

Scale and nature of precarious work in the UK

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Disclaimer:

This report represents independent research that was commissioned by the Director of Labour Market Enforcement (DLME) in January 2020.

The research was completed in April 2020, during the early stages of the Covid-19 pandemic and prior to its full impact on the labour market. Nevertheless, the conclusions of this research continue to be pertinent and provide important evidence into the scale and nature of precarious work in the UK

The views and opinions expressed in this report are those of the authors, and do not necessarily reflect the official views, policy or position of the Director or any agency of HM Government.

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Executive Summary

- This report is focused on estimating the changing scale and nature of precarious work in the UK. This focus reflects the evidence that: 1) precarious workers are likely to be at a high risk of experiencing labour market non-compliance; 2) non-compliance tends to particularly impact upon precarious workers' physical and psychological well-being; and 3) precarious workers appear rarely to report, or seek justice, when faced with non-compliance.
- Precarious work in the labour market can be defined in various ways. For the purposes of this report, we took a pragmatic approach that lent itself to statistical analysis, and defined precarious work as a combination of two or more of the following (weighted) factors: non-traditional work; low income; working at a small workplace; and immigrant/ethnic minority background.
- Based on our conceptualisation, we defined someone as in precarious work if, at minimum, they either (1) have low income and are in non-traditional work; (2) are an immigrant/member of an ethnic minority working at a small firm and have low income; or (3) are an immigrant/member of an ethnic minority working at a small firm and are in non-traditional work.
- The Understanding Society Survey (USS) can be used to derive a new measurement of precarious work and make an inference to the UK population. Initial analysis (added to the Technical appendix of this report) suggested that non-standard work and low income are relatively more important factors than firm size and immigrant/ethnic minority background, so the weighted classification model that we used took this into account.
- We found that between 2009-2018, approximately 8.5-9.5% of the UK workforce, or 5% of the UK population, could be considered precarious workers. This proportion remained steady without much variation throughout the studied period. This finding contrasts with much of the literature, which suggests that precarity (usually measured by a growth in precarious work) has been rising in advanced economies.
- Our findings indicate that precarious workers are more likely to be women and, on average, 5-6 years younger than non-precarious workers. One in four has an occupation typically considered working (i.e., lower supervisory and technical occupations) or lower (i.e., semi-routine and routine occupations) class, and 40% work in one of three industries: hospitality, retail, or construction. Only 23-25% of precarious workers are at unionised

workplaces, compared to more than 50% of non-precarious workers. Precarious and non-precarious workers have similar levels of job satisfaction.

- Our analysis identified remarkable consistencies in the overall scale of precarious work since the Great Recession (2008-2009). Similarly, we found its nature – at least in terms of the aspects examined here – largely unchanged. We provide alternative (sometimes complementary) explanations for these findings: (a) changes in the labour market happened earlier than the study period; (b) precarity became a feature of those in traditional work as well; (c) there are potential limitations in our measurement; and (d) we are depicting the reality of the situation.

Introduction

This report aims to help the Director of Labour Market Enforcement (DLME) better understand the changing scale and nature of precarious work in the UK. It is important to develop this understanding because of the link between precariousness and the risk of labour abuses at work. Although any worker could be affected by breaches of labour market rules and regulations, the risk and impact of non-compliance is highly unlikely to be evenly distributed across the working population. Understanding the scale and nature of precarious work is, therefore, important in helping the DLME and other agencies to better target the resources available (especially around intelligence gathering, compliance, and enforcement work) through an informed, risk-based approach.

Labour market non-compliance is a broad and varied issue, on which the evidence base is underdeveloped and patchy (see Cockbain et al., 2019). Nevertheless, existing research into particular aspects of this complex phenomenon gives reason to believe that those in precarious work may be at particular risk of (sometimes quite extreme) non-compliance (see, e.g., Lewis et al., 2014; Scott et al., 2012; Scott, 2017). Intersecting personal, environmental and structural factors can render people in precarious work vulnerable to abuse and constrain their willingness and abilities to seek redress and/or find alternative work (see, e.g., Åhlberg, 2018; Anderson, 2010; Fudge, 2018, Vosko et al., 2017). Consequently, mining existing data to build a better-evidence base on the scale and nature of precarious work is a valuable initial step in supporting the evolving policy and practice in relation to UK labour market regulation – although precarious work is certainly not a proxy for mapping labour market non-compliance itself, for which further targeted research is needed.¹

The current report advances understandings of precarious work by: (1) assessing how precarious work can be measured using existing survey instruments; (2) using these newly tested measurements to track the change in the proportion of people in precarious work over time; and, (3) identifying some correlates of precarious work, such as gender, age, industry, occupation, etc. The report achieves these aims through rigorous analysis of the Understanding Society Survey (USS), which is the largest longitudinal household survey in the world, that has been running since 2009, and is representative of all four countries of the UK.

The report is divided into four main sections. It starts with a review of the empirical and theoretical literature on *Precaarity and Precarious Work*. We discuss how these two concepts intersect but differ from each other. We also provide an overview of how precarity and precarious work have been measured in the literature to date.

In the second main section, *Data and Methods*, we provide an overview of the Understanding Society Survey, a representative longitudinal household survey of the four nations of the UK, and discuss why we believe that it is especially well-suited to assess precarious work.

¹ More work in this space would be valuable in helping move away from traditional reactive, complaints-led approaches to enforcement, that suffer marked biases and overlook much non-compliance (Weil, 2008; Weil and Pyles, 2005), towards resource prioritisation based on a more robust and representative evidence base.

We also give a brief introduction to the statistical methods used for the measurement models of precarious work and the descriptive analysis.

The *Results* section begins with a presentation of our findings on the scale of precarious work and a brief comparison of people in precarious and non-precarious work across the four characteristics that were used for our measurement model. Next, we examine the nature of precarious work by assessing the association between certain individual characteristics (demographic and labour market-related variables) and people in precarious/non-precarious work. More details about the measurement model and analysis can be found in the *Technical Appendix*.

We conclude our report with a *Discussion* where we provide some tentative early conclusions, exploring possible explanations for the results observed, and outline some potential future pathways that empirical research into precarious work could take.

Precarity and Precarious Work

Conceptualisation of Precarity and Precarious Work

There is what has been called an “exploitation continuum” running from decent work to extreme abuse (Skrivánková, 2010; Scott, 2017) (see Figure 1).² This is not to imply that exploitation does not exist at all when employers are fully compliant with the law, just that it tends to be comparatively limited and/or its effects are typically mitigated (mainly by financial benefits). Various terms and concepts have been deployed to capture the (arguably increasingly) problematic aspects of work and employment in advanced economies across this exploitation continuum (including: precarity, informalisation, insecurity, vulnerability, intensification, flexibility, casualisation, degradation, risk, liminality). The most widely used terminology is that of precarity and precarious work, and it is this terminology that we have adopted in our research.

