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Working paper

# Going solo: how starting solo self-employment affects incomes and well-being

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## Abstract

Using a large-scale panel data set, we trace the evolution of incomes and well-being around the entry into ‘solo self-employment’ – that is, running a business without employees. We find that solo self-employment is used to self-insure against employment shocks: employment rates fall and poverty rates rise in the run-up to entry, and many who fell out of employment report being dismissed or made redundant from their previous job. However, their average earnings do not fully recover within three years of entry. For those who move into solo self-employment directly from employee jobs, for whom this transition is more likely to have been voluntary, earnings remain lower and poverty rates higher for at least two years after entry. Despite the effect on incomes, becoming solo self-employed is associated with improvements in well-being across a number of measures. We see a large and sustained rise in job satisfaction, even among groups who are likely to be using solo self-employment to self-insure. Comparing entries into solo self-employment with entries into or moves between employee jobs, we find that well-being trajectories are remarkably similar despite significantly lower earnings in solo self-employment. This suggests that there may be intangible benefits that compensate for lower earnings, that (on average) apply even to those who are ‘pushed’ into solo self-employment.

JEL codes: J31, J32, J65, J81, I31

Keywords: Self-employment, atypical work, job satisfaction, well-being

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## Introduction

Self-employment has been rising steadily in the UK over the past two decades, driven by a rise in ‘solo self-employment’ – sole traders who operate without employees.<sup>1</sup> One in nine workers today is solo self-employed, and solo self-employment accounts for more than a quarter of the total increase in employment since the Great Recession. Previous research has shown that the solo self-employed appear more precarious than employees and the self-employed with employees: they have lower wages on average, are more likely to be underemployed and are more likely to have transitioned out of unemployment (Boeri et al., 2020).

These trends have raised concerns about the quality of self-employed jobs and what this means for the UK labour market. Media reports often portray the rise in solo self-employment as resulting from a lack of good-quality alternatives in standard employment and a deterioration in workers’ bargaining power, rather than an indication of entrepreneurial drive or preferences for self-employment.<sup>2</sup> High-profile litigation by Uber and Deliveroo drivers has focused attention on ‘bogus’ self-employment, particularly in the gig economy, where companies are seen to use self-employment to bypass labour protection laws and shift risk onto workers.

The recent academic literature has examined solo self-employment and other atypical work arrangements in this negative light, focusing on workers’ willingness to pay for more traditional employment conditions (Boeri et al., 2020; Datta, 2019) and the effect of atypical work on wage moderation (Boeri et al., 2020; Bell and Blanchflower, 2019; Katz and Krueger, 2017). On the other hand, there is an established literature that documents higher levels of job satisfaction among the self-employed, which suggests that there may be psychological benefits of self-employment that compensate for lower wages and higher risk (Benz and Frey, 2008a and 2008b; Clark and Senik, 2006; Hundley, 2001; Blanchflower et al., 2001; Blanchflower and Oswald, 1998).

This paper uses panel data from a large and nationally representative annual survey, the UK Household Longitudinal Study (UKHLS), to track how people’s incomes and well-being evolve around the entry into solo self-employment. We focus on individuals in their prime working years, aged 25–59. We use an event study framework to address some of the issues with cross-sectional comparisons – for example, if people who are inherently happier are more likely to be self-employed (leading to a positive correlation between happiness and self-employment) or if people enter self-employment in response to negative income shocks (leading to a negative correlation between self-employment and incomes). By tracking people for years before and after their entry into self-employment, we can also shed light on potential motivations for entering self-employment (by studying pre-trends) and examine whether income and well-being effects fade over time.

We find that solo self-employment is used to insure against employment shocks. Rates of unemployment and inactivity rise sharply in the three survey waves prior to entering solo self-employment, from 30% three years before to 37% in the year before entry, and poverty rates rise from 14% to 18%. 11% of those who were employed in the wave before entry also had a spell of unemployment or inactivity between waves (compared with just 1% of those who move into self-employment with employees). A substantial

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<sup>1</sup> Our definition excludes those who run their own limited liability companies without employees. Owner-managers are legally considered employees for tax purposes and in many UK surveys (including the Family Resources Survey and the UK Household Longitudinal Study).

<sup>2</sup> See, for example, *The Guardian*, ‘Bogus self-employment exploits workers and scams the taxman’, 13 March 2017 (<https://www.theguardian.com/commentisfree/2017/mar/13/bogus-self-employment-exploits-workers-scams-tax-philip-hammond-national-insurance-uneven-taxation>) or *The Telegraph*, ‘Self-employment hits 20-year high as people try to avoid unemployment, ONS says’, 20 June 2012 (<https://www.telegraph.co.uk/news/uknews/9344366/Self-employment-hits-20-year-high-as-people-try-to-avoid-unemployment-ONS-says.html>).

share of those who became unemployed or inactive in the run-up to entering solo self-employment report being dismissed or made redundant from their previous job. Solo self-employment appears to be a route back into work: 90% of those who become solo self-employed are still in work three years after entry, with around a third of those who remain in work transitioning into standard employment.

Whilst solo self-employment provides some insurance against negative employment shocks, it does not allow individuals to recover their previous levels of income on average. For those who fell out of employment in the two survey waves leading up to their entry into solo self-employment (that is, between  $t-3$  and  $t-1$  where  $t$  is the year of entry), earnings improve after entry but do not fully recover to their previous levels. Average net earnings for this group remain around £470 or 30% a month lower three years after entry than three years before. For those who were employed in the wave prior to entry, we see a fall in average earnings of over £120 or 8% a month and a rise in relative poverty of around 8 percentage points that persist for at least three years. But this fall is much steeper among those who had a spell of unemployment or inactivity between waves, who are more likely to be falling back on solo self-employment in response to employment shocks. Monthly earnings for this group fall by around £500 (30%) in the year of entry and poverty rates rise by 14 percentage points, compared with just £110 (8%) and 7 percentage points for those who were continuously employed between waves.

Non-income measures of living standards – in particular, material deprivation and food expenditure – change little around the entry into solo self-employment, despite falls in incomes. This may reflect individuals smoothing their consumption – for example, through using savings; alternatively, it is possible that some of the fall in earnings observed in the survey data reflects under-reporting of self-employment incomes. Using differences in food consumption to estimate the degree of under-reporting (following Engström and Hagen (2017), Hurst et al. (2014) and Pissarides and Weber (1989)), we estimate that self-employment incomes could be under-reported by up to 10–13% in the UKHLS (though this is likely to be an overestimate for reasons given in Appendix B). Our estimates of the effects on incomes should therefore be taken as a lower bound; however, even if taken at face value, the consumption method does not suggest that the 30% fall in earnings observed among those who enter solo self-employment after falling out of work in previous years is entirely due to under-reporting.

Despite lower earnings, we find that starting solo self-employment improves well-being on average, leading to a rise in life satisfaction and satisfaction with income and a fall in distress. The improvement is more pronounced for those who were unemployed or inactive in the year before entry, but even for those who were employed, we see a significant fall in distress and rising satisfaction with their incomes, despite the fact that their actual incomes appear to fall. They also experience a large increase in job satisfaction, of 1 point (on a seven-point scale) in the year of entry relative to a mean job satisfaction score of 4.7 the year before. These effects are not primarily driven by changes in industry, hours worked or commuting times as people move into solo self-employment. And whilst we see some evidence of adaptation over time, average well-being levels (with the exception of life satisfaction) are still significantly higher three years after entry than in the year before.

Well-being – job satisfaction in particular – appears to improve even among groups who may have been pushed into self-employment: those who had a spell of unemployment or inactivity in the year before starting solo self-employment, and those who did not expect to start their own business in the previous year. Further, when we compare entries into solo self-employment with entries into or moves between employee jobs, we find that well-being trajectories are remarkably similar despite significantly lower earnings in solo self-employment. All this suggests that there may be intangible benefits of solo self-employment that compensate for lower earnings, that (on average) apply even to those who are ‘pushed’ into self-employment.

Our paper adds to a growing body of work on self-employment and atypical work more generally. We confirm and update trends that have been documented elsewhere on the nature of solo self-employment and how it compares with other forms of work (Boeri et al., 2020; Datta et al., 2019; Katz and Krueger, 2019b, 2019a, 2017). Looking at pre-trends and responses in previous waves of the survey, we find that solo self-employment is used to insure against income shocks. This complements other studies on the role of the alternative work as self-insurance (Koustaş, 2019) and on solo self-employment as an ‘intermediate state’ between unemployment and employment (Boeri et al., 2020).

However, we also consider solo self-employment from a well-being perspective, building on previous studies on job satisfaction among the self-employed that have not featured prominently in the recent debate (Benz and Frey, 2004, 2008a, 2008b; Clark and Senik, 2006; Hundley, 2001; Blanchflower et al., 2001; Blanchflower and Oswald, 1998). We find that whilst entering solo self-employment leads to lower earnings than employee jobs – as much of the recent literature suggests – individuals also experience an improvement in well-being. This provides an alternative perspective to the value of solo self-employment, in terms of psychological benefits that compensate for lower earnings, that complements recent work using studies of willingness to pay to elicit the value of alternative work arrangements (Boeri et al., 2020; Datta, 2019; Mas and Pallais, 2017).

The paper is organised as follows. Section 1 sets out the UK context, documenting cross-sectional trends in the levels and nature of solo self-employment over the past few decades. Section 2 describes our data set and presents summary statistics from the sample. Section 3 presents our main results on income and well-being trajectories around the entry into solo self-employment. Section 4 concludes.

## **1. UK context**

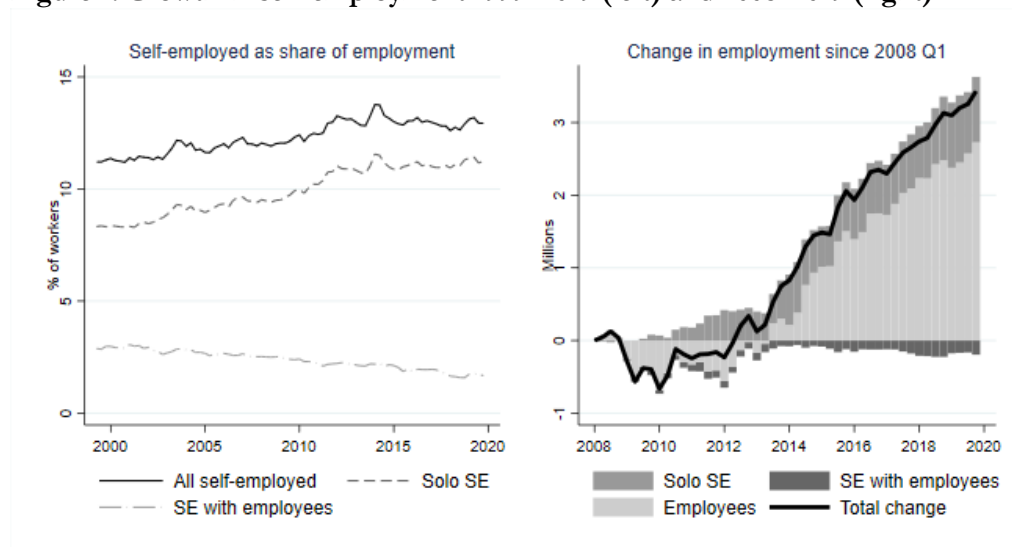
The development of self-employment in the UK since the 1980s falls into three periods (Meager, 2019). The share of workers in self-employment rose in the 1980s, due to (among other things) a structural shift from manufacturing to service industries and growth in subcontracting, particularly in the construction sector. It then stagnated and fell in the 1990s.<sup>3</sup> Since the turn of the century, the share of workers in self-employment has been rising steadily again. This is shown in the first panel of Figure 1, which uses data from the Labour Force Survey, the source of official employment statistics. In the last quarter of 2019, over 4.2 million people or 13% of workers in the UK were self-employed, up from 11% in 1999.

The recent rise in self-employment has been entirely driven by an increase in the ‘solo self-employed’, who operate on their own without employees. 87% of self-employed workers at the end of 2019 were in solo self-employment, up from 74% two decades ago. Rising solo self-employment accounts for over a quarter (26%) of the total increase in employment since the financial crash of 2008, as seen in the second panel of Figure 1. The rise in owner-managers without employees (who are classed as employees for tax purposes and in many surveys) accounts for a further 11% of the increase.

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<sup>3</sup> We do not include this period in our figures, as prior to 1999Q2 it is not possible to distinguish between the self-employed and owner-managers in the Labour Force Survey.

**Figure 1. Growth in self-employment 1999–2019 (left) and 2008–2019 (right)**



Note: Aged 16+. Excludes government training schemes and unpaid home workers. Sole directors of limited liability companies are classed as employees.

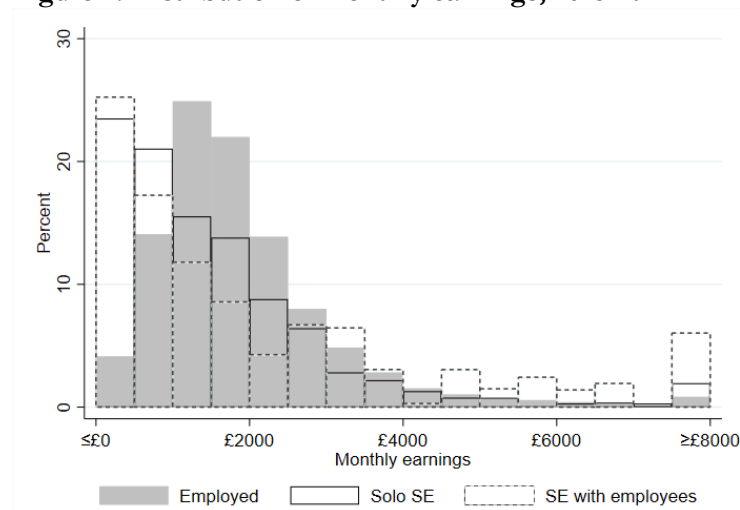
Source: Quarterly Labour Force Survey 1999Q2–2019Q4.

Part of the recent increase in self-employment has been due to older cohorts near retirement age entering self-employment (Office for National Statistics, 2018). Ramnath et al. (2017) show that self-employment at older ages is associated with different earnings dynamics, as people use self-employment to wind down their earnings and transition into retirement. We have also seen a large increase among younger people becoming self-employed (Office for National Statistics, 2018); they may use part-time self-employment, including gig work, to supplement other sources of income. Throughout the rest of this paper, we focus on individuals in their prime working years, aged 25–59, who account for 77% of all self-employed individuals and 76% of the solo self-employed in the latest data (2019Q4).

The solo self-employed have lower earnings than employees. Figure 2 shows the distribution of total post-tax monthly earnings of employees, the solo self-employed and the self-employed with employees in 2018–19, where workers are classified based on their main employment status.<sup>4</sup> This is based on data from the Family Resources Survey, the source of ONS statistics on self-employment earnings (Office for National Statistics, 2018). Where earnings are not recorded on a monthly basis (for example, if annual accounts are used), they are converted into a monthly equivalent. Figure 2 shows 43% of solo self-employed individuals have earnings below £1,000 a month, compared with just 18% of employees. Earnings among the self-employed with employees are more dispersed, with more weight both at the bottom of the distribution and at the top. 40% have earnings below £1,000 a month, but 17% have earnings exceeding £5,000 a month, compared with just 3% of employees.

<sup>4</sup> This includes earnings from second and third jobs. 4% of employees, 6% of the solo self-employed and 5% of the self-employed with employees have more than one job.

**Figure 2. Distribution of monthly earnings, 2018–19**



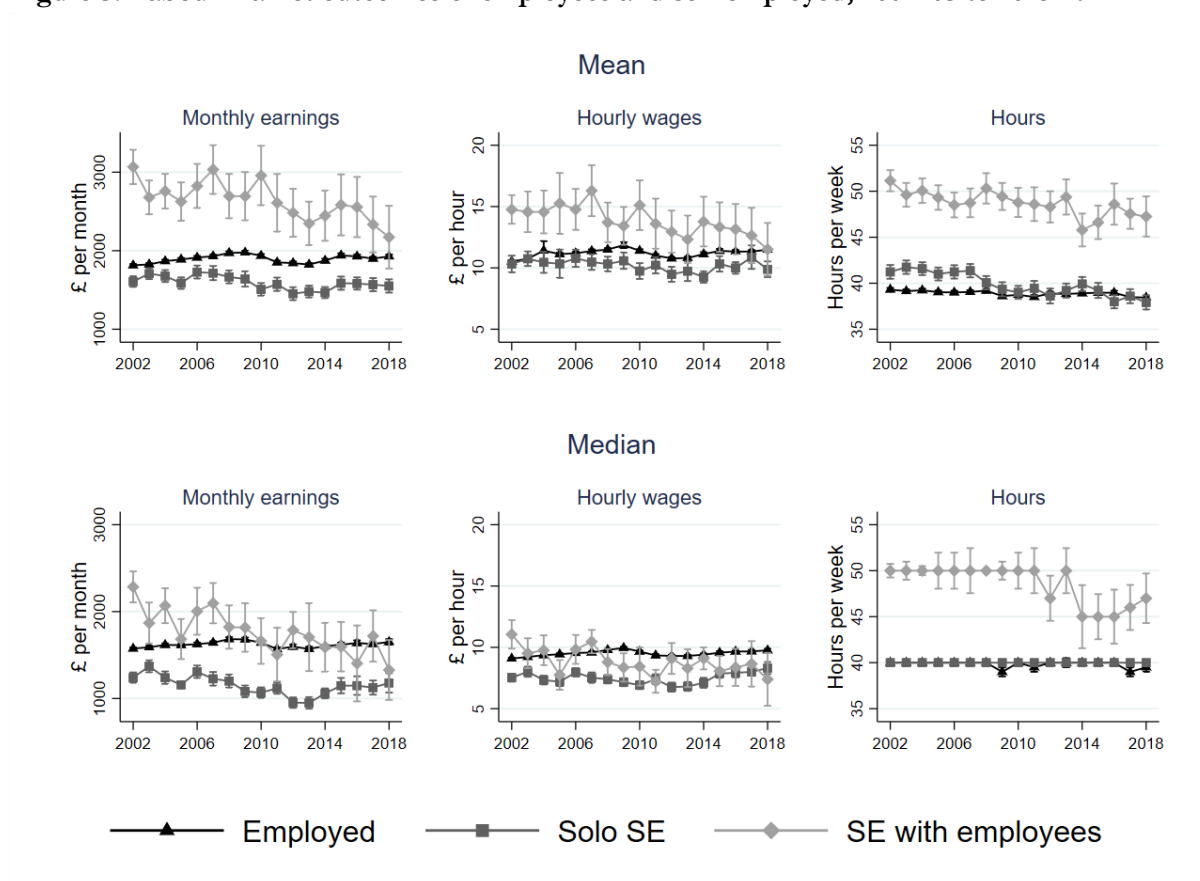
Note: Aged 25–59. Shows net earnings in £500 bins. Censored at £0 and £8,000. Earnings not reported on a monthly basis are converted into a monthly equivalent.

