Spatio-temporal un-boundedness: A feature, not a bug, of self-employment

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Abstract

This article considers whether unbounded times and spaces of work are systematically associated with self-employment. In contrast to analyses that frame the spatial and temporal location of work as signifying autonomy or freedom, it posits that self-employment is produced by, and then reproduces, constraints on and preferences about spatio-temporal organisation at both occupational and individual level. Using data from five years of the UK Labour Force Survey (2013-17) the article takes a novel approach in the quantitative analysis of self-employment by conducting intra-occupational analysis within each of four relatively homogenous occupational groups: hairdressers, shopkeepers, arts workers and accountants. Analysis shows that: 1) at population-level self-employment is strongly associated with both spatial and temporal unboundedness; 2) these effects are stronger for women than men; 3) in intra-occupational analyses, gender, alongside other socio-demographic measures, is largely non-significant, suggesting that the relationship between these and self-employment is primarily produced by differences associated with occupational segregation; 4) the association between self-employment and different types of spatio-temporal unboundedness varies markedly by occupation. The article points to the importance of occupation and the spatio-temporal organisation of concrete work activity in understanding the reproduction of self-employment. It concludes, therefore, that spatio-temporal unboundedness should be considered as a feature, or structural component, of self-employment, not a choice or by-product.

Keywords

Work-life boundaries, working time, gender, self-employment, occupation

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Introduction

As Karl Marx noted a century and a half ago, battles to set the temporal limits of employment, to carve out and defend non-working time (weekends; holidays) and to reduce the length of the working day, have been central to class conflict and, therefore, the development of capitalist labour relations (Marx, 1867). Similarly, the spatial delineation of places of work and the separation of these from extra-work (and domestic) life have been quintessential aspects of industrial capitalism and its imaginings (Hareven, 1991) and underscored gendered and racialised divisions of labour (Ekinsmyth, 2014).

Yet if wage-labour produces and is produced within historically constructed spatio-temporal boundaries, self-employment is subject to different social, historical and individual pressures and different spatio-temporal constraints. For instance, a characteristic of self-employment, notwithstanding the myriad of forms it takes (Bögenhold and Klinglmair, 2016; Bögenhold this issue), is a two-fold lacuna, the absence of direct labour relationships and of associated regulatory constraints. Alongside that, self-employment is characterised by individualised responsibility, risk and precarity. This article explores the extent to which self-employment is also characterised by less spatially and temporally demarcated work, asking to what extent unbounded spaces and times are a general feature of self-employment as opposed to a quirk or choice.

Advocates for self-employment suggest that it provides workers with freedom and autonomy, enabling them to choose where and when to work (Dellot, 2014). In this version work during unsocial times, at home, on the move, or at variable hours of the day is evidence of personal preference. Yet qualitative studies have over-and-again shown self-employment status produces pressures on individuals to tolerate greater unpredictability in their working times (Hardy and Sanders, 2015) and spaces (Cohen 2010); and that unbounded work produces tensions for self-employed workers, who frequently respond by attempting to re-bound working times, places and social relations (Mustafa and Gold, 2013; Myrie and Daly, 2009). This article suggests, moreover, that by stepping back from prevalent discourses of independence and entrepreneurialism (Valdez, 2015) we can identify the ways that spatio-temporal unboundedness is located within broader contexts, namely occupational structures and individuals' extra work lives. These contexts produce sets of preferences and constraints that are both constitutive of, and reinforced by, self-employed status.

Later sections of the article employ secondary quantitative data from the UK Labour Force Survey to chart the relationship between spatio-temporal unboundedness and self-employment, initially within the whole working population, but latterly, within four relatively homogeneous occupational groupings. The analysis shows that: 1) at population-level self-employment is strongly associated with both spatial and temporal unboundedness; 2) these effects are stronger for women than men; 3) in intra-occupational analysis, gender and other socio-demographic measures are largely non-significant, suggesting that relationships between these and self-employment are primarily produced by differences associated with occupational segregation; 4) the association between self-employment and different types of spatio-temporal unboundedness varies markedly by occupation. Based on this analysis the paper suggests that spatio-temporal unboundedness is not simply a contingent outcome of self-employment, but rather is intimately related to its (re)production: as such it is a feature, not a bug.

(Re)producing self-employment

Self-employment rates have increased across most OECD countries (Meager, 2016). In the UK in the period since the financial crisis of 2008 rises in self-employment have far outpaced employment, with self-employment now accounting for about fifteen percent of total employment. Yet, average

self-employment income has fallen (Office for National Statistics, 2014), exacerbating the concerns of policy-makers for self-employed who typically lack access to pension, maternity or sickness benefit and therefore occupy a precarious financial position (D'Arcy and Gardiner, 2014).

These self-employment rises have prompted attention, but also a focus on 'new' types of self-employment, namely forms of sub-contractual labour associated with online algorithmically-driven platforms such as *Uber*, *Etsy*, *Deliveroo* and *Mechanical Turk,* variously identified as 'crowd work' (Huws and Joyce, 2016), 'gig work' (De Stefano, 2015; Graham et al., 2017), 'the platform economy' (Forde et al., 2017) or 'sharing economy' (Rahim et al., 2017). Yet if increasingly large numbers of workers receive a small income working with these platforms, a much smaller number depend on them to regularly top-up earnings and a yet smaller number rely on platform work for their full income (Rahim et al., 2017). Moreover, as Lockey (2018) notes, 'the two debates – rising self-employment and the emergence of the platform economy – are regularly elided, [but] there is almost no evidence that connects the two trends.' Rather, analysis of self-employment reveals considerable continuity – for instance, although Uber has changed the conditions of self-employment for taxi drivers, this was an occupation with already high rates of self-employment and significant sub-contracting. Therefore, the main effect of online platforms has been to change the mode of third party control over a proportion of self-employed workers: an important change for the workers concerned, but relatively minor in terms of net self-employment or even its occupational clustering. Instead, empirical studies have found that, 'those who became self-employed post-financial crisis are not markedly different from those who were already self-employed' (D'Arcy and Gardiner, 2014: 40). Continuities occur, in part, because self-employment is a social relationship that is produced and then reproduced. Cross-sectional analysis of the currently self-employed is, therefore, as much an insight into the structural locations of self-employed reproduction (or how self-employment is sustained), as an insight into the production of new self-employment. Indeed, post-recession UK self-employment rate increases are due to fewer people exiting self-employment, rather than increased entry (Office for National Statistics, 2014: 5).

