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Being your own boss: the many faces of self-employment

Pamela Lenton

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ABSTRACT

The number of individuals registered as self-employed in the UK has grown considerably over the past decade. The economics literature generally agrees that the self-employed work longer hours than their counterparts who are in paid employment and earn less. However, most of the literature considers the self-employed as a homogeneous group of individuals, whereas in reality, the term now encompasses a variety of very different entrepreneurs, such as businesses or partnerships, sole traders, freelance workers and sub-contractors. Using UK panel data, this paper examines the differences in the characteristics of self-employed individuals by self-employment type to highlight the difference between these groups and their employed counterparts. Random effect probit estimations that model the determinants of being in different self-employment groups highlight the heterogeneous nature of self-employment and their different determinants. Wage estimations reveal different returns to separate classifications of self-employment.

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1. Introduction

The number of self-employed individuals in the UK has increased significantly over the past decade, and notably did not decline even during the period of the global economic crisis. In 2015 it was estimated that around 15% of workers in the UK were self-employed and that self-employment accounted for approximately a third of the growth in employment since 2010 (Bank of England 2015). Not only have we witnessed the growth in self-employment, we have also seen a 36% increase in freelance workers over the past decade (Kitching 2016). In this paper, the exceptional growth of self-employment and its broader consequences for the labour market are examined. The focus here is on the fact that 'the self-employment sector' is an aggregation of very different types of enterprise (e.g. incorporated businesses, partnerships, sole traders, freelance workers and sub-contractors) with very different dynamics and very different drivers[2]. The number of freelance workers has risen from 1.4 million in 2008 to over 1.91 million in 2015, a rise of 36 percent (Kitching 2016). The rise in freelance workers has been assisted by rise of the 'gig economy' whereby individuals are able to advertise their services or find clients over the internet, with 'Uber' being the most well-known of this type of platform in the UK.

We shall attempt to define the drivers of these different types of self-employment and the implications of this heterogeneity for the behaviour of the sector. We begin by examining employment trends, as depicted above, and then explore the determinants of the real incomes of the self-employed, in particular exploring the often-advanced proposition that the self-employed experience a wage penalty because they value the freedom of being one's own boss over job security[3]. Most recently, for example, it has been reported that the median wage of the self-employed is lower today than the median twenty years ago (Resolution Foundation 2016) but this paper attempts to highlight the fact that the composition of the body of individuals presenting as self-employed is very different today compared to twenty years ago.

The decision, then to become self-employed may be due to a multiplicity of reasons that include both push and pull factors. The pull factors include, for instance, the desire to be enterprising and thereby earn a higher real wage, or the desire to be one's own boss and enjoy the autonomy and work-life balance that derive from this. The push factors would include redundancy, insecurity (and the fear of redundancy), or, if in paid employment, because the nature of the job the employee has always done has changed and now they

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[2] For example, the self-employed sole trader or business owner will run their business and serve their own clients whereas a sub-contractor usually has one client who in turn has their own clients; in essence, the sub-contractor acts as 'a middle-man' and services his client's clients.

[3] For example, Parker (2004) and Crosan and Minniti (2012) have argued that for the newly self-employed the psychological benefits from increased autonomy are more important than higher wages in regular employment. But contrary to this general belief, Hundley (2001) using data for the U.S. found that the self-employed are more satisfied with their work than paid employees because they are more likely to utilise their skills and that they also perceive themselves as having have greater job security (Hundley 2001).

are face with either unemployment or the chance of carrying on in the same job, but as a self-employed subcontractor. In this paper, the focus is on the pull factors as possible drivers for entering the type of self-employment in which an individual is found, and the subsequent wage return to their self-employment. Using panel data for the UK over a period of 6 years, the characteristics of both individuals and their job are used as controls in probit models of entry into self-employment and of entry into specific classifications of self-employment. Additionally, the increase in self-employment in the UK and our data set allows the estimation of wage returns for those self-employed who report a wage, for each classification of self-employment.

The contribution of this paper, then, is to attempt to address the heterogeneity within the self-employed sector by investigating the probability that an individual selects himself into self-employment, specifically using UK panel data that allows a comparison between different classifications of self-employment. We examine whether or not there are differences in the factors that influence being in a particular type of self-employment. Wage equations are then estimated which make a comparison between each classification of self-employment with the wage return for employees. In the following section, a review of the existing self-employment literature is presented. The data and methodology is presented in section 3, followed by the results in section 4 and finally the conclusion in section 5 where there is discussion of the implications of the findings.

2. Literature

There is a wealth of literature, which examines motivations for becoming self-employed and on the extent of the wage penalty for being self-employed. However, as discussed in the introduction, the majority of this literature considers the self-employed as a homogenous group. From an econometric point of view, this was necessary because of the small proportions found in self-employment in many datasets in the past, before the emergence and growth of the 'new self-employed classifications'. For example, in the study by Taylor (1996), there were a total of 466 self-employed observations in his 1991 dataset. Some studies do disaggregate by gender, and it has been found in much of the literature that men are more likely to be self-employed than women (Parker and Obe 2003). However, there a large literature has [recently] emerged that considers whether women enter self-employment because they then may be able to juggle earning income with family commitments (Carter 2006; Dawson et al 2009; Wellington 2014). Carter (2006 p8) finds that more women than men use their home as a base for their business, although females find it more difficult than males to raise venture capital. Females are also more likely to run a business from home if their spouse is employed. This finding is also supported by Dawson et al (2009) who, using UK Quarterly Labour Force data from 1999 to 2001 find that women are concerned more with lifestyle factors and less with

