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SURVIVAL OF THE FITTEST? AN ANALYSIS OF SELF-EMPLOYMENT DURATION IN BRITAIN*

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This paper uses data from the British Household Panel Survey to investigate the duration of self-employment spells in Britain. The results suggest that 40% of self-employment ventures started since 1991 have not survived their first year in business. Evidence is produced showing that a substantial proportion of self-employment spells are not terminated through bankruptcy, but through moves to alternative employment. The fittest, in terms of self-employment survival, are those with no previous unemployment experience but with some work experience, who quit their previous job, and who entered self-employment with some initial capital.

Policy makers have implemented initiatives designed to encourage and facilitate the growth of small businesses and self-employment in Britain. Such enterprises are regarded as an important source of job creation and innovation. Despite this, little attention has focused on their success. This paper investigates issues concerning the success of the self-employed by examining the length of self-employment spells using life tables and Cox proportional hazard models, and the reasons given for leaving self-employment. Unlike most previous studies, it is concerned with the individual running the firm, allowing personal characteristics to influence the probability of survival. Uniquely, the data allow the separate analysis of voluntary and involuntary self-employment terminations. All analyses are carried out separately for men and women using micro-level data from the British Household Panel Survey.

Previous work analysing self-employment survival rates has mainly focused on personal asset and wealth holdings. Most is consistent with the hypothesis that entrepreneurial activity is restricted by liquidity constraints, either by preventing firm entry (Evans and Leighton, 1989; Evans and Jovanovic, 1989; Holtz-Eakin *et al.*, 1994*a*; Lindh and Ohlsson, 1996; Robson, 1996; Blanchflower and Oswald, 1998) or by affecting firm longevity (Evans and Leighton, 1989; Bates, 1990; Holtz-Eakin *et al.*, 1994*b*).

British data suggest that many self-employment ventures are quickly terminated. Cressy (1996) reports that, of a random sample of two thousand businesses started in Britain in 1988, only 38% were still surviving in 1992. Evidence from the Department of Employment (1986) suggests that two thirds of individuals completing the full twelve months of the Enterprise Allowance Scheme (EAS) were still in business two years later, while the National Audit Office (1988) shows that 57% were still in business three years later.[1] New

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[1] The Enterprise Allowance Scheme offered £40 per week for one year to the unemployed who wanted to establish a small business and had £1,000 to invest. Individuals were also offered advice and guidance on running a small enterprise.

evidence produced here suggests that survival rates among the self-employed in general are considerably lower than those among EAS participants.

The remainder of the paper is set out as follows. Section 1 briefly describes the underlying theoretical framework while Section 2 describes the data. Section 3 discusses the results from the lifetable estimates, Section 4 examines the reasons given for leaving self-employment and Section 5 describes the specification of the Cox models and the results. The final section summarises and concludes.

1. Theoretical Discussion

The underlying theoretical approach here is similar to Evans and Jovanovic (1989), Evans and Leighton (1989) and Taylor (1996), in that labour market state is a choice variable determined by expected utility from each state. We can write:

$$\mathrm{E}(U_{SE}) = f(\theta,\ k,\ r,\ D, \mathbf{X})$$

$$\mathrm{E}(U_{E}) = g(w, \mathbf{X})$$

Expected utility from self-employment, $\mathrm{E}(U_{SE})$, is a function of entrepreneurial ability θ, available capital k, the interest rate r, the level of demand in the economy D (following Acs and Audretsch, 1989; Kessides, 1990; Robson, 1996), and individual tastes and preferences $\mathbf{X}$. Similarly, expected utility from employment is a function of the wage w, and $\mathbf{X}$. Individuals receive no utility from being unemployed. Following Jovanovic (1982), it is assumed that an individual's entrepreneurial ability is initially unknown by both that individual and other agents, but is revealed with experience. Offers of employment take the form of a wage, w. An individual will therefore prefer self-employment if:

$$\mathrm{E}(U_{SE}) > \mathrm{E}(U_{E}).$$

The choice of labour market state is continually revised as individuals situations change. However, some individuals who would prefer to enter self-employment may be constrained by a lack of capital, either because they have not accumulated the wealth themselves or do not have the supply of collateral sufficient to secure a loan (Holtz-Eakin *et al.*, 1994*b*; Black *et al.*, 1996; Robson, 1996; Blanchflower and Oswald, 1998).

Given this framework, the determinants of self-employment dissolution emerge. For example, an individual will voluntarily dissolve a business and enter employment if a wage offer is received such that $\mathrm{E}(U_{E}) > \mathrm{E}(U_{SE})$. Similarly a voluntary termination may occur if tastes or preferences change or if individuals revise downwards their estimates for θ. Bankruptcy occurs when the individual is unable cover loan obligations (perhaps due to an increase in r, or a decrease in D). This structure is used to inform the subsequent empirical analysis.

