

Clogs to Clogs in Three Generations? Explaining Entrepreneurial Performance in Britain Since 1850

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Research into culture and entrepreneurship in Britain has been dominated by casual empiricism. This article shows the benefits of using a new method. Lifetime wealth accumulation is specified as a measure of entrepreneurial performance, and applied to data collected from dictionaries of business biography. Industry, region, and religious dissent are ruled out as explanations of entrepreneurial performance. Education and entrepreneurial type are the important predictors. Firm inheritors and those receiving a high-status education experienced relatively low lifetime rates of wealth accumulation. Firm founders, managers, and individuals with a lower-status education were comparatively successful.

Entrepreneurial ability is not always inherited, according to Alfred Marshall in his *Principles of Economics*:

... when a man has got together a great business, his descendants often fail, in spite of their great advantages, to develop the high abilities and special turn of mind and temperament required for carrying it on with equal success. . . . When a full generation has passed, when the old traditions are no longer a safe guide, and when the bonds that held together the old staff have been dissolved, then the business almost invariably falls to pieces. . . .¹

Most references to inheritance and entrepreneurship in the economic history literature cite David Landes's influential account of European industrialization, which describes late-nineteenth-century Britain as plagued by nepotism, tradition, and inflexibility. Inherited business ownership is said to have created complacency and conservatism, while the pursuit of social and political distinction encouraged entrepreneurial lethargy. The persistence of family capitalism supposedly delayed the adoption of efficient administrative and organizational structures, such that British firms fell behind their

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¹ Marshall, *Principles*, pp. 299–300.

competitors in terms of both capacity and efficiency. A lackluster enterprise culture, in sum, is seen as a primary obstacle to economic growth.²

But what is the evidence for this failure? Judgements of performance typically rest on case studies that are sufficient neither to refute nor to confirm more general hypotheses of weak British entrepreneurship. The Kenrick family in hardware manufacture, the Du Crosses in rubber, and the Crawshays in iron and steel are habitually cited as examples of dynastic downfall. But instances of success are equally plentiful. Before 1914 the three largest firms in Britain—J&P Coats, Imperial Tobacco, and Watney Combe Reid—were built up around the founding family rather than new management structures. Cadbury Brothers, the epitome of good management, is an example of a family firm that thrives even today.

Cultural explanations of economic decline have proved difficult to test using qualitative, archival, or institutional research methods. In the historical debate about culture's influence on economic performance, education has typically played a prominent role. The British public school, with its emphasis on conformity, is singled out for condemnation. The slow pace of technical advance, especially in the old staple industries, has been attributed to the practical exclusion of science and technology from the public school curriculum.³ Yet the evidence is far from conclusive. As H. Berghoff points out, "so far no one has really proved that a classical education always has a negative effect on non-classical careers."⁴

Several writers have followed Max Weber's theory of "ascetic Protestantism," arguing that religious dissent is the handmaiden of capitalist economic growth. To a large degree the evidence is impressionistic. For T. S. Ashton, the fact that nonconformists were better educated than the rest of the middle class in eighteenth- and nineteenth-century Britain accounts for their prominence in business life.⁵ Nonconformist teachings that idleness was a source of sin are said to have encouraged profit-seeking entrepreneurship, while systems of mutual support provided access to information, credit, and trade.⁶ A number of studies use empirical data to test the hypothesis that nonconformists were overrepresented in the ranks of Britain's entrepreneurs.⁷

² There are various manifestations of the cultural thesis. The best-known (certainly the most derided) is Wiener, *English Culture*. For a summary of this debate see Collins and Robbins, *British Culture*, and Rubinstein, *Capitalism*. See also Berghoff and Möller, "Tired Pioneers," p. 262; Aldcroft, "Entrepreneur"; Coleman, "Gentlemen and Players"; Kindleberger, *Economic Growth*; Landes, *Unbound Prometheus*; Payne, *British Entrepreneurship*; and Chandler, *Scale and Scope*. Using case-study evidence, Rose ("Beyond Buddenbrooks") argues that poor provision for succession into the business leadership of family firms contributed to failure. See, for example, Berghoff, and Möller, "Tired Pioneers," p. 262.

³ Ward, "Public Schools"; and Warwick, "Did Britain."

⁴ Berghoff, "Public Schools," p. 161.

⁵ Ashton, *Industrial Revolution*, p. 19.

⁶ Kindleberger, *Economic Growth*.

⁷ Berghoff, "British Businessmen"; Hagen, *Social Change*; Howe, *Cotton Masters*; and Rubinstein, *Men*.

But these studies do not adequately distinguish between mere entrepreneurship and entrepreneurial *success*.⁸ There has been no direct test of the hypothesis that religious affiliation is a determinant of entrepreneurial performance.⁹

This article systematically analyzes the link between culture and entrepreneurial success. A measure of entrepreneurial performance is developed using information on lifetime wealth accumulation. Entrepreneurs are profiled using categories such as entrepreneurial type, education, religion, industry, and region. Key issues in the debate on culture and entrepreneurship in Britain are explored.

A PERFORMANCE MEASURE

In the economic history literature, the use of economic theory to assess entrepreneurial performance is confined almost exclusively to the application of the neoclassical paradigm.¹⁰ Debate has centered largely on the issue of whether entrepreneurs active in British industry were economically rational in their choices of technology. Advances in growth theory have important implications for this research. By allowing that investment decisions might have been influenced by market conditions, resource flows, and technology spillovers, "endogenous growth theory may offer additional lines of defence for those wishing to absolve British business of any failure."¹¹

However, performance tests based on new growth theory are unlikely to sway the critics who favor cultural explanations of Britain's relative retardation. M. Wiener, a key exponent of the so-called cultural critique, argues that the sources of British economic decline remain beyond the narrow competence of the economist.¹² A central objective of this article is to combine economic theory and the empirical study of culture in order to reexamine the hypothesis of culturally induced entrepreneurial decline in Britain. A performance test is undertaken on the basis of a postulated link between profit and entrepreneurial success on the one hand, and between profit and the lifetime wealth accumulation of entrepreneurs on the other hand.

In accordance with Frank Knight, Joseph Schumpeter, and more recent theorists, I assume here that the pursuit of profit is the prime motive for entrepreneurial activity, while acknowledging that there can also be non-

⁸ This argument has been made by Berghoff, "British Businessmen." If society creates an outgroup, in this case nonconformists, one would expect to find an overrepresentation of that group in the business community. The cause, rather than inherent entrepreneurial ability, might be restricted access to alternative career paths such as the professions.

⁹ For further information on this issue see Kirby, "Quakerism," p. 105.

¹⁰ McCloskey, "Did Victorian Britain"; and McCloskey and Sandberg, "From Damnation," are perhaps the best-known examples.

¹¹ Crafts, "Forging Ahead," p. 206.