Most work on precarity focuses on advanced economies (Waite, 2009: 416) and scholars have tended to argue that it is on the rise across the developed world (Kalleberg, 2009; Kalleberg, 2018; Kalleberg and Vallas, 2018; Livanos and Papadopoulos, 2019; Rodgers and Rodgers, 1989; Standing, 2011; Stone and Arthurs, 2013; Weil, 2014). Precarity emerged as a popular academic concept in France in the 1970s (Barbier, 2011), linked to the work of Pierre Bourdieu (Bourdieu, 1963, 1998), though its use has been traced back further still to the 1950s (Millar, 2017). It has since been used to capture structural changes in the political-economic system and associated arguments over shifts in capitalism that are said to be fundamentally undermining security in social life. A range of key thinkers – such as Anthony Giddens, Ulrich Beck, Zygmunt Bauman, Richard Sennett – have all theorised the intensification of insecurity in contemporary life. Those most exposed by this shift, which is socially selective in nature, have been labelled a new “precariat” (characterised by a deep sense of anger, anomie, anxiety, and alienation) and are estimated by some to now account for at least a quarter of the adult population (Standing, 2011: 24).³

Precarity, then, is a broader condition, and has been theorised in a wider and more abstract sense than precarious work (Millar, 2017). Explanations for its recent rise to prominence, after the relatively stable and secure post-war years, centre *inter alia* on: a decline in worker collectivism and union power; the growing power of the financial services sector and the rise in shareholder capitalism; increasingly flexible firms and increasingly insecure forms of (post-Fordist) employment; associated with the aforementioned three trends, a general shift in power from labour to capital; rising globalisation and the associated mobility of capital, especially in response to labour costs; the increasing role of the online and digital economy in shaping labour relations. Many have linked some, if not all, of these shifts to the ideology of neoliberalism, which is seen as eroding pay and conditions amongst the working-class and, increasingly, sections of the middle-classes.

² The ILO launched the concept of decent work in 1999 and it has been subject to various critiques (Burchell et al., 2014).

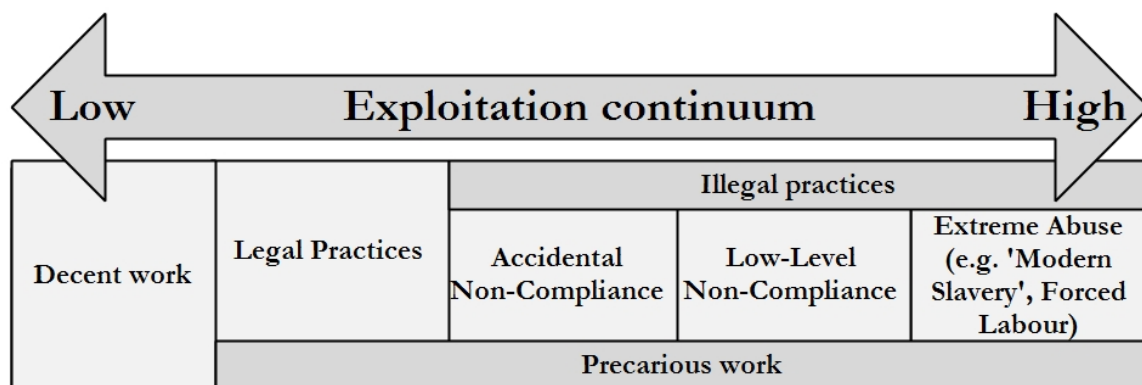
³ Though, we note that this estimate has been criticised for being so broad as to lose conceptual value (Alberti et al., 2018). The idea of a new ‘precariat’ emerging, distinct from the working class, has also been contested (Munck, 2013).

This deterioration in pay and/ or working conditions is particularly evident in affluent countries, given their relatively high starting position.

For most scholars, precarity requires problematic employment, or employment trends, to be present. However, it is possible for precarity to rise without a commensurate statistical rise in precarious work. For instance, in the UK, legislation that has eroded union power and worker collectivism, the increasing difficulties of workers accessing informal and formal justice, and the growing surveillance of workers, have all been cited as part of a rise of general precarity (Mangan, 2019). Crucially, these shifts affect a whole range of workers and not just those defined as being in precarious work. Related to this, previously standardised and secure employment relationships in professional sectors of the economy have, according to some, been undermined over recent decades: “Processes of heightened casualisation and work degradation in professional fields... support the argument that aspects of precarity are also affecting those previously protected from the vagaries of the market” (Livanos and Papadopoulos, 2019: 7). There is, then, a distinction between precarity as a concept and precarious work as an identifiable and measurable statistical category.

This rising impact of precarity on everyday life, and the associated labour market dynamism, has meant that long-established and relatively static policy and legal frameworks designed to protect workers sometimes appear ineffective and new solutions may be needed (Kenner et al., 2019). These solutions need to be sensitive to the fact that precarity, and the precarious work helping to underpin it, may not actually involve non-compliance. Work can be exploitative and harmful without illegality being present (Scott, 2017; Zhang and Zuberi, 2017), as indicated in Figure 1.

Figure 1: The exploitation continuum – decent work, precarious work, and illegal practices



Precarity is usually examined as a problem affecting more and more citizens of the developed world. Most would accept, however, that precarious work is not always problematic. A self-employed IT specialist, for example, may be employed on an *ad hoc* basis but relatively high pay means that such work is seen as lucrative and its uncertainty a sacrifice worth bearing. Put another way, precarious work in a basic and non-pejorative sense involves insecure and uncertain

forms of work, and some of this work may in fact be ‘decent’ and exist outside an exploitation continuum. Most scholars, however, use precarious work in a pejorative sense i.e. it is highlighted and studied when it exists outside of decent work (as shown in Figure 1).⁴

As noted above, there is general consensus that advanced economies are now experiencing more precarity than in the post-war 20th century, with a rise in problematic forms of precarious work key to this. There are a few, however, who argue that the widespread talk of precarity ignores the reality of relative stability and even improvement of contemporary work and employment (Fevre, 2007). Most recently, in the UK context, the Institute for Fiscal Studies (IFS) concluded that: “the overall shape of the (UK) labour market has not changed radically, yet” (IFS, 2017: 35). In other words, the IFS evidence did not appear to support the precarity thesis. One’s position with respect to the debate over rising levels of precarity tends to hinge, however, on how precarious work is defined and measured (see below). It is also shaped by the extent to which one believes rising levels of precarious work are a necessary precondition for growing precarity.

Measuring Precarious Work

There has certainly been more written about the growth in precarity (as noted in the ‘Conceptualisation of Precarity and Precarious Work’ section above) than there has been actual conclusive empirical evidence of increased precarious work. It seems easier to advance the general thesis of precarity, than it does to measure the changing nature of work; possibly because at an abstract level one can often be looser with definitions.

On the ground, numerous researchers have noted the problems of defining and measuring precarious work empirically. Kiersztyn (2018: 93) notes, for instance, that: “despite the social and political significance of labour market risks, it remains unclear how precarity may be defined and operationalised”. Similarly, Mai (2018: 275-277) calls precarious work an “elusive notion” with definitions “deeply contested”, and Livanos and Papadopoulos (2019: 73-74) argue: “no universally accepted definition or measurement of precarious employment can be achieved. Therefore, any suggested measure may be incomplete and subject to criticism”. In measuring precarious work, one must be pragmatic and adjust to both the limited statistical data available and/ or limitations in the data that is there. This may explain why some have lamented the dearth of quantitative research on precarious work (Alberti, 2018). This said, there are various ways in which such work can be measured and these are outlined below (see also Figure 2).

Most researchers focus on **non-standard/ atypical work** when seeking to define precarious work. However, there are major practical barriers to examining the changing prevalence of such work over time and space (Kalleberg, 2018: 76). Most obviously: “there is no official definition of non-standard employment” (ILO, 2016: 7). The ILO (2016) identifies four types of non-standard employment: (1) temporary employment; (2) part-time work; (3) temporary agency

⁴ In addition, even those in problematic forms of precarious work may not experience significant precarity due to various cushioning factors (Barnes and Weller, 2020). The relationship between precarious work and precarity is not, therefore, to be assumed.

work and other forms of employment involving multiple parties; and (4) disguised employment relationships and dependent self-employment, especially in construction and the gig economy (see: ILO 2016: 98-102). Similarly, the OECD defines non-standard work as: temporary; part-time; or self-employed (OECD, 2018: 70). It also notes, in line with most social scientists, that: “non-standard employment has been on an upward trend over the past 30 years in most OECD countries (and) the financial crisis has accelerated the destruction of ‘standard’ jobs” (OECD, 2018: 69, 79) but observes important geographical variations in the intensity of this trend.