2. The Data

The data are from Waves 1 to 5 (1991 to 1995) of the British Household Panel Survey (BHPS), a nationally representative random sample of some 5,500 households and 10,000 individuals. Two sources of labour market information in the BHPS are used, the lifetime job history data collected at Wave 3 and the data collected annually concerning labour market activity in the period between interviews. In each case respondents are asked to classify their labour market status over time. The definition of self-employment is therefore subjective.[2] The data sources are described in more detail below.

Lifetime job history data

The retrospective lifetime job history data provide information on all self-employment spells started from the time the respondent first left full-time education up to September 1990. Details of start and end dates, industry, occupation and reason for spell termination are collected.[3] The main advantage of these data is that they provide a large number of observations on which to conduct analysis. The obvious disadvantage is that they may suffer from recall error. This problem was minimised in the BHPS by constructing the job histories over two years. At Wave 2 individuals were asked first to reconstruct their marital and fertility histories and then their lifetime employment history. The latter collected start and end dates of each spell of employment, self-employment, unemployment or non-participation experienced to date over the lifetime of the respondents. At Wave 3, individuals were presented with these employment histories and asked about their accuracy. If completely accurate, the information was used to collect the details of each employment and self-employment spell. If partially accurate or inaccurate, then respondents were asked to recount their detailed job history without reference to their Wave 2 account.

Respondents therefore have two chances to recall their job histories accurately, prompted in the first instance by a recollection of personal events and in the second by the account given one year previously. However, even with these aids, individuals may not remember details of self-employment spells experienced many years ago. Spells recorded in the early years of the work history for older members of the sample may only be a measure of longer spells that are more likely to be remembered. Alternatively, it may be that short unemployment spells are forgotten (Elias, 1996; Paull, 1996), artificially

[2] Self-employment is traditionally associated with risk taking and entrepreneurship. This relationship has been weakened in Britain by employers categorising workers as self-employed to avoid overheads such as national insurance payments. As this practice has been most common in the construction industry, all analysis has also been conducted excluding the self-employed in construction (accounting for under 20% of the sample). The results remain little changed from those reported in the paper

[3] In order not to discard useful information, some imputation has been carried out. For cases where the season rather than the month of entry or exit are reported, Winter has been imputed into January, Spring into April, Summer into July and Autumn into October. This affects 29% of self-employed spells. Spells for which neither month nor season are reported, or where the year is missing, are discarded. This results in 17% of self-employment spells being dropped.

lengthening spells of self-employment. To help overcome this, spells starting after 1979 have been analysed separately from the complete lifetime job histories.[4] As well as reducing the probability of recall error, this has the advantage of focusing on the period when self-employment in Britain was growing at its fastest (Taylor, 1997).

Panel data

The second source of data originates from the core annual questionnaire. This includes an account of all labour market transitions occurring since the September of the previous year, and contains information on employment type, start and end dates, occupation, industry and reason for job termination. These panel data have the advantage of only stretching respondents memories to one year previously. An additional benefit is that, by restricting analysis to spells starting after the Wave 1 date of interview, information on individual characteristics collected at Wave 1 can be included as explanatory variables in the regression models. The disadvantage of using these data is that there is a maximum of four years in which employment spells have been accumulated. Some summary statistics for both data sources are presented in Appendix Table A1.

3. Lifetable Estimates

Table 1 presents lifetable estimates of the proportion of self-employed surviving for each period. The first row considers all spells recorded by men in the lifetime job histories. The estimates show that 4% of these self-employment spells do not last six months. A further 6% terminate in the following six months, with 90% surviving the first year in business. A similar proportion of

Table 1

Lifetable Estimates of Self-employment (surviving %)

	Duration (months)						
	6	12	24	36	48	60	Initial *N*
Men							
All spells	96	90	80	71	65	58	910
Starting 1979–	95	88	78	68	61	54	519
Starting 1991–	76	59	48	41	33		292
Women							
All spells	95	90	77	65	58	51	451
Starting 1979–	94	86	71	58	51	44	250
Starting 1991–	79	63	45	36	31		204

Source: BHPS lifetime job histories and Waves 1–5.

[4] Of this post 1979 sample, 14% of spells are affected by recoding seasons into months, and 11% are discarded because of missing date information.

self-employment enterprises end in their second and third year. Survival rates are higher in the fourth and fifth year, with 58% of self-employment spells among men lasting five years. Women appear to have lower survival rates in self-employment, with 51% lasting the first five years. Survival rates for spells starting since 1979 follow similar, if marginally lower patterns.