Source: Family Resources Survey 2018–19.

The gap in earnings between employees and the solo self-employed has widened since 2002. Figure 3 shows that whilst mean and median employee earnings (in January 2019 prices) have risen modestly since 2002, average earnings among the solo self-employed have fallen over this period.<sup>5</sup> This reflects a fall in both the hourly wages of the solo self-employed and their hours worked. Earnings among the self-employed with employees have also fallen, though the estimates are much less precise due to the smaller sample size. We see that the self-employed with employees have much higher mean earnings than do employees, but similar levels of median earnings, which reflects the variation in their earnings discussed above.

<sup>5</sup> Cribb et al. (2019) show that the fall in sole trader profits since the Great Recession is driven by those who remain in self-employment, rather than by new entrants or those who exit. Consistent with this, Family Resources Survey (FRS) data show little change in average earnings among those who recently started their businesses (within the last year), and a decline among those who started their businesses over a year ago.

**Figure 3. Labour market outcomes of employees and self-employed, 2002–03 to 2018–19**



Note: Aged 25–59. Earnings refer to total net (post-tax) earnings. Workers classed based on main employment status. Earnings not reported on a monthly basis are converted into a monthly equivalent. Hours include paid and unpaid overtime. Hourly wages are calculated as total net earnings divided by total hours worked. Error bars denote 95% confidence intervals. Cash values shown in January 2019 prices.

Source: Family Resources Survey 2002–03 to 2018–19.

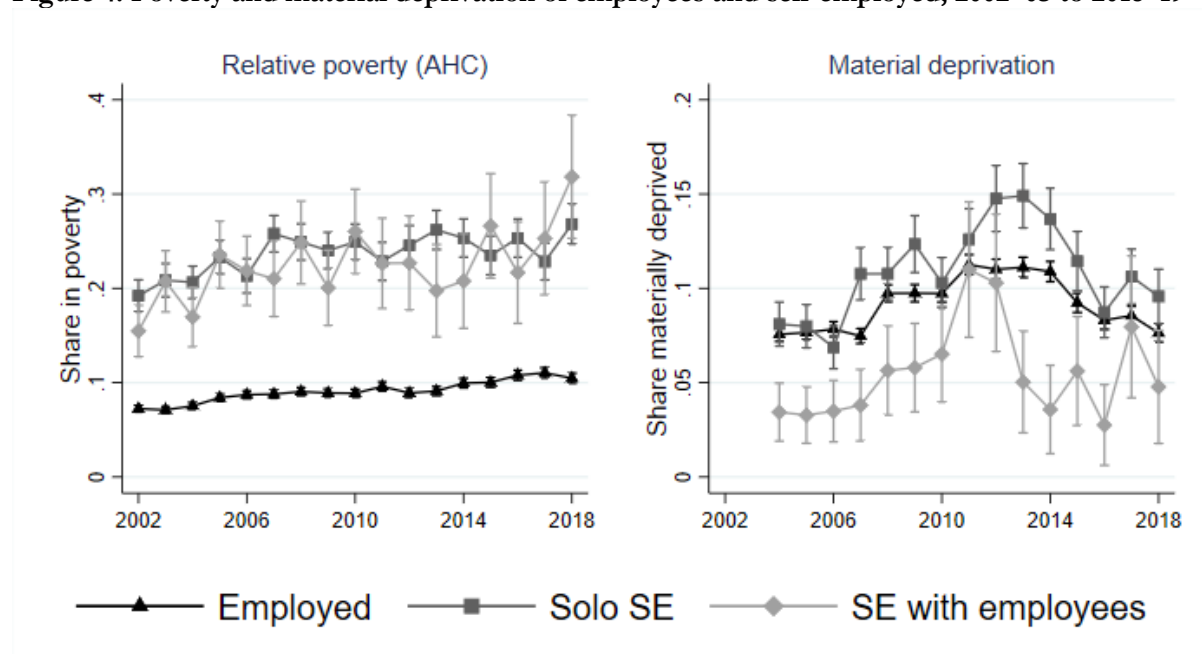
The first panel of Figure 4 shows that the self-employed – both with and without employees – are much more likely to be in poverty. We use a standard measure of relative income poverty: a household is considered to be in poverty if its income falls below 60% of the median in the given year, where income is calculated after taxes and benefits, after deducting housing costs (AHC) and adjusted for household size and composition using the modified OECD equivalence scale.<sup>6</sup> Based on this measure, 27% of prime-aged solo self-employed individuals were in poverty in 2018–19 (95% confidence interval 25%–29%), compared with 10% of employees (95% confidence interval 10%–11%). Poverty rates among the newly solo self-employed, who started their businesses after the end of the previous tax year, are even higher at 31% (95% confidence interval 20%–42%). The estimates for the self-employed with employees are less precise, but they are significantly higher than for employees and not significantly different from the estimates for the solo self-employed.

The solo self-employed were also more likely to be materially deprived than employees between 2007 and the early 2010s, though in recent years the difference is no longer statistically significant, as shown in the second panel of Figure 4. This uses the measure of material deprivation for working-age families derived in Bourquin et al. (2019) based on survey questions available from 2004–05 onwards. Families are classed as materially deprived if they feel they cannot afford a certain number of ‘basic’ items or activities (such as

<sup>6</sup> Results are similar using incomes measured before housing costs (BHC), and using absolute measures of poverty that compare incomes with 60% of the median in a fixed year.

keeping their house warm or going on holiday once a year), with greater weight assigned to items that most families already have. The fact that the gap in material deprivation is smaller than the relative poverty gap may reflect higher levels of property and financial wealth among the self-employed (Office for National Statistics, 2018) or potential under-reporting of self-employment incomes (discussed in Section 3 and Appendix B).

**Figure 4. Poverty and material deprivation of employees and self-employed, 2002–03 to 2018–19**



Note: Aged 25–59. Households are in relative poverty if their incomes fall below 60% of the median in the given year. Household incomes are calculated after taxes and benefits and after deducting housing costs, and adjusted for family size and composition using the modified OECD equivalence scale. Material deprivation measure based on Bourquin et al. (2019). Error bars denote 95% confidence intervals.

Source: Family Resources Survey 2002–03 to 2018–19.

The rise in solo self-employment and the growing disparity in earnings have raised concerns about the quality of self-employed jobs and what this means for the UK labour market. Media reports often portray the rise in solo self-employment as resulting from a lack of quality jobs and a deterioration in workers’ bargaining power, rather than an indication of entrepreneurial drive or preferences for self-employment.<sup>7</sup> Much of the recent literature has examined solo self-employment and other atypical work arrangements in this negative light, portraying self-employment (and atypical work more generally) as less desirable than traditional employment (Boeri et al., 2020; Datta, 2019; Mas and Pallais, 2017).

At the same time, a number of studies have documented higher job satisfaction among the self-employed in the US and Europe (Benz and Frey, 2008a; Clark and Senik, 2006; Hundley, 2001; Blanchflower et al., 2001; Blanchflower and Oswald, 1998). Recent studies have also found higher levels of life satisfaction and lower distress among Uber drivers, a small but salient subset of the solo self-employed (Apouey and Stabile, 2020; Berger et al., 2018).

<sup>7</sup> See, for example, *The Guardian*, ‘Bogus self-employment exploits workers and scams the taxman’, 13 March 2017 (<https://www.theguardian.com/commentisfree/2017/mar/13/bogus-self-employment-exploits-workers-scams-tax-philip-hammond-national-insurance-uneven-taxation>) or *The Telegraph*, ‘Self-employment hits 20-year high as people try to avoid unemployment, ONS says’, 20 June 2012 (<https://www.telegraph.co.uk/news/uknews/9344366/Self-employment-hits-20-year-high-as-people-try-to-avoid-unemployment-ONS-says.html>).

We find that this extends to the solo self-employed and to other measures of well-being. The top four panels of Figure 5 show recent trends in self-reported life satisfaction, the extent to which people think the things they do in life are worthwhile, and self-reported happiness and anxiety. These are based on the Annual Population Survey (APS), the source of UK official well-being statistics. The APS has collected data on these four well-being measures since 2011. The bottom two panels of Figure 5 show job satisfaction and a composite measure of distress drawn from the 12-item General Health Questionnaire (GHQ). They are based on data from the UK Household Longitudinal Study (UKHLS). We discuss the data and measures in detail in the following section and we list the precise wording of the questions asked in Table A.1 in Appendix A.<sup>8</sup>

We can draw a few points from Figure 5. First, the solo self-employed also fare better than employees in terms of thinking life is worthwhile, job satisfaction, distress and happiness. They are no more anxious than employees – whilst Apouey and Stabile (2020) and Berger et al. (2018) find higher levels of anxiety among Uber drivers, this does not apply to the solo self-employed as a whole.<sup>9</sup> The exception to the rule is life satisfaction: the solo self-employed used to report lower levels of life satisfaction, but in recent years have caught up with employees and the difference is no longer significant. Further, whilst self-reported well-being along the measures recorded in the APS and UKHLS have been improving for all employment groups, they appear to have improved more among the solo self-employed than among employees.<sup>10</sup> Figure 5 also shows that the self-employed with employees have significantly higher levels of well-being on average than do employees or the solo self-employed, and are also no more anxious.

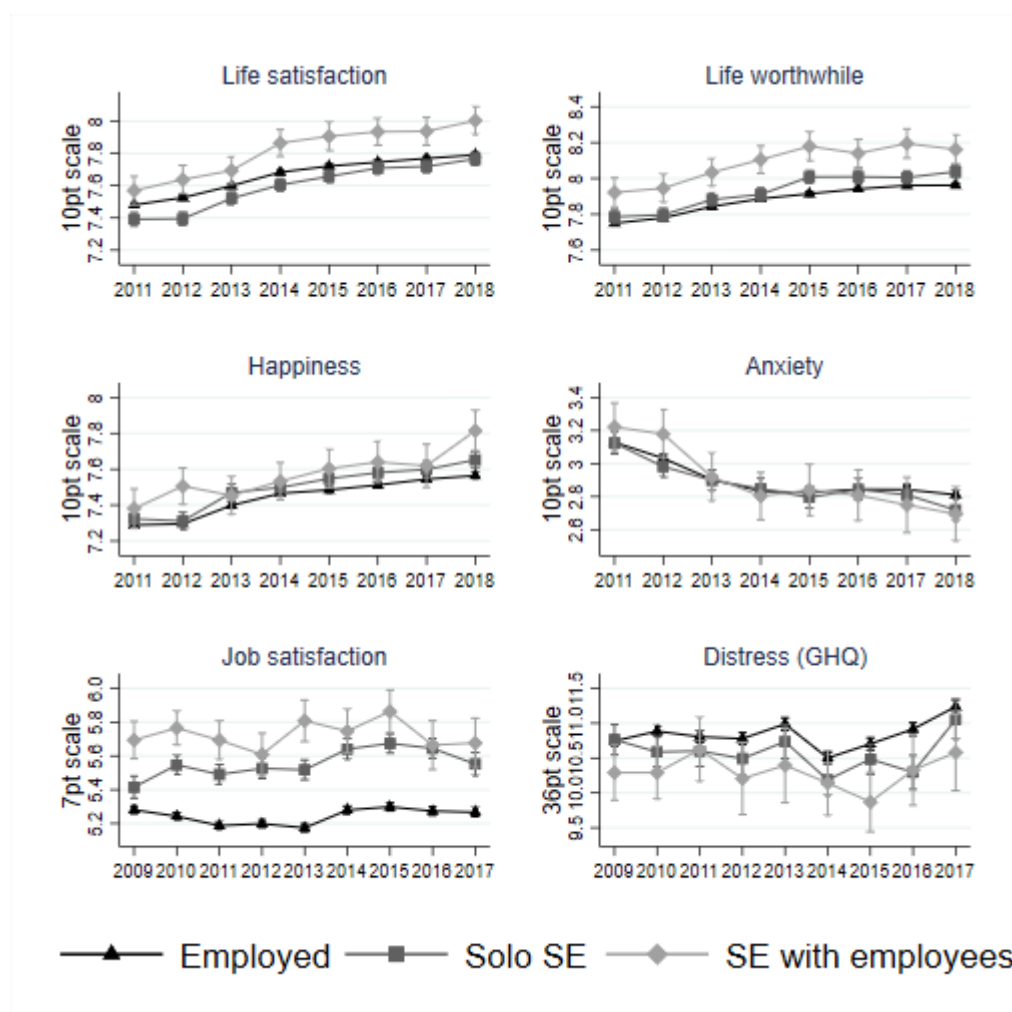
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<sup>8</sup> The estimates in Figure 5 are mean well-being scores. With few exceptions, the median scores are the same across employment types and across years.

<sup>9</sup> They are also no more likely to be very anxious or distressed than employees, as shown in Figure A.1 in Appendix A, which plots the distribution of well-being measures in the latest year.

<sup>10</sup> We can test this directly by regressing well-being measures on dummies for solo self-employment and self-employment with employees, a linear time trend and interactions between the self-employment dummies and the time trend. The interaction effect on solo self-employment is significant at the 0.1% level for life and job satisfaction, at the 5% level for life worthwhile and distress, and at the 10% level for happiness.

Figure 5. Well-being of employees and self-employed, 2011–2018 (APS) and 2009–2017 (UKHLS)



Note: Aged 25–59. Years in APS panels refer to financial years, so 2011 refers to April 2011–March 2012. Years in UKHLS panels refer to the year that each wave starts, in which the majority of interviews occur. For example, 2009 refers to Wave 1, which ran 2009–2010 with a very small number (3% of) households interviewed in 2011. Between 50% and 59% of all households were interviewed in the first year of each wave.

Source: Annual Population Survey 2011 to 2018 (top four panels) and UKHLS Waves 1–9 (bottom two panels).

Cross-sectional differences in well-being might simply reflect selection or non-comparability of subjective well-being measures – for example, if happier people are more likely to become self-employed, or if the types of people who become self-employed are also prone to interpreting well-being questions and scales in a more positive light. But they might also indicate that there is something about being self-employed that improves well-being – which points to self-employment being a choice, or at least ex-post rationalisable, rather than something imposed on individuals by poor labour market conditions. That well-being levels of the solo self-employed have kept pace with – if not improved more than – those of employees in recent years is also at odds with the recent literature (Boeri et al., 2020; Datta, 2019). If people are increasingly being pushed into solo self-employment by a lack of employment opportunities, one might expect the solo self-employed to become less selected on preferences and therefore less happy over time.

We use panel data to track the evolution of outcomes around the entry into self-employment to address some of the issues with cross-sectional comparisons. First, interpersonal comparability of well-being measures is less important in panel data, as we do not compare levels of self-reported well-being across different individuals. Second, we can explore potential bias in cross-sectional comparisons arising from

outside shocks. Koustas (2019) shows that economic distress increases in the months before people start gig work, which leads gig work to be correlated with economic distress. In a similar vein, it is possible that poverty rates are higher among the self-employed because economic shocks lead people to become self-employed, or that well-being measures are higher because people enter self-employment when they are feeling particularly good about their lives. Finally, panel data can help us discern effects that take place with a lag, or alternatively study whether effects fade over time as people adapt to their new situation (Clark and Georgellis, 2013; Clark et al., 2008). By studying trends prior to the entry into self-employment, we can also shed light on potential motivations for entering self-employment, in particular whether self-employment is used to insure against negative income shocks (Koustas, 2019, 2018).

## 2. Data and methodology

We use panel data from the first nine waves of the UK Household Longitudinal Study (UKHLS), also known as Understanding Society. The study began in 2009 with around 30,000 households, as a successor to the British Household Panel Survey (BHPS). In the second wave, around 6,700 households who were previously interviewed as part of the BHPS were added to the survey, and a boost of around 2,900 immigrant and ethnic minority households were added in Wave 6. Interview waves span two overlapping years, so that Wave 1 runs from 2009 to 2010, Wave 2 from 2010 to 2011 and so on.<sup>11</sup> Individuals aged 16 or older in each household are re-interviewed approximately one year apart, including individuals who move addresses and/or leave their original households to form new households. The sample is weighted to be nationally representative and to adjust for selective attrition. The study design and content closely follow those of other longitudinal panel studies, such as the Panel Study of Income Dynamics (PSID) in the US and the Socio-Economic Panel Study in Germany.

We use an event study framework to document the evolution of earnings and well-being around the entry into self-employment, defined as the first wave in which the individual is observed as self-employed in his or her main job. The aim of the exercise is not to estimate causal effects, but to explore potential motivations for entering self-employment (by examining pre-trends) and to document how key outcomes evolve thereafter. We use a standard event study specification, given as:

$$(1) \quad y_{it} = \sum_{k \in K} \beta_k D_{it}^k + \alpha_i + \gamma_t + \epsilon_{it}$$

where  $y_{it}$  is an outcome variable of interest,  $\alpha_i$  is an individual fixed effect and  $\gamma_t$  is a wave effect.<sup>12</sup>  $D_{it}^k = I\{t = E_i + k\}$  is an indicator for time to or from entry into self-employment,  $E_i$ , where  $k < 0$  indicates waves before entry and  $k > 0$  indicates waves after entry. For brevity, we refer to the wave of entry  $t = E_i$  simply as  $t$ , the next wave  $t = E_i + 1$  as  $t+1$ , and so on. The indicator for the wave prior to entry is omitted, so that the  $\beta_k$  coefficients express changes relative to  $t-1$ .

Summary statistics of outcome variables at  $t-1$  are given in Table A.2 in Appendix A. We exclude individuals who are not seen entering self-employment – that is, individuals who are self-employed in the first wave in which they appear in the data. We include all available waves after the first entry into self-employment, including waves in which the individual is no longer self-employed.

We use an unbalanced seven-wave panel with three waves before and after entry, that is, from  $t-3$  to  $t+3$ . To test for potential bias arising from the unbalanced panel, we compare our main results using a

<sup>11</sup> Between 2% and 5% of households in each wave were interviewed in a third year. For example, 3% of households in Wave 1 were interviewed in 2011.