In the case of non-standard work in the UK, there has been much analysis, in particular, of self-employment and the gig economy (IFS, 2017; Resolution Foundation, 2017; RSA, 2017). Recent studies suggest that there has been growth in self-employment, especially part-time self-employment, and in the gig economy since the Great Recession. However, the studies are also cautious: they do not suggest that this growth marks a significant structural shift in the UK labour market after the Great Recession; though they do note the considerable potential for future growth in non-standard work (especially in the gig economy) (RSA, 2017: 64).

Not all non-standard work is precarious. In addition, standard employment can become associated with precarity. In the UK and US, for example, precarious work has often been hidden within standard employment relationships: with union powers being curtailed and hiring and firing relatively easy (Livanos and Papadopoulos, 2019: 63; Managan, 2019). Thus, non-standard work is an important indicator of precarity, but it is not the only indicator. As the ILO argues: “rather than labelling non-standard employment as precarious, it is more useful to consider the insecurities that may be associated with any work – whether standard or non-standard” (ILO, 2016: 18). Similarly, Kiersztyn (2018: 91) notes: “treating non-standard employment arrangements as a basis for identifying precarious jobs is likely to be misleading”.

Many, especially those conducting new surveys, look at **income (i.e., economic insecurity)** when trying to understand whether or not work is precarious. In an early work, Rodgers and Rodgers (1989) emphasize low pay as a key characteristic of precarious work (see also: Bernhardt et al. 2013a, 2013b; WAC, 2011). Along similar lines, Pollert (2005) focuses on workers at or below the median hourly wage. However, she also includes trade union non-membership as an additional criteria alongside low income (see also: Noack et al., 2015). One of the things to note here is that low-income alone is not sufficient to define precarious work. Many on low incomes may well be on a career-path that is eventually designed to lead on to more lucrative employment: this would be the case with apprentices, for example. This is why studies tend not to use low income, on its own, as a basis for measuring precarious work. In addition, there are also those on low income who, although not presented with a career ladder, use low-paid work as a basis for longer-term advancement beyond their current job/ employer: this would be the case for many young people at university working minimum wage jobs on the side, for example. These examples explain why certain groups may be engaged in ostensibly precarious work (especially when measured by income) but may not feel as precarious as their low-wage status would suggest.

Some past studies have found evidence that people working in **small organisations** are more likely to be in precarious work (Noack and Vosko, 2011; Weil, 2005). This has also been backed up by UK-specific research carried out the Resolution Foundation, which found that smaller workplaces are more likely culprits of not adhering to minimum wage legislation, not providing paid holidays, and not giving payslips to their employees (Judge and Cominetti, 2019).

More broadly, some researchers also consider the **surrounding environment** within which work is located as a potential contributor to its precariousness (Gallie, 2009; Kalleberg, 2018; Standing, 2011). Most notable here are the protections in place for workers via labour laws/ rights, welfare safety nets and the levels of workplace collectivism (especially union density and collective bargaining). When labour laws and welfare safety-nets are high and/ or when collectivism is strong the link between, for instance, non-standard employment and precarious work may be challenged. Additionally, the link between standard employment and decent work may be challenged when labour rights, welfare safety nets and union activity are low. Under such conditions, there may for instance be no real need to resort to non-standard employment. Thus, context matters in terms of moderating the ultimate impact of precarious work and this come through, in particular, in studies that have an international comparative dimension.

Additionally, it is possible to measure precarious work through **workers' subjective beliefs**, especially around perceived job (in)security and broader labour market (in)security. Beyond this, wider subjective measures of general well-being and happiness can also be used. However, a reliance on subjective measures alone to define precarious work can be “misleading” (Kiersztyn, 2018: 92). Some individuals, especially young people, tend to perceive themselves as less secure than they actually are. Playing down insecurity is also a psychological coping mechanism for some, whilst others may actually over-estimate their insecurity due to reference group comparisons (Kiersztyn, 2018: 97-99).

In terms of **groups most likely to be in precarious work and experiencing precarity**, Livanos and Papadopoulos (2019: 192), like many others, conclude that: “younger workers, females, non-nationals and the low educated are found to be worse off than their counterparts in the labour market”. In relation to non-nationals, it is also clear that **migrants** often find themselves at the forefront of precarity in general, including precarious work (McDowell et al., 2009; Waite, 2009), especially early on in their host country stay, and that legal and citizenship status particularly matters (Goldring and Landott, 2011). Similarly, certain **minority groups** appear particularly likely to experience discrimination and/ or face everyday barriers to upward mobility (for example due to a neighbourhood effect). This situation can mean that some minorities suffer more labour market disadvantage and are at greater risk of experiencing precarious work than the norm (Catney and Sabater, 2015; Zuccotti and Platt, 2017). However, there are also migrant and minority groups who perform above average in the labour market, and so the link between migrant/ minority groups and precarious work must not be over-simplified.

There is a vast literature with respect to the **negative and often harmful outcomes** associated with precarious work. It is clear that precarious work can be associated with stress, exposure to hazards, poor mental and physical health outcomes, delayed family formation,

relationship breakdown, indebtedness, housing insecurity and delayed retirement. A recent study by Sumner et al. (2020), for instance, has shown that whilst employment offers health advantages relative to unemployment, this advantage does not hold if employment is on an insecure basis, with the temporarily employed having similar levels of health biomarkers to the unemployed. There are many challenges, though, both in identifying the harms associated with precarious work, and in establishing whether correlation equals causation.

Table 1 provides an example of the range of approaches to measuring precarious work: what stands out is the multi-dimensional nature of attempts to operationalise and measure precarity. It is also important to stress that a person does not always need to meet all indicators to be categorised as a precarious worker. In addition, there are differences in the power (especially in terms of validity and reliability), and relative importance (weighting), of the different indicators of precarious work across the studies.

The studies of precarious work in Table 1 draw on existing general secondary data (e.g. the European Labour Force Survey; the European Working Conditions Survey; the UK Labour Force Survey), collect new survey data that is largely representative (Bernhardt et al., 2013a, 2013b) or truly representative of the labour market (Noack et al., 2015; Pollert, 2005), or use non-probability sampling (WAC, 2011). In terms of the existing data, a relatively wide range of indicators are often examined to assess the scale of precarious work. In terms of new survey data, low-wages and non-membership of a trade union are the most common inclusion criteria determining who constitutes a precarious worker. Interestingly, relatively few of the studies in Table 1 draw on additional in-depth qualitative insight (exceptions include: Pollert, 2005; TUC, 2007).

Some scholars conclude that: “both objective and subjective measures, commonly used in the literature as indicators of labour market precarity, are to some extent unreliable (and) the very nature of labour market and cultural change...makes the capturing of this change through large-scale survey data questionable” (Kiersztyn, 2018: 118). We agree that there are major difficulties measuring precarious work, not to mention comparing it over time and space, or linking it to non-compliance; and that improvements in survey techniques are still required. In addition, it is probably impossible to define precarious work once-and-for-all and then continue measuring it the same way for decades to come. Notwithstanding these issues, survey statistics are still able to offer key insights into the scale and nature of precarious work and are, alongside other complementary methods, a vital method for better understanding this complex issue.