Self-employment spells starting since 1991 have lower survival rates. For men, 76% of spells starting after 1991 last six months, 59% the first year and 48% the second year. Only one third of self-employment spells survive the first four years. It is interesting to note that survival rates for women in self-employment are initially higher than for men.[5]

The survival rates reported here are higher than those estimated in Cressy (1996), although not for spells starting since 1991. Figures from the BHPS lifetime job histories suggest that the survival rates reported in Department of Employment (1986) and National Audit Office (1988) for EAS participants are similar for the self-employment population as a whole. The more reliable panel data, however, imply that survival rates among EAS participants are considerably higher than for the self-employed in general, suggesting that the EAS has been successful in aiding the success of the self-employed.[6]

4. Reasons for Self-employment Exits

It is widely perceived that all exits from self-employment are failures, but is this necessarily the case? Table 2 examines the reasons given for exiting self-employment by duration of spell for all spells recorded in the lifetime job history.

The top panel concentrates on men. The last column shows that in total, 48% of self-employment spells recorded by men are terminated with a move to alternative employment, while 18% are terminated due to bankruptcy.[7] For self-employment spells terminating within one or two years of inception, however, a larger proportion are because of alternative job offers, while 25% of spells terminating in their second and third years do so because of bankruptcy. This may be due to individuals learning about their entrepreneurial ability and revising their expected utility from self-employment downwards. Smaller proportions of long spells are terminated due to bankruptcy or alternative job offers, but are more likely to be terminated by retirement or for health reasons. For women, a similar picture emerges, although a smaller proportion

[5] A consequence of using employment histories is that multiple observations on the same individuals are included. As a referee pointed out, it is possible that those with multiple spells have different survival rates either because of worse (unobserved) business skills, or because of learning through experience. Analysis of only the most recent self-employment spell experienced by individuals suggests that these have marginally higher survival rates for men, but not for women.

[6] The fact that the data are covering different time periods prevents a more robust comparison of the EAS and BHPS survival rates.

[7] It is possible that a self-employed person whose business is failing may accept an offer of employment prior to bankruptcy. However, over 60% of self-employment spells in the data that terminate explicitly for bankruptcy result in unemployment, and as such are of more concern to policy makers. Similarly, it is possible that some of the terminations for family reasons are in fact hidden bankruptcies. Family reasons here include both child birth and caring for existing family members.

Table 2

Reason for Exiting Self-employment by Duration of Spell – complete spells only (column percentages)

Reason for exit	Duration of self-employment spell (years) 0–1	1–2	2–3	3–4	4–5	5–10	10+	Total
Men								
Better/different job	70.4	56.1	47.2	49.1	50.9	39.3	29.7	47.9
Bankruptcy	14.8	23.2	26.4	18.9	16.4	20.5	10.9	18.0
Retired	0.0	0.3	2.8	1.9	1.8	3.6	35.2	9.2
Health reasons	3.7	3.7	2.8	5.7	3.6	10.7	9.4	6.2
Other specified*	1.9	6.1	2.8	5.7	7.3	3.6	4.7	4.3
Other unspecified	9.3	8.5	18.1	18.9	20.0	21.4	10.2	14.4
Total	108	82	72	53	55	112	128	610
Women								
Better/different job	38.5	39.6	32.7	23.3	53.6	40.0	24.6	35.8
Bankruptcy	17.3	13.2	10.2	10.0	3.6	4.0	10.5	9.9
Retired	1.9	1.9	2.0	3.3	0.0	5.3	33.3	7.8
Family care	19.2	17.0	24.5	26.7	17.9	26.7	7.0	19.8
Other specified†	11.5	13.2	16.3	13.3	10.7	14.7	12.2	13.4
Other unspecified	11.5	15.1	14.3	23.3	14.3	9.3	12.3	13.4
Total	52	53	49	30	28	75	57	344

Notes: * Includes family care, moved home and full-time education. † Includes health reasons, moved hime and full-time education. *Source*: BHPS lifetime job history and Waves 1–5.

of spells are terminated for alternative jobs and bankruptcy. A significant proportion are terminated for family reasons.

Table 3 focuses on spells starting since 1979 and 1991 and hints at higher bankruptcy rates post 1979 at 21% for men and 14% for women. There are noticeably higher bankruptcy rates among the post 1991 spells (at 40% for men and 35% for women). Less than 30% of spells starting since 1991 terminate because of alternative job offers. This suggests that either recent self-

Table 3

Reason for Exiting Self-employment: Spells starting since 1979 and 1991 – complete spells only (column percentages)

Reason for exit	Spells starting since 1979 Men	Women	Spells starting since 1991 Men	Women
Better/different job	48.5	35.5	29.0	28.3
Bankruptcy	21.4	13.9	40.0	35.4
Other specified	15.2	37.4	5.5	12.1
Other unspecified	14.9	13.3	25.5	24.2
Total	303	166	145	99

Source: BHPS lifetime job history and Waves 1–5.

employment spells are more likely to fail, or that earlier recordings of self-employment spell terminations are tainted with recall error. It is not possible to disentangle the two effects from these data.