financial gain. However, Wellington (2004) examined the number of women entering self-employment in the United States across the 1970s to the 1990s but found no evidence that they enter self-employment in response to family demands. However, Burke et al. (2009) using the National Childhood Development Survey, which is a panel data set, find that in the south of the UK there are more self-employed than in other regions but that they create fewer jobs, which is indicative of those individuals being sole traders rather than large business entrepreneurs. It has also been questioned whether more educated individuals are required for entrepreneurial activities (Lazear 2005; Burke 2009; Hartog et al. 2010). The evidence appears to be that general ability and skills are more important than a specialised qualification for successful entrepreneurs. In the UK Burke et al (2009) find that in the south those who have post-compulsory education are less likely to enter self-employment because they have more job opportunities. Lazear (2005) in his study of Stanford graduates finds that all round ability and more work experience is essential for successful entrepreneurship, and this also predicts an increased likelihood of these graduates entering self-employment compared to graduates who studied just one subject and who focused only on one role at work. Hartog et al. (2010) using the National Longitudinal Survey of Youth for the U.S. agrees with the conclusions of Lazear (2005). In their study they examine the role of formal qualifications and general abilities, such as, social skills. Their random effects and difference-in-difference estimations reveal a robust finding that conclude that mathematical, social and technical abilities are valuable for entrepreneurs. One paper that does examine the difference in the returns to education between employees, entrepreneurs and what they term as 'necessity entrepreneurs' is that of Fossen and Buttner (2013), who use the German Socio-Economic Panel Survey and find that the return to education for necessity entrepreneurs is around 3% less than for employees.

Taylor (1996), using the British Household Panel Survey, examined aspects of the job and found that the self-employed stated enjoyment of the job to be much more important to them than either pecuniary benefits or job security. This result has also been found by Burke et al (2000). Dawson et al (2014) using UK Quarterly Labour Force Data 1999 to 2001, find that individuals who entered self-employment in Ireland did so to be independent and for better working conditions. Much of the more recent literature focuses on the influence of personality on the decision to enter self-employment, where openness to experiences and extraversion are found to play a major role in this choice (Caliendo et al 2014). In addition to the big five personality types, the propensity of individuals to take risks on their likelihood of entering self-employment or their level of risk aversion in their decision not to enter self-employment has been examined (Ekelund et al, 2005; Fairlie and Holleran, 2012; Brown et al., 2011; Skriabikova et al. 2014). Fairlie and Holleran (2012) using project GATE, a program administered by US Department of Labor in seven states, examine the role of autonomy by creating an index of autonomy from related questions, such as "I enjoy working independently" and "I have innovative ideas". The

estimates from their probit models of the likelihood of entering self-employment some 6, 18 and 30 months after training show that individuals who have a preference for autonomy benefit from entrepreneurship training and are more likely to start-up their own business. Two of the attractions of self-employment are thought to be the flexibility associated with hours worked and the independence entailed (Rees and Shah 1986). Blanchflower and Oswald (1998) using National Childhood Development Survey found that the self-employed report higher levels of job satisfaction than the employed. More recently, Urwin (2011 p33), acknowledges that the proportion of firms without employees has grown since 2000 and states that the category of self-employed without employees is likely to contain 'labour only subcontractors, possibly working for just one customer'. Vorley and Rodgers (2014) have more recently examined the motivations for the start-up of small businesses by interviewing 'home- based businesses' in Sheffield. Their case studies show that the motivations for the start-up of these businesses are complex, comprising both personal and work- related factors.

The literature on the pecuniary benefits to self-employment generally agrees that on average the self-employed, have a wage penalty compared to employees and they also typically report working longer hours (Parker and Obe 2003). However, in an earlier study Rees and Shah (1986) using the General Household Survey 1978 for the UK, find little difference between the earnings of the employed and self-employed, and state that the self-employed have on average less human capital. This finding is contradicted, however, by Hamilton (2000) who uses U.S. data to examine the returns to self-employment for males; aware of the problem of accuracy in self-employment accounts reporting he uses alternative measures of earnings, for example, drawings from the business in one set of estimations and drawings from the business plus the change in business equity in another. His findings are that median earnings are around 35% less for entrepreneurs compared to paid employees, and this implies that there are large non-pecuniary benefits. Burke et al (2000) on the other hand find that those individuals of higher ability have a 30% higher return to their ability when active as an entrepreneur. However, they find this wage premium to self-employment only apparent at the upper echelon of the general ability distribution. Carter (2011) questions whether the self-employed really maximise their income because if they did many would be seen to go back to employment status. She states that income is only one part of the return as typically, wealth and assets are not taken into account when estimating the returns to self-employment.

Thus, the existing literature, where it differentiates at all between categories of the self-employed, differentiates principally by gender and by level of education, and apart from the aforementioned paper by Fossen and Buttner (2013) does not examine the differences between different types of self-employed business, which is the main focus of this paper. The growth in self-employment in the UK in recent years has highlighted the change in the very nature of self-employment with different characteristics across self-

employment type and the heterogeneous characteristics of the individuals found in each category. This paper builds on the previous literature by considering factors that have been found to influence the self-employment decision in the past but now, in addition, addressing the heterogeneity across self-employment type. The wage returns to each self-employment type are then examined to ascertain whether there are wage premiums to each type of self-employment compared to being in paid employment.

