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## **Finding meaning through work: eudaimonic well-being and job type in the US and UK**

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# Finding meaning through work: eudaimonic well-being and job type in the US and UK

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## Abstract

Eudaimonic well-being is an important component of utility that reflects people's preferences for having purpose and meaning in their lives. This paper presents analysis from the American Time Use Survey (ATUS) and the UK Annual Population Survey (APS) to show that the extent to which people find their work meaningful is significantly determined by the type of job they have. Much of the existing literature in this area provides theoretical or qualitative evidence, or evidence from small scale surveys, to identify the aspects of a job most conducive to eudaimonic well-being. This paper is the first to establish large scale quantitative evidence of the effects of job type on eudaimonic well-being across the whole population, based on two large national datasets. I find that jobs that combine professional autonomy with having a direct social impact within the context of a trusting relationship are found to be the most meaningful and worthwhile, controlling for selection into these jobs. These findings have some interesting implications for how wages are set in different labour markets.

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## Section 1: Introduction

In economics, work is traditionally assumed to be a source of disutility, undertaken only for its value in exchange for consumption goods. This is an assumption that has been repeatedly refuted in the subjective well-being literature. For example, Clark and Oswald (1994) show how employment contributes to utility directly aside from its instrumental value. The evidence suggests that work can have intrinsic value to the jobholder in its own right, as noted by economists such as Marshall (1961), Besley and Ghatak (2005) and Akerlof and Kranton (2005). There is a substantial body of literature that describes how some types of work can foster a sense of meaning and purpose (defined as eudaimonic well-being), which is arguably an important component of utility and motivator of work effort.

The existing literature in the field of eudaimonic well-being and work (see Section 2) provides a strong theoretical framework for understanding the features of a job that are conducive to eudaimonic well-being, supported by empirical evidence from qualitative studies and small scale surveys. This paper adds to this literature by using two large national datasets to show how the observable characteristics of one's job (e.g. sector, industry and occupation) have a statistically significant impact on a subjective measure of eudaimonic well-being. This is the first study to establish such large scale quantitative evidence of the effects of job type on eudaimonic well-being across the whole population. I also make some theoretical contributions by explicitly embedding eudaimonic well-being into a formal utility function (see Section 3).

The study uses the American Time Use Survey (ATUS) in which respondents are asked to report how meaningful they find their work and other activities undertaken during the day. The analysis investigates whether job type affects the extent to which working is meaningful relative to the meaningfulness of non-work activities (see Section 6). I also report a supplementary analysis of the UK Annual Population Survey (APS) using a matching approach to explore how job type affects an overall sense of having worthwhile activities in one's life as a whole (see Section 7). The results

reveal considerable heterogeneity in the extent to which different job types affect eudaimonic well-being. Specifically, jobs that combine professional autonomy with having a direct social impact within the context of a trusting relationship are consistently found to be the most meaningful and worthwhile. With a few notable exceptions, these findings provide support for the prevalent theories in the existing literature.

## Section 2: Literature review

‘Eudaimonia’ is an ancient Greek word that can be approximately translated as ‘happiness’<sup>1</sup> but has variously been described as ‘flourishing’ (e.g. Huppert and So, 2013), ‘positive functioning’ (e.g. Ryff, 1989) or ‘worthwhileness’ (e.g. Dolan et al., 2011). It is an important concept in the writings of Aristotle and is identified in the *Nicomachean Ethics* (Aristotle, 2002) as the ‘chief good’, or the ultimate goal or purpose of all human activity.

The Aristotelian view of eudaimonia has a strong moral component. To attain eudaimonia, a person must desire and practise a life characterised by ‘the virtues’, such as justice, generosity, courage and friendship. As such, in its purest sense eudaimonia is a normative concept and one’s level of eudaimonia is not dependent on personal preferences or feelings. Hence eudaimonia stands in stark contrast to the utilitarian understanding of well-being as articulated by Bentham (1907) and dominant in the modern study of economics.

It is often assumed that a Benthamite concept of utility is concerned only with hedonic well-being, an account of experienced pleasure and pain. This is not necessarily the case, however. As Dolan and Kudrna (2016) point out, individuals are able to experience feelings of purpose as well as feelings of pleasure and both may motivate their choices. In that sense, it is possible to graft the concept of eudaimonic well-being into a utilitarian framework such that some individuals have preferences for some aspects of eudaimonia and this forms part of their experienced utility.

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<sup>1</sup> The literal translation is ‘good demon’.

While the terms 'eudaimonia' and 'eudaimonic well-being' can be interchangeable, it is convenient to define 'eudaimonia' as the holistic Aristotelian concept of a flourishing life and 'eudaimonic well-being' as the more utilitarian concept of a component of subjective well-being which encompasses many of the characteristics of eudaimonia. Under these definitions, it is eudaimonic well-being (or a proxy for it at least) that is being specifically investigated in this paper.

In this respect, it is helpful to think of eudaimonic well-being as a 'good' which may be preferred or valued to different degrees by different individuals. Some recent literature provides evidence on the extent to which eudaimonic well-being is preferred in relation to other 'goods'. A survey of stated preferences conducted by Benjamin et al. (2014) finds that, out of over 100 different measures of subjective well-being, aspects of well-being associated with eudaimonia were among the most preferred. Being a good, moral person and living according to personal values was the fourth ranked measure while having a life that is meaningful and has value ranked tenth and feeling the things one does in one's life are worthwhile ranked 20<sup>th</sup>. Adler et al. (2017) conduct a similar stated preference experiment and find that most people prefer high subjective well-being to other 'goods' such as income and physical health, although they find a higher relative preference for affective well-being in comparison to eudaimonic well-being. Similarly, Dolan et al. (2017) using the ATUS find that life evaluations (which may be considered a proxy for subjective preferences) are more strongly associated with experiences of positive and negative affect than with experiences of meaningfulness. The evidence is therefore mixed in the sense that eudaimonic well-being does appear to be important for utility but to a lesser extent than more hedonic or affective aspects of well-being.

There is a large amount of literature exploring eudaimonia and work, or the extent to which work provides meaning to people's lives. When discussing the benefits one attains from paid work, a number of authors (e.g. Spencer, 2015; Kamarade and McKay, 2015; Chalofsky, 2003) make the distinction between extrinsic and intrinsic rewards. Standard labour market theory asserts that

people are motivated to work in order to earn a wage that in turn finances consumption thus generating utility. Other aspects of a job, for example working conditions or prospects for career progression, may also contribute to utility more directly. These rewards can be considered extrinsic in the sense that they are derived not from the work itself but from the private returns to work. For people motivated by extrinsic rewards, the work is a means to an end rather than an end in itself. This is the standard assumption in traditional labour market models.

In contrast, intrinsic rewards describe the well-being derived from undertaking the job itself irrespective of any payments received in exchange for completing the work. For people motivated by intrinsic rewards, the work is an end in itself and there is no reliance on its instrumental role to bring about further ends. As identified by Hinchcliffe (2003), there are certain types of work that can be described as having intrinsic value (e.g. caring for a terminally ill patient) while other types of work have merely instrumental value (e.g. planting turnips)<sup>2</sup> and this may affect how the job is viewed by the jobholder. Of course, for many people both intrinsic and extrinsic rewards contribute to the well-being derived from work. The intrinsic value of work as a motivator for effort is also recognised by Marshall (1961). In the *Principles of Economics*, he asserts that:

“... the desire for excellence for its own sake graduates down from that of a Newton, or a Stradivarius, to that of the fisherman who, even when no one is looking and he is not in a hurry, delights in handling his craft well, and in the fact that she is well built and responds promptly to his guidance. Desires of this kind exert a great influence on the supply of the highest faculties and the greatest inventions; and they are not unimportant on the side of demand. For a large part of the demand for the most highly skilled professional services and the best work of the mechanical artisan, arises from the delight that people

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<sup>2</sup> This is a specific example given by Hinchcliffe (2003), in turn citing MacIntyre (1981). In light of the current evidence, it is perhaps not the best example as the results in this paper suggest that agricultural trades do produce relatively high levels of eudaimonic well-being, suggesting there may be some intrinsic value in horticultural activities.

have in the training of their own faculties, and in exercising them by aid of the most delicately adjusted and responsive implements.”(Book III Chapter II, p89 in the 1961 version)

In light of the connection between the ethical dimension of work and the intrinsic rewards that it can provide, it is not surprising to read that jobs that enable workers to act in accordance with their own morality are considered to be particularly meaningful. The importance of authenticity for eudaimonic well-being at work is highlighted by Menard and Brunet (2011), Lips-Wiersma et al. (2016) and Rosso et al. (2010), while Akerlof and Kranton (2005) show how the congruence between one’s identity and the values of an organisation or the requirements of a job may affect motivation and payoffs.

Self-determination theory (Deci and Ryan, 2000) argues that conditions that support the individual’s experience of autonomy, competence and relatedness are most conducive to providing intrinsic motivation for action. Therefore, we might expect working conditions that support good relationships with colleagues and clients (Lopes, 2011) or facilitate autonomy or personal growth (Turban and Yan, 2016) to generate higher experiences of eudaimonic well-being.