Table 1: Attempts to operationalise and measure precarity and precarious work

Author	Concept	Main Indicators Used
Bazillier et al. (2016)	Employment Vulnerability	<ul style="list-style-type: none"> Employer-related vulnerability index (type of employment contract; employment relationship; type of organization; firm size; ability to influence policy decisions regarding the organization’s activities)

		<ul style="list-style-type: none"> • Job-related vulnerability index (occupation category, responsibility for supervising other employees; ability to decide how daily work is organized)
Bernhardt et al. (2013a, 2013b)	Unregulated Work	<ul style="list-style-type: none"> • Be a frontline worker, meaning not a manager, professional or technical worker • Hold at least one job in a low-wage industry or occupation in the previous work week
European Commission (2004)	Precarious Employment	<ul style="list-style-type: none"> • Low income • Job tenure less than 1 year • Fixed or temporary agency contract • Low intellect job content • Low degree of autonomy • Harassment during last 12 months • Unsocial hours • Bad physical environment
Fevre (2007)	Insecurity	<ul style="list-style-type: none"> • Non-permanent workers • Chances of becoming unemployed • Job security
Goldring and Landott (2011)	Precarious Work	<ul style="list-style-type: none"> • Index of Precarious Work (IPW) covering 8 indicators: unionisation; contract type; terms of employment; predictability of schedule/ control; basis for pay; benefits; place of work; cash payment
Kalleberg (2018)	Precarious Work	<ul style="list-style-type: none"> • Non-standard work: temporary and involuntary part-time • Job insecurity • Economic insecurity • Subjective well-being
Kiersztyn (2018)	Precarious Work	<ul style="list-style-type: none"> • Contractual status other than regular open-ended employment (either full-time or part-time), but excluding the self-employed • Subjective insecurity
Leschke and Keune (2008)	Precarious Work	<ul style="list-style-type: none"> • Low pay • Very short or very long working hours • Temporary contracts
Livanos and Papadopoulos (2019)	Precarious Work	<ul style="list-style-type: none"> • Contract precariousness (involuntary part-time; involuntary temporary) • Unsociable hours precariousness (evening/ night work; Saturday/ Sunday work; long hours) • Institutional context precariousness (Unpaid overtime; Public Employment Services (PES) involvement)

		<ul style="list-style-type: none"> • Income precariousness (low income from main job) • Insecurity precariousness (fear job loss) • Job context/ working conditions precariousness (higher education mismatch; working conditions dissatisfaction)
Mai (2018)	Precarious Work	<ul style="list-style-type: none"> • Contract uncertainty (involuntary part-time; low job security; self-employed without regular pay, fixed-term, temporary or no contract) • Developmental uncertainty (uncertain career progression) • Income uncertainty (low and insufficient income)
Pollert (2005)	Unorganised Worker	<ul style="list-style-type: none"> • Not represented by a trade union • Had experienced problems at work in the last 3 years • Had worked for an employer at the time of the problems • Had been earning a “low wage” at the time (as defined by earning below the weighted average of gross median earnings for 2001, 2002 and 2003)
Standing (2011)	Precariat	<ul style="list-style-type: none"> • Lacking labour market security • Lacking employment security • Lacking job security • Lacking work security • Lacking skill reproduction security • Lacking income security • Lacking representation security
TUC (2007)	Vulnerable Employment	<ul style="list-style-type: none"> • Low skills in low-paid and temporary work • Undocumented migrant workers
TUC (2017)	Workplace Insecurity	<ul style="list-style-type: none"> • Low paid self-employment • Insecure temporary work (agency, casual, seasonal, other) • Zero-hours contracts
WAC (2011)	Precarious Work	<ul style="list-style-type: none"> • In low-wage jobs

Figure 2: Identifying Precarious Work

Non-Standard Work	Low Income	Non-Unionised Worker	Limited Welfare Safety Net
Socio-Demographic Characteristics (young, minority, migrant, female, low-educated)	Small Firm	Experience Physical and/ or Psychological Harm	Workers’ Perceived (Subjective) Insecurity

Data and Methods

Precarious Work and The Understanding Society Survey

The Understanding Society Survey (USS) is the biggest longitudinal household survey of its kind in the world, reaching more than 40,000 UK households. The USS was first fielded in 2009, and has one wave each year, however, due to the massive size of the sample, the full sample is only surveyed in a two-year period.

The USS tracks approximately 40,000 households over time, comprised of original sample members (OSMs, the part of the sample participating at least since 2009 or who are born to OSM mothers) and permanent sample members (PSMs, who are either people added to the survey on a later date or are fathers of a child born to an OSM mother). In addition, the USS also interviews every member of the household where the OSMs and PSMs reside at the date of data collection, thus, also adding temporary sample members (TSMs). By including TSMs, the USS becomes more sensitive to changes in the make-up of certain communities due to changes in family structure, internal or external migration, etc.

Another desirable feature of the USS is that it is translated to the ten core languages of the UK other than English and Welsh (Arabic, Bengali, Cantonese, Gujarati, Polish, Portuguese, Punjabi, Somali, Turkish, and Urdu), providing coverage of the languages spoken by approximately 97% of the UK population. Furthermore, in 2015 (Wave 6), an Immigrant and Ethnic Minority Boost sample (IEMB) was added to the USS. The IEMB includes people who were born outside the United Kingdom ('immigrants' who arrived to the UK since 2009, approximately 2,000 adults) and members of five ethnic minority groups (African, Bangladeshi, Caribbean, Indian, Pakistani, with approximately 2,500 respondents from each group), although some people might belong to both the immigrant and ethnic minority groups. The goal of this boost sample was twofold. First, it improved the coverage of the USS by including people who have entered the UK since the start of the survey (2009), thus also capturing "new immigrants" and increasing the estimated population coverage of that group to 74%. Second, the IEMB added more individuals who are usually hard-to-reach and who are usually of higher risk of attrition (i.e., dropping out of the survey).

As discussed in the conceptualisation section, we need to consider exploitation as a continuum. There is a real concern that large-scale household surveys are not capable of reaching the sharp end of the exploitation continuum either because people in the worst labour market situation do not live in households (e.g., homeless), are only in the UK for seasonal work, live at a remote location, or are otherwise hard-to-reach. Unfortunately, it is impossible to design a nationally representative probabilistic sampling frame without relying on information that would help the stratification during the sampling process (Heeringa et al., 2010), which will result in the described under-coverage of certain people. In other words, systematic sampling can only be implemented relying on a frame of reference, which is conventionally carried out based on postcode-area sampling in the UK. It is unavoidable that this approach will miss some people.

Despite these challenges, there are three reasons why the USS distinguishes itself as, in our opinion, the best possible survey to assess precarious work in the UK. First, the USS is a longitudinal survey, which means that should any of the people in the sample end up in temporary accommodation, sofa surfing, etc. they would still remain in the sample. Moreover, every child of the original sample members is tracked further increasing the chance that some part of the sample might end up in a non-traditional household and/or suffer from the sharp end of the exploitation continuum. Furthermore, when people co-habit with others, those people are considered as part of their household and are asked to take part in the survey as TSMs, making it more likely that the USS can capture internal and external migration and other relevant changes in the workforce.