¹² See Wiener, *English Culture*, especially the chapter entitled "British Retardation—The Limits of Economic Explanation."

pecuniary influences on the entrepreneurial labor supply, such as a preference for personal autonomy, power, or status.¹³ Profit arises through a variety of channels. In a Schumpeterian sense entrepreneurship is a productive activity which benefits society and the economy. Profit is generated through the introduction of new goods, through the implementation of new methods of organization and production, and through the opening of new markets. Alternatively, as emphasized by W. J. Baumol, profit can derive from activities that damage the industrial system, such as the monopolization of resources or the exploitation of imperfections in the legal system. In such cases, entrepreneurship is a rent-seeking activity which adds no value to, or even subtracts value from, the economy.¹⁴

Under the neoclassical assumption of free entry and exit of entrepreneurial labor, profits will tend towards a competitive equilibrium of zero. Under favorable business-cycle conditions profits will be higher and may vary across firms. In the long run, however, profits converge to zero. In competitive equilibrium there is a return to entrepreneurship, but this is simply a reward for the entrepreneur's own labor.¹⁵

If profits do tend towards a competitive equilibrium of zero, why choose entrepreneurship over regular wage work? According to D. G. Blanchflower and A. J. Oswald, the fact that profits are typically indeterminate *ex ante* provides a spur to entrepreneurial activity. Then if the equilibrium condition does not hold *ex post*, for example due to imperfect capital markets that constrain the effective supply of entrepreneurship, the entrepreneur can achieve supernormal returns. The utility gap between entrepreneurs and wage-workers is wider in the presence of imperfect capital markets. Those who gain access to investment funds can achieve supernormal returns for their business effort.¹⁶

In the absence of a competitive process to eliminate supernormal profits, those who overcome credit constraints can maximize their rate of accumulation. The greater the profit in disequilibrium, the more intense is the inducement towards entrepreneurship. If indeed profit is the prime motive for entrepreneurship, then the more able entrepreneurs will be distinguishable, *ceteris paribus*, by their higher rate of profit. This suggests a useful metric of entrepreneurial success.

Although profit data are not generally available, profit flows may be inferred approximately using information on lifetime wealth accumulation.¹⁷

¹³ Knight, *Risk*; and Schumpeter, *Economic Development*. See also Baumol, *Entrepreneurship*; and Casson, *Entrepreneur*.

¹⁴ Baumol, *Entrepreneurship*.

¹⁵ See Mueller, *Profits*, especially pp. 1–33.

¹⁶ Blanchflower and Oswald, "Supernormal Returns."

¹⁷ Two considerations militate against any attempt to infer profit flows more directly from the declared profits of an entrepreneur's enterprises. First, this would entail a conceptual leap of identifying the firm and the individual. Second, firm-level income data are very scarce for much of the period in question: very few firms took advantage of early limited-liability legislation, and it was not until the

Suppose profit (p_t) is equivalent to the entrepreneur's income (y_t). In long-run competitive equilibrium an entrepreneur will receive a profit stream generated by the process

$$p_t = y_t = \varepsilon_t \quad (1)$$

where ε_t is a random variable distributed as $N(0, \sigma^2_\varepsilon)$ such that realizations of ε_t are serially uncorrelated. If the competitive equilibrium condition does not hold, the entrepreneur can receive supernormal returns such that

$$p_t, y_t > 0 \quad (2)$$

Making the link with wealth accumulation, consider an entrepreneur going into business at time t with initial wealth W_t . Profit income can either be consumed (c_t) or saved. The entrepreneur's wealth in year $t + 1$ is

$$W_{t+1} = [W_t + y_t - c_t] (1 + r) \quad (3)$$

where the wealth outcome is determined by initial wealth, profit, consumption, and rate of return.¹⁸ Rearranging equation 3, the "rate of return" r can be calculated in order to distinguish between large values of W_{t+1} caused by inherited wealth, and large values caused by entrepreneurship.

$$r = \left(\frac{W_{t+1}}{W_t + y_t - c_t} \right) - 1 \quad (4)$$

Over n years of entrepreneurial activity, r will depend on the entrepreneur's ability to exploit opportunities and generate returns on initial wealth. Since initial wealth is commonly inherited, the formula is useful for analyzing the performance of family firms. If firm inheritors are found to run down the assets built up by parents and grandparents, this will offer empirical confirmation of the proverbial hypothesis of "clogs to clogs in three generations."

THE DATA SET

Data were collected from the *Dictionary of Business Biography (DBB)*, the *Dictionary of Twentieth Century British Business Leaders (DTBBL)* and probate archival holdings.¹⁹ All deceased individuals on whom information

1948 Companies Act that firms were forced to detail information about their true assets and profits in consolidated annual balance sheets.

¹⁸ For a detailed theoretical appraisal of wealth accumulation see Hall, "Stochastic Implications."

¹⁹ Jeremy and Shaw, *Dictionary*; and Jeremy and Tweedale, *Dictionary*. Probate records were consulted at the Probate Registry, Somerset House, London.

was available were gathered into a data set. Birth dates ranged from 1789 to 1937 and death dates from 1868 to 1993. These individuals were active in British business during the nineteenth and twentieth centuries. A total of 1,149 observations was obtained, of which 1,079 included terminal wealth entries. An empirical counterpart of equation 4 was estimated for 283 individuals in the data set on whom terminal and inherited wealth entries were gathered.

It is possible to challenge the view of the editors that the sources offer balanced coverage of entrepreneurial leadership in Britain over the last century-and-a-half. In some instances names seem to have been included for extraneous reasons. John Maynard Keynes (1883 to 1946) was renowned principally as an economist and investment policy analyst, though he held several directorships of London-based corporations. Others were included perhaps because their work was technologically significant. Sir Henry Bessemer (1813 to 1898) was an inventor first (his converter process was in operation in Britain until 1974), an engineer and steel master second, and a businessman only a distant third.²⁰

How representative are the data of British entrepreneurship? Certainly the many who entered the entrepreneurial labor market but failed will not be included in the data set, aside from a few well-documented cases of failure and the colorful careers of rogue figures. But between the success stories and the spectacular failures, the catchment area of these biographical dictionaries is wide. According to Baumol, a broad coverage is to be preferred:

... any attempt at a rigid definition of the term entrepreneur ... [should be avoided] ... because whatever attributes are selected they are sure to prove excessively restrictive, ruling out some feature, activity or accomplishment of this inherently subtle and elusive character.²¹

Firm founders, inventors, and managers are included in the sources because all may be said to have contributed to business leadership in Britain. Firm foundership is commonly taken as the defining element of entrepreneurship, typifying the distinction between profit-seeking entrepreneurs and wage-earning workers. However, the roles of inventor and manager can be considered "entrepreneurial" as well. Inventors can attempt to appropriate a return from their inventions with patents and licences. Managers can be credited with transforming inventions into useable products. The manager's wage is, in part, a reflection of the firm's profitability, but it can also be complemented with equity holding. W. D. Rubinstein's analysis of the very wealthy in Britain shows that even unpropertied businessmen could amass fortunes by investing their salaries.²²

²⁰ See the entries for Keynes and Bessemer in the *DBB*.

²¹ Baumol, *Entrepreneurship*, p. 7.

²² Rubinstein, *Men*, pp. 176–92.

A specific source of bias in the *DBB* and *DTBBL* is the overrepresentation of entrepreneurs active in manufacturing and mineral extraction. This bias can be identified using a simple, if also imperfect, test. Individuals active in those sectors account for 66 percent of the full sample (1,149 individuals), which can be compared with a benchmark calculation using S. N. Broadberry's sectoral shares of employment. Broadberry's figures, adjusted, show that if the sample were stripped of this bias, manufacturing and mineral-extraction industries would account for only around 46 percent of those included.²³

Thus coverage in the *DBB* and *DTBBL*, albeit broad, is heavily weighted towards manufacturing and mineral extraction, and towards successful entrepreneurs. These biases do not invalidate the tests carried out below, but they do qualify the results. Flaws in the data, even if they cannot be banished, must ever be kept in mind.

