
Concentration index, 1861					
Concentration index	85	0.40	0.20	0.12	1
Weighted tariffs across sectors					
Weighted tariffs across sectors, 1865	86	4.18	1.40	0.29	8.79
Weighted tariffs across sectors, 1872	86	4.42	1.59	0.17	9.84
Weighted tariffs across sectors, 1901	86	8.40	2.57	3.30	15.29
Weighted tariffs across sectors, 1924	86	6.03	1.83	2.24	10.03

Appendix B. Additional Robustness Analysis

Table B.1: The determinants of the diffusion of the steam engine: robustness analysis

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) OLS	(7) OLS	(8) OLS	(9) OLS	(10) OLS	(11) OLS	(12) OLS	(13) OLS	(14) OLS	(15) OLS	(16) OLS	(17) OLS	(18) OLS
									Horse Power of Steam Engines									
Distance to Fresnes	-0.0132***	-0.0102***	-0.0137***	-0.0137***	-0.0130***	-0.0132***	-0.0133***	-0.0118***	-0.0127***	-0.0131***	-0.0136***	-0.0138***	-0.0133***	-0.0133***	-0.0133***	-0.0131***	-0.0137***	-0.0121***
	[0.00274]	[0.00317]	[0.00288]	[0.00288]	[0.00269]	[0.00285]	[0.00286]	[0.00264]	[0.00270]	[0.00274]	[0.00268]	[0.00258]	[0.00252]	[0.00269]	[0.00276]	[0.00274]	[0.00267]	[0.00245]
Average Rainfall	1.173	1.102	0.917	0.975	1.044	1.176	1.169	0.644	1.108	0.936	1.093	1.213	1.074	1.172	1.077	1.059	1.128	0.884
	[1.064]	[1.051]	[1.161]	[1.162]	[1.096]	[1.060]	[1.056]	[1.051]	[1.042]	[1.110]	[1.139]	[1.081]	[1.093]	[1.087]	[1.108]	[1.084]	[1.020]	[1.114]
Average Temperature	2.545**	2.667**	2.974*	2.920*	2.381**	2.555**	2.573**	2.756***	2.487**	2.221**	2.130**	2.170**	2.527**	2.523**	2.509**	2.585**	2.334**	2.442***
	[0.983]	[1.054]	[1.508]	[1.500]	[0.981]	[0.989]	[0.990]	[0.907]	[0.994]	[1.051]	[1.053]	[1.043]	[1.053]	[1.006]	[1.003]	[0.987]	[1.005]	[0.906]
Latitude	-6.527	9.807	-6.873	-7.702	-7.438	-6.589	-6.653	-3.904	-2.963	-11.24	-10.90	-14.94	-8.872	-6.467	-7.522	-6.291	-4.907	-3.351
	[10.77]	[16.71]	[11.02]	[11.08]	[11.12]	[10.96]	[10.95]	[10.17]	[11.01]	[13.56]	[11.83]	[11.04]	[10.56]	[10.85]	[11.07]	[10.80]	[10.38]	[10.35]
Land Suitability	-0.743	-0.750	-0.766	-0.802	-0.707	-0.746	-0.753	-1.038*	-0.780	-0.551	-0.978	-1.109	-1.067	-0.760	-0.771	-0.791	-0.972	-0.707
	[0.590]	[0.595]	[0.637]	[0.641]	[0.578]	[0.599]	[0.599]	[0.598]	[0.657]	[0.562]	[0.632]	[0.681]	[0.669]	[0.593]	[0.602]	[0.593]	[0.692]	[0.566]
Maritime Department	0.0136	0.237	-0.0699	0.00912	0.0285	0.0127	0.0129	-0.185	-0.00547	0.0273	0.0696	0.0261	-0.138	0.00779	0.0435	0.0150	0.111	0.178
	[0.400]	[0.423]	[0.450]	[0.446]	[0.405]	[0.409]	[0.408]	[0.350]	[0.393]	[0.406]	[0.425]	[0.391]	[0.412]	[0.402]	[0.406]	[0.397]	[0.421]	[0.390]
Border Department	-0.797*	-0.788*	-0.867*	-0.842*	-0.810*	-0.794*	-0.785*	-0.637	-0.787*	-0.764*	-0.677	-0.728*	-0.753*	-0.820*	-0.818*	-0.757*	-0.955**	-0.666
	[0.442]	[0.446]	[0.455]	[0.456]	[0.443]	[0.454]	[0.453]	[0.400]	[0.449]	[0.442]	[0.440]	[0.417]	[0.435]	[0.439]	[0.450]	[0.443]	[0.429]	[0.419]
Distance to Paris	0.00888***	0.00472	0.00959***	0.00920***	0.00865***	0.00888***	0.00888***	0.00834***	0.00923***	0.00827***	0.00902***	0.00872***	0.00928***	0.00903***	0.00866***	0.00875***	0.00997***	0.00844***
	[0.00285]	[0.00367]	[0.00301]	[0.00299]	[0.00286]	[0.00288]	[0.00287]	[0.00274]	[0.00289]	[0.00286]	[0.00292]	[0.00298]	[0.00281]	[0.00280]	[0.00285]	[0.00299]	[0.00268]	
Paris and Suburbs	0.956*	0.644	0.730	0.646	0.459	0.952*	0.947*	1.227**	0.540	1.517*	1.310*	1.018	0.903	0.957*	0.836	0.922*	0.998*	0.774
	[0.512]	[0.554]	[0.478]	[0.493]	[0.526]	[0.520]	[0.519]	[0.525]	[0.784]	[0.898]	[0.724]	[0.649]	[0.651]	[0.500]	[0.518]	[0.517]	[0.540]	[0.575]
Alsace-Lorraine	0.785	0.661	0.805	0.815	0.776	0.781	0.773	0.871	1.932**	0.841	0.611	0.650	2.214***	0.756	-0.0130	0.549	0.577	0.757
	[0.848]	[0.924]	[0.859]	[0.829]	[0.806]	[0.864]	[0.863]	[0.837]	[0.750]	[0.872]	[0.763]	[0.688]	[0.447]	[0.858]	[1.356]	[0.912]	[0.865]	[0.805]
Urban Population in 1700	0.208**	0.223**	0.195*	0.182*	0.175*	0.208**	0.207**	0.0321	0.197*	0.211**	0.181*	0.153	0.143	0.196*	0.195**	0.202**	0.190**	0.169*
	[0.0907]	[0.0920]	[0.101]	[0.103]	[0.104]	[0.0923]	[0.0923]	[0.120]	[0.105]	[0.0908]	[0.101]	[0.0920]	[0.102]	[0.106]	[0.0927]	[0.0906]	[0.0939]	[0.0915]
Distance to London		0.00380																
		[0.00292]																
Population density 1801			0.328															
			[0.400]															
Population density 1831				0.385														
				[0.377]														
Population density 1861					0.487													
					[0.330]													
Iron forges in 1789						0.0117												
						[0.513]												
Presence of iron forges in 1789						-0.0479												
						[1.419]												
Iron forges in 1811							0.0717											
							[0.476]											
Presence of iron forges in 1811							-0.212											
							[1.349]											
Market integration during the French Revolution								0.755**										
								[0.293]										
Share of the native population in each department, 1901									-1.846									
									[2.678]									
Share of the native population in each department, 2010										1.802								
										[2.288]								
Percentage of conscripts who could read, 1827-1829											-0.0226							
											[0.0161]							
Percentage of conscripts who could read, 1831-1835												-0.0332**						
												[0.0159]						
Percentage of conscripts who could read, 1836-1840													-0.0283**					
													[0.0134]					
Universities in 1700														0.140				
														[0.354]				
Jews in Population 1861															33.32			
															[65.41]			
Protestants in Population 1861																1.747		
																[2.963]		
Railroad connection to Paris in 1860																	0.647	
																	[0.421]	
Rivers and Tributaries																		0.578**
																		[0.278]
Adjusted R²	0.624	0.629	0.615	0.615	0.627	0.614	0.614	0.666	0.626	0.624	0.635	0.656	0.661	0.620	0.620	0.621	0.636	0.638
Observations	89	89	85	86	89	89	89	86	87	89	89	89	87	89	89	89	89	89

Note: All regressions include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Table B.2: The determinants of the diffusion of the steam engine: distances from Fresnes-sur-Escaut and other major French cities by foot measured in travel weeks

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) OLS	(7) OLS
	Horse Power of Steam Engines						
Distance from Fresnes (weeks of travel)	-5.910*** [0.944]	-7.771*** [1.543]	-5.715*** [0.910]	-6.144*** [1.004]	-6.069*** [1.017]	-5.857*** [1.050]	-5.627*** [1.052]
Distance from Paris (weeks of travel)		2.366 [1.598]					
Distance from Marseille (weeks of travel)			0.879 [0.765]				
Distance from Lyon (weeks of travel)				0.644 [0.772]			
Distance from Rouen (weeks of travel)					0.271 [0.886]		
Distance from Mulhouse (weeks of travel)						-0.0941 [0.663]	
Distance from Bordeaux (weeks of travel)							0.540 [0.748]
Adjusted R^2	0.295	0.302	0.297	0.292	0.288	0.287	0.292
Observations	89	89	89	89	89	89	89

Note: The dependent variable is in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Table B.3: Industrialization and income per capita, accounting for population density in the 19th century

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV	(6) IV	(7) IV	(8) IV	(9) IV	(10) IV	(11) IV	(12) IV	(13) IV	(14) IV	(15) IV	(16) IV
	GDP per capita, 1872				GDP per capita, 1901				GDP per capita, 1930				GDP per capita, 2001-2010 average			
Horse Power of Steam Engines	0.121** [0.0515]	0.101** [0.047]	0.101** [0.047]	0.123** [0.052]	0.244*** [0.072]	0.213*** [0.065]	0.214*** [0.066]	0.247*** [0.073]	0.102*** [0.026]	0.099*** [0.025]	0.099*** [0.025]	0.099*** [0.026]	-0.061** [0.026]	-0.050** [0.023]	-0.051** [0.024]	-0.066** [0.026]
Population density, 1801		-0.046 [0.041]				-0.052 [0.063]				0.080* [0.042]				0.156** [0.062]		
Population density, 1831			-0.039 [0.038]				-0.061 [0.061]				0.078** [0.039]				0.152*** [0.054]	
Population density, 1861				-0.062 [0.039]				-0.106 [0.070]				0.0783** [0.034]				0.171*** [0.047]
Average Rainfall	-0.505** [0.239]	-0.436** [0.218]	-0.437** [0.217]	-0.495** [0.237]	-0.795** [0.338]	-0.675** [0.303]	-0.678** [0.304]	-0.778** [0.338]	-0.211* [0.125]	-0.187 [0.129]	-0.175 [0.128]	-0.224* [0.122]	0.164 [0.128]	0.135 [0.115]	0.152 [0.116]	0.125 [0.126]
Average Temperature	0.109 [0.315]	-0.064 [0.330]	-0.068 [0.330]	0.126 [0.315]	-0.537 [0.361]	-0.809** [0.383]	-0.805** [0.382]	-0.508 [0.360]	-0.444*** [0.154]	-0.436*** [0.154]	-0.439*** [0.153]	-0.465*** [0.112]	-0.0530 [0.143]	0.0992 [0.157]	0.0951 [0.154]	-0.0982 [0.141]
Latitude	0.118 [0.127]	0.155 [0.116]	0.154 [0.117]	0.114 [0.127]	0.279* [0.156]	0.318** [0.147]	0.318** [0.147]	0.271* [0.155]	0.244*** [0.0491]	0.237*** [0.0527]	0.235*** [0.0522]	0.250*** [0.0490]	-0.0236 [0.0662]	-0.0443 [0.0581]	-0.0521 [0.0589]	-0.0146 [0.0664]
Land Suitability	-4.899 [3.123]	-4.684 [2.991]	-4.693 [2.960]	-4.764 [3.066]	-8.713** [3.849]	-8.508** [3.672]	-8.444** [3.640]	-8.482** [3.842]	-3.325*** [1.160]	-3.338*** [1.193]	-3.425*** [1.173]	-3.476*** [1.114]	1.702 [1.136]	1.661 [1.019]	1.481 [1.008]	1.350 [1.178]
Maritime Department	0.108 [0.111]	0.120 [0.113]	0.121 [0.107]	0.106 [0.111]	0.044 [0.138]	0.062 [0.136]	0.058 [0.131]	0.040 [0.139]	0.007 [0.056]	-0.011 [0.060]	-0.003 [0.060]	0.009 [0.054]	-0.022 [0.053]	-0.060 [0.049]	-0.043 [0.049]	-0.016 [0.051]
Border Department	0.006 [0.138]	0.008 [0.132]	0.009 [0.133]	0.010 [0.139]	0.155 [0.163]	0.155 [0.152]	0.155 [0.153]	0.162 [0.164]	0.102** [0.047]	0.093** [0.047]	0.094** [0.046]	0.097** [0.046]	0.027 [0.045]	0.014 [0.039]	0.019 [0.041]	0.018 [0.045]
Distance to Paris	-0.001 [0.0007]	-0.001 [0.0007]	-0.001 [0.0007]	-0.001 [0.0007]	-0.001 [0.0008]	-0.001 [0.0008]	-0.001 [0.0008]	-0.001 [0.0009]	-0.0002 [0.0003]	-0.0002 [0.0002]	-0.0003 [0.0003]	-0.0003 [0.0003]	0.0002 [0.0003]	0.0003 [0.0003]	0.0002 [0.0003]	0.0002 [0.0003]
Paris and Suburbs	-0.016 [0.116]	0.041 [0.010]	0.039 [0.099]	0.045 [0.101]	-0.189 [0.171]	-0.123 [0.168]	-0.110 [0.170]	-0.084 [0.182]	0.239*** [0.088]	0.178*** [0.051]	0.171*** [0.049]	0.161*** [0.048]	0.437*** [0.154]	0.311*** [0.073]	0.297*** [0.068]	0.267*** [0.068]
Alsace-Lorraine									0.092 [0.083]	0.077 [0.080]	0.079 [0.082]	0.084 [0.083]	0.030 [0.106]	0.012 [0.091]	0.016 [0.086]	0.030 [0.088]
Urban Population in 1700	-0.006 [0.0301]	0.323 [0.239]	0.321 [0.236]	0.479* [0.252]	-0.049 [0.0392]	0.742* [0.412]	0.742* [0.409]	0.979** [0.406]	0.0277** [0.013]	0.153 [0.144]	0.157 [0.145]	0.149 [0.135]	0.0707*** [0.015]	-0.258** [0.122]	-0.247** [0.122]	-0.373*** [0.129]
Observations	85	81	82	85	85	81	82	85	87	83	84	87	89	85	86	89
First stage: the instrumented variable is Horse Power of Steam Engines																
Distance to Fresnes	-0.012*** [0.003]	-.013*** [0.003]	-.013*** [0.003]	-0.012*** [0.003]	-0.012*** [0.003]	-.013*** [0.003]	-.013*** [0.003]	-0.012*** [0.003]	-0.013*** [0.003]	-0.013*** [0.003]	-0.013*** [0.003]	-0.012*** [0.003]	-0.013*** [0.003]	-0.014*** [0.003]	-0.014*** [0.003]	-0.013*** [0.003]
F-stat (1st stage)	19.526	19.779	19.822	19.872	19.526	19.779	19.822	19.872	20.617	20.804	20.775	21.025	23.261	22.556	22.470	23.408

Note: All regressions include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, and the dependent variables are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Table B.4: Industrialization per capita in 1861 and the evolution of income per capita

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV	(6) IV	(7) IV	(8) IV
	GDP per capita, 1872		GDP per capita, 1901		GDP per capita, 1930		GDP per capita, 2001-2010	
Horse Power of Steam Engines	0.121**		0.244***		0.102***		-0.061**	
	[0.052]		[0.072]		[0.026]		[0.026]	
Horse Power of Steam Engines per inhabitant in 1861		31.67**		63.61***		26.21***		-16.80**
		[14.78]		[22.27]		[8.140]		[6.968]
Average Rainfall	-0.505**	-0.257	-0.795**	-0.296	-0.211*	-0.00742	0.164	0.0756
	[0.239]	[0.208]	[0.338]	[0.246]	[0.125]	[0.0900]	[0.128]	[0.0941]
Average Temperature	0.109	0.167	-0.537	-0.421	-0.444***	-0.397***	-0.0530	-0.0977
	[0.315]	[0.270]	[0.361]	[0.319]	[0.113]	[0.116]	[0.143]	[0.109]
Land Suitability	0.118	0.189	0.279*	0.420**	0.244***	0.305***	-0.0236	-0.0498
	[0.127]	[0.128]	[0.156]	[0.182]	[0.0491]	[0.0613]	[0.0662]	[0.0649]
Latitude	-4.899	-3.447	-8.713**	-5.797*	-3.325***	-2.004*	1.702	0.792
	[3.123]	[2.598]	[3.849]	[3.218]	[1.160]	[1.123]	[1.136]	[0.796]
Maritime Department	0.108	0.092	0.044	0.012	0.007	-0.0104	-0.022	-0.008
	[0.111]	[0.105]	[0.138]	[0.131]	[0.056]	[0.052]	[0.053]	[0.046]
Border Department	0.00609	-0.0614	0.155	0.0199	0.102**	0.045	0.027	0.053
	[0.138]	[0.134]	[0.163]	[0.144]	[0.046]	[0.042]	[0.045]	[0.043]
Distance to Paris	-0.001	-0.001	-0.001	-0.001	-0.0002	-0.0002	0.0002	0.0001
	[0.0007]	[0.0007]	[0.0008]	[0.0008]	[0.0003]	[0.0003]	[0.0003]	[0.0002]
Paris and Suburbs	-0.016	0.072	-0.189	-0.011	0.239***	0.314***	0.437***	0.383***
	[0.116]	[0.107]	[0.171]	[0.164]	[0.088]	[0.092]	[0.154]	[0.148]
Alsace-Lorraine					0.092	0.064	0.030	0.067
					[0.083]	[0.116]	[0.106]	[0.121]
Urban Population in 1700	-0.006	0.029	-0.049	0.021	0.028**	0.058***	0.071***	0.0541***
	[0.030]	[0.023]	[0.039]	[0.028]	[0.013]	[0.012]	[0.015]	[0.012]
Observations	85	85	85	85	87	87	89	89

First stage: the instrumented variable is Horse Power of Steam Engines

Distance to Fresnes	-0.0123***	0.00005***	-0.0123***	0.00005***	-0.0127***	0.00005***	-0.0132***	0.00005***
	[0.003]	[0.00001]	[0.003]	[0.00001]	[0.003]	[0.00001]	[0.003]	[0.00001]
F-stat (1st stage)	19.526	13.216	19.526	13.216	20.617	13.990	23.261	15.092

Note: All regressions include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, and the dependent variables are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Table B.5: Industrialization and income per capita, accounting for the distance to London