Time, space and self-employment

The (re)production of self-employment is both individual and structural. At individual level reproduction of self-employment depends upon individual (or household) resources, constraints, options and preferences. At a societal level, the reproduction of self-employment involves the reproduction of those socio-economic niches in which self-employed activity can be sustained, for instance where micro-businesses can compete against or are welcomed by large scale capital. As discussed below, in both sites of reproduction, spatio-temporal unboundedness is key.

Individual spatio-temporal pressures and the (re)production of self-employment

Social historians and feminist sociologists have long argued that work and extra-work (which includes, but extends beyond, the domestic and familial), are not wholly separate spheres, but rather involve interconnected and inter-determinate sets of social, but also spatial and temporal relations (c.f. Glucksmann, 2005; Hareven, 1993). In line with this there is considerable evidence that self-employment is understood by those engaged in it as a strategy to deal with extra-work demands and, especially, to manage work-family conflict (Myrie and Daly, 2009). For instance, a Swedish study found that a majority of self-employed men and a large majority of self-employed women gave 'family/lifestyle' motives for becoming self-employed (Johansson Sevä and Öun, 2015). One of the reasons for this is that self-employment appears to offer possibilities for a 'spatial reconfiguration' of work (Ekinsmyth, 2014; Halford, 2005) and, associated with this, increased temporal flexibility. Thus studies find that women, especially new mothers, look to home-based self-employment to facilitate the management of competing demands (Berke, 2003; Carrigan and Duberley, 2013; Ekinsmyth,

2014; Lewis et al., 2015; Luckman, 2015). This understanding is most explicit where self-employed women self-identify as 'mumpreneurs' (Ekinsmyth, 2011), a framing of work activity that foregrounds domestic status.

There is, however, a considerable gulf between the ideals of self-employment and its lived reality. Where self-employment produces individualised responsibility and workers who are 'always on' it becomes difficult to separate from work during 'non-working' times (Hilbrecht and Lero, 2014). In these contexts the absence of formal spatial or temporal boundaries can exacerbate the pressures of work (Mustafa and Gold, 2013; Myrie and Daly, 2009). In these contexts, 'the notion that women will achieve work-life balance by entering self-employment' is undermined by 'the reality of the hours and commitment that self-employment and business ownership demands' (Forson, 2013: 467). Thus, self-employment does not alleviate work-family tensions (Johansson Sevä and Öun, 2015). Rather, as Luckman (2015: 155) points out, self-employment 'can operate as a twenty-first century poorhouse …including many people working hours far in excess of those they desire for family-friendliness'. Craig, Powell and Cortis (2012) find that, indeed, self-employed mothers do not work shorter hours, but they are able to engage in 'time-shifting', for example, moving their working hours so that they work fewer daytime hours and more at atypical times (evenings or weekends). Primarily, however, in their study self-employment facilitates the juggling of tasks, because it involves a *spatial* realignment and home-working.

Self-employment is also disproportionately undertaken by workers nearing the end of their working lives (D'Arcy and Gardiner, 2014; Mallett and Wapshott, 2015; Small, 2012; Tomlinson and Colgan, 2014). Typically seen a 'pull' effect – that older workers have built up sufficient capital to start businesses and are motivated by a desire for self-realisation and independence – qualitative studies also reveal 'push' reasons that are both spatial and temporal. Older workers may find the labour market inhospitable, especially work within corporately regulated work-spaces requiring standards of youthful aesthetics (Tomlinson and Colgan, 2014), something which self-employed work within domestic spaces may allow them to circumvent (Cohen, 2010). Additionally, older workers increasingly face renewed need for 'flexible' temporalities to manage care for aging parents and partners alongside grandchildren (McKie et al., 2013).

Wider kin relations also play a role in self-employment entry and in the spatio-temporal organisation of this work. Kin can offer financial, instrumental and emotional support, and enable the self-employed worker to meet variable demands. For instance, employed partners who provide income to stabilise early days of self-employment (Hilbrecht and Lero, 2014). Kin resources may be especially important to immigrant and ethnic minority self-employed workers, who face obstacles in accessing formal institutions, such as banks or state agencies and may rely instead on support from spouses, but also children and more distant kin, sometimes supplemented by members of the co-ethnic community. Where such kin support involves access to cheap (or free) labour, it enables the self-employed to accommodate long-working hours and gain competitive advantage in occupational niches in which cheap labour is essential and capital costs low (Cobas and DeOllos, 1989; Phizacklea and Ram, 1996; Ram and Edwards, 2003; Waldinger et al., 1990). Both the type and quantity of kin support available (or sought) is, however, gendered in ways that tend to advantage self-employed men (Hilbrecht and Lero, 2014; Marlow et al., 2009; Valdez, 2016).

Structural spatio-temporal pressures and the (re)production of self-employment

Discussion of self-employment is often surprisingly abstract, with self-employment framed as if it involves a single set of activities. Yet self-employment involves concrete work activity undertaken within specific occupations. This occupational context is important for both the (re)production of

self-employment and the spatio-temporal location of self-employed work. In the post-recession period d'Arcy and Gardiner (2014) find relative continuity of self-employment rates *within* occupations, despite change in overall rates, highlighting the extent to which self-employment is an occupational phenomenon. Occupation also appears in individual rationales for self-employment entry. For instance, in a UK study Dawson et al (2014: 809–10) find that the 'nature of the occupation' was the second most commonly given reason for becoming self-employed, after 'to be independent'. This suggests that for large numbers of workers self-employment is a career stage within their occupational trajectory rather than a radical break. Dawson et al (2014) also find that regional variation in self-employment rates are largely produced by differences in occupational concentration. Similarly, Loscocco and Bird show that occupational sector determines both the relative success of self-employment, and the ways it is organised and gendered (Loscocco and Bird, 2012).