<sup>12</sup> In the subgroup analysis below, wave effects are allowed to vary between those entering solo self-employment and those entering self-employment with employees.

balanced and unbalanced five-wave panel with two waves before and after entry (the sample size of the balanced seven-wave panel is too small to produce meaningful results). Figure A.2 in Appendix A shows that the results are essentially identical.

The sample is restricted to individuals in prime working age (aged 25–59) in the wave of entry. We trim the top and bottom 0.5% of income variables in each wave, and express all cash values in real September 2017 prices using the Consumer Prices Index including owner-occupier housing costs (CPIH).

The figures presented are average values. Where possible, we focus on specific subgroups of interest – for example, by individuals’ economic status prior to entering solo self-employment, by whether they are entering professional or non-professional occupations, or by whether they fell out of employment in the years leading up to becoming solo self-employed. However, the subgroup analysis we can do is limited by sample size, and estimates for smaller subgroups are often rather imprecise.

### *Outcomes of interest*

We study two sets of outcomes: incomes and subjective well-being. On the income side, we track the evolution of individual earnings, household incomes and poverty rates. The UKHLS and its predecessor, the BHPS, are widely used to study income changes (see, for example, the official Income Dynamics statistics published by the Department for Work & Pensions and Postel-Vinay and Sepahsalari (2019), Williams (2009), Cappellari and Jenkins (2002) and Jarvis and Jenkins (1998)). The UKHLS lines up closely with the Family Resources Survey, the data source for UK official income statistics (Fisher et al., 2019).

Our individual earnings measure includes usual employee pay, self-employment earnings in the last period and earnings from second jobs in the last month. Where earnings are not recorded on a monthly basis (for example, if annual accounts are used), they are converted into a monthly equivalent. Given differential tax treatment of employee and self-employment earnings in the UK, we track the evolution of net (post-tax) earnings as people move into self-employment. Household incomes are measured after taxes and welfare benefits and include incomes from earnings, private benefits, investment, pensions and other income sources. We use a relative poverty measure where households are considered to be in poverty if their net incomes, adjusted for household size and composition using the OECD equivalence scale, fall below 60% of the median in the given wave. This is comparable to the ‘before housing costs’ poverty measure in official statistics.

The UKHLS and its predecessor contain a rich set of subjective well-being measures and are widely used to study the determinants of well-being (see, for example, Clark (2019), Powdthavee et al. (2019), Binder and Coad (2015) and Clark and Georgellis (2013)). Here, we focus on three key measures: job satisfaction, satisfaction with life overall, and mental distress as captured by the 12-item General Health Questionnaire (GHQ). We also consider changes in satisfaction with household income and satisfaction with the amount of leisure time. Satisfaction questions use a seven-point scale ranging from ‘completely dissatisfied’ to ‘completely satisfied’. The GHQ has been translated into many languages and has been extensively validated in a range of settings and populations (see Hu et al. (2007) for a summary). The 12-item version contains 12 questions, assessed on a four-point scale, that capture both positive and negative aspects of mental health. Higher scores indicate higher levels of distress. The precise wording of each well-being question is given in Table A.1 in Appendix A.

We fit a standard fixed effects regression, treating the cardinal well-being measures as if they were ordinal and analysing changes in means. Previous research has found that ordinal and cardinal treatments of satisfaction scores yield quantitatively very similar results, including in fixed effects estimation (Ferrer-i-Carbonell and Frijters, 2004; Frey and Stutzer, 2000). Responses to the 12 GHQ questions are summed

into a single aggregate score ranging from 0 to 36. As a robustness check, we run an alternative specification with binary satisfaction variables (where somewhat, mostly and completely satisfied are coded as 1 and all other responses as 0) and a 12-point scale that sums binary measures of the GHQ items. This alternative is shown to generate similar results.

We focus on entries into solo self-employment, which accounts for the rise in self-employment in recent years. This follows the recent literature which treats the solo self-employed and self-employment as distinct types, the former occupying an intermediate state between unemployment and employment, and the latter being a proxy for entrepreneurship (Boeri et al., 2020). The data confirm that individuals in solo self-employment rarely become self-employed with employees: of all prime-aged individuals who are solo self-employed in any wave of UKHLS, only 3.0% have employees in the following wave; this is just slightly higher than the share of prime-aged employees in any wave who become self-employed with employees in the following wave (2.4%).

For comparison, we also examine trajectories into self-employment with employees, highlighting differences from entries into solo self-employment. However, it is worth noting that the majority (64%) of those who become self-employed with employees started out as solo self-employed. As such, our sample of those who enter into self-employment with employees – who have employees in the first wave in which they are self-employed – may not be representative of the wider group.

#### *Descriptive statistics*

Table 1 presents descriptive statistics for our sample. The first three columns describe all prime-aged employees, solo self-employed individuals and self-employed individuals with employees in all nine waves of data. The two last columns describe individuals in the wave of entering self-employment (SE), either as solo self-employed or self-employed with employees.

Individuals in the wave of entry are younger than the sample of self-employed individuals as a whole. They work fewer hours on average, are more likely to be in poverty, and the self-employed with employees have lower wages in the wave of entry than overall. Less trivially, our focus on transitions into self-employment means that we can only study individuals who are observed in some prior state – not, for example, those who begin their careers in self-employment. This sample of individuals, who enter self-employment from employment, unemployment or inactivity, differs from the overall pool of self-employed individuals in certain ways.

Table 1 shows those seen entering solo self-employment are less likely to work in the construction industry than the solo self-employed as a whole. This may reflect the fact that self-employment is the norm in the construction industry in the UK, so a substantial share of those who work in construction will have started their careers in self-employment. Individuals seen entering solo self-employment are also less likely to be male and more likely to have a degree or other higher education qualification. They are slightly more likely to work in a ‘managerial or professional’ job as defined by the National Statistics Socio-Economic Classification (NS-SEC) – we follow the standard three-class grouping, but 99.8% of the solo self-employed in this group are in professional rather than managerial occupations, so we refer to them simply as ‘professionals’ hereon. There are some differences between those seen entering self-employment with employees and the overall pool, but the sample of entrants (in the wave of entry) is small and the differences are not generally statistically significant.

Differences between employees, the solo self-employed and the self-employed with employees can also be seen in Table 1. These have been widely documented and commented on, so we do not dwell on them here (CIPD, 2018; D’Arcy and Gardiner, 2014). In short, the self-employed (both solo and with employees) are on average older than employees and have a higher share of men and ethnic minorities.

They are less likely to work in professional occupations, more likely to work in construction and less likely to work in industries associated with the public sector (public administration and defence, education, health and social work). The solo self-employed are less educated, work fewer hours and have lower wages than those in employment; the opposite is true of the self-employed with employees. The solo self-employed are over-represented in London and the South East.

**Table 1. Descriptive statistics, UKHLS 2009–2019 (Waves 1–9)**

|                                        | Employed | Solo SE | SE with employees | Entry into solo SE | Entry into SE with employees |
|----------------------------------------|----------|---------|-------------------|--------------------|------------------------------|
| <i>Demographics</i>                    |          |         |                   |                    |                              |
| Age                                    | 42.1     | 44.0    | 45.6              | 41.6               | 41.1                         |
| Young (aged 25–34)                     | 26.8%    | 19.3%   | 12.1%             | 28.3%              | 27.5%                        |
| Male                                   | 49.0%    | 65.6%   | 73.9%             | 56.5%              | 72.7%                        |
| White British                          | 85.9%    | 83.7%   | 82.4%             | 80.0%              | 72.7%                        |
| Degree/higher education                | 47.4%    | 42.9%   | 48.3%             | 48.4%              | 52.5%                        |
| Managerial/professional                | 48.5%    | 24.0%   | 30.3%             | 26.9%              | 29.8%                        |
| Weekly hours                           | 37.7     | 36.6    | 47.0              | 31.7               | 44.3                         |
| Hourly wage                            | 10.6     | 9.7     | 12.6              | 9.8                | 11.5                         |
| In relative poverty                    | 4.5%     | 13.8%   | 10.5%             | 16.4%              | 13.1%                        |
| London/South East                      | 25.9%    | 32.3%   | 25.7%             | 33.9%              | 31.3%                        |
| <i>Industry</i>                        |          |         |                   |                    |                              |
| Agriculture, mining and utilities      | 2.2%     | 3.0%    | 7.2%              | 2.1%               | 5.5%                         |
| Manufacturing                          | 10.9%    | 4.3%    | 8.2%              | 4.0%               | 4.9%                         |
| Construction                           | 4.3%     | 22.1%   | 14.3%             | 16.5%              | 11.3%                        |
| Wholesale and retail                   | 12.4%    | 7.1%    | 14.3%             | 8.1%               | 13.3%                        |
| Transportation and storage             | 4.7%     | 6.5%    | 2.8%              | 5.1%               | 4.6%                         |
| Accommodation and food                 | 3.6%     | 1.6%    | 7.0%              | 2.2%               | 11.7%                        |
| Information and communications         | 4.0%     | 5.6%    | 2.5%              | 5.1%               | 5.6%                         |
| Finance, insurance and real estate     | 5.2%     | 3.2%    | 4.0%              | 3.2%               | 0.8%                         |
| Professional, scientific and technical | 5.5%     | 9.9%    | 13.3%             | 10.2%              | 13.8%                        |
| Administrative support services        | 4.2%     | 7.5%    | 5.0%              | 8.9%               | 7.9%                         |
| Public administration and defence      | 8.1%     | 0.6%    | 0.5%              | 1.3%               | 0.3%                         |
| Education                              | 12.5%    | 7.6%    | 2.7%              | 7.3%               | 2.5%                         |
| Health and social work                 | 17.0%    | 7.2%    | 9.8%              | 9.0%               | 6.7%                         |
| Arts, entertainment and recreation     | 1.7%     | 4.7%    | 1.8%              | 4.6%               | 2.0%                         |
| Other services                         | 1.6%     | 6.5%    | 5.2%              | 7.2%               | 6.8%                         |
| <i>N</i>                               |          |         |                   |                    |                              |
| Person-years                           | 158,093  | 20,252  | 4,742             | 2,448              | 318                          |
| Persons                                | 38,451   | 6,827   | 1,878             | 2,448              | 318                          |

Note: Includes prime-aged (25- to 59-year-old) individuals in work. Trims top and bottom 0.5% of wages and hours. Managerial and professional occupations defined as NS-SEC classes 1 and 2, based on the Standard Occupational Classification (SOC) 2010. Industries based on the Standard Industrial Classification (SIC) 2010.

Source: UKHLS Waves 1–9.

### 3. Results

#### *Employment trajectories into and out of self-employment*

Figure 6 shows trajectories in employment status before and after entering self-employment. The first panel shows entries into solo self-employment and the second entries into self-employment with employees. There are three main points we can draw from this figure.

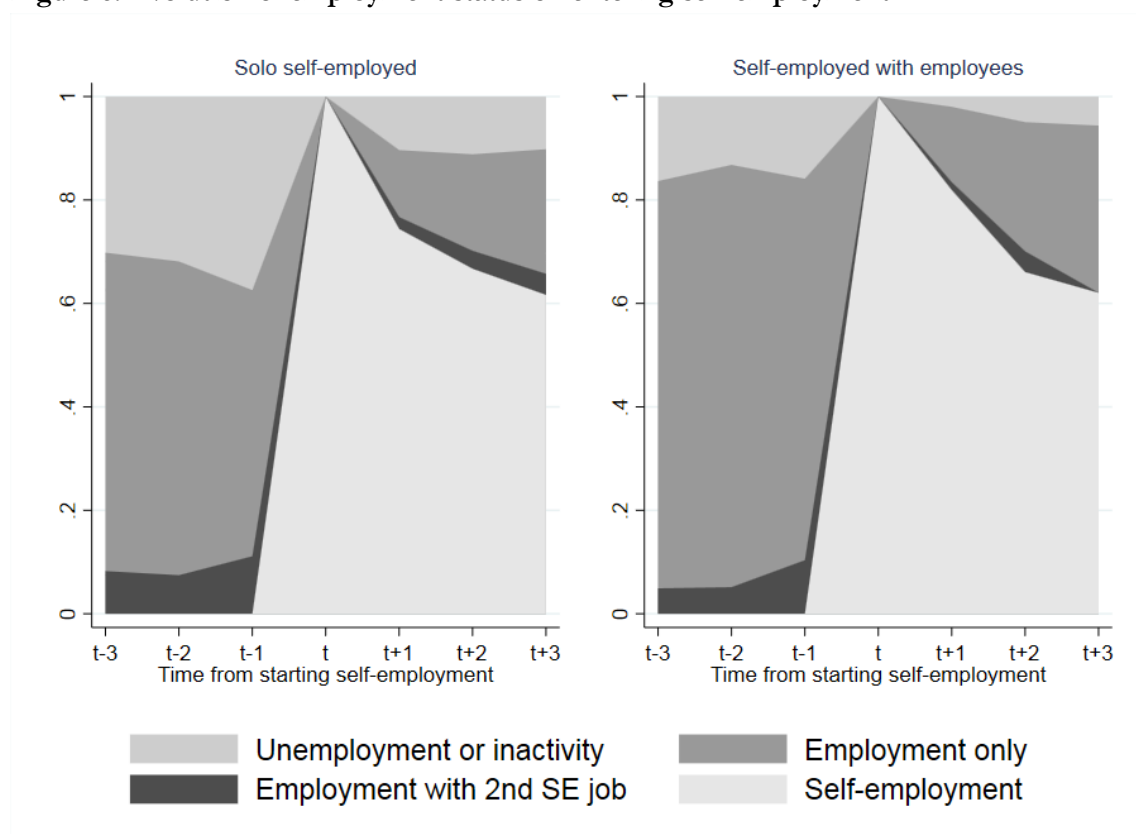
First, the two groups look very different prior to entry, with 37% of those entering solo self-employment coming from unemployment or inactivity, compared with only 16% of those entering self-employment with employees. This corroborates the findings in Boeri et al. (2020). We also see that around a tenth of those entering self-employment were already self-employed in a second job in the wave prior to entry.

Second, the figure shows that self-employment is often transitory. Only 74% of those who enter solo self-employment are mainly self-employed in the wave after entry, and only 62% are mainly self-employed two waves after that. Those entering self-employment with employees drop off more gradually, but three waves after entry the share in self-employment is the same at 62%.

However, we do not see the solo self-employed predominantly falling back out of work. Instead, most of those leaving solo self-employment transition into employment. 73% of those who leave solo self-employment are employed three waves after entry, with 11% remaining self-employed in a second job. It is notable that the share of solo self-employment entrants who are out of work at  $t+3$  is only slightly higher than the share of those entering self-employment with employees (10% versus 6%), when the former are 2.3 times more likely to have been out of work in the wave prior to entry. Solo self-employment appears to allow individuals to transition into employment and remain in work.

Finally, we see a stark fall in employment in the run-up to entering solo self-employment, with the share employed falling from 70% three waves before entry to 63% immediately before entry. There is no fall in employment for those entering self-employment with employees. This suggests that solo self-employment may act as self-insurance against employment shocks, similar to the way in which gig economy jobs appear to insure against earnings shocks in the US (Koustas, 2019). Figure A.3 in Appendix A shows that the fall in employment is particularly pronounced for those entering professional occupations. This suggests that whilst professionals are a minority of the solo self-employed, the insurance motive may be particularly strong for this group.

**Figure 6. Evolution of employment status on entering self-employment**



Source: UKHLS Waves 1–9.

In evaluating the fall in earnings prior to starting gig work, Koustas (2019) was unable to distinguish between the self-insurance hypothesis and the alternative explanation that people wind down their employment earnings in preparation for self-employment. Here, the evidence overwhelmingly supports the former. The fall in employment earnings in the waves preceding entry into self-employment (shown in Figures 7 and 8 below) is driven by an increase in unemployment and inactivity, rather than by a fall in earnings – for example, via a reduction in hours worked – for those who enter from employment. It is theoretically possible that people might quit their jobs and spend a year ramping up their own businesses. But we would expect such people to report themselves as self-employed, rather than as unemployed or inactive, during the interim period.

We can also evaluate the stated intentions of those entering self-employment and the reasons given for leaving their previous jobs. Of those who left their jobs in the wave prior to entering solo self-employment – that is, who were employed at  $t-2$  but unemployed or inactive at  $t-1$  – 35% were made redundant or dismissed (41% if missing values are excluded). Employees in even waves of the survey were also asked whether they expected to start their own business the following year. Those who left their jobs in the wave prior to entering solo self-employment were no more likely to have answered in the affirmative than the general population of employees: 10% expected to start their own business compared with 16% across all employees (12% versus 19% if missing values are excluded).

Some of those who entered solo self-employment from employment in the previous wave – that is, who were employed at  $t-1$  – are also likely to be responding to employment shocks. 11% of this group had a spell of unemployment or inactivity between waves, compared with just 1% of those who move from employment to self-employment with employees. Of those with an unemployment or inactivity spell between waves, nearly half (46%) said they were made redundant or dismissed from their previous job.

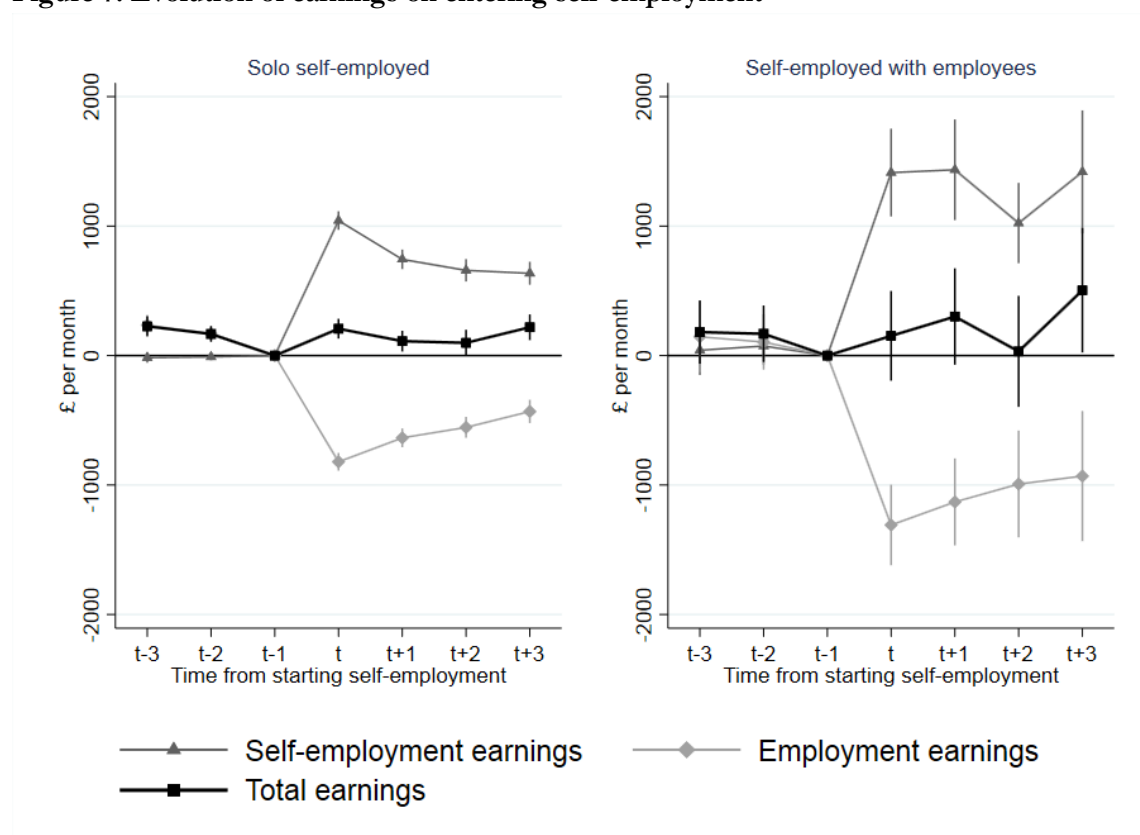
Taken together, a substantial share of those who fell out of employment in the run-up to becoming solo self-employed report having suffered involuntary employment shocks.

