

Self-employment Wealth and Job Creation: The Roles of Gender, Non-pecuniary Motivation and Entrepreneurial Ability

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ABSTRACT. This paper uses National Child Development Study data for a large cohort of British individuals, to explore the influence of education, inheritance and other background characteristics on the propensity to become self-employed; and also on subsequent success, as measured by job and wealth creation. For the first time, we study the effects of our regressor variables on our success measures via disaggregation of our sample by gender – and, in this way, reveal striking differences between the determinants of male and female entrepreneurial performance.

1. Introduction

The important contribution of small firms to employment creation has received significant attention since the pioneering work of Birch (1979). However, there is still only quite a limited literature on the determinants of job creation by the self-employed, e.g. Barkham (1994), Westhead and Cowling (1995), Carroll et al. (1996), and Cowling et al. (1997). The determinants of job and wealth creation by the self-employed fall broadly into those factors which affect the external business environment in which the self-employed operate, and entrepreneurial abilities and characteristics such as managerial skills, innovativeness

and business contacts. This paper is concerned with firm capability and, in particular, the roles of gender, entrepreneurial ability and motivation in self-employment job and wealth creation. Our main contribution is a new empirical analysis of individual data including aspects of motivation, education and training.

The data set which forms the basis for our empirical analysis is Britain's National Child Development Study (NCDS). Previous research on the self-employed in the NCDS has been carried out by Blanchflower and Oswald (1998), and Burke et al. (2000). The former paper did not analyse self-employment job or wealth creation, while the latter neglected wealth creation and neither paper took up the option of disaggregation by gender. Cowling et al. (1997) also focus on disaggregation by gender – but their study differs from ours because: they use a different data set, use transition analysis based on a comparison between two points in time, adopt a multiple state approach and do not consider the value of the business.

We now turn to the conceptual basis of our analysis, which is based on the model outlined in Burke et al. (2000). The capability of the self-employed is usually represented by two main components, namely entrepreneurial ability and access to finance – see Evans and Jovanovic (1989). Entrepreneurial ability is a wide term and refers to the ability of individuals to *perceive*, and *exploit*, business opportunities. The former deals with issues such as alertness (Kirzner, 1973) and imagination (Shackle, 1979) as well as experience and knowledge of the market (Jovanovic, 1982). Entrepreneurial perception is also heightened by greater access to information and an ability to analyse information. Therefore, business contacts

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(McGuire, 1976) and education (Schultz, 1980) become important attributes. The ability to exploit profit opportunities is influenced by many of the same forms of human capital. In general, one would expect an individual with greater business contacts, work experience, education, knowledge of the market and business practice to be more productive. The extent to which an individual is motivated – see McClelland (1965, 1971) – should also influence performance.

We also reconsider the role of non-pecuniary motivation as a determinant of the performance of the self-employed. Non-pecuniary motivation can include factors such as the desire to be independent (one's own boss), specific non-profit objectives for the organisation (for example, to benefit the environment or help others) and enjoyment of the work involved in the enterprise (e.g. working in a particular business sector, being creative, securing a specific form of recognition or notoriety etc.). The traditional view in self-employment studies (for example, Blanchflower and Oswald, 1990; Cressy, 1995) is that non-pecuniary motives may reduce conventional success in terms of wealth creation. However, when one considers the role of effort – specifically, disutility from entrepreneurial effort (for example, see Burke et al., 2000) – in determining entrepreneurial performance, another possibility emerges. An entrepreneur who is highly motivated by non-profit objectives involving job satisfaction has *low* disutility of effort and, as a result, may exert greater (entrepreneurial) effort in the business venture. The self-employed individual's efforts may, thus, have the consequence of boosting the firm's financial performance. If, however, an entrepreneur has high non-pecuniary motivation for *unprofitable* self-employed activity, he/she confronts a trade-off – and will, presumably, choose an optimal mix of profit and non-pecuniary satisfaction.

The paper continues with some description of our data, including summaries of the distributions of our two performance measures – namely, job creation by the self-employed and the value of the business. After this, the probability of self-employment is examined by means of a probit model (for males and females separately). Then we proceed to consider job creation by the self-employed using a tobit model; and the value of the

self-employed business by means of an ordered probit model. Finally, there is a concluding section which attempts to draw together and interpret the empirical results.

2. Data description

The National Child Development Study (NCDS) – the data source used for our empirical analysis – has, over a spell of more than thirty years, been periodically obtaining information about a cohort of individuals born in the week 3rd March, 1958 to 9th March 1958 inclusive and living in Great Britain. Following an initial study in 1958, surveys have been undertaken at irregular intervals – in 1965, 1969, 1974, 1981 and 1991. The relevance of the NCDS for the study of self-employment was considerably increased by the 'fifth sweep' of data collection (NCDS5, 1991) – because, prior to 1991, the most recent survey had taken place in 1981 (NCDS4), when the cohort members were only 23 years old – and, at this age, most self-employment careers are in their very early stages. Blanchflower and Oswald (1998) and Burke et al. (2000) also make use of data from the NCDS – but the former paper only considers the self-employment decision, while neither study disaggregates by gender.

The precise extent of self-employment indicated by NCDS5 depends upon the exact definition that is chosen. Blanchflower and Oswald (1998) choose to define as self-employed the 1,279 (out of 11,369) individuals who indicate self-employment to be their main economic activity – some of whom are only part-time self-employed. Our definition is broader – including some people for whom part-time self-employment is not their main economic activity – and indicates a total of 1,558 self-employed. As we will see below, not all of these report self-employment employment and a value for their business – even as nil. The maximum sample size, for our analysis of the probability of choosing self-employment rather than being solely in some other form of economic activity,¹ is 11,113. This indicates a self-employment probability of 0.140. Although very similar in size to self-employment proportions given for 1991 in Blanchflower and Oswald (1998), our sample includes the unemployed in the "not self-employed" cohort (whereas theirs does not).

A measure of employment by the self-employed is also provided by NCDS5 – where each self-employed cohort member indicates how many employees he/she has. We create a variable, valid for 1,526 cases, where a number of employees is reported and we have defined the cohort member as self-employed.² The frequency and relative frequency distributions of employment by the self-employed are shown in Table I, disaggregated by gender and by formal education. Median and modal employment are both equal to zero, but the mean number of employees hired by self-employed cohort members is 3.39 – giving an overall employment level of 5,178 employees across 1,526 cases.

Overall, there are more than twice as many self-employed males as females. However, among those creating more than ten jobs, the ratio of males to females is about 3.25:1 – and comparison of the male and female distributions is shown in a bar chart³ (see Figure 1). More formally, a statistical test of the respective proportions of self-employed males and self-employed females that create no jobs rejects the null hypothesis of equal proportions at the 1% significance level (treating the male and female samples as independent, the test statistic, which has a standard normal distribution under the null, equals -2.72 – indicating that a lower proportion of self-employed males create no jobs). The full-time self-employed dominate numerically to a similar extent to males

(roughly 2.25:1 – see Figure 2). This dominance unsurprisingly rises among those creating more than ten jobs – to a ratio of nearly 5:1.

We also split the self-employed into those who, by 1991, possess post-compulsory formal educational qualifications (the highly qualified – with at least one “A” level equivalent and/or a first degree and/or a higher degree) and those who do not (the less qualified – with either at least one “O” level equivalent or Certificate of Secondary Education, or no formal academic qualifications). In this sample, the latter outnumber the former by about 3.3:1 overall; but there is a ratio of more than four to one among businesses creating 5 jobs or fewer, in contrast to the 1.1:1 ratio for businesses creating more than 5 jobs. However, this apparent positive link between higher qualifications and job creation is chiefly present for males – more than two thirds of highly qualified females create no jobs (see Figure 3); and, at the 5% significance level, there is no significant difference⁴ between the respective fractions of highly qualified and less qualified females creating more than 5 jobs.