Having preferences for altruism, social impact or serving others is also a mechanism through which work can provide intrinsic rewards and be perceived as meaningful. Formal models that account for altruistic preferences are common in the economics literature. A relevant example is a theoretical study by Besley and Ghatak (2005) which shows that matching between employers and workers leads to an equilibrium where mission-oriented (e.g. public or voluntary sector) organisations do not have to pay a premium to motivate effort and productivity, as the opportunity to contribute to the mission compensates for the lower pay for suitably motivated individuals. Similarly, Polidori and Teobaldelli (2013) find that pro-social behaviour and ‘public service motivation’ are important drivers of effort in the non-profit sector, while Binder (2016) finds that people working in the non-

profit sector experience significantly higher life satisfaction, and that this life satisfaction ‘premium’ is equivalent to £22,000 per year in income.

It is clear that several of these papers articulate how the existence of intrinsic rewards from certain types of work has important labour market implications. If valued by the jobholder, these rewards have an implicit monetary value and essentially provide compensation for any contemporaneous absence of extrinsic benefits. Everything else being equal, therefore, we may expect to see equilibrium wages driven down in labour markets offering high eudaimonic well-being. Hence the literature on compensating wage differentials (e.g. Rosen, 1986) has relevance for this study and we will return to this point in the discussion (Section H) below.

### **Section 3: Theoretical framework**

The purpose of this paper is to explore the extent to which the observable characteristics of one’s job influence one’s subjective sense of eudaimonic well-being or meaningfulness. Ideally, this is to be identified independently of a person’s own characteristics, including one’s tendency to value eudaimonic well-being (or, specifically, the intrinsic rewards from work) or experience eudaimonic well-being in life generally, as well as one’s propensity to choose certain types of job or career.

To motivate this study it is convenient to start with a time use utility model, as proposed by Krueger et al. (2008) for example. In this model, utility is ‘experienced’ over time and thus an individual’s total utility is the sum of the utilities experienced in each unit of time  $t$  within a total time period  $T$  (e.g. one day).

$$U_i = \sum_{t=1}^T U_i(A_t) \tag{1}$$

The utility experienced in time  $t$ , that is  $U_i(A_t)$ , depends on the nature and quality of the activity  $A_t$  being undertaken, which is itself dependent on the inputs invested into that activity. For example, if



$A_t$  is eating dinner, then  $U_i(A_t)$  may depend on factors such as the quality of food being consumed and the company of others with whom one is sharing the meal.

Our next step is to decompose experienced utility into hedonic and eudaimonic components. There is limited precedent in the literature for capturing eudaimonic well-being in a formal utility model. However, the work of Dolan and Kudrna (2016) suggests that well-being is experienced along two dimensions (which they call pleasure and purpose) and therefore we propose a simple decomposition of equation (1) as follows, where  $H_i(A_t)$  and  $E_i(A_t)$  refer to the hedonic utility (feelings of pleasure) and eudaimonic utility (feelings of purpose) derived from  $A_t$  respectively.

$$U_i = E_i^\theta H_i^{1-\theta} = \left[ \sum_{t=1}^T E_i(A_t) \right]^\theta \left[ \sum_{t=1}^T H_i(A_t) \right]^{1-\theta} \quad (2)$$

Here,  $0 \leq \theta \leq 1$  is a measure of the weight that individual  $i$  places on the hedonic and eudaimonic aspects of utility.<sup>3</sup> It is not possible to identify  $\theta$  from my empirical analysis as hedonic and eudaimonic well-being are estimated separately for each activity. Instead, my empirical approach is to examine the two different measures of well-being side-by-side for a given activity. My results show that the ranking of activities and jobs is markedly different depending on whether one focuses on hedonic or eudaimonic well-being, suggesting that these measures of well-being are capturing two distinctly different things.

For the example of eating dinner, we might suppose that the hedonic aspect of utility is primarily derived from the quality of food (making the experience more pleasurable) while the eudaimonic aspect is primarily derived from the meaningfulness of the conversation and relationships fostered with one's eating companions. We could extend this idea more generally by suggesting that the consumption of resources during activities only affects hedonic utility and has no bearing on

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<sup>3</sup> The specification in equation (2) assumes a Cobb-Douglas utility function (i.e. standard convex indifference curves with diminishing marginal rate of substitution between hedonic and eudaimonic well-being) but of course the indifference curves could have a different shape.

eudaimonic utility. I suggest that this is a reasonable assumption but it is not possible to test this from the data, as we only have observations on what activities generate different types of well-being, not why. We cannot, therefore, rule out the possibility that the eudaimonic well-being experienced in any activity is related (probably positively) to the consumption of resources during that activity and hence the income of the individual.

The remainder of this section focuses only on the term inside the first bracket on the right hand side of equation (2).<sup>4</sup> Moreover, I will simplify the model such that  $A_t$  can take one of only two values for each individual (work or leisure). This is described by the dummy variable  $L_t$  which is equal to 1 if  $i$  is working at time  $t$  and 0 otherwise. I also add to the model by allowing the eudaimonic utility one gets from working to vary not only across individuals  $i$  but also across jobs  $j$ , where both  $i$  and  $j$  are assumed to be invariant over time.

$$E_i = \sum_{t=1}^T E_{ij}(L_t) \quad (3)$$

Let us now assume that  $i$  can hold one of two jobs such that  $j \in \{1,2\}$ . Therefore, eudaimonic well-being experienced at any time  $t$  can take one of four values for a given individual:  $E_{i1}(1)$ ;  $E_{i2}(1)$ ;  $E_{i1}(0)$ ; or  $E_{i2}(0)$ . Notwithstanding the caveats discussed above regarding the relationship between income and eudaimonic well-being, there is a strong case for assuming that the latter two utilities are equal as we would not expect job type to have any bearing on the eudaimonic well-being experienced in one's non-working (leisure) time.<sup>5</sup> Therefore, we could propose that:

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<sup>4</sup> The exact same logic can be applied to the second term  $\sum H_i(A_t)$ .

<sup>5</sup> As discussed above, however, we cannot rule out the possibility that eudaimonic well-being is partly determined by income. Hence, if the wage available from job 1 were higher than the wage available from job 2, then we may expect  $E_{i1}(0) > E_{i2}(0)$ . Income may affect both the types of activities undertaken in one's leisure time and the quality of these activities. The empirical analysis controls for the former heterogeneity by including in the model a set of dummy variables defining the other activities that individuals undertake in the same day. It is not possible, however, to control for the latter heterogeneity (quality of activities) as this is unobserved so that does leave open the possibility that baseline eudaimonic well-being (the eudaimonic well-being experienced during non-work activities) is not independent of job selection and income.

$$\hat{E}_i \equiv E_{i1}(0) = E_{i2}(0) \quad (4)$$

Here,  $\hat{E}_i$  can be interpreted as a baseline eudaimonic well-being that  $i$  experiences during any period when he/she is not working, regardless of the job he/she holds. We can also define the eudaimonic well-being that  $i$  gains from spending period  $t$  working in job  $j$  as:

$$E_{ij} \equiv E_{ij}(1) \quad (5)$$

We want to test the null hypothesis that the particular job one does has no impact on how much eudaimonic well-being one derives from work. That is:

$$H_0: E_{i1} = E_{i2} \quad (6)$$

This can also be expressed as:

$$H_0: \hat{E}_i - E_{i1} = \hat{E}_i - E_{i2} \quad (7)$$

Let us now assume that there are two individuals such that  $i \in \{1,2\}$ . The two individuals derive different levels of eudaimonic well-being from leisure and working in the two available job types such that  $\hat{E}_1 \neq \hat{E}_2$  and  $E_{1j} \neq E_{2j}$  for both  $j$ . We might also assume that there is a set ordinal ranking of the available time use activities (time spent in each available job and time spent in leisure) according to their contribution to eudaimonic well-being that is consistent across individuals such that if  $\hat{E}_1 > E_{1j}$  then  $\hat{E}_2 > E_{2j}$  for both  $j$  and if  $E_{11} > E_{12}$  then  $E_{21} > E_{22}$ .<sup>6</sup> In other words, if one person finds a particular activity or job to be more meaningful than another particular activity or job, then every other person also has that same preference ordering. Moreover, we could assume that this ranking is not just ordinally consistent but cardinally consistent such that:

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<sup>6</sup> Similarly, we assume that the reverse inequalities hold such that if  $\hat{E}_1 < E_{1j}$  then  $\hat{E}_2 < E_{2j}$  for both  $j$  and if  $E_{11} < E_{12}$  then  $E_{21} < E_{22}$ .

$$\hat{E}_1 - E_{1j} = \hat{E}_2 - E_{2j} \text{ for both } j \quad (8)$$

We can use this latter assumption to test the null hypothesis in equation (7) that both jobs are perceived as equally meaningful. Let us assume that individual 1 holds job 1 and individual 2 holds job 2. Then let us say that we observe that:

$$\hat{E}_1 - E_{11} > \hat{E}_2 - E_{22} \quad (9)$$

Taking equations (8) and (9) together implies the following counterfactual results:

$$\hat{E}_1 - E_{11} > \hat{E}_1 - E_{12} \quad (10)$$

$$\hat{E}_2 - E_{21} > \hat{E}_2 - E_{22}$$

In other words, individual 1 experiences more eudaimonic well-being from working in job 1 than he/she would do from working in job 2 and individual 2 experiences less eudaimonic well-being from working in job 2 than he/she would do from working in job 1. This implies that job 1 is perceived as more meaningful than job 2 independently of the individuals selecting into those jobs. If these inequalities are significant, then this provides the evidence required to reject the null hypothesis in equation (7).