### *Effects on earnings and incomes*

Figure 7 plots the evolution of earnings around the entry into self-employment. In the run-up to entering solo self-employment, employment earnings fall by an estimated £226 a month (the 95% confidence interval is £148 to £304). This reflects the drop in employment documented above; those entering solo self-employment from employment see no corresponding dip in earnings (Figure 8). We can see from Table A.2, which summarises earnings and other outcome variables at  $t-1$ , that mean monthly earnings in the wave prior to entering self-employment are just £959, so a reduction of over £200 represents a substantial fall in earnings. Earnings recover upon entering solo self-employment and, three waves after entry, are back to their level three waves before entry. The fall in self-employment earnings and the rise in employment earnings in the periods after entry reflect individuals transitioning out of solo self-employment into employee jobs.

We do not find a statistically significant fall in earnings for those entering self-employment with employees. The point estimate at  $t-3$  is of a similar magnitude to that for solo self-employment entrants (£182) but not significantly different from zero ( $p$ -value 0.15). It is also of an economically smaller magnitude, given that pre-entry earnings are much higher among this group (the mean at  $t-1$  is £1,783). This is consistent with solo self-employment, but not self-employment with employees, acting as a form of self-insurance against employment and earnings shocks.

**Figure 7. Evolution of earnings on entering self-employment**



Note: Shows changes relative to  $t-1$ . Error bars are 95% confidence intervals.

Source: UKHLS Waves 1–9.

The improvement in earnings on entering solo self-employment, shown in Figure 7, masks substantial variation by whether individuals enter from employment. Figure 8 shows the evolution of earnings, household incomes and relative poverty rates for those entering solo self-employment, split by whether they were employed in the wave prior to entry.

We see that for those entering from unemployment or inactivity in the previous wave, monthly earnings and household incomes fall by over £500 in the three waves prior to entry, and the share in relative poverty rises by 15 percentage points. One wave prior to entry, mean household incomes are £2,422 and 36% are in relative poverty (Table A.2).<sup>13</sup> Entering solo self-employment leads to a large rise in average earnings and household incomes and a corresponding fall in poverty rates. Three waves after entering self-employment, monthly earnings, household incomes and poverty rates not significantly different on average from their  $t-3$  levels.

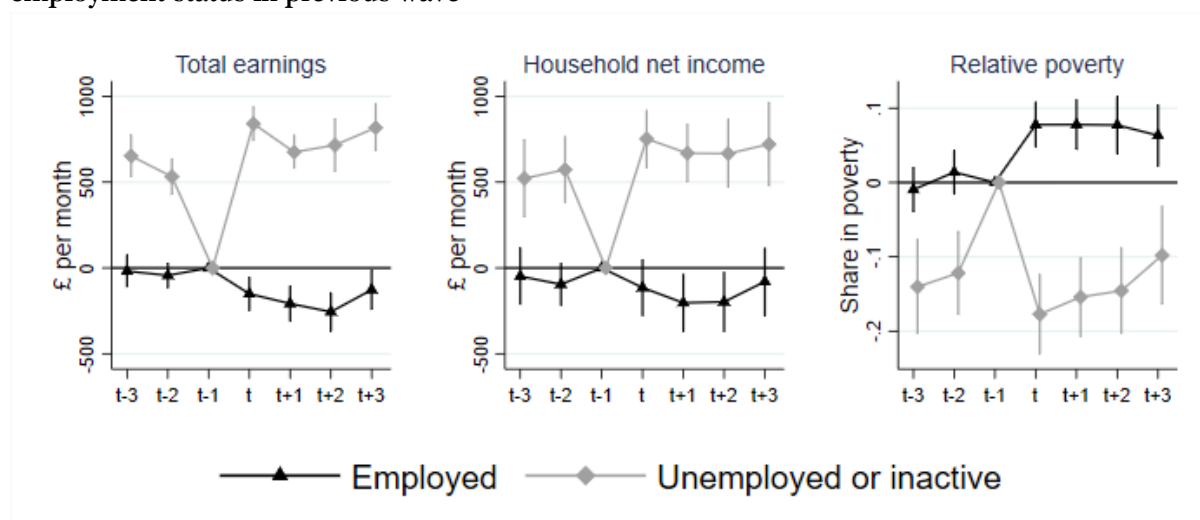
However, given much higher rates of employment at  $t+3$  than at  $t-3$  (as seen in Figure 6), this does not suggest that those who become unemployed or inactive in the run-up to entering self-employment are able to recover their previous level of earnings. Indeed, if we look at the subset of our sample for whom data are available three years prior to entry (around 60% of those who were not employed in the wave before entry), we find that those who were employed at  $t-3$  but fell out of employment in the waves leading up to becoming solo self-employed had significantly lower earnings three waves after entry, by £465 a month, than three waves before entry (Figure A.4). This represents a 30% fall on their average earnings at  $t-1$ . This is in contrast to those who were unemployed or inactive in both  $t-3$  and  $t-1$ , who see a sustained rise in their earnings, which are on average £625 higher three waves after entry than three waves before entry.

Figure 8 shows that trajectories are very different for those entering solo self-employment from employment in the previous wave. For this group, we see no significant changes in earnings, household incomes or poverty rates in the run-up to starting self-employment. Mean earnings are £1,503, mean household incomes £3,839 and 9% are in relative poverty one wave prior to entry (Table A.2). After entering solo self-employment, monthly earnings and household incomes fall significantly by around £200 (at  $t+1$  and  $t+2$ ), and relative poverty rises by up to 8 percentage points. Three waves after entry, monthly earnings are still significantly lower, by around £130 or 9%, than their level prior to entry.

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<sup>13</sup> Mean monthly earnings are £5, not exactly zero as some of those who report being unemployed or inactive still have trivial amounts of earnings.

**Figure 8. Evolution of earnings, income and poverty on entering solo self-employment, by employment status in previous wave**



Note: Shows changes relative to  $t-1$ . Error bars are 95% confidence intervals.

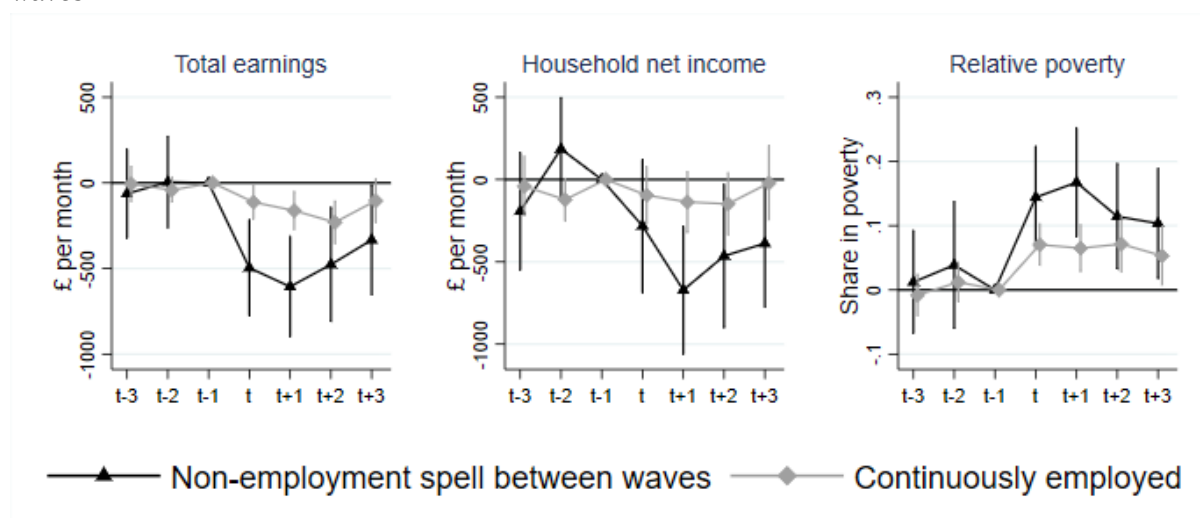
Source: UKHLS Waves 1–9.

Figure 9 shows that the fall in earnings and household incomes among those who were employed in the wave before entering solo self-employment was far greater among those who had a spell of unemployment or inactivity between waves.<sup>14</sup> Estimates for this group are rather imprecise due to the small sample size. Individuals in this group see a huge fall in average monthly earnings, of £496 in the wave of entry, relative to an average of £1,665 at  $t-1$ , and monthly earnings are still £333 lower three years after entry than in the wave before entering solo self-employment. Poverty rates are 17 percentage points higher in the year after entry and are still 10 percentage points higher than their  $t-1$  levels three years after entry. This suggests that whilst solo self-employment acts as self-insurance against negative employment shocks, it does not allow individuals to recover their previous levels of income.

For those who were continuously employed between waves, the fall in monthly earnings is much smaller, at just £113 in the year of entry rising to £230 two years after entry, and the point estimate at  $t+3$  is just £104 lower than the year before entry and not significantly different from  $t-1$  or  $t-3$ . The rise in poverty is also more modest, at around 7 percentage points in most years.

<sup>14</sup> We exclude individuals who had a spell of non-employment but reported doing ‘something else’ during this spell, rather than being unemployed or inactive, since this ‘something else’ may refer to setting up their own business.

**Figure 9. Evolution of earnings, income and poverty on entering solo self-employment from employment in the previous wave, by whether had a spell of unemployment or inactivity between waves**



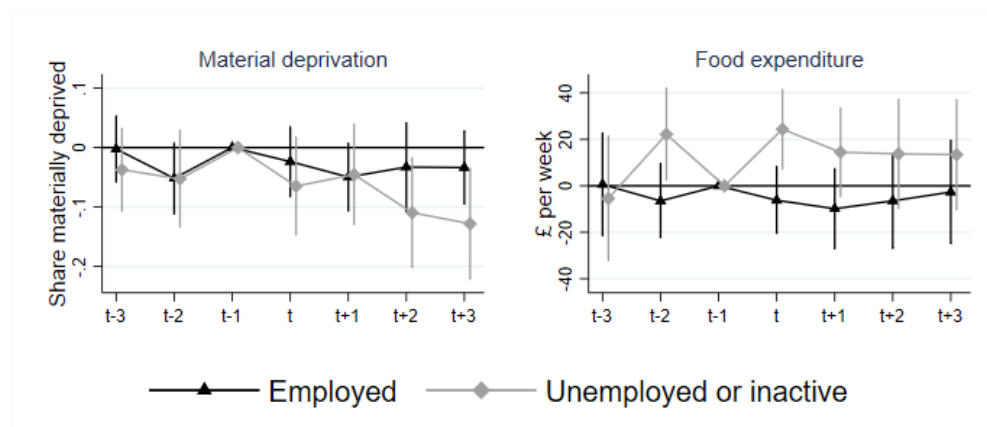
Note: Shows changes relative to  $t-1$ . Error bars are 95% confidence intervals.

Source: UKHLS Waves 1–9.

It is worth noting that other measures of living standards evolve differently from the income-based measures shown above. Figure 10 plots trajectories in material deprivation and weekly food expenditure around the entry into solo self-employment. Households are classed as materially deprived if they feel they cannot afford a certain number of ‘basic’ items or activities, with greater weight assigned to items that most households already have (see Bourquin et al. (2019) for more details).

We see that for those entering from unemployment or inactivity, rates of material deprivation decline over time, but much more gradually than the change in earnings and net incomes seen in Figure 8. Weekly food expenditure rises slightly in the wave of entry but is not statistically different from pre-entry levels in future waves. For those who were employed in the wave prior to entering solo self-employment, we do not see significant changes in material deprivation or food expenditure, despite large falls in reported earnings and incomes. This may reflect households smoothing their consumption in the first years of self-employment by running down savings (for those entering from employment) or increasing savings (for those entering from non-employment). Alternatively, it is possible that the observed fall in earnings among those entering from employment partly reflects under-reporting of self-employment earnings.

**Figure 10. Evolution of material deprivation and food expenditure on entering solo self-employment, by employment status in previous wave**



Note: Shows changes relative to  $t-1$ . Error bars are 95% confidence intervals. Food expenditure includes both food from supermarkets and eating out.

Source: UKHLS Waves 1–9.

There is a large literature on the under-reporting of incomes from self-employment. Random audits of taxpayers who filed self-assessment forms for tax years 1999–2000 to 2009–10 found that over a third (36%) under-reported their incomes (Advani, 2017). There is also an established literature that seeks to estimate the extent of under-reporting, including in survey data, using a consumption-based method (Engström and Hagen, 2017; Hurst et al., 2014; Pissarides and Weber, 1989). The approach is described in detail in Appendix B; in short, it uses ‘excess’ food expenditure among the self-employed and the relationship between consumption and incomes (Engel curves) to infer the degree of under-reporting.

Replicating the analysis in Engström and Hagen (2017) using our UKHLS data, we estimate that the data on self-employment incomes and expenditures are consistent with under-reporting of 10–13% (see Table B.1 in Appendix B). This is likely to overstate the actual degree of under-reporting among those who recently entered self-employment, both because people may learn to under-report their incomes over time and because the consumption-based method ignores potential differences in preferences (that are not captured by observable characteristics) and consumption from wealth rather than income. Nonetheless, if self-employment incomes are under-reported in the UKHLS, then the fall in incomes for those who were employed at  $t-1$  but had a spell of unemployment or inactivity between waves would be smaller than Figure 9 suggests, and those who were continuously employed could have seen a rise in their incomes. The results in Figures 8 and 9 should therefore be interpreted as the lower bound on earnings in the waves following entry into solo self-employment.

### *Effects on well-being*

We now move on to trajectories in well-being. Figure 11 plots the evolution of three measures of well-being around the start of self-employment, again distinguishing between solo self-employment and self-employment with employees. The first column to the left shows changes in overall life satisfaction, measured on a scale from 1 (completely dissatisfied) to 7 (completely satisfied). The middle column shows changes in the 12-item General Health Questionnaire, aggregated into a total score from 0 (the least distressed) to 36 (the most distressed). The final column shows changes in reported overall job satisfaction on a scale from 1 (completely dissatisfied) to 7 (completely satisfied). Because changes are estimated with reference to  $t-1$ , and job satisfaction is only observed for those in work, the results for job satisfaction only apply to those entering self-employment from employment.

Table A.1 reports the precise questions asked for each measure of well-being, and summary statistics one wave prior to entry are given in Table A.2. As discussed in Section 2, we treat the cardinal well-being variables as ordinal and analyse changes in means. Figure A.5 confirms that the results hold using binary measures of life and job satisfaction (where somewhat, mostly and completely satisfied are coded as 1 and all other responses as 0) and a 12-point scale that aggregates binary measures of the GHQ items.

We see that starting solo self-employment is associated with a small but significant rise in life satisfaction and reduction in distress, and substantially higher job satisfaction for those who enter from employment. At the wave of entry, life satisfaction is 0.13 points higher than in the wave before, relative to a mean of 4.95 and a standard deviation of 1.46 at  $t-1$ . Distress falls by 1.05 points relative to a mean of 11.82 at  $t-1$  (around a sixth of a  $t-1$  standard deviation), and job satisfaction improves considerably by 0.99 points relative to a mean of 4.74 (more than half a  $t-1$  standard deviation). We see some evidence of adaptation in life satisfaction and other well-being measures over time, as has been documented in previous studies (Hanglberger and Merz, 2015; Clark and Georgellis, 2013; Clark et al., 2008). But three waves after entering solo self-employment, distress is still significantly lower and job satisfaction significantly higher than in the wave before entry.

Trajectories in well-being are similar for those entering professional occupations and those entering intermediate and routine occupations, as shown in Figure A.6. Indeed, the improvement in life satisfaction and distress seem somewhat stronger for those entering non-professional occupations, though the difference is not statistically significant. This may reflect differential selection, if professionals who enter solo self-employment are more likely to be responding to negative employment shocks, rather than acting on a preference for self-employment.

Figure 11 shows that entry into self-employment with employees is not associated with an improvement in well-being. We do not find statistically significant changes in life satisfaction, distress or job satisfaction, barring a temporary rise in job satisfaction (by 0.66 points or half a  $t-1$  standard deviation) immediately after entry that disappears by  $t+3$ .

