

Entrepreneurs and business performance in nineteenth century France

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A popular explanation for the supposed 'delayed industrialisation' of the nineteenth century French economy has been the inappropriate attitudes and actions of the managerial classes and family firms. To address these claims we model the supply and demand for entrepreneurship and also management success. We analyse a data set of 244 nineteenth century French businessmen, showing that on the demand side textiles offered greater, and iron and steel less, than average opportunities. On the supply side, secondary and university education were negatively associated with starting a successful firm, as was a father already in business. Surprisingly, Protestantism made no difference to the chances of setting up a firm. In the business performance model, the longer the period the businessman was active, the greater the accumulation – not consistent with life-cycle models of saving. Second, those who started their own business, compared with entering an existing firm, left less wealth at death than they could have expected to acquire over a normal lifetime, other things being equal. Unlike formal education, training – mainly apprenticeship – was associated with greater wealth at death. The pace of wealth accumulation suggests a dynamic sector during the Second Empire, at least where larger businesses were concerned.

1. French 'retardation' and businessmen

'Delayed industrialisation' remains a central concern in French nineteenth century historiography. France's turbulent nineteenth century political history was not obviously a suitable background for heavy investment and the rapid diffusion of new technology. Revolutions in 1830, 1848 and 1871, together with disastrous wars at the beginning of the century and in 1870, were unlikely to encourage business confidence. Industrial productivity and living standards remained lower than those across the Channel throughout the period, though growth rates were similar (Crafts 1984). Incomes may have been distributed more equally in France but French industrial employees spent more hours working (O'Brien and Keyder 1978, p. 87). Widespread railway building only began in the early 1850s. The water wheel remained standard technology into the 1860s, when charcoal smelting

had not entirely disappeared, even though the textile, and especially the cotton, industries were dynamic for most of the period (Caron 1979, pp. 139, 149).

A popular explanation for 'retardation' has been the inappropriate attitudes and actions of key players in the economy, especially the managerial classes. Landes (1962) identifies an aversion to risk manifested in preferences for public office, a determination to preserve outmoded family businesses, and a concern to avoid competition. French family firms have been severely criticised by others as well – even if they have been less abused than their British counterparts (Cassis 1995, p. 19). Businessmen of both countries have been charged with insufficient professionalism to invest adequately in production, marketing and management. Chandler (1990, p. 596) pairs French with British enterprises in their lack of organizational capabilities. In larger French firms, cultural bias allegedly restricted recruitment of managers and constrained their concern with profits. Imperfect capital markets supposedly encouraged the continuing dominance of stifling financial and family holding companies. This tacit *entente*, summarises Lévy-Leboyer (1980), was sanctioned by public opinion and sustained by commercial policy.

Revisionists have accumulated case studies to disprove these allegations and have found examples of success (Caron 1992). But the debate has been inconclusive, turning on particular instances and counter-examples (Heywood 1992, pp. 60–66), or assertion and counter-assertion about institutions determining the existence or otherwise of incomplete markets, imperfect information and less than perfect competition. With the exceptions of Nye (1987) and Sicsic (1994)¹ no large body of data has been brought to

¹ Nye (1987) estimated industry cost functions for cotton textiles and flour milling with firm level data for the mid 1860s. He showed that there were no unexploited economies of scale. The drawback of this approach is that if French businessmen were unable to manage large firms then it would be revealed in the higher costs of larger firms, which would show up as a rising section of the estimated average cost curve. Sicsic (1994) addresses this problem by comparing his estimates of mid nineteenth century scale economies by industry with US results. He calculated that there were still economies of scale in traditional small scale industry at the average size in France, but so there were in the United States. In the middle of the century, he concluded, French establishments were not particularly small compared with the US, even in traditional sectors. Unfortunately it is not clear that his calculations actually measure scale economies in French industry – and it is the costs at given establishment size, rather than size itself, which are at the nub of the controversy. The right hand side variables of his Cobb-Douglas production function cannot be assumed to conform with the assumptions required for his weighted least squares estimates to be unbiased. They will not be independent of the disturbance term of the equation since the demand for factor inputs (on the right hand side of the estimated equations) depends upon outputs (on the left hand side of the equations). The parameter estimates are therefore likely to capture a mixture of factor demand and output elasticity effects.

bear systematically upon these claims about French businessmen.² The best that has been achieved has merely described their characteristics, perhaps identifying aspects that many believe pertinent to competent decision-making (e.g. Lanthier 1979; Lévy-Leboyer 1979). These traits have not been linked to performance or subject to any multivariate analysis.

We attempt to remedy this omission by joining objective measures of entrepreneurship and business performance with personal and industrial characteristics during the approximate period of the Second Empire. This approach allows the testing of hypotheses that business activity and entrepreneurship were capital-constrained, limited by the availability or type of formal education, stimulated or restrained by religious affiliations or stifled by family firms.

Section 2 discusses the possible influences upon entrepreneurship and business management more generally. Section 3 describes the data set. Section 4 presents formal testable models of entrepreneurship and business performance and Section 5 examines the results of the analysis.

2. French entrepreneurship and self-employment

Jean-Baptiste Say (1767–1832) distinguished between entrepreneurial profit on the one hand and the return to capital or business profit on the other. For Say, the entrepreneur was an organiser and a leader. We might give his views special weight because, unusually for an economist, Say himself was an entrepreneur and businessman.³ In this study we are closer to Say's position than to identifying entrepreneurship with the supply of capital, or with management generally. Following Schumpeter (1939, vol. I, p. 94), we consider starting a successful business as the single most important mark of the entrepreneurship that we wish to explain. But we are also concerned with the performance of the managerial class as a whole and their impact on the economy. So the present study does not stand or fall on either wide or narrow definitions of the entrepreneur.

Those who founded successful new firms were self-employed, but so were many others. As late as 1872, French agriculture remained a bastion of self-employment, with 2.2m men and 0.5m women who 'cultivated their own land' (Kolb 1880).⁴ Retailing also was a major source of self-employment

² The very small proportion of the nineteenth century component of Grantham's (1997) magisterial survey touching on industry, in contrast to the wealth of agricultural studies, is a good example.

³ After some years as manager of an insurance company in England, Say established a cotton factory at Maubisson which he later transferred to Aulchy-les-Moines in the Pas-de-Calais. He faced uncooperative workers, a hostile environment and adverse natural conditions which must have shaped his theoretical conceptions (Koolman 1971, p. 286).

⁴ Census employment figures are highly dependent on the classification scheme used, and the 1872 census is not among the most reliable (Caron 1979, p. 23–4). But our concern here is with only approximate proportions of self-employment.

with 0.5m males and 0.2m females, although their incomes were likely to have been low. Industry was the principal opportunity for earning a good living as a master. There were many more masters and proprietors in 'industry' (0.25m males) than there were clergy, teachers or state administrators (0.06m males each), or physicians (0.02m males), or notaries and the like (0.03m).

Self-employment, and the share of self-employment in French national income, fell between 1853 and 1911, from 36 to 33 per cent and from 46 to 32 per cent respectively (Kuznets 1963, p. 168). Income from assets rose from 18 to 24 per cent, excluding the difficult to measure income from unincorporated enterprises. Kuznets' best estimate of the rate of return on entrepreneurial and self-employed equity was high, at 26 per cent.⁵ This rate reflects, among other influences, the substantial proportion of income generated outside incorporated businesses in the nineteenth century, not only in agriculture but in industry as well.

The great mass of self-employed retailers and peasants themselves employed very few. They were rarely innovators but instead pursued their traditional way of life, contributing little to economic development. By contrast, however we define the entrepreneur, risk and innovation are involved. An entrepreneur is someone who takes advantage of opportunities not perceived by others, or makes use of information more quickly than they. In an economy with well-defined and well-enforced property rights, such business acumen will improve resource allocation and raise productivity. Thus any study of nineteenth century French entrepreneurship and management must most fruitfully confine itself to a subset of the self-employed and businessmen.

Entrepreneurs founded firms and the most easily measurable new businesses were incorporated. Some assurance that such an index matters for economic development is the close correlation with investment in nineteenth century France (Jobert and Chevailler 1986). Certainly the industrial sector was more dynamic than the rest of the economy. Whereas agriculture grew by one per cent a year between 1840 and 1880, industrial growth averaged approximately 1.5 per cent per annum (Lévy-Leboyer and Bourguignon 1990, p. 3). Of course enterprising businessmen who were not self-employed, or who did not found their own firms, contributed to industrial

⁵ Far higher than for the UK (10 per cent 1860–9), but a little lower than for Germany (31 per cent 1895). Kuznets prefers to derive the rate of return on French entrepreneurial equity by assuming that average per worker income of employees is the minimum standard entrepreneurial labour income (Kuznets 1963, pp. 179–180). What is left over is the numerator of the return on entrepreneurial equity. The high return on French entrepreneurial and self-employed assets must be explained in one of three ways. Either the labour component of entrepreneurial income was underestimated, or equity per entrepreneur was larger than other capital per employee, or the return on equity was genuinely high.

growth as well. Following Casson (1991b), their numbers, along with those of entrepreneurs, can be thought of as determined in a market.