An additional bias might be introduced into the analysis if the smaller sample, for which both terminal and initial wealth data are available, were not representative of the larger sample. Figure 1 compares the density of probate terminal wealth for the larger sample of 1,079 individuals and for the smaller sample of 283 individuals on whom more data are available. The kernel density of terminal wealth is generated to determine whether the different sample sizes narrow or widen the wealth distribution.²⁴ From Figure 1 it is clear that the distribution is preserved across the sample sizes with no apparent loss of generality.²⁵

Data Coding

Most of the information in the biographical sources is qualitative, but it can be collected in a quantitative form using binary coding. In order to test hypotheses relating to cultural explanations of Britain's relative economic decline, the following profile categories are used.

²³ Broadberry, "How did the United States," p. 385. This is the share of the workforce active in such industries on average between 1871 and 1990 as calculated from Broadberry's data, adjusted to exclude agriculture and government because those sectors are also excluded from the biographical sources. The sectoral share of employment for manufacturing and mineral extraction is then an average share of employment taken over the five benchmark years of 1871, 1911, 1930, 1950, and 1990.

²⁴ The kernel function is specified as Gaussian. The wealth data are corrected for price changes using a GDP deflator and indexed to 1938. The deflator is obtained by dividing Feinstein's series of GDP at factor cost in current prices, by his series in constant prices, both given in Mitchell, *British Historical Statistics*, pp. 831–32, 837–38.

²⁵ Similarly under a *t*-test there is no significant difference between the sample means ($t = -1.2173$ with probability 0.8881). The descriptive statistics are (in 1938 £s)

	Mean	Standard Deviation	Median
1,079 individuals	489,309	1,706,650	115,080
283 individuals	627,977	1,678,743	162,026

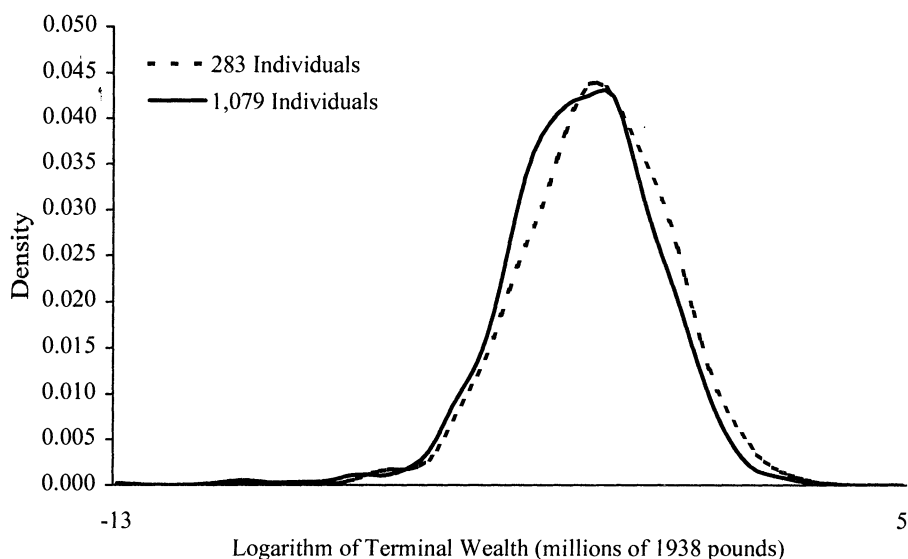


FIGURE 1
KERNEL DENSITY ESTIMATES OF PROBATE TERMINAL WEALTH

Note: See the text and note 24.

A first category, “Entrepreneurial Type,” separates inheritors from non-inheritors. Inheritors are further classified as either third- or second-generation entrepreneurs, depending on their relationship to the founder.²⁶ Non-inheritors are themselves subclassified as either firm founders or career managers. A second category, “Education,” distinguishes those educated at public schools, leading (Clarendon) public schools, and Oxbridge colleges.²⁷ Two further variables distinguish high-status education (public school or Oxbridge university) from lower-status education (basic elementary or secondary education, grammar school, or non-Oxbridge university).²⁸ A variable to distinguish those with a technical or scientific education is also included. A third category, “Religion,” separates nonconformists from all others. The

²⁶ Inheritors beyond the third generation are included under the third-generation profile variable. There are a few cases in which an individual took over a family firm owned by a brother or cousin of the same generation. These cases are coded as firm inheritors but are neither third- nor second-generation inheritors. To avoid confusion they do not appear again under a separate category.

²⁷ In Britain a “public school” is fee-charging and privately managed, equivalent to a “private school” in America. A leading public school (equivalent to a highly prestigious private school such as Exeter or Andover in America) is defined as a Clarendon School, one of the nine leading schools as determined by the Clarendon Commission of 1864. These are Eton, Harrow, Winchester, Westminster, Rugby, St. Paul’s, Merchant Taylors, Charterhouse, and Shrewsbury.

²⁸ An elementary education extended to age eleven and a secondary education up to age sixteen. Grammar schools blurred the distinction between the state and private sectors. Some were maintained by state funds, while others were fee-paying “independent” schools.

TABLE 1
PROFILE CATEGORIES FOR THE INDIVIDUALS IN THE DATA SET

Categories	1,149 Individuals (percentages)	283 Individuals (percentages)
Entrepreneurial type		
Firm inheritor	31	59
Second-generation	21	36
Third-generation	8	22
Noninheritor	69	41
Firm founder	37	20
Manager	32	21
Education		
High status	72	69
Public school	70	62
Clarendon school	20	23
Oxbridge	19	19
Lower status	28	31
Technical-scientific	45	34
Religion		
Nonconformist	21	22
Industry		
Staple	15	29
New technology	22	21
Other manufacturing	29	29
Region		
London	36	30
North East-West	13	35

Note: Percentages refer to individuals on whom information was available.

Source: See the text.

biographical data have been used to assess the strength and duration of allegiance, because in some instances individuals did switch from one religion to another.²⁹ A final category, "Region-Industry," is used to separate individuals active in staple industries (coal, iron and steel, shipbuilding, and textiles), new technology manufacturing industries (chemicals, engineering, electricity, automobiles, and aircraft), other manufacturing, and the two prominent industrial regions of North East-North West and London.

The data are described in Table 1 both for the full set (1,149 observations) and for the subset of individuals on whom terminal and inherited wealth entries are available (283 observations). Comparing the two series it can be seen that the degree of comparability is high, although the smaller sample does contain a larger share of individuals active in staple industries, in the North East-North West, and in inherited firms. Again the presence of this bias does not invalidate the forthcoming hypothesis tests so long as the analytical results are placed in the context of the sample. The objective of this article, to link profile characteristics with entrepreneurial performance, can be achieved with the data at hand.

²⁹ Jeremy discusses the transfer of businessmen's allegiance in "Important Questions," p. 15-16.