There is little impact of region on the distribution of job creation by self-employed businesses – although the relative concentration of businesses creating more than ten jobs is, perhaps surprisingly, least in southern England (region 1) and greatest in Scotland and Wales (region 4 – see Figure 4). The influence of the age of the enter-

TABLE I
Employment by the self-employed, by category

Employment	0	1–5	6–10	11–15	16–20	21–30	31–50	51–100	101–200	201+	Total
Frequency (males)	594	309	63	25	13	15	8	7	3	1	1038
Relative frequency % (males)	57.2	29.8	6.1	2.4	1.3	1.4	0.8	0.7	0.3	0.1	100.0
Frequency (females)	315	121	30	9	3	3	4	1	1	1	488
Relative frequency % (females)	64.5	24.8	6.1	1.8	0.6	0.6	0.8	0.2	0.2	0.2	100.0
Frequency (high qualified)	187	76	36	19	9	7	6	6	3	2	351
Relative frequency % (high qualified)	53.3	21.7	10.3	5.4	2.6	2.0	1.7	1.7	0.9	0.6	100.0
Frequency (low qualified)	715	346	55	15	7	11	6	1	1	0	1157
Relative frequency % (low qualified)	61.8	29.9	4.8	1.3	0.6	1.0	0.5	0.1	0.1	0.0	100.0

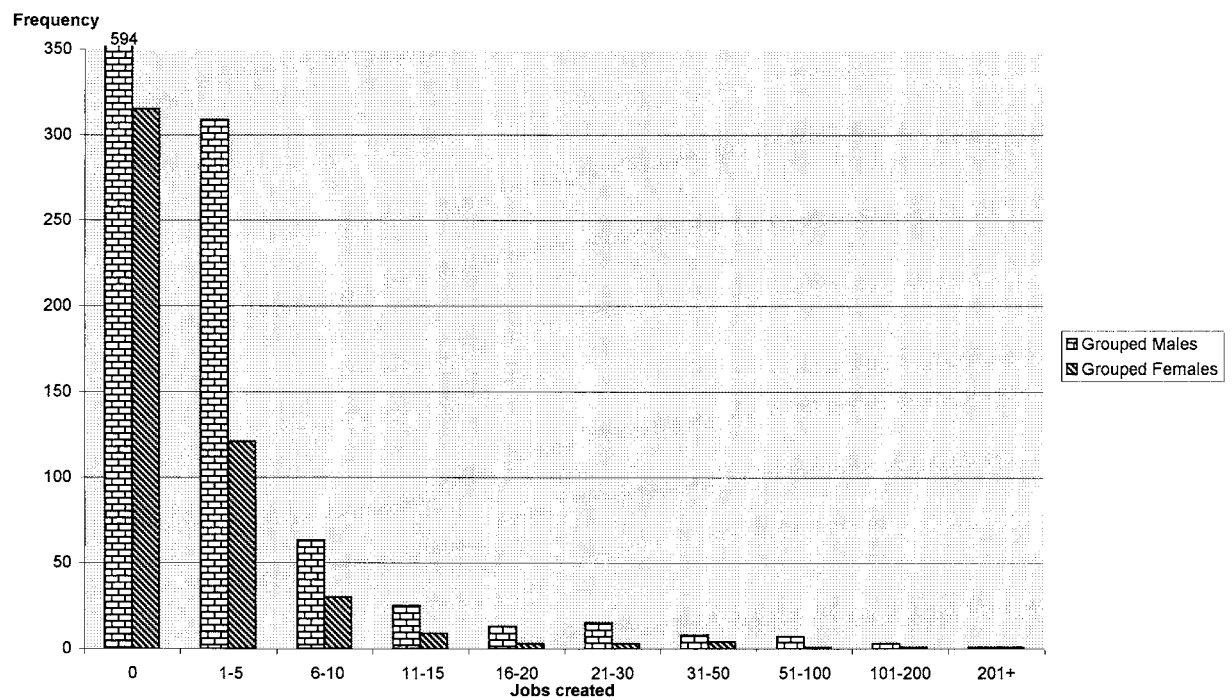


Figure 1. Job creation by the self-employed: distribution by gender.

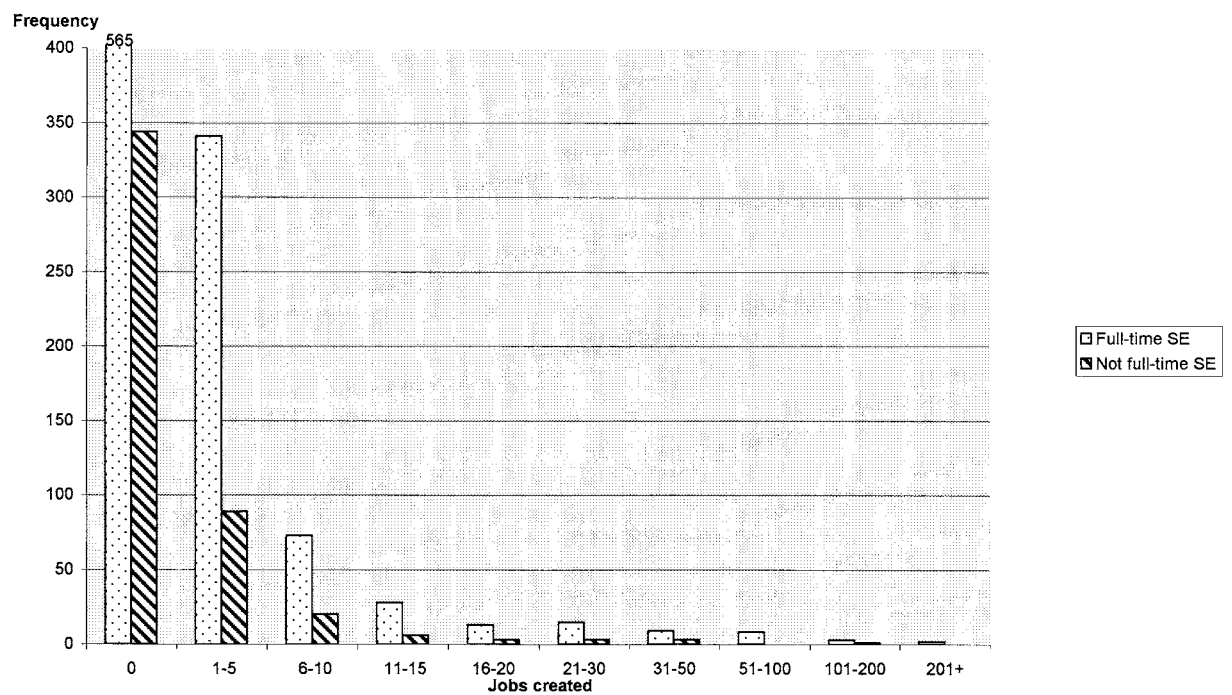


Figure 2. Job creation by the self-employed: distribution by full-time status.