These tables have shown that a minority of self-employment spells are terminated directly because of bankruptcy. A large proportion are ended for moves into alternative paid employment, suggesting that self-employment for many workers is a transitional state between periods of employment. It is the factors determining how quickly these terminations occur that are now considered.

5. The Determinants of Self-employment Duration

The determinants of self-employment tenure are estimated using the Cox proportional hazards model.[8] The hazard rate therefore takes the form:

$$\lambda(t|\mathbf{X}) = \lambda_0(t)\exp(\mathbf{X}'\boldsymbol{\beta})$$

where $\lambda_0(t)$ is the baseline hazard rate, t is duration to date in self-employment, $\mathbf{X}$ is a vector of covariates and $\boldsymbol{\beta}$ is the vector of parameters to be estimated.[9]

Three sets of results are presented and discussed. The first, presented in Table 4, model the single risk of exiting self-employment. Table 5 focuses on exits for bankruptcy reasons, while Table 6 is concerned with exits to alternative employment, capturing better employed labour market matches.

Model specifications

The lifetime job history data places restrictions on the covariates possible, as to ensure exogeneity the variables must be determined prior to the start of the spell. The BHPS includes information on age at start of spell, parent's occupation, ethnic origin and education of the respondent, which may help determine individuals entrepreneurial ability, the probability of receiving alternative job offers and tastes and preferences. Industry and occupation at the start of the spell are included to capture the changing industrial structure of the economy and job-related measures of human capital (Cowling *et al.*, 1997*a*). The lifetime histories allow the calculation of total time spent in various labour market states. These experience variables, calculated at the start of each spell, are included as additional regressors. Previous unemployment

[8] The proportional hazards model is used because it makes no assumptions about the duration dependence of the exit rates, unlike parametric approaches. An alternative fully flexible non-parametric approach proposed by Prentice and Gloeckler (1978) and Meyer (1990) was also attempted. This procedure however proved impractical with the pre 1991 data without substantial censoring due to the large number of relatively long spells. The results from the post 1991 sample using this procedure are not substantively different from those presented here.

[9] As the data include multiple self-employment spells experienced by one individual, the standard errors are adjusted to allow for the same individuals being repeatedly at risk. Similarly, the baseline hazard rates are allowed to differ according to the number of previous self-employment spells each individual has experienced.

Table 4

*Cox Proportional Hazard Model Estimates of the Determinants of Self-employment Duration**

Variable	Men			Women		
	All	Post 1979	Post 1991	All	Post 1979	Post 1991
Aged < 30 at start of spell	−0.676	−0.487	1.698	−0.449	−0.558	1.428
	(0.265)	(0.349)	(0.478)	(0.263)	(0.422)	(0.794)
Aged 30–49 at start of spell	−0.517	−0.436	1.278	−0.518	−0.555	0.605
	(0.201)	(0.251)	(0.410)	(0.234)	(0.321)	(0.587)
Non-white†	−0.350	−0.508	−0.146	−0.440	0.712	0.200
	(0.256)	(0.317)	(0.508)	(0.585)	(0.451)	(0.465)
Married†			0.021			−0.409
			(0.262)			(0.336)
Interest receipts > £100 pa†			−0.351			0.097
			(0.293)			(0.301)
A Levels or above‡	0.296	0.051	0.236	0.028	−0.270	0.182
	(0.118)	(0.180)	(0.299)	(0.149)	(0.273)	(0.541)
O Levels or other‡	−0.016	−0.088	0.075	−0.088	−0.542	0.320
	(0.119)	(0.186)	(0.312)	(0.166)	(0.293)	(0.568)
Vocational qualification‡			−0.236			−0.029
			(0.224)			(0.381)
Self-employed parent§	−0.018	0.227	−0.144	0.087	0.189	−0.217
	(0.098)	(0.137)	(0.237)	(0.133)	(0.181)	(0.320)
Industry of spell						
Agriculture/farming	−0.547	−0.502	0.824	−0.134	0.115	0.293
	(0.195)	(0.301)	(0.540)	(0.264)	(0.377)	(1.025)
Construction	−0.436	−0.550	0.588	0.193	−0.924	0.379
	(0.121)	(0.178)	(0.251)	(0.964)	(1.356)	(0.902)
Distribution/hotels and catering	0.214	0.434	0.024	0.444	0.688	0.136
	(0.122)	(0.186)	(0.290)	(0.137)	(0.194)	(0.404)
Finance/banking	−0.088	0.440	0.396	0.210	0.303	0.031
	(0.166)	(0.201)	(0.342)	(0.219)	(0.278)	(0.458)
Occupation of spell						
Professional/manager	−0.659	−0.735	0.227	−0.380	−0.325	−0.201
	(0.119)	(0.176)	(0.260)	(0.129)	(0.186)	(0.383)
Skilled manual	−0.400	−0.251	−0.009	−0.243	−0.428	−0.380
	(0.118)	(0.163)	(0.254)	(0.187)	(0.280)	(0.546)
Self-employment experience‖	−0.081	−0.137	−0.002	−0.176	−0.180	−0.002
	(0.021)	(0.040)	(0.004)	(0.042)	(0.067)	(0.006)
Employment experience‖	−0.025	−0.031	0.003	−0.023	−0.031	0.003
	(0.008)	(0.010)	(0.001)	(0.010)	(0.016)	(0.002)
Unemployment experience‖	0.021	0.003	0.012	0.099	0.291	0.009
	(0.039)	(0.041)	(0.006)	(0.031)	(0.124)	(0.014)
Quit last job	−0.281	−0.250	−0.450	−0.314	−0.345	−0.170
	(0.090)	(0.130)	(0.203)	(0.126)	(0.189)	(0.319)
Unemployment rate**	0.026	−0.020	0.188	0.067	0.061	−0.031
	(0.012)	(0.029)	(0.104)	(0.015)	(0.038)	(0.156)
Number of spells	846	478	270	428	236	134
% censored	32.5	42.1	50.2	23.6	33.5	53.0
Log-likelihood	−2956	−1301	−563	−1499	−642	−228
χ^2	133	84	57	85	47	44

