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Well-being effects of self-employment: A spatial inquiry

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Well-being Effects of Self-employment: A Spatial Inquiry

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Well-being effects of self-employment: a spatial inquiry

Maria Abreu^a, Özge Öner^b, Aleid Brouwer^c, Eveline van Leeuwen^d

Abstract

Our paper presents an empirical analysis of entrepreneurial well-being using a large-scale longitudinal household survey from the UK that tracks almost 50,000 individuals across seven waves over the period 2009-2017, as well as a number of exploratory case studies. We contribute to the existing literature by investigating how entrepreneurial well-being varies across locations along the urban-rural continuum, and across wealthy-deprived neighbourhoods. We use a Coarsened Exact Matching (CEM) approach to compare the well-being outcomes of individuals who switch into self-employment from waged employment, and show that entrepreneurial well-being, in the form of job satisfaction, is significantly higher for those living in semi-urban locations, relative to those living in urban and rural locations. We argue that semi-urban locations provide an optimal combination of ease of doing business and quality of life. Our results also show that individuals in wealthy neighbourhoods who switch into self-employment experience higher job satisfaction than otherwise comparable individuals living in materially deprived neighbourhoods, although the latter experience greater levels of life satisfaction following the switch.

JEL codes: L26, I13, R2, P25, R23, E24

Keywords: entrepreneurship, well-being, self-employment, urban-rural, neighbourhood effects

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Executive Summary

The recognition that individuals choose to become entrepreneurs for a range of reasons over and above financial motives, and that they benefit from entrepreneurship in a number of non-financial ways, have led to the emergence of a young and rapidly growing strand of literature that investigates the link between entrepreneurship and well-being. Although the initial focus was limited to job satisfaction, more recent studies have investigated the link between entrepreneurship and a wider range of well-being measures and concluded that entrepreneurs may be prioritising job satisfaction to the detriment of other aspects of their well-being. One particular issue that this strand of literature is silent about is the potential importance of location for entrepreneurial well-being – a gap we aim to fill with this paper.

The entrepreneurship literature is vast when it comes to discussing the importance of contextual determinants of entrepreneurship, highlighting factors such as the presence of social networks, labour market thickness, and transport links. If entrepreneurial activity varies in its nature and performance across space, then so might the outcomes of entrepreneurship, including well-being. The literature on well-being is similarly very vocal about the importance of spatial context, and one aspect that is commonly discussed is the urban/rural dimension. We argue that while an urban environment may provide the entrepreneur with the necessary market scale and scope to secure a successful business, it may also impose a number of negative externalities on the individual's well-being due to, for example, high living costs, congestion, commuting, pollution, and crime. Such trade-offs suggest that a binary categorization of cities in an urban-rural dichotomy may lead to an incomplete analysis of the importance of location. Rather, we argue, places that rank between the urban and rural locations may provide a better climate for realizing both higher entrepreneurial well-being and entrepreneurial success. We also argue that, at the neighbourhood level, the level of material deprivation may cause further variations in entrepreneurial well-being. Providing an escape route out of deprivation and a more viable labour market alternative, individuals in deprived neighbourhoods with limited resources and high financial barriers may experience an increase in life satisfaction following a switch into self-employment. In contrast, we hypothesise that their comparable peers in wealthier neighbourhoods may benefit from an increase in job satisfaction but perhaps not in other aspects of well-being.

A potential challenge in analysing the relationship between entrepreneurship and well-being is the presence of *sorting*: the existence of personal characteristics, such as ambition and extraversion, that affect both the propensity to become an entrepreneur, and also job satisfaction and other measures of well-being. A similar sorting effect is also apparent across space, with personal characteristics that are conducive to sorting into locations also affecting entrepreneurial outcomes including well-being. We build an empirical design that allows us to address these challenges, for which we make use of a large-scale longitudinal household survey from the UK that tracks almost 50,000 individuals across seven waves over the period 2009-2017, and a complementary set of 12 qualitative case study interviews. We use a Coarsened Exact Matching (CEM) approach to compare the well-being outcomes of individuals who switch into self-employment from waged employment across different locations. We show that entrepreneurial well-being, in the form of job satisfaction, is significantly higher for those living in semi-urban locations (suburbs, rural fringes of large cities, smaller cities, and towns), relative to those living in urban and rural locations. This finding suggests that semi-urban locations provide an optimal combination of ease of doing business and quality of life. We also show that self-employed individuals living in wealthy neighbourhoods experience greater job satisfaction than comparable individuals in materially deprived neighbourhoods, while the latter experience higher levels of life satisfaction, suggesting the presence of non-pecuniary benefits to self-employment in locations where there are greater constraints to waged employment.

1. Introduction

An important consideration within Economics, Sociology, Psychology, and more widely in the social sciences, is the extent to which well-being is associated with wealth and financial status. Since the 1970s, successive studies have found that subjective well-being is only loosely linked to income (Easterlin, 1974). Much of the evidence shows that it is in fact much more dependent on health, social status, family and employment circumstances, and other factors (Easterlin, 2001; Stutzer, 2004; Frey, 2008; Tideman et al., 2008). Within this debate, a young but rapidly growing literature has established a link between entrepreneurship and well-being. The development of this literature originates from the recognition that entrepreneurial intentions are partly non-pecuniary in nature, with individuals choosing to become entrepreneurs for a range of reasons, other than financial considerations (Carter et al., 2003). For instance, the literature has highlighted the role of

psychological income (Gimeno et al. 1997), job satisfaction (Blanchflower and Oswald, 1990), and independence (Benz and Frey, 2008).¹

The relationship between entrepreneurship and well-being is complex, with a number of factors operating simultaneously for any given individual. These mechanisms are difficult to identify due to sorting processes, and the motivations that determine entrepreneurial intentions are moreover likely to vary across place, and time. From an empirical perspective, a relationship between entrepreneurship and well-being captured at one point in time will not necessarily hold into the medium- and long-term. The use of longitudinal data is therefore crucial in isolating the entrepreneurial well-being from the well-being of individuals who are entrepreneurs, and who may have particular personal characteristics that are conducive to higher well-being (Shir, 2015). While several studies have analysed the cross-sectional relationship between entrepreneurship and well-being, the number of longitudinal studies is still quite limited, with a few notable exceptions (e.g. Binder and Coad, 2013; Binder and Coad, 2016; Binder and Freytag, 2013; Hessels et al., 2017; Shir, 2015).

A relatively under-researched area is the extent to which entrepreneurial well-being varies across locations. The environment an individual is exposed to can be as immediate as the neighbourhood he/she lives in, or can operate at a higher geographical aggregation such as the city. While the entrepreneurship literature is vast when it comes to the importance of contextual determinants of entrepreneurship², perhaps due to its infancy, the literature on entrepreneurship and well-being is rather silent on the matter. If entrepreneurial activity varies in its nature and performance across space, then so might the outcomes of entrepreneurship, including well-being. We argue that, from a resource-based perspective, the characteristics of a potential entrepreneur's milieu dictate not just their entrepreneurial intentions, actions, and the performance of their ventures, but also alter her entrepreneurial well-being. Whether it is examined from an entrepreneurial intentions point of view (Bird, 1988) in which the entrepreneurial engagement is dictated by goal-directed behaviour (Boyd and Vozikis, 1994), or from an effectuation point of view, which argues that entrepreneurial engagement is not a deterministic process but rather a contingent one (Sarasvathy, 2001), the entrepreneur's milieu should be relevant not only for the pre-action phase, but also for the post-action evaluations of their entrepreneurial engagement.

¹ See Parker (2009) for an extensive discussion on the pecuniary vs. non-pecuniary nature of entrepreneurship.

² See, for instance, Anderson and Koster (2011), Fritsch and Mueller (2004) and Dahl and Sorenson (2009).

By exploiting the longitudinal nature of a rich household panel survey for the UK, in conjunction with a set of exploratory case study interviews, we contribute to the existing literature on entrepreneurial well-being in three ways. First, we show that most of the findings of the existing literature on entrepreneurial well-being hold even after controlling for differences in neighbourhood characteristics. That is, self-employed individuals have higher levels of well-being, relative to those who are employed, regardless of their location. Nevertheless, the effects are stronger for some measures of well-being than for others. Second, we conceptualise the relationship between location and entrepreneurial well-being by distinguishing between urban, semi-urban, and rural places, and between wealthy and materially deprived places, which offer different resources for entrepreneurial ventures, but also at times have competing effects on individual well-being. Finally, we show that there is a bonus to entrepreneurial well-being which holds in some locations but not in others. In particular, places that offer a balance between connectivity and ease of doing business on the one hand, and quality of life on the other, result in higher entrepreneurial well-being.

Our paper contributes to the existing and rapidly growing literature on entrepreneurial well-being by highlighting the importance of the geographical/spatial dimension. To our knowledge, this is the first paper that considers location as a source of variation in the relationship between entrepreneurship and well-being. The timing of this contribution is of particular importance. The growing political and social tension between the populations living in urban and rural areas dominates the public debate in the United States and several European countries. Recent literature argues that it is the geographical divide in socio-economic conditions of individuals, and the geographical distribution of jobs that fuel this tension (Moretti, 2012; Rodríguez-Pose, 2018; Rodrik, 2018). We believe that the geographical dimension of entrepreneurship, in particular, the extent to which certain aspects of location are linked to entrepreneurs' well-being, is very topical and timely.

