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Non-standard work: what's it worth? Comparing alternative measures of workers' marginal willingness to pay

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Non-technical summary

A job is about much more than earning a wage. Jobs differ widely in characteristics such as the type of work they involve, the number of hours required, the timing of shifts and the amount of flexibility. The objective of this paper is to estimate how workers trade off some these characteristics for earnings, which is to say estimate their implicit price. If labour markets were perfectly competitive, we should observe higher wages for jobs with undesirable characteristics and lower for jobs with good characteristics. These compensating differentials could be estimated, in principle, from wage regressions, and used to infer how much workers are willing to pay in order to avoid (or to gain) a particular characteristic: their marginal willingness to pay (MWP). In practice, however, labour markets may deviate from the competitive ideal, posing substantial challenges to this approach. As a result, two alternative methods have become increasingly popular. The first, based on revealed preference, looks at job transitions to see whether workers leave bad jobs at a faster rate than good jobs. The second method, based on workers' assessments of their well-being, compares reported well-being in good and bad jobs.

In this paper we compare these two methods in estimating the MWP for non-standard work arrangements in the British labour market. We relate differences in the results to the distinct conceptual basis of each measure. Performing further tests, we conclude that our findings are consistent with a recent literature arguing that people trade off their well-being against other objectives when making choices. Thus the value (MWP) of non-standard work expressed through job choices is different from its value in terms of subjective well-being, and this distinction should be explicitly recognised when presenting MWP estimates.

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Abstract

We compare two alternative ways of measuring workers' marginal willingness to pay (MWP) for four non-standard working arrangements: flexitime, part-time, night work, and rotating shifts. The first method is based on job-to-job transitions within a job search framework, while the second is based on estimating the determinants of subjective well-being. Using BHPS panel data from 1991-2008, we relate differences in the results to conceptual differences between utility and subjective wellbeing proposed recently in the happiness literature. We conclude that there is not a single representation of MWP: utility trade-offs (revealed by choices) need not be the same as wellbeing trade-offs; and we find evidence that subjective wellbeing is traded off against other goods that provide utility. Overall, we find that workers care particularly about their number of weekly hours.

JEL classification : J28, J30, J32, J60

Keywords : Willingness to Pay, Non-standard work, Job Satisfaction, Subjective Well-Being, Job Duration

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Introduction

A job is about much more than earning a wage. Jobs differ widely in characteristics such as the type of work they involve, the number of hours required, the timing of shifts and the amount of flexibility. In a competitive labour market, compensating wage differentials should arise that equalise workers' utility across jobs - so that wages are higher for jobs with undesirable characteristics and lower for jobs with good characteristics (Rosen, 1987). In principle, compensating differentials estimated from hedonic wage regressions can then be used to infer how much workers are willing to pay in order to avoid (or to gain) a particular characteristic: their marginal willingness to pay (MWP). In practice, there are substantial challenges to identifying hedonic equations because workers and firms are matched endogenously (Lang and Kahn, 1990), there may be unobserved confounding factors such as individual ability, and labour markets may deviate from the competitive ideal (Hwang et al., 1998). As a result, two alternative methods have become increasingly popular. The first, based on revealed preference, looks at job transitions to see whether workers leave bad jobs at a faster rate than good jobs. The second method, based on workers' assessments of their well-being, compares reported well-being in good and bad jobs.

In this paper we compare these two methods in estimating the MWP for non-standard work arrangements in the British labour market. We relate differences in the results to the distinct conceptual basis of each measure. Performing further tests, we conclude that our findings are consistent with a recent literature arguing that people trade off their well-being against other objectives when making choices. Thus the value (MWP) of non-standard work expressed through job choices is different from its value in terms of subjective well-being, and this distinction should be explicitly recognised when presenting MWP estimates.

Our work makes several contributions. Methodologically it is the first rigorous comparison of the two alternative MWP measures, estimated using the same sample of individuals and applying the most recent techniques from the applied literature (thus our results are informative of the likely differences in MWP estimates that researchers may find in practice). In addition we link differences in the two measures to conceptual differences between utility and subjective wellbeing that have been validated in recent experimental studies. We thereby contribute to the debate about the measurability of utility and the empirical value of indicators of subjective well-being. An implication of the new literature on utility and subjective wellbeing is that there is not a single representation of MWP: utility trade-offs (revealed by choices) need not be the same as wellbeing trade-offs . We find, for example, that a part-time job would deliver the same amount of job satisfaction as a full-time

job even if workers had to sacrifice most or all of their income; however workers tend to quit part-time jobs with earnings that are substantially less than pro-rata. This indicates that earnings matter to part-time employees (as revealed by their quitting behaviour) over and above their level of job satisfaction. We similarly find some evidence that workers require a smaller premium to compensate them for the dissatisfaction of working at night than is required to stop them from quitting night work. Overall, we provide new evidence about workers' preferences over the amount and timing of the work they do, suggesting that workers care particularly about their number of weekly hours and about night shifts.

The paper is structured as follows. Section 1 presents the background of the paper, providing a brief introduction for the two methodologies. Section 2 introduces non standard working arrangements, the data we use for the empirical analysis, and presents some descriptive statistics. Sections 3 and 4 present, respectively, the revealed preferences approach and the SWB approach, describing the respective theoretical frameworks and estimation approaches. Results are also presented. A possible explanation for our different findings is discussed in Section 5. Section 6 concludes.

1 Background

The work of Rosen (1974) laid the foundations for the study of hedonic markets, in which the prices of differentiated products reflect the characteristics embodied in those products. Applying these ideas to labour markets, Rosen (1987) showed that in a perfectly competitive setting with many firms and workers, each job characteristic is priced in an implicit market. In such an environment workers choose their job, defined as a wage and a set of characteristics, by maximizing their utility subject to the constraint of the hedonic wage curve. In equilibrium, differences in the wages of otherwise homogeneous workers can be interpreted as equalizing differences that compensate workers (at the margin) for accepting specific undesirable job characteristics (or "penalise" them for enjoying desirable characteristics). Since Rosen's early work many researchers have attempted to measure these compensating differentials using hedonic wage equations. However, it has proved remarkably difficult to find compensating differentials that are consistent with reasonable expectations about workers' MWP: estimates are often insignificant, or of unexpected sign. A common explanation is that more productive workers select into jobs with better characteristics, thus biasing estimates of wage differentials towards zero, but even studies that control for unobserved productivity using individual fixed effects often fail to find plausible compensating differentials (Brown, 1980). More generally, identification of wage differentials from hedonic equations is a challenge owing to the endogenous matching of

workers and firms (Lang and Kahn, 1990).[1]

Compensating differentials may also be difficult to find in the real world if labour markets are not be perfectly competitive. The theory of compensating differentials assumes a frictionless labour market in which workers have full information about available jobs and can move costlessly - to prevent a worker quitting a job, any disamenity must be fully compensated by a higher wage. But in a labour market with search frictions or costly mobility, wages will not necessarily compensate for job disamenities (Hwang et al., 1998; Lang and Majumdar, 2004). Job quality may vary among identical workers, with "good" jobs paying both higher wages *and* having better characteristics. Thus hedonic prices in a frictional labour market may diverge from workers' MWP.

Given the difficulties of measuring MWP using hedonic wage regressions, two alternative methods have become popular. The first, developed by Gronberg and Reed (1994), is explicitly embedded in an environment of incomplete information and search frictions. The idea behind their approach is that the utility trade-off between wage and other job attributes influences job durations: workers will stay longer in jobs with higher wages and good attributes. Job separations in such a framework are then informative about workers' preferences for wage and job attributes. Gronberg and Reed estimate workers' MWP for various job attributes applying duration analysis to job spell data from the National Longitudinal Survey Youth Cohort. The same approach is followed by others, including Van Ommeren et al. (2000), who demonstrate the validity of this approach even in the case of a more general characterization of the search environment with respect to the one adopted by Gronberg and Reed (1994), and estimate workers' MWP for commuting using Dutch panel data.