2.1. *The market for entrepreneurs*

2.1.1 *The demand for entrepreneurs.* The demand for entrepreneurship is derived from their productivity and depends upon the opportunities presented by the economy. Openings for entrepreneurship will be determined by state policy, as well as by natural and social endowments, competition and personal ingenuity. A major state policy was that embodied in company law. For most of the period considered in this paper, French company law was that of the 1808 Code of Commerce. The *Société en Commandite* provided a restricted form of limited liability, which until 1856 some British company promoters envied sufficiently to establish companies across the Channel. The full limited liability company (*Société Anonyme*) was not popular, being closely regulated and requiring all capital be paid up prior to registration. Only at the end of our period of study, in 1867, was company law liberalised (Jobert and Moss 1990).

The options for entrepreneurs varied between industries. High marginal returns to cotton might suggest the economy would have been better off had entrepreneurs been able to switch from, say, iron to cotton, for instance (*ex post* returns may differ because of unforeseeable shocks, but if 'bad luck' persists for long periods we suspect it is not 'luck' at all). Businessmen in some industries may be wealthier than in others because the opportunities were greater (though conceivably savings behaviour differed between industries as well).

In some lines of cotton textiles Mulhouse could compete with Lancashire by 1870. It was in Alsace that, with the exception of metallurgy, industrial progress under the Second Empire was most rapid (Clapham 1936, pp. 245–6). It might be thought that France was at a comparative disadvantage in the entire metallurgy sector. Poor French coal deposits and the expense of imported coal were unhelpful. But there is some evidence that the French industry specialised in the more skill-intensive products (O'Brien and Keyder 1978, p. 160).

'Many of the {iron} sections currently rolled in France are not known {in Britain} where they are considered too difficult. So far from hesitating before the difficulty of manufacture of these special types, French engineers are always seeking to create new ones . . .' (Marshall 1862, p. 200).

True entrepreneurship creates such profit opportunities as well.

2.1.2. *The supply of entrepreneurs.* The simplest entrepreneurial supply assumption is the free entry and exit of perfect competition. If we suppose that the supply of entrepreneurship is not infinitely elastic, we must

explain what determines the response. One strand of research identifies sociological factors, such as religion, family size, legal structure and political culture, as the main explanatory variables. Another line of investigation focuses on purely economic factors – risk aversion, time preference, the work–leisure trade-off – as the driving forces behind the supply of entrepreneurship. In what follows we offer a synthesis of the two approaches.

Other things being equal, the larger a country's supply of entrepreneurial risk-takers, the better the economy will perform. We can think of the economy as consisting of an entrepreneurial sector and an employment sector, following Blanchflower and Oswald (1991). For our purposes, the entrepreneurial sector includes those managers of existing firms who are innovative and expansion-orientated, as well as those who start successful new businesses. Whatever encourages a shift from the employed to the entrepreneurial sector not only increases output directly, but by increasing employees' scarcity, boosts wages.

The relative merits of 'intrapreneurship' and entrepreneurship will vary between individuals, industries and periods. The innovator has to balance the inertia of established organisation and the chances of gaining control against the difficulties of building up a business from scratch. An economy where established enterprises are rigid and bound by tradition may shift the balance in favour of new firms, but such an economy is almost certain to present no less formidable barriers to the would-be founder of a business.

Religion. The disposition to take risk affects the supply of business innovators and this may well be affected by the culture in which the potential entrepreneur is brought up. Religion is a pervasive aspect of culture; religious views may influence entrepreneurial temperament and thus the culture of the firm (Casson 1991a). Protestantism supposedly raises economic growth (DeLong 1989), perhaps by inducing thrift (a low rate of time preference) and a large supply of effort. French Protestantism or Calvinism is often associated with business achievement, in marked contrast to Catholicism (for example Pollard 1981, p. 118; Yoshimuri 1988). There is some evidence that French Protestants were more literate than French Catholics, which may have enhanced their innovative abilities (Caron 1979, p. 45). On the other hand Landes' (1976) study of a French textile firm concluded that religion played no role in effective decision making.

Related to the influence of religious beliefs are the attitudes of society towards people who belong to a minority religion, and their ability to form networks for information and credit. Excluding Protestants from official occupations before the Revolution encouraged their concentration upon business.

Wealth and capital availability. If, as seems likely, most people's preferences can be represented by diminishing marginal utility of wealth, the willingness to take a fair gamble of a given size increases with wealth. Under this condition the rich should be more prepared to become entrepreneurs

than the poor. But the opportunity cost of entrepreneurship may also increase with wealth, depending on social standing and mores. The unemployed may have no opportunity cost, even though the utility cost of risk is higher to them than to a bourgeois. Social characteristics and behaviour, such as standing for public office, will then be more reliable indicators of opportunity cost than some general 'wage rate'.

Capital rationing may be vital in explaining the decision to become an entrepreneur. Some potential innovators may be prevented from entering business by being denied access to capital because they lack sufficient personal or family financial assets. Bankers may not fill the gap because they lack the information available to the potential entrepreneur. In these cases, new firms with potential net social benefits will be discouraged by the excessive cost, or the limited availability, of credit.

On the other hand, the ability to borrow may be a reflection of success rather than a cause of it. Insofar as inheritance and gifts are received independently of business performance, any association between them and success may reflect capital rationing or inefficiency (Blanchflower and Oswald 1990). But those most likely to receive inheritances are also most likely to be rich already, by virtue of being brought up in a rich, and thus well connected and informed, family. The respective roles of family background and capital access are not adequately distinguished merely by considering gifts and inheritances (Cressy 1996).

Were the banks (or their absence) responsible for starving French industry and entrepreneurship of capital (Lévy-Leboyer and Lescure 1991, pp. 163–7; Plessis 1987)? Saint-Simonian investment banks established during the Second Empire are sometimes accused of wasting national savings in foreign and urban speculations, certainly not investing in domestic industry. Anyway they were not major forces in the French economy; less than 3 per cent of the manufacturers and merchants of Paris banked with the Comptoir d'Escompte of Paris in the 1860s. Local rather than national banks mattered much more. In addition to the 2000 plus institutions (banks) that accepted deposits, discounted bills and sometimes provided long term capital in 1870, there were also suppliers of legal services, the notaries. In the countryside notaries competed with banks but elsewhere they never recovered from the damage to their credit incurred during the Revolution (Grantham 1997).

Education. Formal education may be investment in human capital, raising the productivity of labour. Even if this is correct, formal education has an opportunity cost: time devoted to academic pursuits might have been spent in training more pertinent to business. Moreover, formal education may be merely consumption, delaying the start of the entrepreneur's career, or at best, a means of 'signalling', hallowed by tradition rather than by efficacy. Higher educational qualifications give entry to establishment institutions and they are also used as a screening device in recruiting managers. There is no need to

become self-employed, or even to work in business at all, if access to well paid official or established positions is available (Chadeau 1988, pp. 221–3).

As in other Western European countries, the earliest French engineering schools were founded in the eighteenth century to provide civil servants, but the system was transformed by the French Revolution (Grelon 1993). The prestigious *Ecole Polytechnique* was created in 1794 as the pinnacle of the existing service. The Polytechnique required a high level of mathematical skill for entry and taught an extremely abstract syllabus (Shinn 1980, Locke 1989, pp. 65–8). As a supplement Napoleon established two *ecoles d'arts et metiers* to train factory foremen and technicians and, at a higher level, private industrial demand for engineers was to be met by the *Ecole Centrale*, founded in 1829. Under the Second Empire technical schools and evening classes for industry began in Lyons, Lille, Mulhouse and elsewhere. Moreover, state educational domination did not preclude entrepreneurship. It is hard to find in, say, Britain anything like the French public service entrepreneurial tradition. Ferdinand de Lesseps (1805–94), for example, began his career as a French diplomat posted to Alexandria in 1832, to Cairo 1833–7, and to Rome in 1849. Then in 1854 de Lesseps was invited by the Egyptian Khedive to build a Suez canal and four years later formed the Suez Canal Company, with more than half the capital subscribed by the French. Building began in 1859 and the canal was finished ten years later (Pudney 1968). We should not therefore ignore the Saint-Simonian tradition and state-encouraged entrepreneurship.