	(1) IV GDP per capita, 1872	(2) IV	(3) IV GDP per capita, 1901	(4) IV	(5) IV GDP per capita, 1930	(6) IV	(7) IV GDP per capita, 2001-2010	(8) IV
Horse Power of Steam Engines	0.121**	0.104	0.244***	0.272**	0.102***	0.120***	-0.0607**	-0.111**
	[0.0515]	[0.0714]	[0.0724]	[0.123]	[0.0261]	[0.0390]	[0.0261]	[0.0497]
Distance to London		0.000277		-0.000448		-0.000295		0.000844
		[0.000730]		[0.00123]		[0.000433]		[0.000561]
Average Rainfall	-0.505**	-0.489**	-0.795**	-0.821**	-0.211*	-0.229	0.164	0.208
	[0.239]	[0.244]	[0.338]	[0.376]	[0.125]	[0.140]	[0.128]	[0.170]
Average Temperature	0.109	0.158	-0.537	-0.616	-0.444***	-0.497***	-0.0530	0.102
	[0.315]	[0.321]	[0.361]	[0.425]	[0.113]	[0.149]	[0.143]	[0.218]
Latitude	0.118	0.108	0.279*	0.296*	0.244***	0.257***	-0.0236	-0.0623
	[0.127]	[0.126]	[0.156]	[0.170]	[0.0491]	[0.0572]	[0.0662]	[0.0888]
Land Suitability	-4.899	-3.757	-8.713**	-10.56	-3.325***	-4.476**	1.702	5.004*
	[3.123]	[4.732]	[3.849]	[7.283]	[1.160]	[2.037]	[1.136]	[2.947]
Maritime Department	0.108	0.123	0.0438	0.0200	0.00656	-0.0112	-0.0215	0.0288
	[0.111]	[0.121]	[0.138]	[0.159]	[0.0559]	[0.0692]	[0.0527]	[0.0723]
Border Department	0.00609	-0.00780	0.155	0.178	0.102**	0.116**	0.0269	-0.0112
	[0.138]	[0.144]	[0.163]	[0.204]	[0.0464]	[0.0491]	[0.0448]	[0.0702]
Distance to Paris	-0.00112	-0.00127	-0.00108	-0.000847	-0.000211	-3.96e-05	0.000215	-0.000264
	[0.000723]	[0.000804]	[0.000847]	[0.000964]	[0.000289]	[0.000432]	[0.000280]	[0.000446]
Paris and Suburbs	-0.0164	-0.0224	-0.189	-0.179	0.239***	0.246***	0.437***	0.416**
	[0.116]	[0.113]	[0.171]	[0.178]	[0.0877]	[0.0879]	[0.154]	[0.167]
Alsace-Lorraine					0.0920	0.0875	0.0295	0.0413
					[0.0831]	[0.0932]	[0.106]	[0.150]
Urban Population in 1700	-0.00613	-0.000705	-0.0485	-0.0572	0.0277**	0.0227	0.0707***	0.0846***
	[0.0301]	[0.0307]	[0.0392]	[0.0534]	[0.0132]	[0.0148]	[0.0149]	[0.0217]
Observations	85	85	85	85	87	87	89	89
		First stage: the instrumented variable is Horse Power of Steam Engines						
Distance to Fresnes	-0.0123***	-0.0093***	-0.0123***	-0.0093***	-0.0127***	0.01***	-0.0132***	0.0102***
	[0.00278]	[0.00329]	[0.00278]	[0.00329]	[0.00279]	[0.00327]	[0.00274]	[0.00317]
F-stat (1st stage)	19.526	7.908	19.526	7.908	20.617	9.332	23.261	10.373

Note: All regressions include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, and the dependent variables are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Table B.6: Industrialization and income per capita, accounting for the presence of rivers and their main tributaries within departments

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV	(6) IV	(7) IV	(8) IV
	GDP per capita, 1872		GDP per capita, 1901		GDP per capita, 1930		GDP per capita, 2001-2010	
Horse Power of Steam Engines	0.121**	0.143**	0.244***	0.268***	0.102***	0.0953***	-0.0607**	-0.0761***
	[0.0515]	[0.0612]	[0.0724]	[0.0795]	[0.0261]	[0.0276]	[0.0261]	[0.0270]
Rivers and Tributaries		-0.125		-0.141		0.0387		0.103***
		[0.0849]		[0.110]		[0.0309]		[0.0367]
Average Rainfall	-0.505**	-0.480**	-0.795**	-0.766**	-0.211*	-0.219*	0.164	0.131
	[0.239]	[0.235]	[0.338]	[0.353]	[0.125]	[0.120]	[0.128]	[0.135]
Average Temperature	0.109	0.0866	-0.537	-0.562	-0.444***	-0.437***	-0.0530	-0.0322
	[0.315]	[0.322]	[0.361]	[0.362]	[0.113]	[0.111]	[0.143]	[0.141]
Latitude	-4.899	-5.561*	-8.713**	-9.464**	-3.325***	-3.134***	1.702	2.167*
	[3.123]	[3.221]	[3.849]	[3.919]	[1.160]	[1.126]	[1.136]	[1.216]
Land Suitability	0.118	0.117	0.279*	0.277*	0.244***	0.245***	-0.0236	-0.0285
	[0.127]	[0.136]	[0.156]	[0.166]	[0.0491]	[0.0473]	[0.0662]	[0.0709]
Maritime Department	0.108	0.0746	0.0438	0.00534	0.00656	0.0176	-0.0215	0.00797
	[0.111]	[0.112]	[0.138]	[0.148]	[0.0559]	[0.0584]	[0.0527]	[0.0559]
Border Department	0.00609	-0.00268	0.155	0.145	0.102**	0.105**	0.0269	0.0379
	[0.138]	[0.138]	[0.163]	[0.163]	[0.0464]	[0.0465]	[0.0448]	[0.0466]
Distance to Paris	-0.00112	-0.00120*	-0.00108	-0.00117	-0.000211	-0.000190	0.000215	0.000271
	[0.000723]	[0.000723]	[0.000847]	[0.000848]	[0.000289]	[0.000283]	[0.000280]	[0.000294]
Paris and Suburbs	-0.0164	0.000977	-0.189	-0.169	0.239***	0.233**	0.437***	0.419**
	[0.116]	[0.124]	[0.171]	[0.184]	[0.0877]	[0.0925]	[0.154]	[0.168]
Alsace-Lorraine					0.0920	0.0825	0.0295	0.0366
					[0.0831]	[0.0819]	[0.106]	[0.0970]
Urban Population in 1700	-0.00613	-0.00271	-0.0485	-0.0446	0.0277**	0.0265**	0.0707***	0.0670***
	[0.0301]	[0.0295]	[0.0392]	[0.0399]	[0.0132]	[0.0130]	[0.0149]	[0.0151]

First stage: the instrumented variable is Horse Power of Steam Engines

Distance to Fresnes	-0.0123***	-0.0110***	-0.0123***	-0.0110***	-0.0127***	-0.0114***	-0.0132***	-0.0121***
	[0.00278]	[0.00240]	[0.00278]	[0.00240]	[0.00279]	[0.00242]	[0.00274]	[0.00245]
F-stat (1st stage)	19.526	21.074	19.526	21.074	20.617	22.174	23.261	24.300

Note: All regressions include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, and the dependent variables are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Table B.7: Industrialization and income per capita, accounting for the conscripts' ability to read before 1840

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV	(6) IV	(7) IV	(8) IV	(9) IV	(10) IV	(11) IV	(12) IV	(13) IV	(14) IV	(15) IV	(16) IV
	GDP per capita, 1872				GDP per capita, 1901				GDP per capita, 1930				GDP per capita, 2001-2010 average			
Horse Power of Steam Engines	0.121** [0.05]	0.119** [0.050]	0.120** [0.050]	0.121** [0.051]	0.244*** [0.072]	0.240*** [0.069]	0.241*** [0.069]	0.243*** [0.070]	0.102*** [0.026]	0.101*** [0.026]	0.102*** [0.026]	0.103*** [0.027]	-0.0607** [0.026]	-0.0593** [0.025]	-0.0557** [0.023]	-0.0575** [0.024]
Share of conscripts who could read, 1827-1829		0.003 [0.003]				0.006 [0.004]				0.001 [0.002]				-0.001 [0.002]		
Share of conscripts who could read, 1831-1835			0.003 [0.003]				0.005 [0.004]				0.0007 [0.002]				-0.004** [0.002]	
Share of conscripts who could read, 1836-1840				0.001 [0.003]				0.004 [0.004]				-6.89e-05 [0.002]				-0.003** [0.001]
Average Rainfall	-0.505** [0.239]	-0.515** [0.249]	-0.530** [0.257]	-0.516** [0.252]	-0.795** [0.338]	-0.815** [0.327]	-0.846*** [0.327]	-0.828** [0.331]	-0.211* [0.125]	-0.214* [0.126]	-0.217* [0.129]	-0.209 [0.128]	0.164 [0.128]	0.159 [0.132]	0.163 [0.132]	0.144 [0.133]
Average Temperature	0.109 [0.315]	0.182 [0.281]	0.155 [0.280]	0.114 [0.308]	-0.537 [0.361]	-0.393 [0.339]	-0.443 [0.335]	-0.523 [0.350]	-0.444*** [0.111]	-0.417*** [0.113]	-0.432*** [0.111]	-0.443*** [0.113]	-0.0530 [0.143]	-0.0761 [0.144]	-0.109 [0.120]	-0.0578 [0.128]
Latitude	0.118 [0.127]	0.140 [0.129]	0.138 [0.132]	0.131 [0.133]	0.279* [0.156]	0.322** [0.156]	0.319** [0.163]	0.318* [0.163]	0.244*** [0.0491]	0.252*** [0.050]	0.249*** [0.051]	0.242*** [0.050]	-0.0236 [0.066]	-0.0335 [0.067]	-0.0614 [0.063]	-0.0628 [0.064]
Land Suitability	-4.899 [3.123]	-4.263 [2.896]	-4.181 [2.934]	-4.662 [2.953]	-8.713** [3.658]	-7.461** [3.543]	-7.226** [3.582]	-7.985** [3.543]	-3.325*** [1.160]	-3.116*** [1.204]	-3.156*** [1.087]	-3.426*** [1.162]	1.702 [1.136]	1.506 [1.133]	0.778 [1.029]	1.313 [1.088]
Maritime Department	0.108 [0.111]	0.0980 [0.109]	0.104 [0.108]	0.111 [0.113]	0.044 [0.138]	0.023 [0.139]	0.035 [0.135]	0.051 [0.139]	0.007 [0.0559]	0.003 [0.057]	0.006 [0.056]	0.009 [0.057]	-0.022 [0.053]	-0.019 [0.053]	-0.020 [0.049]	-0.034 [0.052]
Border Department	0.006 [0.138]	-0.008 [0.142]	0.003 [0.137]	0.006 [0.138]	0.155 [0.163]	0.129 [0.162]	0.150 [0.160]	0.155 [0.164]	0.102** [0.0464]	0.0972** [0.048]	0.101** [0.047]	0.103** [0.047]	0.027 [0.045]	0.034 [0.046]	0.039 [0.044]	0.035 [0.046]
Distance to Paris	-0.001 [0.0007]	-0.001 [0.0007]	-0.001 [0.0007]	-0.001 [0.0007]	-0.001 [0.0008]	-0.001 [0.0008]	-0.0009 [0.0008]	-0.001 [0.0008]	-0.0002 [0.0003]	-0.0002 [0.0003]	-0.0002 [0.0003]	-0.0002 [0.0003]	0.0002 [0.0003]	0.0002 [0.0003]	0.0002 [0.0003]	0.0002 [0.0003]
Paris and Suburbs	-0.016 [0.116]	-0.056 [0.136]	-0.015 [0.120]	-0.010 [0.117]	-0.189 [0.171]	-0.267 [0.204]	-0.185 [0.185]	-0.170 [0.182]	0.239*** [0.0877]	0.224*** [0.079]	0.239*** [0.086]	0.236*** [0.089]	0.437*** [0.154]	0.452*** [0.158]	0.439*** [0.165]	0.423** [0.164]
Alsace-Lorraine									0.092 [0.083]	0.101 [0.079]	0.096 [0.080]	0.047 [0.098]	0.030 [0.106]	0.020 [0.101]	0.010 [0.085]	0.212*** [0.072]
Urban Population in 1700	-0.006 [0.030]	-0.003 [0.028]	-0.002 [0.026]	-0.003 [0.026]	-0.049 [0.039]	-0.04 [0.038]	-0.040 [0.036]	-0.037 [0.036]	0.028** [0.013]	0.029** [0.013]	0.029** [0.012]	0.027** [0.013]	0.071*** [0.015]	0.069*** [0.016]	0.063*** [0.014]	0.063*** [0.015]
Observations	85	85	85	85	85	85	85	85	87	87	87	86	89	89	89	87
	First stage: the instrumented variable is Horse Power of Steam Engines															
Distance to Fresnes	-0.0123*** [0.003]	-0.0125*** [0.003]	-0.0125*** [0.003]	-0.0123*** [0.002]	-0.0123*** [0.003]	-0.0124*** [0.003]	-0.0125*** [0.003]	-0.0123*** [0.002]	-0.0127*** [0.003]	-0.0128*** [0.003]	-0.0128*** [0.003]	-0.0123*** [0.002]	-0.0132*** [0.003]	-0.0136*** [0.003]	-0.0138*** [0.003]	-0.0133*** [0.003]
F-stat (1st stage)	19.526	22.815	25.273	26.354	19.526	22.815	25.273	26.354	20.617	24.468	26.714	26.047	23.261	25.817	28.524	27.759

Note: All regressions include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, and the dependent variables are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Table B.8: Industrialization and income per capita, accounting for the share of grooms who signed their marriage license before 1820

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV	(6) IV	(7) IV	(8) IV	(9) IV	(10) IV	(11) IV	(12) IV	(13) IV	(14) IV	(15) IV	(16) IV
	GDP per capita, 1872				GDP per capita, 1901				GDP per capita, 1930				GDP per capita, 2001-2010 average			
Horse Power of Steam Engines	0.121**	0.0889**	0.0729	0.0792*	0.244***	0.188***	0.178***	0.141**	0.102***	0.0989***	0.0948***	0.0835***	-0.0607**	-0.0444*	-0.0461*	-0.0571**
	[0.0515]	[0.0420]	[0.0445]	[0.0457]	[0.0724]	[0.0583]	[0.0603]	[0.0602]	[0.0261]	[0.0232]	[0.0234]	[0.0243]	[0.0261]	[0.0239]	[0.0250]	[0.0271]
Grooms who Signed their Marriage License, 1686-1690		0.00552**				0.00577**				0.00160				0.000721		
		[0.00222]				[0.00254]				[0.00143]				[0.00110]		
Grooms who Signed their Marriage License, 1786-1790			0.00458**				0.00317				0.000911				0.000424	
			[0.00179]				[0.00250]				[0.00102]				[0.000820]	
Grooms who Signed their Marriage License, 1816-1820				0.00514***				0.00489**				0.00166*				0.00112
				[0.00179]				[0.00214]				[0.000997]				[0.000950]
Average Rainfall	-0.505**	-0.349	-0.596***	-0.600**	-0.795**	-0.721**	-0.947***	-0.949***	-0.211*	-0.204	-0.264*	-0.271**	0.164	0.183	0.176	0.168
	[0.239]	[0.225]	[0.218]	[0.249]	[0.338]	[0.285]	[0.306]	[0.266]	[0.125]	[0.145]	[0.141]	[0.128]	[0.129]	[0.133]	[0.142]	
Average Temperature	0.109	0.114	0.283	0.273	-0.537	-0.880**	-0.716*	-0.509	-0.444***	-0.550***	-0.416**	-0.339*	-0.0530	0.146	0.145	0.220
	[0.315]	[0.410]	[0.376]	[0.401]	[0.361]	[0.406]	[0.404]	[0.390]	[0.113]	[0.205]	[0.194]	[0.188]	[0.143]	[0.179]	[0.175]	[0.186]
Latitude	0.118	0.0989	-0.00541	-0.0431	0.279*	0.253*	0.170	0.0640	0.244***	0.230***	0.202***	0.162**	-0.0236	-0.0421	-0.0320	-0.0669
	[0.127]	[0.130]	[0.144]	[0.151]	[0.156]	[0.139]	[0.165]	[0.148]	[0.0491]	[0.0571]	[0.0689]	[0.0654]	[0.0662]	[0.0592]	[0.0619]	[0.0736]
Land Suitability	-4.899	-4.466	-4.454	-5.284*	-8.713**	-8.657**	-8.542**	-6.896*	-3.325***	-3.695***	-3.445***	-3.015***	1.702	1.744*	1.722*	2.180**
	[3.123]	[3.047]	[3.140]	[2.915]	[3.849]	[3.755]	[3.729]	[3.870]	[1.160]	[1.194]	[1.165]	[1.100]	[1.136]	[0.992]	[0.983]	[1.036]
Maritime Department	0.108	0.0791	0.0715	0.0756	0.0438	0.0865	0.0809	0.0673	0.00656	0.0198	0.0103	0.00449	-0.0215	-0.0617	-0.0608	-0.0669
	[0.111]	[0.111]	[0.106]	[0.111]	[0.138]	[0.124]	[0.130]	[0.117]	[0.0559]	[0.0659]	[0.0648]	[0.0603]	[0.0527]	[0.0508]	[0.0509]	[0.0548]
Border Department	0.00609	-0.0343	-0.0637	-0.0482	0.155	0.112	0.130	0.0904	0.102**	0.0690	0.0863*	0.0720	0.0269	0.00205	-0.00566	-0.0208
	[0.138]	[0.136]	[0.134]	[0.126]	[0.143]	[0.143]	[0.144]	[0.123]	[0.0464]	[0.0458]	[0.0480]	[0.0474]	[0.0448]	[0.0421]	[0.0425]	[0.0431]
Distance to Paris	-0.0011	-0.0009	-0.00100	-0.0012*	-0.0011	-0.0009	-0.0011	-0.0009	-0.0002	-0.0002	-0.0003	-0.0002	0.0002	0.0002	0.0002	0.0002
	[0.0007]	[0.0007]	[0.0007]	[0.0006]	[0.0008]	[0.0008]	[0.0008]	[0.0008]	[0.0003]	[0.0003]	[0.0003]	[0.0003]	[0.0003]	[0.0003]	[0.0003]	[0.0003]
Paris and Suburbs	-0.0164	0.0108	-0.0545	-0.0914	-0.189	-0.136	-0.190	-0.211	0.239***	0.130***	0.110**	0.0968**	0.437***	0.220***	0.220***	0.210***
	[0.116]	[0.108]	[0.107]	[0.128]	[0.171]	[0.178]	[0.185]	[0.207]	[0.0877]	[0.0432]	[0.0461]	[0.0472]	[0.154]	[0.0359]	[0.0385]	[0.0395]
Alsace-Lorraine									0.0920				0.0295	-0.129**	-0.118**	-0.133**
									[0.0831]				[0.106]	[0.0578]	[0.0596]	[0.0677]
Urban Population in 1700	-0.00613	0.00452	0.00653	0.0108	-0.0485	-0.0440	-0.0381	-0.0222	0.0277**	0.0191	0.0230*	0.0278**	0.0707***	0.0656***	0.0644***	0.0685***
	[0.0301]	[0.0297]	[0.0276]	[0.0310]	[0.0392]	[0.0374]	[0.0356]	[0.0343]	[0.0132]	[0.0140]	[0.0140]	[0.0137]	[0.0149]	[0.0132]	[0.0127]	[0.0139]
Observations	85	75	78	77	85	75	78	77	87	75	78	77	89	76	79	78

First stage: the instrumented variable is Horse Power of Steam Engines

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Distance to Fresnes	-0.0122733	-0.0137	-0.0134	-0.0127	-0.0122733	-0.0137	-0.0134	-0.0127	-0.0122733	-0.0137	-0.0134	-0.0127	-0.0122733	-0.0137	-0.0134	-0.0127
	[0.023]***	[0.0029]***	[0.0029]***	[0.0030]***	[0.023]***	[0.0029]***	[0.0029]***	[0.0030]***	[0.023]***	[0.0029]***	[0.0029]***	[0.0030]***	[0.023]***	[0.0029]***	[0.0029]***	[0.0030]***
F-stat (1st stage)	19.526	21.946	20.726	18.319	19.526	21.946	20.726	18.319	20.617	21.946	20.726	18.319	23.261	21.657	20.464	18.084

Note: All regressions include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, and the dependent variables are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Table B.9: Industrialization and income per capita, accounting for the number of universities in 1700

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV	(6) IV	(7) IV	(8) IV
	GDP per capita, 1872		GDP per capita, 1901		GDP per capita, 1930		GDP per capita, 2001-2010	
Horse Power of Steam Engine	0.121**	0.116**	0.244***	0.244***	0.102***	0.106***	-0.0607**	-0.0552**
	[0.0515]	[0.0482]	[0.0724]	[0.0717]	[0.0261]	[0.0262]	[0.0261]	[0.0247]
University		-0.0935		0.0106		0.0723*		0.0804**
		[0.0932]		[0.121]		[0.0405]		[0.0378]
Average Rainfall	-0.505**	-0.501**	-0.795**	-0.796**	-0.211*	-0.213*	0.164	0.158
	[0.239]	[0.237]	[0.338]	[0.338]	[0.125]	[0.121]	[0.128]	[0.128]
Average Temperature	0.109	0.141	-0.537	-0.540	-0.444***	-0.468***	-0.0530	-0.0797
	[0.315]	[0.299]	[0.361]	[0.362]	[0.113]	[0.114]	[0.143]	[0.137]
Latitude	0.118	0.121	0.279*	0.278*	0.244***	0.241***	-0.0236	-0.0289
	[0.127]	[0.126]	[0.156]	[0.156]	[0.0491]	[0.0481]	[0.0662]	[0.0646]
Land Suitability	-4.899	-5.057	-8.713**	-8.695**	-3.325***	-3.243***	1.702	1.772
	[3.123]	[3.092]	[3.849]	[3.851]	[1.160]	[1.097]	[1.136]	[1.093]
Maritime Department	0.108	0.114	0.0438	0.0432	0.00656	0.00331	-0.0215	-0.0249
	[0.111]	[0.111]	[0.138]	[0.138]	[0.0559]	[0.0546]	[0.0527]	[0.0520]
Border Department	0.00609	0.0183	0.155	0.154	0.102**	0.0928**	0.0269	0.0179
	[0.138]	[0.129]	[0.163]	[0.165]	[0.0464]	[0.0470]	[0.0448]	[0.0418]
Distance to Paris	-0.001	-0.0012*	-0.0011	-0.0011	-0.0002	-0.0002	0.0002	0.0002
	[0.0007]	[0.0007]	[0.0008]	[0.0008]	[0.0003]	[0.0003]	[0.0003]	[0.0003]
Paris and Suburbs	-0.0164	-0.0137	-0.189	-0.189	0.239***	0.236***	0.437***	0.432***
	[0.116]	[0.111]	[0.171]	[0.171]	[0.0877]	[0.0779]	[0.154]	[0.139]
Alsace-Lorraine					0.0920	0.0593	0.0295	0.00864
					[0.0831]	[0.0802]	[0.106]	[0.105]
Urban Population in 1700	-0.00613	0.00259	-0.0485	-0.0494	0.0277**	0.0206	0.0707***	0.0626***
	[0.0301]	[0.0274]	[0.0392]	[0.0407]	[0.0132]	[0.0145]	[0.0149]	[0.0145]
Observations	85	85	85	85	87	87	89	89

