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HUMAN CAPITAL, ENTREPRENEURIAL
ENTRY AND SURVIVAL

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Human Capital, Entrepreneurial Entry and Survival

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Abstract: Using British Household Panel Survey data from 1991 to 2008, we examine the interactions between self-employment and several variables, in particular education, age, health, marital status and children. We also consider gender variations. We found that higher education increases the likelihood of self employment and earnings from self employment for female entrepreneurs regardless of their employment status the previous year. For male entrepreneurs who were also entrepreneurs the previous year, higher levels of education reduce the hours worked in self-employment and the likelihood of them stay self employed. However, higher levels of education increase their monthly profit from self-employment. This is due to both higher productivity from their superior human capital and also the self-selection arising from the higher financial incentives they require to be self-employed.

Key Words: Self-Employment; Human Capital; Education

JEL Classification: J22, J24, L26

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1. Introduction

Over the last decades of the twentieth century economic activity has moved away from large firms to small firms and self-employment (Brock and Evans, 1989; Carlsson, 1992; De, 2000). This shift has been characterised as the emergence of an entrepreneurial economy at the heart of which lie entrepreneurs who create wealth and new economic as well as social opportunity (e.g. Audretsch and Thurik, 2000, 2001, 2004). From this perspective, entrepreneurship is considered an engine of economic growth and innovation, and its stimulation is a major dimension of economic policy in many mature economies as a result (Atherton, 2006; De, 2000; Thurik, 2009).

There is, however, a view that entrepreneurship overall and self-employment in particular can be a challenging and unrewarding option for many (Baines, 2002; Fournier, 1998; Smart and Smart, 2005). Popular accounts of entrepreneurship, as well as some sociologically oriented analyses, associate starting and running a business with long hours of work for poor returns and negative wider effects on quality of life, health and wellbeing (MacDonald, 1996). The 'self-exploitation' of self-employment at low wages and profit, and the adverse effects of this form of economic activity on health, wellbeing and social participation can mean that the benefits of running one's own business are scant or non-existent (Pongratz and Voss, 2003). The notion of 'necessity entrepreneurs', who become self-employed because they have no other employment options is well established in the literature, which considers these forms of entrepreneurship as marginally productive at best (e.g. Acs, 2006). Indeed, necessity entrepreneurship through self-employment has been associated with job insecurity and negative economic and personal effects, as well as wider effects such as reduced national happiness (Block

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and Koellinger, 2009; El Harbi and Grolleau, 2012; Fayolle, 2013). These negative representations of self-employment raise an important question in relation to selection of this work option; namely, whether the 'price to pay' for running your own business is too high, especially when non-financial impacts are considered.

In this paper we use the British Household Panel Survey (BHPS) from 1991 to 2009 to explore the effects of education and health on entrepreneurship, as measured by self-employment. We also test whether age and family status are constraints on self-employment in the UK. We investigate whether there are gender differences among British entrepreneurs and explore the effects of these variables on entrepreneurial entry and survival by considering the previous employment status of survey respondents, so providing a test for whether this form of work has the negative effects suggested in some of the literature.

The results from this analysis challenge notions that self-employment has negative effects on health, wealth and wellbeing. We find that: i) Higher education increases the likelihood of self employment and earnings from self employment for female entrepreneurs; ii) For male entrepreneurs who were also entrepreneurs the previous year, higher levels of education reduce the hours worked in self employment. However, higher levels of education increase their monthly profit from self employment; iii) Good health is positive and significant in determining self employment, regardless of previous employment status; (iv) Marriage increases the likelihood of self employment and earnings from self employment, but having children reduces the likelihood of self-employment particularly for women; (v) there is an optimum age to gain the benefits

from self-employment, with increasing effects before this age and decreasing benefits thereafter.

The contribution of this paper lies in its evidence-driven challenge to negative views about self-employment. Identifying positive outcomes and benefits to individuals from self-employment, in terms of income and health in particular, we provide an empirical basis for encouraging this working option. The implications of this study for policy are therefore significant, in that they provide clear evidence that starting and running their own businesses is of real and substantial personal benefit. The remainder of the paper is structured as follows. Section 2 is the literature review. Section 3 describes the data used in our analysis. Section 4 reports the empirical findings and section 5 presents concluding remarks.

2. Literature Review

The individual who becomes self-employed lies at the heart of the entrepreneurial process of new venture creation, and their capabilities strongly influence the future success of business start-ups (Gartner, 1985; Parker and Belghitar, 2006; Reynolds et al., 2004). Moreover, the nature of entrepreneurial activity varies considerably from venture to venture, with individuals playing different roles and deploying different skills and strategies to ensure their ventures are successful, including speculative arbitrage, acquisition and deployment of resources, opportunity recognition and innovation (Cantillon, 1775, Davidsson and Honig, 2003; Kirzner, 1985, Marshall, 1890, Schumpeter, 1911; Shane, 2000; Venkataraman, 1997).