3. Data and Methodology

This paper uses data from the *Understanding Society* dataset, waves 1 through 5, which encompasses years 2009-2014. The data is a representative random sample of households in the UK, collected by the Institute for Social and Economic Research, at the University of Essex. Data collection began in 2009 with each wave of the survey covering a period of two years and each new wave overlapping the second year of the first. Only individuals of working age are used in this paper, which after deleting individuals with missing observations, provides a sample of 45297 observations for our analysis of the nature of self-employment. Further observations are lost in our wage analysis due to missing wage data; this provides a sample of 37855 observations. Understanding society contains information on household composition, demographic detail and educational and work details. Highly relevant to the purpose of this paper, the data contains information on the occupation of individuals and whether or not they are self-employed. Specifically, the question put to individuals who define themselves as self-employed is:

Which of these best describes your employment situation?

Running a business or professional practice

Partner in a business or professional practice

Working for myself

A sub-contractor

Doing freelance work

Self-employed in some other way

This list is by no means an official classification because there is no official definition of self-employment and no straightforward legal definition of what it means to be employed or self-employed, but it does acknowledge that there are diverse types of self-employment and enables an examination of the determinants of entry into these groups. Over the

years the law courts have looked at the question of self-employment status many times, and they have identified some situations in which you are definitely employed and others when you are definitely self-employed. (Low incomes Tax Reform Group 2016). For the purpose of this paper, to highlight the heterogeneous composition of the self-employed body of workers, several categories of those in self-employment are examined. Firstly, self-employment as a whole group is examined as has been previously examined in the literature, then separate categories are created by combining 'business owner' with 'partner in a business' to reflect self-employed business, the 'working for myself' response is classed as sole trader and 'freelance' with sub-contractor' in order to provide meaningful numbers of observations for analysis.

The earnings of the self-employed have typically been problematic for analysts because they are often not reported, for example the UK Labour Force Survey does not ask about the income of the self-employed. For many businesses UK income tax data, which is not publicly available, would contain firm profits, which cannot be directly compared to the wages of the employed. Additionally, doubt is often cast about the reliability of the reported earnings or profits of the self-employed. It is acknowledged here that this measure is imperfect as it cannot take into account any non-pecuniary benefits. As highlighted in the introduction many self-employed are now sub-contracted workers who are working in the same or similar position for their client, who was once their employer and so their reported wage may be fairly accurate. The second major advantage is that there are two methods of reporting financial remuneration for the self-employed. One is by reporting the profits of the business and the other is the reporting of the average either weekly or monthly. Responses, where provided, lead to information on either the self-employment wage or profit. We are able to use the reported wage provided by the self-employed and compare this with their employed counterparts. The method of wage reporting of the self-employed in the data is presented in Table 1. It is noted that there is still a large proportion of the self-employed who do not report their financial remuneration in either section of the survey.

Table 1: The proportions of wage respondents by self-employment type

	Accounts Reported	Wage reported	No wage information	Total %	N
Business or partnership	45.98	5.09	48.93	100	6031
Sole trader	41.48	14.57	43.94	100	6793
Freelance or subcontracted	41.81	18.27	39.92	100	2430
Other self-employed	12.33	7.72	79.95	100	2823
Total self-employed	38.47	10.84	50.69	100	18077

From Table 1 we can see that only five percent of respondents who are in a business or partnership report a wage whereas around fifteen percent of sole traders and eighteen percent of freelance workers or subcontractors report their average wage. The workers in the 'Other' category of self-employed are least likely to prepare any accounts or provide wage information, with just under eight percent reporting their wage. We therefore focus our attention on sole traders and freelance or subcontracted workers as we have sufficient observations of wages to compare these individuals with employed individuals. Hence, this paper is a comparison with employed individuals only. The survey contains the usual demographic information such as, age, gender, marital status, educational qualifications, from which we construct dummy variables. Occupation and industry codes along with region of the UK are also included. To control for the ability to raise capital, which is often argued to aid self-employment start-up, we include the value of the respondent's house[4]. Within wave 2 all respondents, both employees and self-employed are asked about their amount of autonomy within their job. Measures are taken from these direct questions which ask the respondent their level of autonomy, i.e. whether they feel they have a lot, some or no control over:

Job tasks;

The pace of work;

Work manner- how you do your work;

Order of tasks;

Work hours.

We initially start with a balanced panel of workers who have not changed jobs within our time frame and the response applied to this question is then applied to all individuals in each wave. Similarly, we include standardised values of the 'big five' personality characteristics for each individual, which have been shown to influence attitudes to risk taking which influences the decision to become self-employed (Fairlie and Holleran 2012; Caliendo et al. 2014). The big five personality variables of agreeableness, extroversion, openness, conscientiousness and neuroticism, are available in wave 3 and due to their known stability over time in adults, these can be applied to the same individuals across waves. In addition to the autonomy variables, the survey asks the respondents about their place of work, for example whether they work from home, at their own business premises, at the clients premises or whether the work requires travelling. Carter (2006) has, as noted earlier, found that women are more likely than men to work from home, therefore the inclusion of this variable may shed more light on this finding i.e. whether this is true for all

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[4] Individuals who do not own their house are assigned a value of zero. It is acknowledged that this is not a precise measure but the best available within the data.

classifications of self-employment. The descriptive statistics are shown in Table 2 below. We can see that 13% of our sample classify themselves as self-employed, with around 6% stating they are a sole trader and 2% freelance or sub-contracted. Around one-third of our sample holds a degree qualification and a further 14% another form of higher education qualification, which is typically vocation- related. The average house value in the data over the time period 2009 to 2014 is around £197,000 which is in line with official figures that show the average UK house price in 2009 to be around £167,000 climbing to around £204,000 in 2015 (Office for National Statistics 2016). Our workplace-specific variables reveal that just above 6% of workers do so from home and around 9% of workers do so at the clients premises and the same proportion travel. Our autonomy variables reveal the greatest autonomy is reported to be over how work is done and the least autonomy over work hours.