**Figure 11. Evolution of well-being on entering self-employment**



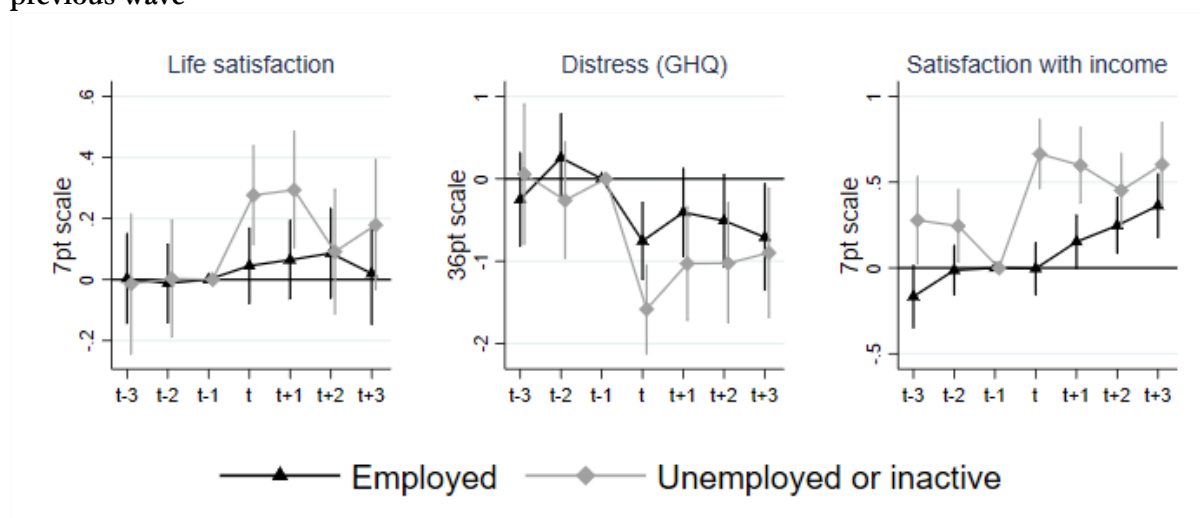
Note: Shows changes relative to  $t-1$ . Error bars are 95% confidence intervals.

Source: UKHLS Waves 1–9.

The improvement in well-being on entering solo self-employment is more pronounced for those who enter from unemployment or inactivity, as shown in Figure 12, but it is not exclusively driven by this group. We have already seen that job satisfaction improves considerably for those who were employed in the wave prior to entry. Figure 12 shows they also report a fall in distress and rising satisfaction with their household incomes, despite the fact that their actual incomes appear to fall.

These effects are virtually unchanged when we control for industry, total hours worked and commuting time, as shown in Figure A.7. This means that the improvements in well-being are not primarily driven by people changing industry as they move into solo self-employment, by their working hours changing or by falls in time spent commuting (Figure A.8). Instead, they may reflect more intangible benefits of self-employment that compensate for lost incomes, such as increased autonomy and flexibility (Lange, 2012; Benz and Frey, 2008b; Hundley, 2001).

**Figure 12. Evolution of well-being on entering solo self-employment, by employment status in previous wave**



Note: Shows changes relative to  $t-1$ . Error bars are 95% confidence intervals.  
Source: UKHLS Waves 1–9.

In Figure 9 above, we saw that those who were employed in the previous wave before entering solo self-employment, but had a spell of unemployment or inactivity between waves, saw a dramatic fall in their incomes. In contrast, those who were continuously employed between  $t-1$  and  $t$  saw only a modest and temporary fall in their incomes. However, as Figure A.9 shows, well-being trajectories are not significantly worse – and if anything look better – for those who had a spell of unemployment or inactivity between waves, who are more likely to have been ‘pushed’ into solo self-employment by negative employment shocks.<sup>15</sup> Looking at the point estimates for job satisfaction and distress, this may reflect a deterioration in well-being at  $t-1$  as they anticipated being made unemployed, though the sample is too small to generate statistically significant results.

To further explore whether positive well-being trajectories reflect selection into self-employment, or whether well-being improves even for those who are pushed into self-employment, we can look at expectations in the previous wave. Employees in even waves of the survey were asked whether they expected to start their own businesses the following year. The data are available for just over a third (36%) of our overall sample: those who started solo self-employment in Waves 3, 5, 7 and 9 who responded to the question. Figure A.10 shows that the rise in job satisfaction appears to be greater among those who planned to enter self-employment, consistent with selection effects, though estimates are imprecise due to the small sample size. However, there seem to be improvements in job satisfaction, satisfaction with income and distress even for those who did not expect to enter self-employment in the previous wave, though estimates are imprecise and generally not statistically significant.

#### *Comparing self-employment with employment transitions*

So far, we have established that solo self-employment is used to self-insure against employment shocks, and improves well-being both for those entering from unemployment or inactivity and for those entering from employment. We now consider how transitions into solo self-employment compare with transitions into employee jobs. If solo self-employment is an intermediate state between unemployment and employment, and is less desirable than traditional employment as the recent literature suggests (Boeri et

<sup>15</sup> Looking at point estimates over time, the sample sizes are too small, and the estimates too imprecise, to generate statistically significant differences.

al., 2020; Datta, 2019; Bell and Blanchflower, 2019; Katz and Krueger, 2017), we might expect it to be associated with worse outcomes than transitions into employee jobs.

Two comparisons can be made. First, we compare entry from non-employment into solo self-employment with entry from non-employment into employment. Second, we compare entry from employment into solo self-employment with moving between employee jobs. In the first case, we include individuals who were previously employed but out of work in the wave prior to entry – not just individuals starting employment for the first time – which is a more fitting comparison as the majority of those who enter solo self-employment have been employed in the past. For individuals with multiple observed entries into new employee jobs, each entry is treated as a separate event in our data. We allow wave fixed effects to vary for those entering employment and solo self-employment.

We recognise the difficulties in making such comparisons and do not claim that they represent causal effects. As shown in Table A.3, those entering a new employee job and solo self-employment differ in their observed characteristics prior to entry; this is particularly true of those entering from employment. They also experience different trends in the waves leading up to entry, which points to differential selection – for example, in the motivation for starting or changing jobs. Nonetheless, we consider the comparisons to be a preliminary step towards understanding whether becoming solo self-employed is indeed inferior to employment.

We start by examining entries from unemployment and inactivity. Table A.3 shows that at  $t-1$ , those who enter solo self-employment are older, more likely to be male and more likely to live in London or the South East than those who enter employment, but the two groups are similar in terms of their earnings, household incomes and measures of well-being prior to entry. Figure A.11 shows that they also exhibit similar pre-entry trends in earnings and well-being. The only difference is that those entering employee jobs experience a small but statistically significant fall in life satisfaction and rise in distress between  $t-3$  and  $t-1$ , which is not seen for those entering solo self-employment.

After entry, those who start employee jobs work longer hours on average and have higher earnings in the years immediately after entry. The gap in earnings is widest one year after entry (around £200 a month) and shrinks thereafter, and is no longer statistically significant by  $t+3$ . Despite the difference in earnings trajectories, well-being measures evolve in essentially the same way across the two groups.

We now turn to entries from employment. It is important to note that these are two very different groups. Individuals entering self-employment are less likely to be young (31% versus 41% are aged 25–34), more likely to be male and more likely to live in London and the South East than those changing employee jobs (Table A.3). They also have significantly lower earnings and appear to have higher levels of well-being at  $t-1$ , though differences in well-being measures are not generally statistically significant.

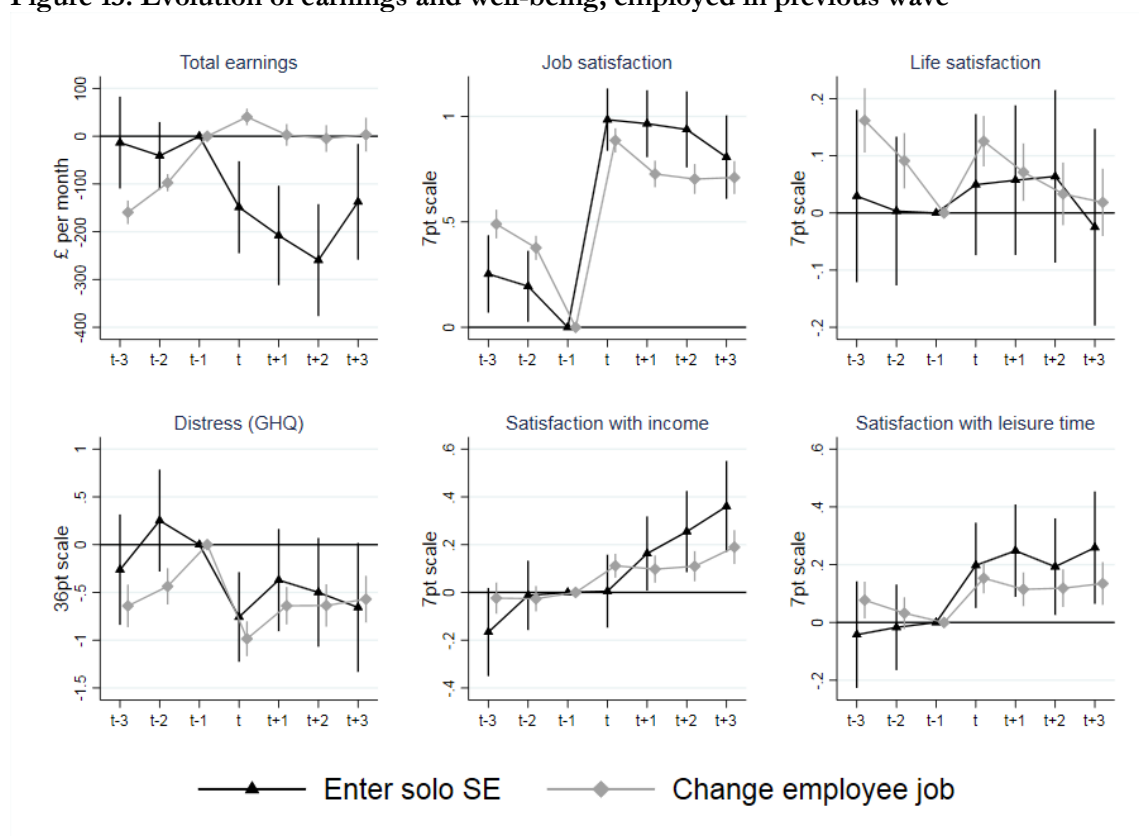
Figure 13 shows that the two groups exhibit very different pre-trends in earnings and well-being. Individuals who change employee jobs see their earnings rise in the waves before entry, but those who enter solo self-employment see no change between  $t-3$  and  $t-1$ . This may reflect the fact that earnings progression is stronger at younger ages, when job-to-job changes are more likely (Bagger et al., 2014) or different motivations for transitions – for example, if those changing employee jobs are more likely to be high performers who leave for a better position. Job changers also experience a significant fall in well-being (in terms of job satisfaction, life satisfaction, satisfaction with leisure time and distress) in the run-up to the move. But apart from a (smaller) fall in job satisfaction, this deterioration in well-being is not seen for those who move from employment to solo self-employment. This is likely to reflect differences in the motivation for changing jobs – for example, if job-to-job transitions are more driven by

dissatisfaction with previous jobs, whereas (as shown above) many of those who enter solo self-employment may have been pushed by employment shocks between waves.

After entry, earnings are stable at their higher  $t-1$  level for individuals who change employee jobs – rising slightly at the wave of entry – but fall considerably by up to £250 a month for those who enter solo self-employment.<sup>16</sup> However, well-being evolves similarly for the newly self-employed and for individuals in new employee jobs. If anything, job satisfaction looks better for the former group (though this difference is no longer statistically significant by  $t+3$ ).

It is difficult to draw direct comparisons given the differences between groups. But it is striking that moving from employment to solo self-employment is not associated with worse well-being trajectories than moving between employee jobs. For those who are out of work in the wave prior to entering solo self-employment or employment, who look more similar, trajectories in well-being are virtually identical. Differential selection may well be at play, but – on the face of it – our results do not support the view that becoming solo self-employed is inferior to starting an employee job in terms of its effects on workers' well-being, despite the clear difference in earnings trajectories.

**Figure 13. Evolution of earnings and well-being, employed in previous wave**



Note: Shows changes relative to  $t-1$ . Error bars are 95% confidence intervals.

Source: UKHLS Waves 1–9.

<sup>16</sup> As discussed above, this may partly reflect under-reporting of self-employment incomes. As a robustness check, we scale up all self-employment incomes by 12.51% (the estimated degree of under-reporting in the UKHLS using a consumption-based method – see Appendix B) in Figure A.12 in Appendix A. This shows that entering solo self-employment is still associated with lower earnings than entering or changing employee jobs, albeit to a lesser degree. As discussed in Appendix B, we see 12.51% as overstating the true degree of under-reporting especially in the first years of self-employment, given that people may learn to under-report over time and may be consuming out of wealth.

## 4. Conclusion

Using a large-scale panel data set, we trace the evolution of incomes and well-being around the entry into solo self-employment. We document three main sets of facts. First, compared with self-employment with employees, there is a steep fall in employment rates in the waves leading up to entry, and a much higher share of those who were employed in the wave before entry also had a spell of unemployment or inactivity between waves. A substantial share of those who fell out of employment in the run-up to becoming solo self-employed report being dismissed or made redundant from their previous job. This suggests that solo self-employment acts as a form of self-insurance against negative employment shocks.

Second, for those who were employed in the wave prior to entry, solo self-employment is associated with a large and persistent fall in earnings and a rise in poverty. These effects are much more pronounced for those who had a spell of unemployment or inactivity between waves, who are more likely to have been ‘pushed’ into solo self-employment. For those who were unemployed or inactive in the wave prior to entry, average earnings rise upon becoming solo self-employed (as may be expected), but do not fully recover for those who fell out of employment in the years leading up to entry. This suggests that whilst solo self-employment provides some insurance against employment shocks, it does not allow individuals to recover their previous levels of earnings. Meanwhile, those who enter solo self-employment directly from employee jobs (for whom the transition is more likely to be voluntary) take a hit to their incomes for at least two years after entry.

Third, despite the effect on incomes, becoming solo self-employed is associated with improvements in well-being. Notably, we see a large and sustained rise in job satisfaction among those who were employed in the wave prior to entry, and this holds among groups who may be using solo self-employment to self-insure – those who had a spell of unemployment or inactivity between waves, and those who did not expect to start their own business in the previous wave. Comparing entries into solo self-employment with entries into or moves between employee jobs, we find that well-being trajectories are remarkably similar despite significantly lower earnings in solo self-employment. This suggests that there may be intangible benefits of solo self-employment that compensate for lower earnings, that (on average) apply even to those who are ‘pushed’ into solo self-employment.

We do not claim that the patterns we document represent causal effects. Nevertheless, they provide an interesting insight into the trajectories associated with solo self-employment for those who choose that path, which is perhaps more nuanced than the recent discourse around atypical work suggests. On the one hand, it does seem as if solo self-employment is a ‘fall-back’ option for many who enter into self-employment, which is consistent with its portrayal as an inferior option or an ‘intermediate state’ between unemployment and employment (Boeri et al., 2020). On the other hand, there seem to be psychological benefits to being solo self-employed that may compensate for the loss in earnings. These benefits – feelings of freedom, autonomy, authority – may be more intangible than attributes that studies of willingness to pay can capture (Datta, 2019; Mas and Pallais, 2017).

In future work, we will look to exploit the differences in well-being and earnings trajectories between the self-employed and employees to estimate the monetary value of self-employment, taking into account potential under-reporting of self-employment incomes as well as expectations about future earnings. From a policy perspective, it may be advisable to better understand the desirable qualities of solo self-employment and look for ways to foster those qualities in traditional employment relationships, as well as shoring up labour market protections for the solo self-employed.

## References

- Advani, A., 2017. Who does and doesn't pay taxes? IFS Briefing Note BN218. <https://doi.org/10.1920/BN.IFS.2017.BN0218>
- Apouey, B. and Stabile, M., 2020. The effects of Uber diffusion on mental health in the UK. INSEAD Working Paper 2020/12/EPS. <https://doi.org/10.2139/ssrn.3395144>
- Bagger, J., Fontaine, F., Postel-Vinay, F. and Robin, J.-M., 2014. Tenure, experience, human capital, and wages: a tractable equilibrium search model of wage dynamics. *American Economic Review* 104, 1551–96. <https://doi.org/10.1257/aer.104.6.1551>
- Bell, D. N. F. and Blanchflower, D. G., 2019. Underemployment in the US and Europe. *Industrial and Labor Relations Review*. <https://doi.org/10.1177/0019793919886527>
- Benz, M. and Frey, B. S., 2004. Being independent raises happiness at work. *Swedish Economic Policy Review* 11, 95–134. <https://www.government.se/49b73b/contentassets/981bf0429ca14288919b4ca50dc1984f/matthias-benz--bruno-s.-frey-being-independent-raises-happiness-at-work>
- Benz, M. and Frey, B. S., 2008a. Being independent is a great thing: subjective evaluations of self-employment and hierarchy. *Economica* 75, 362–83. <https://doi.org/10.1111/j.1468-0335.2007.00594.x>
- Benz, M. and Frey, B. S., 2008b. The value of doing what you like: evidence from the self-employed in 23 countries. *Journal of Economic Behavior & Organization* 68, 445–55. <https://doi.org/10.1016/j.jebo.2006.10.014>
- Berger, T., Frey, C., Levin, G. and Danda, S., 2018. Uber happy? Work and wellbeing in the 'gig economy'. <https://www.oxfordmartin.ox.ac.uk/publications/uber-happy-work-and-wellbeing-in-the-gig-economy/> (accessed 5 January 2020)
- Binder, M. and Coad, A., 2015. Heterogeneity in the relationship between unemployment and subjective wellbeing: a quantile approach. *Economica* 82, 865–91. <https://doi.org/10.1111/ecca.12150>
- Blanchflower, D. G. and Oswald, A. J., 1998. What makes an entrepreneur? *Journal of Labor Economics* 16, 26–60. <https://doi.org/10.1086/209881>
- Blanchflower, D. G., Oswald, A. J. and Stutzer, A., 2001. Latent entrepreneurship across nations. *European Economic Review*, 45, 680–91. [https://doi.org/10.1016/S0014-2921\(01\)00137-4](https://doi.org/10.1016/S0014-2921(01)00137-4)
- Boeri, T., Giupponi, G., Krueger, A. B. and Machin, S., 2020. Solo self-employment and alternative work arrangements: a cross-country perspective on the changing composition of jobs. *Journal of Economic Perspectives* 34, 170–95. <https://doi.org/10.1257/jep.34.1.170>
- Bourquin, P., Cribb, J., Waters, T. and Xu, X., 2019. *Living Standards, Poverty and Inequality in the UK: 2019*. Institute for Fiscal Studies (IFS), Report 157. <https://doi.org/10.1920/re.ifs.2019.0157>
- Cappellari, L. and Jenkins, S. P., 2002. Who stays poor? Who becomes poor? Evidence from the British Household Panel Survey. *Economic Journal* 112, C60–67. <https://doi.org/10.1111/1468-0297.00028>
- CIPD, 2018. Megatrends: More selfies? A picture of self-employment in the UK. <https://www.cipd.co.uk/knowledge/work/trends/megatrends/self-employment> (accessed 5 January 2020)