The second method of measuring MWP is based on the idea that if we were able to observe workers' utility on the job, then we could directly estimate the effects of wages and job attributes. In the absence of measures of utility, researchers have turned to data on self-reported subjective wellbeing (SWB) as a proxy for utility. This has led to a stream of research in areas ranging from health to labour economics that uses the so-called income compensation methodology to value non-financial goods in terms of the amount of income required to hold SWB (utility) constant [2]. The appealing simplicity of this approach comes at the cost of strong assumptions about the relationship between utility and SWB indicators, which we discuss in detail in section 5. Nevertheless, following the SWB approach,

[1] Rosen (1974, 1987) stressed that wage differentials only identify the preferences of those agents who are on the margin of choice. For instance most workers in clean jobs would require more than the equilibrium wage differential to work in a dirty job (this is why they chose a clean job) and vice versa. So the wage differential will not generally equal average MWP. Only if workers have identical preferences will the wage differential equal MWP.

[2] See Dolan et al. (2011) for a survey.

workers' MWP for job amenities can be estimated from an equation to explain SWB as a function of the wage, job amenities and other controls.

The measure of SWB that we focus on is job satisfaction. Hamermesh (1977) pioneered its use as an economic variable and many other studies have since shown that job satisfaction is a predictor of job quits (see among others Freeman 1978; Clark 2001; Lévy-Garboua et al. 2007; Green 2010). While many economists are still sceptical that job satisfaction, and SWB more in general, can be taken as a proxy for utility, Hamermesh (2001) concludes that even given the limitations outlined by many authors, job satisfaction might still be regarded as a key indicator of how workers perceive their job as a whole in relationship to different opportunities in the labour market.

We estimate workers' MWP for non-standard working arrangements in Britain using both the job search approach and the SWB method. In both cases we use the most recent techniques from the applied literature - thus our results are informative of the likely differences in MWP estimates that researchers may find in practice. Estimates under the job search approach are obtained using mixed proportional hazard models with exponential parametrizations and allowing for unobserved heterogeneity. Estimates following the SWB approach are obtained using job satisfaction equations allowing for individual fixed effects. Based on the observed differences in the results, we explore theoretically the differences between the two approaches building on recent contributions to the life satisfaction literature.

2 Non standard work and the British Household Panel Survey

Standard work is generally identified with the traditional "9-to-5" five days workweek. However, alternative working schedules are widespread in modern labour markets. Differences between standard and non-standard workers emerge not only with respect to total amount of hours spent at the workplace, but even in respect of the time of the day people usually work. Moreover, new types of working agreements allowing for higher schedule flexibility, like flexitime, are increasingly available.

We focus on the following dimensions of non-standard work: short or long hours, working at night, rotating shifts, and flexible work. In order to capture variability in the total amount of hours spent at work, we define a set of dummies which identify jobs characterized by, respectively, 1-15, 16-30, 31-48, and more than 49 weekly hours. We adopt this classification rather than one dummy variable for part-time because part-timers do not

constitute an homogeneous category in terms hours worked. Indeed, while the definition of part-time work is generally based on the 30 hours threshold, individuals are likely to have different preferences for, say, working up to 15 hours and between 16 and 30 hours. Focusing on the time of the day people actually work, we identify three categories: people working during the daytime, at night, and in rotating shifts. Finally we identify those jobs characterized by flexible arrangements, defining a dummy for flexitime contracts - the most common type of flexible agreement - and a dummy for the residual categories (annualised hours, term time only, job share, nine day fortnight, 4 1/2 day week, zero hours contract).

Working fewer hours is generally associated with an increased work-life balance, while the opposite holds true for working schedules which entail long hours. A similar argument can be made regarding flexible agreements. They are designed to give workers more control over the working schedule by allowing them to "fine-tune" the time they spend on the job with respect to their out-of-work life. In contrast, night shifts and rotating shifts are likely to be perceived by workers as "bad" working conditions. Indeed, working at night, or being subject to rotating shifts, may adversely affect the work-life balance of workers given the low level of flexibility they allow for.

Our empirical analysis is carried out using data from British Household Panel Survey (BHPS), a nationally representative longitudinal study run between 1991 and 2008. The original BHPS sample covers roughly 10,000 individuals in 5,500 households in Great Britain. The information collected within the survey spans a variety of topics both at the household and individual level, including household composition, individual socio-demographic characteristics, employment status and history, values, health, time use, and satisfaction.

The richness of details about individuals' job makes the BHPS a perfect source of information for the task of this analysis. Specifically, every year individuals are asked to report a variety of characteristics of their current job, including start/end date, monthly earnings, number of hours worked, times of day individuals usually work, particular flexible agreements (from interview wave 9), overall level of job satisfaction, and satisfaction with specific job facets - pay, hours of work, security, promotions prospects, relations with supervisor, use of own initiative.

Importantly, BHPS data contains information about the start and finish dates of job spells, including short-duration jobs held between interview waves. In addition we know the reason that every job spell ended, allowing us to disentangle voluntary job quits from separations which happened for other reasons. To obtain a consistent dataset of individual job spells, we used a revised and updated version of the code developed by Mare (2006), which deals with issues of recall bias and overlapping dates (see also Halpin, 1997). We are

not able to include very short spells (occurring between two waves) in the analysis because there is insufficient information about their characteristics (including, specifically, most dimensions of non-standard work). After having obtained a dataset containing consistent work histories, we include in our estimation sample job spells of individuals aged 16-65 who: i) are in paid employment ii) are not in full-time education or further education; iii) are not self-employed; iv) have no missing values in any of the the relevant characteristics. We end up with a sample of 5,130 individuals in 12,330 spells. However when we focus of flexitime and other flexible agreements we are constrained to use only the last nine waves of the BHPS in which the relevant information was collected (3,384 individuals in 6,184 spells).

Descriptive statistics for the full set of variables we use in our models are presented in table 1. Average log monthly earnings are approximately £1,340. While the majority of workers in our sample (64%) is characterized by the "traditional" working schedule of approximately 40 hours per week, the fraction of individuals working short and long hours is far from negligible. 1-15 hours schedules are present in the 5% of our sample, "standard" part-time (16-30 hours) and long hours (31-48 hours) are present in, respectively, the 15% and the 16% of cases. The 9% of individuals has jobs which entail working at night, while the rotating shifts characterize the 7% of the sample. Flexitime is the most spread form of flexible arrangements, 15%[3]. Overall job satisfaction is derived from individuals' answers to the following question: *"All things considered, how satisfied or dissatisfied are you with your present job overall?"*. It is measured on a Likert-type scale ranging from 1, "not satisfied at all", to 7, "completely satisfied", and exhibits a sample mean equal to 5.36.

Table 2 shows the distribution in our sample of the reason why the job spell was terminated which allows to disentangle voluntary job to job transitions ("left for better job") from separations which happened for other reasons (all the remaining categories). It is worth noting that voluntary job quits are the most frequent type of separation in the data, account for the 25% of them.

[3]The fraction is calculated on the 9-18 waves sample.