If these studies point to the relevance of sector and occupation, they tend to operationalise these using broad categories. For instance, Loscocco and Bird (2012) employ categories as overarching as 'personal services' (including a range of activities from dry cleaning to personal training), Dawson et al (2014) use just six sectoral categories and d'Arcy and Gardiner (2014: 44) nine occupational categories. Problems with this approach become apparent when we note the concentration of self-employment within a few much narrower occupational settings. For instance, 2011 UK Census data shows that over half of all male self-employed work occurs in just 23 out of a list of 369 occupations. Exactly the same number of occupations (23), albeit a slightly different list, accounts for half of all female self-employment (Office for National Statistics, 2013, author's own calculations). Thus, within the vast majority of occupations there is very little self-employed work. Conversely, other occupations have extremely high rates of self-employment and/or are sufficiently large occupations to account for a large part of all self-employment. For example, the single occupational category, 'Hairdressers and barbers' accounts for over six percent of all female UK self-employment. Given this degree of concentration consideration of more fine-grained and better specified occupational groups is important.

Concrete work tasks are not infinitely mutable. This means that within any socio-historical and technological context occupations set the parameters within which space and time are negotiated. Whereas some work activity must be performed at a specified time/place, other activities can be moved or time-shifted or, alternatively, may require temporal and/or spatial variability or a temporal-duration outside the normal working day. For instance, a classic analysis of the development of capitalism drew attention to the ways in which the factory both physically concentrated workers and required their presence during fixed temporal periods (Thompson, 1967). In contemporary capitalism, there continue to be many types of work activity with spatial constraints determined by a requirement for proximity with others or with large scale machinery and which therefore require fixed hours – for instance a teacher's work requires she be present at school during the school-day. In contrast, some work activity, for instance, taxi-driving, is less bounded and working hours or spaces less easily concentrated (Cohen, 2010: 20), while other work, most obviously occupations reliant on mobile technologically, might not *necessarily* be unbounded, but may be able to be performed across a wide variety of places and atypical temporalities (Hislop et al., 2015).

It has been suggested elsewhere (Cohen, 2011; Cohen and Wolkowitz, 2017) that particular forms of occupationally-rooted temporal unboundedness make it unprofitable for large firm sectoral dominance may also therefore establish a fertile terrain for self-employment. Which is to say, that much self-employment occurs within the interstices of the labour market and is focused on activities

that are difficult to coral into the spatio-temporal requirements of profitable direct employment. This includes those work-tasks that cannot be concentrated into a given period or where there is a mismatch between time at work (the time during which workers must be available to carry out tasks) and time working (those moments when labour is employed in profit-making work-tasks). It also includes work activity that is spatially dispersed so as to produce temporal and spatial hiatuses (Cohen, 2010) or where the times and spaces of work activity are persistently unpredictable. To the extent that self-employment thrives in these contexts it is in large part because the self-employed worker is willing to 'count' her time differently to an employee and, for instance, is willing to discount non-working time at work. This is, of course, facilitated when time 'at work' is not spatially demarcated from extra-work life.

This section has suggested that self-employment is occupationally concentrated and patterned. It has pointed to differences in the temporal and spatial organisation of work activity in different occupations and proposed that occupations that involve unbounded temporal and spatial work activity creates contexts in which self-employment may be found, specifically *because* those contexts provide scope for the self-employed to develop coping strategies that are not open to larger-scale capital.

Methods

Data

Data are from the Labour Force Survey (LFS). The LFS is conducted with a representative sample of UK households four times a year. It employs a panel design, with one fifth of the sample replaced each quarter. Respondents therefore typically remain in the sample for five consecutive quarters. Each quarterly dataset contains about 90,000 respondents. Because it involves a large sample it is also ideal for exploring relatively small sub-groups in the population such as the self-employed or homeworkers and has been used to explore within-occupation variation (Friedman et al., 2017).

Data from five years of the LFS (2013-2017) were merged. In each case the January-March (Winter) quarter was selected. Wave five data were omitted because respondents in this wave were first included the Winter of the previous year. This avoids any respondent being double-sampled. The initial combined dataset included 391,036 respondents. Of these 185,925 had a currently recorded occupation and were included in further analysis.

The combined data are analysed in two ways. First, the data are used to identify population-level relationships between unbounded work and self-employment. A secondary question in this analysis is whether and to what extent this is gendered. Or, do women do self-employment in a way that involves greater or lesser boundary-breaching than do men? The second set of analyses explore equivalent questions, but do so by exploring work within specified occupations.

Occupational groups

Four occupational groups were selected to explore in greater depth – accountants; hairdressers; shopkeepers and arts workers. These occupations were selected on the basis of a) size – sufficient respondents in a single occupation or closely aligned set of occupations to conduct statistical analyses; b) rates of own-account and employer self-employment – a reasonably large number of both types of self-employed worker; c) diversity – selected occupational groups were varied, with different status, qualifications, socio-demographic-profiles and different types of work activity.[1] Hairdressing was chosen as the most common form of female self-employment and involves workers in a mix of 'body work' (involving the touch and the manipulation of customers' bodies) and emotional labour (Cohen and Wolkowitz, 2017). In the UK it does not require accreditation. In

contrast, accountancy work is professionally accredited, typically involves considerable desk-based work and extensive use is made of information and communication technologies, making this a 'technologically-dependent' form of work (Hislop et al., 2015). Shop-keeping is the archetypical 'petit-bourgeois' activity, and one of the most common forms of both male and female self-employment, as well as an occupation associated with immigrant self-employment (Villares-Varela et al., 2018). The occupational group 'arts workers' as constructed here is a little more diverse, but encompasses artists; authors, writers and translators; actors, entertainers and presenters; dancers and choreographers; musicians; arts officers, producers and directors; and photographers, AV and broadcasting equipment operators. These workers perform 'creative work' (Florida, 2002)[2] in a sector renowned for poor employment practices and the exploitation of workers' internal commitment and motivations (Gill and Pratt, 2008; Hesmondhalgh and Baker, 2013). The four occupational groups shown are not intended to 'represent' all self-employment. Rather, by deploying a more fine-grained understanding of occupation than found in previous analysis and then conducting within-occupation analysis we can highlight variability and continuity. We can also ask whether self-employment and its spatio-temporal relations appears as a different phenomenon when analysed at occupation, rather than population, level and how this varies across quite different occupations. Table 1 shows the unweighted sample sizes for each of these occupations for each year in the sample. These occupation-specific samples range from 1,156 to 3,026. Combined, these four occupational groups comprise over 4% of the total labour force: a small, but non-trivial, share of all employment.