3. The businessmen data set

We evaluate the foregoing ideas with the data derived from Barjot *et al.* (1991–4), a collection of biographies of French businessmen.⁶ The subjects were selected on the basis of the ability of a number of specialist researchers to complete a substantial proportion of a standardised questionnaire about them. The sample consists primarily of successful entrepreneurs, for the majority whose businesses survived less than a few years will be excluded. But it is the successful minority who influence long run economic performance, not the mass of failures, or those who do not accumulate at any point over their lifetimes. There is no particular reason why businessmen for whom records survive among the ‘successes’ should be different from the ‘successes’ for whom adequate traces are missing; in this respect the selection process will be random.⁷

⁶ By and large capitalists who may have chaired the *conseil d'administration* are not included in the data set, only executive directors. Neither we, nor the researchers in the Barjot project, considered them managers or entrepreneurs.

⁷ Andrew Godley (personal communication) has suggested that there might be a dynastic bias in the sample on the grounds that long-lived family firms are more likely to leave historical records. But the hypothesis seems to be untestable.

In recent periods small, short-lived businesses are typically of lower than average productivity. But second and third generation family businessmen can and did run down their firms, while leaving records. Hence the poor performance of these larger enterprises will be included in the data set. Since some businessmen in our sample failed, their net wealth at death was zero or less. They were entirely mortgaged to the banks. Their misfortune ensures that our data span the entire range of wealth outcomes; for the other end of the wealth scale is also represented in our sample. The wealthiest of the '200 families' under the Second Empire left 36 million francs at death (Plessis 1982) and the most prosperous businessman in our data set bequeathed 32 million francs. Hence the sample does not suffer from selection bias.⁸

Our businessmen worked in a considerable number of regional departments, but, in general, not those where firm formation is believed to have been highest.⁹ The literacy of our departments was well below the average for France, even when Alsace was included. Where possible we have tabulated family background, marital status, details of education, training, experience abroad, recruitment patterns, and also inheritance and wealth at death. Information on the private life of the subject, such as cultural activities and religion, are included when available.

Turning to the definitions of our categories, 'training' is formal or informal apprenticeship. Those classified as 'trained' include Jules Roederer (1816–88), François Mazeline (1802–75), Charles Nillus (1798–1881), and Michel Plumer (1796–1869) who were all apprenticed in their father's business before either becoming directors of the same business, or going on to found their own firm. After a period of apprenticeship at his father's *atelier*, François Mazeline, son of Louis-Philippe, locksmith at Le Havre (Seine-Inférieure), established the company 'Mazeline et Frères' making naval and industrial engines.¹⁰

⁸ The estimate may be inefficient, but not biased. However, we do not have a precise idea of the net wealth, positive or negative, of those who failed. The smallest unambiguous terminal wealth in the data set is 9,000 francs or about £500. We therefore assume that our wealth distribution is truncated at that level.

⁹ Ten départements out of ninety accounted for 68 per cent of new firms – or at least, of incorporations. 38 per cent of all 'births' were in Paris alone. Few other provinces, except those of the Nord and the Rhône, were as dynamic (Crouzet 1992, p. 209). The *départements* of the businessmen in the data set were: (1) Seine-Inférieure (Rouen-Le Havre-Bolbec-Oissel-Elbeuf), (2) Eure, (3) Calvados, (4) Manche, (5) Orne, (6) Sarthe, (7) Mayenne, (8) Maine et Loire, (9) Côte d'Or, (10) Nièvre, (11) Saône et Loire, (12) Yonne, (13) Doubs, (14) Haute-Saône, (15) Jura, (16) Bas-Rhin, (17) Haut-Rhin.

¹⁰ Mazeline et Frères was awarded a gold medal at the 'Exposition Universelle' of 1840, for the quality of the company's products. After that the reputation of the enterprise (which employed 750 workers and a capital of 12 million francs in 1866) grew abroad as well. François Mazeline later devoted himself to politics as a member of Le Havre's Chamber of Commerce, becoming an MP from 1846 to 1863. Despite following a non-academic path by taking an apprenticeship instead, he also participated in various learned societies and played a significant role in the formation of education policies (Chaline *et al.* 1990).

We define an 'existing independent firm' as one which had no family connection with the businessman who either bought it or was its employee. Someone who inherited or entered his father-in-law's firm has been considered to have joined a 'family business', as being the 'first generation' of the firm, and of course, as not having started a new business.

Most of the successful businessmen in the Barjot sample married 'upwards'. For them, the 'wife' variable is coded 1. The rest are awarded a zero. An example of a '1' is Jules Clouet (1818–89), a chemical engineer. He married Marie-Caroline Delacretaz whose father was an industrialist, a manufacturer of chemical products. Jules worked in his father-in-law's firm and very quickly became manager. The firm then took the name 'Clouet-Delacretaz' (Skrobek *et al.* 1990).

Table 1 summarises some aspects of the data. Protestants are massively

Table 1. *Some characteristics of the sample.*

<i>Education:</i>				
	Total %*	Protestants %	Non Protestants %	
Secondary	44	57	51	
University	27.5	37	27	
<i>Religion:</i>				
		No. of Children	Catholics %	Non Catholics %
Protestants	52% (of 159 observations from 244 total)	0–3	62	44
Catholics	44% (of 159 observations from 244 total)	8 or more	7	15
<i>Corporate and other personal characteristics (%):</i>				
Start-ups		41.8	Father in business	73
Family firms		51	Experience abroad	23
Upward marriage ('Wife')		77	Training	67
	Mean	St. dev.	Min.	Max.
Number of children	3.58	2.52	0	12
Working life	40.7 years	12.64	2	71
Age at start	29.9 years	7.76	18	65
Father's wealth	1,355,493 francs	2,766,778	533	17,782,000
Wealth at death	2,641,303 francs	4,871,614	0	32,000,000
<i>Firms' size</i>				
Number of employees				
Mean = 991.62	St. dev. = 2,156.33	Min = 15	Max = 17,000	No. of observations = 129 (from 244 total)

Note: *Missing observations mean sample sizes may differ between totals.

over-represented in the sample by comparison with the 2 per cent of the population as a whole that they accounted for during the Second Empire. Even assuming that the religion of all the unidentified persons was Catholicism (or non-Protestantism) the Protestant proportion is still high at 34 per cent. Over the whole French population there is a very strong Protestant tendency to be in business compared with Catholics – roughly 17 times the French average.

Table 1 also shows that 44 per cent of the businessmen in the sample have secondary education and 27.5 per cent higher education. In this respect they are more like contemporary German managers in the Berghoff and Möller (1994) data set, than British. Measured by employment, the average size of businesses, at 990, was higher than in France as a whole,¹¹ but, like the size distribution of firms in every economy, the sample distribution is skewed to the right.

Cotton textiles was the most common industrial sector for businessmen in our sample, with 74 cases and 31 start-ups. ‘Other textiles’ was the next most represented industry. This is consistent with the distribution of output in nineteenth century France as a whole, where clothing and textiles accounted for 30 per cent of value added (Caron 1979, pp. 148–9). Excluding Alsace from the sample does not much alter the ordering, although it does raise the rank of iron and steel, and reduce the lead of cotton (Table 2).

Figure 1 shows the relationship in the data set between fathers in business and the type of firm in which the son worked. Seventy-three per cent of businessmen’s fathers had been in business. A slightly greater number, whose fathers were in business, started their own firms, but the probability

Table 2. *Percentage distribution of sampled businessmen by industrial sectors.*

	Whole sample	Excluding Alsace
Cotton	31.63	21.7
Wool and linen	12.39	8.19
Iron and steel	11.96	16.37
Metal processing–shipbuilding–mechanical engineering	12.39	11.7
Building materials (wood, glass, cement)	3.74	4.1
Bank and insurance	3.77	4.7
Commerce and shipping	8.55	11.7
Transport	1.18	1.17
Coal-mining and chemicals	6.41	5.8
Diverse (alcohol, sugar refining, hats, printing, paper)	7.70	7.0

¹¹ Only 45 employees as late as 1906 (Caron 1979, p. 164).