Second, the USS is one of the few surveys that has an Immigrant and Ethnic Minority Booster sample (mentioned earlier), permitting access to otherwise hard-to-reach immigrant and ethnic minority populations, a coverage unrivalled by other UK household surveys (Lynn et al., 2018). Recent and ongoing efforts to make the USS multi-modal – making it a face-to-face, telephone, or internet survey based on the preference of the participant – will conceivably reduce the level of attrition in future waves (Carpenter and Burton, 2018).

Finally, the sheer size of USS enables a granularity of analysis unrivalled by any other UK survey. This level of detail could make it possible to provide more precise estimates and assess breakdowns (e.g., precarious workers in the agricultural industry, in Yorkshire and the Humber) that would be otherwise impossible. Moreover, when examining a social phenomenon that is only present in a small percentage of society (which may or may not be the case for precarious work), a sufficiently large sample size is essential for providing reliable estimates (i.e., sufficiently low margin of error, Fowler, 2014).

Methods Assessing the Scale and Nature of Precarious Work

As a general household survey, the USS main survey has multiple questions that can be utilised to identify people in precarious work. The unit of our analysis was individuals hence, the variables selected were for individual respondents (not households). For the current study we selected four identifiers of precarious work: (1) low income, which was defined as earning less than 60% of the median income in a given wave of the survey (a common indicator of income poverty); (2) being in non-traditional work, defined as being self-employed, having a temporary job, or having a second job; (3) working for a small firm, defined as working with fewer than 50 people at the workplace; and (4) being an immigrant or from an ethnic minority background.

Our choice of metrics was informed by the international and national literatures on precarious work (see the ‘Measuring Precarious Work’ section above), while also being sensitive to practical considerations and constraints. As such, there were certain measures present in the USS data that we decided not to use, despite the fact that they had been identified as potential indicators of precarious work in the international literature. Their exclusion was largely due to limited relevance in the UK context (e.g., unlike in the United States and Canada, in the UK having a non-employer provided private pension plan is typically the privilege of the wealthy few), gaps

in measurement (e.g., the USS only measures trade union membership in every second wave), or uncertainty in responses (e.g., around a quarter of UK workers responding to USS were not certain whether their workplace was unionised). The exclusion of unionisation-related measures in operationalising what constitutes precarious work is, we acknowledge, a limitation of our study since both union membership at individual level and the overall collective bargaining coverage in a given workplace are factors often considered to affect workers' experiences of - and responses to - precarious work (see, e.g. Scott, 2017 Weil, 2008, 2014). In order to offset this limitation, we did however examine the extent to which union-related measures were associated with whether or not people are in precarious work (see the 'Precarious Work and Its Correlates' section).

In prior international research (e.g., Noack & Vosko, 2011), people qualifying for a certain number of listed characteristics have been identified as people in precarious work. As mentioned previously, this 'checklist approach' of relying on binary 'qualify' vs 'does not qualify' indicators possesses obvious pragmatic benefits in that it makes precarious work fairly straightforward to operationalise. However, at the same time, this is a relatively crude and imprecise measurement that does not capture the way certain factors can be more relevant than others in capturing precarious work.

To gain a better insight into how the various characteristics of precarious work relate to each other, we fitted appropriate measurement models to quantify the relative importance of the four factors discussed earlier (Jackson & Kuha, 2016). These measurement models showed that low income and non-traditional work have the strongest and similar contribution (i.e., importance) defining precarious work, whilst firm size has a smaller, and immigrant/ethnic minority background the smallest contribution. We tested three alternative measurement models and based on our modelling we decided to combine the checklist approach and the data-driven strategy (see the 'Technical Appendix' for a detailed justification).

As described earlier, precarious work goes beyond simply having low income or being in insecure work, generally being a combination of multiple factors. Based on the statistical modelling and the extant literature, at a minimum, we consider someone a precarious worker⁵ if either: (1) they have low income and are in non-traditional employment; (2) they are an immigrant/member of an ethnic minority working at a small firm and have low income; or (3) they are an immigrant/member of an ethnic minority working at a small firm and are in non-traditional work. It follows that on their own neither low income nor non-traditional employment are necessary nor sufficient conditions to identify someone as a precarious worker. Moreover, working for a small firm or being from an immigrant or an ethnic minority background are 'softer' factors and only a combination of the two with either low-income or non-traditional work will make someone a precarious worker. According to this definition, each worker can be identified either as precarious or non-precarious.

⁵ As a proviso to this section, and the rest of the document, for easier readability, we will use the phrase 'precarious worker' throughout, which stands for 'people in precarious work'. That is to say we recognise it is not the workers themselves but the work they do that is precarious.

In the results section, we use descriptive statistics to either estimate the proportion of precarious workers as the share of the population/workforce (Table 2) or, alternatively, to compare people in precarious and non-precarious work to each other across various characteristics (Table 3-6). These tables contain population estimates, which means that all measures were weighted and strata information used to make the results representative to the wider population.

Results

The Scale of Precarious Work in the UK (2009-2018)

Using the measurement model described in the ‘Methods Assessing the Scale and Nature of Precarious Work’ section, we estimated the **scale of precarious work**. Table 2 presents precarious workers as the share of all workers and the share of the UK population (Wave 6, 7, 8, and 9 are shaded grey to denote that the minority booster was only added then). Our estimates suggest that around 9 out of 100 people in the UK workforce can be considered precarious workers. All in all, this amounts to 1 out of 20 people in the UK as a whole. Notably, these figures show very little variation in the studied period (2009-2018) with the proportions staying largely flat (unchanged).

Table 3 summarises how precarious and non-precarious workers compare with each other across the four characteristics that were part of our measurement model: low income, non-traditional work, ethnicity/immigrant background, and working for a small firm. We found that around 93-95% of those meeting the criteria for being precarious workers are low income (compared to 11-14% of non-precarious workers), 88-90% are non-traditionally employed (compared to 18-20% of non-precarious workers), only 65-72% of them are UK-born White British (compared to 85-89% of non-precarious workers), and around three-quarters of them work at a small workplace of fewer than 50 workers (compared to around 45% of non-precarious workers). As a reflection of our measurement model (detailed in the ‘Technical Appendix’), being low income and in non-traditional work are the most important factors, followed by working at a small workplace, and finally, coming from an immigrant or minority background.

Table 2: Precarious workers as a % of workers and % of the UK population

	Precarious workers (% of workforce)	Precarious workers (% of the UK population)
Wave 1 (2009-2010)	9.3%	5.3%
Wave 2 (2010-2011)	8.7%	4.9%
Wave 3 (2011-2012)	8.8%	5.0%
Wave 4 (2012-2013)	8.5%	4.9%
Wave 5 (2013-2014)	9.3%	5.4%
Wave 6 (2014-2015)	9.4%	5.4%
Wave 7 (2015-2016)	9.1%	5.3%
Wave 8 (2016-2017)	9.0%	5.2%
Wave 9 (2017-2018)	8.8%	5.0%

Table 3: Proportion of low income workers, non-traditional workers, UK-born White British workers, and workers working for a small firm in the precarious and non-precarious worker categories