The remainder of the paper is organised as follows. Section 2 presents our theoretical background, and our conceptualisation of entrepreneurial well-being and location, outlining our hypotheses. Section 3 discusses our methodology and data sources. Section 4 presents and discusses our qualitative and quantitative results, and Section 5 concludes.

2. Background, theory, and hypotheses

2.1. Conceptualising subjective well-being

Although the systematic measurement of well-being dates back to the 1960s (e.g. Cantril 1965), the use of subjective well-being measures in empirical analysis has only recently become widely accepted, as studies have shown that survey data can be used to elicit consistent answers to the question *'How satisfied are you with your life, all things considered?'* (Ferrer-i-Carbonell, 2013).³ The literature has found that correlations of this measure with objective outcomes such as health and physical reactions are consistently strong (Kahneman, 1999; Blanchflower and Oswald, 2008), and that individuals from different cultures have a similar understanding of concepts such as satisfaction and happiness (Diener and Lucas, 1999).

In a seminal paper, Kahneman and Krueger (2006) argue: *"how individuals' responses to subjective well-being questions vary with their circumstances and other factors."* (2006, p. 4). Under the assumption that an individual's reported well-being is a product of their perception of their own experiences, the authors highlight two important factors that need to be taken into account in the empirical treatment of well-being. First, individuals report well-being in different ways depending on when they are asked, with the reported well-being impact of an event diminishing as time passes. Second, building on Bentham's concept of *experienced utility*, the authors highlight that there is a significant difference between objective happiness and experienced utility, and a further distinction must be made between *remembered utility* and *moment-utility* by taking the time dimension into account (Kahneman et al., 1997).

Subjective well-being has been conceptualised and analysed in different ways, but most approaches can be categorised as one of the following: *life evaluation*, which refers to an individual's self-assessment of their life or parts of their life; *affect*, which focuses on an individual's feelings and emotional states assessed at a particular point in time; and *eudaimonia*, a concept which considers functionings and the realisation of an individual's potential (OECD, 2013). Life evaluation, the focus of this paper, is a reflective rather than a descriptive concept, as it captures an individual's self-assessment of her life based on a standard she chooses to be the desirable baseline for herself.

³ There is still considerable ambiguity in the literature. Veenhoven and Hagerty (2006, p.74) note that *"There are many words that are used to indicate how well we are doing"*. Depending on which specific knowledge domain they are discussed in, well-being, welfare, happiness, and quality of life can be either used interchangeably, or can have very different meanings.

Such reflective assessment is closely linked to utility in the context of economics, but unlike utility, life evaluation is not necessarily equivalent to the sum of how individuals experience each moment (Kahneman, 1999). Life evaluation is the most relevant concept to identify how individuals think about their welfare in general, and is therefore useful from both an academic and a policy point of view. The most commonly-used measure of life evaluation is life satisfaction, which groups various aspects of individual self-assessment. In addition, life satisfaction has been decomposed into its constituent parts, for example, Van Praag et al. (2003) decompose it into job satisfaction, financial satisfaction, house satisfaction, health satisfaction, leisure satisfaction, and environmental satisfaction.

Well-being and happiness are to a large extent determined by personal characteristics. For instance, several studies have shown that well-being varies significantly over the life cycle, and is generally higher among the young and the elderly, relative to those who are middle-aged.⁴ Other personal characteristics, such as being in a relationship (in particular being married), spending time with family and friends, and enjoying good health, all positively affect well-being (see, for instance, Dolan et al., 2008). Certain types of activities, such as helping others and feeling that one is useful to society also play an important role (Helliwell and Putnam, 2004).

2.2. Entrepreneurial well-being

It is well documented in the literature that employment circumstances have a strong effect on life satisfaction (Benz and Frey, 2008). Even after controlling for income and health, unemployed individuals are significantly less happy than their employed counterparts. This suggests that in addition to earnings, there are other benefits to being employed, for instance, being useful or feeling important (Van Praag, 2009; Parker and Van Praag, 2010). Similarly, Benz and Frey (2008) argue that in addition to the tangible and intangible outcomes, people value the work activity itself, referred to as ‘procedural utility’. *“People care not only about the ‘what’, but also about the ‘how’”* (Benz and Frey, 2008, p. 363).

The analysis of the relationship between entrepreneurship and well-being typically rests on the assumption that individuals recognise an opportunity, and engage in entrepreneurship because

⁴ Stone et al. (2010), in line with previous research by Blanchflower and Oswald (2008), find a U-shaped pattern for the relationship between age and overall well-being, with a low-point at the age of 50. They argue that well-being increases with age because wisdom and an increased ability to regulate one’s emotions result in lower negative affect states (Stone et al., 2010; Baltes, 2003; Carstensen et al., 2003). Moreover, older individuals recall fewer negative experiences than their middle-aged counterparts (Stone et al., 2010).

they derive personal benefits from it (Eckhardt and Shane, 2003; Shane and Venkataraman, 2000). The nature of the benefits associated with entrepreneurship have traditionally been assumed to be mainly of a pecuniary nature, and the role of non-pecuniary motives is a matter of some debate (Benz, 2009; Van Praag and Versloot, 2007; Minniti and Lévesque, 2008). Nevertheless, there is now increasing consensus within the literature that the motives for engaging in entrepreneurship extend beyond financial gains, and an argument can therefore be made that if there are various non-pecuniary dimensions to entrepreneurship, such dimensions should naturally relate to the well-being outcomes of entrepreneurship too (Dolan et al, 2008). More specifically, several studies have found that the self-employed are willing to accept a lower income in exchange for greater independence (Hamilton, 2000). Flexibility and self-control are also associated with lower work-related stress among the self-employed (Hessels et al., 2017). Furthermore, a switch to self-employment is often associated with a rise in social status and ranking, which has a positive effect on well-being (Dolan et al, 2008; Van Praag, 2009).

A distinction is often made between the well-being outcomes arising from necessity- and opportunity-driven entrepreneurship. For example, while both necessity- and opportunity driven entrepreneurs benefit from a switch into self-employment, the effect is stronger for opportunity-driven entrepreneurs (see e.g. Binder and Coad, 2013; Dijkhuizen et al, 2017; Frankish et al., 2014; Larsson and Thulin, 2017). In addition, there is some evidence to suggest that household well-being, and in particular the well-being of families, is strongly linked to employment circumstances. Conceptually, the higher self-esteem and job satisfaction associated with self-employment may lead to better parent-child relationships, and a generally happier household (Veenhoven, 1988). This may in turn generate feedback mechanisms that lead to more successful entrepreneurial ventures. Job characteristics, such as the level of complexity and the degree of challenge, have been shown to affect parenting behaviour within households (Greenberger et al., 1994). These positive outcomes are likely to be observed despite the longer working hours associated with self-employment, as these are somewhat compensated for through the more flexible working patterns associated with self-employment. Based on these findings, we expect to find that self-employed individuals have higher levels of well-being, relative to otherwise comparable individuals in waged employment.

Shir (2015) presents a framework that distinguishes between an entrepreneur's well-being and entrepreneurial well-being. The author argues that entrepreneurial well-being is an affective-cognitive phenomenon, that is distinctly different from the ways in which well-being is examined

in various social science fields, as well as psychology: “[*Entrepreneurial well-being*] is a positive and distinctive mental state, which reflects entrepreneurs’ affective and cognitive experiences of engagement in entrepreneurship as the process of venture creation. These experiences are characterized by positive judgments of the entrepreneurial life and good feelings about it.” (Shir, 2015, p.76). This analytical framework is particularly useful in understanding the mechanisms through which entrepreneurial engagement produces certain well-being outcomes. Individuals with specific time-invariant traits are more likely to sort into entrepreneurship, and such traits are also likely to be correlated with their prior mental well-being and perceptions of their own well-being. The variation between the levels of well-being across individuals that are employed and self-employed, therefore, may be a mere reflection of this selection process, rather than of the underlying well-being outcomes of entrepreneurship.

Dealing with this bias is a challenging task that requires an experimental (or quasi-experimental) research design in which entrepreneurship is assigned to individuals randomly. Setting up such an experiment would be extremely difficult, but a way to partially mitigate the selection bias is to control for innate individual characteristics. Another strategy to tackle selection bias is to exploit the longitudinal dimension of data to control for time-invariant factors associated with both entrepreneurship and well-being (see, e.g., Hessels et al., 2017; Binder and Coad, 2013; Binder and Coad, 2016). The ability to follow individuals over time allows the researcher to observe a switch from unemployment or regular employment into self-employment, and therefore attribute a change in well-being to self-employment more accurately. For instance, Binder and Coad (2013) use a matching procedure to create a counterfactual for self-employed individuals, in order to control for the self-selection bias inherent in the literature. Using the British Household Panel Survey (BHPS, a precursor of the survey used in this study), they find that a switch from employment into self-employment leads to an increase in life satisfaction, although the same is not true for individuals who switch from unemployment into self-employment (which may be due to necessity-driven motives in the case of the latter group).

These empirical efforts are undertaken in order to answer the question of whether greater well-being does indeed arise from entrepreneurship, rather than from sorting or other factors (Shir, 2015; Binder and Coad, 2013; Kautonen and Palmroos, 2010). In line with the previous efforts, we also expect to find that a switch into self-employment is associated with an improvement in well-being, after controlling for personal characteristics.