Notes: * Robust standard errors in brackets. † Characteristics of individuals at start of spell. ‡ Refers to highest qualification on leaving school in the pre 1991 sample, and in 1991 for the post 1991 sample. § When respondent aged 14. ‖ Number of months spent in labour market state at start of current spell. ** National unemployment rate in year of self-employment start.

Table 5

*Cox Proportional Hazard Model Estimates of the Determinants of Self-employment Duration: Involuntary Termination**

Variable	Men			Women		
	All	Post 1979	Post 1991	All	Post 1979	Post 1991
Aged < 30 at start of spell	−0.464	−0.380	1.422			1.166
	(0.621)	(0.735)	(0.766)			(0.564)
Aged 30–49 at start of spell	0.337	−0.385	0.518			
	(0.522)	(0.569)	(0.650)			
Non-white†	−1.430		0.416			
	(1.028)		(0.920)			
Married†			−0.151			
			(0.434)			
Interest receipts > £100 pa†			−1.409			
			(0.615)			
A Levels or above‡	−0.188	0.094	0.478	−0.557	−1.224	
	(0.283)	(0.359)	(0.485)	(0.523)	(0.753)	
O Levels or other‡	−0.059	0.061	−0.530	−0.833	−1.228	
	(0.257)	(0.399)	(0.608)	(0.526)	(0.696)	
Vocational qualification‡			−0.019			
			(0.359)			
Self-employed parent§	−0.142	0.240	−0.635	−0.194		
	(0.233)	(0.279)	(0.400)	(0.487)		
Industry of spell						
Agriculture/farming	−2.167	−1.841	0.714	1.598		
	(0.781)	(1.079)	(0.686)	(0.833)		
Construction	−0.224	−0.259	1.031	2.311	1.949	1.935
	(0.243)	(0.319)	(0.459)	(1.227)	(1.063)	(0.870)
Distribution/hotels and catering	−0.654	−0.450	−2.080	1.338	1.289	−1.072
	(0.334)	(0.467)	(1.111)	(0.491)	(0.493)	(0.702)
Finance/banking	−1.705	−0.889	0.704			−1.183
	(0.569)	(0.649)	(0.518)			(0.624)
Occupation of spell						
Professional/manager	−0.545	−0.762	0.861	0.709	1.225	1.255
	(0.323)	(0.474)	(0.481)	(0.494)	(0.550)	(0.554)
Skilled manual	−0.631	−0.299	0.226	−0.426		
	(0.242)	(0.326)	(0.452)	(0.836)		
Self-employment experience‖	−0.139	−0.080	−0.004	−0.570	−0.835	
	(0.078)	(0.067)	(0.007)	(0.177)	(0.334)	
Employment experience‖	−0.043	−0.038	0.004	−0.072	−0.092	0.006
	(0.018)	(0.023)	(0.002)	(0.035)	(0.038)	(0.004)
Unemployment experience‖	0.049	0.044	0.028	0.144	0.269	0.038
	(0.075)	(0.090)	(0.009)	(0.083)	(0.285)	(0.016)
Quit last job	−0.248	−0.283	−0.234	−0.455	−0.695	
	(0.218)	(0.283)	(0.338)	(0.441)	(0.507)	
Unemployment rate**	0.077	−0.028	0.394	0.168		
	(0.022)	(0.052)	(0.170)	(0.045)		
Number of spells	846	478	270	428	236	134
% censored	87.9	87.2	80.4	92.3	90.3	85.1
Log-likelihood	−526	−284	−198	−144	−84	−64
χ^2	57	34	64	50	22	31