First stage: the instrumented variable is Horse Power of Steam Engines

Distance to Fresnes	-0.0123***	-0.0124***	-0.0123***	-0.0124***	-0.0127***	-0.0128***	-0.0132***	-0.0133***
	[0.00278]	[0.00271]	[0.00278]	[0.00271]	[0.00279]	[0.00274]	[0.00274]	[0.00269]
F-stat	19.526	21.093	19.526	21.093	20.617	21.753	23.261	24.501

Note: All regressions include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, and the dependent variables are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Table B.10: Industrialization and income per capita, accounting for religious minorities in 1861

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV	(6) IV	(7) IV	(8) IV	(9) IV	(10) IV	(11) IV	(12) IV	(13) IV	(14) IV	(15) IV	(16) IV
	GDP per capita, 1872				GDP per capita, 1901				GDP per capita, 1930				GDP per capita, 2001-2010 average			
Horse Power of Steam Engines	0.121** [0.0515]	0.115** [0.0508]	0.124** [0.0533]	0.118** [0.0527]	0.244*** [0.0724]	0.236*** [0.0711]	0.254*** [0.0744]	0.246*** [0.0731]	0.102*** [0.0261]	0.0992*** [0.0242]	0.105*** [0.0264]	0.103*** [0.0242]	-0.0607** [0.0261]	-0.0586** [0.0249]	-0.0606** [0.0263]	-0.0570** [0.0250]
Jews in Population, 1861		36.10 [28.41]		35.88 [28.78]		43.72 [52.35]		42.99 [53.63]		30.89*** [8.402]		36.07*** [8.243]		21.32** [9.446]		25.53*** [8.971]
Protestants in Population, 1861			-0.392 [0.498]	-0.385 [0.474]			-1.282 [0.806]	-1.275 [0.790]			-0.574** [0.267]	-0.778*** [0.220]			-0.0315 [0.267]	-0.439 [0.338]
Average Rainfall	-0.505** [0.239]	-0.578** [0.252]	-0.485** [0.240]	-0.558** [0.254]	-0.795** [0.338]	-0.884** [0.385]	-0.730** [0.339]	-0.818** [0.388]	-0.211* [0.125]	-0.270** [0.126]	-0.184 [0.125]	-0.243* [0.128]	0.164 [0.115]	0.101 [0.129]	0.166 [0.111]	0.115 [0.111]
Average Temperature	0.109 [0.315]	0.0592 [0.307]	0.0987 [0.321]	0.0491 [0.311]	-0.537 [0.361]	-0.597* [0.345]	-0.571 [0.373]	-0.630* [0.357]	-0.444*** [0.113]	-0.484*** [0.106]	-0.461*** [0.114]	-0.513*** [0.106]	-0.0530 [0.143]	-0.0816 [0.135]	-0.0539 [0.144]	-0.100 [0.132]
Latitude	-4.899 [3.123]	-5.420* [2.880]	-5.067 [3.179]	-5.582* [2.926]	-8.713** [3.849]	-9.343*** [3.363]	-9.262** [3.970]	-9.878*** [3.490]	-3.325*** [1.160]	-4.013*** [1.148]	-3.438*** [1.155]	-4.282*** [1.134]	1.702 [1.136]	1.079 [1.156]	1.699 [1.142]	0.905 [1.195]
Land Suitability	0.118 [0.127]	0.114 [0.123]	0.125 [0.129]	0.121 [0.125]	0.279* [0.156]	0.274* [0.150]	0.302* [0.158]	0.297* [0.152]	0.244*** [0.0491]	0.236*** [0.0445]	0.257*** [0.0499]	0.252*** [0.0451]	-0.0236 [0.0662]	-0.0398 [0.0646]	-0.0226 [0.0663]	-0.0302 [0.0638]
Maritime Department	0.108 [0.111]	0.129 [0.108]	0.111 [0.111]	0.132 [0.108]	0.0438 [0.138]	0.0687 [0.127]	0.0530 [0.139]	0.0775 [0.129]	0.00656 [0.0559]	0.0318 [0.0574]	0.00656 [0.0544]	0.0360 [0.0554]	-0.0215 [0.0527]	-0.00238 [0.0522]	-0.0215 [0.0526]	0.00102 [0.0521]
Border Department	0.00609 [0.138]	-0.0271 [0.138]	0.000334 [0.139]	-0.0325 [0.139]	0.155 [0.163]	0.115 [0.154]	0.137 [0.165]	0.0972 [0.156]	0.102** [0.0464]	0.0761* [0.0429]	0.0920** [0.0470]	0.0584 [0.0435]	0.0269 [0.0448]	0.0150 [0.0455]	0.0262 [0.0446]	0.00343 [0.0438]
Distance to Paris	-0.0011 [0.0007]	-0.0013* [0.0007]	-0.0011 [0.0007]	-0.0013* [0.0007]	-0.0011 [0.0008]	-0.0013* [0.0007]	-0.0011 [0.0008]	-0.0013* [0.0008]	-0.0002 [0.0003]	-0.0004 [0.0003]	-0.0002 [0.0003]	-0.0004 [0.0003]	0.0002 [0.0003]	0.00005 [0.0003]	0.0002 [0.0003]	0.00005 [0.0003]
Paris and Suburbs	-0.0164 [0.116]	-0.127 [0.149]	-0.0136 [0.116]	-0.124 [0.151]	-0.189 [0.171]	-0.323 [0.237]	-0.180 [0.174]	-0.312 [0.243]	0.239*** [0.0877]	0.139** [0.0556]	0.245*** [0.0868]	0.131** [0.0521]	0.437*** [0.154]	0.358*** [0.119]	0.437*** [0.154]	0.350*** [0.111]
Alsace-Lorraine									0.0920 [0.0831]	-0.802*** [0.223]	0.201* [0.111]	-0.804*** [0.207]	0.0295 [0.106]	-0.483** [0.211]	0.0337 [0.119]	-0.526** [0.204]
Urban Population in 1700	-0.00613 [0.0301]	-0.0169 [0.0309]	-0.00621 [0.0304]	-0.0169 [0.0312]	-0.0485 [0.0392]	-0.0615 [0.0379]	-0.0487 [0.0395]	-0.0615 [0.0384]	0.0277** [0.0132]	0.0159 [0.0125]	0.0291** [0.0133]	0.0157 [0.0125]	0.0707*** [0.0149]	0.0623*** [0.0137]	0.0708*** [0.0149]	0.0618*** [0.0133]
Observations	85	85	85	85	85	85	85	85	87	87	87	87	89	89	89	89

First stage: the instrumented variable is Horse Power of Steam Engines

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Distance to Fresnes	-0.0123*** [0.00278]	-0.0119*** [0.00276]	-0.0119*** [0.00274]	-0.0115*** [0.00271]	-0.0123*** [0.00278]	-0.0119*** [0.00276]	-0.0119*** [0.00274]	-0.0115*** [0.00271]	-0.0127*** [0.00279]	-0.0126*** [0.00279]	-0.0126*** [0.00279]	-0.0125*** [0.00279]	-0.0132*** [0.00274]	-0.0133*** [0.00276]	-0.0131*** [0.00274]	-0.0132*** [0.00277]
F-stat (1st stage)	19.526	18.642	18.714	18.031	19.526	18.642	18.714	18.031	20.617	20.521	20.272	20.118	23.261	22.994	23.035	22.597

Note: All regressions include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, and the dependent variables are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Table B.11: Industrialization and income per capita, accounting for migrations

	(1) IV	(2) IV	(3) IV	(4) IV
	GDP per capita, 1901		GDP per capita, 2001-2010	
Horse Power of Steam Engines	0.121**	0.227***	-0.0607**	-0.0598**
	[0.052]	[0.070]	[0.026]	[0.026]
Share of the native population in each department, 1901		-1.530**		
		[0.769]		
Share of the native population in each department, 2010				-0.162
				[0.211]
Average Rainfall	-0.505**	-0.714**	0.164	0.185
	[0.239]	[0.334]	[0.128]	[0.128]
Average Temperature	0.109	-0.484	-0.0530	-0.0262
	[0.315]	[0.345]	[0.143]	[0.141]
Latitude	0.118	0.200	-0.0236	-0.0401
	[0.127]	[0.162]	[0.066]	[0.063]
Land Suitability	-4.899	-8.102**	1.702	2.131
	[3.123]	[3.718]	[1.136]	[1.321]
Maritime Department	0.108	0.0981	-0.0215	-0.0227
	[0.111]	[0.120]	[0.0527]	[0.0520]
Border Department	0.00609	0.144	0.0269	0.0246
	[0.138]	[0.147]	[0.0448]	[0.0444]
Distance to Paris	-0.001	-0.001	0.0002	0.0003
	[0.0007]	[0.0008]	[0.0003]	[0.0003]
Paris and Suburbs	-0.016	-0.539*	0.437***	0.386**
	[0.116]	[0.284]	[0.154]	[0.165]
Alsace-Lorraine			0.0295	0.0237
			[0.106]	[0.105]
Urban Population in 1700	-0.006	-0.072*	0.071***	0.070***
	[0.030]	[0.038]	[0.015]	[0.015]
No Engine in 1860-1865	0.466*	0.925**	-0.342***	-0.337***
	[0.249]	[0.384]	[0.125]	[0.122]
Observations	85	85	89	89

First stage: the instrumented variable is Horse Power of Steam Engines

	(1)	(2)	(3)	(4)
Distance to Fresnes	-0.012***	-0.012***	-0.013***	-0.013***
	[0.003]	[0.003]	[0.003]	[0.003]
F-stat (1st stage)	19.526	19.605	23.261	22.769

Note: Data on the native population in 1872 and 1930 are not available. All regressions, except for the unconditional ones, include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, and the dependent variables are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Table B.12: Industrialization and income per capita, accounting for iron forges before 1811

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV	(6) IV	(7) IV	(8) IV	(9) IV	(10) IV	(11) IV	(12) IV
	GDP per capita, 1872			GDP per capita, 1901			GDP per capita, 1930			GDP per capita, 2001-2010 average		
Horse Power of Steam Engines	0.121**	0.134***	0.134***	0.244***	0.256***	0.256***	0.102***	0.100***	0.101***	-0.0607**	-0.0604**	-0.0605**
	[0.052]	[0.050]	[0.050]	[0.072]	[0.070]	[0.070]	[0.026]	[0.027]	[0.027]	[0.026]	[0.027]	[0.027]
Iron forges in 1789		-0.030			0.00386			-0.036			-0.0120	
		[0.0566]			[0.105]			[0.0340]			[0.0318]	
Presence of iron forges in 1789		-0.122			-0.182			0.0946			0.0200	
		[0.191]			[0.339]			[0.117]			[0.0841]	
Iron forges in 1811			-0.024			0.017			-0.036			-0.018
			[0.061]			[0.117]			[0.038]			[0.034]
Presence of iron forges in 1811			-0.139			-0.218			0.093			0.035
			[0.198]			[0.358]			[0.126]			[0.0879]
Average Rainfall	-0.505**	-0.452*	-0.454*	-0.795**	-0.757**	-0.760**	-0.211*	-0.202	-0.202	0.164	0.170	0.171
	[0.239]	[0.236]	[0.237]	[0.338]	[0.349]	[0.350]	[0.125]	[0.123]	[0.124]	[0.128]	[0.126]	[0.126]
Average Temperature	0.109	0.161	0.163	-0.537	-0.486	-0.484	-0.444***	-0.450***	-0.449***	-0.0530	-0.0518	-0.0526
	[0.315]	[0.331]	[0.331]	[0.361]	[0.371]	[0.371]	[0.113]	[0.113]	[0.113]	[0.143]	[0.143]	[0.143]
Latitude	0.118	0.105	0.104	0.279*	0.265*	0.263*	0.244***	0.248***	0.247***	-0.0236	-0.0235	-0.0233
	[0.127]	[0.132]	[0.132]	[0.156]	[0.159]	[0.159]	[0.0491]	[0.0486]	[0.0487]	[0.0662]	[0.0664]	[0.0664]
Land Suitability	-4.899	-5.405*	-5.405*	-8.713**	-9.172**	-9.189**	-3.325***	-3.305***	-3.296***	1.702	1.683	1.692
	[3.123]	[3.068]	[3.074]	[3.849]	[3.783]	[3.785]	[1.160]	[1.151]	[1.154]	[1.136]	[1.146]	[1.149]
Maritime Department	0.108	0.0975	0.0973	0.0438	0.0346	0.0349	0.00656	0.00630	0.00597	-0.0215	-0.0223	-0.0225
	[0.111]	[0.114]	[0.114]	[0.138]	[0.141]	[0.141]	[0.0559]	[0.0563]	[0.0564]	[0.0527]	[0.0527]	[0.0528]
Border Department	0.00609	0.0244	0.0260	0.155	0.177	0.179	0.102**	0.0950*	0.0955*	0.0269	0.0260	0.0252
	[0.138]	[0.144]	[0.144]	[0.163]	[0.161]	[0.161]	[0.0464]	[0.0487]	[0.0489]	[0.0448]	[0.0462]	[0.0462]
Distance to Paris	-0.0011	-0.0013*	-0.0013*	-0.0011	-0.0012	-0.0012	-0.0002	-0.0002	-0.0002	0.0002	0.0002	0.0002
	[0.0007]	[0.0007]	[0.0007]	[0.0008]	[0.0008]	[0.0008]	[0.0003]	[0.0003]	[0.0003]	[0.0003]	[0.0003]	[0.0003]
Paris and Suburbs	-0.0164	-0.0651	-0.0656	-0.189	-0.233	-0.235	0.239***	0.241***	0.242***	0.437***	0.435***	0.436***
	[0.116]	[0.116]	[0.116]	[0.171]	[0.168]	[0.168]	[0.088]	[0.088]	[0.088]	[0.154]	[0.154]	[0.154]
Alsace-Lorraine							0.092	0.097	0.096	0.030	0.028	0.028
							[0.083]	[0.085]	[0.085]	[0.106]	[0.107]	[0.107]
Urban Population in 1700	-0.006	-0.008	-0.008	-0.049	-0.051	-0.051	0.028**	0.029**	0.029**	0.071***	0.0718***	0.071***
	[0.030]	[0.030]	[0.031]	[0.039]	[0.039]	[0.039]	[0.013]	[0.013]	[0.013]	[0.015]	[0.015]	[0.015]
Observations	85	85	85	85	85	85	87	87	87	89	89	89

First stage: the instrumented variable is Horse Power of Steam Engines

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Distance to Fresnes	-0.012***	-0.012***	-0.012***	-0.012***	-0.012***	-0.012***	-0.013***	-0.013***	-0.013***	-0.013***	-0.013***	-0.013***
	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]
F-stat (1st stage)	19.526	18.147	18.146	19.526	18.147	18.146	20.617	19.129	19.127	23.261	21.562	21.580

Note: All regressions include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, and the dependent variables are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Table B.13: Industrialization and income per capita, accounting for mines in 1837

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV	(6) IV	(7) IV	(8) IV
	GDP per capita, 1872		GDP per capita, 1901		GDP per capita, 1930		GDP per capita, 2001-2010	
Horse Power of Steam Engines	0.121**	0.164**	0.244***	0.342***	0.102***	0.123***	-0.0607**	-0.0708**
	[0.0515]	[0.0803]	[0.0724]	[0.113]	[0.0261]	[0.0425]	[0.0261]	[0.0349]
Area Covered by Mines in Department		-0.0374		-0.0852**		-0.0193		0.0111
		[0.0281]		[0.0397]		[0.0169]		[0.0124]
Average Rainfall	-0.505**	-0.616**	-0.795**	-1.049**	-0.211*	-0.270	0.164	0.179
	[0.239]	[0.305]	[0.338]	[0.465]	[0.125]	[0.169]	[0.128]	[0.144]
Average Temperature	0.109	-0.0120	-0.537	-0.812*	-0.444***	-0.507***	-0.0530	-0.0108
	[0.315]	[0.375]	[0.361]	[0.473]	[0.113]	[0.139]	[0.143]	[0.176]
Latitude	0.118	0.117	0.279*	0.275	0.244***	0.245***	-0.0236	-0.0302
	[0.127]	[0.144]	[0.156]	[0.189]	[0.0491]	[0.0530]	[0.0662]	[0.0737]
Land Suitability	-4.899	-5.313	-8.713**	-9.654**	-3.325***	-3.474***	1.702	1.792
	[3.123]	[3.451]	[3.849]	[4.524]	[1.160]	[1.253]	[1.136]	[1.206]
Maritime Department	0.108	0.122	0.0438	0.0749	0.00656	0.0116	-0.0215	-0.0252
	[0.111]	[0.122]	[0.138]	[0.165]	[0.0559]	[0.0590]	[0.0527]	[0.0557]
Border Department	0.00609	-0.0388	0.155	0.0532	0.102**	0.0780	0.0269	0.0455
	[0.138]	[0.151]	[0.163]	[0.184]	[0.0464]	[0.0535]	[0.0448]	[0.0569]
Distance to Paris	-0.001	-0.0009	-0.00108	-0.0005	-0.0002	-5.58e-05	0.0002	0.0001
	[0.0007]	[0.0008]	[0.000847]	[0.001]	[0.0003]	[0.0004]	[0.0003]	[0.0003]
Paris and Suburbs	-0.0164	-0.0298	-0.189	-0.219	0.239***	0.233**	0.437***	0.441***
	[0.116]	[0.123]	[0.171]	[0.185]	[0.0877]	[0.0927]	[0.154]	[0.153]
Alsace-Lorraine					0.0920	0.121	0.0295	0.0203
					[0.0831]	[0.0874]	[0.106]	[0.105]
Urban Population in 1700	-0.00613	-0.0139	-0.0485	-0.0661	0.0277**	0.0244	0.0707***	0.0715***
	[0.0301]	[0.0347]	[0.0392]	[0.0458]	[0.0132]	[0.0149]	[0.0149]	[0.0157]
Observations	85	85	85	85	87	87	89	89

First stage: the instrumented variable is Horse Power of Steam Engines

Distance to Fresnes	-0.0123***	-0.00837***	-0.0123***	-0.00837***	-0.0127***	-0.00879***	-0.0132***	-0.0103***
	[0.00278]	[0.00226]	[0.00278]	[0.00226]	[0.00279]	[0.00225]	[0.00274]	[0.00245]
F-stat (1st stage)	19.526	13.775	19.526	13.775	20.617	15.201	23.261	17.705

Note: All regressions include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, and the dependent variables are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Table B.14: Industrialization and income per capita, accounting for market integration during the French Revolution