Table 1: Descriptive statistics

VARIABLES	**Mean**	**Std. Dev.**	**Min**	**Max**
Log of real monthly earnings	7.19	0.71	2,81	8,93
Hours: 1-15	0.05	0.22	0	1
Hours: 16-30	0.15	0.35	0	1
Hours: 31-48	0.64	0.48	0	1
Hours: 49+	0.16	0.37	0	1
Night shifts	0.09	0.28	0	1
Rotating shifts	0.07	0.26	0	1
Flexitime*	0.15	0.36	0	1
Other flexible agreements*	0.03	0.18	0	1
Female	0.50	0.50	0	1
Pre-school children	0.11	0.31	0	1
Age	38.26	11.78	16	65
Never married	0.30	0.46	0	1
Married	0.59	0.49	0	1
Separated	0.10	0.30	0	1
Widowed	0.01	0.11	0	1
Education: primary\lower secondary	0.16	0.37	0	1
Education: upper secondary	0.46	0.50	0	1
Education: higher education	0.38	0.49	0	1
Occup.: large employers & higher management	0.04	0.20	0	1
Occup.: higher professional	0.07	0.26	0	1
Occup.: lower management & professional	0.29	0.45	0	1
Occup.: intermediate	0.19	0.39	0	1
Occup.: lower supervisory & technical	0.12	0.33	0	1
Occup.: semi-routine	0.16	0.37	0	1
Occup.: routine	0.13	0.33	0	1
Firm size: <25	0.34	0.47	0	1
Firm size: 25-99	0.25	0.43	0	1
Firm size: 100-499	0.24	0.43	0	1
Firm size: >499	0.17	0.38	0	1
Union recognition at the workplace	0.49	0.50	0	1
Job satisfaction: overall	5.36	1.30	1	7
Observations	33,959			

Notes: Regional (20), Industry (9), and Wave (18) dummies are excluded for brevity. *Statistics for Flexitime and Other flexible arrangements are to waves 7-18 (16,092 observations)

Table 2: Reason for leaving the current job

Reason for leaving the job	N. of ended spells	% of ended spells
Promoted	2,261	24.26
Left for a better job	2,334	25.04
Redundant	1,150	12.34
Dismissed	161	1.73
Temp. job ended	433	4.65
Retirement	373	4.00
Stopped for health reasons	255	2.74
Stopped for family reasons	303	3.25
Other	2,050	22.00
	9,320	100.00

	Total N. of spells	% of total spells
Ended spells	9,320	75.59
Ongoing spells	3,010	24.41
Total	12,330	100

3 Deriving MWP from job-to-job transitions

A methodology to estimate MWP from job durations was first developed by Gronberg and Reed (1994). The basic idea is that in a dynamic search environment differences in job durations are informative about the relative weights of job characteristics in workers' utility functions. Extending Gronberg and Reed's methodology, Van Ommeren et al. (2000) describe how the theoretical model applies under a more generic search environment, and calculate workers' MWP for commuting using Dutch data. In the same spirit Van Ommeren and Fosgerau (2009) compare MWP for commuting time obtained using job moving behaviour with estimates obtained using workers' search behaviour as an identification strategy. Other applications include estimation of MWP to avoid night shifts - Manning (2003) - and estimation of MWP for job attributes using data on maternity leave in Germany - Felfe (2012). Bonhomme and Jolivet (2009) use job durations to estimate MWP for non-wage characteristics. Using data from the European Community Household Panel (ECHP) they find significant MWP for most job amenities, but they demonstrate that the estimates differ from those implied by a cross-sectional regression of wages on non-wage characteristics. Dale-Olsen (2006) uses Norwegian matched employer-employee data to estimate MWP for safety comparing hedonic wage, quit and job duration models, while Dey and Flinn (2008) estimate the MWP for health insurance coverage using US data from Survey of Income and Program Participation (SIPP).

3.1 Theoretical framework

Under the assumption of a perfectly competitive labour market, a standard cross-section hedonic wage regression is able to represent a long-run equilibrium relationship between wage and non-wage characteristics. However, Hwang et al. (1998) demonstrate how estimates of MWP derived from hedonic wage regressions are likely to be biased within a dynamic framework characterized by job search and an equilibrium wage dispersion. They show that, if firms differ in the cost of providing non-wage characteristics, those firms which face higher costs will offer lower wages and worse working conditions in equilibrium. Firm heterogeneity would act as an unobservable disturbance term in a hedonic wage regression, and it would likely be correlated with job characteristics of interest. This would bias estimates of workers' MWP for amenities and disamenties. Gronberg and Reed (1994) develop and apply a new methodology in order to estimate workers' MWP starting from a simple model of on-the-job search, as developed by Mortensen (1987).

Suppose that individuals have jobs characterized by (w,X) - the wage, w , and a set of non-wage characteristics, X. While on their job, they receive new job offers from firms. New offers arrive according to a Poisson process at rate λ. On the other side, workers face a probability of being laid off, δ, at each point in time. This latter involuntary separation rate is assumed to be independent of wage and job characteristics within the model. This assumption, although rather restrictive, is crucial in order to estimate workers' MWP. Job offers at every point in time are random draws from the joint cumulative distribution of wage and job attributes, $F(w^*,X^*)$, faced by workers of given productivity in the labour market. Workers are assumed to know both the arrival rate λ, and the joint cumulative distribution $F(w^*,X^*)$, however the timing of realization, and the characteristics of the specific offer are unknown. Every job delivers to the worker the instantaneous utility flow $u(w,X)$, which depends on both the wage and non-wage characteristics. Job mobility is driven by dynamic optimization, this is to say that workers decide whether to change their job when facing a new offer by maximizing the expected present value of utility over an infinite horizon. Defining $V(w,X)$ to be the expected present value of utility of the current job with characteristics w and X, and $V(w^*,X^*)$ the value function of the alternative potential offer, workers accept a new job when:

$$V(w^*,X^*) > V(w,X) \tag{1}$$

Given that, according to the model, the search environment does not change when accepting a new offer, the only change within the value function is the instantaneous utility flow $u(w,X)$. The condition expressed by equation (1) is, then, equivalent to:

$$u(w^*, X^*) > u(w, X) \tag{2}$$

The total exit rate out of the current job can be expressed as:

$$\theta(w, X) = \delta + \lambda \left[1 - F\left(u\left(w, X\right)\right)\right] \tag{3}$$

The above expression describes the total exit rate as the sum of the probability of an involuntary separation plus the probability of quitting. The latter can be further decomposed into two components, namely the probability of receiving a new offer, λ, and the probability that the offer received is acceptable for the worker, $[1 - F\left(u\left(w, X\right)\right)]$. $F\left(u\left(w, X\right)\right)$ is the cumulative distribution of the random variable $u\left(w^*, X^*\right)$ obtained from the joint distribution $F(w^*, X^*)$, evaluated at the current job values, (w, X). It represents the probability that the offer delivers an higher instantaneous utility, triggering a job-to-job transition.

Differentiating equation (3) with respect to w, and the generic job attribute x within the vector X we get:

$$\frac{\partial \theta(w, X)}{\partial w} = -\lambda \frac{\partial F\left(u(w, X)\right)}{\partial u(w, X)} \frac{\partial u(w, X)}{\partial w} \tag{4}$$

$$\frac{\partial \theta(w, X)}{\partial x} = -\lambda \frac{\partial F\left(u(w, X)\right)}{\partial u(w, X)} \frac{\partial u(w, X)}{\partial x} \tag{5}$$

Taking the ratio of these two terms:

$$\frac{\partial \theta(w, X)/\partial x}{\partial \theta(w, X)/\partial w} = \frac{\partial u(w, X)/\partial x}{\partial u(w, X)/\partial w} \tag{6}$$

The right-hand side of the above equation describes workers' MWP, i.e. the rate at which a worker would be willing to trade the wage against a generic non-wage attribute x. Given δ does not depend on w and X by assumption, MWP can be obtained by looking at the ratio of marginal effects of x and w on the hazard rate for job-to-job transitions.

3.2 Reduced-form duration model specification

In our empirical specification we assume that the length of a job spell up to a job-to-job transition follows an exponential distribution with a constant hazard rate, $h(w, X)$, which depends on current job characteristics. Following Van Ommeren et al. (2000) we assume this hazard rate has an exponential parametrization, and can be written as follows:

$$h(t|\nu_i, Z_i) = \exp(Z_i'\beta) \cdot \nu_i \tag{7}$$

where Z_i is a vector of individual and job characteristics, including the vector X_i - and ν_i, an unobserved random variable capturing worker heterogeneity. The inclusion of ν_i in the model is crucial in order to get consistent estimates of the parameter vector β, as pointed out by Lancaster (1990). The sample we use in order to estimate the duration model for job-to-job transitions consists of 5,130 individuals in 12,717 spells, using waves 1-18 of the BHPS. When we focus on flexitime and other flexible agreements, however, we are constrained to use data only for waves 9-18 in which the relevant information was collected. Our data consist of both multiple spells and multiple observations within each spell - each observation corresponding to a wave of the BHPS. The vector Z_i includes a range of controls: age, gender, education level, family status, union recognition at the workplace, firm size, industry, regional, and social group dummies. Job characteristics except industry, and individual characteristics are allowed to vary annually, when appropriate, within the spells. A spell is defined as the length of time until a voluntary job-to-job transition. Job spells ending in a transition out to unemployment or inactivity are treated as censored observations in our duration model.