Notes: See Table 4.

may result in skill depreciation or perhaps reflect a lack of business acumen which indicates a higher probability of failure, or a lower arrival rate of alternative job offers. Previous self-employment experience may indicate the accumulation of, or perhaps lack of, business skills. In order to capture

Table 6

*Cox Proportional Hazard Model Estimates of the Determination of Self-employment Duration: Voluntary Termination**

Variable	Men			Women		
	All	Post 1979	Post 1991	All	Post 1979	Post 1991
Aged < 30 at start of spell	−0.377	0.026		0.184	0.188	
	(0.441)	(0.558)		(0.580)	(1.005)	
Aged 30–49 at start of spell	−0.193	0.058		−0.066	0.039	
	(0.363)	(0.440)		(0.561)	(0.777)	
Non-white†	−0.567	−0.666		−0.950	0.328	
	(0.428)	(0.508)		(0.987)	(0.451)	
Married†			0.617			−0.873
			(0.464)			(0.501)
Interest receipts > Δ100pa†			−0.632			
			(0.505)			
A Levels or above‡	0.564	0.388		0.207	0.308	1.032
	(0.170)	(0.317)		(0.274)	(0.653)	(0.635)
O Levels or other‡	0.117	0.215		−0.472	−0.551	
	(0.180)	(0.319)		(0.313)	(0.668)	
Self-employed parent§	−0.086	0.055		−0.025	0.368	
	(0.146)	(0.205)		(0.230)	(0.294)	
Industry of spell						
Agriculture/farming	−0.113	−0.313	1.509	0.055	0.754	0.716
	(0.270)	(0.469)	(0.863)	(0.474)	(0.507)	(0.595)
Construction	−0.658	−0.743	0.787	−0.129		
	(0.189)	(0.285)	(0.477)	(1.315)		
Distribution/hotels and catering	0.376	0.570	0.648	0.117	0.148	
	(0.178)	(0.275)	(0.506)	(0.244)	(0.378)	
Finance/banking	0.623	1.044	1.419	0.366	0.656	1.395
	(0.200)	(0.270)	(0.580)	(0.325)	(0.404)	(0.691)
Occupation of spell						
Professional/manager	−1.059	−1.160	−0.659	−0.717	−0.637	−1.750
	(0.165)	(0.238)	(0.456)	(0.223)	(0.306)	(0.840)
Skilled manual	−0.197	−0.153	−0.408	−1.024	−2.001	
	(0.168)	(0.239)	(0.471)	(0.364)	(0.779)	
Self-employment experience‖	−0.171	−0.357		−0.194	−0.206	
	(0.056)	(0.141)		(0.095)	(0.180)	
Employment experience‖	−0.038	−0.036	−0.003	−0.030	−0.010	
	(0.011)	(0.016)	(0.002)	(0.018)	(0.032)	
Unemployment experience‖	−0.037	−0.094	0.018	0.182	−0.120	
	(0.068)	(0.088)	(0.006)	(0.041)	(0.340)	
Quit last job	−0.158	−0.147	−0.537	−0.372	−0.411	
	(0.134)	(0.191)	(0.427)	(0.214)	(0.340)	
Unemployment rate**	0.003	−0.030	0.083	0.045	0.023	−0.285
	(0.015)	(0.040)	(0.221)	(0.026)	(0.063)	(0.272)
Number of spells	846	478	270	428	236	134
% censored	68.2	72.6	86.6	73.4	77.1	85.9
Log-likelihood	−1431	−607	−167	−527	−218	−67
χ^2	112	69	38	71	53	32

Notes: See Table 4.

macroeconomic effects, the (national) unemployment rate in the year of self-employment start-up is included.

Reasons for spell terminations have been used to create a variable indicating whether an individual quit their job preceding the self-employment spell.[10]

[10] Job terminations due to movements to better or different jobs have been categorised as quits.

Those who quit their previous employment may be more positive and perhaps more persevering in their self-employment decision.

The panel data allow the inclusion of additional covariates from Wave 1, determined prior to the start of the spell. A wealth measure is included, indicating whether an individual received interest or dividend payments exceeding £100 in the twelve months prior to the Wave 1 interview.[11] Family variables are included to measure the degree of responsibility on the individual and the possible utility from leisure. Vocational qualifications could reflect training that may increase entrepreneurial ability.