Let us now consider the theoretical arguments that may help to predict which job types  $j$  may be most likely to yield higher reports of meaningfulness within the framework set out above.

The literature review above suggests that there are certain job characteristics that should be more likely than others to bestow intrinsic rewards to the jobholder. The first thing to say is that many of these job characteristics will not be observable in the data. A work environment which is conducive to eudaimonic well-being is to a large extent dependent on the specific employer, the specific department or team in which the individual works, or indeed the specifics of the job description

itself. For example, fostering a good sense of relatedness is possible in any job and is in the most part dependent on the culture of the organisation, the attitudes and personalities of managers and the way in which the work is organised (e.g. whether there is a significant focus on teamwork). Likewise, the ability to work authentically is theoretically possible in many jobs, as employers in many different sectors can have strong ethical policies which enable staff to stay true to their values. As highlighted by Spencer (2015), it is not just the work itself but the context of the work (i.e. how it is organised in particular workplaces) that makes it meaningful.

However, there is reason to expect a degree of systematic relationship between certain sectors and occupations, and the sorts of job characteristics conducive to eudaimonic well-being. For example, we may expect to observe a vertical pattern. Self-determination theory (Deci and Ryan, 2000) would imply that people in more highly skilled and senior positions would be more likely to experience autonomy and competence in their work compared to those in lower ranked occupations. Moreover, higher levels of autonomy may also foster greater levels of authenticity which is also conducive to eudaimonic well-being. Similar arguments might also be put forward to hypothesise that self-employed people may experience higher levels of eudaimonic well-being than employed people, who are more likely to be constrained in how they go about their job (Benz and Frey, 2008).<sup>7</sup>

We might also expect to see the impact on eudaimonic well-being to vary horizontally between sectors and occupations. In other words, it is not just the level of job but also the nature of the good being produced by the jobholder which matters for meaningfulness. Jobs where the good produced is indistinguishable from the work itself (for example, the caring job described by Hinchcliffe, 2003) may be particularly conducive to eudaimonic well-being. If the jobholder perceives his/her work as an activity which is an end in itself rather than a means to an end, we might expect him/her to experience eudaimonic well-being in the midst of undertaking the work. There are also many jobs

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<sup>7</sup> It is possible that this effect will vary according to the type of self-employment. Those in more modern forms of self-employment (e.g. the so-called 'gig economy') may be expected to experience less autonomy and hence meaningfulness than those in more traditional forms of self-employment. However, I cannot make this distinction from my data.

and sectors where service to the community is an underlying mission. In particular, public sector and voluntary sector organisations tend to have the feature whereby job performance is assessed on the basis of creating value to society rather than contributing to firm profits. As a result, working for such an organisation might make the jobholder feel that what he/she is doing is altruistic and hence more meaningful. Note, however, that this is a different concept than that put forward by Besley and Ghatak (2005), where naturally altruistic people sort into mission-orientated jobs. The hypothesis being proposed here is that certain jobs cause the jobholder to foster greater feelings of altruism and hence eudaimonic well-being than they would otherwise had they been randomly allocated into a different job.

#### **Section 4: Data**

The American Time Use Survey (ATUS) is a federally administered survey in the United States (US) published by the Bureau of Labor Statistics (2016) with the purpose of developing nationally representative estimates of how American people spend their time. In three years of the survey (2010, 2012 and 2013), a Well-Being Module was added to capture how people felt during three randomly selected activities in the diary day (excluding sleeping, grooming and personal activities). For each activity, the respondent was instructed to *“please use a scale from 0 to 6, where a 0 means you did not experience this feeling at all and a 6 means the feeling was very strong. You may choose any number 0, 1, 2, 3, 4, 5 or 6 to reflect how strongly you experienced this feeling during this time.”* The respondent was initially asked to report, on a 0-6 scale, the extent to which they were happy, tired, stressed, sad and in pain during the activity in question. These five affective questions were asked in a random order. They were then asked the eudaimonic question: *“From 0 to 6, how meaningful did you consider what you were doing? 0 means it was not meaningful at all to you and a 6 means it was very meaningful to you.”* Although this study focuses on the meaningfulness

question, I also repeat the analysis using the five affective states as the dependent variable as a comparison.<sup>8</sup>

I use a pooled dataset of 20,055 individuals (interviewed in 2010, 2012 or 2013) who were in work and reported their well-being in three activities each. Therefore, this generates a balanced panel of 60,165 observations.

The explanatory variables of interest in the ATUS analysis can be divided into two groups: those that vary by activity and those that vary by person. The main activity-level variable of interest is the categorisation of the activity itself. A qualitative description of the activity provided by the respondent was coded into one of over 400 categories, grouped together into 17 major time use categories (plus an eighteenth 'unknown' category). I have converted these categories into a set of 18 dummy variables. The activity category of most interest in this study is 'working and work-related activities'. Among the 20,055 individuals included in the sample, 5,298 (26%) were recorded as working during at least one of the three activities for which they reported their well-being, including 890 (4%) recorded as working during at least two activities and 54 (<1%) in all three activities.<sup>9</sup> Aside from the nature of the activity itself, some other characteristics of the activity are also captured in the data and may be expected to influence how one feels during that activity. These other variables are: duration of the activity in minutes, time of day (whether morning, afternoon, evening or night), whether also looking after children at the time, location of activity (whether home, workplace, travelling, other place or unspecified), and whether one was interacting with anyone else at the time.

The data also includes many person-level variables. These include personal characteristics such as sex, age, ethnicity and region. Moreover, there are a number of variables relating to an individual's job including sector, industry, occupation and earnings.

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<sup>8</sup> Scales are reversed for the four negative feelings (tired, stressed, sad, pain) so that all scales are increasing in well-being.

<sup>9</sup> Therefore, the sample for whom there is a variation across the three activities in terms of the work / non-work split is  $5,298 - 54 = 5,244$ .

I have also explored the research question using data from the United Kingdom (UK). The Annual Population Survey (APS) published by the Office of National Statistics Social Survey Division (2016) captures eudaimonic well-being alongside evaluative (life satisfaction) and hedonic (happiness and anxiety yesterday) measures of subjective well-being. Unlike the ATUS, where eudaimonic well-being (meaningfulness) is attributed to specific activities, the APS question captures an overall evaluation of eudaimonic well-being: “Overall, to what extent do you feel that the things you do in your life are worthwhile, where nought is ‘not at all worthwhile’ and 10 is ‘completely worthwhile’?” The APS also contains a large number of other personal and labour market characteristics. I use a pooled cross-section of 588,718 individuals who answered the worthwhile question, of whom 419,364 were in work. Responses are pooled across the five years between 2011/12 and 2015/16.

## Section 5: Model

The basic model for the ATUS analysis assumes that the well-being  $S_{in}$  reported by person  $i$  during activity  $n \in \{1,2,3\}$  is a function of the nature of that activity.

$$S_{in} = \alpha + \mathbf{A}_{in}\boldsymbol{\beta} + \mathbf{X}_{in}\boldsymbol{\gamma} + \nu_i + \varepsilon_{it} \quad (11)^{10}$$

Here,  $\mathbf{A}_{in}$  is a 1x17 vector  $(A_{1in}, A_{2in}, \dots, A_{17in})$  in which  $A_{1in} = 1$  if individual  $i$ 's  $n$ th activity is work-related and 0 otherwise. Likewise, the dummy variables  $A_{2in}$  through to  $A_{17in}$  denote whether or not the  $n$ th activity falls into each of the other categories. As these are mutually exclusive categories, at most one element of  $\mathbf{A}_{in}$  is 1 with the remaining elements in the vector set to zero. A vector of 17 zeroes implies that the activity falls into the omitted category. The vector  $\mathbf{X}_{in}$  in equation (11) contains all other explanatory variables that vary in  $i$  and  $n$ . This includes duration of activity, time of day, location, whether or not one was looking after children at the time and

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<sup>10</sup> This specification implicitly assumes that  $S_{in} - S_{jn} = S_{in}^* - S_{jn}^*$  for any two individuals  $i$  and  $j$  selected from the population, where  $S_{in}$  denotes reported well-being and  $S_{in}^*$  denotes actual well-being. This is a strong assumption which allows one to interpret  $S_{in}$  as a cardinal variable that can be estimated using ordinary least squares (OLS). If this assumption is relaxed such that  $S_{in}$  is only an ordinal proxy for  $S_{in}^*$  then an ordinal estimator should be used. All the results in this paper have also been estimated using the Blow Up and Cluster (BUC) method (see Dickerson et al, 2014) and the results are consistent with the OLS estimators.



whether or not one was with other people at the time. The error term  $v_i$  contains all personal characteristics (including job characteristics and income) that do not vary across activities, while the error term  $\varepsilon_{in}$  accounts for all residual variation across activities. To account for the fixed effect  $v_i$ , equation (11) can be expressed in demeaned terms, where  $\bar{S}_i \equiv \frac{1}{3} \sum_{n=1}^3 S_{in}$  and  $\dot{S}_{in} \equiv S_{in} - \bar{S}_i$  (and similarly for all left hand side variables):

$$\dot{S}_{in} = \alpha + \ddot{\mathbf{A}}_{in} \boldsymbol{\beta} + \ddot{\mathbf{X}}_{in} \boldsymbol{\gamma} + \ddot{\varepsilon}_{in} \quad (12)$$