Table 2: Descriptive Statistics

Variable	mean	Std dev	N
Employee	0.869	0.337	45297
All Self-employed	0.131	0.337	45297
Self-employed Business or Partnership	0.052	0.223	45297
Self-employed Sole trader	0.055	0.227	45297
Self-employed Freelance/sub-contract	0.019	0.130	45297
Ln deflated hourly pay	2.500	0.618	37885
Hours	33.992	11.457	45297
Male	0.467	0.499	45297
Married	0.598	0.490	45297
White	0.869	0.337	45297
Age	43.619	10.426	45297
Age square	2011.327	903.498	45297
Degree	0.326	0.469	45297
Other higher	0.144	0.351	45297
A'Levels	0.201	0.401	45297
GCSE	0.200	0.400	45297
Low vocational	0.075	0.263	45297
No qualification	0.047	0.212	45297
Big-5 Personality			
Agreeableness	5.622	1.000	45297
Openness	4.627	1.227	45297
Extroversion	4.618	1.288	45297
Conscientiousness	5.630	1.000	45297
Neuroticism	3.534	1.361	45297
House value	196795.2	565305.1	45297
Occupation			
Manager/ professional	0.154	0.361	45297
Assistant Professional	0.155	0.362	45297
Technical	0.173	0.379	45297
Administrative	0.118	0.323	45297
Craft and related	0.087	0.282	45297
Personal/ protective services	0.103	0.304	45297
Wholesale and retail sales	0.057	0.232	45297
Machine operatives	0.064	0.245	45297

Other unskilled manual	0.088	0.283	45297
Industrial classification			
Primary Industry	0.011	0.103	45297
Manufacturing	0.097	0.296	45297
Utilities	0.012	0.107	45297
Construction	0.059	0.236	45297
Wholesale and Retail sales	0.118	0.322	45297
Transportation	0.051	0.220	45297
Accommodation and Food	0.032	0.175	45297
Information and Communications	0.041	0.198	45297
Financial and Insurance	0.047	0.212	45297
Scientific and Technical	0.061	0.239	45297
Administration and support services	0.041	0.199	45297
Public Administration and Social Security	0.080	0.271	45297
Education	0.135	0.342	45297
Health	0.182	0.386	45297
Arts and Entertainment	0.019	0.136	45297
Other Services	0.015	0.123	45297
Region			
North East	0.042	0.201	45297
North West	0.107	0.309	45297
Yorkshire and Humber	0.083	0.276	45297
East Midlands	0.084	0.277	45297
West Midlands	0.085	0.279	45297
East	0.100	0.300	45297
London	0.121	0.326	45297
South East	0.135	0.342	45297
South West	0.093	0.290	45297
Wales	0.042	0.199	45297
Scotland	0.068	0.252	45297
Northern Ireland	0.040	0.195	45297
Workplace specific variables			
Work from home	0.064	0.244	45297
Work at company premises	0.746	0.436	45297
Work at client premises	0.087	0.282	45297
Work travelling/other	0.094	0.292	45297
Autonomy over job tasks	0.428	0.495	45297
Autonomy over work pace	0.471	0.499	45297
Autonomy over how do work	0.577	0.494	45297
Autonomy over task order	0.566	0.496	45297
Autonomy over work hours	0.294	0.455	45297

Table 3 shows the mean statistics for our self-employed individuals, comparing each of the separate categories of self-employed on whom we focus (sole trader, business or partnership, and freelance/subcontractor). The main differences we see across the classifications are that freelance or sub-contracted self-employed workers are on average more highly educated with a much higher proportion of this group holding a degree. Just above a third of sole traders' work from home along with freelance and subcontract at just under thirty percent, which is clearly much larger than the business or partnership group who work from their company premises. The autonomy reported by self-employed

workers that relates to different aspects of their job is seen to be influenced by the classification of self-employment, with sole traders consistently reporting the highest levels across all aspects.

Table 3: Mean statistics across self-employed groups

Variable	All self-employed	Business or partnership	Sole trader	Freelance/ subcontractor
Male	0.655	0.437	0.695	0.712
Married	0.671	0.530	0.666	0.559
Age	0.466	0.421	0.465	0.447
Degree	0.328	0.283	0.241	0.395
Other higher	0.133	0.126	0.127	0.119
'A'Levels	0.197	0.206	0.226	0.225
GCSE	0.182	0.213	0.202	0.154
Low vocational	0.093	0.082	0.104	0.079
No qualification	0.067	0.078	0.090	0.038
Work from home	0.341	0.065	0.355	0.283
Agreeableness	5.587	5.619	5.632	5.438
Openness	4.903	5.007	4.859	4.861
Extroversion	4.761	4.799	4.743	4.635
Conscientiousness	5.664	5.768	5.621	5.496
Neuroticism	3.270	3.385	3.189	3.321
Work at company premises	0.262	0.738	0.135	0.110
Work at client premises	0.251	0.090	0.321	0.414
Work travelling/other	0.146	0.096	0.189	0.193
Autonomy over job tasks	0.761	0.427	0.796	0.519
Autonomy over work pace	0.764	0.472	0.793	0.581
Autonomy over how do work	0.834	0.578	0.857	0.708
Autonomy over task order	0.793	0.567	0.819	0.670
Autonomy over work hours	0.653	0.296	0.682	0.471

The survey asks for the hours worked per week in the job for both the employed and self-employed. The reported wage is checked and a weekly wage is calculated which is then divided by the reported hours to provide an hourly pay variable. This is then deflated by reporting year, with 2009 as the base year, using the UK Retail Prices Index. For our wage estimations this dependent variable is logged. Table 4 summarises the wages across the groups. We can see that there is a large difference between the mean wage of paid employees and all self-employed and between the two self-employment categories, which supports the argument that self-employment should not be treated as homogenous.