A natural next step in a longitudinal study of entrepreneurial well-being is to examine the extent to which the well-being effects from entrepreneurship persist or dissipate over time. The well-being literature consists of a number of studies that investigate the duration of well-being effects resulting from various life events, and how the contemporaneous effects from such events dissipate over time through adaptation (or habituation).⁵ On the issue of adaptation to employment circumstances, an important study is that by Lucas et al. (2004), where the authors investigate well-being recovery from unemployment over a 15-year period, using German data. Contrary to the findings of most adaptation studies, they show that individuals who have experienced unemployment do not fully return to their former levels of life satisfaction (even after they are re-employed), and their reaction to recurring unemployment is not mitigated by a previous unemployment experience. Similarly, Clark et al. (2008) and Clark and Georgellis (2013) show that while adaptation to marriage, divorce, birth of a child, and widowhood tends to be rapid and complete, there is generally incomplete recovery in the case of unemployment. Also on this point, Binder and Coad (2016) use longitudinal data to investigate the duration of the well-being effects originating from self-employment, and identify an increase in life satisfaction and health satisfaction following a voluntary switch into self-employment (i.e., from employment), which are persistent over time. However, they find no positive effects for necessity-driven self-employment, in the form of a switch from unemployment into self-employment. On the basis of these findings we expect to observe the existence of persistently higher levels of well-being following a switch from waged employment into self-employment.

2.3. Space and entrepreneurial well-being

2.3.1 Urban-rural dimension

In less developed countries, where rural areas tend to be significantly poorer and lacking in infrastructure and services, studies have found that life satisfaction is greater in urban areas (Easterlin et al., 2011), although there are some exceptions (Knight and Gunatilaka, 2010). However, in most high-income countries, there is ample evidence to show higher levels of well-being in rural areas, and correspondingly lower levels in urban areas (Glaeser 2011; Morrisson 2007; Veenhoven, 1994; Dolan et al, 2008; Berry and Okulicz-Kozaryn, 2009, Easterlin et al, 2011;

⁵ One such life event commonly studied in the literature is marriage, with studies finding an attenuation of the positive well-being effects associated with marriage over time (Lucas et al., 2003; Lucas and Clark, 2006; Stutzer and Frey, 2006), and likewise, people rapidly adapting to divorce and its potentially negative well-being effects (Gardner and Oswald, 2006).

Adams, 2014). Urban residents are faced with higher levels of crime, congestion, pollution, as well as social isolation and inequality, which are only partly compensated for through higher incomes and urban amenities (greater choice of consumer goods and services, cultural activities, new ideas, and an urban “buzz”). In contrast, rural residents can access more affordable and spacious housing, green spaces, and lower levels of pollution and congestion. The literature has found that the well-being effects linked to the level of urbanisation are only partly due to differences in individual characteristics (such as age, income, and marital status), and the self-selection of individuals into particular locations (Glaeser et al., 2016).

We argue that some of the factors that result in lower levels of well-being in cities also affect entrepreneurial well-being, in particular, factors relating to the ease of doing business, social network effects, and working conditions and circumstances. The literature is rich with arguments in favour of starting a business in urban locations, where entrepreneurial climate is argued to be better than it is in rural areas, due to agglomeration effects resulting from the size and thickness (number of buyers and sellers) of the market in urban areas (Dahlqvist and Davidsson, 2000; Liedholm, 2002; Armington and Acs, 2002). Similarly, McCann and Folta (2008) suggest that the performance threshold for new businesses in clusters is lower than it is for firms in more isolated areas, as it is easier for the founders to switch to other activities and to sell leftover specialised assets, should the firm go under. As highlighted by Bosma and Schutjens (2011), the greater presence of entrepreneurs in urban areas encourages new entrepreneurial ventures, in part through a reduction of the fear of failure, also known as the “peer example” effect (Obschonka et al., 2012). In addition, the level of in-migration into larger cities influences attitudes towards entrepreneurship, since migrants are generally risk takers (Levie, 2007). Furthermore, these effects are likely to be self-reinforcing, since locations with a positive attitude towards entrepreneurship are likely to attract more people with an entrepreneurial attitude (Feldman, 2014).

A contrasting viewpoint is provided by Renksi (2008, p.63), who shows (with reference to Atkinson, 2004 and Drabenstott, 2003) that entrepreneurs in rural locations typically have lower pecuniary and non-pecuniary costs, due to lower congestion, pollution, crime, property prices, burdensome building permit processes, and so on, compared to urban areas. Moreover, rural locations have become increasingly astute at leveraging their natural and cultural amenities to attract footloose professionals seeking a small-town quality of life. These factors may result in higher levels of well-being for entrepreneurs in rural places. Similarly, Gottlieb (2006) argues that the trends that cause de-concentration, such as increased congestion costs, improved transport

and communication technology in rural areas, and the search for (natural) amenities as a luxury good, explain why people may move out of cities. Gottlieb (2006) suggests that firms prefer urban locations because *“firms prefer denser settings than individuals, setting up a tension between workers’ lifestyle and job availability.”* (Gottlieb, 2006, pp 155). This argument highlights an important potential tension between an individual’s well-being, and the economic performance of her business, and is particularly important for understanding how location can affect entrepreneurial well-being. The entrepreneur needs to locate her business in a large-enough market where the survival and success of the business is viable. In doing so, she may prefer a market with a critical mass of customers, suppliers, and workers to make the business financially secure. However, large markets come with intense competition, thus, we observe a significant churn as a result of rapid firm exit in urban space. For instance, McCann and Folta (2008, p.559) state that *“agglomeration increases the number of local rivals, with whom organizations compete more intensely”*.

The desirability of location in the context of the size and thickness of its market does not always correlate with its desirability in terms of individual well-being. On the one hand, urban density provides a good level of demand for an individual entrepreneur’s business, while also facilitating her own consumption in the form of cultural amenities that increase her utility (Brueckner et al., 1999; Glaeser et al., 2001). However, cities also come with a number of disamenities, or “public bads”, that are associated with density such as congestion, pollution, and crime (Glaeser 1998; Glaeser and Sacerdote 1999). These disamenities are in turn associated with lower quality of life in dense urban spaces, as shown in a number of studies (Kahn, 2010; Tolley 1974; Blomquist et al., 1988; Gyourko and Tracy 1991). Other negative aspects of working in cities, such as longer commuting times, have been shown to have a disproportionately negative effect on well-being (Stutzer and Frey, 2005; Novaco and Gonzalez, 2009).

An individual running her own business will need to decide on the location that serves her best, given the trade-off between access to a large enough market and a residential location that maximizes her utility. Such a trade-off is particularly important for the consideration of entrepreneurial well-being, given the importance of the local context in determining the success of any nascent enterprise, and the greater degree of embeddedness of entrepreneurs within locations, relative to employees who often live further away. This suggests that a binary categorization of cities along an urban-rural dichotomy could result in an incomplete analysis of the importance of location for entrepreneurial well-being. Rather, we argue, places that rank

between urban and rural areas may provide a better climate for realizing both higher entrepreneurial well-being and entrepreneurial success simultaneously.

There is now evidence that the spatial range at which agglomeration benefits apply has expanded over time (Phelps, 2004). Small firms located in smaller settlements near larger urban areas can still benefit from access to the specialized labour and information available in the urban market (Phelps et al., 2001). Like the large urban markets themselves, places that are close to urban areas can benefit from these externalities while also acting as a breeding ground for entrepreneurship. In this context, Phelps et al. (2001) find some evidence on the relevance of “borrowed” market size for the location dynamics of small firms in rural areas in the UK with high accessibility. Even though there seems to be an observed urban to rural shift in firm formation and growth, the evidence on the precise mechanisms for this shift are unclear. On this point, Renski (2008, p 62) similarly argues that *“firms locating in small and peripheral places on the metropolitan fringe benefit from the size advantages of the nearby city without incurring the same costs, and may occupy these locations because they offer the preferred balance between urbanisation and diseconomies”*. Intermediate places in the urban-rural continuum, such as suburbs, semi-rural edges of metropolitan areas, and small cities and towns, generally rank more highly on measures of entrepreneurial performance (Renski, 2008). In the context of entrepreneurial well-being, locating in these intermediate places should also mitigate the potential loss of well-being associated with urban lifestyles while supporting the entrepreneur’s financial success. We therefore hypothesise:

Hypothesis 1: The positive effect on well-being following a switch from waged employment into self-employment is greater for individuals living in semi-urban areas (suburbs, rural fringes of large cities, smaller cities, and towns), relative to comparable individuals living in urban and rural locations.

2.3.2 Material deprivation

A further issue of relevance in the context of location and entrepreneurial well-being is the level of poverty and material deprivation in the neighbourhood. The literature has found that deprivation negatively affects quality of life through a combination of factors including the absence of public services or their low quality, high crime rates, low human capital levels, and low quality of housing (Airey, 2003; Smith et al., 2004; Thompson et al., 2012). Aesthetic appearance is also important, for example, Bond et al. (2012) show that negative attributes in the built environment

(such as the external appearance of housing) have significant effects on the mental well-being of individuals in deprived neighbourhoods.

The literature has also identified dynamic effects resulting from a change in neighbourhood. In a study conducted on extreme-poverty neighbourhoods in the U.S, Ludwig et al. (2012) find that moving from a high-poverty to a lower-poverty neighbourhood leads to long-term improvements in adult physical and mental health and subjective well-being, while having little effect on economic self-sufficiency.⁶ Related to this, they argue that subjective well-being is more strongly affected by changes in ‘neighbourhood economic disadvantages’, rather than racial segregation. This point is particularly interesting since racial segregation has been declining steadily since the 1970s while income segregation has been increasing. As argued by Sampson (2003), neighbourhoods and communities cannot be treated as just another individual trait, but should be considered as an important unit of analysis for the investigation of individual well-being.