[TABLE 1 HERE]

Variables

Work relations is measured by three categories: employee, self-employed own-account worker and self-employed, employing others. As Table 2 shows self-employment accounts for about 15 percent of the working population, with this primarily taking the form of own-account work. This is much higher in some of the selected occupations, however. Thus, a majority of hairdressers and arts workers are self-employed (51 and 69 percent respectively) as compared to a large minority of shopkeepers (33 percent) and a smaller minority of accountants (20 percent). Amongst arts workers only about three percent of the self-employed are employers. In contrast, about 43 percent of self-employed shopkeepers are employers. This highlights how self-employment clusters within particular occupations, and that the opportunity to move from own-account to employer self-employment is unequally distributed across occupations.

[TABLE 2 HERE]

Three types of unbounded temporality are explored: duration, schedule and variability. *Duration* is measured using the variable 'Usual weekly hours'. Analysis of self-employed work has highlighted that it may involve inordinately long hours, but also marginal, short hours. Thus, the variable is transformed into three categories: 'normal' hours are measured here as weekly hours between 30 and 45 per week.[3] Over half of the working population reports working these hours. Short hours (1 to 29 per week) are reported by 24 percent of the population and long hours (46+ hours per week) are reported by 19 percent. There is some variation by occupation, with hairstylists and, to a lesser extent, art workers notable for their short hours (worked by 42 and 31 percent respectively) and shopkeepers for their long hours (worked by 38 percent).

Unbounded *schedule* here refers to work being performed during a culturally non-working day – the weekend. The variable is coded one if respondents work on either or both weekend-days. A fifth of

all workers report working weekends. When this is examined by occupation we see that the majority of each of hairdressers and shopkeepers, but only three percent of accountants, do weekend work.

Unbounded *variability* is measured by a variable that asks respondents whether their 'weekly hours tend to vary', with response categories Yes and No. Over a third of workers report variable hours. Given the current focus on the negative effects of zero-hour and variable-hour contracts this is perhaps noteworthy. The variable does not, however, distinguish variability initiated at the worker's discretion (a positive form of flexibility) from variability that is the product of unpredictability (a negative impact). Notably, more than two thirds of arts workers report that they work variable hours, a rate almost twice that found among hairdressers. If this variability were purely the product of workers' preferences it is unlikely inter-occupational differences would be that high.

Unbounded *Space* is explored using a single variable that asks workers to specify whether they work in their 'own home', 'the same grounds or building' as home, 'different places with home as a base' or in a 'Separate from home'.[4] The large majority of workers work 'separate from home'. This varies a little by occupation, with 21 percent of art workers and eight percent of accountants working at home and 33 percent of art workers and 13 percent of hairdressers working in different places (heretofore described as 'mobile' (Brown and O'Hara, 2003; Cohen, 2010)). Because relatively few workers state that they work in the 'same grounds or building', future analyses merge this category with those who work from their own home. While both working at home and mobile work involve the breaking down of boundaries, mobile work is likely to radically increase unpredictability, exposing workers to unfamiliar environments and increasing the difficulty with which even familiar work-tasks are performed.

Analysis strategy

The analysis below investigates whether self-employment is associated with work that is spatio-temporally unbounded. Second it looks at how this relationship, between spatio-temporal unboundedness and self-employment, is gendered and third, in a separate set of analyses (below), how the relationship between spatio-temporal unboundedness and self-employment varies by occupation. Multinomial regression is used to explore those factors underpinning (re)production of self-employment. In all analyses own-account and employer self-employment are differentiated from employee status (the reference category). This follows previous studies in which important differences were found between own-account and employer self-employed (c.f. Johansson Sevä and Öun, 2015) and reflects the different temporal and spatial possibilities open to sole-workers and those who employ others. In all analyses both socio-demographic and temporal and spatial arrangements are employed as independent variables. Gender is employed as an interaction term to examine the gendering of identified processes. The second set of regression analyses are carried out separately on each of the four selected occupational groups. Lower sample size, and less variability make it impossible to interact gender with as many spatio-temporal measures in these analyses.

The use of spatio-temporal arrangements as independent, rather than dependent, variables is relatively unorthodox: the standard assumptions are that the times of work follow from employment status. Yet, as discussed above, if we consider the individual and structural bases for (re)production of self-employment the reverse argument emerges: that self-employed status is the product of spatio-temporal constraints or preferences. For instance, self-employment may represent an attempt to experience greater 'freedom' (something that often is implicitly spatial or temporal); it may be sought to manage work-life conflict; and, at a structural level, self-employment may occur within the interstices of the labour market focused on activities, that are difficult to squeeze into the temporal-spatial requirements of profitable direct employment.

Findings

Demographics

Many of the socio-demographic features identified previously are found to impact the odds of being self-employed, either working as an own-account worker or employing others. Male workers have odds over three times that of female workers of being self-employed own-account workers and just under three times that of women of being self-employed, employing other. Additionally, older workers, workers not born in the UK and workers who do not report health problems all have raised odds of being self-employed (either own-account workers or employers). Marriage is a little more complicated. Being married decreases the likelihood of own-account self-employment, but only for men. Conversely, being married increases the odds of both men's and women's employer self-employment, but the increase is bigger for women than men. This suggests that the benefits of shared household resources, for supporting individual self-employment are especially important for women in larger-scale (employer) self-employment. Having a child under four slightly increases the odds of own-account self-employment for both men and women (a fifteen percent increase). It also increases the odds of employer-self-employment, especially for women. Although not a very strong effect, this is in line with previous studies that suggest that self-employment may be a way of managing child-care, especially for mothers.

[TABLE 3 HERE]

Space

Unbounded space (mobile work and homeworking) is very strongly associated with self-employment. This is most true of own-account female self-employment, where being either a mobile worker or home-based multiplies workers' odds of own-account self-employment over thirty-fold. The connection with employer self-employment is also strong, albeit a little less so: being mobile or home-based increases female workers' odds of employer self-employment, by a multiple of five and eight, respectively. Overall, the findings here suggest that work that either requires, or work that can be performed in, unbounded space is much more likely to be performed by the self-employed.[5] Additionally, in all cases we see significant gender interactions which indicate that unbounded working spaces are somewhat less strongly associated with male self-employment. Thus, while men who are mobile for their job have increased odds of performing own-account self-employment (as compared to men with dedicated workplaces), these odds are half as great as for mobile women. Similarly, although working from home is strongly connected with male own-account and employer self-employment, the odds are 0.4 times as great as for home-based women. In other words, unbounded space is strongly associated with self-employment for both men and women, but the association is considerably stronger for women.