Results

Table 4 displays the results from the proportional hazards models. A coefficient greater (less) than zero implies a positive (negative) impact on the hazard rate or a negative (positive) impact on survival. The first three columns focus on men in the analysis of self-employment duration across individual lifetimes, for spells starting since 1979 and for spells starting since 1991 respectively. The last three focus on women.

As Holtz-Eakin *et al.* (1994*b*) and Cressy (1996) find for the United States and Britain respectively, age has a significant impact on self-employment survival. Men aged under fifty years at the start of the spell have a lower exit rate (by some 40–50%)[12] using the lifetime history data, but a significantly higher exit rate according to the post 1991 data. A similar age effect is noticeable for women.[13] Wealth appears to have little effect, supporting the findings of Cressy (1996).

Consistent with Cowling *et al.* (1997*a*) but unlike Cressy (1996), qualifications have little effect on exit rates, with the exceptions of A Levels or above increasing the exit rate for men using the lifetime data and O Levels or below reducing it for women post 1979. This suggests that academic success is a poor indicator of entrepreneurial ability.[14] Having a self-employed parent increases the exit rate from self-employment for men post 1979, which is rather counter-intuitive as one might expect individuals with self-employed parents to have more business acumen (Lentz and Laband, 1990).

Industry plays a major role, particularly for men. Men in agriculture and construction have lower exit rates from self-employment (by some 40%) pre 1991, but higher exit rates post 1991. This reversal may reflect the changing industrial structure of the economy and the recession of the early 1990s which

[11] On the advice of a referee, housing equity in 1991 was also tried as a wealth measure as this is the most common source of collateral. However, this has no significant effect, and the receipt of interest and dividend payments variable was preferred on the basis of log-likelihood comparisons.

[12] The proportional change in the hazard rate is calculated by taking the anti-log of the reported coefficient.

[13] It is difficult to determine what is causing this dramatic shift in the age parameters. It may be that younger individuals starting up a business in the tail of the 1990s recession were less prepared to survive than older workers.

[14] This is consistent with the signalling hypothesis, in that individuals planning to enter self-employment have no need to acquire formal qualifications to indicate their quality to potential employers.

hit particularly hard on the construction industry. Men and women in distribution, hotels and catering have higher exit rates pre 1991, as do men in financial industries post 1979.

Differences in exit rates by occupation also emerge in the lifetime data. Those in professional occupations have a lower exit rate (by 50% for men and 30% for women) as do those in skilled manual occupations. This perhaps indicates that occupation is a more accurate indicator of entrepreneurial ability than formal qualifications (Cowling *et al.*, 1997*a*).

Unlike Cressy (1996), previous business experience appears an important determinant of survival. For the pre 1991 sample, each previous month spent in self-employment prior to the start of the current spell reduces the exit rate by 10–15% for both men and women. Each month in paid employment reduces the exit rate by 2–3%. Unemployment experience increases the exit rate from self-employment for women, with each previous month increasing the exit rate by 10% (34% in the post 1979 sample). In the post 1991 sample, each previous month in employment reduces the probability of survival by 0.3% per month for men, while each previous month in unemployment reduces the probability by 1.2%. It is possible that unemployment experience either reduces or is an indicator of lower entrepreneurial ability, while self-employment experience indicates the accumulation of business skills.

Quitting the previous employment spell generally has the expected sign across all samples. For men it significantly reduces the exit rate by some 25–30% pre 1991 and by 37% post 1991. The exit rate from self-employment is positively related to the unemployment rate at the start of the spell for men using both the lifetime data and post 1991 data, and for women pre 1991. This suggests high exit rates are associated with low labour demand (consistent with Robson, 1996).

Industry, occupation and previous labour market experience therefore play a key role in determining an individual's probability of survival in self-employment, as does the level of labour demand in the economy. Those pulled into self-employment (quitting their previous employment spell) are more successful in remaining self-employed. The importance of industry and age in particular have appeared to change in magnitude and sign in the 1990s.

Involuntary terminations

Involuntary terminations of self-employment are of concern to individuals and policy makers as they are likely to result in unemployment. This analysis focuses on spells reportedly terminated due to bankruptcy. These are analysed in a competing risk framework with those exiting for non-bankruptcy reasons treated as censored. The results are presented in Table 5.[15]

Concentrating initially on the pre 1991 sample for men, neither age, education nor having a self-employed parent play a significant role in determining the

[15] Due to the small number of completed (i.e. not censored) spells, not all coefficients enter all models. The specifications produced here are chosen on the basis of log-likelihood comparisons.

probability of bankruptcy. Those in agriculture, distribution and finance industries and in professional or skilled manual occupations are less likely to suffer bankruptcy, as are those with previous self-employment and employment experience. For men post 1991, high annual interest receipts prior to becoming self-employed significantly reduce the exit rate from self-employment suggesting that those entering self-employment with more wealth are less likely to become bankrupt. Holtz-Eakin *et al.* (1994*b*) report similar findings for self-employment spells in general in the United States. Men aged under 30 or working in construction are more likely to suffer an involuntary termination post 1991. Professional men are also more prone to bankruptcy, perhaps reflecting the effect of the recession of the early 1990s. Each previous month of unemployment experienced increases the probability of failure by 2.8%. Bankruptcy is unsurprisingly also associated with high aggregate unemployment rates.