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	IV	IV	IV	IV	IV	IV	IV	IV
	GDP per capita, 1872		GDP per capita, 1901		GDP per capita, 1930		GDP per capita, 2001-2010	
Horse Power of Steam Engines	0.121**	0.113**	0.244***	0.246***	0.102***	0.104***	-0.061**	-0.078**
	[0.052]	[0.057]	[0.072]	[0.073]	[0.026]	[0.027]	[0.026]	[0.031]
Market Integration during the French Revolution		-0.050		-0.187*		-0.046		0.127***
		[0.0921]		[0.101]		[0.0349]		[0.0387]
Average Rainfall	-0.505**	-0.393*	-0.795**	-0.542*	-0.211*	-0.169	0.164	0.0703
	[0.239]	[0.213]	[0.338]	[0.295]	[0.125]	[0.107]	[0.128]	[0.127]
Average Temperature	0.109	0.00261	-0.537	-0.763**	-0.444***	-0.489***	-0.053	0.033
	[0.315]	[0.332]	[0.361]	[0.344]	[0.113]	[0.119]	[0.143]	[0.154]
Latitude	0.118	0.180	0.279*	0.436***	0.244***	0.285***	-0.0236	-0.0884
	[0.127]	[0.136]	[0.156]	[0.162]	[0.049]	[0.056]	[0.066]	[0.073]
Land Suitability	-4.899	-4.845	-8.713**	-9.068**	-3.325***	-3.356***	1.702	2.129*
	[3.123]	[3.107]	[3.849]	[3.531]	[1.160]	[1.155]	[1.136]	[1.223]
Maritime Department	0.108	0.121	0.044	0.091	0.007	0.009	-0.0215	-0.0620
	[0.111]	[0.117]	[0.138]	[0.130]	[0.056]	[0.055]	[0.053]	[0.052]
Border Department	0.006	-0.005	0.155	0.112	0.102**	0.088**	0.027	0.044
	[0.138]	[0.142]	[0.163]	[0.149]	[0.046]	[0.042]	[0.045]	[0.047]
Distance to Paris	-0.0011	-0.0012	-0.0011	-0.0013	-0.0002	-0.0002	0.0002	0.0004
	[0.0007]	[0.0007]	[0.0008]	[0.0008]	[0.0003]	[0.0003]	[0.0003]	[0.0003]
Paris and Suburbs	-0.016	-0.028	-0.189	-0.276	0.239***	0.216**	0.437***	0.506***
	[0.116]	[0.135]	[0.171]	[0.196]	[0.0877]	[0.0982]	[0.154]	[0.149]
Alsace-Lorraine					0.0920	0.0904	0.0295	0.0470
					[0.0831]	[0.0738]	[0.106]	[0.111]
Urban Population in 1700	-0.006	0.011	-0.049	0.001	0.028**	0.040***	0.071***	0.044***
	[0.030]	[0.028]	[0.039]	[0.039]	[0.013]	[0.013]	[0.015]	[0.014]
Observations	85	83	85	83	87	85	89	86
	First stage: the instrumented variable is Horse Power of Steam Engines							
Distance to Fresnes	-0.123***	-0.011***	-0.123***	-0.011***	-0.127***	-0.118***	-0.132***	-0.118***
	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]
F-stat (1st stage)	19.526	18.620	19.526	18.620	20.617	19.807	23.261	19.868

Note: All regressions include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, and the dependent variables are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

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Table B.15: Industrialization and income per capita, accounting for the railroad network in 1860

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV	(6) IV	(7) IV	(8) IV
	GDP per capita, 1872		GDP per capita, 1901		GDP per capita, 1930		GDP per capita, 2001-2010	
Horse Power of Steam Engines	0.121**	0.121**	0.244***	0.246***	0.102***	0.103***	-0.0607**	-0.0543**
	[0.0515]	[0.0499]	[0.0724]	[0.0708]	[0.0261]	[0.0254]	[0.0261]	[0.0214]
Railroad connection to Paris in 1860		-0.00501		0.0265		0.0119		0.113***
		[0.0708]		[0.114]		[0.0405]		[0.0346]
Average Rainfall	-0.505**	-0.503**	-0.795**	-0.805**	-0.211*	-0.215*	0.164	0.149
	[0.239]	[0.232]	[0.338]	[0.346]	[0.125]	[0.127]	[0.128]	[0.114]
Average Temperature	0.109	0.111	-0.537	-0.547	-0.444***	-0.448***	-0.0530	-0.106
	[0.315]	[0.313]	[0.361]	[0.366]	[0.113]	[0.114]	[0.143]	[0.122]
Latitude	0.118	0.120	0.279*	0.268*	0.244***	0.240***	-0.0236	-0.0586
	[0.127]	[0.128]	[0.156]	[0.161]	[0.0491]	[0.0505]	[0.0662]	[0.0606]
Land Suitability	-4.899	-4.913	-8.713**	-8.638**	-3.325***	-3.286***	1.702	2.026*
	[3.123]	[3.170]	[3.849]	[3.914]	[1.160]	[1.179]	[1.136]	[1.057]
Maritime Department	0.108	0.108	0.0438	0.0477	0.00656	0.00818	-0.0215	-0.00461
	[0.111]	[0.111]	[0.138]	[0.139]	[0.0559]	[0.0570]	[0.0527]	[0.0524]
Border Department	0.00609	0.00678	0.155	0.152	0.102**	0.100**	0.0269	0.00441
	[0.138]	[0.138]	[0.163]	[0.164]	[0.0464]	[0.0464]	[0.0448]	[0.0412]
Distance to Paris	-0.0011	-0.0011	-0.0011	-0.0011	-0.0002	-0.0002	0.0002	0.0003
	[0.0007]	[0.0007]	[0.0008]	[0.0009]	[0.0003]	[0.0003]	[0.0003]	[0.0003]
Paris and Suburbs	-0.016	-0.0166	-0.189	-0.188	0.239***	0.239***	0.437***	0.438***
	[0.116]	[0.116]	[0.171]	[0.170]	[0.0877]	[0.0878]	[0.154]	[0.155]
Alsace-Lorraine					0.092	0.086	0.030	-0.012
					[0.083]	[0.083]	[0.106]	[0.102]
Urban Population in 1700	-0.006	-0.006	-0.049	-0.050	0.028**	0.027**	0.071***	0.066***
	[0.030]	[0.029]	[0.039]	[0.038]	[0.013]	[0.013]	[0.015]	[0.014]
Observations	85	85	85	85	87	87	89	89

First stage: the instrumented variable is Horse Power of Steam Engines								
Distance to Fresnes	-0.012***	-0.013***	-0.012***	-0.013***	-0.013***	-0.013***	-0.0132***	-0.0137***
	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]
F-stat (1st stage)	19.526	20.802	19.526	20.802	20.617	21.835	23.261	26.360

Note: All regressions include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, and the dependent variables are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Table B.16: Industrialization and income per capita, accounting for the concentration of the industrial sector in 1860-1865

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV	(6) IV	(7) IV	(8) IV
	GDP per capita, 1872		GDP per capita, 1901		GDP per capita, 1930		GDP per capita, 2001-2010	
Horse Power of Steam Engines	0.121**	0.116**	0.244***	0.229***	0.102***	0.098***	-0.061**	-0.054**
	[0.052]	[0.050]	[0.072]	[0.072]	[0.026]	[0.026]	[0.026]	[0.025]
Concentration Index		0.066		0.258		0.068		-0.096
		[0.150]		[0.225]		[0.0945]		[0.086]
Average Rainfall	-0.505**	-0.504**	-0.795**	-0.795**	-0.211*	-0.218*	0.164	0.167
	[0.239]	[0.248]	[0.338]	[0.338]	[0.125]	[0.126]	[0.128]	[0.130]
Average Temperature	0.109	0.139	-0.537	-0.351	-0.444***	-0.403***	-0.0530	-0.0476
	[0.315]	[0.329]	[0.361]	[0.360]	[0.113]	[0.117]	[0.143]	[0.152]
Latitude	0.118	0.137	0.279*	0.260*	0.244***	0.238***	-0.0236	-0.0401
	[0.127]	[0.130]	[0.156]	[0.153]	[0.0491]	[0.0497]	[0.0662]	[0.0644]
Land Suitability	-4.899	-4.385	-8.713**	-7.833**	-3.325***	-3.071***	1.702	1.073
	[3.123]	[2.983]	[3.849]	[3.690]	[1.160]	[1.059]	[1.136]	[1.050]
Maritime Department	0.108	0.099	0.044	0.024	0.007	0.001	-0.022	-0.016
	[0.111]	[0.110]	[0.138]	[0.134]	[0.056]	[0.053]	[0.053]	[0.050]
Border Department	0.006	0.013	0.155	0.213	0.102**	0.118**	0.027	0.031
	[0.138]	[0.144]	[0.163]	[0.168]	[0.046]	[0.047]	[0.045]	[0.044]
Distance to Paris	-0.0011	-0.0010	-0.0011	-0.0010	-0.0002	-0.0002	0.0002	8.66e-05
	[0.0007]	[0.0007]	[0.0008]	[0.0008]	[0.0003]	[0.0003]	[0.0003]	[0.0003]
Paris and Suburbs	-0.016	0.009	-0.189	-0.142	0.239***	0.252***	0.437***	0.405***
	[0.116]	[0.115]	[0.171]	[0.177]	[0.0877]	[0.090]	[0.154]	[0.154]
Alsace-Lorraine					0.092	0.066	0.030	0.052
					[0.0831]	[0.0839]	[0.106]	[0.107]
Urban Population in 1700	-0.006	-0.001	-0.049	-0.036	0.028**	0.031**	0.071***	0.064***
	[0.030]	[0.030]	[0.039]	[0.039]	[0.013]	[0.013]	[0.015]	[0.015]
Observations	85	81	85	81	87	83	89	85

First stage: the instrumented variable is Horse Power of Steam Engines

Distance to Fresnes	-0.012***	-0.013***	-0.012***	-0.013***	-0.013***	-0.013***	-0.013***	-0.014***
	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]
F-stat (1st stage)	19.526	18.828	19.526	18.828	20.617	19.527	23.261	21.502

Note: All regressions include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, and the dependent variables are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Table B.17: Industrialization and the evolution of the share of the workforce in the industrial sector, accounting for the number of buildings destroyed in the World Wars

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV	(6) IV	(7) IV	(8) IV	(9) IV	(10) IV	(11) IV	(12) IV	(13) IV	(14) IV
	Share of Workforce in Industry 1930		Share of Workforce in Industry 1968		Share of Workforce in Industry 1975		Share of Workforce in Industry 1982		Share of Workforce in Industry 1990		Share of Workforce in Industry 1999		Share of Workforce in Industry 2010	
Horse Power of Steam Engines	0.100***	0.0874***	0.0502***	0.0497***	0.0380***	0.0371***	0.0218***	0.0209***	0.00655	0.00535	-0.00254	-0.00346	-0.0118*	-0.0126*
	[0.0174]	[0.0224]	[0.0106]	[0.0113]	[0.00836]	[0.00897]	[0.00600]	[0.00657]	[0.00579]	[0.00630]	[0.00526]	[0.00574]	[0.00612]	[0.00668]
Destroyed Buildings WWI		0.00361												
		[0.00407]												
Destroyed Buildings WWII				0.00104		0.00322		0.00419		0.00638**		0.00446*		0.00673**
				[0.00595]		[0.00484]		[0.00340]		[0.00299]		[0.00258]		[0.00310]
Average Rainfall	-0.0352	-0.0123	0.0481	0.0591	0.0789*	0.103*	0.0928***	0.123***	0.0993***	0.143***	0.105***	0.136***	0.0699**	0.115***
	[0.0961]	[0.0911]	[0.0511]	[0.0678]	[0.0437]	[0.0580]	[0.0317]	[0.0415]	[0.0342]	[0.0418]	[0.0319]	[0.0377]	[0.0327]	[0.0382]
Average Temperature	-0.192**	-0.181**	-0.109*	-0.103	-0.0541	-0.0384	-0.00405	0.0161	0.0261	0.0562	0.0479	0.0688*	0.0491	0.0806**
	[0.0976]	[0.0881]	[0.0574]	[0.0712]	[0.0507]	[0.0614]	[0.0386]	[0.0450]	[0.0406]	[0.0460]	[0.0321]	[0.0374]	[0.0346]	[0.0399]
Latitude	-0.785	-0.777	-0.717	-0.739	-0.548	-0.621	-0.215	-0.320	0.114	-0.0379	0.475	0.378	0.685**	0.499
	[0.909]	[0.844]	[0.498]	[0.495]	[0.386]	[0.394]	[0.289]	[0.312]	[0.308]	[0.336]	[0.289]	[0.313]	[0.318]	[0.323]
Land Suitability	0.0734*	0.0707*	0.0542*	0.0535*	0.0414*	0.0365	0.0229	0.0161	0.0240	0.0130	0.00934	0.00180	-6.57e-05	-0.0127
	[0.0437]	[0.0381]	[0.0280]	[0.0317]	[0.0245]	[0.0271]	[0.0205]	[0.0219]	[0.0219]	[0.0224]	[0.0186]	[0.0193]	[0.0187]	[0.0196]
Maritime Department	-0.00129	0.000751	-0.0310*	-0.0322	-0.0273*	-0.0322*	-0.0235**	-0.0297**	-0.0294**	-0.0395***	-0.0312***	-0.0386***	-0.00452	-0.0147
	[0.0374]	[0.0343]	[0.0187]	[0.0223]	[0.0152]	[0.0180]	[0.0115]	[0.0133]	[0.0121]	[0.0139]	[0.0112]	[0.0128]	[0.0125]	[0.0141]
Border Department	0.0947**	0.0805**	0.0716***	0.0702***	0.0548***	0.0518***	0.0244*	0.0208	0.0101	0.00496	-0.00546	-0.00915	-0.00515	-0.0101
	[0.0397]	[0.0361]	[0.0226]	[0.0224]	[0.0199]	[0.0194]	[0.0143]	[0.0140]	[0.0143]	[0.0134]	[0.0117]	[0.0113]	[0.0103]	[0.0103]
Distance to Paris	6.19e-05	4.02e-05	-0.000127	-0.000130	-0.000203**	-0.000209**	-0.000195**	-0.000205**	-0.000176**	-0.000188**	-0.000110	-0.000116	4.17e-05	2.35e-05
	[0.000200]	[0.000185]	[0.000118]	[0.000122]	[9.78e-05]	[0.000103]	[7.78e-05]	[8.33e-05]	[8.03e-05]	[8.72e-05]	[7.05e-05]	[7.68e-05]	[7.20e-05]	[7.44e-05]
Paris and Suburbs	0.0820	0.0987*	-5.41e-05	0.000491	-0.0394	-0.0415	-0.0692**	-0.0726**	-0.0711**	-0.0770***	-0.0918***	-0.0958***	-0.0281	-0.0357
	[0.0588]	[0.0594]	[0.0520]	[0.0517]	[0.0513]	[0.0510]	[0.0331]	[0.0330]	[0.0284]	[0.0286]	[0.0212]	[0.0217]	[0.0231]	[0.0233]
Alsace-Lorraine	-0.0481		-0.0318		-0.0152		0.0137		0.0218		0.0180		0.0244	
	[0.0583]		[0.0327]		[0.0237]		[0.0179]		[0.0203]		[0.0188]		[0.0204]	
Urban Population in 1700	0.00132	0.00400	0.000248	-9.29e-05	-0.00148	-0.00173	-0.00379	-0.00411	-0.00287	-0.00304	-0.00306	-0.00306	0.00330	0.00306
	[0.00989]	[0.00964]	[0.00595]	[0.00610]	[0.00530]	[0.00542]	[0.00367]	[0.00375]	[0.00356]	[0.00367]	[0.00301]	[0.00314]	[0.00325]	[0.00334]
Observations	89	86	89	86	89	86	89	86	89	86	89	86	89	86

First stage: the instrumented variable is Horse Power of Steam Engines														
Distance to Fresnes	-0.0132***	-0.0177***	-0.0132***	-0.0124***	-0.0132***	-0.0124***	-0.0132***	-0.0124***	-0.0132***	-0.0124***	-0.0132***	-0.0124***	-0.0132***	-0.0124***
	[0.00274]	[0.00456]	[0.00274]	[0.00253]	[0.00274]	[0.00253]	[0.00274]	[0.00253]	[0.00274]	[0.00253]	[0.00274]	[0.00253]	[0.00274]	[0.00253]
F-stat (1st stage)	23.261	15.090	23.261	23.876	23.261	23.876	23.261	23.876	23.261	23.876	23.261	23.876	23.261	23.876

Note: All regressions include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, and the dependent variables are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Table B.18: Industrialization and the evolution of the share of the workforce in the industrial sector, accounting for military casualties in the World Wars

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	IV	IV	IV	IV	IV	IV	IV	IV	IV	IV	IV	IV	IV	IV
	Share of Workforce in Industry		Share of Workforce in Industry		Share of Workforce in Industry		Share of Workforce in Industry		Share of Workforce in Industry		Share of Workforce in Industry		Share of Workforce in Industry	
	1930		1968		1975		1982		1990		1999		2010	
Horse Power of Steam Engines	0.100***	0.0981***	0.0502***	0.0499***	0.0380***	0.0378***	0.0218***	0.0217***	0.00655	0.00636	-0.00254	-0.00269	-0.0118*	-0.0117**
	[0.0174]	[0.0168]	[0.0106]	[0.0105]	[0.00836]	[0.00821]	[0.00600]	[0.00588]	[0.00579]	[0.00562]	[0.00526]	[0.00510]	[0.00612]	[0.00595]
WWI deaths		-0.115***												
		[0.0412]												
WWII deaths				-0.00924		-0.00499		-0.00324		-0.00471		-0.00371		0.00320
				[0.0107]		[0.0101]		[0.00854]		[0.0103]		[0.00865]		[0.0102]
Average Rainfall	-0.0352	0.0561	0.0481	0.0512	0.0789*	0.0806*	0.0928***	0.0939***	0.0993***	0.101***	0.105***	0.106***	0.0699**	0.0688**
	[0.0961]	[0.0965]	[0.0511]	[0.0491]	[0.0437]	[0.0422]	[0.0317]	[0.0309]	[0.0342]	[0.0338]	[0.0319]	[0.0317]	[0.0327]	[0.0333]
Average Temperature	-0.192**	-0.0671	-0.109*	-0.0936	-0.0541	-0.0457	-0.00405	0.00136	0.0261	0.0340	0.0479	0.0541*	0.0491	0.0437
	[0.0976]	[0.103]	[0.0574]	[0.0597]	[0.0507]	[0.0524]	[0.0386]	[0.0408]	[0.0406]	[0.0418]	[0.0321]	[0.0321]	[0.0346]	[0.0367]
Latitude	-0.785	0.399	-0.717	-0.541	-0.548	-0.452	-0.215	-0.153	0.114	0.204	0.475	0.546*	0.685**	0.624*
	[0.909]	[1.014]	[0.498]	[0.501]	[0.386]	[0.385]	[0.289]	[0.287]	[0.308]	[0.303]	[0.289]	[0.284]	[0.318]	[0.320]
Land Suitability	0.0734*	0.0163	0.0542*	0.0478	0.0414*	0.0380	0.0229	0.0207	0.0240	0.0207	0.00934	0.00681	-6.57e-05	0.00212
	[0.0437]	[0.0477]	[0.0280]	[0.0299]	[0.0245]	[0.0264]	[0.0205]	[0.0222]	[0.0219]	[0.0239]	[0.0186]	[0.0199]	[0.0187]	[0.0192]
Maritime Department	-0.00129	0.0212	-0.0310*	-0.0292	-0.0273*	-0.0263*	-0.0235*	-0.0229*	-0.0294**	-0.0285**	-0.0312***	-0.0304***	-0.00452	-0.00516
	[0.0374]	[0.0402]	[0.0187]	[0.0195]	[0.0152]	[0.0159]	[0.0115]	[0.0120]	[0.0121]	[0.0126]	[0.0112]	[0.0115]	[0.0125]	[0.0127]
Border Department	0.0947**	0.0894**	0.0716***	0.0740***	0.0548***	0.0560***	0.0244*	0.0252*	0.0101	0.0113	-0.00546	-0.00451	-0.00515	-0.00597
	[0.0397]	[0.0360]	[0.0226]	[0.0231]	[0.0199]	[0.0203]	[0.0143]	[0.0147]	[0.0143]	[0.0144]	[0.0117]	[0.0117]	[0.0103]	[0.0103]
Distance to Paris	6.19e-05	0.000161	-0.000127	-0.000104	-0.000203**	-0.000190*	-0.000195***	-0.000187**	-0.000176**	-0.000164**	-0.000110	-0.000101	4.17e-05	3.37e-05
	[0.000200]	[0.000216]	[0.000118]	[0.000119]	[9.78e-05]	[9.83e-05]	[7.78e-05]	[7.74e-05]	[8.03e-05]	[8.06e-05]	[7.05e-05]	[7.11e-05]	[7.20e-05]	[7.20e-05]
Paris and Suburbs	0.0820	0.165***	-5.41e-05	0.00953	-0.0394	-0.0343	-0.0692**	-0.0659**	-0.0711**	-0.0662**	-0.0918***	-0.0879***	-0.0281	-0.0314
	[0.0588]	[0.0369]	[0.0520]	[0.0470]	[0.0513]	[0.0480]	[0.0331]	[0.0308]	[0.0284]	[0.0270]	[0.0212]	[0.0203]	[0.0231]	[0.0250]
Alsace-Lorraine	-0.0481		-0.0318	-0.0362	-0.0152	-0.0176	0.0137	0.0122	0.0218	0.0195	0.0180	0.0163	0.0244	0.0259
	[0.0583]		[0.0327]	[0.0332]	[0.0237]	[0.0243]	[0.0179]	[0.0187]	[0.0203]	[0.0215]	[0.0188]	[0.0197]	[0.0204]	[0.0207]
Urban Population in 1700	0.00132	0.0113	0.000248	0.00152	-0.00148	-0.000790	-0.00379	-0.00335	-0.00287	-0.00222	-0.00306	-0.00255	0.00330	0.00286
	[0.00989]	[0.0101]	[0.00595]	[0.00550]	[0.00530]	[0.00480]	[0.00367]	[0.00340]	[0.00356]	[0.00339]	[0.00301]	[0.00298]	[0.00325]	[0.00321]
Observations	89	86	89	89	89	89	89	89	89	89	89	89	89	89
First stage: the instrumented variable is Horse Power of Steam Engines														
Distance to Fresnes	-0.0132***	-0.0133***	-0.0132***	-0.0135***	-0.0132***	-0.0135***	-0.0132***	-0.0135***	-0.0132***	-0.0135***	-0.0132***	-0.0135***	-0.0132***	-0.0135***
	[0.00274]	[0.00292]	[0.00274]	[0.00280]	[0.00274]	[0.00280]	[0.00274]	[0.00280]	[0.00274]	[0.00280]	[0.00274]	[0.00280]	[0.00274]	[0.00280]
F-stat (1st stage)	23.261	20.818	23.261	23.457	23.261	23.457	23.261	23.457	23.261	23.457	23.261	23.457	23.261	23.457