Table 4: Hourly wage across different employment classifications

	mean	Std dev	N
Employee	15.79	40.99	36176
All Self-employed	12.41	15.68	982
Self-employed sole trader	11.87	16.88	505
Self-employed Freelance/sub-contract	14.26	16.59	222

Note: Business and Partnership are not included because they report accounts.

Figures 1a through 1d show the logged distribution of wages for employees, all self-employed, those who classify themselves as sole traders and those who classify themselves as freelance or sub-contractors, respectively. We can see that all categories exhibit a normal distribution but that the sole traders, figure 1c have a distribution with a long left tail, which is reflected in figure 1b of all self-employed.
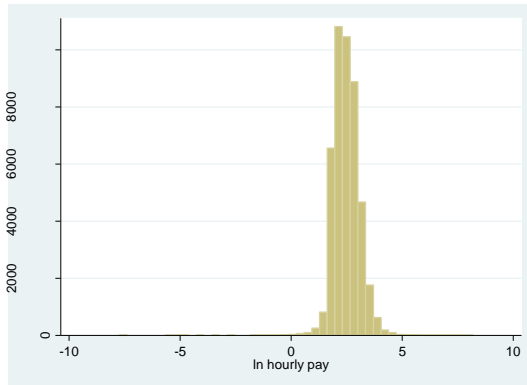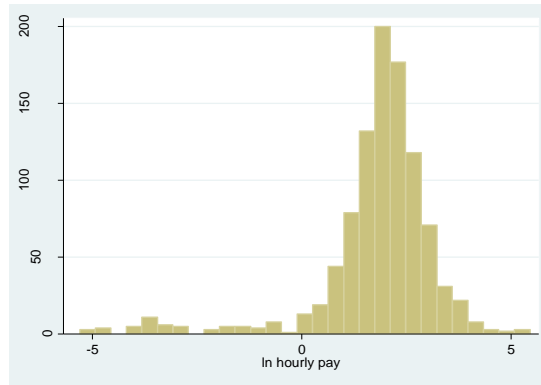
Figure 1a: Employees

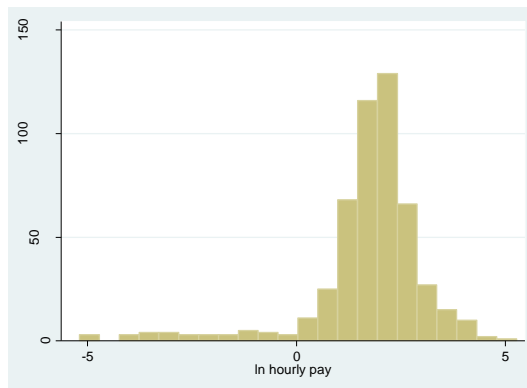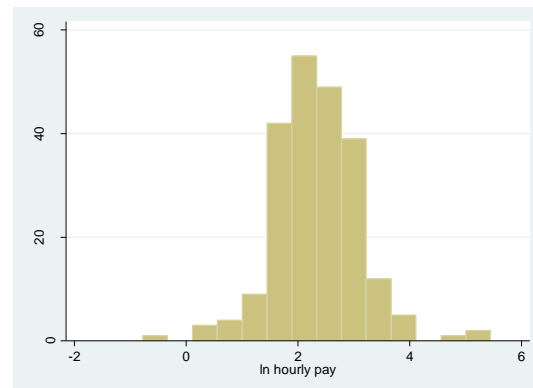Figure 1b: All Self-employed

Figure 1c:SE Sole trader

Figure 1d: SE, freelance/sub-contractor

Given the differences between the self-employment groups discussed in the introduction and the differences highlighted in the descriptive statistics, the hypotheses to be tested here are that:

1. There are differences in the factors that determine the probability of entering self-employment compared to paid employment across different self-employment classifications.

2. Sole traders and freelance workers are encouraged to start-up in self-employment because of the autonomy that comes from being their own boss.

3. There are significant differences in wages/earnings between employed and self-employed, and also between the different categories of self-employed.

Hypotheses 1 and 2 are addressed by estimating the factors that may influence whether an individual chooses employment or one of our self-employment categories (sole trader or freelance/subcontractor). Following Taylor (1996) and Burke et al (2000) separate probit equations are estimated of the probability of being found in each state compared to being in paid employment. Our data is a panel so we take account of this by estimating random-effects probits. The explanatory variables are mainly time-invariant which necessitates the estimation of random effects:

$$y^* = \alpha_i + \beta' x_{it} + \mu_{it} \qquad (1)$$

where y^* is the probability of finding the individual in self-employment. In the vector **x**, the explanatory variables include the usual personal and demographic characteristics, for example, gender, marital status and children, the presence of young children has been shown to increase the probability of self-employment, especially for women (Carter 2006). Work-related characteristics include occupation, industrial classification, the place of work and work task autonomy variables. We may expect that some self-employed prefer the convenience of working from home to suit their lifestyles, especially where young children are present in the household. Regional dummy variables are included to capture differences across regions, and a variable to capture tenure in the current job. Finally, dummy variables that indicate whether each individual assesses themselves as having a lot of autonomy in different aspects of their job are included. The error term, μ_i is assumed normal.

Hypothesis 3 is addressed, firstly by estimation of separate Mincerian wage equations for each of two self-employed classifications and all self-employed taken together:[5]

$$lny = \alpha_i + \beta' x_{it} + \mu_{it} \tag{2}$$

Where lny is logged hourly pay, deflated to the base year 2009.