How do these attributes relate to entrepreneurship? Williams and Williams (2011) discuss the barriers to entrepreneurship in deprived urban neighbourhoods in a study that employs mixed methods, for those who identify as entrepreneurs or potential entrepreneurs. They find that these individuals struggle with direct barriers to engaging in entrepreneurship, such as a lack of self-belief and confidence, and a lack of affordable workspace. Barriers to entrepreneurship include negative perceptions of place, fear of crime and financial lending hurdles. In addition, and as discussed in the previous section, location dictates access to markets, and to the many resources that come with them such as finance, skilled labour, infrastructure, sub-contractors, and other facilities (Dahlqvist and Davidsson, 2000). These are more likely to be lacking in the thinner markers of deprived neighbourhoods. Similarly, the likelihood of engaging in entrepreneurship increases with the share of entrepreneurs in the neighbourhood, with entrepreneurs often clustered closely in space (Andersson and Larsson, 2016). This clustering emerges as a result of social interactions between individuals, which tend to be very localised in nature (Durlauf, 2004). Social interactions with entrepreneurs help to mitigate the frictions related to uncertainty, and ease the practice of entrepreneurship and the start-up process (Minniti 2005; Bosma et al., 2012), but are likely to be less prevalent in deprived neighbourhoods where there are fewer entrepreneurs.

⁶ The study is based on the U.S. Department of Housing and Urban Development’s (HUD) Moving to Opportunity (MTO) programme, a large-scale randomized social experiment.

The literature has therefore identified significant barriers to entrepreneurship in poor and materially-deprived locations. However, entrepreneurship can be an important source of income and employment for individuals who would otherwise face significant barriers to waged employment (Acs et al., 2008). As shown by Williams and Williams (2014) in the UK context, the motives for entrepreneurship in deprived areas are mixed, but often involve family constraints requiring flexible working arrangements, a quest for work that is more empowering and fulfilling, and difficulties in finding employment in the local area, all of which are associated with broader measures of well-being. Moreover, entrepreneurship can be a route out of deprivation, as shown by Frankish et al. (2014), who find that entrepreneurs are more likely than other residents to eventually move out of deprived neighbourhoods and into wealthier neighbourhoods.

The effect of entrepreneurship on well-being is therefore likely to vary across deprived and non-deprived areas, with benefits found in the wealthiest areas (where entrepreneurs are likely to face the lower barriers, and to have greater choice in their employment circumstances) and in the poorest areas (where despite significant constraints, entrepreneurship can offer financial and non-pecuniary benefits that exceed those of the local labour market). We therefore hypothesise:

Hypothesis 2: The positive effect of a switch into entrepreneurship on job satisfaction is greater for individuals living in wealthy neighbourhoods, relative to the effect on otherwise comparable individuals living in materially deprived neighbourhoods.

Hypothesis 3: The positive effect of a switch into entrepreneurship on well-being is as high for individuals in deprived neighbourhoods as it is for individuals in wealthy neighbourhoods, if well-being is measured more broadly to encompass life satisfaction.

3. Methods

The analysis is based on a two-stage research strategy. In a first stage, 12 scoping case study interviews were conducted with entrepreneurs from a range of backgrounds in two London neighbourhoods. These were used to inform the development of the conceptual framework, the hypotheses, the choice of variables to be included in the matching model, and the policy implications of the results. In the second stage, we use longitudinal data from the UK Household Longitudinal Study (UKHLS), a large-scale household survey which is representative of the UK population, to provide quantitative evidence on the well-being effects of a switch into self-

employment, and to analyse the extent to which location mediates these effects. In order to control for the endogeneity in the form of self-selection bias inherent in the analysis of this relationship, we use on a non-parametric matching estimator, and exploit the longitudinal nature of the UKHLS survey. We follow the entrepreneurship literature in using self-employment as a proxy for entrepreneurship, but are aware of the limitations of this approach, and discuss these in Section 5.⁷

3.1 Empirical strategy

We first consider a set of descriptive statistics on the nature of self-employment in the UK, in order to provide an overview of the characteristics and outcomes for employed and self-employed individuals. These are shown in Tables 1-3. We use variable means, and difference in means tests, to provide an indication as to whether well-being outcomes are significantly higher for the self-employed, and how these outcomes vary with different measures of well-being, and across locations. These results are shown in Table 2, and Tables 4 and 5.⁸

The remainder of the quantitative analysis is based on non-parametric matching approach. Our aim is to address the problem of endogeneity due to selection bias inherent in the study of entrepreneurial well-being (Binder and Coad, 2013). Intuitively, individuals who decide to become self-employed are likely to differ from individuals who remain in waged employment in ways that also affect their well-being. Moreover, we do not observe both individual states, that is, each individual is either self-employed or employed, but not both at the same time. As a result, a simple linear regression of well-being on the decision to switch into self-employment, even if the regression contains a large number of control variables, is likely to lead to biased estimates.

We use a Coarsened Exact Matching (CEM) approach to create a balanced sample on the basis of a set of variables identified in the literature as being strongly associated with the probability of switching into self-employment. Our analysis aims to answer the question: “What would be the effect on well-being of a switch into self-employment, if individuals were assigned to self-employment at random?”. The switch into self-employment is our “treatment” variable, and we use weighted linear regression models to calculate the sample average treatment effect on the treated (SATT), intuitively, the average well-being outcome for individuals who switched into self-

⁷ See also the detailed note in Appendix A.

⁸ In all cases the results were adjusted to account for the complex survey design used by the UKHLS.

employment, relative to the outcomes if they had remained in waged employment. Our key outcome variable is *job satisfaction*, although we also consider a number of broader measures of well-being, principally *life satisfaction*, to test Hypothesis 3 (see Section 3.3.1 for details). Our choice of pre-treatment matching variables is: *age, female, born in the UK, marital status, children, professional occupation, household income quintile, area type, neighbourhood deprivation quintile*, and the survey *wave*. The motivation for the use of these variables, and the data sources used to construct them, are explained in more detail in Section 3.4. A limitation of our empirical approach is that we assume that these variables capture all the relevant heterogeneity in the decision to switch into self-employment, and there is no further assignment on unobservable characteristics. We argue that any remaining heterogeneity is likely to be small, but our results should be interpreted in light of this limitation. We discuss the implications in Section 5.

The CEM approach temporarily coarsens the matching variables into categories, and sorts all individuals into strata, so that within each strata all individuals fall into the same category for each matching variable. Any strata without at least one treated and one non-treated individual are discarded, and the process generates weights that can be used in further analysis to achieve a balanced sample. The degree of balance achieved can be measured using a multivariate imbalance measure (denoted L_1), which is based on the difference between a multi-dimensional histogram of all matching variables in the treated group vs. in the non-treated group. An improvement in balance is indicated by a reduction in the size of L_1 . CEM matching offers a number of advantages over other matching methods. It provides a form of exact matching through its use of the coarsening process, which allows the degree of imbalance to be set in advance of the analysis, since the imbalance is bounded by the coarsening process. It also restricts the matched data to areas of common support, and provides a simple way (via weights) to use the resulting matched sample in regression analysis (Iacus et al, 2011).⁹

We estimate three sets of weighted linear regression models using the CEM weights. First, we run a set of regressions of job satisfaction one, two, and three years into the future, on a dummy variable capturing a switch into self-employment.¹⁰ The coefficient of the treatment variable (switch into self-employment) gives an estimate of the SATT. The results are shown in Table 3. For comparison purposes, we also show the results for other measures of well-being frequently

⁹ Our CEM models were estimated using the *imb* and *cem* routines in Stata (Blackwell et al., 2009).

¹⁰ All of the regressions also include the continuous variable *age* as a control variable, to account for any residual heterogeneity due to the coarsening process.

considered in the literature: *life satisfaction*, *leisure satisfaction*, *income satisfaction*, *health satisfaction*, and *subjective well-being*.

Second, we run a set of regressions of job satisfaction one, two, and three years into the future, on a dummy variable capturing a switch into self-employment (as before), dummy variables for *semi-urban* and *rural* location (with *urban* as the omitted category), and interaction effects between the treatment and location dummies. The coefficient of the treatment variable is the SATIT, as before. The coefficients of the location dummies capture the effects on well-being of being located in *semi-urban* and *rural* locations, relative to *urban* locations, which we expect to be positive. These are the overall well-being effects resulting from location, which are independent of employment circumstances. The coefficients on the interaction terms capture the entrepreneurial well-being “bonus” effects resulting from location. If *Hypothesis 1* holds, we expect the interaction-term coefficient for *semi-urban* to be positive (relative to the omitted category, *urban*), and to be greater than the interaction-term coefficient for *rural*. For reference, the constant shows the baseline estimate of well-being for individuals who remain in waged employment, and live in *urban* locations (the omitted category). These results are shown in Table 6.

Finally, we test whether the level of neighbourhood deprivation entrepreneurial well-being, using dummies and interaction terms for neighbourhood deprivation quintiles (*Q1-Q5*, where *Q1* is the wealthiest, and *Q5* is the most deprived). If *Hypothesis 2* holds, we expect the coefficient of the switch into self-employment variable to be positive, as it is capturing the added job satisfaction for self-employed individuals in *Q1* (the omitted neighbourhood category), and the coefficients of the interaction terms for *Q2-Q5* to be zero or negative. Moreover, we expect the coefficients of the *Q2-Q5* dummies to be negative, since overall well-being is likely to be lower in more deprived neighbourhoods. The constant shows the baseline estimate of job satisfaction for individuals who remain in waged employment, and live in *Q1* neighbourhoods. These results are shown in the upper panel of Table 7. In our last set of regressions, we run the same model using life satisfaction as the treatment variable, shown in the lower panel of Table 7. If *Hypothesis 3* holds, we expect to see a zero or negative coefficient for the switch into self-employment variable, which is capturing the added life satisfaction for self-employed individuals in *Q1* (the omitted neighbourhood category), and positive coefficients for the *Q2-Q5* interaction terms.