Note: All regressions include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, and the dependent variables are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Appendix C. Industrialization and the Evolution of Sectoral Employment, 1872-2010

Table C.1: Industrialization and the share of workforce in industry, 1872, 1901 and 1930

	(1) OLS	(2) OLS	(3) IV	(4) OLS	(5) OLS	(6) IV	(7) OLS	(8) OLS	(9) IV
	Share of Workforce in Industry, 1872			Share of Workforce in Industry, 1901			Share of Workforce in Industry, 1930		
Horse Power of Steam Engines	0.0326*** [0.00472]	0.0273*** [0.00648]	0.0634*** [0.0131]	0.0354*** [0.00489]	0.0366*** [0.00776]	0.0845*** [0.0137]	0.0429*** [0.00614]	0.0420*** [0.00877]	0.100*** [0.0174]
Average Rainfall		0.0284 [0.0548]	-0.0341 [0.0725]		0.0107 [0.0546]	-0.0721 [0.0827]		0.0574 [0.0600]	-0.0352 [0.0961]
Average Temperature		0.0998 [0.0646]	0.0332 [0.0751]		-0.0435 [0.0629]	-0.132* [0.0797]		-0.107 [0.0750]	-0.192** [0.0976]
Latitude		0.476 [0.494]	-0.617 [0.607]		0.468 [0.566]	-0.980 [0.774]		0.596 [0.654]	-0.785 [0.909]
Land Suitability		0.00619 [0.0327]	0.0134 [0.0359]		0.0509* [0.0303]	0.0604* [0.0364]		0.0681* [0.0343]	0.0734* [0.0437]
Maritime Department		-0.0113 [0.0233]	0.00303 [0.0260]		-0.0273 [0.0233]	-0.00838 [0.0304]		-0.0104 [0.0287]	-0.00129 [0.0374]
Border Department		0.0611*** [0.0222]	0.0626** [0.0266]		0.0449* [0.0231]	0.0469 [0.0312]		0.0851*** [0.0258]	0.0947** [0.0397]
Distance to Paris		-7.18e-05 [0.0001]	-0.0002 [0.0001]		0.0001 [0.0001]	-2.32e-05 [0.0002]		0.0001 [0.0002]	6.19e-05 [0.0002]
Paris and Suburbs		-0.0220 [0.0443]	-0.0491 [0.0370]		0.0348 [0.0254]	-0.00119 [0.0312]		0.119*** [0.0414]	0.0820 [0.0588]
Alsace-Lorraine								0.00460 [0.0522]	-0.0481 [0.0583]
Urban Population in 1700		0.00987* [0.00531]	-0.00144 [0.00756]		0.00992 [0.00674]	-0.00507 [0.00863]		0.0178*** [0.00655]	0.00132 [0.00989]
Adjusted $R2$	0.465	0.582		0.493	0.575		0.459	0.669	
Observations	87	87	87	87	87	87	89	89	89

First stage: the instrumented variable is Horse Power of Steam Engines

Distance to Fresnes			-0.0131*** [0.00276]			-0.0131*** [0.00276]			-0.0132*** [0.00274]
F-stat (1st stage)			22.612			22.612			23.261

Note: All regressions, except for the unconditional ones, include a dummy variable for the three departments which had no steam engine in 1860-1865. The dependent variables and the explanatory variables except the dummies are in logarithm. The aerial distances are measured in kilometers. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Table C.2: Industrialization and the share of workforce in industry, 1968-2010

	(1) OLS	(2) OLS	(3) IV	(4) OLS	(5) OLS	(6) IV	(7) OLS	(8) OLS	(9) IV
	Share of Workforce in Industry, 1968			Share of Workforce in Industry, 1975			Share of Workforce in Industry, 1982		
Horse Power of Steam Engines	0.0256***	0.0282***	0.0502***	0.0244***	0.0258***	0.0380***	0.0194***	0.0192***	0.0218***
	[0.00409]	[0.00593]	[0.0106]	[0.00394]	[0.00513]	[0.00836]	[0.00321]	[0.00396]	[0.00600]
Average Rainfall		0.0831**	0.0481		0.0983**	0.0789*		0.0969***	0.0928***
		[0.0391]	[0.0511]		[0.0406]	[0.0437]		[0.0333]	[0.0317]
Average Temperature		-0.0767	-0.109*		-0.0362	-0.0541		-0.000221	-0.00405
		[0.0529]	[0.0574]		[0.0509]	[0.0507]		[0.0414]	[0.0386]
Latitude		-0.195	-0.717		-0.259	-0.548		-0.153	-0.215
		[0.387]	[0.498]		[0.349]	[0.386]		[0.292]	[0.289]
Land Suitability		0.0521*	0.0542*		0.0403	0.0414*		0.0227	0.0229
		[0.0292]	[0.0280]		[0.0267]	[0.0245]		[0.0226]	[0.0205]
Maritime Department		-0.0345**	-0.0310*		-0.0292*	-0.0273*		-0.0239*	-0.0235**
		[0.0172]	[0.0187]		[0.0156]	[0.0152]		[0.0126]	[0.0115]
Border Department		0.0679***	0.0716***		0.0528***	0.0548***		0.0239	0.0244*
		[0.0193]	[0.0226]		[0.0196]	[0.0199]		[0.0153]	[0.0143]
Distance to Paris		-0.000103	-0.000127		-0.000189*	-0.000203**		-0.000192**	-0.000195**
		[0.000109]	[0.000118]		[0.000101]	[9.78e-05]		[8.39e-05]	[7.78e-05]
Paris and Suburbs		0.0139	-5.41e-05		-0.0317	-0.0394		-0.0676*	-0.0692**
		[0.0483]	[0.0520]		[0.0512]	[0.0513]		[0.0345]	[0.0331]
Alsace-Lorraine		-0.0118	-0.0318		-0.00418	-0.0152		0.0161	0.0137
		[0.0297]	[0.0327]		[0.0242]	[0.0237]		[0.0182]	[0.0179]
Urban Population in 1700		0.00647	0.000248		0.00196	-0.00148		-0.00306	-0.00379
		[0.00484]	[0.00595]		[0.00465]	[0.00530]		[0.00355]	[0.00367]
Adjusted $R2$	0.341	0.581		0.349	0.573		0.326	0.579	
Observations	89	89	89	89	89	89	89	89	89

First stage: the instrumented variable is Horse Power of Steam Engines

	(3)	(6)	(9)
Distance to Fresnes	-0.0132***	-0.0132***	-0.0132***
	[0.00274]	[0.00274]	[0.00274]
F-stat (1st stage)	23.261	23.261	23.261

	(10) OLS	(11) OLS	(12) IV	(13) OLS	(14) OLS	(15) IV	(16) OLS	(17) OLS	(18) IV
	Share of Workforce in Industry, 1990			Share of Workforce in Industry, 1999			Share of Workforce in Industry, 2010		
Horse Power of Steam Engines	0.0163***	0.0142***	0.00655	0.0112***	0.00831***	-0.00254	0.00570***	0.00428	-0.0118*
	[0.00303]	[0.00359]	[0.00579]	[0.00268]	[0.00266]	[0.00526]	[0.00185]	[0.00279]	[0.00612]
Average Rainfall		0.0872**	0.0993***		0.0878***	0.105***		0.0442	0.0699**
		[0.0363]	[0.0342]		[0.0321]	[0.0319]		[0.0267]	[0.0327]
Average Temperature		0.0149	0.0261		0.0320	0.0479		0.0254	0.0491
		[0.0421]	[0.0406]		[0.0309]	[0.0321]		[0.0321]	[0.0346]
Latitude		-0.0671	0.114		0.217	0.475		0.302	0.685**
		[0.298]	[0.308]		[0.260]	[0.289]		[0.226]	[0.318]
Land Suitability		0.0247	0.0240		0.0103	0.00934		0.00141	-6.57e-05
		[0.0227]	[0.0219]		[0.0181]	[0.0186]		[0.0149]	[0.0187]
Maritime Department		-0.0282**	-0.0294**		-0.0295***	-0.0312***		-0.00200	-0.00452
		[0.0123]	[0.0121]		[0.0109]	[0.0112]		[0.0106]	[0.0125]
Border Department		0.0114	0.0101		-0.00366	-0.00546		-0.00248	-0.00515
		[0.0159]	[0.0143]		[0.0125]	[0.0117]		[0.00945]	[0.0103]
Distance to Paris		-0.000184**	-0.000176**		-0.000122*	-0.000110		2.38e-05	4.17e-05
		[8.36e-05]	[8.03e-05]		[7.02e-05]	[7.05e-05]		[6.19e-05]	[7.20e-05]
Paris and Suburbs		-0.0759**	-0.0711**		-0.0986***	-0.0918***		-0.0383	-0.0281
		[0.0325]	[0.0284]		[0.0253]	[0.0212]		[0.0287]	[0.0231]
Alsace-Lorraine		0.0149	0.0218		0.00821	0.0180		0.00981	0.0244
		[0.0200]	[0.0203]		[0.0173]	[0.0188]		[0.0205]	[0.0204]
Urban Population in 1700		-0.00503	-0.00287		-0.00613**	-0.00306		-0.00125	0.00330
		[0.00352]	[0.00356]		[0.00290]	[0.00301]		[0.00282]	[0.00325]
Adjusted $R2$	0.251	0.530		0.158	0.571		0.102	0.133	
Observations	89	89	89	89	89	89	89	89	89

First stage: the instrumented variable is Horse Power of Steam Engines

	(12)	(15)	(18)
Distance to Fresnes	-0.0132***	-0.0132***	-0.0132***
	[0.00274]	[0.00274]	[0.00274]
F-stat (1st stage)	23.261	23.261	23.261

Note: All regressions, except for the unconditional ones, include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Table C.3: Industrialization and the share of workforce in services, 1872, 1901 & 1930

	(1) OLS	(2) OLS	(3) IV	(4) OLS	(5) OLS	(6) IV	(7) OLS	(8) OLS	(9) IV
	Share of Workforce in Services, 1872			Share of Workforce in Services, 1901			Share of Workforce in Services, 1930		
Horse Power of Steam Engines	0.000157	0.000156	0.000753	0.0119**	0.0113**	0.0153	0.0102***	0.00524*	0.0108
	[0.000312]	[0.000326]	[0.000699]	[0.00544]	[0.00516]	[0.0130]	[0.00365]	[0.00292]	[0.00993]
Average Rainfall		-0.00649	-0.00752*		-0.129**	-0.136**		-0.0722*	-0.0810**
		[0.00413]	[0.00429]		[0.0548]	[0.0538]		[0.0371]	[0.0372]
Average Temperature		-0.00678	-0.00788*		-0.139*	-0.147**		-0.111*	-0.119**
		[0.00464]	[0.00450]		[0.0723]	[0.0680]		[0.0604]	[0.0570]
Latitude		-0.111***	-0.129***		-0.0152	-0.137		-0.261	-0.392
		[0.0360]	[0.0414]		[0.413]	[0.456]		[0.301]	[0.306]
Land Suitability		0.00359	0.00371*		0.0607**	0.0615**		0.0613**	0.0618***
		[0.00233]	[0.00224]		[0.0267]	[0.0250]		[0.0247]	[0.0233]
Maritime Department		0.00338*	0.00362**		0.0339	0.0355*		0.0314*	0.0322*
		[0.00178]	[0.00173]		[0.0204]	[0.0195]		[0.0187]	[0.0171]
Border Department		0.00157	0.00160		0.0396*	0.0397**		0.0359**	0.0368***
		[0.00156]	[0.00149]		[0.0206]	[0.0196]		[0.0136]	[0.0134]
Distance to Paris		-2.53e-05**	-2.69e-05***		9.87e-05	8.82e-05		1.77e-05	1.16e-05
		[1.02e-05]	[9.81e-06]		[0.000113]	[0.000101]		[8.15e-05]	[7.28e-05]
Paris and Suburbs		0.0076**	0.0071**		0.147***	0.144***		0.150***	0.146***
		[0.0032]	[0.0023]		[0.0460]	[0.0430]		[0.0355]	[0.0328]
Alsace-Lorraine								0.0379*	0.0328
								[0.0216]	[0.0247]
Urban Population in 1700		-0.0007*	-0.0009**		0.0105*	0.0093*		0.0106***	0.0090***
		[0.0004]	[0.0004]		[0.0055]	[0.0053]		[0.0037]	[0.0035]
Adjusted $R2$	-0.008	0.214		0.077	0.409		0.091	0.516	
Observations	87	87	87	87	87	87	89	89	89
First stage: the instrumented variable is Horse Power of Steam Engines									
Distance to Fresnes			-0.0131***			-0.0131***			-0.0132***
			[0.00276]			[0.00276]			[0.00274]
F-stat (1st stage)			22.612			22.612			23.261

Note: All regressions, except for the unconditional ones, include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Table C.4: Industrialization and the share of workforce in services, 1968-2010

	(1) OLS	(2) OLS	(3) IV	(4) OLS	(5) OLS	(6) IV	(7) OLS	(8) OLS	(9) IV
	Share of Workforce in Services, 1968			Share of Workforce in Services, 1975			Share of Workforce in Services, 1982		
Horse Power of Steam Engines	0.00335	0.00448	0.00944	-0.00159	0.00103	0.00628	-0.00306	-0.00132	0.00103
	[0.00397]	[0.00331]	[0.00926]	[0.00443]	[0.00291]	[0.00914]	[0.00417]	[0.00272]	[0.00828]
Average Rainfall		-0.108***	-0.116***		-0.120***	-0.128***		-0.115***	-0.119***
		[0.0388]	[0.0390]		[0.0409]	[0.0419]		[0.0351]	[0.0354]
Average Temperature		-0.139***	-0.146***		-0.161***	-0.169***		-0.132***	-0.136***
		[0.0461]	[0.0460]		[0.0466]	[0.0473]		[0.0390]	[0.0399]
Latitude		-0.836**	-0.954**		-0.854**	-0.978**		-0.512	-0.568
		[0.387]	[0.435]		[0.421]	[0.485]		[0.396]	[0.451]
Land Suitability		0.0396*	0.0400*		0.0373	0.0378*		0.0196	0.0198
		[0.0236]	[0.0222]		[0.0241]	[0.0228]		[0.0216]	[0.0201]
Maritime Department		0.0552***	0.0559***		0.0550***	0.0558***		0.0487***	0.0491***
		[0.0175]	[0.0161]		[0.0172]	[0.0161]		[0.0160]	[0.0150]
Border Department		0.0399***	0.0408***		0.0367**	0.0376**		0.0424***	0.0428***
		[0.0144]	[0.0140]		[0.0158]	[0.0152]		[0.0139]	[0.0133]
Distance to Paris		-2.31e-05	-2.87e-05		1.51e-05	9.20e-06		8.49e-05	8.23e-05
		[9.87e-05]	[9.23e-05]		[0.000105]	[0.000101]		[9.69e-05]	[9.22e-05]
Paris and Suburbs		0.128***	0.125***		0.137***	0.133***		0.149***	0.148***
		[0.0222]	[0.0213]		[0.0266]	[0.0251]		[0.0190]	[0.0187]
Alsace-Lorraine		0.0415	0.0370		0.0381	0.0333		0.0134	0.0113
		[0.0279]	[0.0280]		[0.0271]	[0.0272]		[0.0251]	[0.0240]
Urban Population in 1700		0.0129***	0.0115***		0.0135***	0.0120***		0.0145***	0.0138***
		[0.00389]	[0.00404]		[0.00408]	[0.00431]		[0.00361]	[0.00366]
Adjusted $R2$	-0.002	0.530		-0.009	0.552		-0.003	0.613	
Observations	89	89	89	89	89	89	89	89	89

First stage: the instrumented variable is Horse Power of Steam Engines

Distance to Fresnes			-0.0132***			-0.0132***			-0.0132***
			[0.00274]			[0.00274]			[0.00274]
F-stat (1st stage)			23.261			23.261			23.261

	(10) OLS	(11) OLS	(12) IV	(13) OLS	(14) OLS	(15) IV	(16) OLS	(17) OLS	(18) IV
	Share of Workforce in Services, 1990			Share of Workforce in Services, 1999			Share of Workforce in Services, 2010		
Horse Power of Steam Engines	-0.00511	-0.00189	0.00533	-0.00382	-0.000654	0.00740	0.00643	0.0100**	-0.00435
	[0.00387]	[0.00259]	[0.00702]	[0.00357]	[0.00233]	[0.00620]	[0.00518]	[0.00435]	[0.0111]
Average Rainfall		-0.106***	-0.117***		-0.101***	-0.114***		-0.156***	-0.133***
		[0.0345]	[0.0351]		[0.0313]	[0.0317]		[0.0511]	[0.0485]
Average Temperature		-0.122***	-0.133***		-0.0998***	-0.112***		-0.206***	-0.185***
		[0.0332]	[0.0364]		[0.0295]	[0.0325]		[0.0606]	[0.0557]
Latitude		-0.409	-0.580		-0.434	-0.625*		-0.322	0.0191
		[0.370]	[0.428]		[0.322]	[0.366]		[0.460]	[0.512]
Land Suitability		0.00747	0.00813		0.00947	0.0102		0.0371	0.0358
		[0.0191]	[0.0186]		[0.0168]	[0.0166]		[0.0314]	[0.0288]
Maritime Department		0.0500***	0.0512***		0.0442***	0.0454***		0.0562***	0.0540***
		[0.0150]	[0.0143]		[0.0134]	[0.0128]		[0.0199]	[0.0195]
Border Department		0.0373***	0.0385***		0.0357***	0.0370***		0.0122	0.00983
		[0.0130]	[0.0127]		[0.0111]	[0.0112]		[0.0170]	[0.0165]
Distance to Paris		0.000110	0.000102		9.04e-05	8.14e-05		0.000165	0.000181
		[8.97e-05]	[8.69e-05]		[7.84e-05]	[7.56e-05]		[0.000119]	[0.000111]
Paris and Suburbs		0.138***	0.134***		0.144***	0.139***		0.260***	0.269***
		[0.0203]	[0.0184]		[0.0184]	[0.0163]		[0.0387]	[0.0400]
Alsace-Lorraine		0.00845	0.00191		0.00654	-0.000764		0.0871***	0.100***
		[0.0224]	[0.0224]		[0.0195]	[0.0198]		[0.0318]	[0.0372]
Urban Population in 1700		0.0130***	0.0109***		0.0117***	0.00941***		0.00895*	0.0130***
		[0.00350]	[0.00359]		[0.00311]	[0.00311]		[0.00460]	[0.00474]
Adjusted $R2$	0.013	0.624		0.005	0.655		0.011	0.537	
Observations	89	89	89	89	89	89	89	89	89