For women, the small number of uncensored spells limits the number of covariates. In the pre 1991 sample, formal qualifications reduce the probability of bankruptcy, as does previous self-employment and employment experience. Working in agriculture, construction or distribution/hotels and catering industries or in a professional occupation increases the probability bankruptcy. Post 1991, those under 30 working in construction and in professional occupations have higher bankruptcy rates. As for men, previous experience of unemployment increases the bankruptcy rate, by 3.9% per month. Those in finance and banking have lower bankruptcy rates.

Voluntary terminations

It is of equal interest to investigate who exits self-employment to (re)enter paid employment, as this indicates locating a better employed labour market match. Table 6 presents the estimates for voluntary terminations to self-employment spells, defined as moving to better or different employment. Again these are analysed in a competing risk framework with those exiting for other reasons treated as censored.

Considering initially the results for men using the lifetime data, those educated to A Level standard or above have a higher probability of moving to alternative employment. This may reflect the larger number of job offers that such individuals are likely to receive. Similarly those in the distribution, hotels and catering and finance and banking industries have a higher exit rate to alternative employment. This perhaps suggests that self-employment experience in these industries reward individuals with skills that are attractive to potential employers. Construction workers and those with more employment and self-employment experience are less likely to leave self-employment for alternative employment, as are those in higher status occupations. Individuals with business experience or in high status occupations may have more confidence in their entrepreneurial abilities, and be less inclined to accept offers of paid employment. In the post 1991 sample, industry effects again emerge, with those in agriculture and finance more likely to leave for other jobs. As before, the sign on the construction parameter has switched, most likely

caused by the recession of the 1990s. Unemployment experience is also associated with voluntary self-employment exits for men post 1991.

For women, again the covariates are limited by the small number of uncensored spells. Results from the lifetime data suggest that professionals, managers and those in skilled manual occupations are less likely to leave self-employment for alternative employment. This perhaps reflects the fact that women are more able to realise their career potential in self-employment, not hindered by the 'glass ceilings' that appear in paid employment (Gregg and Machin, 1993; Booth *et al.*, 1998). This effect is also noticeable post 1991. As previously, labour market experience, either in self-employment or paid employment reduces the probability of leaving self-employment for other employment, as does leaving the previous employment spell voluntarily. Unemployment, either personal experience or aggregate rates, increases this exit rate.

Bankruptcies and voluntary exits lead to different conclusions about the determinants of 'successful' self-employment survival. Wealth, for example, reduces the bankruptcy rate for men, but has no effect on the exit rate to employment, or on the overall exit rate. Those starting businesses in periods of high aggregate unemployment are more likely to become bankrupt, while those in distribution, hotels and catering and finance and banking industries are more likely to exit to alternative employment. These effects are obscured in the single risk approach.

6. Conclusions

This paper has investigated issues surrounding the length of self-employment spells in Britain. Less than 50% of self-employment spells started since 1991 have survived their first two years in business. Despite widespread belief that all self-employment is terminated by bankruptcy, evidence produced here suggests that this is not the case. A substantial proportion of self-employment spells are terminated through moves to alternative employment, suggesting that for many self-employment is a transitory state between employment spells.

The BHPS data allow the determinants of bankruptcy and of voluntary exits to be distinguished. These determinants have changed over time and are different for men and women. In particular, evidence emerges supporting the findings of Cowling *et al.* (1997*a*) in that employment related human capital, captured in occupations and business experience, appears to play a major role in determining the bankruptcy rate and the exit rate to employment, while formal qualifications are not important. Unemployment, through both personal experiences and aggregate rates, increase the self-employment exit rate. Initial wealth, measuring access to capital, is found to reduce the probability of bankruptcy for men significantly. The fittest, in terms of self-employment survival, are those with no previous unemployment experience but with some work experience, who quit their previous job and enter self-employment with some initial capital.

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Appendix Table A1
The BHPS Data

	Number of spells	% complete	Mean duration (months) Complete spells	Incomplete spells
Men				
All spells	910	67.6	84.44	144.77
Spells starting after 1979	519	58.4	41.45	88.88
Spells starting after 1991	292	50.7	9.96	22.84
Women				
All spells	451	77.2	68.22	118.43
Spells starting after 1979	250	67.6	35.86	78.78
Spells starting after 1991	204	49.0	9.86	19.43

Source: BHPS lifetime job history and Waves 1–5.

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