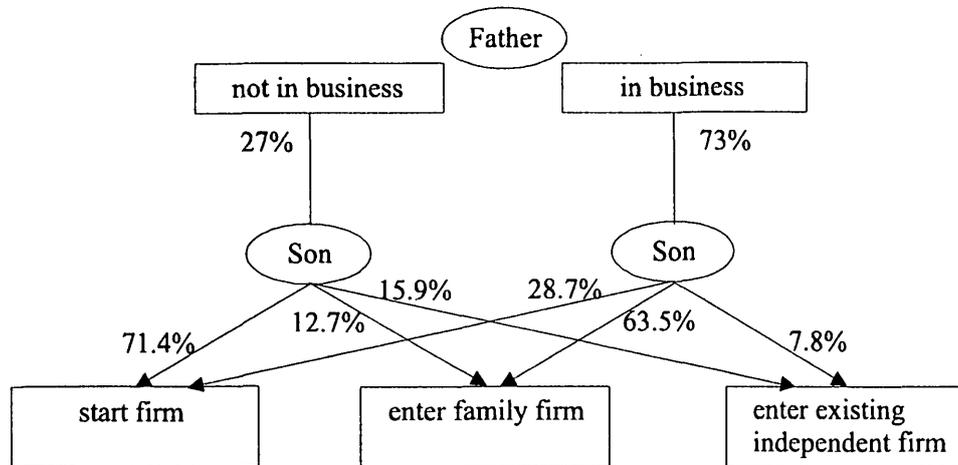


Figure 1. *Paternal influences on choice of firm type.*

that they would do so was much less. It was possible to lack a father in business and yet to enter a family firm, as 12.7 per cent of this category did. Far more common for this group though was to become a businessman by starting an enterprise. Those without a father in business were twice as likely to take employment in an already existing independent firm (15.9 per cent) as those with this family connection (7.8 per cent).

Although the proportion with fathers in business seems high, other things being equal, over a few generations the percentage from a 'business caste' would fall radically. The percentage with fathers in business over two generations would be 73 per cent \times 73 per cent = 53 and over three generations, about 39 per cent. The rate of attrition of 'business dynasties' is similar. In the current data set, first generation business men account for 52.9 per cent of the sample, second generation for 38.9 per cent and third generation for 8.2 per cent. This is consistent with Crouzet's (1995, p. 31) conclusion. Compared with Berghoff and Möller's (1994) German-British sample, the French resemble the British rather than the Germans in holding public office (and therefore in social integration), in the salaried proportion and in generational composition.

Figure 2 shows the relationship between university education and type of firm. University education seems to have slightly increased the chances of entering an independent firm, from 9.1 per cent to 11.3 per cent. University educated businessmen were most likely to work in family firms (62.7 per cent), presumably because the family had achieved the income to support a son at university. Crouzet (1995) identifies this as an important strategy for maintaining a 'business dynasty'. Non-university educated businessmen were far more likely to have founded their own enterprise. University education was a mark of status achieved, though as we noted, independent

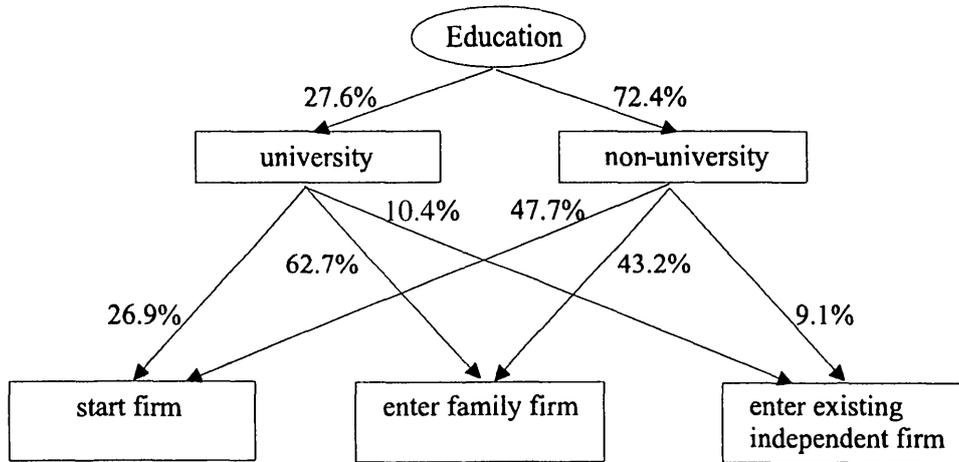
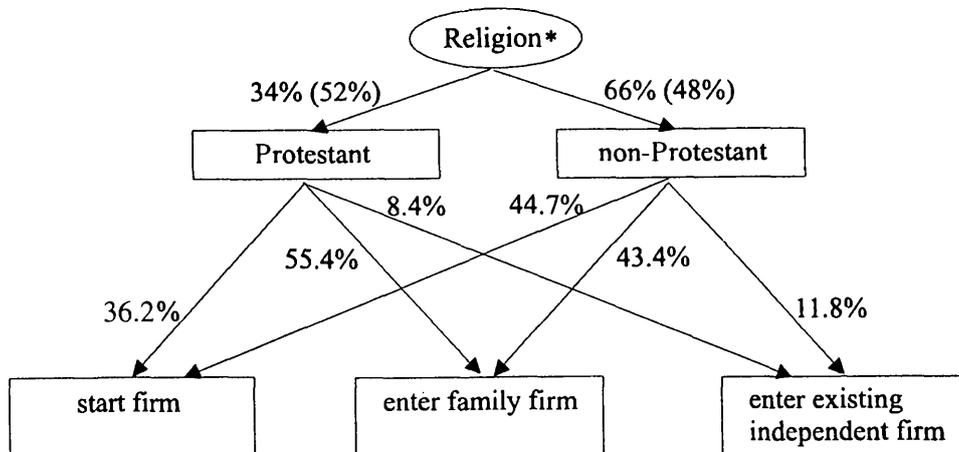


Figure 2. Education and choice of firm type.

firm employment is some evidence of signalling, or human capital accumulation, through higher education as well.

Unfortunately the religion of the businessman is not reported in many cases. Protestants accounted for 52 per cent of the 159 on which information is available. However we might reasonably assume that few, if any, Protestants in the sample would not have their religion recorded. Restricting ourselves to those for whom religion is noted, there is very little difference between Protestants and non-Protestants in the distribution between the three types of firms (Figure 3). In particular, within the sample of business-



Note: *The first figure is calculated on the assumption that all non-reported cases were 'non-Protestant'. The bracketed figures are calculated as percentages of reported cases.

Figure 3. Protestantism and choice of firm type.

men Protestants have no special propensity to found new firms, according to a *chi*-squared test. Again, in comparison with the entire French population, Protestants of course do have a far higher probability of setting up their own businesses. That is necessary if they are to maintain their remarkably strong business presence.

A similar irrelevance of Protestantism within the businessman group appears with education. Nineteen Catholics were recorded as having received higher education compared with 32 non-Catholics. Forty-seven Protestants out of 82 received secondary education compared with 39 non-Protestants out of 76. *Chi*-squared tests showed these differences not to be significant. Of course the caveat already stated applies; in comparison with other businessmen, Protestantism is irrelevant, but compared with the entire French population, being Protestant increases the chances of receiving higher education.

We were unable to code 'father's industry', where he was in business. Some weak indirect evidence of family transmission of informal human capital is given by the proportion of businessmen in different industries whose fathers were in business. Surprisingly the proportion was lowest of four sectors in iron and steel at 64 per cent. Fifty-five businessmen in cotton textiles out of 71 had fathers in business, some 80 per cent. The proportions were similar or higher in 'other textiles' and in engineering.

Although these descriptive statistics add to our knowledge of Second Empire *patronat*, they are not very compelling evidence for, or against, many historical propositions simply because they do not allow us to control for many other possible influences on the subject of the explanation. In the following section, we attempt a remedy with multivariate analysis.

4. Testing hypotheses about French businessmen

We have two models of entrepreneurship and business performance within which hypotheses can be tested. The first is concerned with the determinants of starting successful firms, and the second with business success measured by wealth at death. For both, the possible influences, which may be proxies for more abstract economic measures, are similar, as discussed in Section 2. We consider demand side forces, especially industry-specific ones. On the supply side we estimate the impact of culture, in particular religion, of capital availability, and of human capital, both formal as with education, and informal as with family background. We choose the specification of these variables most appropriate to each model.