Duration models of the type expressed by equation (7) are knows as parametric "shared frailty model" (Gutierrez, 2002 and Cleves et al., 2008). The frailty term ν_i reflects worker-specific heterogeneity in duration variation. The duration unconditional on ν_i is then obtained by integrating out this component, assuming that it follows a Gamma distribution with mean 1 and variance θ (to be estimated from the data). The model is estimated via Maximum Likelihood.

3.3 Estimates of MWP from duration model

Tables 3 and 4 present, respectively, the estimated coefficients of our duration models and the associated MWP. Estimated MWP are obtained according to the following formula:

$$MWP_x = \exp\left(-\frac{\hat{\beta}_x}{\hat{\beta}_{lnw}}\right) - 1 \tag{8}$$

where $\hat{\beta}_x$ is the coefficient associated with the dummy indicating the generic non-wage attribute x, and $\hat{\beta}_{lnw}$ is the coefficient associated with the log of real monthly earnings.[4]

[4]We exponentiate in order to convert log points to a proportion, given the considered changes are discrete

Table 3: Duration model for job-to-job transitions: estimated coefficients

	Waves 1-18		**Waves 9-18**	
	(1)	**(2)**	**(3)**	**(4)**
Real monthly earnings (log)	-0.604***	-0.337***	-0.558***	-0.190**
	[0.046]	[0.057]	[0.072]	[0.087]
Hours: 1-15	-0.842***	-0.208	-0.807***	-0.007
	[0.135]	[0.134]	[0.217]	[0.210]
Hours: 16-30	-0.513***	-0.091	-0.564***	0.031
	[0.083]	[0.082]	[0.122]	[0.119]
Hours: 49 +	0.251***	0.105*	0.218**	0.150
	[0.065]	[0.062]	[0.102]	[0.095]
Work at Night	0.324***	0.176**	0.280**	0.137
	[0.076]	[0.071]	[0.111]	[0.102]
Rotating Shifts	0.037	0.097	-0.169	0.010
	[0.092]	[0.087]	[0.165]	[0.154]
Flexitime			-0.082	0.069
			[0.105]	[0.099]
Other Flexible			-0.196	0.056
			[0.160]	[0.162]
Additional controls	no	yes	no	yes
Observations	33,959	33,959	16,092	16,092
Number of individuals	5,130	5,130	3,384	3,384
Number of spells	12,330	12,330	6,184	6,184

Notes: Standard errors in parenthesis; *** p<0.01, ** p<0.05, * p<0.1. Additional controls included in all equations: gender dummy; age; age squared; family status dummies (3); dependent children dummy; education dummies (2); firm size dummies (3); union at the workplace dummy; region dummies (17); industry dummies (8) occupation dummies (6); wave dummies (17). The full set of results is provided in the Appendix

The first two columns of table 3 use observations from waves 1-18 of the BHPS. We refer to these results when considering the effects of working hours, rotating shifts and night shifts. The last two columns show evidence from waves 9-18 of the BHPS in which the relevant information concerning flexible agreements was collected. We refer to this evidence when considering flexitime and other flexible agreements. In column 1 quits are modelled as a function of our key explanatory job characteristics only. They are all highly statistically significant with the exception of rotating shifts. However, when we include relevant individual and other job-related attributes (including a full set of dummies for regions, industry and socio-economic status) in column 2, the magnitude of the coefficients associated with the key explanatory variables dramatically drop, with only night shifts and overtime remaining significant at conventional levels. Looking at the sign of coefficients in this column, they are (more or less) in line with our expectations. Workers with high monthly earnings or short hours are more likely to have longer durations before they quit

for a better job. The opposite holds true for workers working long hours, working at night or in shifts. The coefficients on the control variables (presented in appendix) indicate that job durations are longer for women, people with low levels of education and for those jobs where unions are recognized at the workplace. Conversely individuals experiencing shorter durations before a job-to-job transition are those with higher levels of education, single or separated. Focusing on flexitime and other flexible agreements, coefficients in column 3 and 4 suggest that these types of job are associated with shorter durations, however the estimates are very imprecise.

We now turn to MWP for non-standard work implied by these coefficients (table 4). MWP is interpreted as the percentage of the real monthly earnings that workers are willing to trade off, on average, for each of our job characteristics of interest, in order to hold utility fixed. Standard errors are obtained using the delta method.

Table 4: MWP estimates using job-to-job transitions

	MWP	**S.E.**
Hours: 1-15	-0.460**	0.185
Hours: 16-30	-0.237	0.173
Hours: 49+	0.367	0.25
Work at Night	0.688*	0.389
Rotating Shifts	0.335	0.346
Flexitime	0.436	0.787
Other Flexible	0.340	1.158

Notes: *** p<0.01, ** p<0.05, * p<0.1. MWP's are expressed as fraction of real mothly earnings. MWP's for each characteristic are obtained using coefficients from table 1.3, column 2. MWP's for Flexitime and Other Flexible are obtained using coefficients from the same table, column 4. Standard Errors are obtained using Delta Method

Statistically significant MWP are found only for night shifts, and for those jobs at the low extreme of the weekly hours distribution: less than 15 weekly hours per week. Our estimates suggest that "traditional" full time workers would be willing to take a monthly earnings cut of 46% if their hours were cut to 15 hours per week or less (or alternatively they would not be willing to work more than 15 hours per week if their monthly earnings were reduced by 46%). This results, together with the (non-significant) positive MWP for long hours, may be interpreted as a signal of workers' preference for short hours. They do not, on the face of it, seem implausible: a reduction from 40 to 15 hours (10hours)

represents a 63% (75%) reduction in working time, although the required earnings changes are substantially less than pro rata. Looking at night shifts, our evidence suggest that this job characteristic is perceived by workers as a strong disamenity requiring a compensation of almost 70% of the monthly wage. This figure is in line with the 90% found by Manning (2003) using UK LFS data.

4 Deriving MWP from job satisfaction

We now illustrate the alternative methodology for calculating workers' MWP for non standard working arrangements. This methodology is an application to the labour market case of the income compensation, or satisfaction, approach, using a specific measures of subjective well-being (SWB) - job satisfaction in our case - as a proxy for utility. As we show, MWP can then be identified from a job satisfaction equation including earnings and non-monetary characteristics.

This methodology has been increasingly applied by many authors in different fields, ranging from health, environmental, to labour economics. Ferrer-i-Carbonell and Van Praag (2002) use SWB data for Germany to estimate income compensations for chronic diseases. Ferreira and Moro (2010), Luechinger (2009), Luechinger and Raschky (2009), Frey et al. (2010) use the same methodology to value environmental attributes. Ferrer-i-Carbonell and van den Berg (2007) provide a monetary evaluation of informal care in Holland using SWB data. Clark and Oswald (2002), and Oswald and Powdthavee (2007) calculate income compensations for a variety of life events, like partner loss or divorce in, respectively, the US and the UK. Blanchflower and Oswald (2004), after investigating well-being trends in the UK and the US, use SWB data to estimate the average compensation for unemployment. Di Tella et al. (2001) use a similar methodology to calculate the trade-offs between macro-level unemployment and inflation using life satisfaction data. Stutzer and Frey (2008), and Dickerson et al. (2012) calculate willingness to pay for commuting time using SWB data for, respectively, Germany and the UK. Helliwell and Huang (2010) use data data on job satisfaction to value non-financial job characteristics.