The entrepreneurial capability and knowledge and skills set of entrepreneurs, i.e. human capital variables such as education, knowledge, practical skills and business experience, are an essential dimension, therefore, of entrepreneurial success (Ackerman and Humphreys, 1990; Cressy, 1996; Hunter, 1986; Lofstrom (2002Schuetze (2000) Unger et al., 2009). Human capital enables better planning and formulation of business strategies (Baum et al., 2001; Baum and Locke 2004; Baum and Silverman, 2004; Frese et al., 2007; Hannon and Atherton, 1998), as well as enhancing opportunity recognition (Chandler and Hanks, 1994; Schultz, 1959; Shane and Venkatraman, 2000) and entrepreneurial alertness (Westhead et al., 2005).

Formal education, which is a key dimension of human capital (Becker, 1964; Mincer, 1974), has been found to have a beneficial effect on new venture creation. Studies have found that better qualified individuals are more likely to enter self-employment (Bates 1995, Carr, 1996; Naude et al 2008, Parker and Belghitar 2006, Rees and Shah 1986; Reynolds et al., 2004). Empirical research has also found that education produces nonlinear effects in supporting the probability of becoming an entrepreneur and in achieving success (Bellu at al., 1990; Cooper et al. 1994; Davidsson, 1995; Honig, 1996).

This leads to our first research question:

QUESTION 1: Is formal education positively associated with propensity to become self-employed and with positive outcomes from self-employment?

Tacit forms of knowledge, acquired experientially, also improve performance and productivity (Polanyi, 1967). Relevant work experience has been found to be related positively to both propensity to start a venture and future prospects of that venture

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(Gimeno et al., 1997; Robinson and Sexton, 1994). Practical knowledge and task-related human capital that can be applied to the venture also determine the success of entrepreneurial activity (Unger et al., 2011).

Prior experience and knowledge are especially beneficial in acquiring the resources, in particular finance, needed to start a new venture (Atherton, 2009; Brush et al., 2001). Evans and Leighton (1989) found a strong positive relationship between greater asset holdings and self-employment, which suggests that liquidity constraints play a role when setting up a firm. According to Amarante et al. (2011) entrepreneurs and financiers combine to transform ideas into innovation. In entrepreneurial economies financial systems, according to Baumol et al. (2007), are more likely to finance new, risky firms. Astbro and Bernhardt (2005) suggest that high human capital relaxes financial constraints, due to greater productivity of human capital in wage work than in self-employment. Parker and Belghitar (2006) found that successful nascent entrepreneurs have established credit with suppliers and received some money from nascent operations already and if they own their home.

Previous studies have found that propensity to be self-employed increases with age, in part because age can be seen as a proxy for experience (Mata, 1996; Preisendorfer and Voss, 1990; Robinson and Sexton, 1994; Zissimopolous and Karoly, 2005). The data source used in this study does not provide information about work and entrepreneurial experience of self-employed individuals, but does provide their age. As a result, we use age as a proxy indicator of accumulated experience, on the basis that age and accumulated tacit knowledge through experiential learning and practice are positively associated. This leads to our second research question:

QUESTION 2: Is the age of a self-employed individual positively related to self-employment, and are there more positive outcomes from self-employment at older ages?

It is a truism, borne out by the wider academic literature, that working long hours over a sustained period are bad for an individual's health (See van der Hulst, 2003, for a review of this literature). The tendency for many self-employed individuals to work long hours has led to a view that many entrepreneurs are likely to experience adverse health and other negative effects as a result of starting their own businesses (Min, 1990; de Vries, 1977). From this perspective, entrepreneurs work long hours in an attempt to improve the prospects of survival and growth of their businesses, and so displace wage labour and capital with their own 'sweat equity' (Cooper et al., 1998; Filion, 1991). There is also a wider literature that associates increases in self-employment with erosions in employment rights, resulting growth in what has been termed 'precarious' employment and self-employment (Quinlan et el., 2001).

This association has been critiqued, however, both in terms of its empirical validity and its consideration of other compensating variables that may diminish the adverse effects of self-employment on entrepreneurs. Empirical analysis by Benz and Frey (2008) found strong and highly positive relationship between self-employment and wellbeing, based on the sense of independence that arises from running one's own business. As noted in that paper, there is an established literature showing that the self-employed are on average more satisfied than those in employment, in large part due to perceptions that the nature and conditions of work when self-employed provide qualitatively positive benefits to individuals (Blanchflower, 2000; Block and Koellinger, 2009; Frey, 2008; Hyytinen and Ilmakunnas, 2007; Parasuraman and Simmers, 2001).

These varying views about the effects of self-employment on working hours, wellbeing and health therefore raise a further question for consideration in this paper:

QUESTION 3: Are the effects of self-employment on working hours, success of the venture, and health and wellbeing positive or negative?

Although human capital, both formal and experiential, is a key influence on and determinant of entrepreneurial success, it is not the only factor to be considered. Moreover, individual choices on working hours may be contextualised by personal motivations, socioeconomic circumstances and other highly contextualised considerations that will not be considered in the review of the literature above. As such, other factors are likely to affect the interactions between education, experience, working hours, health and wellbeing and propensity to start a business and continue in self-employment.