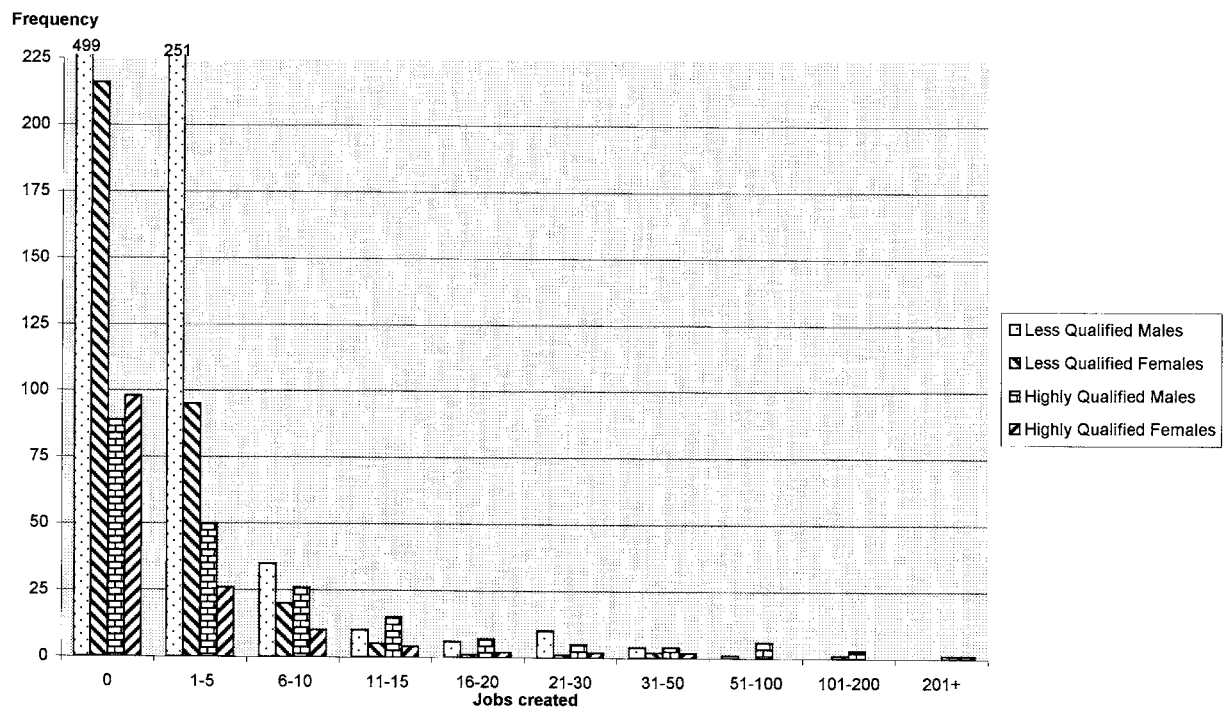


Figure 3. Job creation by the self-employed: distribution by education and gender, frequencies.

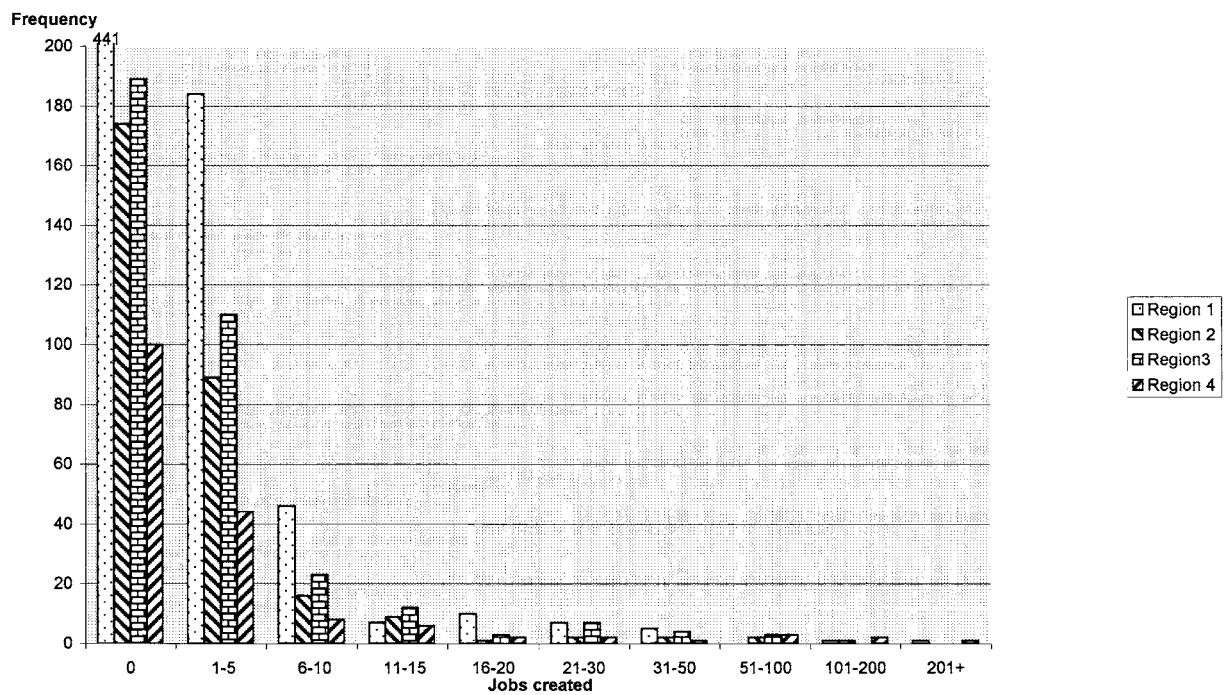


Figure 4. Job creation by the self-employed: distribution by region.

prise is interesting (see Figure 5) – with businesses of age 8–12 years doing best at creating above 10 jobs, followed by those aged 3–7 years, and then by those aged less than 3 years. Only three (out of 102) businesses aged 13 years or above were successful in creating more than 10 jobs. However, at the 5% significance level, we do find that the proportion of businesses aged under 3 years creating no jobs is significantly larger than the corresponding proportion among businesses aged at least 3 years, and the proportion creating more than 10 jobs is significantly lower among the young businesses.

We now examine the frequency and relative frequency distributions of the value of business (after loan repayment) variable for 1341 cases – disaggregated by gender and education level in Table II overleaf. The preponderance of males – by more than two to one – is, noticeably, at its lowest for zero value businesses, and reaches nearly three to one for businesses of value above £10,000 (see Figure 6). A statistical test, of the respective proportions of self-employed males and self-employed females that have businesses with zero value, rejects the null hypothesis of equal

proportions at the 1% significance level (the test statistic equals -3.90 – indicating that a lower proportion of self-employed males have a zero-value business). There is a slightly greater numerical dominance of the full-time self-employed – and this dominance is markedly more pronounced for businesses of net value beyond £10,000 (more than five to one – see Figure 7).

Of further interest are the results of splitting the self-employed into those with post-compulsory formal educational qualifications (the highly qualified) and those without (the less qualified). The latter outnumber the former by more than three to one overall; but such a description neglects the contrast between the four to one ratio for self-employed businesses valued up to £50,000 and the 2.3:1 ratio for businesses valued above £50,000. Formal statistical testing confirms this impression – the proportion of self-employed businesses valued above £50,000 is significantly higher among highly qualified self-employed individuals than it is among the less-qualified. Even this disaggregation hides the fact that quite a substantial proportion (close to 30%) of low-value female-run self-employed businesses are run by