	Low income (<60% median)		Non-traditional work		UK-born White British		Working for a small firm	
	Precarious	Non-precar.	Precarious	Non-precar.	Precarious	Non-precar.	Precarious	Non-precar.
Wave 1 (2009-2010)	92.5%	12.7%	87.8%	18.7%	64.5%	84.7%	77.4%	44.6%
Wave 2 (2010-2011)	93.7%	13.2%	89.4%	18.9%	68.9%	87.8%	76.8%	45.1%
Wave 3 (2011-2012)	94.5%	13.6%	89.5%	18.5%	70.4%	87.4%	76.6%	45.3%
Wave 4 (2012-2013)	93.0%	13.1%	89.4%	19.3%	68.9%	87.7%	78.4%	44.7%
Wave 5 (2013-2014)	94.7%	13.2%	89.5%	18.0%	71.9%	87.9%	75.2%	44.4%
Wave 6 (2014-2015)	95.0%	12.6%	90.3%	20.3%	70.1%	87.5%	76.0%	44.3%
Wave 7 (2015-2016)	94.7%	12.2%	89.8%	19.2%	69.1%	87.5%	75.0%	45.3%
Wave 8 (2016-2017)	95.0%	11.6%	88.9%	20.2%	69.8%	88.0%	77.3%	44.5%
Wave 9 (2017-2018)	94.2%	10.7%	89.1%	20.0%	69.9%	88.6%	74.7%	44.4%

Precarious Work and Its Correlates – The Nature of Precarious Work

As a way of testing the newly acquired measurement of precarious work, we assessed its association with several other variables. Specifically, we carried out multivariate analysis for each wave of the USS. Precarious work was the outcome variable with seven explanatory variables entered for each model: gender, age, urbanisation, UK regions, occupational classes, and the industry a person worked in (all these models are included in the technical appendix). From these variables, the level of urbanisation and the various UK regions did not show a consistent statistically significant partial association with precarious work across the different waves.⁶ In contrast, gender, age, occupational class, and the industry the person worked in, all demonstrated statistically significant partial correlations with precarious work. Examining each of these aspects separately could provide some insight into the **nature of precarious work**.

Table 4: Proportion of women and mean age of workers: by precarious/ non-precarious worker categorisation

	Proportion of workers who are women		Average age	
	Precarious	Non-precar.	Precarious	Non-precar.
Wave 1 (2009-2010)	51.5%	46.1%	36.2	41.2
Wave 2 (2010-2011)	54.3%	47.7%	36.4	41.5
Wave 3 (2011-2012)	52.9%	47.3%	36.5	42.1
Wave 4 (2012-2013)	50.9%	47.5%	36.7	42.2
Wave 5 (2013-2014)	51.8%	47.6%	36.7	42.3
Wave 6 (2014-2015)	53.0%	47.5%	36.1	42.6
Wave 7 (2015-2016)	53.2%	48.0%	36.7	42.7
Wave 8 (2016-2017)	55.8%	48.2%	36.8	42.8
Wave 9 (2017-2018)	55.9%	49.1%	36.5	43.1

⁶ The only exception was London: living in London significantly increased the odds of being in precarious work compared to living in other regions (all else considered).

Based on our analysis, and depending on the particular wave, around 51-56% of precarious workers are women, compared with 46-49% of non-precarious workers (Table 4). Precarious workers are also 5-7 years younger on average than their non-precarious counterparts (Table 4). Approximately 26-29% of precarious workers have occupations which would be considered either working (i.e., lower supervisory and technical occupations) or lower (i.e., semi-routine and routine occupations) class based on the National Statistics Socio-Economic Classification (NS-SEC), compared to only 17-18% among non-precarious workers (Table 5). Some 15-20% of precarious workers work in the hospitality industry compared to only around 5-6% of non-precarious workers. They are also more likely to work in the retail sector (14-17% vs. 13% non-precarious) and in construction (7-9% vs 6-7% non-precarious) than non-precarious workers. Overall, 40-43% of precarious workers work in one of these three industries compared to only around 24-25% of non-precarious workers (for sectoral breakdown, please refer to Table 5). Notably, early data published by the ONS (2020) suggest that the Covid-19 crisis has ravaged precisely these industries the most, which bodes very badly for the futures of precarious workers.

Table 5: Proportion of workers in occupations considered as working or lower class, proportion of workers in the hospitality, retail and construction industries: by precarious/ non-precarious categorisation

	Working and lower class		Hospitality (Industry)		Retail (Industry)		Construction (Industry)	
	Precarious	Non-precar.	Precarious	Non-precar.	Precarious	Non-precar.	Precarious	Non-precar.
Wave 1 (2009-2010)	26.9%	17.0%	16.6%	5.4%	16.4%	12.7%	9.2%	7.1%
Wave 2 (2010-2011)	27.3%	16.9%	16.4%	5.4%	16.5%	12.7%	8.2%	6.7%
Wave 3 (2011-2012)	26.7%	17.3%	15.0%	5.4%	15.3%	12.8%	9.2%	6.6%
Wave 4 (2012-2013)	27.2%	17.2%	16.0%	5.2%	14.2%	13.0%	9.4%	6.4%
Wave 5 (2013-2014)	28.3%	17.1%	16.0%	5.2%	15.7%	12.8%	8.7%	6.3%
Wave 6 (2014-2015)	28.2%	17.8%	16.9%	5.3%	15.7%	12.5%	8.1%	6.1%
Wave 7 (2015-2016)	26.4%	17.6%	17.0%	5.4%	14.6%	12.5%	8.1%	5.8%
Wave 8 (2016-2017)	27.9%	17.9%	18.8%	5.4%	14.1%	12.6%	7.3%	5.7%
Wave 9 (2017-2018)	29.1%	17.3%	19.6%	5.6%	14.6%	13.3%	8.6%	5.7%

Finally, we also considered job satisfaction among precarious and non-precarious workers and whether their workplaces were unionised (Table 6). The unionisation variable is measured every second wave by the USS, and approximately a quarter of the respondents are uncertain whether their workplace is unionised (the proportions in Table 6 represent the share of respondents who were certain and answered ‘Yes’ to the question). Despite the data completeness issues, we examined this metric as unionisation is widely considered an important factor in protecting and enforcing labour rights.⁷ Job satisfaction was measured on a 1-7 Likert-scale with higher values representing stronger satisfaction. There was no statistically significant difference between the precarious and non-precarious workers in any of the waves. Conversely, there was a marked difference in the level of unionisation: while only 23-25% of precarious workers had a union at their workplace, for non-precarious workers this was more than double, 50-53%.

Table 6: Average job satisfaction and proportion of workers at unionised: by precarious/ non-precarious categorisation

	Job satisfaction (average score)		Proportion of workers at unionised workplaces	
	Precarious	Non-precar.	Precarious	Non-precar.
Wave 1 (2009-2010)	5.2	5.3		
Wave 2 (2010-2011)	5.3	5.3	23.8%	51.2%
Wave 3 (2011-2012)	5.3	5.3		
Wave 4 (2012-2013)	5.3	5.3	24.9%	51.9%
Wave 5 (2013-2014)	5.4	5.3		
Wave 6 (2014-2015)	5.4	5.4	23.2%	50.3%
Wave 7 (2015-2016)	5.5	5.4		
Wave 8 (2016-2017)	5.5	5.4	22.8%	53.2%
Wave 9 (2017-2018)	5.3	5.3		

⁷ Note that the USS does not consistently capture information on individual-level union membership (it is only recorded if people mention unprompted that they pay union dues) and there are no questions that capture overall collective bargaining coverage of a workplace (i.e. the rate of unionisation among all workers), which is hardly surprising given that individuals are probably unlikely to know this figure.

Discussion

Early Conclusions

The goal of this project was to provide an initial overview of the conceptualisation and operationalisation of precarious work in the UK, as well as considering some of the correlates of the newly derived measurement. Therefore, we end our report with some early and provisional conclusions about the scale and nature of precarious work in the UK. To our considerable surprise, and going against almost all of the precarity literature, **the scale and nature of precarious work remained largely unchanged** over the last decade. In other words, both the proportion of people in precarious work and their profile were consistent between 2009-2018 – at least based on the selected demographic and labour market-related variables added to the analysis. As this study was exploratory in nature, we can only provide tentative explanations of why this might be the cause.