4.1 Theoretical framework

In standard modern microeconomic theory, observed choices are sufficient to reveal preferences defined in terms of some underlying but unobserved utility function. But in recent decades, spurred by the increased availability of subjective measure of well-being and advances in psychological research, economists have started to re-consider a more direct

approach to measuring welfare which dates back to the hedonic notion of utility advanced by Bentham [5]. In their influential contribution, Frey and Stutzer (2002) state the following:

> *The insights gained from research on happiness throw new light on important issues analyzed in economics. Most important, they enlarge the scope of empirical measurement and provide new tests for theories. Happiness is not identical to the traditional concept of utility in economics. It is, however, closely related. On the one hand, the concept of subjective happiness is a valuable complementary approach, which covers many more aspects of human well-being than the standard concept of utility. On the other hand, subjective well-being can be considered a useful approximation to utility, which economists have avoided measuring explicitly.*

Following this approach the monetary value of a good is the amount of income required to hold SWB constant following one-unit change in the amount of the good consumed. To the extent that SWB measures approximate utility, income compensations and marginal willingness to pay coincide, thus to apply this methodology we first need to identify a relevant measure of SWB to proxy utility from the job. Overall job satisfaction is the ideal candidate for the task given that its connections with workers' behaviour on the labour market have been widely documented in the literature.

If individual utility from the job depends on the wage and a set of non-wage job attributes, and job satisfaction is a proxy for utility, the MWP for our job characteristics of interest can be calculated as the monthly earnings increase (decrease) which is required to compensate changes in the relevant job attribute in order to hold job satisfaction fixed.

We assume that:

$$JS(w,X) = f\left(u(w,X)\right) \tag{9}$$

where $f(\cdot)$ is a continuous, differentiable function.

From equation (9) it follows:

$$\frac{\partial JS(w,X)/\partial x}{\partial JS(w,X)/\partial w} = \frac{\dfrac{\partial f\left(u(w,X)\right)}{\partial u(w,X)}\dfrac{\partial u(w,X)}{\partial x}}{\dfrac{\partial f\left(u(w,X)\right)}{\partial u(w,X)}\dfrac{\partial u(w,X)}{\partial w}} = \frac{\dfrac{\partial u(w,X)}{\partial x}}{\dfrac{\partial u(w,X)}{\partial w}} \tag{10}$$

According to the above formula, MWP for the generic job attribute x is the ratio between marginal effects of x and w on job satisfaction. Note that MWP can be identified

[5] For a general survey of the new economics of happiness literature refer to: Frey and Stutzer (2010); Van Praag and Ferrer-i Carbonell (2008)

under weaker conditions than marginal satisfaction (utility) because MWP is the ratio of two marginal utilities, and they differ from "marginal job satisfaction" by the same constant of proportionality.

4.2 Estimation issues

Under the above identification assumption 9, all we have to do in order to calculate workers' MWP, is to estimate a standard equation for job satisfaction, and then calculate the marginal effects of the wage and non-wage characteristics. Following Ferrer-i-Carbonell and Frijters (2004), we need to address two practical estimation issues: the first one deals with the role of unobservable individual characteristics, while the second hinges on interpersonal comparability of individual SWB evaluations. Our ideal estimation framework should contain two key "ingredients": a latent variable model accounting for ordinal comparability, and individual fixed effects to control for the potential endogeneity bias. This can written as:

$$\begin{aligned} JS^*_{it} &= \alpha + \beta_{lnw} w_{it} + \beta'_x X_{it} + \gamma' Z_{it} + \nu_i + \varepsilon_{it} \\ JS_{it} &= k \quad \text{if} \quad \lambda_k \leq JS^*_{it} < \lambda_{k+1} \end{aligned} \tag{11}$$

While there is general agreement in the literature about the crucial importance of unobserved confounders when dealing with data on satisfaction, the potential consequences of using OLS (rather than ordinal methods) to model SWB indicators are not clear cut. In light of this ongoing discussion we decided to estimate our parameters of interest with three different estimators: a naive ordered logit model with no FE, a linear FE model, and the BUC estimator for FE ordered logit models developed by Baetschmann et al. (2015). While we present as main results the ones obtained using the linear approximation, the results obtained using the pooled ordered logit and the BUC estimator are presented in the appendix.

4.3 Estimates of MWP from job satisfaction equation

Tables 5 and 6 present, respectively, the estimated coefficients of the satisfaction equation estimated using a linear model with fixed effects, and the associated MWP obtained as described in equation (8).

Table 5: Job satisfaction, fixed effects OLS: estimated coefficients

	Waves 1-18		**Waves 9-18**	
	(1)	**(2)**	**(3)**	**(4)**
Real monthly earnings (log)	0.101***	0.169***	0.160***	0.190***
	[0.028]	[0.033]	[0.047]	[0.052]
Hours: 1-15	0.276***	0.350***	0.220**	0.258**
	[0.062]	[0.065]	[0.099]	[0.101]
Hours: 16-30	0.157***	0.194***	0.154***	0.158***
	[0.038]	[0.039]	[0.057]	[0.056]
Hours: 49 +	-0.037	-0.045	-0.058	-0.060
	[0.028]	[0.028]	[0.041]	[0.041]
Work at Night	-0.079**	-0.070**	-0.091*	-0.088*
	[0.036]	[0.036]	[0.051]	[0.051]
Rotating Shifts	-0.111**	-0.115**	-0.236***	-0.224***
	[0.048]	[0.049]	[0.073]	[0.074]
Flexitime			0.070*	0.053
			[0.039]	[0.038]
Other Flexible			-0.078*	-0.096**
			[0.043]	[0.045]
Additional Controls	non	yes	no	yes
Observations	33,959	33,959	16,092	16,092
Number of individuals	5,130	5,130	3,384	3,384

Notes: Standard errors in parenthesis; *** p<0.01, ** p<0.05, * p<0.1. Additional controls included in all equations: gender dummy; age; age squared; family status dummies (3); dependent children dummy; education dummies (2); firm size dummies (3); union at the workplace dummy; region dummies (17); industry dummies (8) occupation dummies (6). The full set of results is provided in Appendix

The structure of table 5 follows table 3 . Results in the first two columns use data from all waves of the BHPS, while the last 9 waves are used to derive results in last two columns. In column 1 and 3 overall job satisfaction is modelled as a function of our key job characteristics only, while the same set of covariates used in the previous duration analysis is included in column 2 and 4

Estimated coefficients and implied MWP obtained using alternative estimators are presented in the appendix. Almost all the key job characteristics are significantly associated with job satisfaction in column 1 and these associations are strengthened by the inclusion of the full set of controls in column 2. Real monthly earnings, together with the two dummies for short weekly hours have a positive effect on overall job satisfaction, suggesting a "satisfaction premium" for part-time work. In contrast, a negative effect is found for night and rotating shifts. The effect of long hours is negative, as expected, although not statistically significant. Our evidence suggests a positive although not significant effect of flexitime

and a negative and significant effect for other flexible arrangements. We also find the well documented U-shaped effect of age on our subjective measure of well-being, and lower levels of job satisfaction for never-married workers (the effects of other characteristics are not significant).

Table 6 presents estimated MWP for each of the job characteristics of interest, interpreted as the percentage of monthly earnings that a worker is willing to trade off for each job characteristic considered, in order to hold job satisfaction (and by assumption utility) fixed.

Table 6: MWP estimates using job satisfaction, fixed effects OLS

	MWP (%)	**S.E.**
Hours: 1-15	-0.873***	0.051
Hours: 16-30	-0.681***	0.080
Hours: 49+	0.302	0.217
Work at Night	0.512	0.340
Rotating Shifts	0.975	0.600
Flexitime	-0.243	0.162
Other Flexible	0.658	[0.467

Notes: *** p<0.01, ** p<0.05, * p<0.1. MWP's are expressed as fraction of real mothly earnings. MWP's for each characteristic are obtained using coefficients from table 1.5, column 2. MWP's for Flexitime and Other Flexible are obtained using coefficients from the same table, column 4. Standard Errors are obtained using Delta Method

The strong "satisfaction premium" for short hours translates in our context in very high estimated MWP. According to our estimates "traditional" full time workers are willing to take a monthly earnings cut of roughly 87% and 69% when moving to a job characterized by, respectively, less than 15 hours and 16-30 hours per week. Compared to the results obtained using job-to-job transitions, the estimated MWP are almost twice as large. We interpret the high statistical significance on the one hand, and the implausible magnitude on the other, as the signal of some possible misinterpretation of the underlying methodology which we discuss below. Among the remaining MWP for job attributes of interest, none of them is statistically significant at conventional levels, although the signs correspond to expectations.