To answer the research question, one does not just need to estimate how well-being is affected by whether or not the activity in question is work-related (i.e. whether  $A_{1in} = 1$ ) but also whether the impact of an activity being work-related is affected by the type of job held by individual  $i$ . This can be tested by introducing interaction terms into equation (12). Let us assume that every individual in the data can hold one of  $K$  job types. This information can be represented by a set of dummy variables  $J_{1i}$  through to  $J_{Ki}$ , only one of which can be equal to 1 for any given  $i$ . We can then interact these job type dummies with whether or not the activity is work-related to generate the vector  $\mathbf{J}_{in} = (J_{1i}A_{1in}, J_{2i}A_{1in}, \dots, J_{(K-1)i}A_{1in})$ . This can be expressed in demeaned form such that  $\ddot{\mathbf{J}}_{in} = (J_{1i}\ddot{A}_{1in}, J_{2i}\ddot{A}_{1in}, \dots, J_{(K-1)i}\ddot{A}_{1in})$  and hence included as an additional term in the regression to be estimated.

$$\dot{S}_{in} = \alpha + \ddot{\mathbf{A}}_{in} \boldsymbol{\beta} + \ddot{\mathbf{X}}_{in} \boldsymbol{\gamma} + \ddot{\mathbf{J}}_{in} \boldsymbol{\delta} + \ddot{\varepsilon}_{in} \quad (13)$$

When  $S$  is specified as eudaimonic well-being (meaningfulness), the specification in equation (13) relates directly to the theory above. Where individual  $i$ 's  $n$ th activity is work-related, then  $\dot{S}_{in}$  can be interpreted as the additional meaningfulness that  $i$  gets from working over and above a baseline level of meaningfulness derived from non-work activities (that is  $\hat{E}_i - E_{ij}$  in the theoretical notation) conditional on the combination of activities undertaken during the day and other characteristics that

vary across activities. The vector of interaction terms  $\mathbf{j}_{in}$  can be used to test the hypothesis that  $\hat{E}_i - E_{ij}$  is significantly different for different values of  $j$ .

## Section 6: Results from US data

I first of all present some descriptive statistics to illustrate the distributions of the key variables in the regression analysis. Figure 1 shows the distributions of the six well-being outcome measures used in the analysis. The histogram shows that in nearly 40% of cases the activity was reported as being very meaningful (the highest possible score). Similar ceiling effects are observed for the other five well-being outcomes.

Table 1 shows the means and distributions of all activity-level variables used in the regression analysis. Just over 10% of activities reported by those in work (the sub-population used for this analysis) are coded as work-related, the fifth most common category after travelling (26%), socialising, relaxing and leisure (16%), household activities (15%) and eating and drinking (15%). Table 2 shows the distribution of individuals by sector, occupation and industry. Nearly two-thirds (63%) of individuals worked as an employee in the private for-profit sector, 18% worked in the government sector,<sup>11</sup> 11% were self-employed and 8% worked in the private non-profit sector.<sup>12</sup> Individuals were spread across all occupations, with management occupations (13%) and office and administrative support occupations (13%) the most common categories. The most common industries (not shown in the table) were health care and social services (15%) and educational services (11%).

Observing the raw mean well-being scores shown in Table 3 suggests that overall working is a moderately meaningful activity. It is considered more meaningful than consumer purchases, personal care, travelling, household activities, and socialising, relaxing and leisure. However, it scores less well on average than religious and spiritual activities, volunteer activities, caring for and

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<sup>11</sup> The government sector includes all public sector workers at the federal, state or local level.

<sup>12</sup> The private non-profit sector includes non-government organisations such as churches, unions, associations or foundations.

helping others both inside and outside the household, telephone calls, and sports, exercise and recreation.

Table 3 also shows how working compares to other activities on the five affect scales included in the survey (happy, in pain, sad, stressed and tired). Compared to some activities (e.g. caring for other household members, religious activities, volunteering and sport), working is both less meaningful and is associated with lower affect on all five measures. However, there are also activities where affect is higher but meaningfulness is lower than work-related activities (i.e. considered more pleasurable but less purposeful than working). These include household activities, consumer purchases and travelling. Socialising, relaxing and leisure is also associated with higher affect than working, except for tiredness where there is no significant difference. These findings are consistent with Dolan and Kudrna (2016), who use the same data (but only the 2010 sample) to show how different activities are associated with different average levels of 'pleasure' and 'purpose'.

Let us now turn to the regression results, applying the OLS fixed effects specification in equation (13). Recall that we are interested in assessing whether the type of job one has is related to the extent to which work is considered meaningful relative to the other activities one does during the day. Table 4 shows the results of interacting the work dummy with sector, where self-employment is the reference category. The results suggest that sector does make a difference to how much meaningfulness people attribute to their working lives. Those in the private for-profit sector report the lowest levels of meaningfulness while those in the private non-profit sector are most likely to find their work meaningful. This perhaps supports the hypothesis that working for an employer with social (mission-oriented) objectives can feel more meaningful than working for an employer with a primary objective of profit maximisation. Moreover, the finding that self-employed people experience significantly more meaningfulness than private sector (for-profit) employees (i.e. the private sector coefficient in Table 4 is negative and significant) perhaps supports the hypothesis that meaningfulness can be related to how much autonomy one has while at work. These differences are

not so stark when we look at the affect measures. In fact, non-profit workers report the highest relative stress levels at work which suggests that work can feel both meaningful and stressful at the same time.

Table 5 shows the same regression results but with work interacted with occupation. Again, we see some significant differences between occupations in how work is found to be meaningful. The occupation group with the highest coefficient for meaningfulness is community and social service occupations. Legal occupations, education, training and library occupations, and healthcare practitioner and technical occupations also score highly on this measure. Once again, this suggests that jobs with a perceived high social benefit are felt to be more meaningful. These occupations seem to share the characteristic of directly helping others with some important aspect of their lives (e.g. their health, education or legal concerns) within the context of a trusting relationship.

When compared to other activities, working in these occupations is still considered less meaningful than caring for one's own household members, engaging in sport or exercise and participating in religious activities. However, the results suggest that paid work in these occupations is at least on a par with volunteering (not shown in the tables).

In general, more highly skilled occupational groups report more meaningfulness at work than those at the lower end of the occupation spectrum. This may support the hypothesis that autonomy at work and the freedom to be authentic in how one carries out one's job also contribute to a sense of meaningfulness. However, a few lower ranked occupations do 'buck the trend'. For example, those working in personal care and service occupations as well as those in construction and extraction occupations experience more meaningfulness than those in business and financial occupations.

The results also suggest that there may be some 'trade-offs' between meaningfulness and affect. For example, despite being one of the most meaningful occupations, people in legal occupations are the least happy, most sad and most stressed while at work compared to all other occupations. Education

and health practitioners also have among the most stressful jobs. The same cannot be said for community and social service occupations, however. As well as being the most meaningful occupation, workers in this occupation are also the most happy and the least in pain while at work, while stress levels are moderate compared to other occupations. There are also some occupations which are low ranking in terms of both meaningfulness and affect, including protective service occupations, sales and related occupations and office and administrative support occupations.

A similar analysis (not shown in the tables) looks at the impact of industry on the meaningfulness of work. This presents a similar story to the analysis by occupation. The industries where workers report the highest level of meaningfulness while at work are: agriculture, forestry, fishing and hunting; professional and technical services; educational services; and health care and social services. Again, this sense of work being meaningful does not necessarily translate to higher levels of affect at work. Aside from finance and insurance, professional and technical services and educational services are the most stressful industries to work in. Moreover, people working in professional and technical services report being among the least happy while at work. However, workers in the agriculture, forestry, fishing and hunting industry are among the most happy and least stressed people while working, as well as finding the work meaningful.

Table 6 shows the results of interacting the work dummy with the logged hourly earnings of the individual. There is a positive coefficient between higher wages and higher meaningfulness at work which is on the margins of statistical significance. This suggests that higher pay (or other factors that go along with higher pay, such as greater responsibility or recognition) may help to make work more meaningful.<sup>13</sup> The results also show that more highly paid people experience more stress at work relative to the rest of their lives. This makes intuitive sense as one would expect higher earners to

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<sup>13</sup> It is possible that this result underestimates the true effect of wage on the meaningfulness of work. As discussed in footnote 5, income may affect the meaningfulness of non-work activities as well. If this is in a positive direction, then this reduces the positive difference (or increases the negative difference) between eudaimonic well-being at work  $E_{ij}$  and baseline eudaimonic well-being  $\hat{E}_i$ . However, under the assumption that consumption of material resources should affect hedonic well-being but not eudaimonic well-being, the model should fully identify the effect of wage on the meaningfulness of work.

have more responsibility in their job but also have the means to protect themselves from stressful situations outside of work.