- Clark, A. E., 2019. Born to be mild? Cohort effects don't (fully) explain why well-being is U-shaped in age. In M. Rojas (ed.), *The Economics of Happiness: How the Easterlin Paradox Transformed Our Understanding of Well-Being and Progress*. Cham, Switzerland: Springer International Publishing.  
[https://doi.org/10.1007/978-3-030-15835-4\\_17](https://doi.org/10.1007/978-3-030-15835-4_17)
- Clark, A. E., Diener, E., Georgellis, Y. and Lucas, R. E., 2008. Lags and leads in life satisfaction: a test of the baseline hypothesis. *Economic Journal* 118, F222–43. <https://doi.org/10.1111/j.1468-0297.2008.02150.x>
- Clark, A. E. and Georgellis, Y., 2013. Back to baseline in Britain: adaptation in the British Household Panel Survey. *Economica* 80, 496–512. <https://doi.org/10.1111/ecca.12007>
- Clark, A. E. and Senik, C., 2006. The (unexpected) structure of 'rents' on the French and British labour markets. *Journal of Socio-Economics*, 35, 180–96. <https://doi.org/10.1016/j.socec.2005.11.010>
- Cribb, J., Miller, H. and Pope, T., 2019. *Who Are Business Owners and What Are They Doing?*, Institute for Fiscal Studies (IFS), Report 158. <https://doi.org/10.1920/re.ifs.2019.0158>
- D'Arcy, C. and Gardiner, L., 2014. Just the job or a working compromise? The changing nature of self-employment. Resolution Foundation Report. <https://www.resolutionfoundation.org/publications/just-the-job-or-a-working-compromise-the-changing-nature-of-self-employment/> (accessed 5 January 2020)
- Datta, N., 2019. Willing to pay for security: a discrete choice experiment to analyse labour supply preferences. Centre for Economic Performance (CEP), Discussion Paper 1632. <http://cep.lse.ac.uk/pubs/download/dp1632.pdf> (accessed 30 June 2020)
- Datta, N., Giupponi, G. and Machin, S., 2019. Zero-hours contracts and labour market policy. *Economic Policy* 34, 369–427. <https://doi.org/10.1093/epolic/eiz008>
- Engström, P. and Hagen, J., 2017. Income underreporting among the self-employed: a permanent income approach. *European Economic Review* 92, 92–109. <https://doi.org/10.1016/j.eurocorev.2016.12.001>
- Ferrer-i-Carbonell, A. and Frijters, P., 2004. How important is methodology for the estimates of the determinants of happiness? *Economic Journal* 114, 641–59. <https://doi.org/10.1111/j.1468-0297.2004.00235.x>
- Fisher, P., Fumagalli, L., Buck, N. and Avram, S., 2019. Understanding Society and its income data. <https://www.understandingsociety.ac.uk/research/publications/525786> (accessed 3 July 2020)
- Frey, B. S. and Stutzer, A., 2000. Happiness, economy and institutions. *Economic Journal* 110, 918–38. <https://doi.org/10.1111/1468-0297.00570>
- Hanglberger, D. and Merz, J., 2015. Does self-employment really raise job satisfaction? Adaptation and anticipation effects on self-employment and general job changes. *Journal for Labour Market Research* 48, 287–303. <https://doi.org/10.1007/s12651-015-0175-8>
- Hu, Y., Stewart-Brown, S., Twigg, L. and Weich, S., 2007. Can the 12-item General Health Questionnaire be used to measure positive mental health? *Psychological Medicine* 37, 1005–1013. <https://doi.org/10.1017/S0033291707009993>
- Hundley, G., 2001. Why and when are the self-employed more satisfied with their work? *Industrial Relations* 40, 293–316. <https://doi.org/10.1111/0019-8676.00209>

- Hurst, E., Li, G. and Pugsley, B., 2014. Are household surveys like tax forms? Evidence from income underreporting of the self-employed. *Review of Economics and Statistics* 96, 19–33. [https://doi.org/10.1162/REST\\_a\\_00363](https://doi.org/10.1162/REST_a_00363)
- Jarvis, S. and Jenkins, S., 1998. How much income mobility is there in Britain? *Economic Journal* 108, 428–43. <https://doi.org/10.1111/1468-0297.00296>
- Katz, L. F. and Krueger, A. B., 2017. The role of unemployment in the rise in alternative work arrangements. *American Economic Review* 107, 388–392. <https://doi.org/10.1257/aer.p20171092>
- Katz, L. F. and Krueger, A. B., 2019a. The rise and nature of alternative work arrangements in the United States, 1995–2015, *ILR Review* 72, 382–416. <https://doi.org/10.1177/0019793918820008>
- Katz, L. F. and Krueger, A. B., 2019b. Understanding trends in alternative work arrangements in the United States. National Bureau of Economic Research (NBER), Working Paper w25425. <https://ssrn.com/abstract=3311399> (accessed 6 July 2020)
- Koustas, D. K., 2018. Consumption insurance and multiple jobs: evidence from rideshare drivers. <http://dmitrikoustas.com/DKoustas-RideSmoothing-WP.pdf> (accessed 5 January 2020)
- Koustas, D. K., 2019. What do big data tell us about why people take gig economy jobs? *AEA Papers and Proceedings* 109, 367–71. <https://doi.org/10.1257/pandp.20191041>
- Lange, T., 2012. Job satisfaction and self-employment: autonomy or personality? *Small Business Economics* 38, 165–77. <https://doi.org/10.1007/s11187-009-9249-8>
- Mas, A. and Pallais, A., 2017. Valuing alternative work arrangements. *American Economic Review* 107, 3722–59. <https://doi.org/10.1257/aer.20161500>
- Meager, N., 2019. Self-employment: independent ‘enterprise’, or precarious low-skilled work? The case of the UK. In W. Conen and J. Schippers (eds), *Self-Employment as Precarious Work: A European Perspective*. Elgar Online. <https://doi.org/10.4337/9781788115032.00012>
- Office for National Statistics, 2018. Trends in self-employment in the UK: analysing the characteristics, income and wealth of the self-employed. <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/articles/trendsinselfemploymentintheuk/2018-02-07> (accessed 5 January 2020)
- Pissarides, C. A. and Weber, G., 1989. An expenditure-based estimate of Britain’s black economy. *Journal of Public Economics* 39, 17–32. [https://doi.org/10.1016/0047-2727\(89\)90052-2](https://doi.org/10.1016/0047-2727(89)90052-2)
- Postel-Vinay, F. and Sepahsalari, A., 2019. Labour mobility and earnings in the UK, 1992–2016. Institute for Social and Economic Research (ISER), Understanding Society Working Paper 2019-09. <https://www.iser.essex.ac.uk/research/publications/working-papers/understanding-society/2019-09> (accessed 5 January 2020)
- Powdthavee, N., Plagnol, A. C., Frijters, P. and Clark, A. E., 2019. Who got the Brexit blues? The effect of Brexit on subjective wellbeing in the UK. *Economica* 86, 471–94. <https://doi.org/10.1111/ecca.12304>
- Ramnath, S., Shoven, J. B. and Slavov, S., 2017. Pathways to retirement through self-employment. National Bureau of Economic Research (NBER), Working Paper w23551. <https://ssrn.com/abstract=2996307> (accessed 6 July 2020)

Williams, N., 2009. Seniority, experience, and wages in the UK. *Labour Economics* 16, 272–83.  
<https://doi.org/10.1016/j.labeco.2008.09.003>

## Data sources

Department for Work and Pensions. (2020). *Households Below Average Income, 1994/95-2018/19*. [data collection]. 14th Edition. UK Data Service. SN: 5828, <http://doi.org/10.5255/UKDA-SN-5828-12>

Department for Work and Pensions, Office for National Statistics, NatCen Social Research. (2020). *Family Resources Survey, 2018-2019*. [data collection]. UK Data Service. SN: 8633, <http://doi.org/10.5255/UKDA-SN-8633-1>

Office for National Statistics, Social Survey Division. (2019). *Annual Population Survey, April 2018 - March 2019*. [data collection]. UK Data Service. SN: 8510, <http://doi.org/10.5255/UKDA-SN-8510-1>

Office for National Statistics, Social Survey Division. (2019). *Annual Population Survey, April 2017 - March 2018*. [data collection]. 4th Edition. UK Data Service. SN: 8356, <http://doi.org/10.5255/UKDA-SN-8356-4>

Office for National Statistics, Social Survey Division. (2019). *Annual Population Survey, April 2016 - March 2017*. [data collection]. 5th Edition. UK Data Service. SN: 8197, <http://doi.org/10.5255/UKDA-SN-8197-5>

Office for National Statistics, Social Survey Division. (2019). *Annual Population Survey, April 2015 - March 2016*. [data collection]. 6th Edition. UK Data Service. SN: 8003, <http://doi.org/10.5255/UKDA-SN-8003-6>

Office for National Statistics, Social Survey Division. (2019). *Annual Population Survey, April 2014 - March 2015*. [data collection]. 7th Edition. UK Data Service. SN: 7742, <http://doi.org/10.5255/UKDA-SN-7742-7>

Office for National Statistics, Social Survey Division. (2019). *Annual Population Survey, April 2013 - March 2014*. [data collection]. 8th Edition. UK Data Service. SN: 7521, <http://doi.org/10.5255/UKDA-SN-7521-8>

Office for National Statistics, Social Survey Division. (2019). *Annual Population Survey, April 2012 - March 2013*. [data collection]. 8th Edition. UK Data Service. SN: 7507, <http://doi.org/10.5255/UKDA-SN-7507-8>

Office for National Statistics, Social Survey Division. (2019). *Annual Population Survey, April 2011 - March 2012*. [data collection]. 4th Edition. UK Data Service. SN: 7088, <http://doi.org/10.5255/UKDA-SN-7088-4>

University of Essex, Institute for Social and Economic Research. (2019). *Understanding Society: Waves 1-9, 2009-2018 and Harmonised BHPS: Waves 1-18, 1991-2009: Special Licence Access, Census 2001 Lower Layer Super Output Areas*. [data collection]. 11th Edition. UK Data Service. SN: 6670, <http://doi.org/10.5255/UKDA-SN-6670-11>

## Appendix A – Additional figures and tables

**Table A.1. Well-being questions in Annual Population Survey and UKHLS**

|                                 | Question                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Annual Population Survey</i> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Life satisfaction               | Overall, how satisfied are you with your life nowadays? where nought is ‘not at all satisfied’ and 10 is ‘completely satisfied’                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Life worthwhile                 | Overall, to what extent do you feel that the things you do in your life are worthwhile? where nought is ‘not at all worthwhile’ and 10 is ‘completely worthwhile’                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Happiness                       | Overall, how happy did you feel yesterday? where nought is ‘not at all happy’ and 10 is ‘completely happy’                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Anxiety                         | On a scale where nought is ‘not at all anxious’ and 10 is ‘completely anxious’, overall, how anxious did you feel yesterday?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <i>UKHLS</i>                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Job satisfaction                | On a scale of 1 to 7 where 1 means ‘Completely dissatisfied’ and 7 means ‘Completely satisfied’, how dissatisfied or satisfied are you with your present job overall?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Satisfaction with life overall  | On a scale of 1 to 7 where 1 = ‘Completely Dissatisfied’ and 7 = ‘Completely Satisfied’, please tell me the number which you feel best describes how dissatisfied or satisfied you are with the following aspects of your current situation: Your life overall                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Distress (GHQ Likert)           | <p>This is based on the General Health Questionnaire (GHQ-12) which consists of 12 items, each assessing the severity of a mental problem over the past few weeks using a four-point scale (from 0 to 3).</p> <p>The 12 scores are used to generate a total Likert score ranging from 0 to 36, with higher scores indicating higher levels of distress.</p> <p>The questions are as follows:</p> <ol style="list-style-type: none"> <li>1. Have you recently been able to concentrate on whatever you’re doing?</li> <li>2. Have you recently lost much sleep over worry?</li> <li>3. Have you recently felt that you were playing a useful part in things?</li> <li>4. Have you recently felt capable of making decisions about things?</li> <li>5. Have you recently felt constantly under strain?</li> <li>6. Have you recently felt you couldn’t overcome your difficulties?</li> <li>7. Have you recently been able to enjoy your normal day-to-day activities?</li> <li>8. Have you recently been able to face up to problems?</li> <li>9. Have you recently been feeling unhappy or depressed?</li> <li>10. Have you recently been losing confidence in yourself?</li> <li>11. Have you recently been thinking of yourself as a worthless person?</li> <li>12. Have you recently been feeling reasonably happy, all things considered?</li> </ol> |
| Satisfaction with income        | On a scale of 1 to 7 where 1 = ‘Completely Dissatisfied’ and 7 = ‘Completely Satisfied’, please tell me the number which you feel best describes how dissatisfied or satisfied you are with the following aspects of your current situation: The income of your household                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

|                                |                                                                                                                                                                                                                                                                                  |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Satisfaction with leisure time | On a scale of 1 to 7 where 1 = ‘Completely Dissatisfied’ and 7 = ‘Completely Satisfied’, please tell me the number which you feel best describes how dissatisfied or satisfied you are with the following aspects of your current situation: The amount of leisure time you have |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Table A.2. Summary statistics in wave before entering self-employment**

|                                | All self-employed    |                      | Solo self-employed   |                      |
|--------------------------------|----------------------|----------------------|----------------------|----------------------|
|                                | SE with employees    | Solo SE              | From employment      | From non-employment  |
| Monthly earnings               | 1783.40<br>(1654.81) | 959.17<br>(1142.44)  | 1503.08<br>(1108.59) | 4.75<br>(93.23)      |
| Monthly household income       | 4185.65<br>(2262.93) | 3336.83<br>(2152.59) | 3839.44<br>(2222.22) | 2421.80<br>(1669.71) |
| Relative poverty (BHC)         | 13.04<br>(33.77)     | 18.18<br>(38.58)     | 8.63<br>(28.10)      | 35.73<br>(47.97)     |
| Job satisfaction               | 5.49<br>(1.43)       | 4.74<br>(1.68)       | 4.74<br>(1.68)       | N/A                  |
| Satisfaction with life overall | 5.29<br>(1.49)       | 4.95<br>(1.46)       | 5.10<br>(1.40)       | 4.69<br>(1.54)       |
| Distress (GHQ Likert)          | 10.52<br>(4.57)      | 11.82<br>(5.97)      | 11.22<br>(5.60)      | 12.88<br>(6.43)      |
| Satisfaction with income       | 4.68<br>(1.76)       | 4.02<br>(1.79)       | 4.29<br>(1.71)       | 3.54<br>(1.82)       |
| Satisfaction with leisure time | 4.02<br>(1.60)       | 4.46<br>(1.60)       | 4.33<br>(1.59)       | 4.70<br>(1.57)       |
| Constantly under strain (GHQ)  | 2.16<br>(0.76)       | 2.19<br>(0.79)       | 2.17<br>(0.77)       | 2.24<br>(0.83)       |
| Hours worked                   | 33.75<br>(20.04)     | 21.07<br>(21.05)     | 33.06<br>(17.30)     | 0.04<br>(0.61)       |
| One-way commute (minutes)      | 25.73<br>(23.16)     | 25.62<br>(23.77)     | 25.62<br>(23.77)     | N/A                  |

Source: UKHLS Waves 1–9.

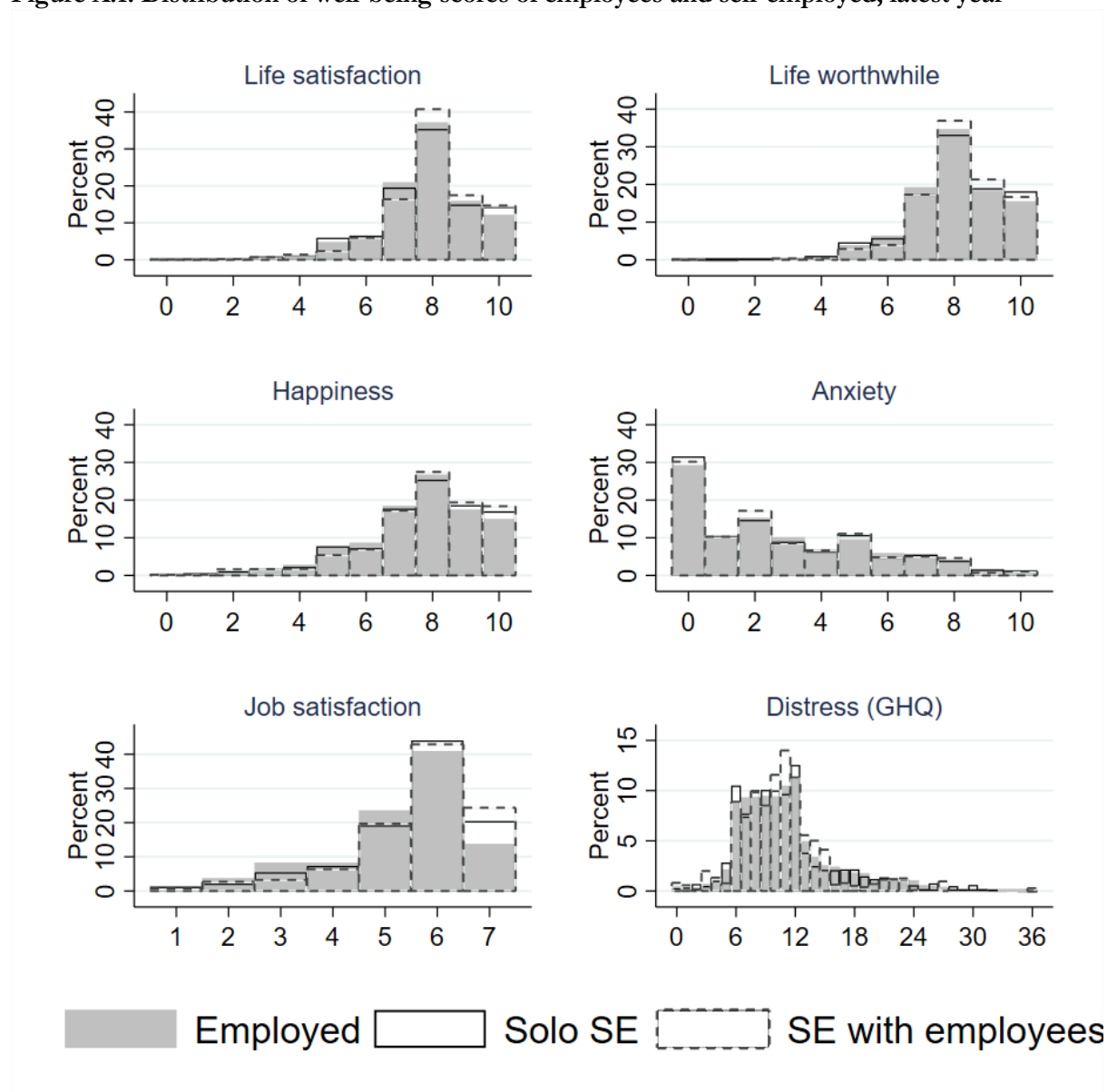
**Table A.3. Summary statistics in wave before entering solo SE or new employee job**