First stage: the instrumented variable is Horse Power of Steam Engines

Distance to Fresnes			-0.0132***			-0.0132***			-0.0132***
			[0.00274]			[0.00274]			[0.00274]
F-stat (1st stage)			23.261			23.261			23.261

Note: All regressions, except for the unconditional ones, include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Table C.5: Industrialization and the share of executives in the workforce (age 25-54), 1968-2010

	(1) OLS	(2) OLS	(3) IV	(4) OLS	(5) OLS	(6) IV	(7) OLS	(8) OLS	(9) IV
			Share of executives and intellectual professions in workforce (age 25-54)						
		1968			1975			1982	
Horse Power of Steam Engines	0.00236***	0.00196***	0.00257	0.00211**	0.00133	-0.00105	0.00219*	0.000817	-0.00306
	[0.000788]	[0.000653]	[0.00160]	[0.00101]	[0.000887]	[0.00253]	[0.00111]	[0.000869]	[0.00262]
Average Rainfall		0.00849	0.00751		-0.00316	0.000634		-0.00358	0.00259
		[0.00908]	[0.00677]		[0.00908]	[0.00938]		[0.0108]	[0.0112]
Average Temperature		-0.00978	-0.0107		-0.0257**	-0.0222*		-0.0221*	-0.0164
		[0.00710]	[0.00713]		[0.0124]	[0.0127]		[0.0123]	[0.0134]
Latitude		-0.0129	-0.0275		-0.0249	0.0317		-0.0260	0.0660
		[0.0658]	[0.0736]		[0.116]	[0.127]		[0.121]	[0.130]
Land Suitability		0.00266	0.00272		0.00936	0.00914		0.00835	0.00799
		[0.00384]	[0.00357]		[0.00673]	[0.00634]		[0.00656]	[0.00635]
Maritime Department		-0.00290	-0.00281		0.00122	0.000850		0.000893	0.000288
		[0.00299]	[0.00281]		[0.00454]	[0.00452]		[0.00476]	[0.00493]
Border Department		0.00891***	0.00901***		0.0106**	0.0102**		0.00755	0.00691
		[0.00244]	[0.00237]		[0.00440]	[0.00396]		[0.00500]	[0.00467]
Distance to Paris		1.35e-05	1.28e-05		3.28e-05	3.55e-05		2.94e-05	3.37e-05
		[1.76e-05]	[1.67e-05]		[2.98e-05]	[2.77e-05]		[3.19e-05]	[2.91e-05]
Paris and Suburbs		0.0352***	0.0349***		0.0628***	0.0643***		0.0764***	0.0789***
		[0.0117]	[0.0107]		[0.00691]	[0.00663]		[0.00759]	[0.00744]
Alsace-Lorraine		0.000406	-0.000150		0.00442	0.00658		0.00338	0.00689
		[0.00552]	[0.00525]		[0.00971]	[0.00891]		[0.00978]	[0.00878]
Urban Population in 1700		0.0042***	0.0041***		0.0056***	0.0062***		0.0060***	0.0071***
		[0.0008]	[0.0009]		[0.0010]	[0.0011]		[0.0011]	[0.0013]
Adjusted $R2$	0.116	0.603		0.035	0.598		0.031	0.630	
Observations	89	89	89	89	89	89	89	89	89

			First stage: the instrumented variable is Horse Power of Steam Engines						
Distance to Fresnes			-0.0132***			-0.0132***			-0.0132***
			[.00274]			[.00274]			[.00274]
F-stat (1st stage)			23.261			23.261			23.261

	(1) OLS	(2) OLS	(3) IV	(4) OLS	(5) OLS	(6) IV	(7) OLS	(8) OLS	(9) IV
			Share of intermediary professions in workforce (age 25-54)						
		1990			1999			2010	
Horse Power of Steam Engines	0.00245*	0.000888	-0.00478	0.00329**	0.000837	-0.00682*	0.00453**	0.00176	-0.0115**
	[0.00147]	[0.00110]	[0.00323]	[0.00159]	[0.00115]	[0.00359]	[0.00213]	[0.00165]	[0.00544]
Average Rainfall		-0.00407	0.00494		0.00991	0.0221		0.0166	0.0377
		[0.0131]	[0.0138]		[0.0133]	[0.0158]		[0.0191]	[0.0240]
Average Temperature		-0.0194	-0.0111		-0.00825	0.00301		-0.0148	0.00469
		[0.0161]	[0.0173]		[0.0174]	[0.0195]		[0.0262]	[0.0300]
Latitude		-0.0582	0.0763		0.0273	0.209		0.0463	0.361
		[0.148]	[0.158]		[0.156]	[0.171]		[0.205]	[0.237]
Land Suitability		0.00940	0.00888		0.00472	0.00402		0.00540	0.00419
		[0.00778]	[0.00766]		[0.00803]	[0.00842]		[0.0113]	[0.0124]
Maritime Department		-0.00149	-0.00238		-0.00305	-0.00425		-0.00373	-0.00579
		[0.00623]	[0.00648]		[0.00694]	[0.00743]		[0.01000]	[0.0110]
Border Department		0.00868	0.00774		0.00977	0.00850		0.0131	0.0109
		[0.00666]	[0.00641]		[0.00738]	[0.00733]		[0.0113]	[0.0117]
Distance to Paris		4.55e-05	5.18e-05		4.91e-05	5.76e-05		7.39e-05	8.86e-05
		[3.91e-05]	[3.59e-05]		[4.10e-05]	[3.92e-05]		[5.49e-05]	[5.48e-05]
Paris and Suburbs		0.0997***	0.103***		0.0978***	0.103***		0.128***	0.137***
		[0.0118]	[0.0121]		[0.0166]	[0.0172]		[0.0222]	[0.0239]
Alsace-Lorraine		0.00311	0.00824		-0.000848	0.00610		-0.00813	0.00386
		[0.0133]	[0.0127]		[0.0124]	[0.0134]		[0.0166]	[0.0206]
Urban Population in 1700		0.00799***	0.00960***		0.00942***	0.0116***		0.0131***	0.0168***
		[0.00145]	[0.00180]		[0.00164]	[0.00212]		[0.00239]	[0.00324]
Adjusted $R2$	0.020	0.639		0.041	0.601		0.041	0.572	
Observations	89	89	89	89	89	89	89	89	89

			First stage: the instrumented variable is Horse Power of Steam Engines						
Distance to Fresnes			-0.0132***			-0.0132***			-0.0132***
			[.00274]			[.00274]			[.00274]
F-stat (1st stage)			23.261			23.261			23.261

Note: All regressions, except for the unconditional ones, include a dummy variable for the three departments which had no steam engine in 1860-1865.The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Table C.6: Industrialization and share of intermediary professionals in the workforce (age 25-54), 1968-2010

	(1) OLS	(2) OLS	(3) IV	(4) OLS	(5) OLS	(6) IV	(7) OLS	(8) OLS	(9) IV
				Share of intermediary professions in workforce (age 25-54)					
		1968			1975			1982	
Horse Power of Steam Engines	0.00637***	0.00616***	0.0116***	0.00455***	0.00471***	0.00358	0.00239**	0.00169	0.00109
	[0.00117]	[0.00152]	[0.00306]	[0.00117]	[0.00127]	[0.00302]	[0.000986]	[0.00121]	[0.00296]
Average Rainfall		0.0304**	0.0217		0.000676	0.00247		0.0124	0.0134
		[0.0115]	[0.0133]		[0.0127]	[0.0128]		[0.0150]	[0.0147]
Average Temperature		-0.0275*	-0.0355**		-0.0569***	-0.0553***		-0.0516***	-0.0507***
		[0.0138]	[0.0153]		[0.0130]	[0.0135]		[0.0158]	[0.0156]
Latitude		-0.0376	-0.168		-0.221*	-0.194		-0.0793	-0.0649
		[0.117]	[0.152]		[0.128]	[0.144]		[0.144]	[0.164]
Land Suitability		0.00895	0.00945		0.0135*	0.0134*		0.0120	0.0120
		[0.00636]	[0.00652]		[0.00752]	[0.00700]		[0.00873]	[0.00807]
Maritime Department		-0.0113**	-0.0105*		0.00322	0.00322		0.00513	0.00503
		[0.00555]	[0.00572]		[0.00567]	[0.00546]		[0.00525]	[0.00505]
Border Department		0.0172***	0.0181***		0.0152***	0.0150***		0.00760	0.00750
		[0.00497]	[0.00572]		[0.00492]	[0.00448]		[0.00610]	[0.00560]
Distance to Paris		-1.37e-05	-1.98e-05		-2.66e-05	-2.54e-05		7.94e-06	8.61e-06
		[3.20e-05]	[3.34e-05]		[3.70e-05]	[3.47e-05]		[3.97e-05]	[3.72e-05]
Paris and Suburbs		0.0240**	0.0206**		0.0554***	0.0561***		0.0446***	0.0450***
		[0.0094]	[0.0084]		[0.0181]	[0.0167]		[0.0168]	[0.0156]
Alsace-Lorraine		-0.00869	-0.0137*		0.00827	0.00929		0.00921	0.00975
		[0.00905]	[0.00805]		[0.00850]	[0.00816]		[0.00877]	[0.00777]
Urban Population in 1700		0.0060***	0.0045***		0.0054***	0.0057***		0.0058***	0.0060***
		[0.0013]	[0.0014]		[0.0014]	[0.0015]		[0.0014]	[0.0017]
Adjusted $R2$	0.274	0.623		0.123	0.546		0.040	0.421	
Observations	89	89	89	89	89	89	89	89	89
			First stage: the instrumented variable is Horse Power of Steam Engines						
Distance to Fresnes			-0.0132***			-0.0132***			-0.0132***
			[.00274]			[.00274]			[.00274]
F-stat (1st stage)			23.261			23.261			23.261

	(1) OLS	(2) OLS	(3) IV	(4) OLS	(5) OLS	(6) IV	(7) OLS	(8) OLS	(9) IV
				Share of intermediary professions in workforce (age 25-54)					
		1990			1999			2010	
Horse Power of Steam Engines	0.00143	0.000957	-0.00303	0.00125	0.00116	-0.00624*	-0.000644	-0.000115	-0.00822**
	[0.000933]	[0.00119]	[0.00287]	[0.00102]	[0.00122]	[0.00336]	[0.000965]	[0.00128]	[0.00339]
Average Rainfall		0.00828	0.0146		-0.000450	0.0113		-0.00358	0.00932
		[0.0138]	[0.0138]		[0.0142]	[0.0153]		[0.0145]	[0.0154]
Average Temperature		-0.0541***	-0.0482***		-0.0463***	-0.0354*		-0.0397**	-0.0278
		[0.0155]	[0.0167]		[0.0158]	[0.0181]		[0.0162]	[0.0181]
Latitude		-0.0368	0.0579		0.0229	0.199		-0.0391	0.153
		[0.148]	[0.162]		[0.155]	[0.171]		[0.135]	[0.162]
Land Suitability		0.0133	0.0129		0.00989	0.00921		0.00604	0.00530
		[0.00826]	[0.00799]		[0.00854]	[0.00898]		[0.00919]	[0.00986]
Maritime Department		0.00377	0.00315		0.00317	0.00201		0.00672	0.00546
		[0.00555]	[0.00586]		[0.00574]	[0.00657]		[0.00506]	[0.00613]
Border Department		0.00600	0.00534		0.00523	0.00400		0.00153	0.000182
		[0.00645]	[0.00587]		[0.00675]	[0.00652]		[0.00619]	[0.00627]
Distance to Paris		3.25e-05	3.70e-05		5.18e-05	6.00e-05		4.82e-05	5.73e-05
		[3.86e-05]	[3.58e-05]		[4.13e-05]	[3.85e-05]		[3.73e-05]	[3.57e-05]
Paris and Suburbs		0.0563***	0.0588***		0.0542***	0.0589***		0.0468**	0.0519***
		[0.0172]	[0.0150]		[0.0191]	[0.0159]		[0.0205]	[0.0171]
Alsace-Lorraine		0.00746	0.0111		0.00692	0.0136		0.00214	0.00949
		[0.00908]	[0.00938]		[0.0103]	[0.0126]		[0.00992]	[0.0132]
Urban Population in 1700		0.00559***	0.00671***		0.00584***	0.00793***		0.00530***	0.00759***
		[0.00145]	[0.00171]		[0.00155]	[0.00193]		[0.00157]	[0.00194]
Adjusted $R2$	0.006	0.428		0.001	0.385		-0.008	0.309	
Observations	89	89	89	89	89	89	89	89	89
			First stage: the instrumented variable is Horse Power of Steam Engines						
Distance to Fresnes			-0.0132***			-0.0132***			-0.0132***
			[.00274]			[.00274]			[.00274]
F-stat (1st stage)			23.261			23.261			23.261

Note: All regressions, except for the unconditional ones, include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, are in logarithm.. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Table C.7: Industrialization and the share of employees in the workforce (age 25-54), 1968-2010

	(1) OLS	(2) OLS	(3) IV	(4) OLS	(5) OLS	(6) IV	(7) OLS	(8) OLS	(9) IV
					Share of employees in workforce (age 25-54)				
		1968			1975			1982	
Horse Power of Steam Engines	0.00640***	0.00661***	0.0136***	0.00182	0.00191	0.00160	-0.00122	-0.000742	-0.00201
	[0.00178]	[0.00204]	[0.00509]	[0.00175]	[0.00173]	[0.00496]	[0.00135]	[0.00118]	[0.00312]
Average Rainfall		0.00701	-0.00409		-0.0421**	-0.0416**		-0.0482***	-0.0462***
		[0.0188]	[0.0202]		[0.0204]	[0.0203]		[0.0153]	[0.0150]
Average Temperature		0.00314	-0.00710		-0.0298	-0.0293		-0.0240	-0.0222
		[0.0247]	[0.0260]		[0.0266]	[0.0256]		[0.0182]	[0.0178]
Latitude		-0.316	-0.481**		-0.508**	-0.500**		-0.474***	-0.444**
		[0.192]	[0.227]		[0.209]	[0.237]		[0.148]	[0.173]
Land Suitability		0.00720	0.00783		0.0198	0.0197		0.00995	0.00984
		[0.0122]	[0.0120]		[0.0145]	[0.0134]		[0.00986]	[0.00912]
Maritime Department		-0.00446	-0.00337		0.0139	0.0139*		0.0215***	0.0213***
		[0.00880]	[0.00884]		[0.00877]	[0.00823]		[0.00629]	[0.00595]
Border Department		0.0330***	0.0341***		0.0291***	0.0290***		0.0181***	0.0179***
		[0.00747]	[0.00851]		[0.00789]	[0.00730]		[0.00532]	[0.00490]
Distance to Paris		-6.51e-05	-7.29e-05		-5.63e-05	-5.59e-05		-5.61e-05	-5.46e-05
		[4.91e-05]	[4.80e-05]		[5.44e-05]	[5.13e-05]		[3.68e-05]	[3.55e-05]
Paris and Suburbs		0.0382	0.0338		0.0707***	0.0709***		0.0563***	0.0571***
		[0.0257]	[0.0227]		[0.00830]	[0.00855]		[0.00721]	[0.00704]
Alsace-Lorraine		-0.00429	-0.0106		0.00708	0.00736		0.0146	0.0158
		[0.0131]	[0.0146]		[0.0174]	[0.0163]		[0.0120]	[0.0107]
Urban Population in 1700		0.0070***	0.0050*		0.0057***	0.0058***		0.0033**	0.0036**
		[0.0024]	[0.0025]		[0.0020]	[0.0021]		[0.0014]	[0.0015]
Adjusted $R2$	0.149	0.407		0.000	0.466		-0.003	0.549	
Observations	89	89	89	89	89	89	89	89	89

	First stage: the instrumented variable is Horse Power of Steam Engines								
Distance to Fresnes			-0.0132***			-0.0132***			-0.0132***
			[.00274]			[.00274]			[.00274]
F-stat (1st stage)			23.261			23.261			23.261

	(1) OLS	(2) OLS	(3) IV	(4) OLS	(5) OLS	(6) IV	(7) OLS	(8) OLS	(9) IV
					Share of employees in workforce (age 25-54)				
		1990			1999			2010	
Horse Power of Steam Engines	-0.00390***	-0.00273***	-0.00157	-0.00493***	-0.00234**	0.00421*	-0.00494***	-0.00212*	0.00871**
	[0.00119]	[0.000985]	[0.00235]	[0.00104]	[0.00101]	[0.00254]	[0.000889]	[0.00125]	[0.00353]
Average Rainfall		-0.0430***	-0.0448***		-0.0469***	-0.0573***		-0.0435***	-0.0607***
		[0.0112]	[0.0112]		[0.0107]	[0.0127]		[0.0142]	[0.0172]
Average Temperature		-0.00791	-0.00961		-0.0103	-0.0199		0.00844	-0.00747
		[0.0137]	[0.0137]		[0.0122]	[0.0141]		[0.0146]	[0.0186]
Latitude		-0.304**	-0.331**		-0.351***	-0.507***		-0.274**	-0.531***
		[0.116]	[0.118]		[0.113]	[0.118]		[0.126]	[0.132]
Land Suitability		-0.00296	-0.00285		-0.00528	-0.00469		-0.00539	-0.00440
		[0.00653]	[0.00613]		[0.00513]	[0.00622]		[0.00583]	[0.00793]
Maritime Department		0.0245***	0.0247***		0.0246***	0.0256***		0.0194***	0.0211***
		[0.00458]	[0.00427]		[0.00463]	[0.00508]		[0.00573]	[0.00689]
Border Department		0.0149***	0.0151***		0.0107**	0.0118**		0.0102	0.0120
		[0.00453]	[0.00430]		[0.00479]	[0.00552]		[0.00708]	[0.00816]
Distance to Paris		-2.81e-05	-2.94e-05		-3.08e-05	-3.81e-05		-2.55e-05	-3.75e-05
		[2.73e-05]	[2.57e-05]		[2.69e-05]	[2.58e-05]		[3.30e-05]	[3.20e-05]
Paris and Suburbs		0.0347***	0.0339***		0.0124*	0.00824		-0.00420	-0.0111
		[0.00898]	[0.00877]		[0.00705]	[0.00800]		[0.00647]	[0.00815]
Alsace-Lorraine		0.0112	0.0101		0.00932	0.00338		0.00764	-0.00218
		[0.00712]	[0.00709]		[0.0100]	[0.0120]		[0.0143]	[0.0180]
Urban Population in 1700		0.00107	0.000747		-0.00157	-0.00342**		-0.00401***	-0.00707***
		[0.00111]	[0.00114]		[0.00106]	[0.00135]		[0.00127]	[0.00192]
Adjusted $R2$	0.114	0.609		0.205	0.630		0.202	0.510	
Observations	89	89	89	89	89	89	89	89	89

	First stage: the instrumented variable is Horse Power of Steam Engines								
Distance to Fresnes			-0.0132***			-0.0132***			-0.0132***
			[.00274]			[.00274]			[.00274]
F-stat (1st stage)			23.261			23.261			23.261

Note: All regressions, except for the unconditional ones, include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Appendix D. Industrialization and the Educational Achievements of Women

Table D.1: Industrialization and female school enrollment in 2010

	(1) OLS	(2) OLS	(3) IV	(4) OLS	(5) OLS	(6) IV
	School Enrollment of Women Age 15-17 in 2010			School Enrollment of Women Age 18-24 in 2010		
Horse Power of Steam Engines	0.593**	-0.462	-2.696***	0.815**	-0.329	-3.062**
	[0.295]	[0.472]	[1.025]	[0.326]	[0.564]	[1.248]
Average Rainfall		10.14**	13.70***		8.344*	12.70**
		[4.431]	[4.811]		[4.550]	[5.425]
Average Temperature		3.980	7.263		1.977	5.994
		[5.792]	[5.620]		[6.158]	[6.231]
Latitude		47.47	100.5**		58.80	123.7**
		[40.67]	[46.32]		[47.68]	[56.00]
Land Suitability		-3.391	-3.596		-2.725	-2.975
		[3.083]	[3.097]		[3.374]	[3.507]
Maritime Department		-0.264	-0.613		-0.421	-0.848
		[2.027]	[2.072]		[2.265]	[2.395]
Border Department		1.395	1.024		1.872	1.419
		[2.023]	[2.002]		[1.982]	[2.033]
Distance to Paris		0.0129	0.0154		0.0204	0.0235*
		[0.0109]	[0.0112]		[0.0123]	[0.0129]
Paris and Suburbs		10.58***	11.99***		12.53***	14.26***
		[1.919]	[1.801]		[2.816]	[2.434]
Alsace-Lorraine		-3.612	-1.586		-5.091	-2.612
		[3.773]	[4.382]		[3.812]	[3.932]
Urban Population in 1700		3.034***	3.666***		3.561***	4.335***
		[0.409]	[0.509]		[0.477]	[0.586]
Adjusted $R2$	0.017	0.392		0.027	0.433	
Observations	89	89	89	89	89	89