The ATUS analysis also finds some notable differences between men and women (not tabulated), with respect to the jobs they find meaningful. When running the same regressions separately for males and females, it can be shown that both men and women report high meaningfulness from working in community and social service occupations, but men attribute higher meaningfulness to education, training and library occupations while women attribute higher meaningfulness to healthcare practitioner and technical occupations. Men working in healthcare practitioner and technical occupations enjoy similar levels of meaningfulness to men working in computer and mathematical science occupations and architecture and engineering occupations, while for women these latter two occupations are among the least meaningful. Even more starkly, legal occupations are also among the least meaningful occupations for women, but this is the highest ranked occupation for men. While these findings may indicate genuine gender differences, they may also reflect the tendency for men and women to cluster in different types of job within these broad occupational classifications.

## **Section 7: Results from UK data**

I also explore the research question using UK data from the APS, by analysing the association between responses to the ‘worthwhile’ question and the labour market attributes of individuals. However, the APS is cross-sectional in the sense that respondents report on their subjective well-being only once, so it is not possible to adopt a fixed effects method. To condition for inter-personal heterogeneity, we use a matching approach whereby each individual is given a propensity score for selecting into each job category and the inverse propensity scores are used to estimate a weighted average treatment effect (ATE) for each job category.<sup>14</sup> A subset of these ATEs is shown in Table 7.

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<sup>14</sup> A full description of the methodology for the APS analysis is available from the author on request. See Nikolova and Graham (2015) for an example of another paper that uses a matching method to estimate effects on well-being.

For robustness, the ATEs are weighted according to a restricted set of pre-treatment variables largely determined at birth (gender, age and ethnicity) and a wider set of pre-treatment variables that might also influence job selection (the birth pre-treatments plus disability, religion, region of residence and educational qualifications). The results show that being in work is associated with higher levels of worthwhileness relative to being out of work<sup>15</sup> as is being self-employed (relative to being an employee) and working in the public sector (relative to the private sector).

We also estimate ATEs for all top-level industry classifications and three-digit occupational classifications (not shown in the tables). Despite being based on a different dataset, different method and different conceptualisation of eudaimonic well-being, the results of this analysis are broadly consistent with the ATUS results. Education and health and social work are the sectors with the highest ATEs and most of the (particularly professional) occupations within these sectors (e.g. welfare professionals, therapy professionals, health professionals, teaching and educational professionals and nursing and midwifery professionals) are ranked highly in terms of size of ATE. These results again suggest that high skilled workers delivering tangible social impact through their work experience the highest levels of eudaimonic well-being. However, in contrast to the US results, legal professionals are estimated to have a negative ATE.

It is also interesting to note that people working in construction and agricultural trades experience relatively high eudaimonic well-being, a finding that is broadly replicated in both the US and UK data. This may be due to higher propensity for self-employment in these industries, which is found to be conducive to meaningful work. Otherwise, it is difficult to find a reason for this finding from the existing literature so this may be an area that warrants further research.

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<sup>15</sup> The exception is a negative association between worthwhileness (and the other three well-being outcomes) and being economically active, when weighted by the full set of pre-treatments. A possible explanation for this result is that unemployment has such a negative impact on well-being that it is better to remain outside the labour force than be economically active and risk being unemployed.

## Section 8: Discussion

The analysis presented in this paper is based on two very different datasets from different countries, using substantially different methodologies. Nevertheless some similar findings seem to be emerging.

Firstly, the results suggest that working does improve eudaimonic well-being. In the UK, people in work are significantly more likely to say that the things they do in life are worthwhile, while in the US, working is one of the more meaningful activities people do during the day despite being associated with relatively low affective well-being. However, the results from ATUS suggest that working is less meaningful than some other activities people do during the day.

Secondly, the extent to which one acquires eudaimonic well-being through work is highly dependent on the type of job one has. For a start, there is a clear vertical relationship between job role and eudaimonic well-being. In the US data, people in higher skilled occupations are more likely to ascribe meaningfulness to their work relative to their other daily activities. Similarly, in the UK, the majority of managerial occupations are associated with a positive treatment effect on overall sense of worthwhileness, while the effect is negative for the majority of medium to low skilled occupations. In both analyses, self-employment is also associated with higher worthwhileness or meaningfulness. This supports the hypothesis that autonomy at work, which in turn gives the jobholder freedom to work authentically and with integrity, is an important determinant of eudaimonic well-being. This also may explain why salary has a small positive effect on the meaningfulness one attributes to one's work.

However, the horizontal relationship between job role and eudaimonic well-being is arguably even more important. This is demonstrated by the fact that, in both analyses, there are certain occupations that 'buck the trend' insofar as they are relatively low skilled jobs but are associated with relatively high eudaimonic well-being. For example, in the APS data, childcare workers, care workers and hairdressers have significantly higher eudaimonic well-being than engineers or IT



professionals. Similarly, in the ATUS data, care workers find their work relatively more meaningful than business and financial professionals. This suggests that it is not just the level but also the nature of the work which makes it more meaningful. Specifically, jobs which can be described as directly helping or serving others seem to bestow more eudaimonic well-being on the jobholder. This supports the literature which finds a link between meaning at work and the extent to which the job allows one to fulfil altruistic preferences. It also possibly supports the hypothesis that activities that are an end in themselves feel more worthwhile than activities which are means to an end, or where the final 'good' is not seen by the jobholder.

With this in mind, it is no surprise that in both datasets the jobs that are associated with the most eudaimonic well-being are those that combine both professional autonomy and direct pro-social benefit. These include health professionals, therapists, nurses, midwives, teachers, lecturers and social workers. In the US data, lawyers also experience high meaningfulness at work although that is not reflected in the UK data. While some of these professions are also associated with higher hedonic or affective well-being, in other cases (for example legal professionals) people appear to experience relatively low hedonic well-being (e.g. high stress or low happiness) at the same time as high eudaimonic well-being, illustrating the co-existence of two very distinct aspects of well-being.

Before concluding, it is important to return to the question: does eudaimonic well-being matter? The survey questions about meaningfulness and worthwhileness in the ATUS and APS respectively presuppose that the respondents prefer to engage in activities that they find meaningful and worthwhile. Of course, this may not always be the case and the extent to which eudaimonic well-being matters may vary considerably between people. A person experiencing low levels of meaningfulness from his/her job may be no worse off than a person experiencing high meaningfulness if eudaimonic well-being is not an important contributor to his/her overall utility and this lack of meaningfulness is compensated by higher hedonic well-being.

As discussed in Section 2 above, the literature sheds some light on this question. Evidence from Benjamin et al. (2014), Adler et al. (2017) and Dolan et al. (2017) suggests that eudaimonic well-being is valued by people but possibly to a lesser extent than hedonic well-being. In the notation of equation (2), we might suppose that for a typical individual  $\theta$  is less than 0.5 but significantly greater than zero. It follows, therefore, that if eudaimonic well-being is important for utility and it is being experienced in different jobs to different degrees, then it has important implications for labour supply. Eudaimonic well-being (or lack thereof) may act as a significant motivator (de-motivator) for work effort and a significant influence on occupational choice, potentially driving down (up) wages in occupations delivering high (low) levels of eudaimonic well-being. In other words, the extent to which a given job offers the jobholder feelings of meaning and purpose is an important determinant of compensating wage differentials between occupations requiring similar skill levels.

## **Section 9: Conclusion**

This paper is the first to establish comprehensively an association between job type and eudaimonic well-being using two large quantitative datasets covering nationally representative populations. The findings in this paper suggest that the nature of one's work is an important determinant of one's level of eudaimonic well-being. In both the US and the UK, jobs that combine professional autonomy with having a direct social impact within the context of a trusting relationship are consistently found to be the most meaningful and worthwhile. This includes professionals working in health, social care and education. In the US, people in such jobs feel that their work time is particularly meaningful relative to their non-work activities, while in the UK, having this sort of job is a significant predictor of how worthwhile one's life is felt to be as a whole. Broadly, these findings are coherent with the existing literature that describes the types of work most conducive to eudaimonic well-being. However, in a few cases where eudaimonic well-being is found to be relatively high, namely in the construction and agricultural sectors, the literature does not seem to provide an adequate explanation. This provides scope for further research.

We might infer from these results that eudaimonic well-being is an important motivator for work effort, but that its strength as a motivator varies considerably across different careers. Assuming that eudaimonic well-being is an important component of utility, we would expect that the extent to which jobs offer meaning and purpose to the jobholder will be a significant determinant of equilibrium wages in different sectors.