PROBATE RECORDS AND ESTIMATION TECHNIQUE

This section describes how probate records are used to measure the lifetime wealth accumulation of the individuals in the data set. In doing so it draws heavily on Rubinstein's detailed account of probate records as a statistical source.³⁰ Three problems stand out. First, wealth recorded in probate may not be an accurate reflection of an individual's total worth. Probate records cover only those assets which an executor must dispose of, and take no account, beyond a certain period prior to death, of gifts bestowed upon others. Over the course of this period, as death duties grew more severe, there was likely to have been a *ceteris paribus* reduction in the value of formal bequests. Gifts *inter vivos*, investments not aggregated with the estate, and reductions in the duty value of assets were among the ways death duties could be dodged.³¹

In order to adjust for the impact of rising death duties, I use a period "control" to segregate individuals liable to different taxation regimes. Figure 2 tracks the real rate of duty charged on estates of various size between 1894 and 1990.³² The increasingly progressive taxation of wealth transfers is apparent. Before the First World War death duties were relatively slight. After 1919 charges increased substantially, in addition to tighter restrictions on *inter vivos* giving. Finance acts following the Second World War introduced higher rates of death duty. The change to Capital Transfer Tax in 1975 and Inheritance Tax in 1986 reduced the rate of taxation, but additional limitations on lifetime gifts closed loopholes which had previously lessened exposure to tax liability on death.³³

The fact of distinctive death-duty regimes suggests a subdivision of observations into three cohorts: cohort 1 includes deaths before 1919, cohort 2 includes deaths between 1919 and 1945, and cohort 3 includes deaths after 1945. Within each death cohort, terminal wealth will have been subject to comparable rates of taxation and predeath transfer. This procedure is likely to be a noisy estimator of death-duty evasion and avoidance, because of the long time periods involved and because of behavioral heterogeneity. If the errors are normally distributed, however, and a large enough set of observations is considered, such deviations will not introduce major distortions into the reported results.

A second problem is that probate records provide a snapshot of wealth at one moment in time, namely death, and thus may conceal fluctuations in

³⁰ See Rubinstein, *Men*, pp. 9–27.

³¹ See Horsman, "Avoidance"; and Whalley, "Estate Duty."

³² Tax liability depended on the level of taxation charged on an estate (shown in Figure 2), but the estate size liable for duty depended on a variety of factors, especially laws regarding lifetime gifts, which did change over time. Therefore Figure 2 can only serve as a guide to the breaks in trend.

³³ For detailed descriptions of death-duty legislation see Lawday and Mann, *Green's Death Duties*; and Miller, *Machinery*.

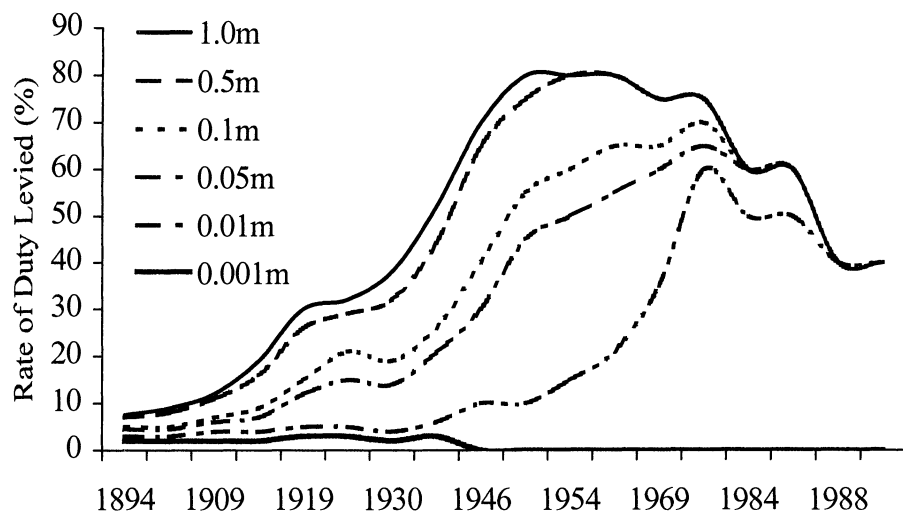


FIGURE 2
THE REAL RATE OF DEATH DUTY CHARGED ON A VARIETY OF SIZED-ESTATES IN
1938 £s

Sources: Calculated from the data in Lawday and Mann, *Green's Death Duties*, pp. 1201–16; and HMSO, *Taxes Acts*.

assets over the life cycle. In the context of a standard neoclassical utility-maximization problem, the entrepreneur at the beginning of the life cycle plans consumption and leisure for the present and the future. The consumption profile will be influenced by the rate of time preference. If individuals save over working periods and dissave during retirement, there will be some running down of assets with old age. If there is a bequest motive, households with children may leave more wealth than do childless households; alternatively, *inter vivos* gifts can be bestowed upon children, reducing the terminal wealth of parents. Altruistic entrepreneurs can turn to philanthropy.³⁴

In order to test for such effects I specified the following equation

$$\ln W = \alpha_0 + \alpha_1 C + \alpha_3 A_2 + \alpha_4 P + \varepsilon \quad (5)$$

where $\ln W$ is the natural logarithm of probate terminal wealth, C refers to the number of the entrepreneur's children, A to the entrepreneur's age at death, and P is a dummy variable coded one for individuals active in philanthropy.³⁵

The empirical results are reported in Table 2. Regressions are run within the previously mentioned death cohorts, in order to control for changes in the death-duty regime. The standard errors are corrected for possible hetero-

³⁴ For discussions of the life-cycle model see Modigliani, "Role"; and Kotlikoff, "Intergenerational Transfers."

³⁵ The wealth data are indexed in 1938 prices using a GDP deflator.

TABLE 2
TERMINAL WEALTH REGRESSIONS

Variable	Cohort 1 (Deaths before 1919)		Cohort 2 (Deaths 1919–1945)		Cohort 3 (Deaths after 1945)	
	Full Sample	Subsample	Full Sample	Subsample	Full Sample	Subsample
Constant	-3.582** (0.626)	-3.311** (1.237)	-2.274** (0.625)	-2.630** (0.626)	0.727 (0.757)	1.701 (1.245)
Children	0.035 (0.026)	0.072 (0.055)	0.048 (0.032)	0.043 (0.054)	-0.074 (0.070)	-0.038 (0.132)
Age	0.015* (0.009)	0.013 (0.016)	-0.001 (0.008)	0.008 (0.008)	-0.016* (0.009)	-0.029** (0.014)
Philanthropy	0.781** (0.182)	0.694** (0.335)	1.293** (0.209)	0.880** (0.372)	0.810** (0.209)	1.003** (0.390)
<i>F</i> -statistic	8.22**	1.96	12.74**	1.97	5.33**	2.97**
<i>R</i> ² (adjusted)	0.065	0.049	0.105	0.033	0.045	0.052
<i>N</i>	273	65	266	86	333	74

* = Significant at the 10 percent level.

** = Significant at the 5 percent level.

Notes: Huber-White robust standard errors are in parentheses. Regressions included those individuals on whom information was available. The squared age variable was dropped on an *F*-test.

Source: See the text.

skedasticity bias. Equation 5 is applied to both samples (the full sample of 1,079, and the subsample of 283) to test for divergence in the subsample results. Although the larger sample provides a better “fit” to the observations, the coefficients are generally similar in size across the two samples, and share the same sign.

As the low *R*-squareds of the regressions indicate, life-cycle factors will not greatly distort the measure of entrepreneurial performance. The life-cycle variables specified account for, at best, 10 percent of the variation in the logarithm of terminal wealth. The coefficients on the “children” variable are not significantly different from zero, which means that family size is not a good predictor of terminal wealth. Using the coefficients on age, on the other hand, it is difficult to prove or disprove that life-cycle factors affected the measure of entrepreneurial success. Whereas the correlation of age with terminal wealth is positive in cohort 1, it is insignificant at the customary level in cohort 2, and negative in cohort 3. The life-cycle theory predicts a polynomial in age, but the squared age term is dropped from the regressions on an *F*-test. There is a range of possible explanations for the age variable results, none of which can be confirmed or denied with these data.³⁶

³⁶ For example, the results for cohort 1 may reflect the fact that the longer-lived had more time to accumulate wealth and thus left more at death. Thereafter, higher death-duty charges may have encouraged *inter vivos* giving, thus reducing the precautionary demand for wealth at death for older individuals (hence the cohort 3 results). A squared age term would be more likely to feature in a dynamic measure of wealth over the life cycle rather than a static measure of wealth at death.