3.2 Sample

In a first stage, 12 scoping case study interviews were conducted with entrepreneurs from a range of backgrounds, in two London neighbourhoods. One set of case studies focuses on a gender-based cluster in Walthamstow, East London. The other set focuses on an ethnic entrepreneurship cluster (involving Turkish first- and second-generation immigrants) in Stoke Newington, North-East London. In both cases we identified interviewees by first contacting a local community centre (in the case of Walthamstow), and a local community leader and business advisor (in the case of Stoke Newington). The semi-structured interviews were conducted over 20-31 March 2017.

The interviewees were selected to cover a range of backgrounds, including lower- and middle-income households, and also involved several individuals with family and health constraints (single-parent households, disability and health constraints, lack of formal qualifications, and language constraints). The purpose of the interviews was to strengthen the identification of the central issues related to the well-being effects of entrepreneurship, to obtain information that could guide us in the related research domain, and pinpoint the specific research questions to address in the quantitative analysis. Our scoping case studies provide insights into the challenges and opportunities faced by self-employed individuals, the role of the local area and community in promoting entrepreneurship, and the impact of self-employment for their well-being and that of their families. The issues raised by the case studies were used to develop the empirical models used in the quantitative analysis, and the findings are briefly summarised in Appendix B.

The quantitative analysis was conducted at the individual level using the UKHLS survey, and the data includes individuals who are either employed or self-employed. Most of the variables included in the analysis are based on responses to the individual questionnaire, but we also use data from the household questionnaire for background information (particularly on household income and composition). The fieldwork for each survey is conducted over a two-year period, with overlaps between consecutive waves, i.e., Wave 1 was conducted over 2009-2011, Wave 2 over 2010-2012, and so on. Each household included in the survey is contacted once a year, and all original household members aged 16 and over, plus new members who have joined the original households, are included in the survey. In addition, children aged 11-15 in the households are asked to complete a shorter questionnaire. The data used in the analysis cover the period 2009-2017, and are taken from Waves 1-7 of the survey.

The sample used in the quantitative analysis is restricted to individuals who are either employed or self-employed. We do this in order to ensure a relatively comparable sample, since the motives for

switches from unemployment, retirement, and other employment categories into self-employment are complex, and beyond the scope of this paper. Our panel data set includes 49,577 individuals and a total of 172,807 observations across seven waves of the survey. Of this sample, 13% of individuals are self-employed in any given year.¹¹

3.3 Variables

3.3.1 Well-being

In keeping with most of the entrepreneurial well-being literature, we focus on the *job satisfaction* sub-domain as our outcome variable of interest. This is a self-reported variable taken from the UKHLS, recorded in response to the question: “please tick the number which you feel best describes how dissatisfied or satisfied you are with the following aspects of your current situation [job overall]”, measured on a 1-7 Likert scale, ranging from 1=completely dissatisfied to 7=completely satisfied. We consider *life satisfaction*, and three of its sub-domains (*leisure satisfaction*, *income satisfaction*, and *health satisfaction*), for comparison purposes with earlier studies, all measured on a 1-7 Likert scale, as before. Following the insights obtained in our scoping case studies, we consider a variable that captures the *life satisfaction* of children aged 10-15 in the household: “how do you feel about your life as a whole?”, again measured on a 1-7 Likert scale (1=not at all happy, and 7=completely happy).

In addition, and as a robustness check, we consider a set of questions that capture affect and eudaimonia aspects of well-being. The UKLHS contains a set of 12 questions known collectively as the General Health Questionnaire (GHQ-12), which covers mental health and well-being, and contains questions measuring affect, e.g., “have you recently been feeling unhappy or depressed?”, and questions measuring functionings, e.g., “have you recently been able to face up to problems?” and “have you recently felt that you were playing a useful part in things?”. The answer to each question can be coded on a 0-3 scale, with all answers added up to give a 0-36 scale (where 0=least distressed and 36=most distressed). We invert this measure to give a measure of *subjective well-being* on a 0-36 scale, with 0 the lowest subjective well-being, and 36 the highest. This variable is widely

¹¹ Of the full sample which includes other employment categories (students, retirees, stay at home parents, long-term sick and disabled, etc.), just under 8% of individuals are self-employed.

used in the UK as a measure of distress and minor psychiatric disorders, and provides an alternative measure of well-being, based on a combination of the affect and eudaimonia approaches.

3.3.2 Self-employment

We follow the empirical entrepreneurship literature in using self-employment as a proxy for entrepreneurship, although we are aware of the limitations of this approach (see the empirical note in Appendix A for a more detailed discussion). Comparing the well-being of entrepreneurs at different stages in their business venture would lead to significant biases, and we therefore focus on analysing the change in well-being for individuals who switch into self-employment from waged employment, relative to individuals who remain in waged employment throughout. We measure self-employment using a self-reported variable from the UKLHS, which is a binary variable indicating whether an individual is employed or self-employed (in their main job or occupation).

3.3.3 Neighbourhood characteristics

The dataset includes detailed geographical identifiers which allow us to assign households to Lower Super Output Areas (LSOAs) and Scottish Data Zones, a highly disaggregated census geography. There are nearly 42,000 LSOAs (and Scottish Data Zones) in the UK, each relatively homogenous in terms of socio-economic characteristics, with around 1,000-3,000 residents per LSOA, and 500-1,000 residents per Scottish Data Zone. We assign households in the UKLHS survey to different urban/rural categories, on the basis of whether the LSOA to which the household belongs is part of a settlement of a specific size.¹² Our urban/rural categories are: *rural* (household is located in a settlement with fewer than 10,000 residents or in the open countryside), *semi-urban* (household is part of a city or town), and *urban* (household is located in a minor or major conurbation).

Our measure of material deprivation is based on the Index of Multiple Deprivation (IMD), which is the most widely used neighbourhood-level measure of deprivation in the UK. It is a composite measure covering seven domains: income, employment, education and skills, health, crime,

¹² The urban/rural classification used by the Scottish Government, and the one used by the Northern Ireland Statistics and Research Agency (NISRA), are different from the classification used by the Office for National Statistics (ONS) for England and Wales. We follow the approach suggested by Oliver O'Brien at UCL, and use the ONS urban/rural classification, with adjustments to allow comparability with Scotland and Northern Ireland. This classification is available from the Consumer Data Research Centre (CDRC) website at <https://data.cdrc.ac.uk/dataset/population-density-and-urban-rural-classification>.

infrastructure, barriers to housing and services, and quality of the living environment.¹³ We assign households to IMD deprivation quintiles (*Q1-Q5*, where *Q1* is the wealthiest).

3.3.4 Control variables

The additional variables used in the matching model are defined as follows. *Age* is the age of the respondent in years. *Professional occupation* is a dummy variable indicating whether an individual's occupation belongs to the first two categories of the Standard Occupational Classification (SOC) 2010 for the UK¹⁴. *Household income quintile* is a set of dummy variables indicating the net household income quintile, where household income has been adjusted for household size and composition.¹⁵ We consider a number of additional variables in the descriptive analysis: *monthly gross labour income*, which is individual income resulting from labour-based activities, excluding benefits and pensions, deflated using the Consumer Price Index with housing costs (CPIH); *weekly hours worked* a self-reported measure of the number of hours worked per week, including overtime; *commuting time* (in minutes), which is the average time it takes to travel into work in the morning, and is a measure of accessibility; and *commuting by car* and *commuting by public transport*, two dummy variables which also measure accessibility, and indicate the type of transport used. Descriptive statistics for all the variables included in the analysis are shown in Appendix C, and a correlation matrix is provided in Appendix D.

4. Results and discussion

4.1 Descriptive statistics

¹³ The IMD is compiled separately for England, Wales, Scotland, and Northern Ireland, and the deprivation quintiles are not directly comparable across these areas. We therefore use the adjusted index created by Abel et al. (2016), which is harmonised and comparable across the UK.

¹⁴ The major occupational groups are: (i) managers, directors and senior officials; (ii) professional occupations; (iii) associate professional and technical occupations; (iv) administrative and secretarial occupations; (v) skilled trades occupations; (vi) caring, leisure and other service occupations; (vii) sales and customer service occupations; (viii) process, plant and machine operatives; (ix) elementary occupations.

¹⁵ The household income quintiles are constructed as follows. We start with a measure of household income provided by the UKLHS survey, which is equal to the sum of all income across household members (including welfare benefits and pensions), net of income tax and national insurance. We then use the modified OECD equivalence scale to create a measure of equivalised household size (which assigns a weight of 1 to the first adult, 0.5 to subsequent adults and children aged 14 and over, and 0.3 to children under 14). Finally, we adjust the net household income measure by the equivalised household size to account for economies of scale in household consumption. Households are assigned to income quintiles based on this equivalised household income measure. This is done separately for each year of the survey to allow for changes in the income distribution over time.