Social capital, developed and mediated through key relationships and via personal as well as transactional networks, complement the human capital effects of education and experience as well as the resource endowments of new ventures (Loury, 1987; Coleman, 1988).

There is evidence that government and university funded programs can improve the prospects of successful start-up for new venture founders, although their effectiveness and impact can be highly variable (Atherton, 2006; Bennett, 2008; Bennett and Robson, 1999; Bryson and Daniels, 1998; Parker and Belghitar, 2006; Robson and Bennett, 2000; Shane 2009; Smallbone et al., 2002; Storey, 1992; Wren and Storey, 2002). In certain cases, particularly where the amount is not large, inherited wealth can play an important role in enabling entrepreneurship, by making available start-up capital to the founder (Faria and Wu, 2011).

These additional considerations make it likely that factors other than education, age and experience will affect propensity to become and stay self-employed and patterns in working hours, entrepreneurial success and health and wellbeing. As such, our analysis concerns itself with several key considerations of self-employment, but recognises that additional variables and explanatory factors are likely to affect outcomes from entrepreneurship through self-employment than the variables analysed in this paper.

3. Data and Methodology

The data used for this research is the British Household Panel Survey (BHPS) from wave 1 to wave 18 (1991 – 2009). From the survey, we initially considered the variable indicating whether an individual was self-employed or not ("self employed: yes or no"), which because of its binary response is suitable for a Probit model. We also considered variables relating to time working ("Self employed: hours worked per week") and income generated ("Self employed: monthly profit"), which are suitable for a Tobit model given the wide range of possible responses. We estimate the probability of an individual being an entrepreneur through a Probit equation. The labour supply function and the profit function of an entrepreneur are estimated through Tobit equations. This is done separately for males and females. We use education and age effect as indictors of human capital on the basis that age is an instrument variable for experience and education for human capital, as discussed earlier in this paper. Marriage and number of children act as control variables.

Based on their employment status last year, we disaggregate our sample into four groups: a) Entrepreneurial survival, for those entrepreneurs whose employment status

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were self employed last year (Table 1); b) Entrepreneur entry from paid employment, for those entrepreneurs whose last year's employment status were employee (Table 2); c) Entrepreneur entry from Unemployment, for those entrepreneurs whose last year's employment status were unemployed (Table 3). d) Nascent Entrepreneur entry from other status, for those entrepreneurs whose last year's employment status were retired, maternity leave, family care, full time student, long term sick and disable, government training scheme, or something else (Table 4). All together there are 24 equations.

Appendix shows the means of the variables. The survival rates show staggering difference between male and female entrepreneurs. The vast majority of male entrepreneurs (93.8%) stayed on as entrepreneurs the subsequent year, while only around half of female entrepreneurs (53.7%) did so. The reason behind this phenomenon would require further research. We posit two hypotheses. One is that male entrepreneurs are more successful than female entrepreneurs. The other is that male entrepreneurs are forced to stay on as entrepreneurs even if they are unsuccessful due to family constraints.

Another statistic worth noticing from Appendix is that a higher percentage of the unemployed last year choose self employment (6.1% for males and 3.4% for females) than those who are employed last year (3.4% for males and 1.7% for females). This is hardly surprising as the unemployed are on active lookout for better employment prospects. They would also accept lower payoffs from self employment than someone with a job.

Empirical evidence is quite robust from the Random-effects Probit model and Random-effects Tobit model (Tables 1 to 4), and the results are consistent with the Random-effects Logit model, and Fixed Effect model we ran **(available upon request).**

4. Empirical Results

Our review of the literature concluded that higher education, and thus higher levels of formally generated human capital, may increase the likelihood of self employment and, once individuals have entered entrepreneurship, earnings from self employment (Cassar, 2006). Table 1 shows this to be the case for female entrepreneurs who were also entrepreneurs the previous year. This finding is consistent for female entrepreneurs regardless of their employment status the previous year, as shown in Tables 2, 3 and 4.

For male entrepreneurs who were entrepreneurs the previous year, i.e. those continuing in self-employment, higher levels of education reduces hours worked as well as the likelihood of them staying in self employment (Table 1). This indicates a positive relationship between successful entry into self-employment and the overall level of human capital of the founder, as measured by formal education (c.f. research question 1). Higher human capital increases the likelihood of starting a business and remaining in self-employment, and has a positive effect on working hours, with fewer hours worked the higher the level of formal education. From this perspective, it is reasonable to assume that continuation year-on-year in self-employment can be considered an indicator of the male entrepreneur's desire to continue to run his own business.

Moreover, greater human capital as measured by higher levels of education is positively correlated with increases in male entrepreneurs' monthly profit from self-employment. Entrepreneurs with a first degree increased income by just over £1000 per annum and positive relationships were found amongst entrepreneurs with postgraduate

qualifications (Table 1). This can be explained in several different ways. Firstly, individuals with high human capital are more likely to secure higher levels of wage income through employment than individuals with lower human capital. As such, their decision to continue in self-employment would most likely be based on a judgement that income from this employment status will be higher than wages from employment. From this perspective, only individuals who see a greater return from self-employment will continue to select this working option over the prospect of high wage income through employment, a finding consistent with Burke et al (2000). A second plausible explanation for the positive relationship between formal educational and earnings from self-employment is the greater productivity yields that individuals with higher human capital can secure through application of their knowledge and expertise.