Temporality

The three types of unbounded temporality analysed impact on the likelihood of self-employment in multiple ways. First, atypical temporal duration (short or long hours, as opposed to regular hours of 30-45 per week) increases the likelihood of own-account self-employment (by about 70 and 30 percent for short and long hours, respectively). Thus, the own-account self-employed may be in marginal employment (with low hours), but this type of self-employment also occurs where workers put in long shifts. Conversely, there is a negative association between working short hours and self-employment that involves employing others, whereas working long-hours multiplies the odds of being in this status by 150 percent. Thus, long working hours increases the odds of self-employment, and especially of employer-self-employment, but working short hours makes own-account self-

employment more likely and employer self-employment less likely. The effects of temporal duration on the odds of being in own-account self-employment are significantly reduced for men, as opposed to women. Therefore, short or long hours of work are more strongly related to women's than to men's own-account self-employment. Turning to employer self-employment, however, there are no significant gender interactions with temporal duration.

Two other types of unbounded temporality are explored: schedule (weekend working) and predictability/flexibility (variable hours). Both types of unbounded temporality increase the odds of own-account and employer self-employment. As was the case with unbounded space and temporal duration, the impact of both weekend working and variable hours on the odds of self-employment is significantly less strong for men, as compared to women. The exception is the association of variable hours with own-account working, which is not gendered. Thus, both temporal variability and unsocial hours are strongly associated with own-account self-employment and, for women especially, self-employment is associated with weekend work, a form of 'time-shifting' (Craig et al., 2012).

This analysis shows, therefore, that unbounded spaces (mobile and home) and times (temporal duration, schedule and variability) are associated with both own-account and employer self-employment. To a large extent this is true for men and for women. Where, however, gender differences exist, they show that unbounded times and spaces more strongly underpin women's, than men's, self-employment activity. This analysis cannot differentiate, however, whether this difference is due to differences in preference, or whether it relates to more structural differences in the spatio-temporal organisation of the (different) types of work in which self-employed men and women engage. To explore this further we need to control for some of those differences by doing within-occupation analysis.

Occupation

The second set of analyses again use multinomial logit to regress work relations (employee versus own-account self-employed and employer self-employed) on workers' demographic characteristics and on the organisation of time and space. Now, however, separate analyses are done for each of the four selected occupational groups. This analysis includes all demographic, temporal and spatial independent variables. Due to smaller Ns, and relatively small sub-groups, especially amongst those involved in employer self-employment, it has not been possible to include all the gender-interactions from Table 3. However, three gender interactions could be included in all four analyses (two demographic and one temporal). Other interactions were explored within those occupations where this was possible, but are not shown here.

[TABLE 4 HERE]

In contrast to the whole labour-force analysis, intra-occupational analyses find that socio-demographic variables have few significant, or sizeable, effects on self-employment. It may be that the non-significance of socio-demographic variables here is, in part, due to smaller sample sizes in these analyses than in the labour-force analysis. As we will see, however, relatively strong spatio-temporal effects remain in all four within-occupation analyses. Additional analyses (not shown) in which self-employment within each occupation was regressed on socio-demographic variables only (without additional spatial or temporal variables) similarly identified very few significant effects. This suggests, therefore, that the socio-demographic effects identified in the whole-labour force analysis may in large part be occupational effects, something that is unsurprising given the gendered and racialised nature of many high-self-employment occupations. There are, however, a few exceptions among our four occupational cases, where socio-demographic characteristics appear to play a

significant, and sizeable, role in within-occupational analysis. The first relates to shopkeepers. As the final columns of Table 4 shows, several socio-demographic effects on self-employment amongst shopkeepers persist even after controlling for spatio-temporal organisation. These include a consistently significant effect for being born outside of the UK, highlighting the extent to which, amongst those working as retail or wholesale shopkeepers, the native born are more likely to work as employees and self-employment is associated with migrant status. This chimes with the various analyses of immigrant self-employment, which have focused on this occupation (c.f. Phizacklea and Ram, 1996). A second strong socio-demographic effect is found in hairdressing, where with every year they age workers have odds 24 percent higher of becoming own-account self-employed and 49 percent higher of becoming employer self-employed. Given that this is a relatively young occupation this suggests that self-employment may be a career stage – wherein workers either leave the occupation or become self-employed as they age.

As already indicated, spatio-temporal effects are more consistently significant across the different occupations, and in some cases quite sizeable. As was the case at population level, spatial unboundedness is an important predictor of self-employment across occupations. This is especially the case for own-account work, although the effect strength of spatial unboundedness varies by occupation. For instance, mobile work has a very strong effect on own-account self-employment in hairdressing (multiplying the odds of own-account work by 220) and strong effects on own account work in other occupations (multiplying the odds between 10 and 23 times). Mobile work is less strongly and less consistently associated with employer self-employment. Working at home has a consistently strong association with own-account work (multiplying the odds by between 12 and 27) and more varied relationship to employer self-employment. For example, among accountants neither mobile work nor homeworking effect the odds of being in employer self-employment, but among arts workers mobile and homework each increase the likelihood of employer self-employment (five- and seven-fold, respectively). Thus, in some sectors, but not others, spatial unboundedness persists into employer self-employment. We can say, therefore, that spatial unboundedness (mobile and homework) are strongly and consistently associated with own-account work, despite occupational-variation, but have inconsistent and weaker relationships with employer self-employment.

The story is much more mixed with respect to temporal unboundedness, with different types of unbounded temporality impacting differently on self-employed status across occupations. In accountancy, a professional occupation in which pressures to work long hours are widespread, we find that temporal duration is unconnected with self-employment (own-account or employer). In contrast, long hours are associated with employer self-employment for arts workers, hairdressers and shopkeepers and, to a much lesser extent, with own-account work in arts and shop-keeping. Short hours are positively associated with self-employment in the arts and shop-keeping, but negatively with own-account and employer hairdressing. Short hours in hairdressing, therefore, increases the likelihood of direct employment, whereas short hours in the arts increases the likelihood of self-employment. Since these are the two occupations in which short-hours are most common this highlights that the precise ways in which temporal duration and self-employment are connected varies by sector. For instance, it is likely that within hairdressing, a relatively young and highly feminised sector, part-time work is a normal part of regular employee relationships, whereas short-hours in the arts may more often be attributable to a lack of work – and self-employment ensures that this risk is assumed by the individual self-employed worker. In two of the four occupations the interaction of gender and temporal variability is significant. In both cases (hairdressing and shop-keeping) the effect of variable hours on own-account self-employment is considerably less pronounced for men than women, suggesting that women's self-employment is

more closely associated with unbounded times in these occupations (although among shop-keepers the main effect for temporal variability is insignificant, so it may be that in this case it is male invariant temporality that is associated with own-account self-employment). Interestingly the gender-variability interaction was not significant in Table 3, highlighting again the importance of occupational context.