We explain P , the probability of choosing to start a business, as against entering a family firm, or an existing independent firm, by the equation:

$$\begin{aligned} \text{Log}\left(\frac{P}{I - P}\right) = & \alpha_0 + \alpha_1 \text{Industry}_i + \alpha_2 \text{Education} + \alpha_3 \text{Cap. Constr.} \\ & + \alpha_4 \text{Religion}_i + \alpha_5 \text{Father}, \end{aligned} \quad (1)$$

where the dependent variable is the logarithm of the 'odds ratio'. If the probability of choosing self-employment is 0.1, the odds are 9 to 1 against. The marginal probability response to a change in any one of the five independent variables above (x_i), in equation (1), is:

$$\partial P/\partial x_i = P[1 - P] \alpha_i \quad (1a)$$

Not only are we interested in the determinants of entrepreneurship but also we want to assess effectiveness. Judgements of performance implicitly or explicitly compare entrepreneurship with some ideal standard. The neoclassical efficient choice of production technique with given factor prices offers one measure of success, as well as a framework for calculating the costs of failure (for example Lindert and Trace 1971). It does not address the criticism that the task of the entrepreneur is to shift constraints, not to optimise subject to them.

The approach here is to employ lifetime wealth accumulation as a performance indicator, for it is not open to the previous objection (although there is no ideal standard with this method). If wealth is made supplying things or services that people voluntarily buy, then the contribution is greater the more income the entrepreneur receives. Gifts before death reduce the value of the 'bequest index', but in periods before heavy taxation on average this effect will have been small for all but a few businessmen, and for them we know the bias in the index.¹²

Adopting wealth as the criterion of success, and putting together the supply and demand for entrepreneurship and management, we can specify the following equation:

$$K_{t+n} = \beta_0 + \beta_1 \text{Industry} + \beta_2 \text{Education} + \beta_3 K_t + \beta_4 \text{Fam} + \beta_5 \text{Sibs} + \beta_6 n, \quad (2)$$

where K_{t+n} is terminal wealth, either personal or the value of the firm, K_t is a measure of capital constraint, such as inherited wealth, and n is the number of years for which the entrepreneur was active. Informal human capital possibly includes holding public office, age at start of self-employment, and in this formulation, specifically whether working in a family business or not (*Fam*), and number of siblings (*Sibs*).¹³

We can imagine future founders of businesses in an earlier period considering the possibilities of work open to them, the likely pecuniary and

¹² The case for this variable is discussed more fully in Nicholas (1998).

¹³ Equation 2 could be re-written with increase in wealth – terminal wealth minus inherited wealth – as the dependent variable. Only if the coefficient on inherited wealth in the untransformed (2) was +1 would it then be appropriate to exclude inherited wealth from the set of explanatory variables. When $\beta_1 = +0.33$ say, the implied coefficient on inheritance in an increase in wealth equation is -0.66 ; inheritance reduces the increase in wealth.

non-pecuniary benefits obtainable, and assessing some of the risks involved (for example Laferrere and McEntee 1996). A strong demand for entrepreneurship in a particular industry is reflected in equation 1 by $\alpha_1 > 0$. On the other hand, if there are few opportunities, perhaps because of technological change such as the shift of fuel source, $\alpha_1 < 0$. Analogously in the 'wealth model' (equation 2), the *ex ante* marginal returns to entrepreneurship in each sector will be equal, in the absence of entry barriers, and where private information and experience is irrelevant. In this case $\beta_1 = 0$. But industries with unusual profit opportunities would be identified by a positive coefficient.

If education adds to human capital, with greater productivity more educated people may be more willing to start businesses; $\alpha_2 > 0$ in equation 1. But more probably education raises the opportunity cost of entrepreneurship. More education increases job options and decreases the willingness to incur the risk of innovation ($\alpha_2 < 0$). In the wealth equation the coefficients on the education variables should measure how much, for example, a *Lycée* education was worth (the size of β_2 for instance). Suppose that businessmen with higher education acquired higher consumption expectations. Then their terminal wealth might have been lower than that of a comparable group without higher education, which showed a similar business performance. In that case β_2 would not identify the marginal productivity of human capital.

If capital markets were efficient, lenders would find all reliable borrowers who would make sufficient profits to repay the loans in each case. Possible employment and self-employment incomes would not be capital constrained, and $\alpha_3 = 0$. However, if potential entrepreneurs were unable to borrow money at the going rate of interest, then their ability to found a firm would have depended upon family, friends or inheritances as sources of capital. In this case the more capital available through their personal network, the greater the chances of becoming an entrepreneur ($\alpha_3 > 0$).¹⁴ Marrying 'upward' may be one way of shifting the capital constraint. Unfortunately the capital constraint effect cannot be disentangled from the opportunity cost or the utility of wealth and risk effect. If those with more wealth had less need to shoulder the risks of starting a business then, by contrast, the coefficient α_3 is negative. More wealth might mean a greater willingness to take an entrepreneurial risk of a given size, in which case the sign is reversed.

Analogously with the discussion of firm foundation, a test of capital market failure in the wealth model is whether inherited wealth (or marrying upwards) explains terminal wealth independently of characteristics ($\beta_3 > 0$). If it does, there were significant market imperfections, for those without

¹⁴ Evans and Leighton (1989) find that men in the US with greater assets are more likely to switch to self-employment.

inheritances were unable to take advantage of the same entrepreneurial opportunities. If it does not, then we need not worry about omitting inherited wealth from the performance index. An astute entrepreneur could have borrowed sufficient funds if he chose, without using his own, either directly or as collateral.

As noted already, Protestants might be more likely than non-Protestants in France to found businesses. But that is not the choice modelled here. We are concerned whether among at least averagely successful French businessmen, Protestants were more likely to found firms. In this case $\alpha_4 > 0$. On the other hand, among successful French businessmen, Protestants could have had a lower propensity to initiate new firms, because there were already so many well established firms run by Protestants, perhaps with a higher rate of business survival. So, it is possible that Protestants dominated business even in the presence of a negative coefficient, α_4 . In equation (2) the coefficient on religion offers a measure and a test of the efficiency or assiduity of Protestants in wealth accumulation.

A father in business perhaps may be able and willing to create a post for a son in his company – in which case $\alpha_5 < 0$ in equation (1). On the other hand, the son may not get on with his father and choose to prove himself elsewhere, hence $\alpha_5 > 0$. When there are many such cases, the son's choice can be thought of probabilistically. Sons with a father in business and certain other characteristics may be more, or less, likely to enter the family firm, set up their own business, or enter an existing independent company. Another option would be to seek employment elsewhere – in the Church, the Army or the Civil Service, but our data set does not cover those choices.

Entering a family firm, or a relative in the business, might have conferred a direct advantage in wealth accumulation. Alternatively or additionally, family firms might have provided employment beyond the capabilities of the family member or encouraged complacency and conservatism. In which case even a negative coefficient (β_4) becomes possible. Numbers of siblings may affect the size of inheritance and also entrepreneurial behaviour – through the need to find jobs for them, by supplying a greater or lesser information network, or by contributing a group of loyal and energetic managers ($\beta_5 > 0$) (Crouzet 1995).

The businessman's increase in wealth may be greater, the longer the period spent in business, the higher the average rate of return on his assets and the greater his rate of savings.¹⁵ We cannot measure his savings directly so we assume they depend on his income, if necessary allowing that the rate differs between social groups and occupations. The businessman is assumed to accumulate on behalf of successive generations of his family, or posterity.

¹⁵ A manager may choose to sell his business, buy a country estate and live off his savings, but that makes no difference so long as the period in business is accurately recorded. While working, a businessman also consumes.

We must also recognise that savings may vary over the life cycle, and therefore so may wealth. Indeed it is possible that no wealth at death at all will be left, with perfect foresight and no bequest motive, if the life cycle theory is correct. But we can test these propositions that imply (unadjusted) wealth at death is a poor performance indicator. Bequest motives would produce significant positive coefficients on the 'number of children' variable. Including polynomials in n , the number of years active in business, tests the individual life cycle wealth accumulation prediction of a non-linearity in the 'period of activity' variable.

5. Results

Table 3 shows estimates of various specifications of equation (1), the determinants of entrepreneurship or founding new firms. The coefficient on 'father in business' is large and negative. A wider range of job opportunities was open to people with this characteristic. We can explore this 'family' effect further, examining whether businessmen with more brothers were more likely to start businesses because the family firm could only employ so many siblings. A father in business would then appear to reduce the chances of starting a firm, even if businessmen were more likely to sire entrepreneurs than others. If this were the case we would expect 'number of siblings' would increase the chances of starting a firm, other things being equal. However, businessmen whose fathers had three or more children totalled 145. Of these 48 founded new firms. Those with only 0 or 1 sibling totalled 40, and 13 of these started businesses; very similar proportions in both cases. When the number of father's children was included in equation 1 of Table 3, the fit of the equation when adjusted for degrees of freedom, deteriorated and the coefficient was negative. When included in an equation only with 'father in business', the sibling variable was still not statistically significant (neither equation is reported).