Most of the explained variation in the dependent variable stems from the philanthropy dummy. This variable is positive and significant at better than the 5 percent level. Cross tabulations reveal that 42, 31, and 28 percent of the individuals in the respective cohorts could be identified as making charitable donations. Following R. Halvorsen and R. Palmquist, the parameters across the three cohorts show that the estate of a philanthropist was between 100 and 264 percent greater than that of a nonphilanthropist.³⁷ According to these cross-section results, and assuming identical initial endowments, a philanthropist would score a higher performance rating than a nonphilanthropist, despite philanthropy's direct effect of reducing wealth. Although individuals with the largest terminal wealth also gave away the most—which depresses their measured rates of return—those results are nevertheless robust when controlling for philanthropic giving, as will be explained below.

There are complicated issues involved in testing the life-cycle hypothesis. At the micro level evidence can be amassed both in favor of and against life-cycle patterns of wealth accumulation and decumulation.³⁸ The results from equation 5 are tentative and serve only as a method of testing the extent to which life-cycle factors will influence the results of the performance analysis. Neither family size nor a propensity for philanthropy will pose a significant distortion. Age at death is either positively or negatively correlated with terminal wealth, depending on the cohort. Overall, only a small percentage of the variation is explained.

A third problem is the measurement of initial wealth endowment. Using lifetime wealth accumulation as an index of entrepreneurial performance requires known values of both terminal and initial wealth. I use paternal bequest in the denominator of the expression because fathers represent the sole group for which wealth information can be traced. Ideally, indirect inheritances would also be considered, as the sources of inheritance are much broader than father-to-progeny. Nonetheless there are good reasons for believing that a paternal bequest is a useful proxy for the entrepreneur's initial endowment. Entrepreneurs can borrow on the expectation of an inheritance, or use their fathers' collateral to secure loans.³⁹ Empirically, the distribution of wealth in one generation is closely linked with the preceding generation's, and the major source of wealth inequality is direct as opposed to indirect inheritances.⁴⁰

On the basis of the extant data, it is possible to calculate what may be described as an approximation of r

³⁷ These percentages are calculated by subtracting 1 from the antilog of the smallest (0.694) and the largest (1.293) parameter estimates and multiplying by 100. See Halvorsen and Palmquist, "Interpretation."

³⁸ Hall and Mishkin, "Sensitivity"; Runkle, "Liquidity Constraints"; and Zelder, "Consumption."

³⁹ Blanchflower and Oswald, "What Makes an Entrepreneur?"

⁴⁰ Atkinson, *Economics of Inequality*; Harbury and Hitchens, *Inheritance*; and Harbury and McMahon, "Inheritance."

$$r^* = \left[\sqrt[n]{\left(\frac{W_{t+n}}{W_t} \right)} \right] - 1 \quad (6)$$

where r^* is the approximate rate of return on initial wealth expressed in equation 4, and W_{t+n} and W_t are probate terminal and inherited wealth, respectively. The period of business activity in n years is taken as the date of death minus the date of entry into entrepreneurship.⁴¹ Notwithstanding the fact that income and consumption data are missing from this formula, r^* in equation 6 is a close empirical counterpart to r in equation 4. It can be assumed that heterogeneity in consumption will be smoothed out in estimates of r^* across a data set of individuals. It is also a reasonable *a priori* assumption that wealth will be an increasing function of the entrepreneur's profit income.

RESULTS AND ANALYSIS

The estimation results are given in Table 3. For each death cohort, the mean rate of return is given along with its standard error and the number of observations in each cell.⁴² "Years" refers to the average number of years of business activity, equivalent to n in equation 6. As with all the estimates in Table 3, comparisons can only be made within cohorts, because of the particular distortions to recorded wealth created by death-duty evasion and avoidance.

The results in Table 3 reflect economic and societal changes in Britain since the middle of the nineteenth century; the gaps, too, reflect those changes. In cohorts 2 and 3 a separate category for managers can be specified in line with the growing ranks of career managers in public corporations. Conversely, in the heyday of cohort 3, far fewer new firm founders made it into the prominence of Britain's business leaders during this high point of "organization society."⁴³ The traditional staple-nonstaple dichotomy is represented in the first two cohorts but not in the third, where a new-technology–non-new-technology category is specified. Although new technology industries were already important during the interwar years, and the staple industries persisted after 1945, small sample size restricts rate-of-return calculations to the instances given in Table 3. Religious categories are

⁴¹ Though most relinquished their entrepreneurial roles before they died, biographical information is not sufficiently detailed to make the necessary adjustment. By contrast, great detail is provided on the career patterns of the individuals included. This makes it possible to establish the date when a business career commenced, especially for firm founders, because the date of business start-up is invariably given.

⁴² In 21 cases a father's wealth was equal to zero. A value of £1 was imputed in order to estimate the rate of return. I conducted a series of experiments using higher and lower imputed values (ranging from £0.1 to £10), and the substantive results remained unchanged.

⁴³ Roper, *Masculinity*, pp. 47–73.

TABLE 3
RATE OF RETURN ESTIMATES

Category	Cohort 1 (Deaths before 1919)			Cohort 2 (Deaths 1919-1945)			Cohort 3 (Deaths after 1945)		
	Mean	Standard Error	Years	Mean	Standard Error	Years	Mean	Standard Error	Years
Pooled (unweighted)	0.0932	0.0165	84	0.0406	0.0107	105	0.0174	0.0085	94
Entrepreneurial type									
Firm inheritor	0.0454	0.0195	47	0.0079	0.0072	62	-0.0072	0.0070	58
Second generation	0.0557	0.0296	29	0.0160	0.0099	39	-0.0058	0.0110	33
Third generation	0.0282	0.0111	17	-0.0058	0.0115	20	-0.0057	0.0078	25
Noninheritor	0.1513	0.0249	37	0.0920	0.0231	43	0.0570	0.0172	36
Firm founder	0.1591	0.0297	29	0.1419	0.0420	19	—	—	—
Manager	—	—	—	0.0542	0.0236	24	0.0545	0.0203	28
Education									
High-status	0.0295	0.0205	42	0.0178	0.0095	79	0.0081	0.0083	77
Lower-status	0.1569	0.0219	42	0.1163	0.0296	26	0.0596	0.0261	17
Public school	0.0180	0.0224	36	0.0175	0.0102	72	0.0103	0.0090	71
Not public school	0.1491	0.0200	48	0.0917	0.0239	33	0.0395	0.0205	23
Clarendon school	—	—	—	-0.0009	0.0105	24	-0.0204	0.0099	26
Oxbridge	—	—	—	—	—	—	-0.0181	0.0101	22
Technical-scientific	0.0581	0.0163	25	0.0453	0.0167	42	0.0462	0.0161	31
Not technical-scientific	0.1086	0.0224	57	0.0374	0.0140	63	0.0032	0.0095	63
Religion									
Nonconformist	0.1262	0.0272	25	0.0475	0.0290	19	—	—	—
Other	0.0795	0.0203	59	0.0391	0.0115	86	—	—	—