These results are significant in establishing the positive tangible benefits of self-employment, as measured by shorter working hours and higher monthly income, arising for individuals with high levels of human capital. For these individuals, entrepreneurship offers both a higher economic return and greater leisure time, and hence increased welfare through positive wellbeing effects.

Patterns related to monthly income vary by previous employment status, indicating different patterns for continuing entrepreneurs to those entering self-employment. For male entrepreneurial entry whose last year's employment status was employed, education is only significant for monthly profit by other higher qualification (Table 2). For male entrepreneurial entry whose last year's employment status was unemployed, education is generally significant for the likelihood of entering self-employment and for monthly profit by GCSE/O level (Table 3). For male nascent

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entrepreneurs whose last year's employment status were retired, maternity leave, family care, full time student, long term sick and disable, government training scheme, or something else, the post A level education variables are significant for determining self employment, and are significant for monthly profit (Table 4). Rotefoss and Kolvereid (2005) found that higher education is positively associated with becoming a nascent entrepreneur, as people with higher education are better able to identify opportunities and are therefore more likely to initiate start-up attempts.

Our results suggest that the nature of self-employment may be influence by previous employment status and how that relates to human capital., so extending Rotefoss and Kolvereid's overall conclusion. The results above suggest that variations in the nature of self-employment are influenced by prior employment status. For males who were previously employed, the positive correlation for income with other higher qualification, i.e. non-degree awards such as vocational awards, point to a greater likelihood for these individuals to set up businesses in areas such as skilled trades where vocational education has a positive impact on human capital. For individuals who were previously unemployed, the correlation with basic qualifications and income suggest entry into lower-skilled self-employment where the barriers to entry are also low, such as catering and personal services. For those entering from other statuses, the positive correlation with higher levels of formal education indicates that these individuals are voluntarily entering self-employment because of higher levels of human capital that increase the propensity to identify opportunities to start a venture and then secure improved returns and benefits from this decision.

The age effect is the most consistent significant variable across our analysis. Out of 24 equations, 21 of them had age effects that are significant non-linear functions (Tables 1 to 4). Our analysis indicates that a 50.7 year old male entrepreneur is most to earn the highest profit from self employment. The lowest peak age of 37.3 and is for new entrepreneurs entering self-employment from another employment status. These entrants into self-employment are therefore younger and generate lower monthly incomes, which is perhaps not surprising given the inclusion of students in this category who in the main will be younger and due to less experience and accumulated assets more likely to generate lower income returns from entrepreneurship.

For women, the age at which they generate the highest monthly incomes is 47.5 years, which is younger than their male counterparts. The lowest is 35 years, and the average is 43.3 compared with the average overall age of 44.4 years. As proposed earlier in this paper, age is related to the individual's years of labour market experience, and so can be used as an indicator or proxy for human capital (Holtz-Eakin et al 1994). These findings indicate that male entrepreneurs have more experience than female entrepreneurs, and accordingly generate higher monthly incomes from self-employment.

More broadly, the relationship between age and income is non-linear and significant, regardless of gender. This indicates an optimal age at which to maximise income returns from self-employment, before which income is still rising and after which there is marginal reduction. This result also challenges a generalised conclusion that older individuals with high human capital entering self-employment are most likely to gain the highest income from this economic activity. Instead, the analysis indicates an

optimal age for self-employment between the mid-forties and early fifties. After this, the financial return on selecting self-employment erodes.

Of the 24 equations, good health is positive and significant in 18 of them (Tables 1 to 4). However, this finding raises a question about the nature and direction of this relationship, with two possible interpretations. The first is that entrepreneurs who are self-employed will need to be healthier in order to cope with the challenges and requirements of this mode of working. The longer hours and the greater responsibility commonly associated with self employment mean that the less healthy are likely to find it a more demanding status (Rees and Shah 1986). Taylor (2001) found having a health condition that limits the type or amount of work possible reduces the probability of self-employment by 1%.

Our analysis of the relationship between human capital and working hours discussed above suggests an alternative explanation. Given the tendency for individuals with higher levels of formal education to work fewer hours and generate more income, the positive relationship between good health and self-employment may also be seen as a benefit or outcome from this form of economic activity. Reduced working hours decreases the risks of poor health due to workload and work-related stress. In addition, the additional leisure time afforded by shorter working hours is likely to increase wellbeing, and so have a positive effect on health. Greater levels of income from self-employment will also have positive effects on health, in terms of ability to access superior healthcare and improved dietary and other lifestyle choices that a higher income allows for.

Marriage has a positive and significant impact on entrepreneurial entry from unemployment for both men and women (Table 3). Marriage is also good for venture survival (Table 1). This supports the findings of Davidsson and Honig (2003), who used married status as a social capital indicator, and found that both human capital and social capital increased the probability of being a nascent entrepreneur. The positive effects of marriage on entry into self-employment and survival are likely to be both affective and material, in that a spouse can provide emotional support to the entrepreneur and, if employed, can support that individual while starting or experiencing cash flow constraints.