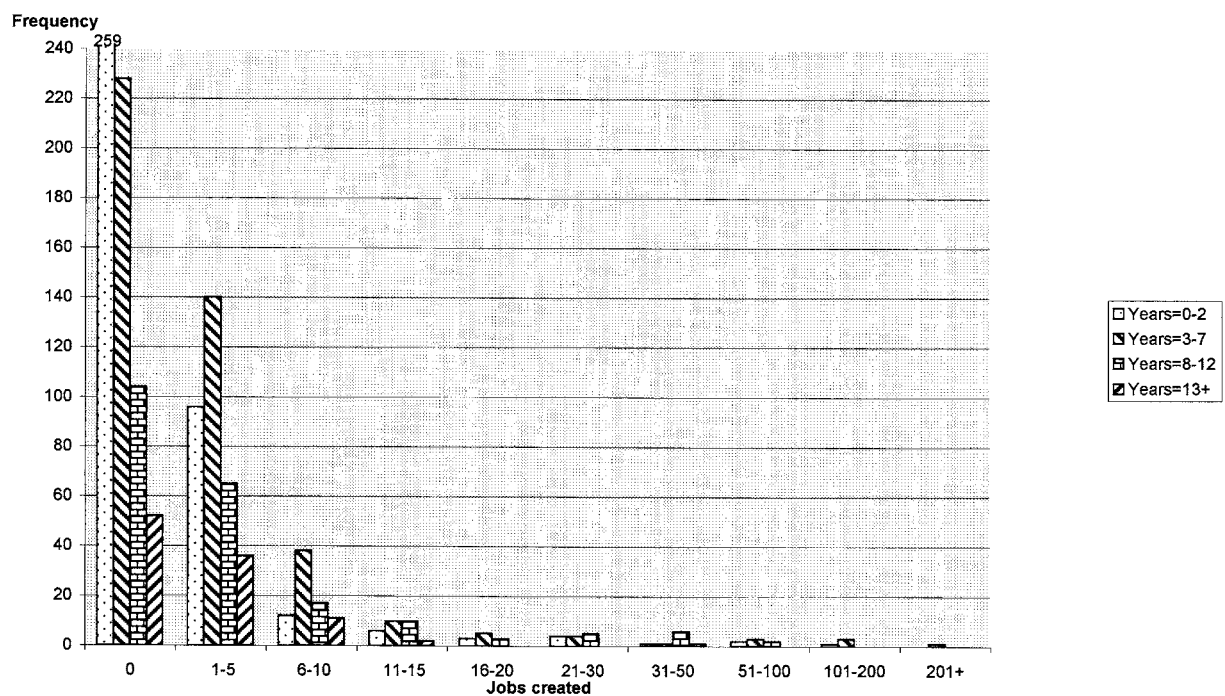


Figure 5. Job creation by the self-employed: distribution by years self-employed.

TABLE II
Value of self-employed businesses, by category.

Business value (£000s)	0	>0, ≤10	>10, ≤50	>50, ≤100	>100, ≤250	>250, ≤500	>500	Total
Frequency (males)	454	151	126	67	68	29	25	920
Relative frequency % (males)	49.3	16.4	13.7	7.3	7.4	3.2	2.7	100.0
Frequency (females)	256	59	43	26	18	12	7	421
Relative frequency % (females)	60.8	14.0	10.2	6.2	4.3	2.9	1.7	100.0
Frequency (high qualified)	138	39	38	27	29	9	10	290
Relative frequency % (high qualified)	47.6	13.4	13.1	9.3	10.0	3.1	3.4	100.0
Frequency (low qualified)	562	167	130	66	56	32	22	1035
Relative frequency % (low qualified)	54.3	16.1	12.6	6.4	5.4	3.1	2.1	100.0

highly qualified individuals.⁵ By contrast, there are nearly six times as many self-employed businesses of net value up to £10,000 run by less qualified males as there are run by highly qualified males⁶ – see Figure 8.

There is very little evidence of meaningful impact by region on the distribution of the values of self-employed businesses (see Figure 9). However, age of the enterprise has a more substantial role, as shown in Figure 10. Over two

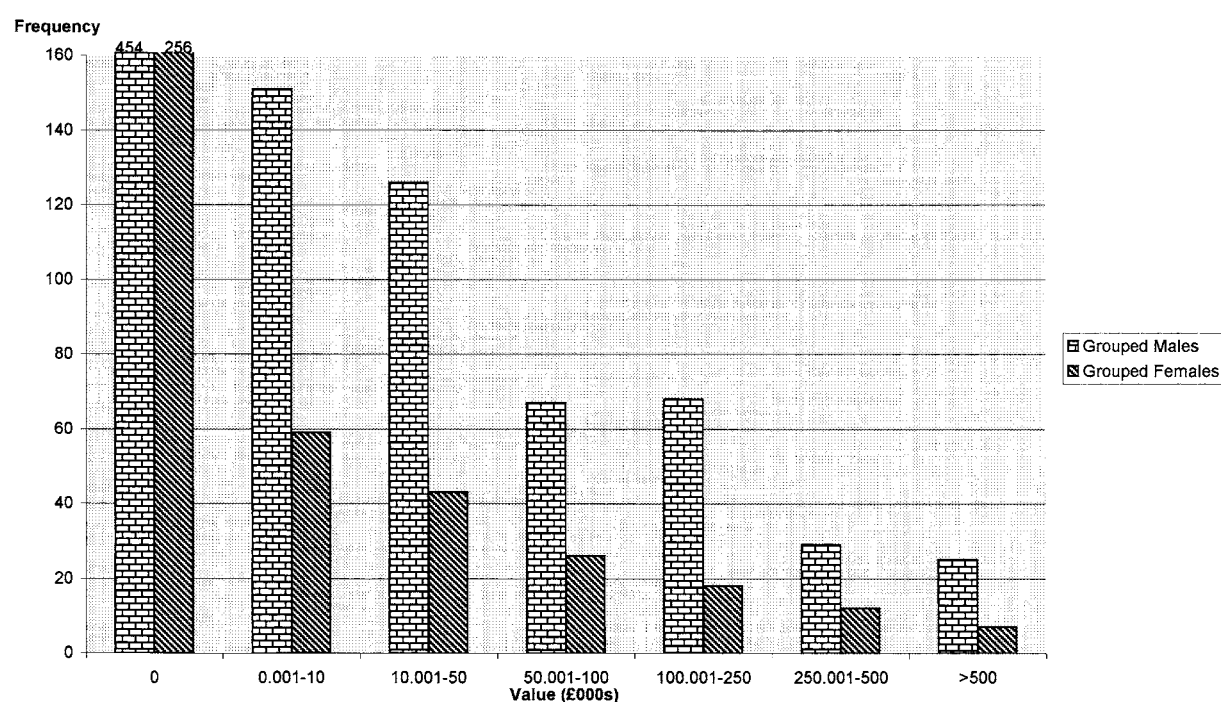


Figure 6. Value of self-employed businesses after loan repayment: distribution by gender.