Despite the descriptive statistics, metal industries, mainly iron and steel in our sample, were not a good place to start a business, once other conditions are controlled for (the negative coefficient is second in size only to 'father in business') (equations I, IV, VI in Table 3). Moreover, the largest employer in our sample is Eugène Schneider, the iron and steel manufacturer at Le Creusot with 17,000 workers in 1866. This suggests that economies of scale created natural industry barriers to entry.

Secondary and university education were negatively associated with entrepreneurship, consistent with the interpretation of the 'father in business' variable. Human capital created, or reflected, opportunities that were preferable to business innovation – employment in independent or even family firms. Businessmen became educated by virtue of being relatively well off. But the equations in effect control for the influence of 'father in business' on education. If that was the only line of causation, then including

Table 3. *Logits. Dependent variable: Start-up of business.**

	I	II	III	IV	V	VI	VII
Metal industry	-1.45 [-2.14]	-	-	-0.51 [-2.23]	-	-1.39 [-2.05]	-
Secondary education	-0.89 [-2.63]	-0.77 [-2.35]	-0.88 [2.49]	-0.75 [-2.14]	-0.77 [-2.46]	-	-0.74 [-2.21]
University education	-	-	-	-	-	-1.12 [-2.82]	-
Father in business	-2.22 [-5.65]	-2.06 [-5.53]	-1.79 [-4.77]	-2.14 [-5.43]	-1.87 [-5.46]	-2.30 [-5.70]	-1.98 [-5.29]
No. of children	0.13 [1.94]	0.14 [2.18]	-	0.11 [1.63]	-	0.12 [1.87]	0.13 [1.97]
Date of birth	-	-	-	-0.03 [-1.87]	-	-	-
Wife	-	-	-0.61 [-1.45]	-	-	-	-
Date of start-up	-	-	-	-	-0.21 [-1.84]	-	-0.71 [-1.39]
Constant	1.26 [2.90]	0.92 [2.35]	1.72 [3.68]	47.15 [1.92]	40.65 [1.90]	1.24 [2.89]	32.43 [1.43]
% cases not predicted correctly	26.86	26.86	28.57	27.86	31.25	27.36	27.77
No. of cases	201	201	175	201	224	201	198
Log-likelihood	-112.68	-115.20	-99.79	-110.88	-129.08	-111.92	-112.73
Restricted L-likelihood	-136.26	-136.26	-118.17	-136.26	-151.30	-136.26	-134.31
Chi-squared	47.16	42.11	36.77	50.76	44.44	48.68	43.17

Notes: *t*-ratio in parentheses. * I = businessmen who started own business; o = all other businessmen in the sample.

only 'father in business' in the equation would yield as good a fit as when 'education' was added, which is not the case.

The greater the number of a businessman's children, the higher the chances that he would set up a firm (for example equation II in Table 3). Those with many children were inclined to establish an enterprise as a means of giving them employment. Alternatively, children may have been an asset, in the form of a loyal group of employees, that encouraged firm formation (Crouzet 1995). Either way, the finding is consistent with business 'Malthusianism' (Lévy-Leboyer and Bourignon 1990, p. 9), but there is no necessary implication that this was harmful to the French economy.

Most enterprises passed through a cycle of growth and decline. Some businessmen whose firms were founded more recently do not appear in the sample because their enterprises were still too small. This may explain why the coefficient on the date of businessmen's birth is negative (equation IV, Table 3); someone with a later date of birth apparently has a lower probability of starting up a business. In effect the coefficient measures sampling bias.

'Wife' (the marrying 'upwards' variable) was included as a way of testing for a capital constraint or a wealth/utility effect, along with inherited wealth.¹⁶ It might also proxy the opportunity cost of entrepreneurship. Both coefficients were negative though not statistically significant (equation III, Table 3 for 'wife', inherited wealth not reported).

Only 5 out of 48 businessmen whose inherited wealth we know, started successful enterprises. The relationship between the size of the inheritance and the probability of starting a successful business was negative, and also, like 'wife' in the larger sample, 'inheritance' was the least statistically significant variable ($t = 1.17$, $pr. = 0.24$) in a regression including 'father in business' and 'secondary education' variables. This finding might point once again to the undesirable status of French entrepreneurship. Individuals from poorer families were more likely to start firms. The education coefficient corroborates this story.

Consistent with the *chi*-square test of Section 4, religion makes no difference to the chances of setting up a firm within this sample (equation V, Table 3).

As noted earlier, the effect on the probability of starting a business of a unit change in one of the independent variables is not the coefficient of the logit variables in Table 3. However the signs are indicative and the magnitudes of their coefficients yield their relative effects. For example, in equation II, the coefficient on 'secondary education' (SEC) is -0.77 , but at the means of all variables the effect on the probability of starting a business is -0.18 . That is, if we compare two average businessmen, the one with SEC

¹⁶ A social classification similar to Berghoff and Moller (1994) was adopted.

will have an 18 per cent lower chance of starting a business. The coefficient of SEC is one third of the size of the coefficient of 'fathers in business'. The probability of 'start up', other things being equal, decreases by 48 per cent if the businessman's father was in business (almost three times 18 per cent).

With 'number of (entrepreneur's) children' we can consider more than one unit increases. For example, the difference between the start-up probability of a businessman with say 7 children, compared with one with 3 children, is approximately four times 0.03 (12 per cent) where 0.03 is the unit probability response calculated from the coefficient 0.14.

Two very clear findings emerge from the estimates of equation 2, the wealth at death or business performance model (Table 4).¹⁷ First, the longer the period the businessman was active, the greater the accumulation. Each year added about an extra 2.7–2.8 per cent to wealth at death on average. This was faster than the French economy as a whole was growing and just higher than Toutain's (1987) industrial output growth rate for 1820–70. On the other hand, with an average of 3.6 surviving children each, the businessmen in our sample also made a disproportionate contribution to population growth for which capital needed to be provided. If business success is measured by capital accumulation, longevity was helpful for a French nineteenth century businessman. One with a 40 year career would leave 60 per cent more wealth than an otherwise comparable entrepreneur whose career spanned only 20 years.

Should we be surprised at the (partial) correlation of wealth and longevity? Certainly if we believed in the 'life-cycle' consumption hypothesis, for we would not expect that higher order polynomials in age lacked any explanatory power in the wealth equations (not reported). The refutation of the life-cycle hypothesis renders the terminal wealth as a measure of performance more plausible.¹⁸ What significance attaches to the size of the coefficient? Kuznets (1963) noted that the ratio of wealth to income was declining in the nineteenth century. Against that background, a 2.7–2.8 per cent growth of wealth per annum for the group looks like a strong performance, even though the 1850s are reckoned to be a period of rapid economic growth. Our businessmen are rather large employers by nineteenth century French standards though. Total business wealth includes the assets of a much larger group of smaller enterprises – whose wealth may have been growing more slowly. But at least it does appear that the larger firms,

¹⁷ The dependent variable should ideally be real wealth, but the estimates of Table 4 are based on nominal wealth for two reasons. First, the French price level in the nineteenth century, so far as it can be measured, is trendless. Hence we think that businessmen would most likely take decisions on the assumption that nominal wealth was identical with real wealth. Second, the uncertainty about the appropriate deflator implies that any real wealth measure constructed by deflating nominal wealth is likely to be very inaccurate.

¹⁸ So also does the statistical insignificance of numbers of entrepreneur's children in equation 2 (not reported). Willingness to give a sufficient inheritance to each child was apparently not an important reason for wealth accumulation.

Table 4. Truncated regressions. Dependent variable: Log – wealth at death (limit 9000fr).