Discussion

The foregoing analysis has shown that self-employment is much more likely to occur when work is performed in unbounded times and spaces. This study has considered unbounded temporality as multi-faceted, and has included measures to assess temporal duration, schedule and variability. All three dimensions of temporal unboundedness increase the likelihood of self-employment, albeit with slightly different effects on own-account versus employer self-employment. Unbounded spatial organisation consistently and substantially increased the likelihood of self-employment. Since only some work can be performed in unbounded spaces – for instance work involving heavy fixed machinery or the regular co-presence of a group of co-workers and customers typically cannot – this finding identifies a potentially important underlying factor in the occupational concentration of self-employment. As noted above, spatial unboundedness is associated with boundary-crossing and, where it involves mobility, may introduce increased social, environmental and temporal unpredictability into working life. This highlights the extent to which self-employment regularly involves multi-layered types of unpredictability and the associated multiple risks which must be borne by individual workers.

Second, and congruent with previous work (Craig et al., 2012; Ekinsmyth, 2011), the analysis has identified a strong relationship between unbounded spatio-temporal organisation and gender. This is especially true of spatial unboundedness, with female own-account, but also employer, self-employment strongly associated with unbounded work spaces (homeworking or mobile work). The same association holds, albeit slightly less strongly or consistently, with respect to unbounded temporality. Whether this means that women are indeed embarking on self-employment that facilitates an idealised work-life integration and greater control and flexibility, or are forced to engage in self-employment in marginal spaces and at unpredictable times is not clear.

What this study has highlighted, however, is the importance of occupation. Taking a novel approach to quantitative analysis of self-employment, merged waves of the UK LFS were used to construct relatively homogenous occupational groupings. This allowed analysis of within-occupation self-employment, where occupation was a relatively meaningful construct (‘hairdresser’ or ‘accountant’ rather than ‘personal service worker’ or ‘professional’). These within-occupational analyses show that there are different factors underpinning own-account and employer self-employment in different occupations. Socio-demographic factors have relatively little within-occupation impact on self-employment. In contrast, spatial organisation remains hugely important, especially for own-account self-employment. Even here, however, there is occupational variation. For instance, accountants whose work involves unbounded space are more likely to be own-account self-employed, but there is no significant effect on their likelihood of being employers.

The argument, as laid out in Figure 1 (below), is that self-employment is (re)produced in part in response to a set of spatio-temporal preferences and constraints. These preferences and constraints (box 3) are generated in, at least, two ways. First, they are a product of the temporal and spatial structures of individuals’ extra-work life (box 2). Second, they are produced by the spatio-temporal structures imposed by particular types of work (box 1). In Figure 1, these relationships are represented by the arrows that go between boxes 1 and 3 and between boxes 2 and 3. These spatio-

temporal organisational and individual preferences and constraints (box 3) produce forms of spatio-temporal unboundedness and (re)produce self-employment.

[FIGURE 1 HERE]

Although not shown on Figure 1, the question of whether organisational and individual preferences and constraints lead to self-employment is not pre-given but is likely to vary with institutional context. Thus, there may be reduced demand for unbounded workplace temporalities in societies with well-organised state-sponsored child-care. Similarly, although types of work may involve temporal unpredictability and create problems for capital with respect to the efficient use of employee labour, the use of self-employment as a mechanism to shift the risk for such temporally variable work, may be less possible in societies with stronger employment protections (Hipp et al., 2015; Kreide, 2003).

Conclusion

This article has explored the ways in which spatio-temporal variability underpins self-employment and how this is affected by the organisational contexts of work. This is not, however, intended as a negation of the argument that self-employment produces its own set of spatio-temporal pressures and possibilities. Rather, it is undoubtedly the case that the self-employed are sometimes more willing or are more strongly compelled than employees to work long hours, to vary their hours with varying demand, wait-out non-working times without pay or to engage in work in otherwise non-work spaces (Cohen, 2010; Hardy and Sanders, 2015). This aspect of self-employment is something that has been widely exploited in the development of new types of self-employment, most notably, as part of the 'uberization' of work (Fleming, 2017). The argument made here, however, is that this temporal unboundedness is a feature not a bug of self-employment. As such it should not be seen as a choice or by-product of self-employed work, but rather as something that underpins the structural locations within which self-employed work is reproduced in capitalism. As this article has shown, both at population level, but even more, after controlling for occupation, a relatively large part of total variation in self-employment is indeed accounted for by spatio-temporal organisation.

In the above analyses shopkeepers were an interesting exception, with much stronger socio-demographic effects on the likelihood of being self-employed than found in the other three occupations examined. It is worth noting that shop-keeping is a type of self-employment that typically requires long hours or considerable labour input, but also relatively unskilled labour, as compared to the other occupations examined here. Shop-keeping is, therefore, the archetypal example of a self-employed activity in which the ability to command the (cheap) labour of oneself and others is critical, whether this is achieved on the basis of kin relations or by leveraging relationships among those with otherwise constrained labour market options, including immigrants (Edwards and Ram 2006). This is a reminder, therefore, that not only does the relationship between self-employment and space and time vary by occupation, but so too does the types of socio-demographic context required to (re)produce oneself as self-employed.

This article has highlighted some of the ways with which space, time and occupation intertwine with self-employment. However, it represents only the first steps in the development of this analysis. Future analyses could fruitfully look more closely at specific occupations and at more diverse occupations as well as different countries and time periods, to better specify the arguments made here.