Across the entire sample, just over 8% of individuals switch into self-employment in any given year. Self-employment covers a large variety of occupations and takes many different forms. As shown in Table 1, the two largest groups of self-employed individuals are own account workers (42%), and those running a business or professional practice either alone (24%) or with a partner (12%). The final two categories are freelance workers (10%) who generally work in human-capital intensive or artistic activities, and sub-contractors (7%), who are generally skilled tradesmen or consultants working in lucrative sectors.

[Table 1 about here]

4.3 Entrepreneurial well-being

Table 2 shows the mean levels of well-being across self-employed and employed individuals. On average, self-employed individuals have higher levels of job satisfaction than those who are employed, in line with the findings of the previous literature, and with the findings of our scoping case studies. There is no difference, on average, between self-employed and employed individuals when it comes to life satisfaction or health satisfaction. We see that the self-employed have higher levels of leisure satisfaction and lower levels of income satisfaction (again in line with our case study findings), however, the differences are small. The self-employed also have higher levels of subjective well-being, and their children have higher levels of overall life satisfaction. We therefore confirm the findings of the previous literature, with the exception of life satisfaction, where we find no discernible difference between the employed and self-employed.

[Table 2 about here]

We next turn to the dynamic effects of well-being resulting from self-employment. We use the CEM approach discussed in Section 3.1.¹⁶ Our results, shown in Table 3, indicate that there is a large positive effect on job satisfaction resulting from a switch into self-employment (0.42 points higher on the Likert scale, or around a third of a standard deviation higher), and that this effect is persistent over time, in keeping with the findings of the previous literature. However, we find very little evidence of entrepreneurial well-being effects for other measures of well-being. Since these results are based on a matched sample that compares individuals living in similar neighbourhoods

¹⁶ The imbalance analysis for the CEM is shown in Appendix E. The degree of imbalance (measured by variable L_i) falls significantly following the matching, and the univariate imbalance is close to zero for most variables, with the exception of age. In order to control for any remaining imbalance, we include age as an additional explanatory variable in the regression models shown in Tables 3, 6 and 7.

(in terms of urban/rural and wealthy/deprived), these findings suggest that location may be an important mediator for the medium- and long-term effects of self-employment for broader measures of well-being (other than job satisfaction).

[Table 3 about here]

Finally, we look at some descriptive statistics on the work environment for employed and self-employed individuals (Table 4). We find that self-employed individuals work longer hours, but have a shorter commute into work (if they work outside the home). They are also much more likely to work from home, and to commute by car rather than by public transport. As discussed in Section 2, all of these factors have been found to affect well-being, and are also strongly linked to location. We next explore the relevance of location in more detail.

[Table 4 about here]

4.4 The importance of location

Table 5 shows how well-being indicators vary for self-employed individuals located in more or less urbanised areas. Job satisfaction is significantly higher in semi-urban and rural areas, and life satisfaction, for both adults and children, is significantly higher in rural areas.

[Table 5 about here]

Table 6 shows the effects of a switch into self-employment on job satisfaction one, two, and three years into the future. The analysis is similar as that shown in Table 3, with the same personal and locational matching variables, and we are again comparing individuals who switch into self-employment, with very similar individuals who remain in waged employment. However, in contrast with the previous model, we now allow the “entrepreneurial well-being bonus” to vary across locations. Our results show that a switch into self-employment results in a higher level of well-being for individuals living in urban areas in the first two years following the switch (shown by the coefficient of the self-employment switch variable). However, there is a further entrepreneurial well-being bonus from locating in semi-urban areas (shown by the coefficient of the self-employment x semi-urban interaction term), which is equivalent to 0.2-0.3 points on the Likert scale, or around a quarter of a standard deviation higher. The results also show that there is

no entrepreneurial well-being benefit to locating in rural areas, although individuals in rural areas have higher levels of job satisfaction, regardless of employment circumstances (shown by the coefficient of the *rural* variable). These results support *Hypothesis 1*. The trade-off between the “public bads” associated with large cities, and access to a sufficiently large market to make business ventures viable, appears to be optimised in semi-urban locations.

[Table 6 about here]

We next test whether the level of material deprivation in the neighbourhood affects entrepreneurial well-being. We analyse the effects of a switch into self-employment on both job satisfaction (first half of Table 7) and life satisfaction (second half). The results show that job satisfaction is higher for individuals who switch into self-employment in the wealthiest neighbourhoods, relative to those who remain in waged employment (shown by the coefficient of the self-employment switch variable). The effect is large, and equivalent to 0.4 to 0.5 points on the Likert scale, equivalent to between a quarter and a third of a standard deviation. Moreover, the entrepreneurship bonus is lower for individuals in more deprived neighbourhoods, and close to zero or negative for those living in Q4. This result supports *Hypothesis 2*.

While individuals living in deprived neighbourhoods have lower levels of both job and life satisfaction (relative to comparable individuals living in wealthy neighbourhoods), the second half of Table 7 shows that there is nevertheless an entrepreneurial well-being bonus in terms of life satisfaction for individuals living in the most deprived neighbourhoods, relative to those in the wealthiest neighbourhoods. Our results show that individuals living in Q1 who switch into self-employment have the same, or slightly lower (in the second year), life satisfaction relative to individuals who remain in waged employment (shown by the coefficient of the self-employment switch variable). However, individuals who switch into self-employment and live in deprived neighbourhoods enjoy an entrepreneurial well-being premium relative to those in the wealthiest neighbourhoods (shown by the positive coefficients of the self-employment and Q2-Q5 interaction variables). This bonus ranges from 0.4 to 0.7 points on the Likert scale, which is equivalent to between a quarter and half of a standard deviation. This result supports *Hypothesis 3*.

[Table 7 about here]

5. Discussion and concluding remarks

Using a longitudinal household survey from the UK that follows 49,577 individuals across seven waves over the period 2009-2017, as well as exploratory case studies conducted in the form of semi-structured interviews in the greater London area, we investigate the entrepreneurial well-being that originates from a switch to self-employment from employment. The main contribution of the paper is to analyse how entrepreneurial well-being varies across space, in particular, across locations along the urban-rural axis, and across neighbourhoods with different levels of material deprivation.

We argue that factors related to geographical context cause variations in entrepreneurial well-being even when individual characteristics are held constant. Our exploratory case studies highlight how family circumstances dictate entrepreneurial engagement. Most of the interviewees defined themselves as non-conformist and put great emphasis on the importance of time and the spatial flexibility that comes with “being one’s own boss”. Nearly all of those interviewed stated that they experience higher job satisfaction following self-employment compared to previous episodes of waged employment, although the health and stress-related effects resulting from self-employment are mixed. Most of those interviewed reported lower or uncertain income, but greater leisure satisfaction due to more flexible working hours. Most also noted the benefits of working from home, or if working outside the home, of the short commuting times required as compared to their previous experiences of employment.

We confirm the findings of previous studies on entrepreneurial well-being, in showing that self-employed individuals in our sample have higher levels of job satisfaction, as well as higher levels of overall subjective well-being and leisure satisfaction, and marginally lower levels of income satisfaction. In addition, we show that the children of the self-employed have higher levels of life satisfaction, a novel finding for the literature, and one that confirms the conclusions from our scoping case studies. Interestingly, once we match on locational characteristics, including the degree of rurality and the level of multiple deprivation, we only find persistent positive effects on job satisfaction associated with a switch to self-employment.

A major focus of our analysis is on the urban-rural dimension. Moving away from a simple urban-rural dichotomy, we test the variation in entrepreneurial well-being among those that are located in urban, semi-urban, and rural locations. We find that, on average, levels of job satisfaction are significantly higher in both semi-urban and rural areas (relative to urban), and life satisfaction, for

both adults and children, is significantly higher in rural areas. However, we find that a switch into self-employment has a large and positive effect on job satisfaction and that this effect is greatest in semi-urban areas (relative to both urban and rural areas). This finding supports our conceptual argument that there is a trade-off to locating in places that are most conducive to running a small business, in that they are not necessarily the places with the highest quality of life. Large cities are often discussed as entrepreneurial facilitators. But our findings signal that, given a sufficiently large market size or sufficient access to one, individuals are better off in semi-urban areas, which can be characterised as places that offer a reasonably-good quality of life and also a relatively good business environment.

A question then naturally arises as to the precise mechanisms which cause this entrepreneurial well-being “premium” in semi-urban areas. As discussed in our conceptual framework, the literature has found that greater flexibility in the work environment significantly increases job satisfaction. This finding was confirmed in our scoping case studies: almost all of our interviewees remarked on the increased flexibility afforded by their self-employed (or business owner) status. They noted the ability to choose one’s workplace, being able to run their business from their home, or from premises close to their home, being able to walk or cycle to their work, and being able to leave work to pick up their children from school, or to participate in leisure activities. One of the few interviewees who felt negatively about self-employment (the café owner in Stoke Newington) mentioned, as one of the constraints that were affecting her well-being, the long commute from her home to her business. The business is located in a relatively trendy and expensive area, and as a result, the owner has to travel further to reach her workplace.

These insights suggest that self-employed individuals value living close to home (or working from home), and the flexibility in the management of their time that a shorter commute provides them with. Similarly, several of our interviewees, particularly in the Walthamstow cluster, mentioned the importance of peer group effects, and how they had benefitted from a local network of other self-employed business owners. A number of them also mentioned the benefits of living close to one’s customer base, and therefore understanding and being able to target it more effectively. All of these findings suggest that the increased levels of entrepreneurial well-being we identify in semi-urban areas might be due to a better balance between access to reasonably large markets, on the one hand, and greater flexibility in the working environment, on the other, which in turn translates into higher levels of job satisfaction. Further research could explore these mechanisms in more detail.