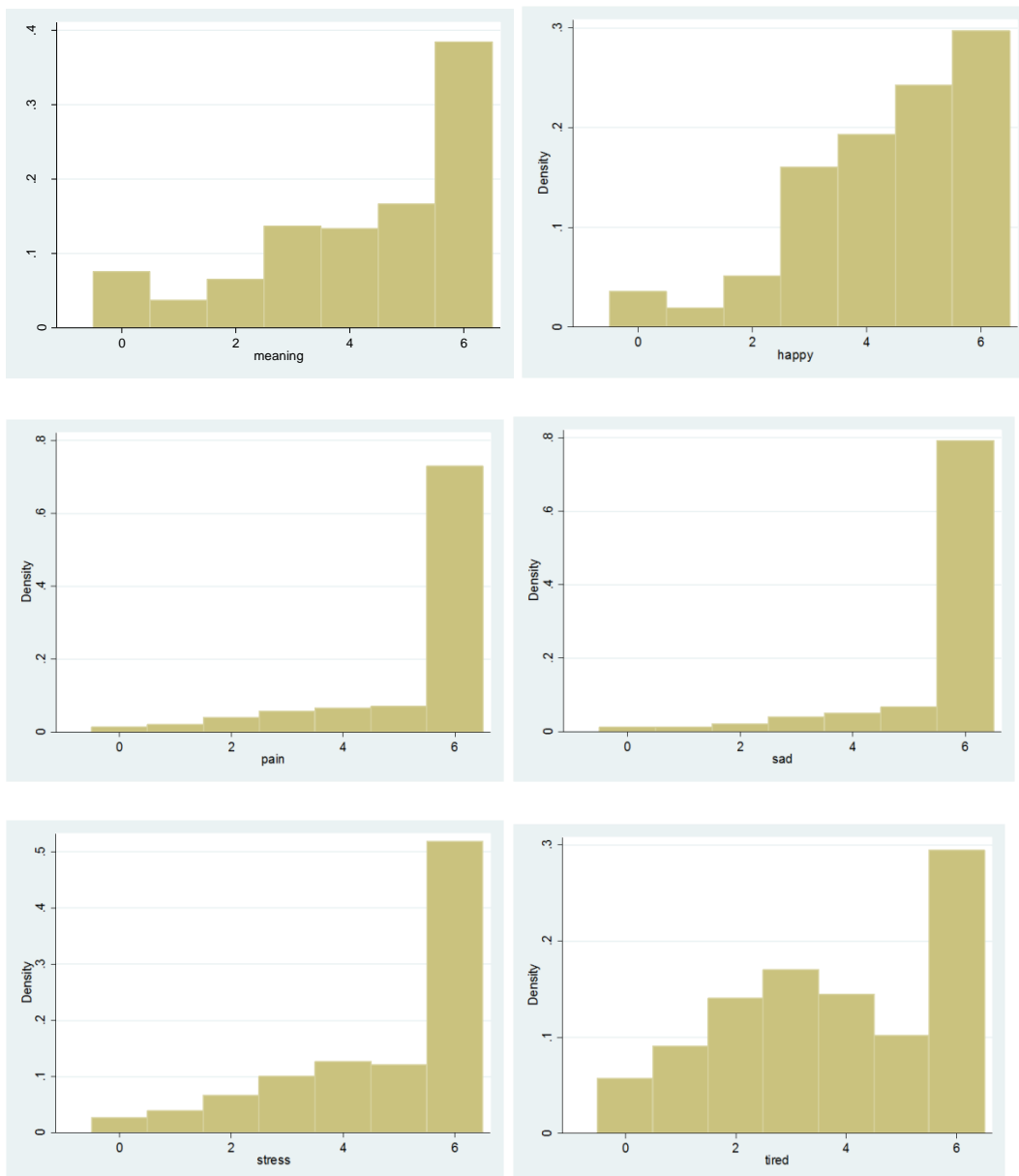
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Figure 1 – Reported well-being during activity on the six measures (meaningfulness, happiness, pain, sadness, stress and tiredness), where 0 is the lowest well-being and 6 is the highest well-being.



Sample is all activities for which well-being questions were asked, excluding individuals that did not report well-being for three activities or were not in work. Pooled data from 2010, 2012 and 2013. N=60,165. Source: American Time Use Survey (ATUS).

**Table 1 - Means and distributions of explanatory variables – activity-level variables (ATUS)**

|   | %    | N      |
|---|------|--------|
| Activity type:  |      |        |
| Personal care   | 0.2  | 141    |
| Household activities                                  | 15.4 | 9,248  |
| Caring for and helping household members              | 5.6  | 3,380  |
| Caring for and helping non-household members          | 0.9  | 558    |
| Working and work-related activities                   | 10.4 | 6,242  |
| Educational activities                                | 0.5  | 306    |
| Consumer purchases                                    | 4.1  | 2,488  |
| Professional and personal care services               | 0.5  | 285    |
| Household services                                    | 0.1  | 60     |
| Government services and civic obligations             | 0.0  | 18     |
| Eating and drinking                                   | 14.9 | 8,989  |
| Socialising, relaxing and leisure                     | 15.9 | 9,577  |
| Sports, exercise and recreation                       | 1.8  | 1,055  |
| Religious and spiritual activities                    | 0.9  | 564    |
| Volunteer activities                                  | 0.7  | 408    |
| Telephone calls                                       | 0.8  | 471    |
| Travelling  | 26.2 | 15,774 |
| Unknown   | 1.0  | 601    |
| Time of day:  |      |        |
| Morning (start time 04.00-11.59)                      | 35.3 | 21,243 |
| Afternoon (start time 12.00-17.59)                    | 38.9 | 23,411 |
| Evening (start time 18.00-23.59)                      | 25.0 | 15,016 |
| Night (start time 00.00-03.59)                        | 0.8  | 495    |
| Location:   |      |        |
| Home  | 44.8 | 26,936 |
| Workplace   | 11.4 | 6,848  |
| Travelling  | 25.8 | 15,514 |
| Other place   | 17.8 | 10,731 |
| Unspecified   | 0.2  | 136    |
| Whether looking after children as secondary activity: |      |        |
| Yes   | 23.3 | 14,003 |
| No  | 76.7 | 46,162 |
| Whether interacting with others at the time:          |      |        |
| Yes   | 60.0 | 36,101 |
| No  | 40.0 | 24,064 |
| Duration of activity in minutes (mean)                | 69   | 60,165 |
| Total number of activities                            |      | 60,165 |

**Table 2 - Means and distributions of explanatory variables – work-related variables (ATUS)**

|  | %       | N      |
|--|---------|--------|
| <b>Sector:</b>                                 |         |        |
| Government (federal, state or local)           | 17.9    | 3,590  |
| Private, for profit                            | 63.0    | 12,635 |
| Private, non-profit                            | 7.8     | 1,558  |
| Self-employed (incorporated or unincorporated) | 11.2    | 2,253  |
| Without pay                                    | 0.1     | 19     |
| <b>Occupation:</b>                             |         |        |
| Management                                     | 12.8    | 2,559  |
| Business and financial operations              | 5.2     | 1,040  |
| Computer and mathematical science              | 3.2     | 638    |
| Architecture and engineering                   | 2.3     | 451    |
| Life, physical and social science              | 1.1     | 217    |
| Community and social service                   | 2.2     | 441    |
| Legal  | 1.4     | 279    |
| Education, training and library                | 7.9     | 1,586  |
| Arts, design, entertainment, sports and media  | 2.2     | 433    |
| Healthcare practitioner and technical          | 6.1     | 1,223  |
| Healthcare support                             | 2.2     | 450    |
| Protective service                             | 2.2     | 434    |
| Food preparation and serving related           | 4.0     | 804    |
| Building and grounds cleaning and maintenance  | 3.6     | 728    |
| Personal care and service                      | 3.6     | 715    |
| Sales and related                              | 9.3     | 1,860  |
| Office and administrative support              | 12.6    | 2,529  |
| Farming, fishing and forestry                  | 0.8     | 154    |
| Construction and extraction                    | 4.2     | 836    |
| Installation, maintenance and repair           | 3.4     | 675    |
| Production                                     | 5.1     | 1,018  |
| Transportation and material moving             | 4.9     | 985    |
| Hourly earnings (mean)                         | \$16.78 | 9,746  |
| Total number of individuals                    |         | 20,055 |



**Table 3 – Mean well-being by activity type (0-6 scale) (ATUS)**

|  | Meaning     | Happy       | Pain        | Sad         | Stress      | Tired       |
|--|-------------|-------------|-------------|-------------|-------------|-------------|
| Working and work-related activities          | 4.42        | 3.96        | 5.12        | 5.32        | 3.78        | 3.61        |
| Personal care                                | <b>3.83</b> | <b>3.16</b> | <b>3.09</b> | <b>4.62</b> | 4.04        | <b>2.12</b> |
| Household activities                         | <b>4.13</b> | <b>4.15</b> | <b>5.18</b> | <b>5.48</b> | <b>4.78</b> | <b>3.73</b> |
| Caring for and helping household members     | <b>5.17</b> | <b>4.76</b> | <b>5.45</b> | <b>5.66</b> | <b>4.62</b> | <b>3.30</b> |
| Caring for and helping non-household members | <b>4.90</b> | <b>4.72</b> | <b>5.29</b> | 5.41        | <b>4.76</b> | 3.75        |
| Educational activities                       | 4.58        | <b>3.73</b> | <b>5.45</b> | 5.39        | <b>3.38</b> | <b>3.07</b> |
| Consumer purchases                           | <b>3.82</b> | <b>4.18</b> | <b>5.32</b> | <b>5.50</b> | <b>4.66</b> | <b>3.98</b> |
| Professional and personal care services      | 4.31        | 3.86        | <b>4.82</b> | <b>5.12</b> | <b>4.26</b> | <b>3.87</b> |
| Household services                           | 4.03        | 3.62        | 5.37        | 5.50        | <b>4.33</b> | 4.02        |
| Government services and civic obligations    | 4.50        | <b>3.17</b> | 5.28        | 5.78        | 4.06        | <b>4.61</b> |
| Eating and drinking                          | 4.46        | <b>4.61</b> | <b>5.33</b> | <b>5.55</b> | <b>4.93</b> | <b>3.88</b> |
| Socialising, relaxing and leisure            | <b>4.05</b> | <b>4.48</b> | <b>5.29</b> | <b>5.50</b> | <b>5.05</b> | 3.65        |
| Sports, exercise and recreation              | <b>5.03</b> | <b>4.85</b> | <b>4.93</b> | <b>5.70</b> | <b>5.19</b> | <b>3.94</b> |
| Religious and spiritual activities           | <b>5.66</b> | <b>5.04</b> | <b>5.51</b> | <b>5.43</b> | <b>5.34</b> | <b>4.49</b> |
| Volunteer activities                         | <b>5.16</b> | <b>4.79</b> | <b>5.35</b> | <b>5.74</b> | <b>4.68</b> | <b>4.11</b> |
| Telephone calls                              | <b>4.74</b> | <b>4.42</b> | 5.15        | 5.21        | <b>4.55</b> | 3.78        |
| Travelling                                   | <b>3.97</b> | <b>4.37</b> | <b>5.33</b> | <b>5.46</b> | <b>4.67</b> | <b>3.80</b> |
| Unknown                                      | 4.42        | <b>4.34</b> | <b>5.24</b> | <b>5.47</b> | <b>4.64</b> | 3.63        |