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
Period of activity	0.028 [3.25]	0.028 [3.09]	0.027 [3.15]	0.027 [3.02]	0.034 [3.34]	0.027 [3.09]	-	0.027 [2.64]	0.027 [3.22]	0.027 [3.24]	0.027 [3.22]
Startup	-0.54 [-2.33]	-0.58 [-2.42]	-0.54 [-2.34]	-0.55 [-2.36]	[-0.42] [-1.55]	-0.60 [-2.40]	-	0.135 [0.34]	-0.62 [-2.66]	-0.53 [-2.36]	-0.59 [-2.60]
Alsace			0.24 [1.03]	-	-	-	-	-	-	-	-
Cotton	-	-	-	-	-	-	-	-	-	0.52 [2.21]	0.44 [1.83]
Iron and Steel	-	-	-	-	-	-	-	-	-0.78 [-1.87]	-	-0.60 [-1.40]
Protestant	-	-	-	-	0.02 [0.06]	-	-	-	-	-	-
Experience abroad	-	0.56 [2.14]	-	0.44 [1.66]*	-	-	-	-	-	-	-
Father in business	-	-	-	-	-	-0.76 [-0.27]	-	-	-	-	-
Training	0.73 [2.78]	-	0.69 [2.62]	0.69 [2.60]	0.88 [2.61]	0.73 [2.76]	-	0.12 [0.27]	0.78 [3.00]	0.68 [2.63]	0.72 [2.81]
Log. inheritance	-	-	-	-	-	-	0.33 [3.52]	0.25 [2.12]	-	-	-
Constant	12.60 [29.60]	13.01 [33.17]	12.56 [29.50]	12.56 [28.61]	12.17 [20.95]	12.69 [24.34]	10.10 [8.24]	9.96 [6.34]	12.69 [30.10]	12.48 [29.71]	12.56 [29.88]
No. of observations	114	110	111	108	84	108	33	32	111	111	111
σ	1.20 [14.85]	1.23 [14.78]	1.19 [14.85]	1.19 [14.65]	1.22 [12.91]	1.20 [14.64]	0.97 [8.12]	0.88 [8.00]	1.18 [14.86]	1.17 [14.86]	1.16 [14.86]
Log-likelihood	-177.52	-178.0	-176.99	-172.30	-136.44	-173.17	-45.86	-41.48	-175.81	-175.10	-174.15

Note: t-ratio in parentheses.

and therefore also their owners' wealth, were expanding at a tolerable pace, a conclusion which has not found unanimous favour in the literature.

The second robust finding is that those who started their own business apparently reduced their terminal wealth by even more than this; about 80 per cent relative to those who could step into an established firm.¹⁹ There is some evidence from a later period and other countries (Lansbury and Mayes 1996) that new entry and exit is a source of productivity growth. Hence successful new firm formation confers a benefit on the economy: starting a firm can be painful for the entrepreneur but good for the economy, by intensifying competition.²⁰ When a variable for wealth inherited is added (equation VIII, Table 4), the negative relation between starting a firm and dying rich disappears. But the sample gets very much smaller (32). If those who inherited more also left more wealth at death but did not start firms, the relationship between starting firms and wealth at death, *ignoring inheritance*, might be spurious. Rich people did not start firms. Wealth persists, hence it might be claimed, causation runs from wealth to 'start-ups', not the other way round. However, when we exclude those who inherited wealth from the sample, the relation between 'start-ups' and terminal wealth is retained, and, as already noted, the negative effect of wealth on start-up chances is statistically insignificant.

Some forms of human capital were very helpful for business success. Training rather more than offset the otherwise negative association of wealth with starting a business. A founder of a firm with training experience would expect to leave rather more capital at death than a businessman in a family firm with otherwise identical characteristics. But education variables, secondary and university education were not significantly different from zero (not tabulated): formal education was apparently worthless to a purely commercially minded businessman.²¹

Most specifications of 'informal human capital', such as the 'father in

¹⁹ Where Z is the 'start up' dummy variable, the calculation for the classical regression model is as follows:

$$\text{Log}_e K = a + bZ, \quad K = e^{a+bZ}, \quad K_1/K_0 = (e^{a+b})/e^a = e^b$$

The proportionate change in K, when the dummy comes on, is:

$$(K_1 - K_0)/K_0 = (K_1/K_0) - 1 = e^b - 1$$

In our case *b* is 0.6 so the proportionate decrease in wealth would be 82 per cent.

However for the truncated regressions of Table 3 the estimation parameters must be multiplied by σ to obtain the model parameters. σ lies between 1.1 and 1.2 in most models. Given the uncertainty surrounding the precise values of the coefficients, a multiplier of that magnitude makes little difference.

²⁰ Other results for the United States in the 1980s (Evans and Leighton 1989) suggest those becoming self-employed have lower incomes and productivity. However, by focusing on successful firm formation we exclude most poorer wage workers who became self-employed.

²¹ We say 'apparently' because as we noted in the earlier discussion, there are other possible reasons for this result that cannot be eliminated with the data available.

business' (equation VI in Table 4), 'numbers of siblings', 'family firms' and 'Protestant' variables (equation V), were equally insignificant. But 'experience abroad' was a possible major influence (equations II, IV). It is collinear with 'Alsace' and 'training'; that is businessmen from Alsace seem disproportionately to gain experience abroad and to have undergone some form of training. The 'experience' coefficient varied between 0.56 and 0.43 with the specification. This comparative stability may indicate that there is a genuine and sizeable independent effect. Protestants were disproportionately represented among Alsatian businessmen (Hau 1987), but neither the region nor the religion were themselves a cause of wealth, relative to other members of the sample.

Insofar as inheritance shifted a capital constraint, there is some evidence of credit market failure for those businessmen without substantial inheritances, though the number of observations is small. The coefficients imply that a one per cent higher inheritance leads to a 0.2–0.3 per cent higher wealth at death (equations VII and VIII in Table 4), other things being equal.

The region of Alsace was not associated with higher wealth at death, but the concentration of cotton textile businesses there made the region more prosperous than most (equations III, X and XI). The cotton industry effect offsets the impact of 'start-ups'. Cotton appears to be an industry in which fortunes were made and left – again offsetting the disadvantages of starting a firm. Iron and steel reduced wealth, insofar as there was any distinct industry effect (equations IX and XI).

Turning to counterfactual implications, the parameter estimates do not suggest any economic advantage for businessmen from extending the type of secondary and university education in nineteenth century France. More training and experience abroad would apparently have been helpful though. Better financial facilities would have boosted wealth accumulation and presumably industrial growth. Negative findings are of as much interest as positive ones. The (not tabulated) result that businessmen's wealth at death was unaffected by being in a family firm implies that condemnations of this French institution may be misplaced. A smaller proportion of family firms may not have boosted income and economic growth.

6. Conclusion

Businessmen in nineteenth century France were socially integrated, like those in Britain, but relatively well educated, like those (rather later) in Germany. Frenchmen who started successful firms were however not among the best educated or the wealthiest. But the French economy as a whole may well have benefited more from the additional competition of new firms. Experience abroad, training, and being long-lived were all significant influences on the supply of business acumen. The likelihood of a business-

man starting his own firm was reduced if he had received secondary or university education, if his father was in business and the more money he inherited. These characteristics opened up better opportunities and indeed were a consequence of them. The finding that inheritance, or upward marriage, did not increase the chances of starting a firm, does not imply that criticisms of the French banking and credit system were misplaced. Firm formation may have been capital-constrained but the opportunity-cost dominated. The small but significant effect of inherited wealth on businessmen's terminal wealth suggests that capital market, and perhaps product market, imperfections were indeed of some importance.

International transfers of technology, primarily from England, were obviously profitable, as the 'experience abroad' coefficient shows. Alsatian businessmen were most liable to participate in this process. The conventional condemnation of French education from a business viewpoint is born out by the insignificant impact of these variables on wealth, in contrast to 'training'.

It is well known that French Protestants formed a business élite, being more likely among businessmen to have higher education and, in relation to the population as a whole, more likely to be in business. What is new is that our results imply French business performance was not affected by Protestantism. Under the Second Empire, Protestants did not accumulate more wealth, other things being equal, nor did they show a higher propensity to establish new firms than other businessmen.

Few variables identified the demand or opportunities for entrepreneurship, probably because sectoral entry barriers were of small importance. Cotton was a promising industry for personal wealth creation. Economies of scale, and possibly the tariff on coal keeping up fuel prices, are reflected in the low successful new firm formation rate in primary metals production – despite the absorption and modification of Bessemer technology in this period.

Businessmen became richer at 2.7–2.8 per cent a year – faster than the French rate of growth of income per head. The Second Empire apparently possessed a dynamic rather than a 'retarded' business sector.²² We must note that fecundity and gentrification may have diluted the effect. Businessmen's children who entered the professions where they did not accumulate at the same rate, would have dragged down the rate. But businessmen with more children were more likely to found their own successful firms, both increasing output and perhaps extending competition.

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²² Although the expansion of the data set, which we hope to undertake, may modify this conclusion.