There is a clear effect by gender from having children, with this being negative for women. Hundley (2001) argued that for women in self-employment, house work and childrearing limit the scope of their self employment and the number of hours available to work on the business. Our empirical results show that having children, and the number of children, is negative and significant in the survival of female entrepreneurs. Having more children reduces the likelihood of continuing in self-employment. However, the BHPS does not provide data about the type of economic activity, or inactivity, female entrepreneurs not continuing in self-employment move to. (Table 1). Having children reduces the monthly profit of female entrepreneurs who were self-employed the previous year by £47, which although not a large amount of income does show a negative effect.

The same variable has a different effect on male entrepreneurial survival self-employment. While having children reduces the likelihood of male entrepreneurs to continue in self-employment, it increases monthly profit by £59 (Table 1). For entrepreneurial entry from paid employment, number of children increases the probability

for employees' transition into self-employment (Table 2). Rees and Shah (1986) argued that a married man will be more prepared to take on the risks associated with self-employment, and family support may make self employment less demanding than it would be otherwise. The two results we noted above suggest that Rees and Shah are correct in terms of having children having a positive effect on motivation to start a business, in anticipation of higher incomes that indeed do arise from this choice. However, we also find that men with children are less likely to continue in this working status, suggesting that those that enter self-employment and then do not secure improved incomes return to employment.

5. Conclusions and implications

Using data from the British Household Panel Survey (BHPS), this paper studies the role by human capital on British entrepreneurial entry and survival. We found that higher education increases the likelihood of self employment and earnings from self employment for female entrepreneurs regardless of their employment status the previous year. For male entrepreneurs who were also entrepreneurs the previous year, higher levels of education reduce the hours worked in self-employment and the likelihood of them stay self employed. Moreover, higher levels of education increase their monthly profit from self-employment. This is due to both higher productivity from their superior human capital and also the self-selection arising from the higher financial incentives they require to be self-employed. As such, we can conclude that the response to research question 1 is that formal education is positively related with positive outcomes from self-employment,

and that its effects on propensity to start a business and stay in self-employment vary by gender.

The age effect provides a nuanced response to our research question 2, which we explore in more detail later in this section of the paper. Whereas our second research question suggested a positive correlation between age, as a proxy for experience, and positive outcomes from self-employment, our results identified an optimum age range for self-employment from an individual's mid-forties through to her or his early fifties. As such, we qualify our response to question 2 to state that there is a positive correlation between age and positive income gains from self-employment up to an optimal age, after which these gains reduce.

Our overall finding therefore is that self-employment can have positive effects on income, working hours and health for individuals, particularly for those who are older and have higher levels of human capital. This finding provides clear evidence that starting and running your own business can be good for individuals, both in terms of wealth creation but also in wider positive effects on health, wellbeing and quality of life. There is not necessarily a trade-off therefore between being successfully self-employed in terms of personal income and wider health and wellbeing effects. Instead, individuals with higher levels of human capital and sufficient experience are able to establish and run profitable enterprises in ways that are positive for health and wellbeing.

Our analysis suggests that age functions as a proxy for experience and the accumulation of assets and resources that enable entrepreneurship through self-employment. Based on our results, the optimal ages for generating the highest incomes from self-employment were approximately 15 to 20 years before the official retirement

age, and roughly twenty-five to thirty years after graduation from university for school-leavers going immediately on to higher education. At this age range, individuals would be considered highly experienced in their occupations and well-established in their careers. As a result, there is most likely to be the best balance between working experience, on the one hand, and accumulation of resources to fund business start-up. Founder capital has been found to be of particular significance in both attracting other forms of new venture finance and securing sufficient funding to fully capitalise the business start-up (Atherton, 2009).

This age range may also signify three other wider influences on entry into entrepreneurship. Firstly, this age range allows for the prospect of anticipated future earnings through self-employment over a sufficient period to make such decisions attractive before individuals contemplate retirement. Secondly, the age range is more likely to allow for release of tied assets, such as house equity following mortgage repayment and/or capital appreciation, liquidation of savings and investment schemes, and early retirement from an existing career. And, thirdly, there may be a demographic effect, as children leave home at around the age of eighteen, which equates to a child-bearing age in the late twenties and early to mid-thirties.

These observations point to a major conclusion from this analysis, namely that there is a time when enter and continuing in self-employment is most likely to be successful in generating superior financial rewards and positive wider wellbeing benefits. Our results suggest that the timing of successful self-employment occurs when personal assets - both tangible in the form of resources to enable start-up and intangible in terms of knowledge and expertise - combine in an optimal way with motivation to start in

anticipation of a greater likelihood of future wealth creation and accumulation. Conversely, individuals entering self-employment without the appropriate combination of experience, resources and motivation that arises from an expectation of superior future income streams are unlikely to experience positive outcomes from self-employment.