TABLE 3—continued

Region	Cohort 1 (Deaths before 1919)				Cohort 2 (Deaths 1919–1945)				Cohort 3 (Deaths after 1945)			
	Mean	Standard Error	N	Years	Mean	Standard Error	N	Years	Mean	Standard Error	N	Years
London	0.0928	0.0240	24	47	0.0280	0.0152	31	46	0.0077	0.0163	29	49
Not London	0.0933	0.0211	60	42	0.0450	0.0133	66	48	0.0211	0.0120	45	50
North East-West	0.1052	0.0209	39	44	0.0318	0.0134	35	51	0.0221	0.0174	24	50
Not North East-West	0.0828	0.0250	45	43	0.0451	0.0147	68	44	0.0128	0.0116	50	49
Industry												
Staple	0.0609	0.0326	27	43	0.0366	0.0226	28	48	—	—	—	—
Nonstaple	0.1082	0.0187	57	44	0.0420	0.0122	77	46	—	—	—	—
New technology	—	—	—	—	—	—	—	—	0.0446	0.0214	20	45
Non-new technology	—	—	—	—	—	—	—	—	0.0101	0.0090	74	50
Other manufacturing	0.0969	0.0254	26	42	0.0354	0.0219	27	44	0.0037	0.0099	29	55

Notes: "Years" refers to the number of years of business activity, equivalent to n in equation 6. "—" reflects missing data, or an insufficient number of observations. To correct for inflation, the wealth data are indexed respectively in 1900, 1938, and 1980 prices using a GDP deflator. 1900, 1938, and 1980 are among the standard index years used by Feinstein. These years correspond approximately with the average date of death for the individuals in the respective cohorts.

Source: See the text.

included only for the first two cohorts, reflecting the decline of nonconformist denominations and the more general trend of twentieth-century secularization.

Before discussing the disaggregated results fully, it is useful to consider how well the entrepreneurs in the data set performed as a group. The first row of Table 3 reports the unweighted rate of return pooled across all individuals in the sample. The parameter estimates can be multiplied by 100 to give the percentage rate of return per annum. Thus the average annual rate of return for the cohorts is 9.32, 4.06, and 1.74 percent, respectively. As an interpretive aid, two sets of benchmark rates are estimated as well. First, I calculate the average yield on consols from data assembled by B. R. Mitchell.⁴⁴ Consols are a low-risk, ultra-low-yield asset, the yield on which may be taken as the minimum expected return from a wealth portfolio. At 9.32 percent per annum, the lifetime rate of wealth accumulation in cohort 1 is over three times greater than the average consol yield of 3.0 percent between 1870 and 1918. Measured rates of return to entrepreneurship in the latter cohorts are dramatically lower, but this undoubtedly reflects, in part at least, the impact of heavier death duties on estate planning. Since the rate of return on consols is not subject to this distortion, further comparisons are unpromising. As an alternative benchmark, I applied equation 6 to a sample of nonbusinessmen landowners taken from H. J. Perkin's data set covering elites in British society since 1880.⁴⁵ These landowners are likely to have been more like rentiers than genuine entrepreneurs. Their rate of return, much like the yield on consols, could then be regarded as a threshold below which successful entrepreneurs would not be expected to fall. The mean rates of return for these landowners are given in Table 4. Comparing Tables 3 and 4, it can be seen that the gap between the lifetime rates of return of entrepreneurs and landowners is large and persistent across all three cohorts.

Finding a high rate of return for the individuals included is not altogether surprising, given that the sample is biased towards the inclusion of success stories. These entrepreneurs were active mostly in successful firms, and our measure of their performance is skewed by the data set's coverage. The more telling result of the exercise comes from disaggregating the sample in order to test the hypothesis that particular cultural traits influence entrepreneurial performance.

A useful by-product of disaggregating the sample by death cohort is that individuals are simultaneously segregated according to their period of business activity—filtering out, to some extent, long-run variations in profit opportunities. Cohorts 1, 2, and 3 capture, respectively, individuals active in

⁴⁴ Mitchell, *British Historical Statistics*, p. 678.

⁴⁵ Perkin, *Elites* [computer file]. These constitute individuals coded as landowners under Perkin's category scheme. All individuals for whom Perkin gives probate wealth and land value information are included in the calculation.

TABLE 4
RATE OF RETURN ESTIMATES FOR A SAMPLE OF LANDOWNERS

	Mean	Standard Error	Limits of 95 Percent Confidence Interval		N
			Upper	Lower	
Cohort 1 landowners (deaths before 1919)	0.0077	0.0118	0.0314	-0.0159	56
Cohort 2 landowners (deaths 1919-1945)	0.0011	0.0142	0.0300	-0.0277	35
Cohort 3 landowners (deaths after 1945)	-0.0507	0.0263	0.0027	-0.1041	38

Source: See the text.

the mid- to late nineteenth century, the interwar period, and the post-1945 period. In addition to changes over the long run, there may be industry and region effects that influence the wealth outcomes of individuals within the specified cohorts. The specified industry and region categories can be used to determine the likelihood that success was a function of being in an expanding rather than a declining region or industry.

It is clear from Table 3 that neither region nor industry was a determinant of lifetime rates of wealth accumulation across the three cohorts. At the 95 percent confidence interval, all mean rates of return overlap for the region and industry variables. The confidence interval serves as a prescription for determining the size of the point estimate error, and as a method for assessing the statistical significance of the difference between mean interval estimates. It is interesting to note that no wealth-making premium accrued to individuals active in London. Contrary to previous assertions, it appears that nineteenth and early-twentieth-century London was not in fact the center of wealth creation, around which the wealth of the rest of the country tended to revolve.⁴⁶ Lifetime rates of wealth accumulation among London entrepreneurs did not deviate significantly from those of entrepreneurs active in the northern half of the country. Nor was there a wealth-making premium accruing to individuals active in staple industries or new technology industries in their respective epochs of ascendancy. Conversely, individuals active in staple industries during the period of interwar decline appear to have escaped significant disadvantage. Successful entrepreneurs were adept at exploiting wealth-making opportunities irrespective of regional or sectoral growth rates. These variables do not explain, for this sample of largely successful individuals, variations in entrepreneurial performance.

Recourse to religious affiliation does not explain measured performance either. The rate of return for nonconformists was higher than for other religious groups in cohorts 1 and 2, but there is no significant difference

⁴⁶ See Rubinstein, *Men*, p. 102, and "Victorian Middle Classes." For further refutation of the Rubinstein hypothesis that commercial and financial wealth was superior to industrial and manufacturing wealth, see Nicholas, "Wealth Making."