In order to explore the potential consequences stemming from linearization of the outcome - implicit in our FE linear model for job satisfaction - we estimated the same model

using the BUC estimator proposed by Baetschmann et al. (2015). The results are presented in the appendix, together with those obtained using a naive pooled ordered logit which neglects unobserved heterogeneity. Looking at the implied MWP, we found almost no difference between the results presented above and the ones obtained using the BUC estimator, suggesting that linearizing an intrinsically ordinal outcome when the focus is on ratio between coefficients provides a good approximation. On the other hand, a comparison between estimated MWP with and without fixed effects, confirms, the crucial importance of individual unobserved heterogeneity when dealing with subjective measures of well-being, as argued by Ferrer-i-Carbonell and Frijters (2004).

5 A comparison and some possible interpretations

How do the the two sets of estimated MWP compare? The signs of the MWP estimates coincide for all the job characteristics of interest (except flexitime which is not significant) but there are considerable differences in significance and magnitude. Looking at statistical significance MWP for short hours are highly significant using the job satisfaction approach, while MWP implied by the duration model coefficients are not, with the exception of the MWP for 1-15 weekly hours. The same applies for the estimated MWP for night shifts which is significant only in the duration estimates.

Do the differences in magnitude form systematic patterns? The job satisfaction approach seems to amplify the effect of short hours. Using job delivers MWP lower magnitude, although not significant or slightly significant, implying a more realistic pay penalty. One may be tempted to argue, then, that the satisfaction approach tends to overestimate coefficients on non-monetary characteristics relative to the money measure, resulting in overestimated MWP (Benjamin et al., 2012). This pattern, however, is not clear-cut. Indeed, our estimated MWP for long hours derived using job satisfaction is relatively low in magnitude compared to its duration counterpart, and the same holds true for night shifts.

The differences and similarities just outlined give reason to think that the estimated quantities using the two approaches are linked but implicitly different. What emerges from the comparison is a potential difference between the theoretical "object" we would like to estimate and its empirical counterpart. Drawing on recent advances in the literature that distinguish between decision and experienced utility (Kahneman et al., 1997), we now link together the three main "ingredients" of our measures of MWP: job mobility, utility, and job satisfaction.

5.1 Some possible interpretations

On the one hand the duration approach is based on a on-the-job search model. Workers change their job when facing a new job offer only if the expected value of the new job is higher than the one of the current job. If workers choose those jobs which deliver the highest level of utility among the available options, job-to-job transitions should reveal impact of job characteristics on workers' utility. The concept of utility used here is decision utility, defined as the weight attributed to a given outcome in making a decision(Kahneman et al., 1997).

On the other hand the satisfaction approach is based on a measure of experienced utility, which is the actual wellbeing (in our case job satisfaction) associated with a given outcome (Chetty, 2015). There is an ongoing and recently expanding debate in behavioural economics about the extent to which experienced and decision utility coincide (Chetty, 2015). In a related study to ours, Akay et al. (2015) compare the income-leisure preferences revealed by labour supply choices (based on static labour supply models) with preferences implied by SWB equations. They conclude that preferences coincide on average, although they differ among some sub-populations who may be subject to choice constraints or optimisation errors. In the case of job search there there appears to be considerable evidence that job satisfaction is a good predictor of quitting behaviour (see among others Hamermesh, 1977; Freeman, 1978; Clark, 2001; Lévy-Garboua et al., 2007; Green, 2010). If workers choose those jobs which deliver the highest level of (decision) utility among the available options, and job satisfaction is a good predictor of such choices, then utility and job satisfaction would appear to be closely linked. This represents a natural extension, to the job domain, of the theoretical approach adopted by the subjective well-being literature, which implicitly assumes that people make choices to maximise to SWB and that they are well informed about the consequences of their choices in terms of SWB (Benjamin et al., 2012). Job satisfaction can then be used as a proxy for utility and we can write

$$JS = g\left(U\left(w, X\right)\right) \tag{12}$$

where, following our previous notation, w and X represent, respectively, wage and non wage characteristics of the job and $g\left(\cdot\right)$ is a continuous, differentiable function. Differentiating both $JS\left(w, X\right)$ with respect to w and the generic element x within the vector X we get:

$$\begin{aligned} JS_x &= g_U U_x \\ JS_w &= g_U U_w \end{aligned} \tag{13}$$

From which:

$$\frac{U_x}{U_w} = \frac{JS_x}{JS_w} \tag{14}$$

Looking at quits:

$$h(w,X) = f\left(U\left(w,X\right)\right) \tag{15}$$

From which:

$$\begin{aligned} h_x &= f_U U_x \\ h_w &= f_U U_w \end{aligned} \tag{16}$$

It would then follow:

$$\frac{U_x}{U_w} = \frac{h_x}{h_w} = \frac{JS_x}{JS_w} \tag{17}$$

From equation (17) it follows that the two methodologies should be able to estimate, in theory, the same empirical quantity of interest. Our empirical analysis, however, suggests that this is not the case using our data.

The second possibility we consider is that utility and SWB are distinct concepts. Workers make choices which are assumed to maximize utility but do not necessarily lead to the highest level of SWB. In this interpretation workers trade off SWB against other things they care about. Benjamin et al. (2012) provide experimental evidence that when alternatives differ in terms of money, subjects make choices that conflict with their SWB rankings of outcomes. Glaeser et al. (2014) find that people move to cities where they will be less happy but enjoy higher earnings or lower housing costs, and Adler et al. (2015) find that considerable numbers of people prefer health to happiness. In this view, SWB can be regarded as an argument in the utility function rather than a proxy for it.

For instance, it may be that job characteristics have both a direct impact on utility, and an indirect impact mediated by job satisfaction. Worker's utility could be re-written as:

$$U\left(w,X,JS\left(w,X\right)\right) \tag{18}$$

This is similar to the general theoretical formulation of Benjamin et al. (2012):

$$U\left(X, H\left(X\right)\right) \tag{19}$$

with $H(X)$ being SWB. The authors claim that, if people seek to maximize SWB alone the vector of partial derivatives U_X will equal zero. Using data on hypothetical choice and SWB indicator, they show that in the equation $\Delta U_{is} = \beta_H \Delta H_{is} + \beta_X \Delta X_{is} + \varepsilon_{is}$, the null hypothesis $H_0 : \beta_X = 0$ can be easily rejected. They use this as a test of the hypothesis that SWB is an important argument of the utility function rather than being its representation.[6]

Translating this argument to the case of job satisfaction amounts to re-writing equation (15) as:

$$h(w,X) = f\left(U\left(w,X,JS\left(w,X\right)\right)\right) \tag{20}$$

If equation (20) embodies the true relation between job satisfaction and utility, rather than equation (15), then the ratio $\frac{h_x}{h_w}$ is no longer equal to $\frac{U_x}{U_w}$.

$$\begin{aligned} h_w &= f_U U_w + f_U U_{JS} JS_w \\ &= f_U \left(U_w + U_{JS} JS_w\right) \end{aligned} \tag{21}$$

$$\begin{aligned} h_x &= f_U U_x + f_U U_{JS} JS_x \\ &= f_U \left(U_x + U_{JS} JS_x\right) \end{aligned} \tag{22}$$

Looking at the ratio

$$\begin{aligned} \frac{h_x}{h_w} &= \frac{f_U \left(U_x + U_{JS} JS_x\right)}{f_U \left(U_w + U_{JS} JS_w\right)} \\ &= \frac{U_x + U_{JS} JS_x}{U_w + U_{JS} JS_w} \end{aligned} \tag{23}$$

[6]Focusing on job satisfaction, Clark (2001) provides a theoretical justification for the inclusion of job satisfaction measures inside an equation representing voluntary separations which seems in line, at least implicitly, withBenjamin et al. (2012). Using his notation, V_i is the value function describing the utility stream in job i. An individual will quit to job j if $V_j - C > V_i$, with C being a moving cost. He argues that what's inside V_i is not just the wage rate, but a set of characteristics, so that $V_i = V(w_i, h_i, Z_i)$, with w_i representing the wage, h_i the number of hours worked, and Z_i a set of job characteristics. Interestingly, he suggests to use job satisfaction as a measure of "job quality" or "utility at work" within the Z vector of non monetary characteristics. This implicitly defines job satisfaction an element of the utility function, a measure of quality of the job match on the side of the worker, which can be traded off for something else that workers care about.