The explanatory variables include personal and demographic characteristics, work-related characteristics including occupation, industrial classification, the place of work, where we may find that individuals face a wage penalty if they are trading-off family commitments with work. Regional dummy variables are included to capture average wage differences across regions, and a continuous variable captures tenure in the job. The error term, μ_i, is assumed normal.

It must be acknowledged that individuals may select themselves into their respective employment state. Therefore, separate instrumental variable wage equations are estimated for each category of self-employment. The instruments in this model are the responses to the five work-related autonomy questions[6].

4. Results

The results from our random effect probit models are shown in Table 5. The marginal effects are all interpreted as compared to being in paid employment.[7] Column 1 contains all self-employed, column 2 'business or partnerships' column 3 'sole traders' and column 4 'freelance or subcontractors'. We find that when looking at all self-employed, in contrast to (Parker and Obe 2003), men are no more likely to be self-employed than women. However, when sole traders only are considered men are more likely than women to be in this category. Being married is found to increase the probability of being self-employed compared to singletons which supports the idea of married individuals treating self-employment as a 'fall-back' if the business fails (Carter 2006); however, if the freelance and sub-contractor classification only is examined this effect is negative. This finding is interesting and suggests that entry into freelance or sub-contract work may be less risky than running a business or being a trader. The education dummy variables are

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[5] There are too few observations of the wage in the Business and Partnership category, therefore these individuals are excluded from this analysis.

[6] Estimates were also obtained that included a dummy variable, which took the value of 1 if the respondent had children. These results were similar but the instruments were tested and were found to be weaker than the instruments used in the reported estimations.

[7] Marginal effects are from separate probit estimations and therefore direct comparisons of magnitude cannot be made across separate models.

insignificant in the probit model containing all self-employed but they are highly significant in the separate classification models and of differing signs. It appears that educational qualifications reduce the probability of being a sole trader but having a high level of education, (A'level and above) increases the likelihood of being in the freelance or sub-contract category. The results clearly support our hypothesis 1, that the factors that determine being in a specific self-employment category are very variable. Hence, as these self-employment categories increase with the changing composition of the UK labour market, any analysis of self-employment needs to take these classifications into account. The workplace-specific variables show that all groups are significantly most likely to work from home, and all groups are significantly more likely to work at a place other than their own work premises. In order to test whether females are more likely to work from home than males, interactions of working from home with male were estimated[8], which again revealed differences across self-employment categories. Males were found to be significantly less likely to work from home using the all self-employed data or the business and partnership classification, but this was insignificant for sole traders, and for those in the freelance or sub-contractor category, whilst insignificant the sign become positive. The 'hours worked' variable reveals that the self-employed taken together work more hours than employees, which is the usual finding in the literature, however, contrary to the existing economic literature the significantly negative marginal effect on hours worked for the freelance and sub-contractor group reveals that they actually work fewer hours than employees. Finally, the results reveal some support for hypothesis 2, with sole traders and freelance and subcontractors being more likely to have autonomy over how their work is carried out compared to employees, which is not true for estimates of all self-employed. All of our self-employed classifications have autonomy over job tasks and working hours compared to employees, but only business and partnerships have autonomy over how the work is carried out.

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[8] Estimates that include interactions are not reported here but are available from the author upon request.

Table 5: Random Effect Probits of the determinants of self-employment

	All Self-Employed N=45297		Business or Partnership N=41598		Sole trader N=41673		Freelance/Sub-contract N=40238	
	Coefficient	Std err	Coefficient	Std err	Coefficient	Std err	Coefficient	Std err
Male	0.078	(0.107)	-0.454*	(0.243)	0.116	(0.249)	-0.263	(0.329)
Age	0.071**	(0.032)	0.221***	(0.071)	0.098	(0.068)	0.185**	(0.092)
Age Square	-0.000	(0.000)	-0.002**	(0.001)	-0.000	(0.001)	-0.002	(0.001)
Married	0.082	(0.090)	0.046	(0.202)	-0.015	(0.195)	-0.498**	(0.252)
Children	0.158**	(0.077)	0.231	(0.160)	0.307*	(0.174)	-0.237	(0.235)
Non-white	0.576***	(0.139)	0.945***	(0.321)	1.475***	(0.292)	1.026**	(0.456)
House value	0.000	(0.000)	0.000	(0.000)	-0.000	(0.000)	0.000	(0.000)
Degree	-0.035	(0.222)	-0.448	(0.517)	-0.944**	(0.447)	1.726**	(0.780)
Other Higher Education	-0.173	(0.230)	-0.812	(0.536)	-0.836*	(0.467)	1.436*	(0.796)
A level	-0.266	(0.219)	-0.977*	(0.520)	-0.579	(0.421)	1.328*	(0.762)
GCSE	-0.315	(0.216)	-0.982**	(0.512)	-0.995**	(0.419)	0.216	(0.777)
Low Vocational	-0.242	(0.245)	-0.780	(0.558)	-1.018**	(0.496)	0.829	(0.837)
Agreeableness	-0.074	(0.048)	-0.189*	(0.106)	-0.042	(0.101)	-0.231*	(0.139)
Openness	0.215***	(0.051)	0.447***	(0.118)	0.407***	(0.109)	0.539***	(0.146)
Extroversion	0.122***	(0.047)	0.132	(0.104)	0.135	(0.104)	0.119	(0.134)
Conscientiousness	-0.134***	(0.052)	-0.158	(0.121)	-0.341***	(0.110)	-0.449***	(0.148)
Neuroticism	-0.000	(0.049)	0.173	(0.107)	-0.160	(0.107)	-0.165	(0.144)
Managerial/Professional	-1.173***	(0.152)	-1.406***	(0.317)	-3.531***	(0.354)	-4.625***	(0.537)
Assistant Professional	-0.202	(0.152)	0.167	(0.343)	-1.982***	(0.354)	-1.666***	(0.438)
Administrative	-1.557***	(0.219)	-3.385***	(0.500)	-4.483***	(0.520)	-3.214***	(0.623)
Craft and related	1.194***	(0.182)	2.099***	(0.380)	3.073***	(0.367)	1.015**	(0.457)
Personal/ protective services	-0.221	(0.200)	-1.009**	(0.518)	0.255	(0.427)	-3.645***	(0.816)
Wholesale and retail sales	-0.568**	(0.269)	-2.242***	(0.795)	-1.082	(0.749)	-1.997*	(1.123)
Machine operatives	0.236	(0.214)	-0.432	(0.535)	1.566***	(0.441)	-0.112	(0.567)