Such a reading of the data has significant implications for government interventions to stimulate new self-employment, for several reasons. Firstly, encouragement of individuals who do not have the appropriate or optimal combination of resources and experience is unlikely to lead to successful self-employment and either the economic benefits of increased wealth creation or wider social welfare effects of improved health and wellbeing. In other words, encouragement of self-employment by individuals who are not ready for this option will either have little effect or will have a negative effect on individuals and increased levels of venture failure, as these individuals find self-employment challenging and choose not to continue in this working status.

A second policy implication that follows on from this is that self-employment is less likely to be a favourable and ultimately viable option for individuals who are unemployed. Our analysis found that the wider positive benefits accrue most to individuals with high levels of human capital who continue in self-employment or move from employment in anticipation of increased income. If unemployment is taken as a form of labour market recognition of lower levels of human capital, as may be the case for certain individuals particularly those experiencing longer-term unemployment, then the positive relationship between human capital and positive effects from self-employment are less likely to be forthcoming to this group. Government policies to

engage the unemployed in the workplace through self-employment therefore are less likely to have the economic impacts envisaged.

A wider implication arising from this conclusion is that although age is a proxy for experience, the combinations outlined above are not dictated by increased age. Instead, individuals are likely to have good prospects for entrepreneurial success through self-employment when the combination of experience, resources and motivation as a result of expected future income gains combine. This may happen at very different ages, depending upon the prior experiences and knowledge of the individual.

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Table 1 Random-effects regression of Panel Data
(Those entrepreneurs whose last year's employment status were self employed)

	Male (age 16 – 65)			Female (age 16 – 65)		
	Probit: Self Emp. Yes or No	Tobit: Self Emp. Hours worked	Tobit: Self Emp. Monthly profit	Probit: Self Emp. Yes or No	Tobit: Self Emp. Hours worked	Tobit: Self Emp. Monthly profit
Higher degree	-1.062** (0.49)	-12.53*** (1.99)	469.1** (196)	0.734** (0.33)	2.179 (1.36)	260.9*** (84.7)
First degree	-1.243*** (0.29)	-7.284*** (1.27)	1009*** (111)	1.003*** (0.15)	2.948*** (0.78)	361.2*** (44.4)
Other higher	0.137 (0.20)	0.371 (0.63)	333.8*** (70.3)	0.308*** (0.09)	0.926 (0.58)	128.3*** (29.2)
A level	-0.114 (0.23)	-2.025** (0.94)	247.0*** (83.6)	0.276** (0.12)	1.786*** (0.66)	119.2*** (33.5)
O level	0.427 (0.27)	-1.853** (0.77)	153.5* (79.9)	-0.035 (0.10)	0.718 (0.62)	52.05* (29.5)
Age	0.766*** (0.06)	3.289*** (0.14)	125.5*** (15.8)	0.218*** (0.02)	1.340*** (0.13)	50.35*** (6.50)
$Age^2/100$	-0.823*** (0.07)	-3.772*** (0.17)	-123.8*** (18.5)	-0.249*** (0.03)	-1.544*** (0.16)	-54.49*** (7.94)
Good health	0.309** (0.14)	0.932/** (0.39)	35.67 (52.4)	0.164** (0.07)	1.635*** (0.37)	70.39*** (22.2)
Married	0.674*** (0.19)	2.166*** (0.57)	12.96 (67.6)	0.207** (0.09)	0.572 (0.51)	-19.33 (26.7)
No. of children	-0.202** (0.09)	0.036 (0.23)	59.32** (27.6)	-0.175*** (0.04)	-1.751*** (0.24)	-46.54*** (12.3)
Constants	-12.73*** (1.04)	-29.04*** (2.91)	-2174*** (314)	-5.241*** (0.43)	-19.34*** (2.47)	-933.7*** (122)
Sigma_u	2.320	17.83	1027	1.221	13.77	411.3
Sigma_e	3.190	12.95	1878	1.842	10.77	746.2
Rho	0.911	0.655	0.230	0.772	0.621	0.233
Wald chi2(10)	221	745	246	208	208	208
Log likelihood	-1342	-38772	-83002	-3504	-28745	-57377
Observations	9185			6984		
No of individuals	2483			3293		
Obs per ind. Min	1			1		
Obs per ind. avg	3.7			2.1		
Obs per ind. max	17			17		

(Source of data: Wave 1 to 18, 1991 – 2009, the British Household Panel Survey.
*; **; and *** denote significance at the 10; 5; and 1% level, respectively.
Figures in parentheses are standard errors.)