|                          | Solo self-employment |                     | New employee job    |                     |
|--------------------------|----------------------|---------------------|---------------------|---------------------|
|                          | From employment      | From non-employment | From employment     | From non-employment |
| Age                      | 40.05<br>(10.07)     | 40.10<br>(10.08)    | 37.61<br>(9.99)     | 37.84<br>(10.20)    |
| Young (25–34)            | 0.31<br>(0.46)       | 0.29<br>(0.46)      | 0.41<br>(0.49)      | 0.39<br>(0.49)      |
| Male                     | 0.59<br>(0.49)       | 0.48<br>(0.50)      | 0.49<br>(0.50)      | 0.40<br>(0.49)      |
| White British            | 0.80<br>(0.40)       | 0.79<br>(0.41)      | 0.83<br>(0.38)      | 0.80<br>(0.40)      |
| Degree/higher education  | 0.51<br>(0.50)       | 0.42<br>(0.49)      | 0.52<br>(0.50)      | 0.38<br>(0.49)      |
| London and South East    | 0.34<br>(0.47)       | 0.39<br>(0.49)      | 0.28<br>(0.45)      | 0.29<br>(0.45)      |
| Monthly earnings         | 1503.08<br>(1108.59) | 4.75<br>(93.23)     | 1650.85<br>(960.59) | 10.69<br>(109.68)   |
| Monthly household income | 3839.44              | 2421.80             | 3780.48             | 2351.05             |

|                                |           |           |           |           |
|--------------------------------|-----------|-----------|-----------|-----------|
|                                | (2222.22) | (1669.71) | (1925.90) | (1654.57) |
| Relative poverty (BHC)         | 0.09      | 0.36      | 0.05      | 0.38      |
|                                | (0.28)    | (0.48)    | (0.21)    | (0.49)    |
| Job satisfaction               | 4.74      | N/A       | 4.59      | N/A       |
|                                | (1.68)    |           | (1.67)    |           |
| Satisfaction with life overall | 5.10      | 4.69      | 5.01      | 4.74      |
|                                | (1.40)    | (1.54)    | (1.41)    | (1.61)    |
| Distress (GHQ Likert)          | 11.22     | 12.88     | 11.64     | 12.81     |
|                                | (5.60)    | (6.43)    | (5.78)    | (6.50)    |
| Satisfaction with income       | 4.29      | 3.54      | 4.36      | 3.58      |
|                                | (1.71)    | (1.82)    | (1.64)    | (1.78)    |
| Satisfaction with leisure time | 4.33      | 4.70      | 4.21      | 4.65      |
|                                | (1.59)    | (1.57)    | (1.56)    | (1.65)    |
| Constantly under strain (GHQ)  | 2.17      | 2.24      | 2.16      | 2.18      |
|                                | (0.77)    | (0.83)    | (0.80)    | (0.83)    |
| Hours worked                   | 33.06     | 0.04      | 38.19     | 0.14      |
|                                | (17.30)   | (0.61)    | (12.41)   | (1.48)    |
| One-way commute (minutes)      | 25.62     | N/A       | 28.67     | N/A       |
|                                | (23.77)   |           | (23.36)   |           |

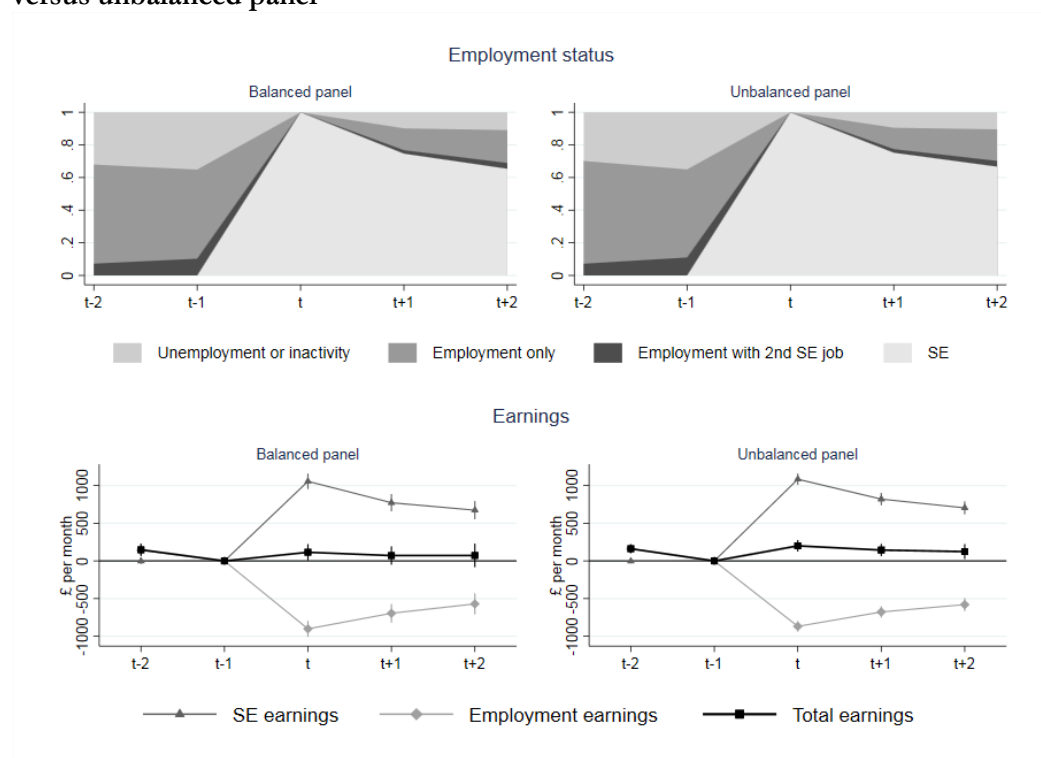
Source: UKHLS Waves 1–9.

Figure A.1. Distribution of well-being scores of employees and self-employed, latest year



Source: APS 2018 and UKHLS Wave 9.

**Figure A.2. Evolution of earnings and employment status on entering self-employment, balanced versus unbalanced panel**



Source: UKHLS Waves 1–9.

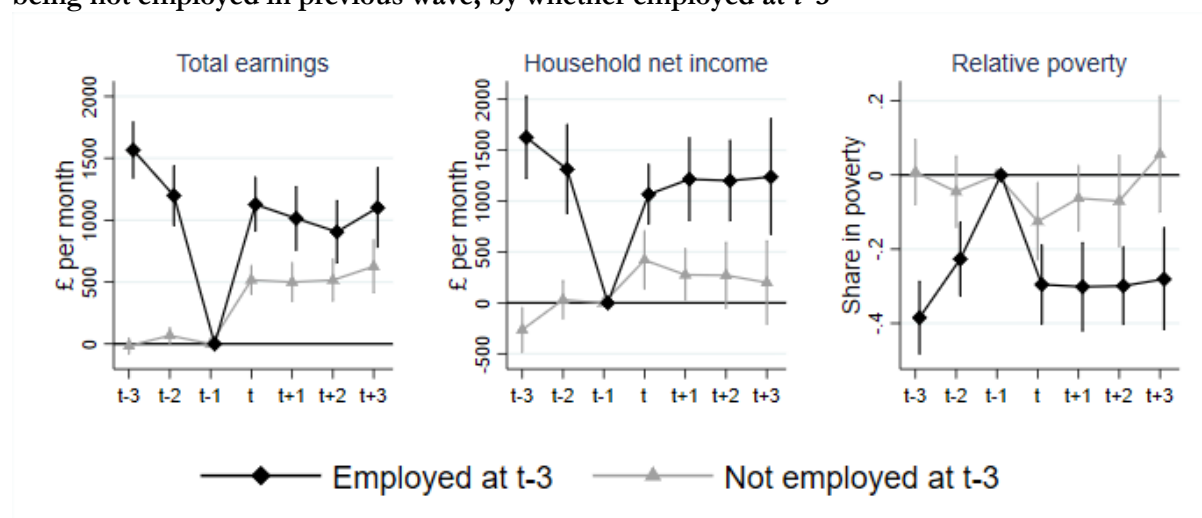
**Figure A.3. Evolution of employment status on entering solo self-employment, by occupation group**



Note: Managerial and professional occupations defined as NS-SEC classes 1 and 2.

Source: UKHLS Waves 1–9.

**Figure A.4. Evolution of earnings, income and poverty on entering solo self-employment from being not employed in previous wave, by whether employed at  $t-3$**



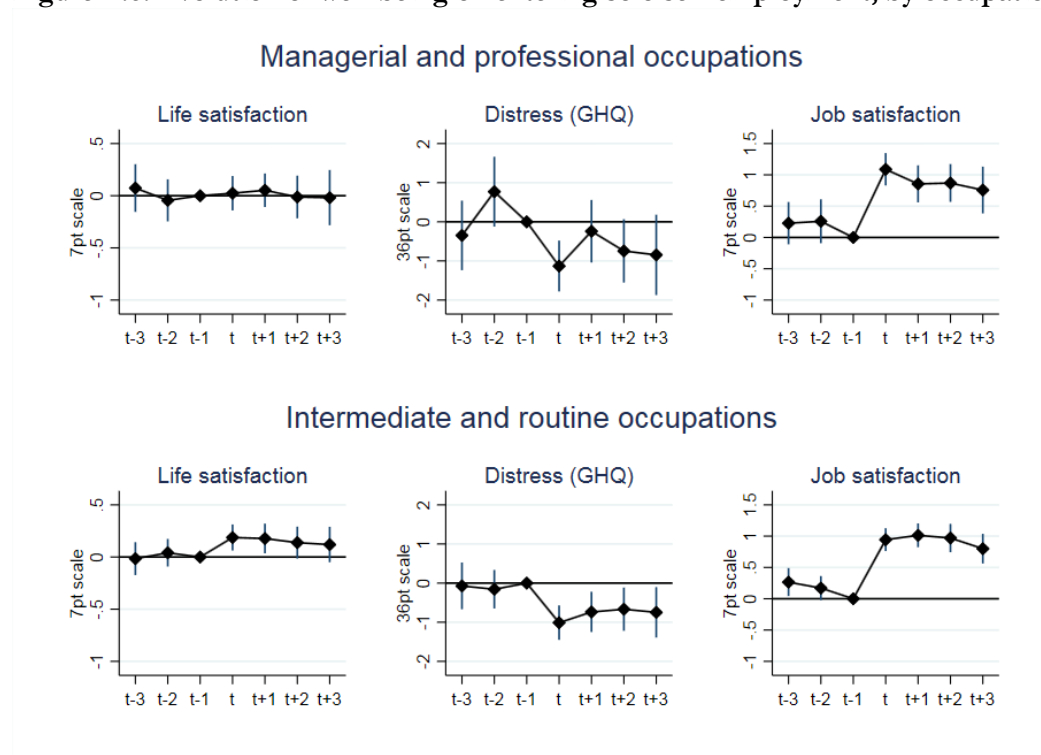
Note: Sample restricted to those for whom data at  $t-3$  are available (60% of those entering solo self-employment who were not employed in the previous wave). Shows changes relative to  $t-1$ . Error bars are 95% confidence intervals.  
Source: UKHLS Waves 1–9.

**Figure A.5. Evolution of well-being on entering self-employment, binary coding**



Note: Shows changes relative to  $t-1$ . Error bars are 95% confidence intervals.  
Source: UKHLS Waves 1–9.

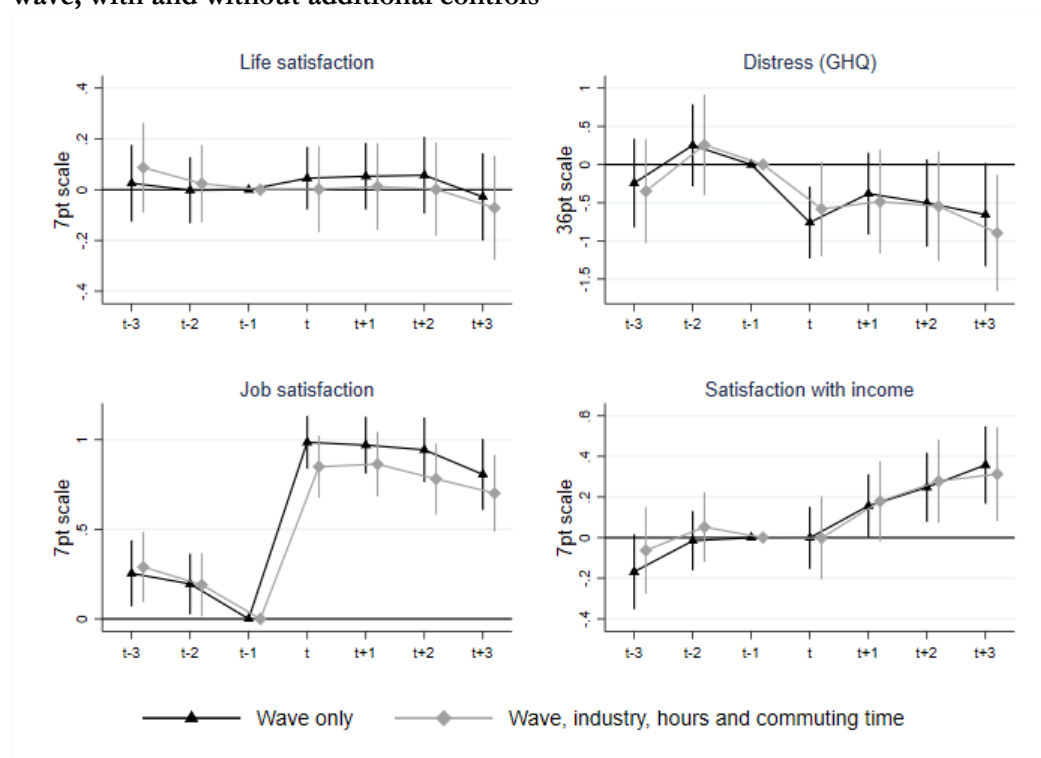
Figure A.6. Evolution of well-being on entering solo self-employment, by occupation group



Note: Managerial and professional occupations defined as NS-SEC classes 1 and 2. Shows changes relative to  $t-1$ . Error bars are 95% confidence intervals.

Source: UKHLS Waves 1–9.

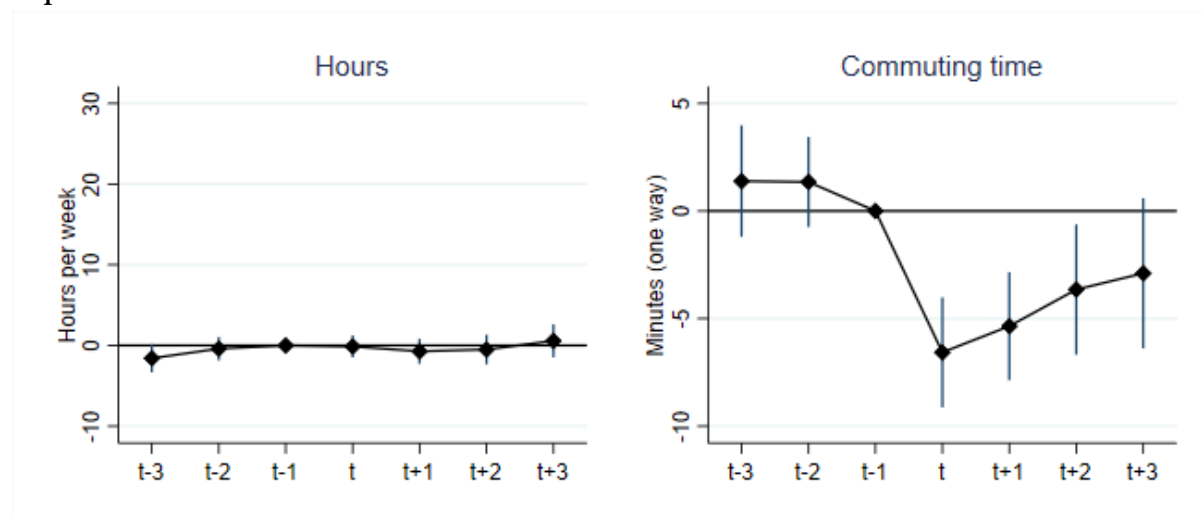
**Figure A.7. Evolution of well-being on entering solo self-employment, employed in previous wave, with and without additional controls**



Note: Additional controls include: one-digit SIC dummies, linear and quadratic hours, working from home dummy, and linear and quadratic one-way commute. Hours include paid and unpaid overtime. Shows changes relative to  $t-1$ . Error bars are 95% confidence intervals.

Source: UKHLS Waves 1–9.

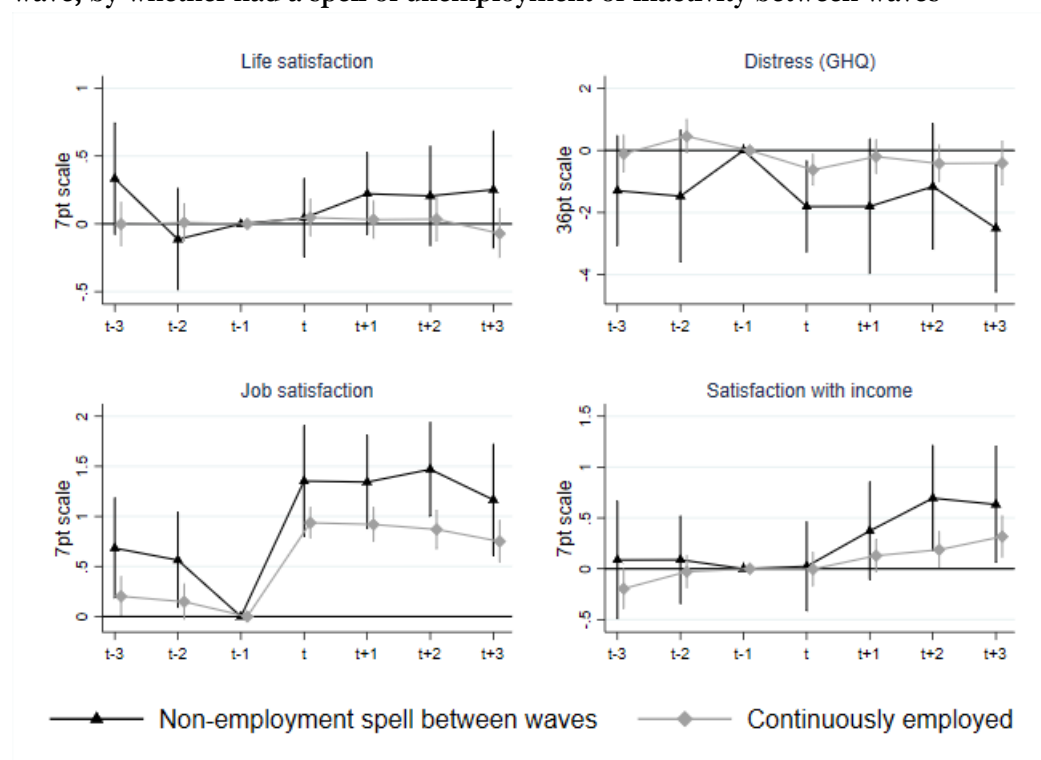
**Figure A.8. Evolution of hours and commuting time on entering solo self-employment, employed in previous wave**



Note: Hours include paid and unpaid overtime. Shows changes relative to  $t-1$ . Error bars are 95% confidence intervals.