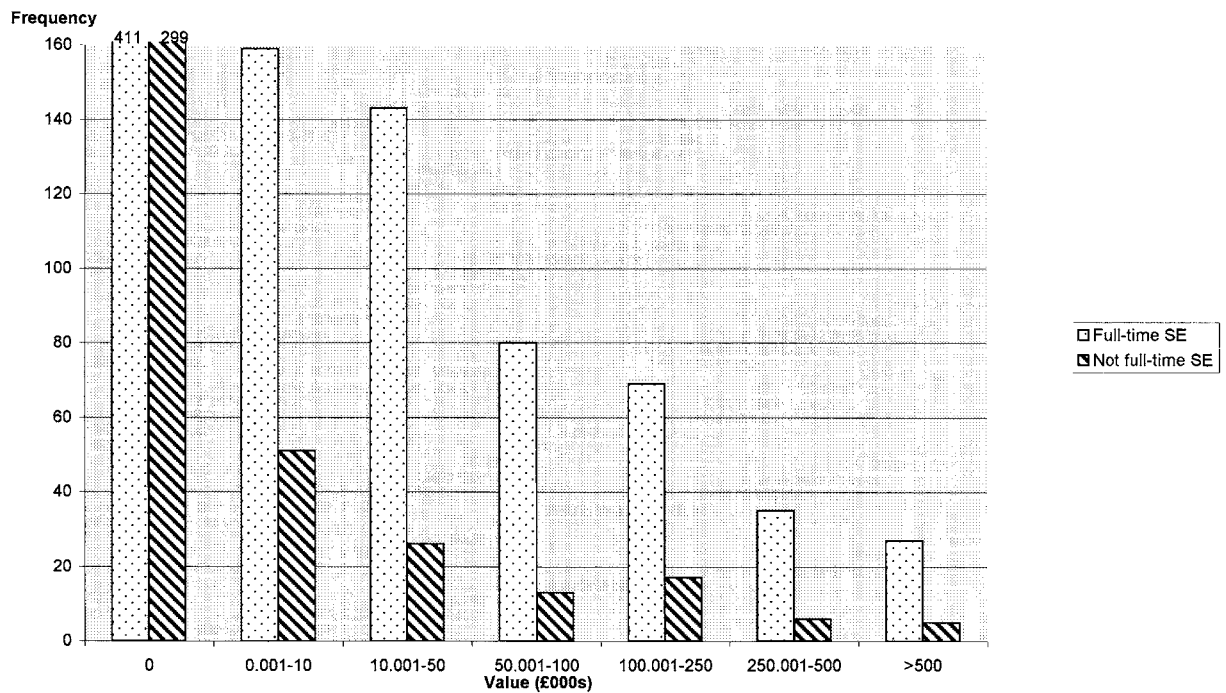


Figure 7. Value of self-employed businesses after loan repayment: distribution by full-time status.

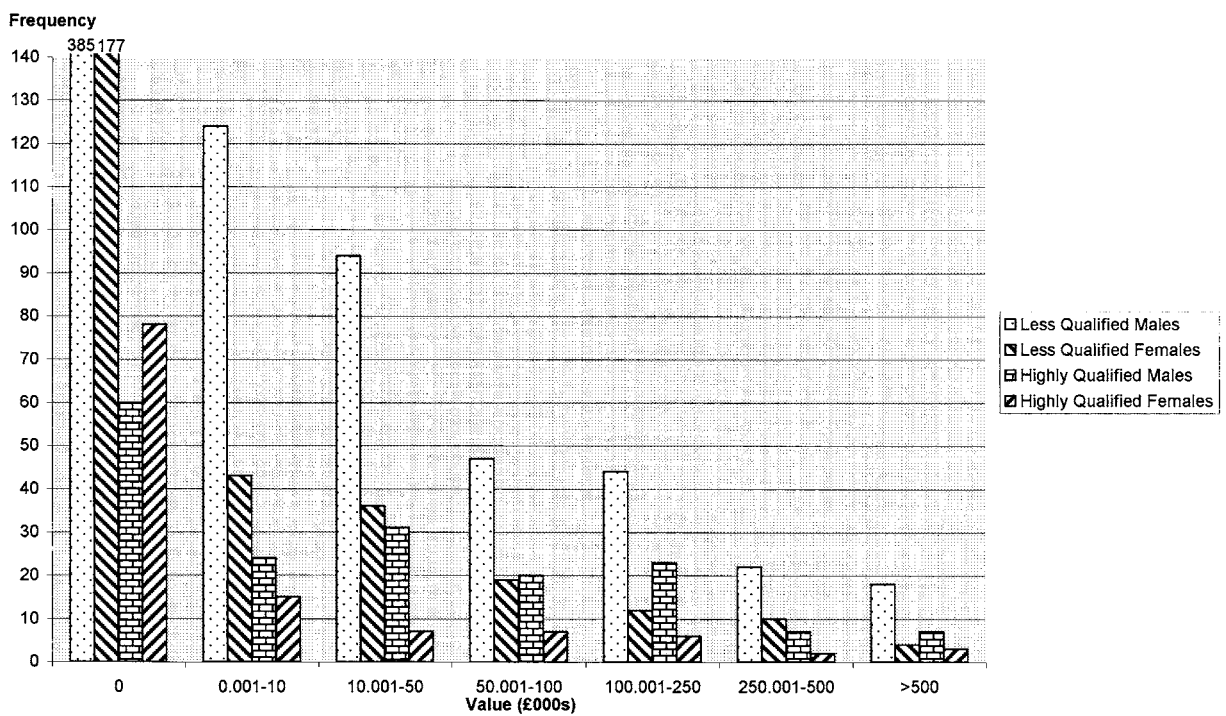


Figure 8. Value of self-employed businesses: distribution by education and gender, frequencies.

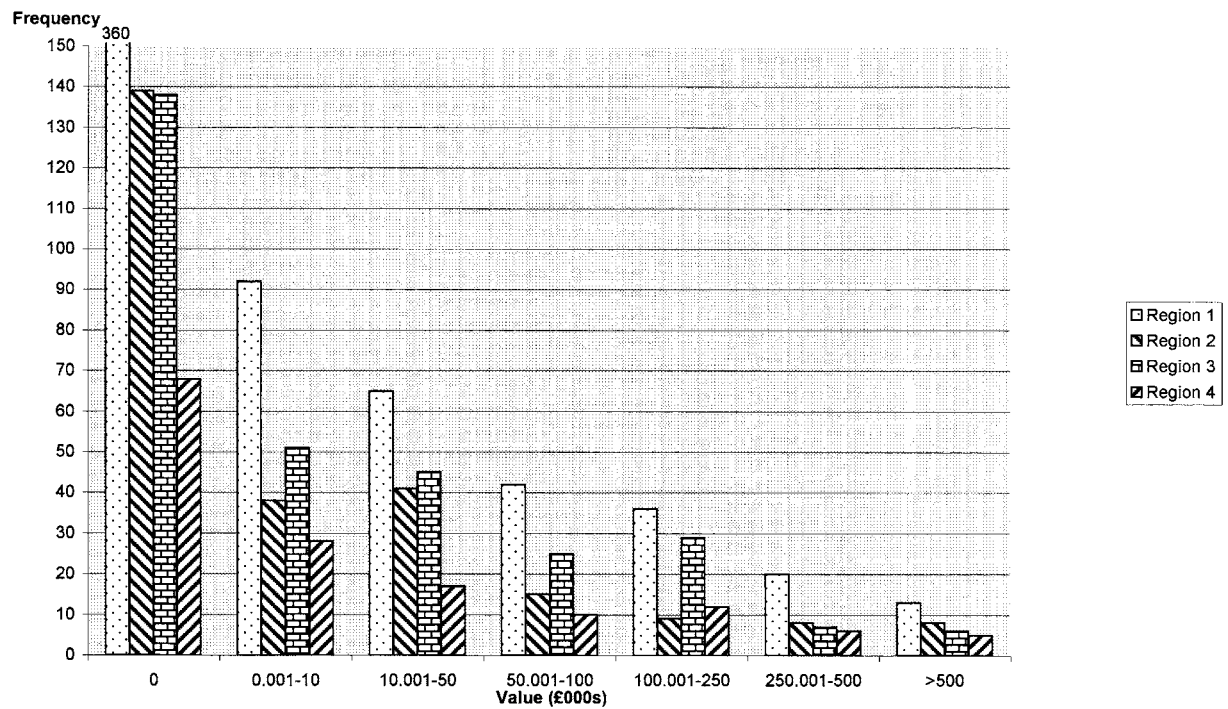


Figure 9. Value of self-employed businesses after loan repayment: distribution by region.