Other unskilled manual	-0.738***	(0.215)	-2.189***	(0.605)	-0.815	(0.519)	-1.152*	(0.666)
Work at home	3.587***	(0.110)	5.972***	(0.263)	8.755***	(0.311)	6.977***	(0.351)
Work at client premises	2.227***	(0.083)	2.746***	(0.194)	5.220***	(0.217)	5.591***	(0.289)
Work travelling/other	1.619***	(0.089)	1.895***	(0.207)	3.805***	(0.217)	5.086***	(0.319)
Hours worked	0.013***	(0.003)	0.059***	(0.006)	0.004	(0.005)	-0.014*	(0.008)
Autonomy over job tasks	1.187***	(0.162)	2.309***	(0.384)	2.454***	(0.337)	0.499*	(0.402)
Autonomy over work pace	0.236	(0.163)	1.257***	(0.404)	0.394	(0.360)	-0.189	(0.403)
Autonomy over how do work	0.319	(0.219)	1.219*	(0.656)	1.205**	(0.480)	1.111**	(0.559)
Autonomy over task order	-0.463**	(0.192)	-0.652	(0.539)	-0.764*	(0.412)	-0.391	(0.491)
Autonomy over work hours	1.872***	(0.127)	3.969***	(0.284)	3.679***	(0.263)	1.639***	(0.338)
Constant	-9.425***	(0.780)	-23.362***	(1.852)	-18.566***	(1.635)	-21.405***	(2.261)
Log likelihood	-6093.248		-2597.2306		-2448.0193		-1593.5104	

Variables included in the models but not reported here for brevity include assets, industrial classification and region. Base groups are no education, technical occupation, health industry, work at company premises.

The estimates of our instrumental variable models are shown in Table 6. The results from the Hausman tests for all wage equations reveal that the instrumented wage equations are preferred to OLS (OLS estimates are provided in Table A1 in the appendix). The results support hypothesis 3, that there are differences in wage returns across self-employment classifications. The predicted value for all self-employed compared to being in paid employment, shown in column 1, reveals that there is no significant difference between the wage return of all self-employed and paid employees.

Table 6: Instrumental Variables Random Effects wage equations

Dependent Variable: In deflated hourly wage	Estimate (Robust std error)	Estimate (Robust std error)	Estimate (Robust std error)
Predicted self-employed	0.359		
	(0.311)		
Predicted Sole trader		0.971**	
		(0.421)	
Predicted Freelance/sub-c			0.763
			(0.816)
Male	0.196***	0.186***	0.236***
	(0.012)	(0.012)	(0.043)
Age	0.042***	0.042***	0.042***
	(0.003)	(0.003)	(0.016)
Age Square	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)
Married	0.023***	0.019**	-0.023
	(0.008)	(0.008)	(0.033)
Non-white	-0.125***	-0.125***	-0.122
	(0.015)	(0.015)	(0.095)
Degree	0.391***	0.407***	0.381***
	(0.23)	(0.024)	(0.111)
Other Higher Education	0.239***	0.244***	0.260***
	(0.023)	(0.023)	(0.064)
A level	0.192***	0.204***	0.205***
	(0.022)	(0.022)	(0.075)
GCSE	0.125***	0.132***	0.152***
	(0.021)	(0.021)	(0.050)
Low Vocational	0.070***	0.083***	0.113**
	(0.022)	(0.023)	(0.053)
Work at home	-0.315***	-0.303***	-0.344
	(0.072)	(0.072)	(0.307)
Work at client premises	-0.010	-0.017	-0.053
	(0.019)	(0.016)	(0.077)
Work travelling/other	0.005	0.006	-0.072
	(0.014)	(0.012)	(0.087)
Constant	1.842***	1.819***	1.947***
	(0.069)	(0.069)	(0.478)
	N= 37909	N=37602	N= 37432
	R-sq 0.3368	R-sq 0.3289	R-sq 0.2136

Variables estimated but not reported here for brevity include assets, occupational classification, industrial classification and region. Base groups are no education, technical occupation, health industry, work at company premises.

Sole traders, (shown in column 2), enjoy a statistically significant higher wage return compared to paid employees, which suggests that sole traders may enter self-employment because they realise that they can gain a higher wage return to their abilities than if they are in paid employment. The results reveal no significant difference in the wage return between freelance or sub-contacted self-employed and paid employees. This result could be indicative of freelance workers valuing the possible opportunity to be able to organise their lifestyle, perhaps working from home and so making the trade-off between lifestyle and wages. This result could also be indicative of sub-contracted workers undertaking work for a company who may have been their previous employer. In all estimations males always earn more than females, which is a consistent finding in the literature. In the work-place related variables for sole traders and all self-employed there is a large wage penalty to working from home. This may be indicative of a trade-off between work and family commitments as highlighted in the literature (Carter 2006; Dawson et al. 2009; Wellington 2014), leading to a wage penalty.