Source: UKHLS Waves 1–9.

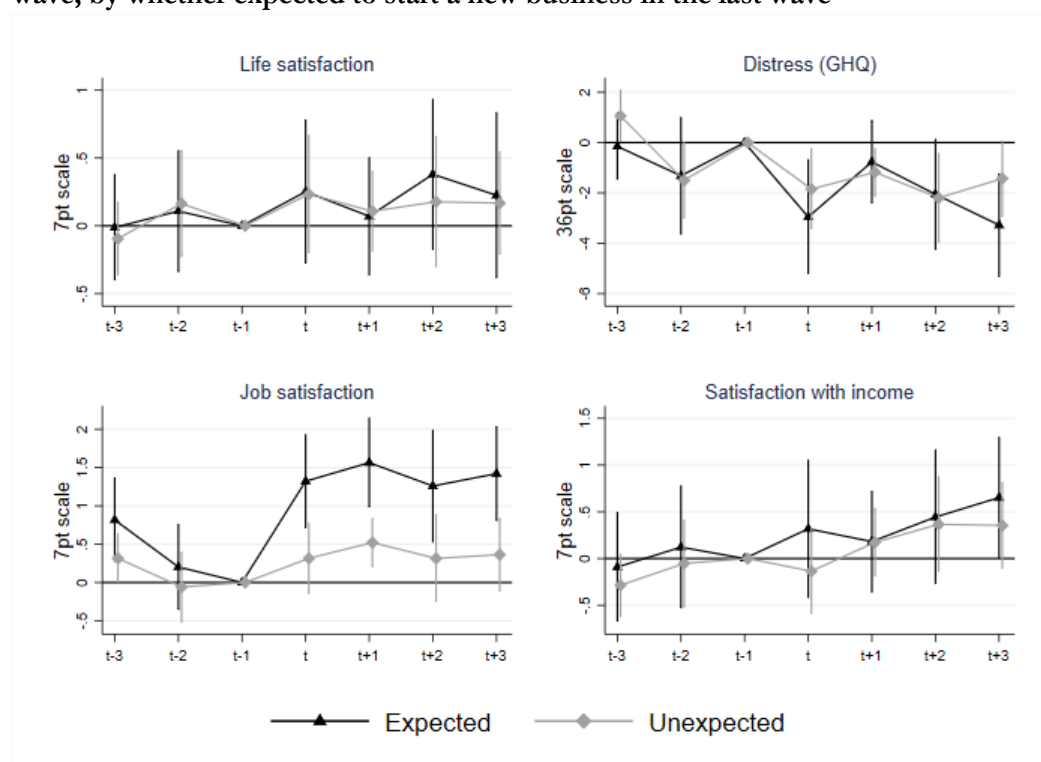
**Figure A.9. Evolution of well-being on entering solo self-employment, employed in previous wave, by whether had a spell of unemployment or inactivity between waves**



Note: Shows changes relative to  $t-1$ . Error bars are 95% confidence intervals.

Source: UKHLS Waves 1–9.

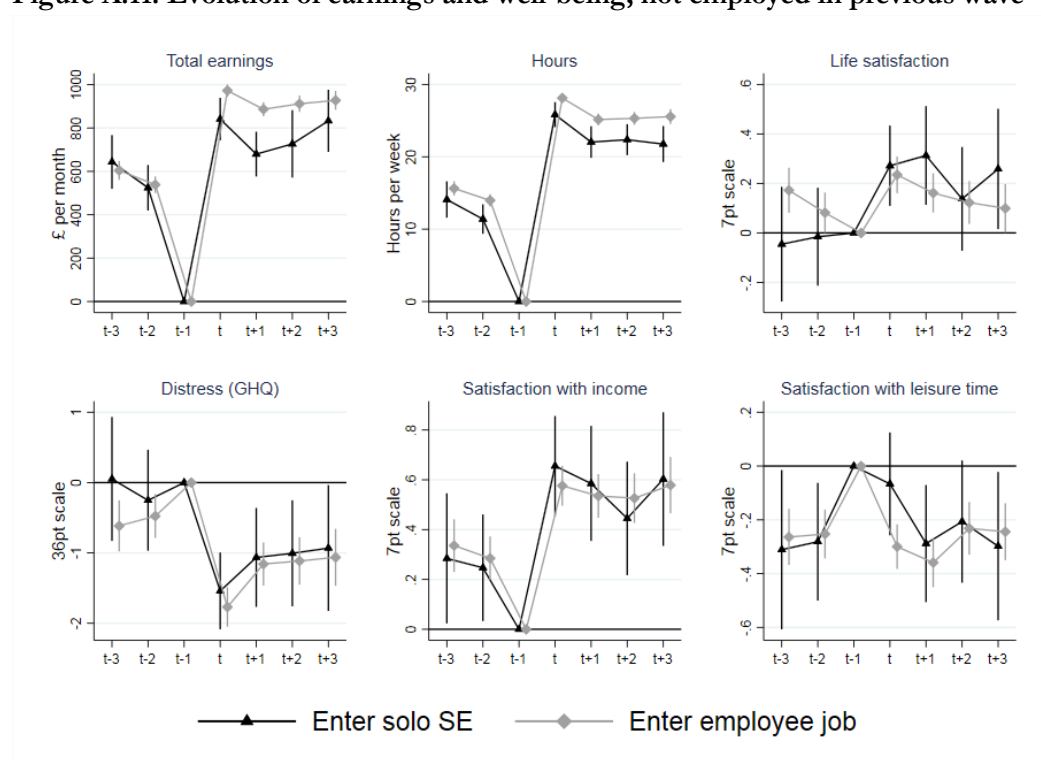
**Figure A.10. Evolution of well-being on entering solo self-employment, employed in previous wave, by whether expected to start a new business in the last wave**



Note: Shows changes relative to  $t-1$ . Error bars are 95% confidence intervals.

Source: UKHLS Waves 3, 5, 7 and 9.

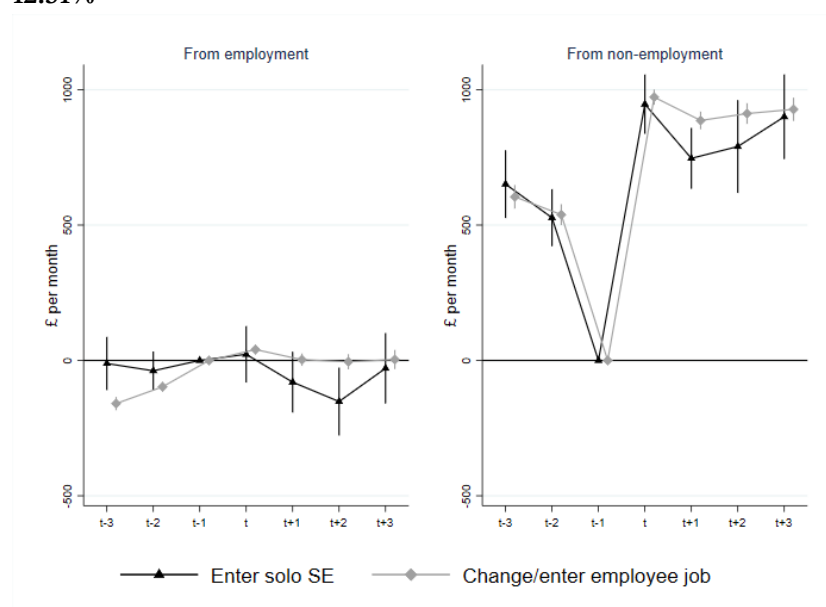
**Figure A.11. Evolution of earnings and well-being, not employed in previous wave**



Note: Shows changes relative to  $t-1$ . Error bars are 95% confidence intervals.

Source: UKHLS Waves 1-9.

**Figure A.12. Evolution of earnings and well-being with all self-employment incomes scaled up by 12.51%**



Note: 12.51% is based on the estimated degree of under-reporting using the restricted sample in Table B.1 (last column). Shows changes relative to  $t-1$ . Error bars are 95% confidence intervals.

Source: UKHLS Waves 1–9.

## Appendix B – Under-reporting of self-employment earnings

There is a large body of work that uses differences in consumption to estimate the degree of under-reporting of self-employment earnings, starting with the seminal paper by Pissarides and Weber (1989). Recent papers using this approach have found evidence of under-reporting in household surveys, even though survey responses do not affect households' tax liabilities (Engström and Hagen, 2017; Hurst et al., 2014).

The consumption method compares the relationship between food consumption and income (Engel curves) among employees and the self-employed, and uses 'excess' food consumption to infer the degree of under-reporting. The following equation is estimated on pooled data on employee and self-employed households:

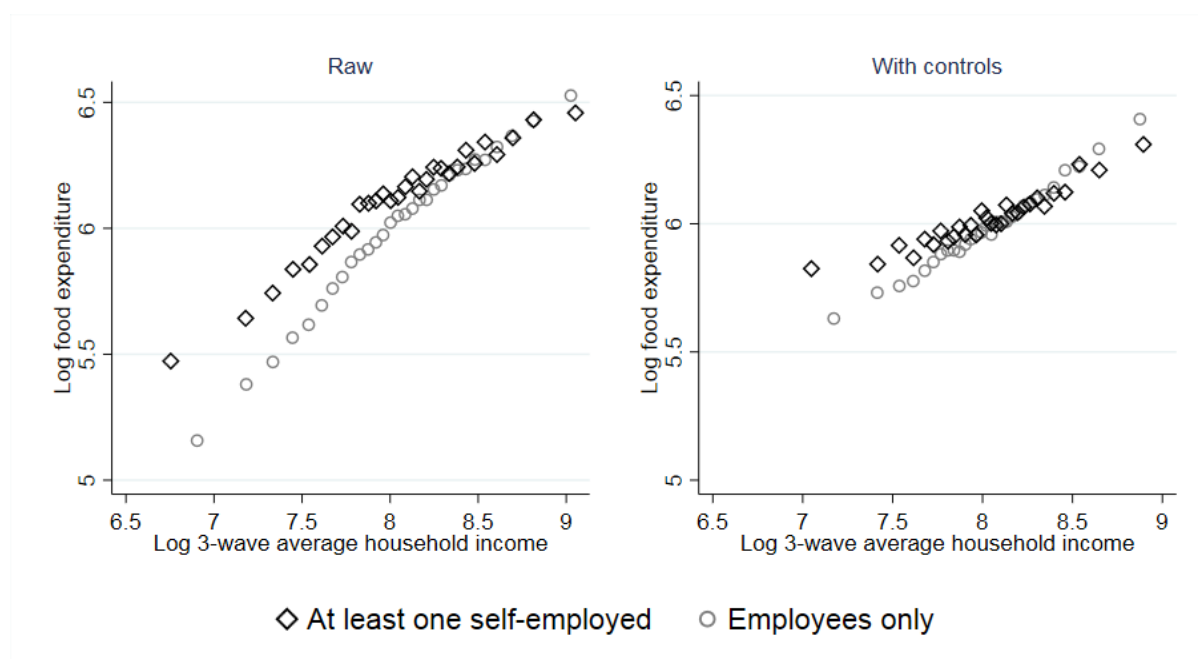
$$(2) \quad c_{it} = \beta y_{it} + \gamma SE_{it} + X_i \alpha + \varepsilon_{it}$$

where  $c_{it}$  is the log consumption of household  $i$  in year  $t$ ,  $y_{it}$  is a measure of permanent income,  $SE_{it}$  is an indicator denoting whether anyone is self-employed in the household,  $X_i$  is a vector of controls and  $\varepsilon_{it}$  is a random error term. The parameter  $\gamma$  captures the difference in log consumption at any given level of income – that is, the difference in intercepts between the Engel curves of employee and self-employed households. The degree of under-reporting can then be estimated by  $\hat{k} = \exp(-\gamma/\beta)$ , where  $1 - \hat{k}$  is the fraction by which the self-employed under-report their income.

According to the permanent income hypothesis, the relevant income measure in equation 2 is permanent income. Recent studies (Engström and Hagen, 2017; Hurst et al., 2014) have used average incomes over a number of years to approximate permanent income. This is important because transitory income fluctuations attenuate estimates of  $\beta$ , which leads to an overestimate in the degree of under-reporting. Using three-year average incomes, Hurst et al. find under-reporting of around 25% in the US. Engström and Hagen show that averaging over long periods reduces the estimate of under-reporting, which suggests that three-year averages are still a noisy measure of permanent incomes. Using seven-year average incomes and defining self-employed households based on their status at time  $t$  (see below), they estimate under-reporting of 16% in Sweden, compared with 19% using three-year averages.

Figure B.1 plots food consumption against three-year average net household incomes in our UKHLS data (the picture using seven-year averages is similar, though noisier). We see that low-income self-employed households have considerably higher food consumption than employee households with the same levels of income. The gap narrows but does not disappear when we control for household characteristics that may affect the relationship between income and food consumption, including demographics, household composition and proxies for wealth such as homeownership and self-reported house values for homeowners.

**Figure B.1. Relationship between food expenditure and income**



Note: Includes households with at least one prime-aged (25–59) person in work. Trims top and bottom 0.5% of household incomes. Self-employed households defined based on current status. Plots median log food expenditure for 30 bins of log net household income averaged over three waves. Controls for household head characteristics (sex, education, age, ethnicity), household composition, region, tenure, homeownership and self-reported house value for homeowners.

Source: UKHLS Waves 1–9.

Engström and Hagen (2017) consider two classifications of self-employed households: an ‘unrestricted’ definition, which classes a household as self-employed if it is self-employed in year  $t$ , and a ‘restricted’ definition, which requires that households are consistently self-employed in all seven years. Replicating their analysis in our UKHLS data, we estimate under-reporting of around 10% using the unrestricted sample and around 13% using the restricted sample of households (Table B.1). These estimates are lower than their estimates of 16% and 22% respectively. Part of the difference is due to the inclusion of controls for wealth, proxied by homeownership and property values: omitting these from our specification yields estimates that are roughly 2 percentage points higher.

As in Engström and Hagen (2017), estimated under-reporting is lower using longer-run averages, and higher using the restricted sample than the unrestricted sample. The difference between the estimates may stem from the fact that current self-employment status is a poor proxy for permanent status, given the transitory nature of self-employment, which leads to attenuation bias in the estimates. Alternatively, it is possible that self-employed households learn to under-report incomes over time, so households that are continuously self-employed for seven years behave differently from those who are self-employed for shorter periods.

**Table B.1. Estimation results**

|                            | Unrestricted sample   |                       |                       |                       | Restricted sample    |                      |                      |                      |
|----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------|----------------------|----------------------|----------------------|
|                            | 1-year                | 3-year                | 5-year                | 7-year                | 1-year               | 3-year               | 5-year               | 7-year               |
| Self-employed              | 0.0533***<br>(.00890) | 0.0512***<br>(.00878) | 0.0515***<br>(.00868) | 0.0502***<br>(.00859) | 0.0602***<br>(.0122) | 0.0599***<br>(.0121) | 0.0631***<br>(.0120) | 0.0628***<br>(.0120) |
| $\beta$                    | 0.314***<br>(.0112)   | 0.401***<br>(.0105)   | 0.435***<br>(.0105)   | 0.454***<br>(.0106)   | 0.358***<br>(.0122)  | 0.427***<br>(.0129)  | 0.451***<br>(.0132)  | 0.469***<br>(.0134)  |
| Under-reporting            | .1563***<br>(.0243)   | .1198***<br>(.0194)   | .1117***<br>(.0178)   | .1049***<br>(.0170)   | .1549***<br>(.0288)  | .1308***<br>(.0247)  | .1305***<br>(.0233)  | .1251***<br>(.0223)  |
| <i>N</i>                   | 19998                 | 19998                 | 19998                 | 19998                 | 13732                | 13732                | 13732                | 13732                |
| <i>R</i> <sup>2</sup>      | 0.407                 | 0.420                 | 0.425                 | 0.427                 | 0.419                | 0.427                | 0.430                | 0.432                |
| Adj. <i>R</i> <sup>2</sup> | 0.406                 | 0.418                 | 0.424                 | 0.426                 | 0.417                | 0.425                | 0.428                | 0.430                |

Note: Ordinary least squares (OLS) estimates with robust standard errors in parentheses. Controls as in the note to Figure B.1. Includes households present in seven continuous waves. Restricted sample contains households that remain in employment or self-employment in all seven waves. Standard errors for under-reporting calculated using delta method.

Source: UKHLS Waves 1–9.

There are many potential issues with consumption-based methods of estimating under-reporting of self-employment incomes, not least that there may be differences in preferences between employee and self-employed households that are not captured by the controls. As shown in Figure B.1, and also to some extent in Engström and Hagen (2017) and Hurst et al. (2014), the Engel curves of employee and self-employed households are not perfectly parallel, which casts the assumptions underlying the method into doubt. There may also be differences in the ability to consume out of wealth: self-employed individuals in the UK have higher levels of financial and housing wealth (Office for National Statistics, 2018), and omitting measures of housing wealth from our set of controls increases the estimated degree of under-reporting.

However, given previous evidence on under-reporting using both the consumption method and random audits of tax forms (Advani, 2017), it is prudent to interpret the reported self-employment incomes in our data as a lower bound. If the self-employed systematically under-report their incomes, the difference between self-employed and employee earnings may be smaller than the above analysis suggests.