If we believe this interpretation of job satisfaction, and the consequent representation of the rate for voluntary separations in equation (20), the last equation implies the estimated MWP we presented in table 2 need not to coincide with the marginal rate of substitution , $\frac{U_x}{U_w}$, given we are not controlling for job satisfaction in that case.

Our empirical framework is different from the one in Benjamin et al. (2012) in that we structurally interpret ratios of coefficients of a duration model for job quits rather than focusing on the impact of a set of explanatory variables in a random utility model for choices. However, in the same spirit, we can verify whether the inclusion of job satisfaction in our duration model changes the effect of our job characteristics of interest. Under the hypothesis that the unique driver of workers' voluntary separations is job satisfaction, we would expect no explanatory power for job characteristics once job satisfaction is controlled for. In contrast, if non monetary characteristics have both a direct impact on utility and an indirect one mediated by job satisfaction, we would expect that the ones which are significant in our specification for the hazard ratio of separation stay significant even after the inclusion of job satisfaction. Our results are presented in table 7.

As expected, our findings confirm that job satisfaction is a good predictor of voluntary quits. Its coefficient in our duration model is negative and highly statistically significant, confirming the previously mentioned findings in the literature: people who are less satisfied of their jobs are more likely to quit. Second, focusing on our job characteristics of interest we find that controlling for overall job satisfaction slightly changes the magnitude of coefficients in the direction predicted by our satisfaction equation. Comparing the estimated coefficients in table 3 and table 7, however, we find that those characteristics which were significant before the inclusion of job satisfaction - monthly earnings, long hours, and night shifts - are still significant when job satisfaction is added to the model specification. Our evidence seems to suggests that the interpretation of job satisfaction as an element of the utility function is preferable to the one under which it can be used as a proxy for it. We regard this evidence as a further confirmation of the difference between (decision) utility and subjective well-being.

Table 7: Duration model for job-to-job transitions adding job satisfaction: estimated coefficients

	Waves 1-18	**Waves 9-18**
	(1)	**(2)**
Real monthly earnings (log)	-0.312***	-0.164*
	[0.058]	[0.088]
Hours: 1-15	-0.092	0.079
	[0.134]	[0.210]
Hours: 16-30	-0.042	0.080
	[0.082]	[0.119]
Hours: 49 +	0.113*	0.149
	[0.062]	[0.095]
Work at Night	0.155**	0.099
	[0.071]	[0.102]
Rotating Shifts	0.075	-0.006
	[0.087]	[0.154]
Flexitime		0.070
		[0.099]
Other Flexible		0.058
		[0.161]
Job Satisfaction: Overall	-0.227***	-0.242***
	[0.014]	[0.022]
Additional Controls	yes	yes
Observations	33,959	16,092
Number of individuals	5,130	3,384
Number of spells	12,330	6,184

Notes: Standard errors in parenthesis; *** p<0.01, ** p<0.05, * p<0.1; Additional controls included in all equations: gender dummy; age, age squared, family status dummies (3), dependent children dummy, education dummies (2), firm size dummies (3), union at the workplace dummy, region dummies (17), industry dummies (8), occupation dummies (6); wave dummies (17). The full set of results is provided in the appendix.

6 Conclusions

The objective of this paper was to estimate and compare MWP for some job characteristics using two different approaches. Our evidence suggests that estimates obtained differ across the two methodologies. Drawing on the recent expanding literature on decision and experience utility, we presented a potential theoretical explanation of the possible differences building on alternative interpretations of job satisfaction

We try to assess whether job satisfaction can be interpreted as a measure of job quality on the workers' side - hence an element of the utility function - rather than a proxy for

utility as suggested by the economics of happiness literature. In order to so we include job satisfaction in our duration model for quits, and test the hypothesis that those coefficients of our relevant job characteristics which were significant before the inclusion of job satisfaction are still significant when we control for it. Our results show that some of our job characteristics of interest are likely to have both a direct and indirect effect on the hazard rate of separation. Under a structural interpretation of the duration model, this evidence would suggest that job satisfaction stands as element of the utility function rather than its representation.

Even if we cast legitimate doubts about a structural interpretation of the duration model due to its necessary simplistic assumptions, the relationship we estimate between job-to-job transitions and our job characteristics of interest do exist in the data. On the one hand our results suggest that some job characteristics affect job-to-job transitions. On the other hand the same characteristics have an impact on job satisfaction. Though job satisfaction is confirmed to be a good predictor of voluntary job mobility, job characteristics are still important in an equation for quits even when controlling for it. Job satisfaction seems not to be the object that people seek to maximize when facing an alternative job offers. It helps to explain quits, but it is not the only driver of job mobility. It is then better regarded as one among several elements of the utility function. Job satisfaction, as well as any measure of subjective well-being, refers to an experience. Borrowing Bentham's words it refers to the feelings coming from the experience of a job. It is then likely that for a number of reasons, well explained by Khaneman among others, what people actually choose is not what delivers them the highest amount of pleasure. As a consequence, even in the lucky case in which we are able to perfectly identify choices, they need not to coincide with what people actually prefer from a hedonic perspective. This is to say that utility and well-being are intrinsically connected concepts, but not the same "thing".

Our results raise obvious questions about which measures of MWP should be preferred (MWP in terms of decision utility or well-being?) as well as the implications for welfare measurement and policy. Views differ on whether welfare should be assessed in terms of decision or experience utility. Both Chetty (2015) and Glaeser et al. (2014) consider situations of residential mobility but come to opposite conclusions about the use of SWB measures. Chetty focuses on cases in which families fail to take full account of their own (and their children's) experience utility when deciding where to live. Optimal policy may then be to use tools such as housing vouchers to nudge them into decisions that increase their SWB. On the other hand Glaeser et al. (2014) argue that people knowingly choose less SWB for more income and thus SWB is a poor measure of overall welfare, and relying on it can lead to welfare-reducing policies. Similar considerations may apply to our divergent

measures of MWP of working hours or night shifts. Should they be valued by what workers choose (knowingly?) or what makes them happy?

One thing appears certain: while economists model individual preferences as the main drivers of choices, and regard utility an important theoretical construct which represents them, we should give up the possibility of measuring it through SWB indicators. In light of this, our estimated MWP will then remain what they actually are: a measure of trade off between money and non-monetary characteristics in terms of job satisfaction. More importantly, claiming that satisfaction is a proxy for utility becomes irrelevant once we accept, as economists, the idea that subjective well-being indicators are welfare measure per se. Job satisfaction describes one aspect of workers' well-being which can be used, to some extent, to predict part of workers' behaviour, but does not need to coincide with the economists' notion of utility.