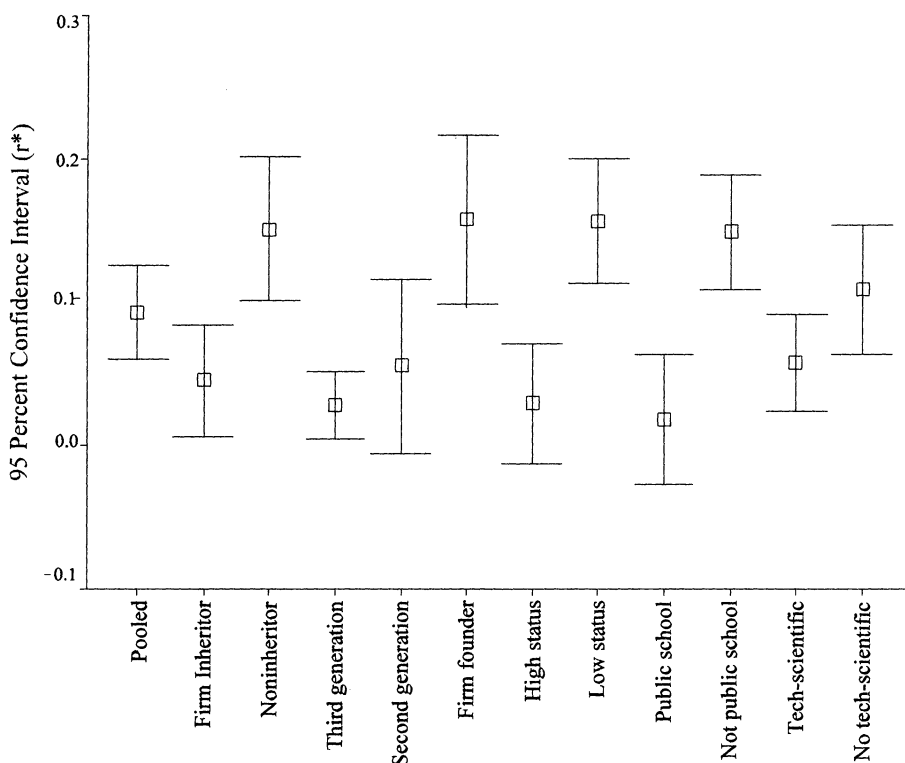


FIGURE 3
RATES OF RETURN AT THE 95 PERCENT CONFIDENCE INTERVAL:
COHORT 1 ENTREPRENEURS

Note: Cohort 1 entrepreneurs are those who died before 1919.

between the estimated means at the 95 percent confidence level. This test is somewhat imperfect because the biographical sources provide no systematic indication of the degree to which religion affected business decision making.⁴⁷ However, if nonconformist sectarianism fostered information and credit networks which in turn proved conducive to the growth of firms owned by nonconformists, as is often claimed in the literature, there should appear a positive entrepreneurial performance effect. But Table 3 suggests that even if nonconformists were overrepresented among Britain's entrepreneurs, they were not distinguished by extraordinary entrepreneurial success.

The most important determinants of entrepreneurial performance, according to the results in Table 3, were entrepreneurial type and education. Figures 3 through 5 provide a visual representation of the mean rates of return calculated at the 95 percent confidence interval. Two striking patterns emerge from the data. First, there is a comparatively low lifetime rate of

⁴⁷ These problems are noted by Jeremy, "Important Questions" and *Capitalists*.

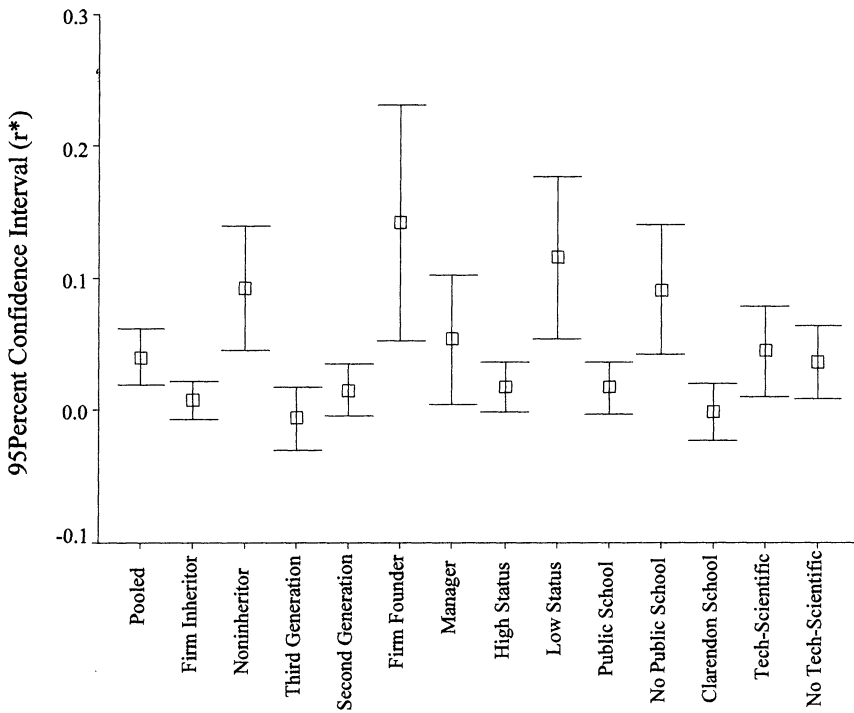


FIGURE 4
RATES OF RETURN AT THE 95 PERCENT CONFIDENCE INTERVAL
COHORT 2 ENTREPRENEURS

Note: Cohort 2 entrepreneurs are those who died between 1919 and 1945.

wealth accumulation for firm inheritors. The older the dynasty, the lower is the rate of return. Third-generation entrepreneurs clearly underperformed relative to firm founders or managers. Second, a negative performance effect can be identified for individuals receiving a high-status rather than a lower-status education. In cohorts 1 and 2 there is a large gap in the lifetime rate of wealth accumulation between these two groups. Notwithstanding the fact that this gap closes in cohort 3, it is striking that an education in the upper echelons of the British system—at a Clarendon school or an Oxbridge college—was associated with negative rates of return to entrepreneurship.

Returning to the issue of philanthropic giving, if philanthropists were overrepresented in specific profile categories, the resultant bias might account for the performance differences identified in Figures 3 through 5.⁴⁸

⁴⁸ In cohort 2, firm inheritors were 27 percent likelier to be described as philanthropists than were noninheritors. In a probit model, the slope coefficient for the marginal effect on “philanthropy” of a change in the value of the dummy variable “firm inheritor” is 0.2740, with a standard error 0.0924. For cohorts 1 and 3 the coefficient on “firm inheritor” is not significantly different from zero.

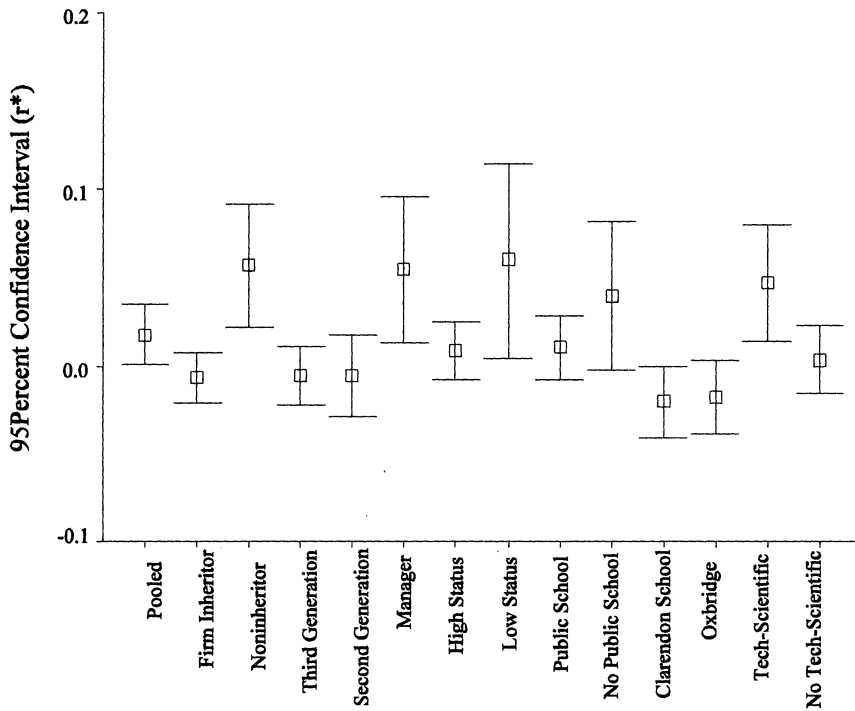


FIGURE 5
RATES OF RETURN AT THE 95 PERCENT CONFIDENCE INTERVAL
COHORT 3 ENTREPRENEURS

Note: Cohort 3 entrepreneurs are those who died after 1945.