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References

- BARJOT, D. *et al.* (1991–4). *Les Patrons du Second Empire*, 4 vols. Paris: Picard-Cenomane.
- BERGHOFF, H. and MÖLLER, R. (1994). Tired pioneers and dynamic newcomers? A comparative essay on English and German entrepreneurial history 1870–1914. *Economic History Review* 47, pp. 262–87.
- BLANCHFLOWER, D. and OSWALD, A. (1990). What Makes a Young Entrepreneur? *NBER Working Paper*, no. 3252.
- BLANCHFLOWER, D. and OSWALD, A. (1991). What makes an entrepreneur? *University of Oxford Applied Economics Discussion Paper* no. 125. Oxford: Institute of Economics and Statistics.
- CARON, F. (1979). *An Economic History of Modern France*. London: Methuen.
- CARON, F. (1992). L'économie française dans les années 1900: Dynamiques et blocages. In P. Milza and R. Poidevin (eds), *La Puissance Française à la Belle Époque: Mythe ou Réalité*. Paris: Paris Complexe.
- CASSIS, Y. (1995). Divergence and convergence in British and French business in the nineteenth and twentieth centuries. In Y. Cassis, F. Crouzet and T. Gourvish (eds), *Management and Business in Britain and France*. Cambridge: Cambridge University Press.
- CASSON, M. (1991a). *Entrepreneurship and Business Culture*. Oxford: Clarendon.
- CASSON, M. (1991b). *The Entrepreneur: An Economic Theory*. Aldershot: Gregg Revivals.
- CHADEAU, E. (1988). *L'Économie du Risque. Les Entrepreneurs 1850–1930*. Paris: Olivier Orban.
- CHALINE, J-P, BAROT, S. and MANNEVILLE, P. (1990). 'Mazeline'. In D. Barjot *et al.* (eds) *Les Patrons du Second Empire I*. Paris: Picard-Cenomane.
- CHANDLER, A. (1990). *Scale and Scope: The Dynamics of Industrial Capitalism*. Cambridge, MA: Belknap Harvard University Press.
- CLAPHAM, J. H. (1936). *Economic Development of France and Germany*. Cambridge: Cambridge University Press.
- CRAFTS, N. F. R. (1984). Economic growth in Britain and France, a review of the evidence. *Journal of Economic History* 44, pp. 49–67.
- CRESSY, R. (1996). Are business start-ups debt-rationed? *Economic Journal* 106, pp. 1253–70.
- CROUZET, F. (1992). Conclusion. In M. Moss and P. Jobert (eds), *Naissance et Mort des Entreprises en Europe XIXe-XXe Siècles*, CNRS-URA973, pp. 196–213.
- CROUZET, F. (1995). Les dynasties des entrepreneurs en France et en Grande-Bretagne. *Entreprises et Histoire* 9, pp. 25–42.
- DELONG, B. (1989). Productivity growth, convergence and welfare; comment. *American Economic Review* 79, pp. 1138–59.
- EVANS, D. S. and LEIGHTON, L. S. (1989). Some empirical aspects of entrepreneurship *American Economic Review* 79, pp. 519–535.

- GRANTHAM, G. (1997). The French cliometric revolution: a survey of cliometric contributions to French economic history. *European Review of Economic History* 1, pp. 353–405.
- GRELON, A. (1993). The training and career structures of engineers in France 1880–1939. In R. Fox and A. Gaugini (eds), *Education, Technology and Industrial Performance in Europe 1850–1939*. Cambridge: Cambridge University Press.
- HAU, M. (1987). *L'Industrialisation de l'Alsace, 1803–1939*. Strasbourg: Association des Publications près les Universités de Strasbourg.
- HEYWOOD, C. (1992). *The Development of the French Economy*. Cambridge: Cambridge University Press.
- JOBERT, P. and CHEVAILLER, J-C. (1986). La démographie des entreprises en France au XIXe siècle: quelques pistes. *Histoire Economie et Société* 2, pp. 233–64.
- JOBERT, P. and MOSS, M. (1990). Prologue. In P. Jobert and M. Moss (eds), *The Birth and Death of Companies: An Historical Perspective*. Lancaster: Parthenon.
- KOLB, G. F. (1880). *The Conditions of Nations*. London: Bell.
- KOOLMAN, G. (1971). Say's conception of the role of the entrepreneur. *Economica* 151, pp. 269–86.
- KUZNETS, S. (1963). *Modern Economic Growth*. New Haven, CT: Yale University Press.
- LAFERRERE, A. and McENTEE, P. (1996). Self-employment and intergenerational transfers: liquidity constraints or family environment. *Serie des Documents de Travail du Centre de Recherche en Économie et Statistique (CREST)*, no. 9637.
- LANDES, D. S. (1962). French entrepreneurship and industrial growth in the nineteenth century. In B. E. Supple (ed.), *The Experience of Economic Growth*. New York: Random House.
- LANDES, D. (1976). Religion and enterprise: the case of the French textile industry. In E. C. Carter II, R. Forster, and J. N. Moody (eds), *Enterprise and Entrepreneurs in Nineteenth Century France*, pp. 41–86.
- LANSBURY, M. and MAYES, D. (1996). Entry, exit, ownership and the growth of productivity. In D. G. Mayes (ed.), *Sources of Productivity Growth*. Cambridge: Cambridge University Press.
- LANTHIER, P. (1979). Les dirigeants de l'industrie électrique en France 1893–1973. In M. Lévy-Leboyer (ed.), *Le Patronat de la Seconde Industrialisation*. Paris: Les Editions Ouvrières.
- LÉVY-LEBOYER, M. (1979). Le Patronat Française, 1912–1973. In M. Lévy-Leboyer (ed.), *Le Patronat de la Seconde Industrialisation*. Paris: Les Editions Ouvrières.
- LÉVY-LEBOYER, M. (1980). The large corporation in modern France. In A. D. Chandler and H. Daems (eds), *Managerial Hierarchies: Comparative Perspectives on the Rise of Modern Industrial Enterprise*. Cambridge, MA: Harvard University Press.
- LÉVY-LEBOYER, M. and BOURGUIGNON, F. (1990). *The French Economy in the Nineteenth Century: An Essay in Econometric Analysis*. Maison des Sciences de l'Homme and Cambridge University Press.
- LÉVY LEBOYER, M. and LESCURE, M. (1991). France. In R. Sylla and G. Toniolo (eds), *Patterns of European Industrialization: The Nineteenth Century*. London and New York: Routledge.
- LINDERT, P. H. and TRACE, K. (1971). Yardsticks for Victorian entrepreneurs. In

- D. N. McCloskey (ed.), *Essays on a Mature Economy: Britain after 1840*. London: Methuen.
- LOCKE, R. R. (1989). *Management and Higher Education since 1940*. Cambridge: Cambridge University Press.
- MARSHALL, F. (1862). *Population and Trade in France in 1861-2*. London: Chapman and Hall.
- NICHOLAS, T. (1998). Aspects of entrepreneurship and wealth accumulation in Britain since 1850. D.Phil. thesis (unpublished), Oxford University.
- NYE, J. V. (1987). Firm size and economic backwardness: a new look at the French industrialization debate. *Journal of Economic History* 47, pp. 649-669.
- O'BRIEN, P. K. and KEYDER, C. (1978). *Economic Growth in Britain and France 1780-1914: Two Paths to the Twentieth Century*. London: Allen and Unwin.
- PLESSIS, A. (1982). *La Banque de France et Ses Deux Cents Actionnaires sous le Second Empire*. Paris: Droz.
- PLESSIS, A. (1987). Le retard Français. La faute à la banque? Banques locales, succursales de la Banque de France et financement de l'économie sous le Second Empire. In P. Fridenson and A. Strauss (eds), *Le Capitalisme Français 19e-20e Siècles Blocage et Dynamiques d'une Croissance*. Paris: Fayard, pp. 198-210.
- POLLARD, S. (1981). *Peaceful Conquest: The Industrialization of Europe 1760-1970*. Oxford: Oxford University Press.
- PUDNEY, J. (1968). *Suez: De Lesseps Canal*. London: Dent.
- SCHUMPETER, J. (1939). *Business Cycles*. New York: McGraw-Hill.
- SHINN, T. (1980). *Savoir Scientifique et Pouvoir Social. L'École Polytechnique, 1794-1914*. Paris: Presses de la Fondation National des Sciences Politiques.
- SICSIC, P. (1994). Establishment size and economies of scale in 19th century France. *Explorations in Economic History* 31, pp. 453-478.
- SKROBEK, M., LEGOY, J. and BAROT, S. (1990). 'Clouet'. In D. Barjot *et al.* (eds) *Les Patrons du Second Empire I*. Paris: Picard-Cenomane.
- TOUTAIN, J. C. (1987). *Le Produit Intérieur de la France de 1789 à 1982*. Grenoble: Presses Universitaire de Grenoble.
- YOSHIMURA, M. (1988). Catholicism and anti-business bias: the case of France. *International University of Japan Annual Bulletin* 5, pp. 107-131.