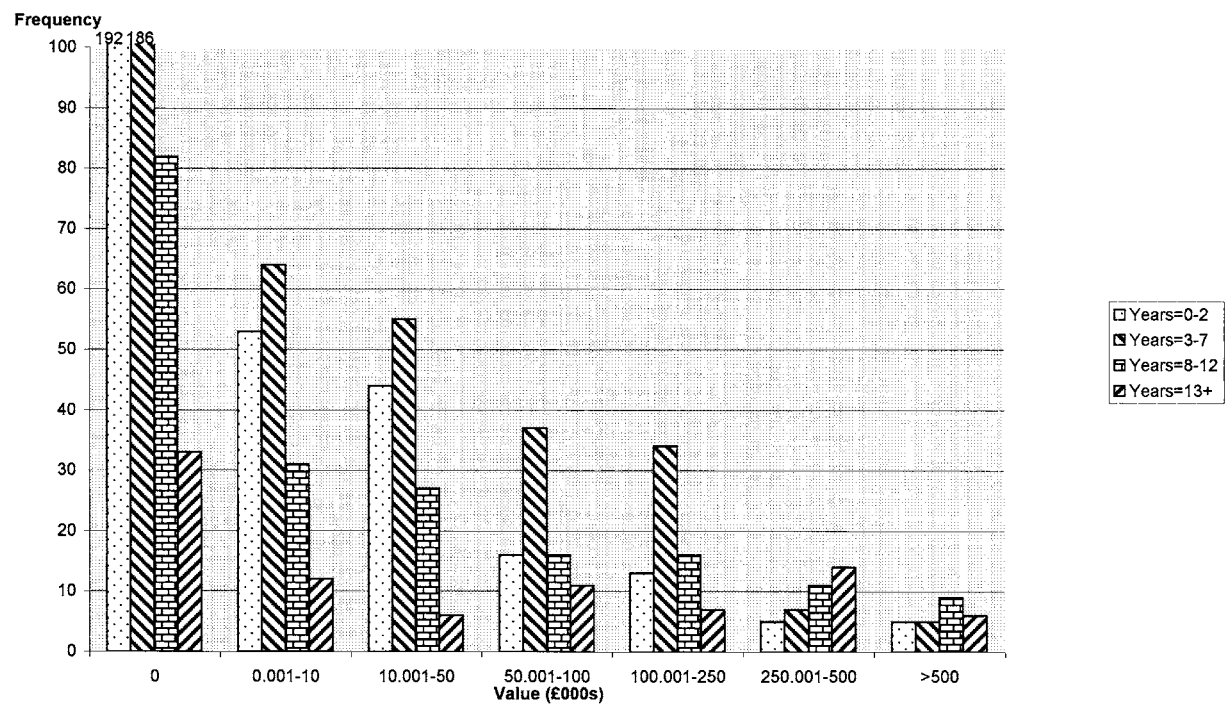


Figure 10. Value of self-employed businesses: distribution by years self-employed.

thirds of the businesses for which we have data are less than eight years old, and almost five sixths of these are of value up to £50,000. Of older businesses, about two thirds are valued up to the same boundary point and almost 14% have a value lying beyond £250,000 (compared to just over 3% of businesses of under eight years of age). As expected, a statistical test indicates clearly that a significantly higher proportion of self-employed businesses aged 8 years and above have a value of at least £50,000, compared to their younger comparators.⁷

Regressors used in our estimation of a self-employment probability probit, and/or our self-employment performance equations are based on the discussion in section 1, including variables in the NCDS data which represent features of a self-employed person's external and internal business environment. Given the interest in the "self-employed female underperformance hypothesis" – e.g. Rosa et al. (1996), Du Rietz and Henrekson (2000), we report separate estimation results by gender. The regressors can be split into a number of main categories, as follows:

1. *Motivation by job characteristics* – three dummies indicate career aspects which the cohort member regarded in 1981 as being most important when choosing a job. These give us an insight into the impact of certain non-pecuniary motivation factors, namely the desire to "be in charge", that to "be one's own boss" and the need for job security.
2. *Region* – this grouped variable is defined as follows: (1 = Greater London, the South East or the South West; 2 = West Midlands, East Midlands or East Anglia; 3 = Yorkshire and Humberside, the North West or the North; 4 = Scotland or Wales). We use this variable to capture regional differences in the external business environment – albeit in a simplified manner.
3. *Inheritance* – this is used to test the role of liquidity constraints. In Table III and Table V, it enters linearly and quadratically, in present (1991) value form. Transformations are undertaken to reduce the risk of estimation problems due to scale differences – specifically,⁸ the linear term is divided by 10000 (yielding a mean across all cases of 0.5745) and the

quadratic term is divided by 1.0×10^{10} (which gives a mean across all cases of 0.5983). We also consider controlling for the year in which the inheritance was received (subtracting 1,900 from the year in question, and then dividing by 100).

4. *Entrepreneurial ability* – we test for the importance of education and training as determinants of entrepreneurial ability. The *post-compulsory qualification* dummy indicates those individuals with an educational qualification at a level above that which can be achieved during compulsory education (i.e., excluding CSEs and "O"-levels). Two further dummies are defined to show receipt by the cohort member of a professional qualification, or of a vocational qualification, by 1991; and another indicates embarkation on an apprenticeship by 1981.
5. *Other factors* – we control for the age of the business by including the variable *Years of self-employment*, which refers to the current spell of self-employment. We also distinguish between part-time and full-time self-employment via the *Not full-time* dummy. A dummy variable, *No children*, is set to one for cohort members without children. This regressor may be relevant because people with children face extra obligations and, thus, time constraints. We might expect such individuals to be pushed towards self-employment (with potential flexibility in working time); and possibly, once self-employed, to have greater hiring needs. An interaction dummy, *Post-comp × no children*, is used to examine whether not having children has a different impact for those with a post-compulsory qualification (compared to the less qualified).

There is a full listing of all regressors in the appendix.

3. Estimation results

We begin our econometric work by considering the factors which influence the probability of an individual being self-employed. The probit model provides a straightforward method of estimating this probability and Table III, below, shows probit maximum likelihood estimates for our preferred

TABLE III
Male and female probit of the self-employment probability.

Variable	Males			Females		
	Estimate	Est./S.E.	Mean	Estimate	Est./S.E.	Mean
Post-compulsory qualification	-0.217	-2.85	0.251	-0.037	-0.46	0.258
No children	-0.120	-2.11	0.333	-0.225	-2.51	0.243
Post-comp $\times$ no children	0.019	0.17	0.108	0.299	2.15	0.099
Professional qualification	0.060	0.77	0.109	0.190	1.97	0.083
Vocational qualification	-0.134	-2.52	0.483	0.012	0.20	0.328
Apprenticeship 1981	0.132	4.43	0.690	0.167	2.63	0.088
Being in charge important 1981	-0.713	-2.01	0.008	-0.466	-1.03	0.007
Own boss important 1981	0.459	6.88	0.114	0.626	5.31	0.034
Job security important 1981	-0.256	-4.78	0.310	-0.238	-2.89	0.177
Inheritance	4.85×10^{-2}	3.66	0.435	5.93×10^{-2}	3.42	0.619
Inheritance squared	-1.75×10^{-2}	-1.60	0.121	-4.84×10^{-2}	-2.11	0.983
Year of inheritance	-0.117	-1.79	0.235	0.029	0.37	0.235
Region	-0.101	-4.72	2.141	-0.073	-2.88	2.160
Constant	-0.567	-8.61	1.000	-1.235	-17.35	1.000
Log-likelihood	-1997.52			-1238.16		
Sample size	4194			4296		
Mean of dependent variable	0.19814			0.08892		

specification – for males and females separately. Our choice of regressors is based upon our previous estimation⁹ of the probability of self-employment [see Burke, FitzRoy and Nolan (2000)] across all individuals – with some modifications to focus on variations in regressor impact across gender, and other changes in the interests of parsimony. The key differences across gender should be noted, beginning with the much higher mean level of self-employment among males (nearly 20%, rather than about 9%). Individuals can be placed into four groups, according to whether they have any post-compulsory qualifications and whether they have had children. If the respective answers to these questions are (No, Yes) – in other words, if the individual has no post-compulsory qualifications and does have children – the first three regressors in Tables III, IV and V are all set at zero (and so have no impact – this is the base category); if the answers are (No, No), the *No children* regressor is equal to one; if the answers are (Yes, Yes), the *Post-compulsory qualification* variable equals one; if the answers are (Yes, No), all the first three regressors are set to one.¹⁰ We find that post-compulsory qualifications are negatively associated with the probability of male self-employment (statistically significant

at the 1% level), but no link is found for females. Having children is positively related to the self-employment probability for males and less qualified females (particularly the latter) – in spite of the fact that more than 10% of those who are not self-employed describe their main economic activity as “Home/Family Care”. Among highly qualified females, there is no statistically significant link between having had at least one child and the probability of being self-employed.