*Bold font denotes that the mean is significantly different to the mean of work and work-related activities, according to a pairwise mean test (95% confidence interval). Note that the scales for pain, sadness, stress and tiredness have been reversed and therefore a higher score denotes higher well-being.*

**Table 4 – OLS fixed effects regression results, by sector (ATUS)**

|                      | Meaning              | Happy                | Pain                 | Sad                  | Stress               | Tired                |
|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Work                 | 0.034<br>(0.097)     | -0.181**<br>(0.077)  | -0.016<br>(0.053)    | -0.014<br>(0.058)    | -0.285***<br>(0.080) | -0.024<br>(0.090)    |
| Work * Govt          | -0.096<br>(0.087)    | -0.102<br>(0.069)    | 0.007<br>(0.048)     | -0.106**<br>(0.052)  | -0.206***<br>(0.072) | -0.096<br>(0.081)    |
| Work * Profit        | -0.218***<br>(0.072) | -0.119**<br>(0.057)  | 0.006<br>(0.039)     | -0.089**<br>(0.043)  | -0.179***<br>(0.059) | -0.113*<br>(0.066)   |
| Work * Non-profit    | 0.102<br>(0.105)     | -0.024<br>(0.083)    | 0.008<br>(0.057)     | -0.066<br>(0.062)    | -0.266***<br>(0.087) | -0.030<br>(0.097)    |
| Personal care        | -0.038<br>(0.167)    | 0.064<br>(0.133)     | -0.493***<br>(0.091) | -0.013<br>(0.099)    | 0.099<br>(0.138)     | -0.573***<br>(0.155) |
| Household activities | -0.202***<br>(0.073) | -0.110*<br>(0.058)   | -0.051<br>(0.040)    | -0.028<br>(0.044)    | 0.013<br>(0.061)     | -0.012<br>(0.068)    |
| Caring own           | 0.609***<br>(0.078)  | 0.309***<br>(0.062)  | 0.045<br>(0.042)     | 0.036<br>(0.046)     | 0.008<br>(0.064)     | -0.097<br>(0.072)    |
| Caring other         | 0.125<br>(0.102)     | 0.096<br>(0.081)     | 0.009<br>(0.056)     | -0.054<br>(0.061)    | -0.053<br>(0.085)    | -0.134<br>(0.095)    |
| Education            | 0.387***<br>(0.123)  | -0.478***<br>(0.098) | -0.086<br>(0.067)    | -0.088<br>(0.073)    | -1.223***<br>(0.102) | -0.344***<br>(0.114) |
| Shopping             | -0.705***<br>(0.080) | -0.256***<br>(0.063) | -0.000<br>(0.044)    | 0.001<br>(0.048)     | -0.171***<br>(0.066) | -0.053<br>(0.074)    |
| Personal services    | -0.437***<br>(0.124) | -0.404***<br>(0.098) | -0.156**<br>(0.068)  | -0.109<br>(0.074)    | -0.260**<br>(0.103)  | -0.119<br>(0.115)    |
| Household services   | -0.463**<br>(0.226)  | -0.656***<br>(0.180) | 0.010<br>(0.124)     | -0.129<br>(0.135)    | -0.309<br>(0.188)    | 0.097<br>(0.210)     |
| Govt services        | -0.094<br>(0.409)    | -0.855***<br>(0.325) | -0.134<br>(0.223)    | 0.540**<br>(0.244)   | -0.788**<br>(0.340)  | 0.899**<br>(0.379)   |
| Eating               | 0.077<br>(0.073)     | 0.268***<br>(0.058)  | 0.064<br>(0.040)     | 0.042<br>(0.043)     | 0.167***<br>(0.061)  | 0.116*<br>(0.068)    |
| Leisure              | -0.271***<br>(0.073) | 0.177***<br>(0.058)  | 0.060<br>(0.040)     | 0.009<br>(0.043)     | 0.254***<br>(0.060)  | -0.044<br>(0.068)    |
| Sport                | 0.616***<br>(0.088)  | 0.364***<br>(0.070)  | -0.572***<br>(0.048) | 0.125**<br>(0.053)   | 0.202***<br>(0.073)  | -0.179**<br>(0.082)  |
| Religion             | 0.574***<br>(0.102)  | 0.244***<br>(0.081)  | 0.071<br>(0.056)     | -0.085<br>(0.061)    | 0.340***<br>(0.084)  | 0.089<br>(0.094)     |
| Volunteer            | 0.285**<br>(0.112)   | 0.217**<br>(0.089)   | -0.040<br>(0.061)    | 0.107<br>(0.067)     | -0.130<br>(0.093)    | 0.133<br>(0.104)     |
| Telephone            | 0.288***<br>(0.106)  | 0.061<br>(0.084)     | 0.064<br>(0.058)     | -0.176***<br>(0.063) | -0.080<br>(0.088)    | 0.093<br>(0.098)     |
| Travel               | -0.386***<br>(0.085) | 0.005<br>(0.067)     | -0.045<br>(0.046)    | -0.018<br>(0.050)    | -0.075<br>(0.070)    | 0.022<br>(0.079)     |

|                            | Meaning             | Happy                | Pain                 | Sad                  | Stress               | Tired                |
|----------------------------|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Duration                   | 0.001***<br>(0.000) | 0.000***<br>(0.000)  | -0.000***<br>(0.000) | -0.000***<br>(0.000) | -0.001***<br>(0.000) | -0.000***<br>(0.000) |
| Morning                    | -0.028<br>(0.081)   | -0.149**<br>(0.064)  | 0.113**<br>(0.044)   | -0.011<br>(0.048)    | -0.041<br>(0.067)    | 1.266***<br>(0.075)  |
| Afternoon                  | -0.139*<br>(0.081)  | -0.168***<br>(0.064) | 0.076*<br>(0.044)    | 0.005<br>(0.048)     | -0.003<br>(0.067)    | 0.990***<br>(0.075)  |
| Evening                    | -0.167**<br>(0.081) | -0.185***<br>(0.064) | 0.033<br>(0.044)     | 0.009<br>(0.048)     | 0.163**<br>(0.067)   | 0.408***<br>(0.075)  |
| Secondary<br>childcare     | 0.333***<br>(0.032) | 0.219***<br>(0.025)  | 0.010<br>(0.017)     | 0.037*<br>(0.019)    | 0.037<br>(0.026)     | -0.012<br>(0.030)    |
| Home                       | 0.159<br>(0.147)    | 0.017<br>(0.117)     | -0.043<br>(0.081)    | 0.149*<br>(0.088)    | -0.100<br>(0.122)    | -0.374***<br>(0.137) |
| Workplace                  | 0.084<br>(0.151)    | -0.107<br>(0.120)    | -0.088<br>(0.082)    | 0.107<br>(0.090)     | -0.446***<br>(0.125) | -0.038<br>(0.140)    |
| Travelling                 | 0.316**<br>(0.157)  | 0.167<br>(0.125)     | 0.018<br>(0.086)     | 0.129<br>(0.094)     | -0.104<br>(0.130)    | -0.180<br>(0.146)    |
| Other place                | 0.456***<br>(0.148) | 0.217*<br>(0.117)    | -0.016<br>(0.081)    | 0.132<br>(0.088)     | -0.022<br>(0.122)    | 0.005<br>(0.137)     |
| Interacting<br>with others | 0.499***<br>(0.017) | 0.265***<br>(0.014)  | 0.006<br>(0.009)     | 0.047***<br>(0.010)  | -0.015<br>(0.014)    | 0.090***<br>(0.016)  |
| Constant                   | 3.845***<br>(0.181) | 4.199***<br>(0.144)  | 5.245***<br>(0.099)  | 5.333***<br>(0.108)  | 4.857***<br>(0.151)  | 3.015***<br>(0.168)  |
| $R^2$                      | 0.09                | 0.05                 | 0.02                 | 0.01                 | 0.08                 | 0.08                 |
| $N$                        | 60,108              | 60,108               | 60,108               | 60,108               | 60,108               | 60,108               |

Omitted variables: Work \* Self-employed; Unknown activity; Night; Unspecified location.