Table 2 shows that philanthropists were wealthier than nonphilanthropists; but given lifetime reductions in wealth, philanthropy was also associated with lower rates of return. In order to test for bias in the results, I have regressed r^* on entrepreneurial type and education, introducing an additional dummy variable to control for philanthropy.⁴⁹ The parameter estimates in Table 5 show that there remains a significant difference at the customary level between the rates of return for firm inheritors and noninheritors, and for recipients of a high-status as opposed to a lower-status education. Although the rate of return will be underestimated for the philanthropists in the sample, the substantive results remain unchanged. These regressions suggest that entrepreneurial type and education affected performance.

Clearly, association is not causation and the results must be heavily qualified. It is not clear that the type of education *per se* will influence business performance. Recent research has emphasized that differences in the nature

⁴⁹ Small sample size precludes the inclusion of a full set of control variables in these regressions across the three cohorts.

TABLE 5
RATE OF RETURN REGRESSIONS

Variable	Cohort 1 (Deaths before 1919)	Cohort 2 (Deaths 1919–1945)	Cohort 3 (Deaths after 1945)
Constant	0.1656** (0.0234)	0.1422** (0.0287)	0.0956** (0.0247)
Firm inheritor	-0.0702** (0.0247)	-0.0918** (0.0251)	-0.0627** (0.0178)
High-status education	-0.1141** (0.0286)	-0.0788** (0.0275)	-0.0495** (0.0230)
Philanthropy	0.0511 (0.0317)	0.0436** (0.0214)	0.0029 (0.0162)
F-statistic	6.69**	8.39**	6.23**
R ² (adj)	0.2329	0.2564	0.171
N	84	105	94

** = significant at the 5 percent level.

Notes: Hubert-White robust standard errors are in parentheses.

Source: See the text.

of scientific and technical education between Britain and the Continent do not explain differences in industrial leadership.⁵⁰ Figures 3 through 5 show that a technical and scientific education was not determinant of business performance for this sample of entrepreneurs. Cross tabulations also reveal that 31, 38, and 32 percent of those in receipt of a high-status education in the three respective cohorts had pursued a technical or scientific course of study. A high-status education was associated with low lifetime rates of wealth accumulation, but it seems unlikely that a paucity of science and technology in that curriculum was the cause.

If firm owners could, by virtue of their wealth, better secure for their offspring a high-status education, the combination of these factors may have significantly worsened entrepreneurial performance. The regressions in Table 6 identify negative firm-inheritor *and* high-status-education effects. It is commonly argued in the literature that tradition and elitism in education were important status preoccupations for business families who had built up wealth through generations. In cohort 1 there is evidence of such a connection. A bivariate probability estimate shows that a firm inheritor was 28 percent more likely to have received a high-status education than a noninheritor.⁵¹ In cohorts 2 and 3, however, there is no significant marginal probability response at the 5 percent significance level. There are complicated links between these variables, and it

⁵⁰ Berghoff and Möller, "Tired Pioneers"; and Cassis, *Big Business*.

⁵¹ I estimated a simple probit model where the probability of receiving a high-status education is measured by a dummy variable for firm inheritors. The slope coefficient is 0.2758, with a standard error of 0.1049.

TABLE 6
THE LEVEL OF WEALTH BY FIRM TYPE AND EDUCATION

Category	Cohort 1 (Deaths Before 1919)		Cohort 2 (Deaths 1919–1945)		Cohort 3 (Deaths After 1945)	
	Terminal Wealth (1900 £)	Initial Wealth (1900 £)	Terminal Wealth (1938 £)	Initial Wealth (1938 £)	Terminal Wealth (1980 £)	Initial Wealth (1980 £)
Firm inheritors						
mean	869669	287861	792507	642461	2944847	5410171
standard deviation	1729404	726512	1881981	1300390	5412767	11487840
median	297299	48065	223451	292293	924961	1823480
Noninheritors						
mean	253824	60088	471745	121364	1947318	3741113
standard deviation	283771	159924	874945	382678	3881642	18999210
median	137124	27254	182519	15184	535659	145261
High status education						
mean	877284	350636	731336	551976	2500536	5266282
standard deviation	1778339	755520	1723458	1119042	4864502	16160940
median	453827	82070	202956	182684	827573	1259537
Lower-status education						
mean	306290	18009	487483	76312	2844902	2449377
standard deviation	474696	30761	973161	215070	5119655	5023373
median	159639	2644	221707	7907	625474	352790

Source: See the text.

is impossible to say definitively that one factor was more influential than another.⁵²

One explanation of the results would be that there are diminishing marginal returns to inheritance, such that larger inheritances are associated with lower rates of return, *ceteris paribus*. Further analysis of the data in Table 6 shows that there may be some merit in this argument. Inheriting a family firm and possessing a high-status education were positively associated with initial and terminal wealth, whereas noninheritors (firm founders and managers) and those receiving a lower-status education inherited less and bequeathed less on average. On the other hand, there are equally plausible alternative explanations. If, as Marshall contended, entrepreneurial ability is not passed on, there will be a tendency for those who inherit firms to run down assets built up over generations. Firm inheritors gain privileged access to the entrepreneurial labor market and may not possess the skills requisite for success. A comparison of the confidence intervals in Figures 3 through 5 and in Table 4 is particularly revealing. Recall that the rate of return for landowners identifies a threshold level below which the rate of return for successful entrepreneurs would not be expected to fall. Firm inheritors and individuals receiving a high-status educa-

⁵² Although there is no significant marginal probability response under the same test in the second and third cohorts, it is impossible to identify the size of an entrepreneurial-type or education effect.

tion over the three cohorts did not enjoy significantly higher rates of return (at the 95 percent confidence interval) than did these landowners. This sample thus yields *prima facie* evidence that such characteristics were associated with weak entrepreneurship.

CONCLUSION

The cultural critique of British entrepreneurship provides a classic example of an historical postulate that has been accepted without systematic evidence. This article has established a corrective formula using new research methods and a new data source. Although the data set is biased towards the inclusion of successful entrepreneurs and entrepreneurs active in manufacturing and mineral extraction, it provides a reasonably comprehensive source of information. Successful entrepreneurs make the largest contribution to economic growth, while the industries covered are those which frame the debate on culture and entrepreneurial performance in Britain.

Despite the difficulties in modeling the performance of entrepreneurs, a performance measure can be constructed by linking profit income, received as the reward for exploiting business opportunities, with the entrepreneur's lifetime wealth accumulation. An application of this method has identified robust links between aspects of culture and entrepreneurship. The central findings are that region of activity, industry of occupation, and religious affiliation were not determinant of entrepreneurial performance; that a high-status education was associated with inferior performance; and that firm inheritors performed less well than firm founders and managers. In this sample of individuals the passing of generations did correspond with lower lifetime rates of wealth accumulation. Third-generation entrepreneurs, in particular, did fail relative to their *arriviste* counterparts.

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