5. Conclusion

Evidence of large growth over the past decade, in the number of workers classed as self-employed in the UK has prompted an examination of the causes that underlie this phenomenon that appears to have occurred only in the UK. This paper has revisited the topic of the determinants of self-employment, but for the first time has differentiated between the separate classifications of self-employment, namely, those running a business or in a partnership, sole traders and free-lance or subcontractors. Whilst it is acknowledged that there is no universal classification of different self-employment types, there is an obvious difference in the nature of these businesses. Previous studies of the determinants of self-employment assume that these individuals are of a heterogeneous nature. However, using UK panel data from 2009 to 2014 this paper has found significant differences in the determinants of being self-employed across different classifications and demonstrates that as the composition of the self-employed has changed over time any analysis must take this into account else meaning is lost.

 We derive three hypotheses concerning the probability of entering the different self-employment classifications and their respective wage returns. The findings here reveal support for our *hypothesis 1*, that there are differences between what are considered to be the traditional self-employed, such as business and partnerships, and sole traders but the most significant growth in recent times has been in the growth of freelance and sub-contracted workers. The growth of freelance and sub-contracted workers has been witnessed by the growth in the 'gig economy', whereby the self-employed can more easily reach their target market through the internet and the growth in platforms such as 'Uber' has caused an increase in self-employment. This increase in self-employment does not

necessarily lead to large economic growth because a large proportion of these new self-employed workers have no employees. However, working freelance or sub-contracted is more favourable than unemployment for any individual and hence, favourable to society in that it should be encouraged in order to lower the welfare budget. It is also possible that unlike businesses and partnerships, freelance or sub-contracted individuals do not have the added responsibility of paying wage bills and/or rental for premises. Freelancers unlike sole traders, who often have to lay out their own money on materials for their services, may provide a service that does not require a large initial financial commitment and therefore the risks associated with self-employment, whilst not eliminated, are not as great for the freelancer. If this is the case and the risk associated with entry into freelance or sub-contract work is lower than other types of self-employment, it would make sense to encourage individuals who may otherwise be unemployed to consider this option. We suggest that the risks associated with the different classifications of self-employment is an area for further research.

There is support for *hypothesis 2*, as it is found that autonomy of different forms influences the decision to enter self-employment across our classifications with the choice over one's working hours being universally significant across all classifications. Additionally, the results found here reveal that self-employed females are not more likely than males to work from home in the freelance, sub-contracted category of self-employment. This is in contrast to a previous study that shows that females are more likely than males to work from home (Carter 2006), which suggests that further work should disaggregate by self-employment classification. The freelance classification of self-employment is also seen to contain highly educated individuals with forty percent of individuals in this category within our dataset educated to degree standard or higher. This begs the question whether these individuals are unable to find suitable employment to match their qualification level or whether they are choosing freelance or sub-contract work because they are able to obtain greater wage returns. Older workers are likely to have learned their trade in paid employment and built up essential networks so are able to gain wage returns by becoming self-employed.

Hypothesis 3 finally, has some support because the wage returns across self-employment classifications compared to paid employment are found to differ. Sole traders are found to earn a wage premium over workers in paid employment although there is no significant difference in wage returns between business, partnerships and freelance self-employed compared to paid employees[9]. The finding of a wage penalty for individuals who work from home, apparent for all self-employment categories, at a time when many firms and individuals are looking to increase productivity by reducing the amount of time spent

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[9] A caveat to this is that these individuals are self-employed individuals who report a wage.

commuting to and from the office is surprising, although this could be explained by a trade-off between income and lifestyle and is an area for further research.

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Appendix

Table A1: OLS Wage estimates.

Dependent Variable: ln deflated hourly wage	Estimate (Std error)	Estimate (Std error)	Estimate (Std error)
All Self-employed	-0.525***		
	(0.023)		
Sole trader		-0.625***	
		(0.030)	
Freelance/sub-contractor			-0.214***
			(0.039)
Male	0.203***	0.192***	0.189***
	(0.011)	(0.010)	(0.010)
Age	0.044***	0.042***	0.043***
	(0.003)	(0.003)	(0.003)
Age Square	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)
Married	0.017***	0.015*	0.016*
	(0.009)	(0.008)	(0.008)
Non-white	-0.113***	-0.109***	-0.106***
	(0.015)	(0.014)	(0.013)
Degree	0.385***	0.387***	0.396***
	(0.236)	(0.023)	(0.021)
Other Higher Education	0.231***	0.230***	0.238***
	(0.024)	(0.023)	(0.022)
A level	0.186***	0.186***	0.188***
	(0.023)	(0.022)	(0.021)
GCSE	0.115***	0.122***	0.116***
	(0.023)	(0.022)	(0.020)
Low Vocational	0.059***	0.057**	0.056**
	(0.026)	(0.025)	(0.023)
Work at home	-0.139***	-0.089***	-0.053***
	(0.018)	(0.018)	(0.018)
Work at client premises	0.034***	0.028***	0.023**
	(0.010)	(0.010)	(0.009)
Work travelling/other	0.029***	0.027***	0.027***
	(0.010)	(0.010)	(0.010)
Constant	1.841***	1.844***	1.811***
	(0.066)	(0.064)	(0.060)
	N=37855	N=37548	N=37378
	R-Sq= 0.3680	R-Sq= 0.3769	R-Sq= 0.3867

Variables estimated but not reported here for brevity include assets, occupational classification, industrial classification and region.
Base groups are no education, technical occupation, health industry, work at company premises.