Our results also show that there are significant differences in entrepreneurial well-being across wealthy and materially deprived neighbourhoods, with self-employed individuals experiencing a job satisfaction “bonus” if located in wealthier neighbourhoods, and a life satisfaction “bonus” if located in deprived neighbourhoods. Interesting, this result ties in with the findings of our qualitative research, where several interviewees highlighted their financial difficulties and constraints, and their lack of options on the formal labour market. Nevertheless, all of those who highlighted their ongoing financial worries, mentioned the feelings of empowerment and flexibility achieved through starting their own business, and their heightened status within the community.

Our analysis has several limitations that could be addressed by further research. The period we cover in our quantitative analysis (2009-2017), was marked by a significant amount of economic and financial instability in the UK, which followed the financial crisis of 2007-08. It was characterised by an increase in self-employment, which, unlike in other European countries, did not decline following the end of the crisis. Significantly, self-employment levels in the UK remain higher than in the years before the financial crisis. As a result, a good proportion of the switches from employment into self-employment that we observe in our study may have been driven by necessity, rather than by entrepreneurial opportunity. Another limitation is the fact that we are not able to distinguish between the entrepreneurs and the self-employed more generally. Certainly, the importance of location would vary depending on the nature and the scale of the entrepreneurial venture, which due to small samples remains beyond the scope of our analysis, and deserves attention in future research. Finally, in our matching procedure, we assume that our matching variables capture the majority of the factors of relevance in explaining the decision to switch into self-employment. However, there may be unobservable characteristics we are omitting (such as ambition, or attitude to risk), that may also affect well-being outcomes across space. These aspects could be explored in further research, and it is likely that these unobservable factors would reinforce the spatial sorting mechanisms that we capture in our analysis. As a final note, we would argue that the analysis of entrepreneurial well-being may be incomplete if space remains peripheral to the analytical framework.

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Tables and figures

Table 1. Nature of self-employment (% of all self-employed).

	%
Running a business or a professional practice	23.65
Partner in a business or a professional practice	11.73
Working for him/herself	41.61
A sub-contractor	6.70
Doing freelance work	9.52
Self-employed in some other way	6.79
All categories	100.00

Table 2. Well-being for employed and self-employed individuals (and their children).

	Self-employed	Employed	Difference
Job satisfaction	5.675	5.250	0.424***
Life satisfaction	5.223	5.212	0.011
Leisure satisfaction	4.550	4.444	0.105**
Income satisfaction	4.515	4.591	-0.076*
Health satisfaction	4.907	4.933	-0.025
Subjective well-being	25.789	25.381	0.409***
Life satisfaction (children)	5.952	5.857	0.095*

Asterisks denote significance levels for a t-test for the difference in means. *** p<0.01, ** p<0.05, * p<0.1.

Table 3. Baseline well-being effects of a switch into self-employment (over one, two, and three years).

	One year	Two years	Three years
Job satisfaction	0.415*** (0.052)	0.413*** (0.062)	0.239*** (0.075)
Life satisfaction	0.079 (0.053)	0.026 (0.061)	-0.010 (0.076)
Leisure satisfaction	0.045 (0.060)	-0.023 (0.069)	-0.005 (0.087)
Income satisfaction	0.059 (0.063)	-0.037 (0.071)	-0.031 (0.090)
Health satisfaction	0.092 (0.065)	0.084 (0.075)	0.070 (0.092)
Subjective well-being	0.192 (0.185)	0.436** (0.222)	0.134 (0.281)

Weighted OLS regression results using CEM weights. Dependent variable is the well-being outcome one, two, and three years after treatment. Treatment is a switch into self-employment from employment. Age is also included to control for any remaining imbalance (due to coarsening). Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 4. Monetary and non-monetary characteristics of the self-employed.

	Self-employed	Employed	Difference
Monthly gross labour income (£)	2440.0	2383.6	56.4
Weekly hours worked	34.7	32.4	2.3***
Commutes by car (%)	77.7	60.5	17.1***
Commutes by public transport (%)	8.5	14.5	-6.0***
Commuting time (minutes)	22.4	25.5	-3.0***
Works from home (%)	27.3	2.7	24.6***

Monthly labour income is calculated for full-time workers only. *Commuting time* is the average time spent travelling into work, for individuals who work at business or client premises only. Asterisks denote significance levels for a t-test for the difference in means. *** p<0.01, ** p<0.05, * p<0.1.

Table 5. Well-being outcomes for the self-employed, by location.

	Urban	Semi-urban	Rural
Job satisfaction	5.534	5.725***	5.775***
Life satisfaction	5.152	5.245	5.287**
Leisure satisfaction	4.577	4.524	4.555
Income satisfaction	4.528	4.481	4.555
Health satisfaction	4.934	4.863	4.957
Subjective well-being	25.625	25.909	25.792
Life satisfaction (children)	5.971	5.864	6.104*

Asterisks denote significance levels for a t-test for the difference in means with respect to *urban*. *** p<0.01, ** p<0.05, * p<0.1.

Table 6. Effects of a switch into self-employment on well-being (one, two, and three years later), with urban/rural interaction effects.

	One year	Two years	Three years
<i>Effect on job satisfaction</i>			
Self-employment	0.277*** (0.088)	0.246** (0.106)	0.062 (0.134)
Self-employment x Semi-urban	0.208** (0.119)	0.297** (0.141)	0.301* (0.173)
Self-employment x Rural	0.213 (0.140)	0.155 (0.166)	0.166 (0.210)
Semi-urban	0.012 (0.031)	-0.029 (0.036)	-0.034 (0.045)
Rural	0.087** (0.036)	0.126*** (0.044)	0.052 (0.054)
Constant	4.900*** (0.052)	4.977*** (0.061)	5.134*** (0.076)

Weighted OLS regression results using CEM weights. Dependent variable is job satisfaction one, two, and three years after treatment. Treatment is a switch into self-employment from employment. *Age* is also included to control for any remaining imbalance (due to coarsening). The base category for neighbourhood type is *urban*. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 7. Effects of a switch into self-employment (one, two, and three years later), with material deprivation interaction effects.

	One year	Two years	Three years
<i>Effect on job satisfaction</i>			
Self-employment	0.399*** (0.106)	0.464*** (0.125)	0.482*** (0.151)
Self-employment x Q2	0.073 (0.152)	0.032 (0.046)	-0.405* (0.217)
Self-employment x Q3	0.062 (0.155)	0.071 (0.048)	-0.122 (0.224)
Self-employment x Q4	0.007 (0.159)	-0.351* (0.051)	-0.505** (0.223)
Self-employment x Q5 (poorest)	-0.110 (0.176)	-0.081 (0.053)	-0.279 (0.276)
Q2	-0.059 (0.039)	-0.058 (0.046)	-0.044 (0.057)
Q3	-0.116*** (0.040)	-0.043 (0.048)	-0.061 (0.059)
Q4	-0.087** (0.042)	-0.077 (0.051)	0.097 (0.061)
Q5 (poorest)	-0.138*** (0.044)	-0.162*** (0.053)	-0.185*** (0.065)
Constant	5.010*** (0.057)	5.061*** (0.068)	5.154*** (0.085)
<i>Effect on life satisfaction</i>			
Self-employment	0.079 (0.106)	-0.285** (0.122)	-0.054 (0.151)
Self-employment x Q2	-0.017 (0.152)	0.375** (0.172)	-0.016 (0.218)
Self-employment x Q3	0.099 (0.157)	0.474*** (0.178)	-0.020 (0.225)
Self-employment x Q4	-0.082 (0.160)	0.184 (0.185)	-0.027 (0.226)
Self-employment x Q5 (poorest)	-0.002 (0.179)	0.675*** (0.212)	0.470* (0.283)
Q2	-0.063 (0.039)	-0.139*** (0.045)	-0.046 (0.057)
Q3	-0.159*** (0.040)	-0.073 (0.046)	-0.146** (0.059)
Q4	-0.249*** (0.042)	-0.314*** (0.049)	-0.196*** (0.062)
Q5	-0.399*** (0.045)	-0.553*** (0.052)	-0.483*** (0.067)
Constant	5.559*** (0.057)	5.610*** (0.067)	5.596*** (0.086)

Weighted OLS regression results using CEM weights. Dependent variable is the well-being outcome one, two, and three years after treatment. Treatment is a switch into self-employment from employment. *Age* is also included to control for any remaining imbalance (due to coarsening). The base category for the IMD quintile dummies is *Q1* (wealthiest). Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Appendix A. *Self-employment as a proxy for entrepreneurship*

While our paper is concerned with entrepreneurial motives and outcomes, there are several practical difficulties in operationalising these concepts, given the significant constraints in quantitative data collection. The literature typically defines an entrepreneur as an individual who tries something new, as opposed to those who provide their time and labour to perform a specific task or routine (Lichtenstein and Lyons, 1996, p. 22). Entrepreneurs take financial risks, operate from a passion or internal drive to accomplish change, and see unique opportunities to add value to society or to create wealth (Gartner, 1990; Kao, 1993; van Praag, 1999; Gompers et al., 2008; Minniti and Lévesque, 2008). In practice, this is often taken to mean that entrepreneurs are individuals who start a business, and who employ additional workers, although there is some debate in the empirical literature as to where to draw the boundaries (Gartner, 1990; Kao, 1993).