Vocational qualifications exhibit a negative link with the male self-employment probability, but not with that for females. Professional qualifications are related to a higher probability of female self-employment only, while an apprenticeship has a positive link for individuals of either gender with the probability of being self-employed. The desire to be one’s own boss in 1981 is positively (and strongly) associated with self-employment in 1991; while the desire for job security in 1981 has a highly statistically significant negative impact on the 1991 self-employment probability. The view¹¹ that, up to some point, a financial gift or inheritance increases the estimated probability of self-employment¹² – while, for large gifts, the estimated probability reduces (due to the negative estimated coefficient attached to the quadratic

inheritance regressor) is confirmed for females, but the negative quadratic coefficient is statistically insignificant for males. For both males (particularly) and females, the estimated self-employment probability is higher for the south of England than for Scotland and Wales.

Table IV, overleaf, shows the results of separate tobit estimation for job creation by self-employed males and females. Once again, there are some notable differences across the two genders – notice, firstly, the 45% greater average number of jobs created by males. Taking all valid regressors from Table III as a starting point, we add the regressors *Years of self-employment* and *Not full-time*, exclude certain variables found to be statistically insignificant for both males and females, and do not consider any individuals for whom missing data prevented inclusion in the earlier self-employment probability estimation. Whereas both post-compulsory qualifications and professional qualifications are associated with increased job creation by males, these qualifications rather surprisingly have no significant impact on job creation by females.¹³ The predicted effect on job creation of being highly qualified is smaller for males without children than for those who have had offspring. For less qualified females, having no children is very weakly associated with lower job creation. This may be due to the fact that a

lack of child minding obligations allows these women to devote more time to their business and hence implies less of a need for hired assistance. Only for females does not being full-time self-employed have a significant negative effect on job creation.

Receipt of an inheritance only has a statistically significant effect on employment by the male self-employed – with, for an otherwise average self-employed male, predicted job creation peaking for an inheritance of £59,350. Number of years of self-employment is the only regressor that has a robustly significant effect across males and females – as expected, its relationship with job creation is positive. Regional effects on job creation are very weak.¹⁴ Table IV does not report the quantitative impacts of the included regressors – as measured by marginal effects (on the conditional or unconditional number of jobs created). However, we do report our estimates of the standard deviation, σ , of the disturbance term in the tobit equation – and these are quite different across the two genders.

The other dimension of self-employment performance that we consider is the value of the business (after the repayment of outstanding loans) – for which ordered probit estimates are shown in Table V below¹⁵ (again, separately for males and females). The business value variable, unlike

TABLE IV
Male and female tobit of self-employment job creation

Variable	Males			Females		
	Estimate	Est./S.E.	Mean	Estimate	Est./S.E.	Mean
Post-compulsory qualification	16.926	3.72	0.201	-1.877	-0.48	0.322
No children	-1.306	-0.45	0.299	-6.239	-1.30	0.239
Post-comp $\times$ no children	-13.771	-2.40	0.084	6.574	0.97	0.129
Professional qualification	12.031	3.21	0.112	4.022	0.89	0.114
Inheritance	4.519	2.44	0.612	1.286	0.79	1.393
Inheritance squared	-38.080	-2.02	0.068	-13.941	-0.94	0.462
Not full-time	4.057	1.11	0.111	-11.605	-3.78	0.515
Years of self-employment	0.645	2.67	6.141	1.096	2.97	3.746
Region	1.493	1.38	2.000	1.239	0.94	2.004
Constant	-21.444	-6.43	1.000	-10.723	-2.52	1.000
σ	24.763	23.59	N/A	17.840	12.84	N/A
Log-likelihood	-1553.210			-469.904		
Sample size	653			264		
Mean of dependent variable	3.6830			2.5530		

TABLE V
Male and female ordered probit of value of the business

Variable	Males			Females		
	Estimate	Est./S.E.	Mean	Estimate	Est./S.E.	Mean
Post-compulsory qualification	0.555	3.29	0.188	-0.383	-1.69	0.299
No children	-0.029	-0.24	0.291	-0.087	-0.30	0.218
Post-comp $\times$ no children	-0.417	-1.75	0.081	0.430	1.00	0.111
Professional qualification	0.502	3.01	0.103	0.281	1.04	0.111
Vocational qualification	0.225	2.03	0.517	-0.156	-0.83	0.376
Apprenticeship 1981	-0.128	-2.17	0.853	-0.063	-0.34	0.175
Own boss important 1981	0.387	3.59	0.205	0.226	0.83	0.098
Inheritance	0.117	2.78	0.597	-2.65×10^{-2}	-0.46	1.439
Inheritance squared	-0.379	-2.02	0.064	2.67×10^{-2}	0.10	0.513
Year of inheritance				0.442	1.66	0.289
Not full-time	0.060	0.36	0.103	-0.559	-3.10	0.513
Years of self-employment	0.053	5.32	6.174	0.090	3.63	3.829
Region	0.115	2.55	1.983	-0.018	-0.22	1.996
Constant	-0.632	-4.34	1.000	-0.277	-1.00	1.000
Log-likelihood	-875.6955			-291.3390		
Sample size	580			234		

the job creation variable, is only reported in a grouped data form – which is why we use the ordered probit model here. These data samples are about 10% smaller than those for the job creation tobit, even though we have included some individuals for whom only a zero business value *before loan repayment* is reported.¹⁶ The predicted (positive) effect on business value of post-compulsory academic qualifications is statistically significant at the 5% level only for males with children.¹⁷ Otherwise, having no children is not linked to self-employed business value.

Several of the results shown in Table V are qualitatively similar to those for job creation. Firstly, there is a positive relationship between male professional qualifications and business value. Secondly, inheritance of up to a certain amount is associated with increased business value for males – with no significant relationship between inheritance amount and business value for females (although more recent inheritance has a statistically weak positive effect¹⁸). Thirdly, not being full-time is not associated with business value for males, but has a significantly negative association for females. Fourthly, there is a positive link between a self-employed business's age and its value, and this effect is statistically

robust across gender. However, there are also a couple of dissimilar results from the value of business equation – both for males only. Firstly, there are associations between three regressors – desire to be one's own boss at age 23 (positive), vocational qualifications (positive) and apprenticeships (negative) – and self-employed business value (aged 33); whereas these regressors were found to be statistically insignificant in self-employment job creation. Secondly, region has a link with (male) self-employed business value which indicates higher value businesses in Scotland, Wales and the north of England than in the south of England (but Table III suggests the south of England to have a higher estimated self-employment probability; and Table IV indicates no connection between region and job creation by the self-employed). The shortage of significant explanatory variables in the female self-employed business value ordered probit remains a puzzle.