Finally, while this article highlights the extent to which self-employment involves unbounded times and spaces the data do not differentiate whether this is experienced as freedom or uncertainty

(Bögenhold and Klinglmair, 2016). I would suggest, however, that the fact that both spatial and temporal unboundedness appear to be part of how self-employment is structured, suggests that while individuals may find advantages in such unboundedness, it is neither a 'choice' nor a quirk of self-employed work. In a context of rising self-employment it may therefore become increasingly incumbent on self-employed workers and the agencies and campaigns that work with them, to develop mechanisms to spatially and temporally re-bound work (Mustafa and Gold, 2013; Myrie and Daly, 2009).

Tables and Figures

Figure 1: Self-employment and spatio-temporal organisation

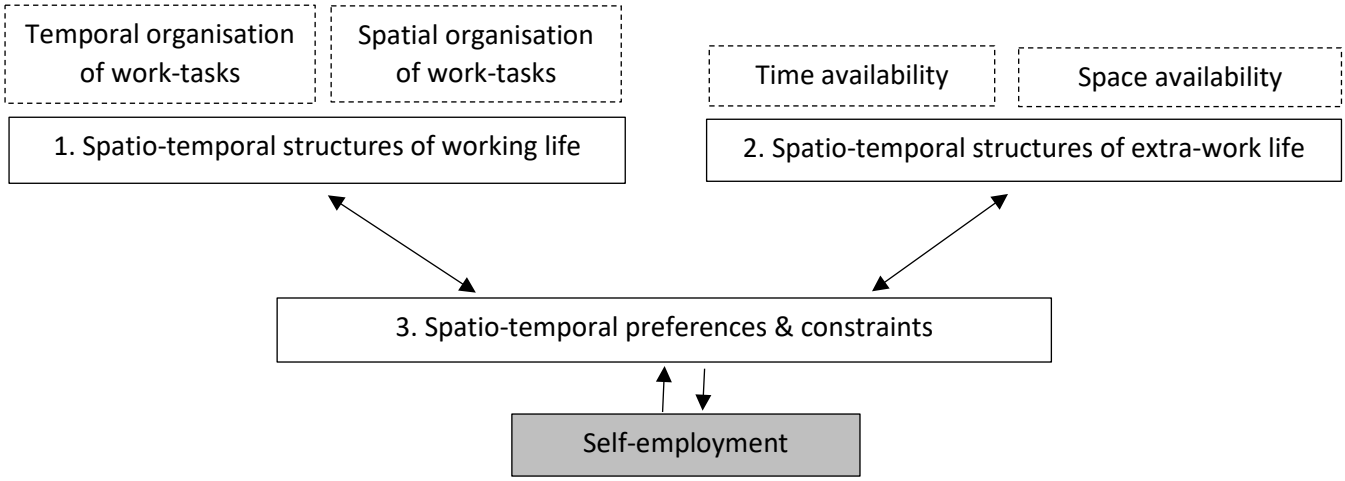

Table 1: Unweighted sample size of occupational groups, UK LFS 2013-2017 (waves 1-4 only)

	Art Workers	Accountants	Hairdressers	Shopkeepers	All workers
2013	429	241	270	705	37421
2014	462	262	281	651	38880
2015	441	226	285	615	37997
2016	406	181	247	525	36100
2017	451	246	197	530	35527
Combined	2189	1156	1280	3026	185925
Pct of wk-force	1.18	0.62	0.69	1.63	100

- *Art workers* includes: SOC2010 categories 3411-3417: 'Artists'; 'Authors, writers and translators'; 'Actors, entertainers and presenters'; 'Dancers and choreographers'; 'Musicians'; 'Arts officers, producers and directors'; 'Photographers, AV and Broadcasting equipment operators'.
- *Accountants* includes: SOC2010 category 2421 'Chartered and certified accountants'.
- *Hairdressers* includes: SOC2010 categories 6221 'Hairdressers, barbers' and 1253 'Hairdressing and beauty salon managers and proprietors'.
- Shopkeepers includes: SOC2010 category 1190 'Managers and directors in retail and wholesale' and 1254 'Shopkeepers and wholesale/retail dealers'.
- *All workers* includes: all respondents with non-missing information on occupation.

Table 2: Descriptive statistics for workers in selected occupational groups and for all workers, UK LFS 2013-2017 (percentages).

		Hairdresser	Accountant	Shopkeeper	Art worker	All occup'ns
Demographics	Male	16.8	58.1	63.1	57.9	53.2
	Married	36.8	64.0	59.5	46.4	51.1
	Child up to 4 years	20.2	20.3	17.6	14.2	16.0
	Born outside the UK	11.3	19.1	17.2	18.1	16.2
	Health problem	22.5	22.4	24.9	26.7	24.6
	Mean Age (SD)	35.9 (13.5)	42.9 (12.5)	44.1 (12.8)	43.0(14.8)	41.31 (13.4)
Work Relations	Employee	49.2	79.9	66.9	30.8	85.1
	Self-employed sole-account worker	37.5	13.0	18.9	66.9	12.4
	Self-employed, employing others	13.3	7.1	14.2	2.4	2.5
Work-Time						
Duration	1 to 29 hours usually	42.1	12.4	11.1	31.3	24.4
	30 to 45 hours usually	50.0	65.8	50.5	49.5	56.3
	46 plus hours usually	7.9	21.8	38.4	19.2	19.3
Schedule	Weekend working (worked either Sat or Sun	67.7	3.1	53.6	26.1	22.5
Variability	Weekly hours tend to vary	35.1	43.6	45.4	70.2	39.4
Work-Space	Own home	2.8	8.5	6.9	21.3	4.1
	Same grounds or building	1.1	0.1	2.5	2.1	1.0
	Mobile (home as base)	13.2	5.8	6.6	33.2	8.5
	Dedicated worksite	82.9	85.6	84.0	43.4	86.3

Note: These data are weighted to represent population by using PWT11 (2013 data), PWT14 (2014 data) and PWT17 (2015-2017 data). All years, waves 1-4 only (wave 5 excluded). Only those providing occupation data (SOC10M) included.