In empirical analyses using large-scale survey or administrative data, it is often difficult to distinguish entrepreneurial individuals from the wider category of business owners or self-employed workers. For instance, a self-employed worker may be entrepreneurial, but at a very early stage in the development of her business idea. Similarly, a business owner may not be very innovative or entrepreneurial, and may have simply bought or inherited a business, or adopted a business idea developed elsewhere. Given the practical difficulties in identifying entrepreneurs, many quantitative studies use the broader concept of self-employment as an operational construct (Gartner and Shane, 1995). We are limited by the same constraints in the quantitative component of our study, and therefore follow the literature in focusing on individuals who are self-employed, and in particular, on those who switch into self-employment, although we are fully aware of the analytical limitations posed by this simplification.

Appendix B. Exploratory Case Studies

Most interviewees highlighted a mix of motives for becoming self-employed, involving both pull and push factors. Among the push factors, several mentioned a change in family circumstances, such as the breakup of their marriage, or their partner leaving them. This was particularly the case for female interviewees with small children. Being self-employed was seen as a higher status and more flexible alternative to low-wage employment, and several of those interviewed highlighted the importance of flexibility in allowing them to work around school hours, and helping to save on childcare costs, but most importantly the ability to reduce their commuting time by working

near home and schools of their children. The enterprises created were mostly based on (a) a serious hobby that turned into a business, or (b) previous experience in a sector that lends itself well to consultancy or freelance work. In addition, all those interviewed mentioned one or more of “being my own boss”, a feeling of empowerment, and status within the community, as important motives. Several of those interviewed highlighted their unconventional nature or ideas, with one female interviewee mentioning that “I have always been non-conformist”. An interesting factor that was mentioned in many of the interviews was the importance of having access to space to run the business, with several interviewees highlighting the importance of owning their own homes, or having space in their homes, as particularly helpful in the early stages of their business. Several interviewees mentioned the role of working tax credits (a state benefit accessible to those on low incomes who are in work) in making flexible self-employment more attractive than being out of the labour force.

In terms of the local context, networks and peer-group effects were highlighted as important determinants of both starting and growing a business. In the case of the female cluster, most of those interviewed highlighted the help and encouragement they received from other female entrepreneurs in the local area, for instance, showing them how to keep accounts, hosting events such as Christmas “office” parties, and sharing resources such as administrative support and office supplies. Several interviewees highlighted the key role of one local female entrepreneur, who also acts as a business advisor to the other female entrepreneurs (a peer example). For the ethnic minority cluster the results were more mixed, with some interviewees highlighting the importance of business advice (particularly in the context of government regulations) from within their community, and others commenting on the degree of excessive competition between entrepreneurs, that was driving some of them out of business.

Nearly all of those interviewed mentioned higher job satisfaction as compared to employment. The only exception was a café owner in the early stages of running the business, who was struggling with long hours, a long commute into work, and difficulties in recruiting staff. All of those interviewed mentioned long hours, but in many cases this was not seen as a negative consequence per se, as the hours are flexible, and the work was (in most cases) seen as enjoyable. All of the female entrepreneurs with children interviewed said that self-employment had a positive effect on their family life, and their relationship with their children. The findings on health and stress levels were mixed. Many of the interviewees reported feeling more in control, and therefore less stressed, than when in employment, but there were some exceptions. Stress seemed to be related to

businesses in their early stages, and the uncertainty of income as a self-employed business owner. Nearly all of those interviewed reported lower or uncertain income, but greater leisure satisfaction due to more flexible working hours.

Appendix C. Descriptive statistics for variables included in the analysis.

Variable	Obs	Mean	Std. Dev.	Min	Max
Job satisfaction	157,198	5.32	1.42	1	7
Life satisfaction	144,860	5.22	1.38	1	7
Leisure satisfaction	144,862	4.43	1.57	1	7
Income satisfaction	144,811	4.56	1.63	1	7
Health satisfaction	144,875	4.92	1.66	1	7
Subjective well-being	146,497	25.42	4.96	0	36
Life satisfaction (children)	16,415	5.880	1.096	1	7
Self-employment	172,734	0.14	0.35	0	1
Switch to self-employment	103,060	0.02	0.12	0	1
Area type: urban	172,807	0.35	0.48	0	1
Area type: semi-urban	172,807	0.44	0.50	0	1
Area type: rural	172,807	0.21	0.41	0	1
Monthly gross labour income	163,686	1,872	1,653	0	15,120
Weekly hours worked	170,582	33.42	12.41	0.10	120
Commutes by car	147,061	0.64	0.48	0	1
Commutes by public transport	147,061	0.14	0.35	0	1
Commuting time (minutes)	117,529	25.60	22.46	0	997
Works from home	156,388	0.05	0.22	0	1
Female	172,807	0.50	0.50	0	1
Age	172,807	42.21	12.86	18	94
Born in the UK	172,807	0.89	0.32	0	1
Married or cohabitating	172,807	0.77	0.42	0	1
Children (y/n)	172,807	0.37	0.48	0	1
Professional occupation	172,807	0.28	0.45	0	1
HH income quintile (5=highest)	172,807	3.45	1.32	1	5
IMD quintile (5=most deprived)	172,807	2.95	1.39	1	5
Wave	172,807	3.79	2.00	1	7

Appendix D. Correlations matrix.

	Job sat.	Life sat.	Leis. sat.	Inc. sat.	Health sat.	Subj. well.
Job satisfaction	1.000					
Life satisfaction	0.231	1.000				
Leisure satisfaction	0.200	0.513	1.000			
Income satisfaction	0.195	0.539	0.473	1.000		
Health satisfaction	0.117	0.468	0.353	0.443	1.000	
Subj. well-being	0.316	0.435	0.285	0.268	0.269	1.000
Switch to self-emp.	0.040	0.003	0.006	-0.004	0.007	0.013
Female	0.039	-0.005	-0.009	-0.028	-0.015	-0.106
Age	0.047	-0.015	0.045	0.033	-0.037	0.009
Born in UK	0.020	0.052	0.028	0.073	0.026	0.045
Married or cohab.	0.001	0.012	-0.104	-0.071	0.000	-0.007
Children (y/n)	-0.009	0.054	-0.018	0.111	0.061	0.005
Prof. occupation	0.036	0.094	0.041	0.233	0.051	0.050
HH income quint.	-0.021	-0.030	-0.026	-0.022	-0.004	-0.007
Deprivation quint.	-0.009	0.007	0.012	-0.001	-0.011	-0.007
Rural	-0.020	-0.029	-0.024	-0.020	-0.002	-0.007
Semi-urban	-0.010	0.006	0.012	-0.001	-0.012	-0.006
Urban	0.034	0.026	0.013	0.024	0.017	0.016
	Switch	Female	Age	Married	Children	Profess.
Switch to self-emp.	1.000					
Female	-0.037	1.000				
Age	-0.003	-0.009	1.000			
Born in UK	-0.016	0.021	0.009	1.000		
Married or cohab.	0.000	-0.075	-0.024	-0.056	1.000	
Children (y/n)	0.006	-0.003	-0.195	-0.079	0.068	1.000
Profess. occupation	0.008	-0.103	0.044	0.000	0.043	0.059
HH income quint.	-0.025	-0.031	0.083	0.048	0.055	-0.177
Deprivation quint.	-0.010	0.003	-0.100	-0.111	-0.051	-0.005
Rural	0.004	-0.006	-0.042	-0.183	0.022	0.013
Semi-urban	-0.010	-0.004	-0.021	0.079	-0.033	-0.004
Urban	0.008	0.011	0.073	0.112	0.014	-0.011
	HH inc.	Depriv.	Urban	S-urban	Rural	
HH income quint.	1.000					
Deprivation quint.	-0.275	1.000				
Rural	-0.009	0.174	1.000			
Semi-urban	-0.017	-0.056	-0.641	1.000		
Urban	0.030	-0.131	-0.358	-0.487	1.000	

Appendix E. Imbalance analysis for CEM matching.

Imbalance analysis (pre-matching)

Multivariate L1 distance: 0.9462

Univariate imbalance:

	L1	Mean	Min	25%	50%	75%	Max
Female	0.189	-0.189	0	0	-1	0	0
Age	0.085	-0.109	0	0	-1	0	-11
Born in UK	0.045	-0.045	0	0	0	0	0
Married or cohabiting	0.015	0.015	0	0	0	0	0
Children	0.035	0.035	0	0	0	0	0
Professional occupation	0.029	0.029	0	0	0	0	0
HH net income quintile	0.145	-0.288	0	-1	-1	0	0
Area type	0.053	-0.014	0	0	0	0	0
IMD quintile	0.035	-0.095	0	0	0	0	0
Wave	0.050	0.164	0	0	1	0	0

Matching summary

Number of strata: 17131

Number of matched strata: 1266

	0	1
All	101489	1571
Matched	17016	1423
Unmatched	84473	148

Multivariate L1 distance: 0.8779

Univariate imbalance:

	L1	Mean	Min	25%	50%	75%	Max
Female	0.000	0.000	0	0	0	0	0
Age	0.072	-0.129	0	0	-1	0	-1
Born in UK	0.000	0.000	0	0	0	0	0
Married or cohabiting	0.000	0.000	0	0	0	0	0
Children	0.000	0.000	0	0	0	0	0
Professional occupation	0.000	0.000	0	0	0	0	0
HH net income quintile	0.000	0.000	0	0	0	0	0
Area type	0.000	0.000	0	0	0	0	0
IMD quintile	0.000	0.000	0	0	0	0	0
Wave	0.000	0.000	0	0	0	0	0