Table 2 Random-effects regression of Panel Data
(Those entrepreneurs whose last year's employment status were employee)

	Male (age 16 – 65)			Female (age 16 – 65)		
	Probit: Self Emp. Yes or No	Tobit: Self Emp. Hours worked	Tobit: Self Emp. Monthly profit	Probit: Self Emp. Yes or No	Tobit: Self Emp. Hours worked	Tobit: Self Emp. Monthly profit
Higher degree	-0.089 (0.14)	0.036 (0.17)	1.169 (4.55)	0.029 (0.17)	0.044 (0.14)	0.318 (6.26)
First degree	0.007 (0.09)	-0.056 (0.11)	4.448 (2.84)	0.261** (0.11)	0.232*** (0.08)	7.943** (3.41)
Other higher	0.028 (0.05)	0.081 (0.07)	4.075** (1.93)	0.277*** (0.07)	0.129** (0.05)	4.798* (2.51)
A level	0.013 (0.07)	0.032 (0.09)	2.484 (2.23)	0.124 (0.09)	0.094 (0.07)	1.775 (2.91)
O level	0.081 (0.07)	-0.004 (0.09)	2.565 (2.17)	-0.055 (0.08)	0.093* (0.06)	0.475 (2.51)
Age	0.063*** (0.01)	0.098*** (0.02)	1.065** (0.50)	0.007 (0.02)	0.083*** (0.01)	0.727 (0.64)
$Age^2/100$	-0.065*** (0.02)	-0.109*** (0.02)	-1.133* (0.62)	0.004 (0.02)	-0.088*** (0.02)	-0.770 (0.79)
Good health	0.109*** (0.04)	0.232*** (0.07)	3.729** (1.89)	-0.039 (0.05)	0.010 (0.04)	1.318 (2.25)
Married	-0.046 (0.05)	0.164** (0.08)	-0.272 (2.08)	-0.091 (0.07)	0.033 (0.05)	0.259 (2.29)
No. of children	0.058*** (0.02)	-0.043 (0.04)	0.176 (0.95)	0.163*** (0.03)	0.042* (0.03)	0.569 (1.24)
Constants	-4.415*** (0.26)	2.467*** (0.39)	505.9*** (9.88)	-4.387*** (0.36)	-0.737*** (0.26)	-13.02 (11.9)
Sigma_u	0.803	10.52	1182	1.098	3.061	0.001
Sigma_e	1.494	6.545	186.4	1.731	3.643	224.3
Rho	0.691	0.721	0.976	0.749	0.414	0.001
Wald chi2(10)	59.66	62.01	20.64	48.96	92.86	11.98
Log likelihood	-6683	-178419	-359990	-3581	-140607	-325219
Observations	51284			49722		
No of individuals	9187			9300		
Obs per ind. Min	1			1		
Obs per ind. avg	5.6			5.3		
Obs per ind. max	17			17		

(Source of data: Wave 1 to 18, 1991 – 2009, the British Household Panel Survey.
*; **; and *** denote significance at the 10; 5; and 1% level, respectively.
Figures in parentheses are standard errors.)

Table 3 Random-effects regression of Panel Data
(Those entrepreneurs whose last year's employment status were unemployed)

	Male (age 16 – 65)			Female (age 16 – 65)		
	Probit: Self Emp. Yes or No	Tobit: Self Emp. Hours worked	Tobit: Self Emp. Monthly profit	Probit: Self Emp. Yes or No	Tobit: Self Emp. Hours worked	Tobit: Self Emp. Monthly profit
Higher degree	0.079 (0.37)	-0.893 (1.41)	-17.00 (44.6)	0.055 (0.75)	-0.426 (0.89)	-2.885 (11.4)
First degree	0.251 (0.16)	0.712 (0.67)	48.64** (20.2)	0.563* (0.34)	1.034*** (0.39)	7.402 (4.90)
Other higher	0.149 (0.11)	0.986** (0.43)	-0.118 (13.2)	0.351 (0.23)	0.680** (0.27)	2.325 (3.37)
A level	0.362*** (0.11)	0.382 (0.48)	-3.965 (14.2)	0.546** (0.26)	0.627** (0.28)	5.259 (3.41)
O level	0.324*** (0.10)	1.358*** (0.42)	29.82** (12.0)	0.231 (0.22)	0.002 (0.22)	3.083 (2.72)
Age	0.085*** (0.02)	0.429*** (0.08)	5.979** (2.41)	0.120** (0.06)	0.111** (0.05)	0.207 (0.63)
$Age^2/100$	-0.110*** (0.03)	-0.538*** (0.10)	-7.889** (3.07)	-0.157** (0.08)	-0.129* (0.07)	-0.104 (0.85)
Good health	0.227*** (0.08)	0.779*** (0.29)	21.40** (10.0)	0.436** (0.19)	0.449** (0.18)	3.875* (2.36)
Married	0.301*** (0.10)	1.237*** (0.41)	11.72 (12.4)	0.419** (0.20)	0.379* (0.22)	5.422** (2.74)
No. of children	-0.032 (0.04)	-0.061 (0.15)	-11.28** (4.71)	-0.019 (0.09)	-0.064 (0.09)	-1.287 (1.25)
Constants	-3.825*** (0.44)	-6.708*** (1.39)	-87.11** (42.6)	-5.869*** (1.31)	-2.102** (0.83)	-7.532 (10.4)
Sigma_u	0.465	5.060	9.056	0.719	1.679	0.001
Sigma_e	0.793	8.183	324.9	1.432	4.271	59.78
Rho	0.386	0.277	0.001	0.672	0.134	0.001
Wald chi2(10)	51.96	77.58	29.67	17.97	42.53	17.97
Log likelihood	-995	-16687	-32925	-373	-7988	-16390
Observations	4571			2720		
No of individuals	2303			1782		
Obs per ind. Min	1			1		
Obs per ind. avg	2.0			1.5		
Obs per ind. max	15			9		

(Source of data: Wave 1 to 18, 1991 – 2009, the British Household Panel Survey.
*; **; and *** denote significance at the 10; 5; and 1% level, respectively.
Figures in parentheses are standard errors.)