Four interpretations of our results stand out as relevant, and they are not all mutually exclusive. The first possible explanation of this strikingly consistent picture of precarious work is that key structural transformations of the labour market pre-date the studied period. For example, using data from the ONS, in the previous decade the share of self-employed in the UK workforce increased by 1.7% from 10.6% in 2001 to 12.3% in 2010. In comparison, there was an only 0.8% increase to 13.1% between 2010-2019. This shows that the previous decade experienced a more pronounced shift towards self-employment than the current one. Therefore, it is possible that the current decade solidified earlier trends instead of creating new ones.

A second possibility is that due to labour market liberalisation, traditional ‘standard’ employment has become more precarious than it used to be (Livanos and Papadopoulos, 2019). Thus, there is less need for precarious workers, as conventionally and normatively defined and measured (see Table 1), because workers in ostensibly standard employment relationships are losing traction and the power balance between capital and labour is shifting in favour of the employers. This goes back to the point made earlier that one need not be engaged in precarious work to feel the effects of growing precarity.

This leads to a third potential explanation: despite having good measurements of the labour market, the USS still lacks certain variables that we would have liked to use to inform our measurement model. Such missing data include information about participating in the gig economy, variables that have been added to upcoming waves of the USS that could improve our measurement model. This new list of variables, however, is still not exhaustive, not asking for instance about zero-hours contracts, although we recognise that fielding a survey that addressed all of the most relevant variables around precarious work might prove impossible due to space constraints. For example, in a recent working paper, Nolan and Cummings (2019) showed that the Labour Force Survey had to include a set of up to twelve questions simply to verify whether someone is on a zero-hours contract. A further limitation, discussed earlier, is that as a general household survey, the USS might miss certain parts of society which are potentially more likely to be engaged in precarious work. Problems with measuring precarious work, and in particular accessing those groups most likely to be engaged in precarious work are ubiquitous (Kiersztyn,

2018; Livanos and Papadopoulos, 2019; Mai, 2018) and are especially relevant for longitudinal research.

It is also possible, however, that our newly designed measurement of precarious work worked as intended and reflects the reality of the UK labour market over the study period. Whilst most international research suggests precarity has grown in advanced world economies (especially since the 1980s), there are some studies that cast doubt upon this precarity thesis (Fevre, 2007). In the UK recent empirical evidence suggests a relatively stable labour market (IFS, 2017), albeit with some areas of concern: such as rising part-time self-employment and the growth of the gig economy (Resolution Foundation, 2017; RSA, 2017). In addition, it is also possible that the relative stability observed is the net result of potentially different trends that are essentially cancelling each other out. For example, growth may be happening in the stable and precarious parts of the labour market, such that there is no overall change with respect to the relative share of precarious work.

Overall, this report into the scale and nature of precarious work in the UK signals a note of caution in two key respects. Whilst much of the literature advances the precarity thesis, patterns of precarious work in the UK appear to be stable and caution us against a wholesale adoption of this thesis. Alongside this, such stability in the relative importance of precarious work may reflect the reality of the UK labour market. However, we must again weigh the evidence and not necessarily assume this to be the case. There are at least three other possible explanations, related to: (1) the UK labour market becoming precarious before the study period; (2) increasing precarity amongst workers employed outside work conventionally defined as precarious; and, (3) concerns over the accuracy of the data in respect to capturing all forms of precarious work.

Having said all this, important insights into non-compliance in the UK labour market can be gained by targeted research; and targeting precarious work is perhaps one of the best ways to access and understand an elusive and under studied phenomenon. More research is clearly needed to maximise the potential of the USS; which in our view is vast and increasing due to recent improvements in the contents of the survey. Precarious work makes up a significant component of the UK labour market and whilst it may not have mushroomed, yet – though Covid-19 might have a major impact in this respect – it should clearly be one of the first points of entry for those interested in non-compliance and workers' associated access to (formal and informal) justice.

Next Steps and Future Directions for Research on Precarious Work and Non-Compliance

In terms of where this research now takes us, firstly it is clear that the ability of the USS to capture precarious work will improve with the recent changes made to the survey. We caution against making sweeping conclusions around the changing scale and nature of precarious work in the UK based on data that pre-dates these improvements. It would also be useful to compare the results from the USS with other UK statistical measures. Although the Labour Force Survey (LFS) might appear at first glance a promising point of comparison, substantive differences between the LFS and USS survey designs and questionnaire contents mean it would likely not be feasible to make

direct comparisons. With that said, results from the LFS could provide a useful counterpoint to our findings.

Secondly, the USS survey could be used to explore the relationship between precarious work and non-compliance in greater depth by sampling for further research people who are considered precarious based on our definition. The limitations of the USS questionnaire could then be remedied by designing a tailor-made survey that would focus on the experiences of labour market non-compliance and worker access to justice. Furthermore, precarious workers could be asked to refer other people who might be considered precarious as well, whereby the ensuing chains of referral would broaden this relatively hard-to-reach sample.

Thirdly, from the perspective of improving enforcement and prevention, it would be extremely helpful to uncover the extent to which precarious workers who experience violations of their labour rights are reporting such non-compliance, the pathways to justice they use, and their experiences of the process. In addition to a quantitative survey, addressing such phenomena might require carrying out substantial qualitative fieldwork such as interviews or focus groups with workers and stakeholders.

Technical Appendix

Measuring Precarious Work

As discussed in the main text, and based on the extant literature, we tapped four characteristics to measure precarious work: low income, non-traditional work, working for a small firm, and immigrant or ethnic minority background. From the USS, either a single (in case of income and firm size) or multiple (in case of non-traditional work and immigrant or ethnic minority background) variables were used to create four new binary variables in the following way:

- **Low income:** Below 60% of the median income = 1, Above = 0
- **Non-traditional work:** Having multiple jobs; being self-employed; and/or in temporary employment = 1, All other employed = 0
- **Working for a small firm:** Number of people employed at the workplace is between 1-49 = 1, 50 or above = 0
- **Ethnic minority or immigrant background:** Ethnic minority or born outside the UK = 1, White British and born in the UK = 0

Unlike in much of the literature on precarious work, where these constructs are usually determined *a priori* and studied in isolation, we wanted to explore their relationship with each other in the data. Therefore, these four binary variables were considered indicators of the latent construct of precarious work (i.e., formative measurement model). Accordingly, principal component analysis was used as an appropriate statistical technique (Jackson and Kuha, 2016). The results of this analysis can be found in Appendix Table 1.

Component loadings quantify the relative contribution of each variable in these models based on the covariance matrix (i.e., statistical association) of the variables entered into the model. These are standardised measures, which can take values between -1 and 1; coefficients that are further away from 0 signal a stronger contribution. From the four variables, low income had the highest component loadings (0.67-0.68), followed by non-traditional employment (0.55-0.61), small firm size (0.44-0.47), and finally, ethnic minority and immigrant background (-0.01-0.11).

Clearly, from these four variables, ethnic minority and immigrant background stood out, depending on the wave in question, as having either weak or no contribution to the latent construct of precarious work. In contrast, the other three variables consistently provided moderate to strong contributions. Crucially, our goal was not to establish a purely data-driven model but to explore how the constructs that define precarious work are related to each other. In other words, we still believe that immigrant and ethnic minority background captures an important aspect of precarious work, which might be independent of the other three variables. Yet, and considering the weak to null relationship of this variable with the latent construct, we also considered the information provided by the principal component analysis.