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ . Standard errors in brackets.

**Table 5 – OLS fixed effects regression results, by occupation**

|                          | Meaning              | Happy                | Pain                | Sad                 | Stress               | Tired               |
|--------------------------|----------------------|----------------------|---------------------|---------------------|----------------------|---------------------|
| Work                     | -0.362***<br>(0.122) | -0.174*<br>(0.097)   | -0.115*<br>(0.067)  | -0.159**<br>(0.073) | -0.076<br>(0.101)    | -0.123<br>(0.113)   |
| Work *<br>Management     | 0.279**<br>(0.114)   | -0.058<br>(0.091)    | 0.146**<br>(0.063)  | 0.114*<br>(0.068)   | -0.479***<br>(0.095) | 0.070<br>(0.106)    |
| Work *<br>Business       | 0.164<br>(0.139)     | -0.226**<br>(0.110)  | 0.137*<br>(0.076)   | 0.062<br>(0.083)    | -0.551***<br>(0.115) | 0.076<br>(0.129)    |
| Work *<br>Computer       | 0.320**<br>(0.162)   | -0.298**<br>(0.129)  | 0.178**<br>(0.088)  | 0.090<br>(0.096)    | -0.636***<br>(0.134) | 0.126<br>(0.150)    |
| Work *<br>Architecture   | 0.382**<br>(0.186)   | 0.058<br>(0.148)     | 0.206**<br>(0.102)  | 0.062<br>(0.111)    | -0.434***<br>(0.154) | 0.152<br>(0.173)    |
| Work * Life<br>science   | 0.341<br>(0.252)     | -0.214<br>(0.200)    | 0.122<br>(0.138)    | 0.183<br>(0.150)    | -0.459**<br>(0.209)  | 0.023<br>(0.234)    |
| Work *<br>Community      | 0.740***<br>(0.182)  | 0.180<br>(0.145)     | 0.284***<br>(0.100) | 0.017<br>(0.109)    | -0.271*<br>(0.151)   | 0.203<br>(0.169)    |
| Work * Legal             | 0.618***<br>(0.212)  | -0.562***<br>(0.169) | 0.189<br>(0.116)    | -0.249**<br>(0.127) | -0.967***<br>(0.176) | -0.082<br>(0.197)   |
| Work *<br>Education      | 0.665***<br>(0.131)  | -0.177*<br>(0.104)   | 0.168**<br>(0.071)  | 0.089<br>(0.078)    | -0.625***<br>(0.108) | 0.004<br>(0.121)    |
| Work * Arts              | 0.465***<br>(0.173)  | 0.023<br>(0.137)     | 0.062<br>(0.094)    | 0.109<br>(0.103)    | -0.235<br>(0.143)    | 0.035<br>(0.160)    |
| Work *<br>Healthcare     | 0.617***<br>(0.138)  | -0.087<br>(0.110)    | 0.147*<br>(0.076)   | 0.092<br>(0.082)    | -0.653***<br>(0.115) | 0.109<br>(0.128)    |
| Work * Health<br>support | 0.266***<br>(0.179)  | -0.042<br>(0.142)    | 0.024<br>(0.098)    | 0.093<br>(0.107)    | -0.370**<br>(0.149)  | -0.116<br>(0.166)   |
| Work *<br>Protective     | 0.109<br>(0.177)     | -0.310**<br>(0.140)  | 0.146<br>(0.097)    | -0.017<br>(0.105)   | -0.460***<br>(0.146) | 0.104<br>(0.164)    |
| Work * Food              | 0.220<br>(0.154)     | -0.096<br>(0.122)    | -0.007<br>(0.084)   | 0.198**<br>(0.092)  | -0.320**<br>(0.127)  | 0.023<br>(0.143)    |
| Work *<br>Cleaning       | 0.153<br>(0.163)     | 0.086<br>(0.130)     | -0.126<br>(0.089)   | 0.058<br>(0.097)    | 0.192<br>(0.135)     | -0.322**<br>(0.151) |
| Work * Care              | 0.279*<br>(0.160)    | 0.040<br>(0.128)     | 0.161*<br>(0.088)   | 0.248***<br>(0.096) | -0.025<br>(0.133)    | 0.152<br>(0.149)    |
| Work * Sales             | 0.121                | -0.227**             | 0.060               | 0.071               | -0.360***            | 0.035               |

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|                     | Meaning | Happy   | Pain    | Sad     | Stress    | Tired   |
|---------------------|---------|---------|---------|---------|-----------|---------|
|                     | (0.121) | (0.096) | (0.066) | (0.072) | (0.100)   | (0.112) |
| Work * Office       | 0.013   | -0.030  | 0.101   | 0.034   | -0.391*** | 0.034   |
|                     | (0.119) | (0.095) | (0.065) | (0.071) | (0.099)   | (0.111) |
| Work * Farming      | 0.177   | -0.025  | -0.055  | 0.017   | -0.129    | -0.136  |
|                     | (0.244) | (0.194) | (0.133) | (0.145) | (0.202)   | (0.226) |
| Work * Construction | 0.240*  | 0.049   | 0.033   | 0.198** | 0.013     | -0.145  |
|                     | (0.145) | (0.115) | (0.079) | (0.086) | (0.120)   | (0.134) |
| Work * Installation | 0.085   | -0.151  | 0.086   | -0.078  | -0.296**  | -0.052  |
|                     | (0.152) | (0.121) | (0.083) | (0.090) | (0.126)   | (0.141) |
| Work * production   | 0.028   | -0.110  | 0.088   | -0.024  | -0.274**  | -0.188  |
|                     | (0.136) | (0.108) | (0.074) | (0.081) | (0.113)   | (0.126) |
| $R^2$               | 0.09    | 0.05    | 0.02    | 0.01    | 0.08      | 0.08    |
| $N$                 | 60,165  | 60,165  | 60,165  | 60,165  | 60,165    | 60,165  |

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*Omitted variable: Work \* Transportation. \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ . Standard errors in brackets. The same set of control variables are used as in Table 4 above but the coefficients pertaining to these covariants are not shown.*

**Table 6 – OLS fixed effects regression results, by hourly earnings (ATUS)**

|                    | Meaning             | Happy             | Pain               | Sad               | Stress               | Tired              |
|--------------------|---------------------|-------------------|--------------------|-------------------|----------------------|--------------------|
| Work               | -0.999**<br>(0.509) | 0.045<br>(0.417)  | -0.504*<br>(0.291) | 0.119<br>(0.319)  | 1.361***<br>(0.423)  | -0.855*<br>(0.480) |
| Work * Log<br>wage | 0.107<br>(0.068)    | -0.028<br>(0.055) | 0.062<br>(0.039)   | -0.029<br>(0.042) | -0.225***<br>(0.056) | 0.102<br>(0.064)   |
| $R^2$              | 0.07                | 0.05              | 0.02               | 0.01              | 0.07                 | 0.07               |
| $N$                | 29,229              | 29,229            | 29,229             | 29,229            | 29,229               | 29,229             |

\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ . Standard errors in brackets. The same set of control variables are used as in Table 4 above but the coefficients pertaining to these covariants are not shown.

**Table 7 – Weighted least squares regression results (APS)**

| Pre-treatment weights: | Birth pre-treatments only |                     |                     |                     | All pre-treatments  |                      |                      |                      |
|------------------------|---------------------------|---------------------|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|
| Dependent variable     | Worthwhile                | Satisfied           | Happy               | Anxious             | Worthwhile          | Satisfied            | Happy                | Anxious              |
| Whether working        | 0.585***<br>(0.005)       | 0.692***<br>(0.005) | 0.487***<br>(0.006) | 0.517***<br>(0.008) | 0.187***<br>(0.005) | 0.224***<br>(0.005)  | 0.032***<br>(0.006)  | 0.046***<br>(0.008)  |
| Whether active         | 0.476***<br>(0.005)       | 0.529***<br>(0.005) | 0.429***<br>(0.006) | 0.484***<br>(0.008) | -0.005<br>(0.005)   | -0.028***<br>(0.005) | -0.103***<br>(0.006) | -0.089***<br>(0.008) |
| Whether self-employed  | 0.130***<br>(0.005)       | 0.022***<br>(0.005) | 0.101***<br>(0.006) | -0.007<br>(0.009)   | 0.149***<br>(0.005) | 0.034***<br>(0.005)  | 0.109***<br>(0.006)  | 0.017*<br>(0.009)    |
| Whether public sector  | 0.212***<br>(0.005)       | 0.056***<br>(0.006) | 0.073***<br>(0.007) | -0.011<br>(0.010)   | 0.148***<br>(0.005) | 0.016***<br>(0.006)  | 0.039***<br>(0.007)  | -0.003<br>(0.010)    |

*Each cell represents a separate regression and shows the coefficient and associated standard error pertaining to the explanatory variable of interest in the WLS regression. Other covariates not shown are whether full time, whether permanent, whether new job and log net weekly earnings. The Working and Active regressions do not include any covariates and the Self-employed regression only includes whether full time and whether new job; \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ . Standard errors in brackets.*