			First stage: the instrumented variable is Horse Power of Steam Engines			
Distance to Fresnes			-0.0132***			-0.0132***
			[0.00274]			[0.00274]
F-stat (1st stage)			23.261			23.261

Note: All regressions, except for the unconditional ones, include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Table D.2: The long-run effects of industrialization on human capital: female high-school and college graduates, 1968-2010

	(1) OLS	(2) OLS	(3) IV	(4) OLS	(5) OLS	(6) IV	(7) OLS	(8) OLS	(9) IV
	Share of Women Age 25 and above with a Secondary or Post-Secondary Degree, 1968			Share of Women Age 25 and above with a Secondary or Post-Secondary Degree, 1975			Share of Women Age 25 and above with a Secondary or Post-Secondary Degree, 1982		
Horse Power of Steam Engines	5.50e-05	0.000734	-0.00175	-0.000226	0.00119	-0.00380	-0.00176	0.000352	-0.00656*
	[0.000942]	[0.000712]	[0.00192]	[0.00158]	[0.00115]	[0.00315]	[0.00179]	[0.00120]	[0.00369]
Average Rainfall		0.00499	0.00895		0.00729	0.0152		0.0110	0.0220
		[0.00747]	[0.00869]		[0.0117]	[0.0139]		[0.0128]	[0.0155]
Average Temperature		-0.0341***	-0.0305***		-0.0625***	-0.0551***		-0.0767***	-0.0666***
		[0.0106]	[0.0106]		[0.0171]	[0.0176]		[0.0177]	[0.0197]
Latitude		-0.166**	-0.107		-0.229*	-0.110		-0.204	-0.0400
		[0.0737]	[0.0875]		[0.130]	[0.147]		[0.175]	[0.194]
Land Suitability		0.00537	0.00515		0.00993	0.00947		0.00948	0.00885
		[0.00492]	[0.00480]		[0.00834]	[0.00818]		[0.00880]	[0.00898]
Maritime Department		0.000909	0.000521		0.00161	0.00083		0.000324	-0.000755
		[0.00375]	[0.00381]		[0.00602]	[0.00630]		[0.00654]	[0.00721]
Border Department		0.00768**	0.00726***		0.0104*	0.00956*		0.00545	0.00430
		[0.00304]	[0.00279]		[0.00560]	[0.00516]		[0.00658]	[0.00630]
Distance to Paris		7.75e-06	1.05e-05		2.78e-05	3.34e-05		6.06e-05	6.83e-05
		[1.87e-05]	[1.87e-05]		[3.33e-05]	[3.28e-05]		[4.42e-05]	[4.21e-05]
Paris and Suburbs		0.0534***	0.0549***		0.0880***	0.0912***		0.103***	0.107***
		[0.0096]	[0.0095]		[0.0126]	[0.0127]		[0.0110]	[0.0117]
Alsace-Lorraine		-0.00349	-0.00123		-0.0103	-0.00580		-0.0142	-0.00795
		[0.00682]	[0.00683]		[0.0120]	[0.0126]		[0.0134]	[0.0142]
Urban Population in 1700		0.0042***	0.0049***		0.0075***	0.0089***		0.0089***	0.0109***
		[0.0008]	[0.0009]		[0.0013]	[0.0016]		[0.0014]	[0.0019]
Adjusted $R2$	-0.011	0.629		-0.011	0.638		0.001	0.662	
Observations	89	89	89	89	89	89	89	89	89

			First stage: the instrumented variable is Horse Power of Steam Engines						
Distance to Fresnes			-0.0132***			-0.0132***			-0.0132***
			[0.00274]			[0.00274]			[0.00274]
F-stat (1st stage)			23.261			23.261			23.261

	(10) OLS	(11) OLS	(12) IV	(13) OLS	(14) OLS	(15) IV	(16) OLS	(17) OLS	(18) IV
	Share of Women Age 25 and above with a Secondary or Post-Secondary Degree, 1990			Share of Women Age 25 and above with a Secondary or Post-Secondary Degree, 1999			Share of Women Age 25 and above with a Secondary or Post-Secondary Degree, 2010		
Horse Power of Steam Engines	-0.00255	0.00112	-0.00931*	-0.00331	0.000944	-0.0116*	-0.00590**	-0.000848	-0.0179**
	[0.00238]	[0.00159]	[0.00514]	[0.00288]	[0.00200]	[0.00621]	[0.00293]	[0.00231]	[0.00726]
Average Rainfall		0.00614	0.0227		0.00448	0.0244		0.0229	0.0500
		[0.0183]	[0.0226]		[0.0224]	[0.0279]		[0.0267]	[0.0342]
Average Temperature		-0.0853***	-0.0700**		-0.0888***	-0.0704**		-0.0693**	-0.0442
		[0.0244]	[0.0277]		[0.0295]	[0.0338]		[0.0340]	[0.0394]
Latitude		-0.202	0.0451		-0.148	0.149		-0.0926	0.312
		[0.241]	[0.267]		[0.291]	[0.319]		[0.320]	[0.354]
Land Suitability		0.00943	0.00848		0.00404	0.00290		-0.00571	-0.00726
		[0.0122]	[0.0126]		[0.0140]	[0.0146]		[0.0160]	[0.0174]
Maritime Department		-0.00185	-0.00347		-0.00140	-0.00335		0.00442	0.00176
		[0.00964]	[0.0107]		[0.0117]	[0.0129]		[0.0129]	[0.0148]
Border Department		0.00926	0.00753		0.0114	0.00930		0.00799	0.00517
		[0.00983]	[0.00973]		[0.0125]	[0.0125]		[0.0146]	[0.0155]
Distance to Paris		0.000115*	0.000127**		0.000172**	0.000186***		0.000193**	0.000212***
		[6.16e-05]	[5.90e-05]		[7.33e-05]	[7.01e-05]		[8.17e-05]	[7.87e-05]
Paris and Suburbs		0.151***	0.157***		0.184***	0.192***		0.196***	0.207***
		[0.0162]	[0.0172]		[0.0213]	[0.0226]		[0.0196]	[0.0216]
Alsace-Lorraine		-0.0252	-0.0157		-0.0301	-0.0188		-0.0379*	-0.0224
		[0.0184]	[0.0201]		[0.0221]	[0.0239]		[0.0211]	[0.0258]
Urban Population in 1700		0.0118***	0.0147***		0.0152***	0.0187***		0.0166***	0.0215***
		[0.00211]	[0.00277]		[0.00253]	[0.00342]		[0.00281]	[0.00406]
Adjusted $R2$	0.002	0.659		0.003	0.667		0.027	0.653	
Observations	89	89	89	89	89	89	89	89	89

			First stage: the instrumented variable is Horse Power of Steam Engines						
Distance to Fresnes			-0.0132***			-0.0132***			-0.0132***
			[0.00274]			[0.00274]			[0.00274]
F-stat (1st stage)			23.261			23.261			23.261

Note: All regressions, except for the unconditional ones, include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Appendix E. Industrialization and GDP per Capita, 1872 & 1901, Accounting for Sectoral Tariff Protection

Table E.1: Industrialization and income per capita, 1872 & 1901, accounting for sectoral tariff protection

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV	(6) IV	(7) IV
		GDP per capita, 1872			GDP per capita, 1901		
Horse Power of Steam Engines	0.121**	0.120**	0.117**	0.244***	0.241***	0.246***	0.238***
	[0.0515]	[0.0534]	[0.0530]	[0.0724]	[0.0727]	[0.0753]	[0.0718]
Weighted tariffs across sectors, 1865		0.202			0.132		
		[0.128]			[0.187]		
Weighted tariffs across sectors, 1872			0.0802			-0.0945	
			[0.118]			[0.161]	
Weighted tariffs across sectors, 1901							0.101
							[0.153]
Average Rainfall	-0.505**	-0.356	-0.421	-0.795**	-0.739**	-0.941**	-0.744**
	[0.239]	[0.253]	[0.275]	[0.338]	[0.362]	[0.401]	[0.363]
Average Temperature	0.109	0.188	0.164	-0.537	-0.430	-0.523	-0.413
	[0.315]	[0.339]	[0.350]	[0.361]	[0.388]	[0.405]	[0.386]
Land Suitability	0.118	0.0766	0.106	0.279*	0.235	0.274*	0.259
	[0.127]	[0.130]	[0.132]	[0.156]	[0.163]	[0.158]	[0.159]
Latitude	-4.899	-4.534	-4.674	-8.713**	-8.537**	-9.060**	-8.662**
	[3.123]	[3.366]	[3.279]	[3.849]	[3.879]	[3.855]	[3.748]
Maritime Department	0.108	0.0985	0.101	0.0438	0.0299	0.0425	0.0234
	[0.111]	[0.110]	[0.112]	[0.138]	[0.137]	[0.139]	[0.136]
Border Department	0.00609	-0.0252	-0.00360	0.155	0.178	0.222	0.188
	[0.138]	[0.149]	[0.149]	[0.163]	[0.169]	[0.173]	[0.166]
Distance to Paris	-0.0011	-0.0011	-0.0011	-0.0011	-0.0011	-0.0011	-0.0011
	[0.0007]	[0.0007]	[0.0007]	[0.0008]	[0.0008]	[0.0008]	[0.0008]
Paris and Suburbs	-0.0164	-0.0496	-0.0137	-0.189	-0.213	-0.195	-0.190
	[0.116]	[0.108]	[0.114]	[0.171]	[0.160]	[0.177]	[0.166]
Alsace-Lorraine							
Urban Population in 1700	-0.00613	-0.00710	-0.00547	-0.0485	-0.0485	-0.0485	-0.0476
	[0.0301]	[0.0296]	[0.0297]	[0.0392]	[0.0389]	[0.0398]	[0.0394]
Observations	85	82	82	85	82	82	82
			First stage: the instrumented variable is Horse Power of Steam Engines				
Distance to Fresnes	-0.0123***	-0.0123***	-0.0120***	-0.0123***	-0.0123***	-0.0120***	-0.0124***
	[0.00278]	[0.00283]	[0.00272]	[0.00278]	[0.00283]	[0.00272]	[0.00279]
F-stat	19.526	19.007	19.492	19.526	19.007	19.492	19.807

Note: All regressions, except for the unconditional ones, include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, are in logarithm. Robust standard errors are reported in brackets. *** indicates significance at the 1%-level, ** indicates significance at the 5%-level, * indicates significance at the 10%-level.

Appendix F. Spatial Correlation

In this appendix, we test for spatial correlation in our main regressions on the impact of steam engines on GDP per capita in Tables 4 and 5 by implementing spatial LM tests on the residuals of the OLS regressions with control variables. The results in Table F.1 suggest that there is no statistical evidence of spatial autocorrelation in the residuals.

Similarly, we run our tests of spatial correlation over our the OLS regressions with control

variables for our various measures of human capital reported in Tables 7, 8, D.1, 9 and D.2. These are the literacy of conscripts (1874-1883 & 1894-1903), the school enrollment in 2010 for men and women age 15-17 and 18-24, as well as the share of men and women age 25 and above with at least a secondary degree.

The test results reported in Tables F.5 to F.8 suggest that there is evidence of spatial correlation for the regressions where the dependent variable is the Gini coefficient (2001-2008 average), the gross income of the individuals at the bottom 25th percentile of the income distribution over the 2001-2010 period, the share of the workforce in industry in 1901, 1931 and 2010, as well as the school enrollment of men and women age 15-17 in 2010.

We then rerun the OLS and IV regressions with Conley (1999) standard errors with a radius of 100km. The results are reported in Tables F.9 and F.11. We find that the statistical significance of our variables remains identical to those in our main regressions.

Table F.1: LM tests of spatial correlation: GDP per capita in 1872, 1901, 1930 and 2001-2010

	GDP per capita, 1872	GDP per capita, 1901	GDP per capita, 1930	GDP per capita, 2001-2010
Spatial error LM test	0.779	0.000	0.454	0.001
p-value	0.377	0.993	0.500	0.974
Spatial lag LM test	0.185	0.354	2.037	1.348
p-value	0.667	0.552	0.154	0.246

Note: The table reports LM tests of spatial correlation for the residuals in the OLS regressions in Columns (4) and (9) in Tables 4 and 5.

Table F.2: LM tests of spatial correlation: Unemployment, Gini inequality coefficient and the distribution of income, after 2000

	Unemployment rate 2002-2011	Gini coefficient 2001-2008	25th Percentile - Fiscal Income per Person in Household, 2001-2010
Spatial error LM test	2.202	7.348	5.599
p-value	0.138	0.007	0.014
Spatial lag LM test	2.104	3.098	9.532
p-value	0.147	0.078	0.002

Note: The table reports LM tests of spatial correlation for the residuals in the OLS regressions in Columns 2, 5 and 8 in Table 6.

Table F.3: LM tests of spatial correlation: Share of the workforce in industry

	Share of the workforce in industry								
	1872	1901	1931	1968	1975	1982	1990	1999	2010
Spatial error LM test	0.010	1.264	2.836	0.102	0.286	0.72	0.046	0.025	3.234
p-value	0.921	0.261	0.092	0.749	0.593	0.396	0.830	0.873	0.072
Spatial lag LM test	2.532	6.806	20.705	2.456	0.123	0.606	2.25	1.816	0.212
p-value	0.112	0.009	0.000	0.117	0.726	0.436	0.134	0.178	0.646

Note: The table reports LM tests of spatial correlation for the residuals in the OLS regressions in Columns 2, 5 and 8 of Table C.1 and in Columns 2, 5, 8, 11, 14 and 17 of Table C.2.

Table F.4: LM tests of spatial correlation: Share of the workforce in services

	Share of the workforce in services								
	1872	1901	1931	1968	1975	1982	1990	1999	2010
Spatial error LM test	1.851	0.002	0.556	0.508	0.039	0.021	0.203	0.166	1.458
p-value	0.174	0.963	0.456	0.476	0.843	0.885	0.652	0.683	0.227
Spatial lag LM test	1.218	0.003	1.053	0.060	0.357	0.235	1.878	0.987	1.295
p-value	0.27	0.960	0.305	0.806	0.550	0.628	0.171	0.320	0.255

Note: The table reports LM tests of spatial correlation for the residuals in the OLS regressions in Columns 2, 5 and 8 of Table C.3 and in Columns 2, 5, 8, 11, 14 and 17 of Table C.4.

Table F.5: LM tests of spatial correlation: Literacy of conscripts, 1874-1893 & 1894-1903

	Share of Literate Individuals among Conscripts	
	1874-1883 average	1894-1903 average
Spatial error LM test	1.573	0.606
p-value	0.210	0.436
Spatial lag LM test	0.849	0.008
p-value	0.357	0.930

Note: The table reports LM tests of spatial correlation for the residuals in the OLS regressions in Columns 2, 5 and 8 in Table 7.

Table F.6: LM tests of spatial correlation: Share of men age 25 and above with a secondary or post-secondary degree, 1968-2010

	Share of Men Age 25 and above with a Secondary or Post-Secondary Degree					
	1968	1975	1982	1990	1999	2010
Spatial error LM test	0.108	0.015	0.019	0.080	0.674	0.724
p-value	0.743	0.901	0.890	0.777	0.412	0.394
Spatial lag LM test	0.005	0.015	0.012	0.011	0.155	0.203
p-value	0.945	0.903	0.914	0.916	0.694	0.652

Note: The table reports LM tests of spatial correlation for the residuals in the OLS regressions in Columns 2, 5 and 8 in Panels A and B of Table 9.

Table F.7: LM tests of spatial correlation: Share of women age 25 and above with a secondary or post-secondary degree, 1968-2010

	Share of Women Age 25 and above with a Secondary or Post-Secondary Degree					
	1968	1975	1982	1990	1999	2010
Spatial error LM test	0.006	0.052	0.184	0.247	1.100	1.028
p-value	0.936	0.819	0.668	0.619	0.294	0.311
Spatial lag LM test	0.011	0.027	0.013	0.092	0.378	0.51
p-value	0.916	0.869	0.91	0.762	0.529	0.475

Note: The table reports LM tests of spatial correlation for the residuals in the OLS regressions in Columns 2, 5 and 8 in Panels A and B of Table D.2.

Table F.8: LM tests of spatial correlation: School enrollment in 2010

	School Enrollment of Men Age 15-17 in 2010	School Enrollment of Women Age 15-17 in 2010	School Enrollment of Men Age 18-24 in 2010	School Enrollment of Women Age 18-24 in 2010
Spatial error LM test	13.429	11.913	1.412	1.510
p-value	0.000	0.001	0.235	0.219
Spatial lag LM test	0.024	1.084	0.955	0.646
p-value	0.876	0.298	0.328	0.422

Note: The table reports LM tests of spatial correlation for the residuals in the OLS regressions in Columns 2 and 5 in Tables 8 and D.1.

Table F.9: Gini inequality coefficient and the distribution of income, after 2000: regressions with spatial Conley (1999) standard errors

|	(1) OLS	(2) OLS	(3) IV	(4) OLS	(5) OLS	(6) IV
		Gini coefficient 2001-2008 average		25th Percentile - Fiscal Income per Person in Household, 2001-2010 Average		
Horse Power of Steam Engines	-0.149	0.008	0.028	1.307	-0.012	-0.093
	[0.002]***	[0.0009]***	[0.002]***	[0.019]***	[0.003]***	[0.009]***
Average Rainfall		-0.070	-0.092		0.177	0.270
		[0.013]***	[0.010]***		[0.021]***	[0.042]***
Average Temperature		-0.067	-0.075		0.211	0.245
		[0.008]***	[0.009]***		[0.026]***	[0.029]***
Latitude		-0.130	-0.124		1.839	1.811
		[0.021]***	[0.020]***		[0.034]***	[0.061]***
Land Suitability		0.053	0.050		-0.138	-0.124
		[0.003]***	[0.005]***		[0.009]***	[0.016]***
Maritime Department		0.014	0.004		-0.073	-0.033
		[0.005]***	[0.005]		[0.010]***	[0.009]***
Border Department		0.028	0.029		0.006	0.004
		[0.005]***	[0.003]***		[0.017]	[0.012]
Distance to Paris		0.0001	0.0002		0.0003	-0.0001
		[0.00002]***	[0.00001]***		[0.00004]***	[0.0001]
Paris and Suburbs		0.094	0.094		0.608	0.608
		[0.005]***	[0.004]***		[0.019]***	[0.022]***
Alsace-Lorraine		-0.026	-0.064		0.073	0.234
		[0.006]***	[0.005]***		[0.017]***	[0.031]***
Urban Population in 1700		0.008	0.003		0.017	0.037
		[0.0007]***	[0.0008]***		[0.003]***	[0.005]***
Observations	89	89	89	89	89	89

Note: All regressions, except for the unconditional ones, include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, and the dependent variables are in logarithm. The table reports spatial Conley (1999) standard errors with a radius of 100km.