Table 4 Random-effects regression of Panel Data
Nascent Entrepreneur entry from other status
(Those entrepreneurs whose last year's employment status were other status)

	Male (age 16 – 65)			Female (age 16 – 65)		
	Probit: Self Emp. Yes or No	Tobit: Self Emp. Hours worked	Tobit: Self Emp. Monthly profit	Probit: Self Emp. Yes or No	Tobit: Self Emp. Hours worked	Tobit: Self Emp. Monthly profit
Higher degree	0.912*** (0.23)	0.523 (0.32)	40.23*** (9.39)	0.439** (0.19)	0.423** (0.19)	4.019** (1.60)
First degree	0.487*** (0.14)	0.343** (0.17)	7.381** (3.74)	0.469*** (0.09)	0.278*** (0.08)	2.920*** (0.71)
Other higher	0.397*** (0.11)	0.263** (0.12)	-1.381 (2.83)	0.338*** (0.06)	0.221*** (0.06)	1.885*** (0.52)
A level	0.039 (0.11)	-0.041 (0.11)	-1.477 (2.61)	0.328*** (0.07)	0.094* (0.05)	1.602*** (0.49)
O level	0.198* (0.11)	0.017 (0.12)	3.957 (0.44)	0.138** (0.06)	0.073 (0.05)	0.612 (0.41)
Age	0.145*** (0.02)	0.206*** (0.02)	3.953*** (0.44)	0.084*** (0.01)	0.077*** (0.01)	0.294*** (0.08)
Age^2 /100	-0.194*** (0.03)	-0.246*** (0.02)	-4.479*** (0.53)	-0.119*** (0.02)	-0.096*** (0.01)	-0.339*** (0.09)
Good health	0.199** (0.08)	0.218** (0.09)	1.353 (1.91)	0.109** (0.05)	0.059 (0.04)	0.662* (0.34)
Married	0.018 (0.13)	0.076 (0.12)	3.466 (2.75)	0.065 (0.06)	0.065 (0.05)	0.719* (0.39)
No. of children	0.063 (0.04)	0.028 (0.05)	0.337 (1.17)	-0.044* (0.02)	-0.003 (0.02)	0.051 (0.17)
Constants	-5.505*** (0.43)	-1.797*** (0.37)	-48.73*** (8.20)	-4.148*** (0.24)	-1.116*** (0.15)	-5.701*** (1.36)
Sigma_u	0.464	4.759	84.32	0.392	0.991	2.174
Sigma_e	1.261	3.965	82.69	0.822	2.902	29.82
Rho	0.614	0.592	0.509	0.403	0.104	0.005
Wald chi2(10)	116	150	151	172	167	81.1
Log likelihood	-1536	-46612	-96239	-2789	-85818	-178690
Observations	15387			33975		
No of individuals	5470			9262		
Obs per ind. Min	1			1		
Obs per ind. avg	2.8			3.7		
Obs per ind. max	17			17		

(Source of data: Wave 1 to 18, 1991 – 2009, the British Household Panel Survey.

*; **; and *** denote significance at the 10; 5; and 1% level, respectively.

Figures in parentheses are standard errors.)

Appendix Variable Means

	Male (age 16 – 65)				Female (age 16 – 65)			
	Self emp. last year	Employee last year	Unemployed last year	Others last year	Self emp. last year	Employee last year	Unemployed last year	Others last year
Self emp. yes or no	0.938	0.034	0.061	0.023	0.537	0.017	0.034	0.017
Hours worked	43.34	1.413	1.915	0.571	14.54	0.436	0.578	0.245
Monthly profit	1278	30.55	29.55	9.096	341.9	8.886	6.693	3.406
Higher degree	0.023	0.039	0.012	0.017	0.027	0.029	0.011	0.011
First degree	0.101	0.130	0.066	0.072	0.108	0.134	0.069	0.064
Other higher	0.264	0.298	0.170	0.149	0.231	0.229	0.144	0.118
A level	0.237	0.238	0.155	0.252	0.204	0.202	0.157	0.177
O level	0.263	0.261	0.231	0.248	0.301	0.313	0.294	0.279
Age	43.93	38.94	35.45	38.13	40.87	39.35	34.73	39.46
$Age^2/100$	20.67	16.57	14.39	18.14	18.12	16.85	13.75	18.24
Good health	0.760	0.745	0.625	0.537	0.695	0.725	0.587	0.573
Married	0.676	0.595	0.340	0.364	0.648	0.574	0.279	0.500
Children	0.773	0.699	0.775	0.453	0.951	0.615	0.738	0.905
Obs.	9,811	54,695	4,804	16,267	7,398	53,195	2,905	36,083

(Source of data: Wave 1 to 18, 1991 – 2009, the British Household Panel Survey)

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