Table 3: Multinomial Logit Regression of work relations on demographic, spatial and temporal attributes, all workers listing an occupation UK LFS 2013-2017: Waves 1 to 4 (Odds Ratios)

		Own Acct				Employer			
		OR		95% CI		OR		95% CI	
Demographics	Male	**3.64**	***	3.30	4.01	**2.88**	***	2.37	3.49
	Married	0.97		0.90	1.04	**2.04**	***	1.77	2.35
	Any child up to 4	**1.15**	**	1.05	1.27	**1.84**	***	1.53	2.20
	Born outside UK	**1.51**	***	1.43	1.59	**1.22**	***	1.11	1.34
	Any health problem	**0.94**	*	0.90	0.99	**0.83**	***	0.77	0.90
	Age of respondent	**1.04**	***	1.03	1.05	**1.07**	***	1.05	1.09
	Age squared	**1.00**	***	1.00	1.00	**1.00**	*	1.00	1.00
gender interactions	*Male * Married*	**0.85**	***	0.78	0.93	**0.81**	*	0.68	0.96
	*Male * Any child under 4*	1.06		0.94	1.19	**0.74**	**	0.61	0.91
Space	Work as mobile	**32.63**	***	29.82	35.71	**5.10**	***	4.09	6.37
	Work from home OR attached to home	**33.78**	***	31.00	36.80	**8.06**	***	6.82	9.52
gender interactions	*Male * Work as mobile*	**0.49**	***	0.44	0.55	0.78	(+)	0.61	1.00
	*Male * Work from home OR attached to home*	**0.41**	***	0.37	0.46	**0.60**	***	0.48	0.74
Temporality	Short hours (<=29)	**1.67**	***	1.55	1.80	**0.61**	***	0.52	0.71
	Long hours (46+)	**1.26**	***	1.13	1.41	**2.55**	***	2.18	2.97
	Weekend working	**1.94**	***	1.79	2.10	**3.31**	***	2.91	3.77
	Hours tend to vary	**2.10**	***	1.96	2.25	**2.19**	***	1.92	2.49
gender interactions	*Male * Short hours*	**0.80**	***	0.72	0.88	0.98		0.77	1.24
	*Male * Long hours*	**0.75**	***	0.66	0.85	1.02		0.85	1.22
	*Male * Weekend working*	**0.88**	**	0.80	0.97	**0.69**	***	0.59	0.81
	*Male * Hours vary*	0.98		0.90	1.07	**0.69**	***	0.60	0.81
	N	145,798							
	Nagelkerke R-sq	0.38							
	-2LL initial model	83,799							
	LR Chi-square	**37,894**	***						

Notes: (+) = P<0.1; * = p<0.05; **= P<0.01; ***=p<0.001, Reference category: employee.

Table 4: Multinomial Logit Regression of work relations on demographic, spatial and temporal attributes, for FOUR occupational groups UK LFS 2013-2017: Waves 1 to 4 (Odds Ratios; omitted category: employee)

		Arts workers		Accountants		Hairdressers		Shopkeepers	
		Own Acct	Employer	Own Acct	Employer	Own Acct	Employer	Own Acct	Employer
		EXP (B)	EXP (B)	EXP (B)	EXP (B)	EXP (B)	EXP (B)	EXP (B)	EXP (B)
Demographics	Male	1.12	3.26	0.73	2.86	1.70	0.92	1.92 ***	1.49
	Married	0.82	1.48	0.98	4.18	0.78	0.94	1.46 (+)	1.86 **
	Any child under 4	0.90	6.37	0.67	0.64	1.98 *	1.60	1.47	0.97
	Born outside UK	1.07	0.64	1.93 *	1.09	1.52	1.19	2.83 ***	2.03 ***
	Any health problem	1.17	0.83	0.63	0.61	1.22	0.98	1.13	0.98
	Age of respondent	1.06 (+)	0.94	1.18 (+)	1.08	1.24 ***	1.49 ***	0.99	1.00
	Age squared	1.00	1.00	1.00	1.00	1.00 ***	1.00 ***	1.00	1.00
Demographic-gender interactions	Male*Married	0.94	1.93	1.83	0.69	1.38	2.86 (+)	0.54 *	0.86
	Male*Child under 4	0.68	0.14 (+)	4.44 (+)	3.27	0.50	0.34	0.76	0.85
Work Space	Work as mobile	22.99 ***	5.24 **	22.66 ***	1.22	219.89 ***	11.85 *	10.06 ***	1.92 *
	Work from home OR in office/bldg attached to home	15.95 ***	7.42 ***	11.99 ***	0.96	27.39 ***	6.15 (+)	11.91 ***	2.35 ***
Work Temporality	Short hours (<=29)	2.01 ***	0.39	1.43	0.49	0.38 ***	0.11 ***	2.15 ***	1.33
	Long hours (46+)	1.49 (+)	4.50 ***	1.00	1.64	1.03	3.97 ***	1.48 **	2.29 ***
	Weekend working	2.84 ***	4.34 ***	4.22 *	11.59 ***	1.15	1.89 *	2.27 ***	1.96 ***
	Hours tend to vary	2.78 ***	9.54 *	2.67 *	1.60	8.97 ***	3.76 ***	1.36	2.00 **
Temporal-gender interactions	Male*Weekly hours vary	1.19	0.33	0.88	1.98	0.23 **	0.46	0.52 **	0.60 (+)
	N	1343		923		1078		2378	
Model Fit	Nagelkerke R-sq	0.55		0.45		0.61		0.29	
	-2LL initial model	1999.04		1059.83		2025.15		3935.49	
	LR Chi-square	752.02 ***		351.34 ***		814.23 ***		660.23 ***	

Notes: (+) = P<0.1; * = p<0.05; **= P<0.01; ***=p<0.001, Reference category: employee.

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[1] Other occupations that fit these criteria were explored, including vehicle mechanics, construction workers, plumbers, taxi drivers, gardeners and bar and restaurant owners. Analyses of these occupations was not pursued for this article due to insufficient variation on independent variables. Specifically, several had too few female self-employed workers to conduct regression analysis.

[2] This group is more limited than some analyses of the 'creative sector', which also include architects, graphic designers, computer programmers and various related occupations. This was to achieve a more homogenous category, including those most directly involved in artistic pursuits, who might be expected to have the most in common.

[3] Initial analyses included 'hours' and 'hours-squared' to explore possible curvilinear relationships. This did not improve fit and produced less easily interpretable results. Therefore, the three-category measure for hours work was preferred.

[4] There are problems with how this variable measures 'mobility' because it misses people who are mobile, but not home-based (Cohen, 2010), but it is the only available measure of unbounded work-space.

[5] This indicates that some self-employed workers are home-based or mobile *and* employ others. Since this suggests complex forms of social and spatial unboundedness it would be an interesting group to follow up.