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Table F.10: Share of the workforce in industry in 1901, 1931 and 2010: regressions with spatial Conley (1999) standard errors

	(1) OLS	(2) OLS	(3) IV	(4) OLS	(5) OLS	(6) IV	(7) OLS	(8) OLS	(9) IV
	Share of the workforce in industry, 1901			Share of the workforce in industry, 1931			Share of the workforce in industry, 2010		
Horse Power of Steam Engines	0.044	0.037	0.072	0.0523	0.044	0.089	0.034	0.005	-0.002
	[0.001]***	[0.002]***	[0.004]***	[0.0009]***	[0.002]***	[0.004]*	[0.001]***	[0.001]***	[0.002]
Average Rainfall		-0.001	-0.037		0.045	-0.008		0.037	0.046
		[0.010]	[0.015]**		[0.013]***	[0.014]		[0.009]***	[0.009]***
Average Temperature		-0.068	-0.078		-0.133	-0.152		0.011	0.014
		[0.009]***	[0.012]***		[0.012]***	[0.017]***		[0.008]	[0.008]*
Latitude		0.054	0.055		0.010	0.025		-0.016	0.006
		[0.020]***	[0.023]**		[0.027]	[0.029]		[0.015]	[0.004]
Land Suitability		0.058	0.050		0.074	0.066		0.005	-0.018
		[0.006]***	[0.008]***		[0.008]***	[0.011]***		[0.004]	[0.014]
Maritime Department		-0.015	-0.032		0.005	-0.018		0.006	0.010
		[0.005]***	[0.005]***		[0.005]	[0.006]***		[0.002]**	[0.003]***
Border Department		0.043	0.044		0.089	0.090		-0.001	-0.001
		[0.006]***	[0.005]***		[0.006]***	[0.007]***		[0.002]	[0.002]
Distance to Paris		0.00001	0.0002		-0.00001	0.0002		-0.00005	-0.0001
		[0.00001]	[0.00002]***		[0.00001]	[0.00002]***		[0.00001]***	[0.00001]***
Paris and Suburbs		0.025	0.025		0.103	0.103		-0.047	-0.047
		[0.005]***	[0.005]***		[0.006]***	[0.006]***		[0.004]***	[0.003]***
Alsace-Lorraine		0.075	-0.048		0.028	-0.063		0.022	0.037
		[0.009]***	[0.013]***		[0.007]***	[0.009]***		[0.004]***	[0.005]***
Urban Population in 1700		0.009	0.0001		0.017	0.005		-0.002	-0.0001
		[0.001]***	[0.002]		[0.001]***	[0.002]***		[0.001]***	[0.0004]
Observations	89	89	89	89	89	89	89	89	89

Note: All regressions, except for the unconditional ones, include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, are in logarithm. The table reports spatial Conley (1999) standard errors with a radius of 100km.

Table F.11: Industrialization and school enrollment for men and women age 15-17 in 2010: regressions with spatial Conley (1999) standard errors

	(1) OLS	(2) OLS	(3) IV	(4) OLS	(5) OLS	(6) IV
	School Enrollment of Men Age 15-17 in 2010			School Enrollment of Women Age 15-17 in 2010		
Horse Power of Steam Engines	14.086	-0.102	-0.678	14.252	-0.080	-0.619
	[0.213]***	[0.028]***	[0.054]***	[0.214]***	[0.024]***	[0.055]***
Average Rainfall		2.662	3.321		1.372	1.989
		[0.236]***	[0.194]***		[0.174]***	[0.172]***
Average Temperature		0.596	0.838		0.230	0.457
		[0.139]***	[0.173]***		[0.147]	[0.170]***
Latitude		-0.831	-0.733		-0.830	-0.738
		[0.064]***	[0.089]***		[0.065]***	[0.077]***
Land Suitability		19.601	19.405		22.300	22.117
		[0.417]***	[0.420]***		[0.341]***	[0.363]***
Maritime Department		-0.518	-0.236		-0.597	-0.332
		[0.125[***	[0.140]*		[0.089]***	[0.106]***
Border Department		-0.659	-0.674		-0.606	-0.620
		[0.095]***	[0.064]***		[0.100]***	[0.075]***
Distance to Paris		0.004	0.001		0.005	0.002
		[0.0003]***	[0.0004]***		[0.0002]***	[0.0004]***
Paris and Suburbs		1.276	1.274		1.488	1.487
		[0.093]***	[0.104]***		[0.070]***	[0.094]***
Alsace-Lorraine		-0.554	0.584		-0.711	0.356
		[0.145]***	[0.269]**		[0.139]***	[0.258]
Urban Population in 1700		0.109	0.252		0.035	0.169
		[0.015]***	[0.016]***		[0.011]***	[0.018]***
Observations	89	89	89	89	89	89

Note: All regressions, except for the unconditional ones, include a dummy variable for the three departments which had no steam engine in 1860-1865. The aerial distances are measured in kilometers. All the other explanatory variables, except the dummies, are in logarithm. The table reports spatial Conley (1999) standard errors with a radius of 100km.

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Appendix G. Average Height of Soldiers in France, 1700-1765
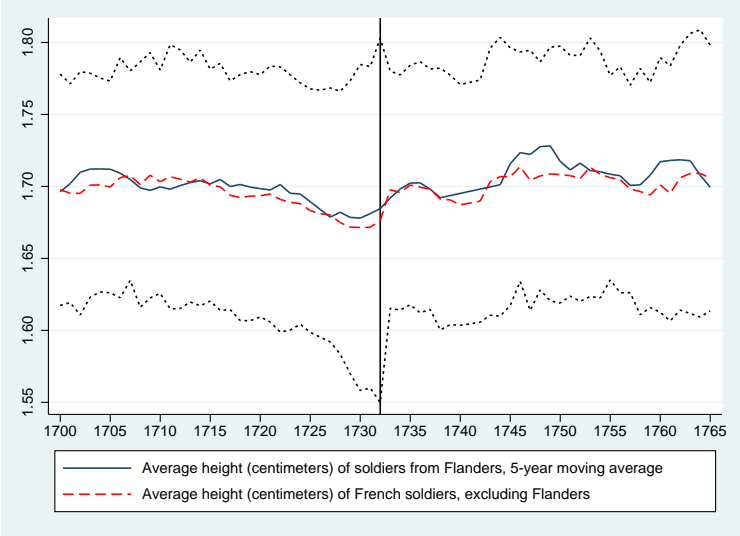
Figure G.8: Average height of soldiers in France, 1700-1765

Note: This figure displays the average mean height of soldiers from Flanders and from the rest of France. The interval between the dotted lines reflects the standard deviation around the national average (excluding Flanders). The vertical line marks the year 1732 when the first commercial application of the steam engine was made in France.

Appendix H. Variable definitions and sources

Dependent variables

Income.

GDP per capita, 1872 and 1901. Each department's GDP per capita in 1872 and 1901. Source: Caruana-Galizia (2013).

GDP per capita, 1930. Each department's GDP per capita in 1930. Source: Combes et al. (2011).

GDP per capita, 2001-2010 average. Each department's GDP per capita averaged over the 2001-2010 period. Source: French bureau of statistics (INSEE - *Institut National de la Statistique et des Etudes Economiques*).

Unemployment, Gini coefficient and 25th percentile of the income distribution.

Unemployment rate, 2002-2011 average. Each department's unemployment rate averaged over the 2002-2011 period. Source: French bureau of statistics (INSEE - *Institut National de la Statistique et des Etudes Economiques*).

Gini coefficient, 2001-2008 average. Each department's Gini coefficient averaged over the 2001-2008 period. Source: French bureau of statistics (INSEE - *Institut National de la Statistique et des Etudes Economiques*)

25th percentile of the income per person in household, 2001-2010 average. Each department's 25th percentile of the gross income per person in household averaged over the 2001-2010 period. Source: French bureau of statistics (INSEE - *Institut National de la Statistique et des Etudes Economiques*)

Workforce, Pre-WWII.

Share of workforce in industry, 1872, 1901, 1931. Each department's share of the workforce in the industrial sector in 1872, 1901 and 1931 (the control group is made of the agricultural sector). Sources: *Annuaire Statistique De La France* (1878-1939) and Béaur, Gérard, and Béatrice Marin. 2011. La Statistique Générale de la France Présentation. L'Atelier du Centre de recherches historiques. http:acrh.revues.org/index2891.html.

Share of workforce in services, 1872, 1901 and 1931. Source: Each department's share of the workforce in the service sector in 1872, 1901 and 1931 (the control group is made of the agricultural sector). Sources: *Annuaire Statistique De La France* (1878-1939) and Béaur, Gérard, and Béatrice Marin. 2011. La Statistique Générale de la France Présentation. L'Atelier du Centre de recherches historiques. http:acrh.revues.org/index2891.html.

Education Measures, Pre-WWI.

Share of literate individuals among conscripts, 1874-1883 and 1894-1903. The average share of French army conscripts, i.e., 20-year-old men who reported for military service in the department where their father lived, who could read and write, computed over the 1874-1883 and 1894-1903 periods. Source: *Annuaire Statistique De La France* (1878-1939).

Education Measures, Post-WWII.

Share of men age 25 and above with a secondary or post-secondary degree, 1968, 1975, 1982, 1990, 1999 and 2010. The share of men age 25 and above in the population of each department who at least completed secondary schooling. Source: The successive censuses conducted by the French bureau of statistics (INSEE - *Institut National de la Statistique et des Etudes Economiques*) in 1968, 1975, 1982, 1990, 1999 and 2010.

Share of women age 25 and above with a secondary or post-secondary degree, 1968, 1975, 1982, 1990, 1999 and 2010. The share of women age 25 and above in the population of each department who at least completed secondary schooling. Source: The successive censuses conducted by the French bureau of statistics (INSEE - *Institut National de la Statistique et des Etudes Economiques*) in 1968, 1975, 1982, 1990, 1999 and 2010.

School enrollment of men/women age 15-17/18-24, in 2010. The shares of men and women in the age groups 15-17 and 18-24 enrolled in an educational institution. Source: The successive censuses conducted by the French bureau of statistics (INSEE - *Institut National de la Statistique et des Etudes Economiques*) in 2010.

Workforce, Post-WWII.

Share of workforce in industry, 1968, 1975, 1982, 1990, 1999 and 2010. The share of the workforce working in the industrial sector (the control group is made of the agricultural sector). Source: The successive censuses conducted by the French bureau of statistics (INSEE - *Institut National de la Statistique et des Etudes Economiques*) in 1968, 1975, 1982, 1990, 1999 and 2010.

Share of workforce in services, 1968, 1975, 1982, 1990, 1999 and 2010. The share of the workforce working in the service sector (the control group is made of the agricultural sector). Source: The successive censuses conducted by the French bureau of statistics (INSEE - *Institut National de la Statistique et des Etudes Economiques*) in 1968, 1975, 1982, 1990, 1999 and 2010.

Share of Executives in Workforce (age 25-54), 1968, 1975, 1982, 1990, 1999 and 2010. The share of executives and other intellectual professions (i.e, engineers, executives, journalists, wage-earners in the arts, information, entertainment sectors, secondary school and university teachers) in the workforce age 25-54. Individuals in this group have a high-level of human capital. Source: The successive censuses conducted by the French bureau of statistics (INSEE - *Institut National de la Statistique et des Etudes Economiques*) in 1968, 1975, 1982, 1990, 1999 and 2010.

Share of Intermediary Professionals in Workforce (age 25-54), 1968, 1975, 1982, 1990, 1999 and 2010. Source: The share of middle management professionals (i.e., technicians, foremen, supervisors, primary school teachers, nurses) and employees (unqualified or qualified industrial and farm workers, as well as workers working for craftsmen) in the workforce age 25-54. Individuals in this group have a medium-level of human capital. Source: The successive censuses conducted by the French bureau of statistics (INSEE - *Institut National de la Statistique et des Etudes Economiques*) in 1968, 1975, 1982, 1990, 1999 and 2010.

Share of Employees in Workforce (age 25-54), 1968, 1975, 1982, 1990, 1999 and 2010. The share of employees (unqualified or qualified industrial and farm workers, as well as workers working for craftsmen) in the workforce age 25-54. Individuals in this group have a low-level of human capital (the control group is made of farmers, artisans and other self-employed individuals). Source: The

successive censuses conducted by the French bureau of statistics (INSEE - *Institut National de la Statistique et des Etudes Economiques*) in 1968, 1975, 1982, 1990, 1999 and 2010.

Explanatory variables

Horse power of steam engines. This variable reports the total horse power of the steam *Engines* in the firms of each department, which is computed from the industrial survey carried out by the French government between 1860 and 1865. See Chanut et al. (2000) for details on the implementation of this survey.

Town population in 1700 (thousand of inhabitants). This variable reports the total population of the major urban centers, i.e., with more than 10,000 inhabitants, in each French department in 1700 using the data in Lepetit (1994, Appendix B).

Maritime department. This dummy variable takes the value one if a French department borders the coastline and zero otherwise.

Border department. This dummy variable takes the value one if a French department borders one of the foreign countries around France (Belgium, Luxembourg, Germany, Switzerland, Italy and Spain) and zero otherwise.

No engine in 1860-1865. This dummy variable takes the value one if the industrial survey carried out by the French government between 1860 and 1865 indicate that there was not any steam engine in the firms of a department and zero otherwise.

Distance to Paris. The great circle distance as "the crow flies" from Paris, the capital of France, to the administrative center of each department. This aerial distance is computed in kilometers.

Paris and suburbs. This dummy variable takes the value one for the three departments, i.e., Seine, Seine-et-Marne and Seine-et-Oise, which encompass *Paris and its suburbs* and zero otherwise.

Alsace-Lorraine. This dummy variable takes the value one for the Bas-Rhin, Haut-Rhin and Moselle departments and zero otherwise in all the regressions on post-WWI outcomes since these three departments were under German rule between 1871 and 1918.

Average rainfall. The average rainfall in cm^3, reported at a half-degree resolution by Ramankutty et al. (2002), across the French departments.

Average temperature. The average temperature (in celsius), reported at a half-degree resolution by Ramankutty et al. (2002), across the French departments.

Latitude. The latitude of the centroid of each French department.

Land Suitability The land suitability index, reported at a half-degree resolution by Ramankutty et al. (2002), across the French departments.

Instrumental variable

Distance to Fresnes sur Escaut. The great circle distance as "the crow flies" from Fresnes-sur-Escaut, where the first steam engine was operated in France in 1732, to the administrative center of each department. This aerial distance is computed in kilometers.

Variables for robustness analysis

Education before 1840

Percentage of conscripts who could read, 1827-1829, 1831-1835 and 1836-1840. Source: Béaur, Gérard, and Béatrice Marin. 2011. La Statistique Générale de la France Présentation. L'Atelier du Centre de recherches historiques. http:acrh.revues.org/index2891.html.

Share of Grooms who Signed their Wedding Licenses, 1686-1690, 1786-1790 and 1816-1820. The share of grooms who signed their wedding licenses with their names over the 1686-1690, 1786-1790 and 1816-1820 periods (as opposed to those who marked it with a cross). Source: Béaur, Gérard, and Béatrice Marin. 2011. La Statistique Générale de la France Présentation. L'Atelier du Centre de recherches historiques. http:acrh.revues.org/ index2891.html.

University. Number of universities in 1700 in each department. Source: Bosker et al. (2013).

Religious minorities

Jews in Population, 1861. Share of Jews in the population in each department. Source: Béaur, Gérard, and Béatrice Marin. 2011. La Statistique Générale de la France Présentation. L'Atelier du Centre de recherches historiques. http:acrh.revues.org/index2891.html.

Protestants in Population, 1861. Share of Protestants in the population in each department. Source: Béaur, Gérard, and Béatrice Marin. 2011. La Statistique Générale de la France Présentation. L'Atelier du Centre de recherches historiques. http:acrh.revues.org/index2891.html.

Economic development and raw materials

Market integration during the French Revolution. The number of external suppliers for each department in the 1790s for the following categories of products: cotton, hosiery, hardware, misc. production goods, misc. consumption goods, linen and hemp, wool and wool cloth, leather products hides and hats, iron, Food items, drinks, paper, wood for industry, fuel (wood and coal). Source: Daudin (2010).

Iron forges, 1789 and 1811. The number of iron forges in each department in 1789 and 1811. Source: Woronoff (1997).

Presence of iron forges, 1789 and 1811. This dummy variable takes the value 1 if there was at least one iron forge in a department in 1789. Source: Woronoff (1997).

Area covered by mines in department. The area covered by coal mines in 1837 in each department. Source: France - Ministère des Travaux Publics (1838). Statistique de l'industrie minérale et des appareils à vapeur en France et en Algérie, Paris.

Railroad connection

Railroad connection to Paris in 1860. This dummy variable takes the value 1 if the administrative center of the department was connected to the railroad network in 1860. Source: Caron (1997).

Population density

Population density, 1801, 1831 and 1861. Source for the data on population: Béaur, Gérard, and Béatrice Marin. 2011. La Statistique Générale de la France Présentation. L'Atelier du Centre de recherches historiques. http:acrh.revues.org/index2891.html. The area covered by each department is computed via GIS.

Distance to cities

Distance to London. The great circle distance as "the crow flies"from London, the capital of England, to the administrative center of each department. This aerial distance is computed in kilometers.

Distance to Marseille. The great circle distance as "the crow flies"from Marseille to the administrative center of each department. This aerial distance is computed in kilometers.

Distance to Lyon. The great circle distance as "the crow flies"from Lyon to the administrative center of each department. This aerial distance is computed in kilometers.

*Distance to Rouen.*The great circle distance as "the crow flies"from Rouen to the administrative center of each department. This aerial distance is computed in kilometers.

Distance to Mulhouse. The great circle distance as "the crow flies"from Mulhouse to the administrative center of each department. This aerial distance is computed in kilometers.

Distance to Bordeaux. The great circle distance as "the crow flies"from Bordeaux to the administrative center of each department. This aerial distance is computed in kilometers.

Distance from Paris (weeks of travel). The time needed for a surface travel from Paris to the administrative center of each department measured in weeks of travel. Source: Özak (2010).

Distance from Marseille (weeks of travel). The time needed for a surface travel from Marseille to the administrative center of each department measured in weeks of travel. Source: Özak (2010).

Distance from Lyon (weeks of travel). The time needed for a surface travel from Lyon from Lyon to the administrative center of each department measured in weeks of travel. Source: Özak (2010).

Distance from Rouen (weeks of travel). The time needed for a surface travel from Rouen to the administrative center of each department measured in weeks of travel. Source: Özak (2010).

*Distance from Mulhouse (weeks of travel).*The time needed for a surface travel from Mulhouse to the administrative center of each department measured in weeks of travel. Source: Özak (2010).

Distance from Bordeaux (weeks of travel). The time needed for a surface travel from Bordeaux to the administrative center of each department measured in weeks of travel. Source: Özak (2010).

Access to waterways

Rivers and Tributaries. This dummy variable takes the value 1 if at least one of the main French rivers or tributaries (whose total length is above 300 km) crosses a given department. These are the Rhin, Loire, Meuse, Rhône, Seine, Garonne, Dordogne, Charente and Escaut.

Share of the native population

Share of the native population in each department, 1901. This variable is constructed as the share of the population born in a given department, out of the total population inhabiting this department in the 1901 census of the French population. Source: *Annuaire Statistique De La France* (1878-1939).

Share of the native population in each department, 2010. This variable is constructed as the share of the population born in a given department, out of the total population inhabiting this department in the 2010 census of the French population. Source: (INSEE - *Institut National de la Statistique et des Etudes Economiques*).

Building Destruction and Military Casualties in World Wars

World War I Building Destruction. Number of buildings destroyed in World War I. Source: Michel (1926, 1932)

World War I Building Destruction. Number of buildings destroyed in World War II. Source: France (1995).

Soldier deaths, World War I and World War II. Number of soldiers born in each department who died in World War I and in World War II. Source: French Ministry of Defense's website www.memoiredeshommes.sga.defense.gouv.fr.

Population 1911. Number of inhabitants in each department. Source: General Census of the French Population, 1911.

Population 1936. Number of inhabitants in each department. Source: General Census of the French Population, 1936.

Share of unionized workers in workforce

Share of unionized workers in workforce, 1901. The share of individuals in the workforce who belonged to an union in 1901 in each department. Source: France. Ministère du travail et de la prévoyance sociale (1911).

Share of unionized workers in workforce, 1930. The share of individuals in the workforce who belonged to an union in 1930 in each department. Source: *Annuaire Statistique De La France* (1878-1939).

Average wage, 1901 (in French Francs)

Average male wage, 1901. Each department's average wage for men in 1901. Source: France. Ministère du travail et de la prévoyance sociale (1911).

Concentration index, 1861

Concentration index. This variable computes the Herfindahl index of industry concentration for each department using the 16 different industries listed in the 1860-1865 industrial survey (textile,

mines, metallurgy, metal objects, leather, wood, ceramics, chemistry, construction, lighting, furnitures, clothing, food, transportation, sciences & arts, and luxury goods). The Herfindahl index of industry concentration is defined as, $H_d = \sum_{i=1}^{16} \left(E_{i,d}/E_d \right)^2$, where H_d is the Herfindahl concentration index for department d, $E_{i,d}$ is the horse power of the steam engines in the firms in sector i of department d and E_d is the horse power of the steam engines in the firms of department d. Source: Chanut et al. (2000)

Weighted tariffs across sectors

Weighted tariffs across sectors. The weighted average of the tariff rates for each of the 16 sectors listed in the 1860-1865 industrial survey (textile, mines, metallurgy, metal objects, leather, wood, ceramics, chemistry, construction, lighting, furnitures, clothing, food, transportation, sciences & arts, and luxury goods) in 1865, 1872, 1901 and 1924, where the weights by the shares of the horse power of the steam engine horse in each department. Source: Chanut et al. (2000) for the industrial survey and Dormois (2006, 2009) for the tariffs.