Appendix Table 1: Component loadings and explained variance of the fitted principal component analyses across the different waves of the USS

	Low income (<60% median)	Non-traditional work	Working for a small firm	UK-born White British
Wave 1 (2009-2010)	0.673	0.569	0.464	0.095
Wave 2 (2010-2011)	0.671	0.581	0.448	0.111
Wave 3 (2011-2012)	0.675	0.611	0.414	-0.003
Wave 4 (2012-2013)	0.679	0.612	0.402	0.051
Wave 5 (2013-2014)	0.677	0.582	0.451	-0.011
Wave 6 (2014-2015)	0.677	0.570	0.465	0.026
Wave 7 (2015-2016)	0.680	0.549	0.483	0.054
Wave 8 (2016-2017)	0.683	0.577	0.448	0.010
Wave 9 (2017-2018)	0.678	0.568	0.465	0.042

Appendix Table 2: Comparison of alternative measurement models of precarious work (% of workforce)

	Final model	“Checklist approach”	Data-driven
Wave 1 (2009-2010)	9.31%	25.63%	4.37%
Wave 2 (2010-2011)	8.69%	24.03%	3.94%
Wave 3 (2011-2012)	8.79%	24.47%	3.92%
Wave 4 (2012-2013)	8.54%	23.59%	3.81%
Wave 5 (2013-2014)	9.26%	24.56%	4.02%
Wave 6 (2014-2015)	9.37%	24.89%	4.45%
Wave 7 (2015-2016)	9.08%	24.70%	4.27%
Wave 8 (2016-2017)	8.99%	24.26%	4.34%
Wave 9 (2017-2018)	8.81%	23.59%	4.06%

We compared three alternative ways of operationalising precarious work (Appendix Table 2). The first perspective followed much of the published empirical literature taking a ‘checklist approach’ where qualifying for a number of criteria out of four made someone a precarious worker. Appendix Table 2 gives an example that was similar to Noack and Vosko (2011), in that meeting two criteria identified someone as precarious. With this approach, our measurement model was fully informed by the previous theoretical and empirical literature in determining what defined precarious work, resulting in a little less than a quarter of the workforce being considered precarious. However, there are some notable shortcomings to this approach, for instance, it would count people on temporary jobs working for a small firm as precarious regardless of their income. Conversely, increasing the number of categories a person would need to qualify for would probably be a too stringent requirement.

Another approach we considered was using a purely data-driven strategy. For this, we used the principal component analysis (described earlier) to derive a single component score estimate for each individual. These component scores, by design, are by and large z-transformed, which means that they are standardised scores that reflect the distribution of the latent variable. For instance, having a score higher than 1.96 means that you belong to approximately the top 5% on the given latent construct. Appendix Table 2 gives an example of this approach, where each individual had to qualify for two out of four categories (same as above) and, in addition, they also had to reach a minimum component score of 1.96. Hence, these people were selected from the pool of precarious workers identified based on the checklist approach, but they also needed to have a high overall component score estimated by the principal component analysis. As shown in Appendix Table 2, approximately 4% of the UK workforce would be considered precarious using this strategy. There are two apparent shortcomings of this strategy. First, any given component score threshold chosen by us would, by definition, determine the ballpark of the proportion we would get. For instance, choosing 1.96 meant that we could expect a value close to 5%. Second, and as indicated by the component loadings, this approach largely overlooks one of our four criteria, ethnic minority or immigrant background.

Dissatisfied with either of these approaches, we decided to combine the two of them trying to take the strengths of each approach and mitigate their weakness. Therefore, our model is a checklist approach that was also informed by the principal component analysis we fitted to the variables. With this in mind, being low income and being in non-traditional employment were given similar weight, while working for a small firm and coming from an immigrant or ethnic minority background were given a smaller weight. Hence, as discussed in the main text, we considered someone a precarious worker provided that either (1) they have low income and are in non-traditional employment; (2) they are an immigrant/member of an ethnic minority working at a small firm and have low income; or (3) they are an immigrant/member of an ethnic minority working at a small firm and are in non-traditional work. Reassuringly, precarious work operationalised this way, encompasses almost everyone who had been identified as precarious workers using the data-driven strategy. The average component score of people selected this way was 1.2-1.4 across the various waves. Although this is a much smaller share of the workforce

compared to the checklist approach, it is less likely that we would have a large number of ‘false positives’ (i.e., workers who only appear to be precarious).

Multivariate Models

We also considered the statistical association a series of variables have with precarious work. We fitted a series of binary logit models with the binary variable of precarious/non-precarious work as the outcome variable. We added gender, age, level of urbanisation, region, industry, and occupation as the independent variables, and used appropriate weights and strata information for the modelling. Appendix Table 3 provides an example of the models we fitted to each wave, with the coefficients transformed to odds ratios for an easier interpretation of the results. Both the modelling and the results (by-and-large) remained consistent throughout the 9 waves (the remaining models are available from the authors upon request).

To provide an example of how these results should be interpreted, take Appendix Table 3 as an example. For the sake of brevity, only the significant results are highlighted, and it is assumed for all variables that these are partial associations (i.e., these are the results when holding all else constant). Being a woman increases the odds of being in precarious work by 36%. A one-year increase in a person’s age decreases the expected odds of being in precarious work by 2%. Of all the UK regions, only living in London increases the odds of being in precarious work. Compared to living in Northern Ireland, a Londoner’s odds of being in precarious work are 1.5 times higher. Using lower class occupations as a baseline, being in a middle-class occupation reduces the expected odds of being in precarious work by 22%, an upper middle class occupation by 58%, and in an elite/upper class occupation by 66%. Conversely, having a working class job instead of a lower class job does not significantly change the odds of being in precarious work. Finally, using agriculture and manufacturing industry as a baseline, working in hospitality on average increases the odds of being in precarious work 3.1 times, working in other industries (such as trash collection or doing household work) 2.6 times, construction 1.7 times, retail 1.6 times, volunteering and church 1.5 times,⁸ education and health 1.4 times, and public administration, communication, and entertainment 1.3 times. By contrast, working in the finance, insurance or legal industry reduces the odds of precarious work by 33%.

⁸ As a rare exception, both the effect size and significance of working in the volunteering/church industry fluctuated across the studied period.

Appendix Table 3: Comparison of alternative measurement models of precarious work (% of workforce)

Wave 1	Precarious worker
Woman	1.359***
Age (year)	0.978***
Urban area (vs rural)	1.131
Region (Northern Ireland as baseline)	
North East	0.791
North West	0.798
Yorkshire and the Humber	0.880
East Midlands	0.916
West Midlands	0.987
East of England	0.993
London	1.492***
South East	1.089
South West	1.057
Wales	0.747
Scotland	0.816
Occupational class (Lower class as baseline)	
Elite/upper class	0.343***
Upper middle class	0.423***
Middle class	0.777***
Working class	0.875
Industry (Agriculture and manufacturing as baseline)	
Construction	1.747***
Retail	1.584***
Transportation	1.125
Public Administration, Communication, Entertainment	1.261*
Hospitality	3.133***
Volunteering and Church	1.521***
Education and Health	1.360**
Finance, Insurance, and Legal	0.672***
Other industries (e.g., trash collection, household workers)	2.596***
Constant	0.154***

*p<0.05, **p<0.01, ***p<0.001

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