Overview and conclusion

The paper investigates the roles of gender, capability and non-pecuniary motivation on the performance of the self-employed. The results clearly indicate substantial differences in the factors that

affect the capability of male and female entrepreneurs and in turn their performance. Similarly, differences emerge in the effects of non-pecuniary motivation on performance. We summarise the main results.

Firstly, the empirical analysis appears to provide some justification for the idea that high non-pecuniary motivation *may* improve a business's financial performance. As expected, the desire to be one's own boss is found to be a positive and significant determinant of choosing self-employment for both males and females. However, it has contrasting effects on performance. In the case of males, non-pecuniary motivation has a positive impact on the value of the business – self-employed individuals who previously declared the importance to them of being their own boss tend, in following their predilection for independence, to also generate extra business value. However, the desire to be one's own boss has a negligible effect on the performance of female self-employed entrepreneurs. This is plausible, since one might expect 33 year old women to have greater non-workforce commitments than males (particularly, in relation to family – and, indeed, for a given size of family) – and, in having a greater need to trade-off pecuniary for non-pecuniary objectives, self-employed females may find themselves more often in less profitable activities. Nonetheless, both the male and female results refute the traditional view that non-pecuniary motivation must have a negative effect on performance – the opposite is the case for males and no evidence of this is found for females.

The paper is also concerned about the impact of entrepreneurial ability on the performance of the self-employed. In this case, the males show the expected effects – with post-compulsory education and professional training being positively associated with the value of the business and the number of employees hired. However, the same determinants of entrepreneurial ability appear to have

insignificant affects on the performance of female entrepreneurs. One possibility is that this may be explained by sectoral differences – women may enter business sectors where post-compulsory education and professional training generate little value added. A more plausible explanation – that women may again be constrained by family commitments which often require working mainly from home, and preclude the hiring of employees to generate a high value business – is not supported by the insignificance of the estimated coefficients on the *No children* regressor in both the female job creation tobit and the value of business ordered probit. The relevant “abilities” for female entrepreneurs thus seem to be uncorrelated with education and training, which is somewhat puzzling. The effect of the inheritance variable, in the case of males – for both job creation and business value – supports the existence of a binding liquidity constraint (which appears to hold regardless of the significance of variables relating to entrepreneurial ability). However, for females, inheritance is statistically insignificant, and this is what one would expect if females faced family constraints on expansion – thus reducing the relevance of inheritance. While our analysis is far from conclusive, the results are interesting and point to the importance of further research with disaggregated data.

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Appendix

The survey data used in this paper is derived from the National Child Development Study (NCDS) of a cohort of individuals born in the week 3rd March, 1958 to 9th March 1958 inclusive and living in Great Britain. Following an initial study in 1958, a series of “sweeps” (NCDS1-NCDS5) has been undertaken at irregular intervals – in 1965, 1969, 1974, 1981 and 1991.

The following summary table illustrates the meaning of abbreviated regressor names:

Abbreviated name	Meaning	Sweep No.
Post-compulsory qualification	Dummy variable, = 1 if Advanced ('A') Level equivalent(s) (usually at age 18), and/or first degree or equivalent and/or higher degree possessed; = 0 otherwise.	5
No children	Dummy variable, = 1 if cohort member has no children.	5
Post-comp × no children	Interaction dummy, = 1 if cohort member has post-compulsory qualification and no children.	5
Being in charge important 1981	Dummy variable, = 1 if being in charge most important for job choice.	4
Own boss important 1981	Dummy variable, = 1 if being one's own boss most important for job choice.	4
Job security important 1981	Dummy variable, = 1 if job security most important for job choice.	4
Inheritance	Inheritance (compounded and scaled).	5
Inheritance squared	Inheritance regressor squared (and rescaled).	5
Year of inheritance	For inheritances, = (Year – 1900)/100; = 0 otherwise.	5
Years of self-employment	Number of years of current self-employment spell.	5
Not full-time	Dummy variable, = 1 if self-employed, but not full-time.	5
Professional qualification	Dummy variable, = 1 for a professional qualification.	5
Vocational qualification	Dummy variable, = 1 for a vocational qualification.	5
Apprenticeship 1981	Dummy variable, = 1 if apprenticeship at least commenced by 1981.	4
Region	= 1 for Greater London, South East or South West; = 2 for West Midlands, East Midlands or East Anglia; = 3 for Yorkshire and Humberside, North West or North; = 4 for Scotland or Wales.	5

Notes

¹ Note that we include the unemployed and, for example, housewives – many of whom are often considered to be economically inactive. In principle, these individuals could make a decision to become self-employed – provided appropriate incentives are offered so that self-employment provides them with greater utility than any feasible alternative.

² The wording of a NCDS question indicates the possible inclusion of job creation by those not currently self-employed. Thus, we do not consider 29 individuals for whom a report of self-employed job creation coincides with an absence of a report of self-employment income and a report of a main economic activity other than self-employment.

³ We employ bar charts, rather than histograms, because category widths are variable – and observations are very unevenly distributed between categories. Histograms would include very tall, thin blocks and wide, very short blocks – to the extent of compromising legibility. Relative frequencies can, of course, be inferred from the bar charts.

⁴ The assumption of independence, underlying the formal

statistical test we conduct here (with test statistic 1.87), is harder to justify when the two samples concern the highest qualification achieved.

⁵ The fraction of highly qualified self-employed females with a zero-value business is higher than the corresponding fraction for less qualified females – but the difference is not statistically significant.

⁶ The difference between the proportion of businesses run by less qualified self-employed males that have net value not exceeding £10,000, and the (lower) corresponding proportion for highly qualified males is statistically significant.

⁷ The test statistic obtained is 5.20.

⁸ Blanchflower and Oswald (1998) do not appear to have rescaled their inheritance regressors, preferring instead to indicate the scale of their estimated coefficients.

⁹ The choice of regressors for the probit in the earlier paper was, itself, the result of a general to specific process.

¹⁰ The statistical significance of the overall effect of advanced qualifications and children can be determined straightforwardly by the calculation of the appropriate standard error.

¹¹ See both Blanchflower and Oswald (1998) and Burke et al. (2000). Admittedly, both of these papers place the turning point at a large inheritance value.

¹² Our reported probit results use a definition of self-employment which is nearly the most inclusive possible. For a univariate probit, it is well known [see, for example, Maddala (1983), Greene (1995)] that a small change in the value of regressor x_j has a marginal effect on the expectation (conditional on the regressor vector) of the observed dependent variable, y , which is given by $\partial E(y|x)/\partial x_j = \phi(x'\beta)\beta_j$, where $\phi(\cdot)$ is the probability density function of a standard normal random variable and hats are used to indicate MLEs.

¹³ Recall that a large proportion of highly qualified self-employed females create no jobs – perhaps because of the kind of activity they choose, including working from home (though we have no data on these points).

¹⁴ If anything, there is a slight tendency towards greater job creation by the self-employed in Scotland and Wales than in the south of England.

¹⁵ Table V does not include estimates of the five threshold parameters from a seven-category ordered probit model. These are fairly similar across the two genders.

¹⁶ On the basis that such a business has a value, after the repayment of loans, of zero or less.

¹⁷ Marginal effects for the ordered probit model are not displayed above – a separate table would be required to indicate the impact on the respective probabilities of occupying each of the seven business value categories.

¹⁸ Note that, for males, a Likelihood Ratio test cannot reject a specification which excludes *Year of inheritance* (the test statistic being 0.86, compared to a 5% significance level critical value of 3.84). For females, a similar Likelihood Ratio test rejects a similar null hypothesis at the 5% significance level, the test statistic being 4.13.

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