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Appendix

Table A1.1: Duration model for job-to-job transitions - full estimates

	Waves 1-18		**Waves 9-18**	
Real monthly earnings (log)	-0.337***	-0.312***	-0.190**	-0.164*
	[0.057]	[0.058]	[0.087]	[0.088]
Hours: 1-15	-0.208	-0.092	-0.007	0.079
	[0.134]	[0.134]	[0.210]	[0.210]
Hours: 16-30	-0.091	-0.042	0.031	0.080
	[0.082]	[0.082]	[0.119]	[0.119]
Hours: 49 +	0.105*	0.113*	0.150	0.149
	[0.062]	[0.062]	[0.095]	[0.095]
Work at Night	0.176**	0.155**	0.137	0.099
	[0.071]	[0.071]	[0.102]	[0.102]
Rotating Shifts	0.097	0.075	0.010	-0.006
	[0.087]	[0.087]	[0.154]	[0.154]
Flexitime			0.069	0.070
			[0.099]	[0.099]
Other Flexible			0.056	0.058
			[0.162]	[0.161]
Job Satisfaction		-0.227***		-0.242***
		[0.014]		[0.022]
Female	-0.176***	-0.128**	-0.152*	-0.134*
	[0.056]	[0.057]	[0.081]	[0.081]
Age	-0.021	-0.035**	-0.059***	-0.070***
	[0.015]	[0.015]	[0.022]	[0.022]
Age²	-0.000*	-0.000	0.000	0.000
	[0.000]	[0.000]	[0.000]	[0.000]
Educ: Primary\Low. Sec.	-0.079	-0.043	-0.034	-0.012
	[0.072]	[0.072]	[0.112]	[0.112]
Educ: Higher	0.335***	0.301***	0.349***	0.315***
	[0.055]	[0.056]	[0.080]	[0.080]
Never married	0.014	-0.037	0.051	-0.005
	[0.069]	[0.069]	[0.104]	[0.104]
Separated	0.216***	0.207**	0.439***	0.410***
	[0.081]	[0.081]	[0.114]	[0.114]
Widowed	-0.126	-0.121	0.066	0.040
	[0.316]	[0.317]	[0.425]	[0.425]
Dependent Children	-0.113	-0.110	-0.057	-0.069
	[0.072]	[0.072]	[0.114]	[0.114]
Firm Size: <25	-0.069	-0.045	-0.146*	-0.117
	[0.057]	[0.057]	[0.084]	[0.084]
Firm Size: 100 - 499	-0.058	-0.078	-0.065	-0.080
	[0.064]	[0.064]	[0.094]	[0.094]
Firm Size: >500	-0.116	-0.136*	-0.147	-0.168
	[0.075]	[0.076]	[0.112]	[0.112]
Union at the Workplace	-0.389***	-0.404***	-0.391***	-0.406***
	[0.055]	[0.055]	[0.081]	[0.081]

	Waves 1-18		Waves 9-18	
Regional Dummies (17)	yes	yes	yes	yes
Industry Dummies (8)	yes	yes	yes	yes
Occupation Dummies (6)	yes	yes	yes	yes
Wave Dummies (17) (9)	yes	yes	yes	yes
Observations	33,959	33,959	16,092	16,092
Number of individuals	5,130	5,130	3,384	3,384
Number of spells	12,330	12,330	6,184	6,184

Notes: S.E. in brackets; *** p<0.01, ** p<0.05, * p<0.1.

Table A1.2: Job satisfaction - full estimates

	OLS FE		Pooled Ordered Logit		BUC	
	Waves 1-18	**Waves 9-18**	**Waves 1-18**	**Waves 9-18**	**Waves 1-18**	**Waves 9-18**
Real monthly earnings (log)	0.169***	0.190***	0.136***	0.107*	0.328***	0.406***
	[0.033]	[0.052]	[0.045]	[0.061]	[0.064]	[0.111]
Hours: 1-15	0.350***	0.258**	0.809***	0.663***	0.688***	0.538**
	[0.065]	[0.101]	[0.105]	[0.146]	[0.136]	[0.217]
Hours: 16-30	0.194***	0.158***	0.361***	0.316***	0.367***	0.320***
	[0.039]	[0.056]	[0.061]	[0.079]	[0.077]	[0.123]
Hours: 49 +	-0.045	-0.060	0.032	-0.018	-0.084	-0.113
	[0.028]	[0.041]	[0.045]	[0.063]	[0.053]	[0.085]
Work at Night	-0.070**	-0.088*	-0.183***	-0.283***	-0.132*	-0.173
	[0.036]	[0.051]	[0.054]	[0.072]	[0.068]	[0.106]
Rotating Shifts	-0.115**	-0.224***	-0.090	-0.104	-0.198**	-0.473***
	[0.049]	[0.074]	[0.069]	[0.106]	[0.088]	[0.149]
Flexitime		0.053		0.026		0.109
		[0.038]		[0.064]		[0.084]
Other Flexible		-0.096**		-0.019		-0.220**
		[0.045]		[0.084]		[0.104]
Female			0.324***	0.238***		
			[0.048]	[0.061]		
Age	0.015	0.015	-0.089***	-0.071***	0.032	-0.103**
	[0.032]	[0.047]	[0.011]	[0.015]	[0.067]	[0.040]
Age²	0.000***	0.001**	0.001***	0.001***	0.001***	0.001**
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Educ: Primary\Low. Sec.	0.004	-0.274	0.300***	0.153*	0.003	-0.330
	[0.138]	[0.527]	[0.065]	[0.092]	[0.240]	[0.763]
Educ: Higher	-0.066	-0.220	-0.142***	-0.139**	-0.124	-0.488
	[0.066]	[0.194]	[0.047]	[0.061]	[0.131]	[0.415]
Never married	-0.158***	-0.125*	-0.241***	-0.252***	-0.302***	-0.254
	[0.050]	[0.075]	[0.059]	[0.079]	[0.095]	[0.156]
Separated	-0.019	-0.065	-0.048	-0.179**	-0.047	-0.140

	OLS FE		Pooled Ordered Logit		BUC	
	Waves 1-18	**Waves 9-18**	**Waves 1-18**	**Waves 9-18**	**Waves 1-18**	**Waves 9-18**
	[0.049]	[0.070]	[0.064]	[0.087]	[0.093]	[0.146]
Widowed	-0.087	-0.073	-0.064	-0.223	-0.201	-0.227
	[0.130]	[0.140]	[0.158]	[0.176]	[0.290]	[0.447]
Dependent Children	0.012	-0.035	-0.015	-0.170**	0.035	-0.073
	[0.031]	[0.047]	[0.047]	[0.071]	[0.063]	[0.103]
Firm Size: <25	0.031	-0.030	0.198***	0.219***	0.054	-0.072
	[0.028]	[0.040]	[0.043]	[0.059]	[0.054]	[0.085]
Firm Size: 100 - 499	0.004	-0.067	-0.060	-0.039	0.006	-0.140
	[0.030]	[0.043]	[0.044]	[0.061]	[0.056]	[0.087]
Firm Size: >500	0.016	-0.067	-0.067	-0.043	0.031	-0.138
	[0.037]	[0.051]	[0.053]	[0.068]	[0.070]	[0.102]
Union at the Workplace	-0.015	-0.006	-0.138***	-0.126**	-0.030	-0.004
	[0.038]	[0.063]	[0.043]	[0.058]	[0.071]	[0.118]
Regional Dummies (17)	yes	yes	yes	yes	yes	yes
Industry Dummies (8)	yes	yes	yes	yes	yes	yes
Occupation Dummies (6)	yes	yes	yes	yes	yes	yes
Wave Dummies (17), (9)	yes	yes	yes	yes	yes	yes
Observations	33,959	16,092	33,959	16,092	87,870	31,882
Number of individuals	5,130	3,384	5,130	3,384	3,903	2,294

Notes: S.E. in brackets; *** p<0.01, ** p<0.05, * p<0.1; the different number of observations in the last two columns is due to: i)individuals with no change in the dependent variable across time do not contribute to the likelihood; ii) the estimation sample is obtained by expanding the original sample a number of times equal to the possible cut-offs

Table A1.3: MWP estimates using job satisfaction - alternative estimators

	Pooled Ordered Logit		**BUC**	
	MWP	**S.E.**	**MWP**	**S.E.**
Hours: 1-15	-0.997***	0.004	-0.877***	0.052
Hours: 16-30	-0.930***	0.055	-0.673***	0.083
Hours: 49+	-0.212	0.274	0.292	0.212
Work at Night	2.827	2.255	0.495	0.336
Rotating Shifts	0.931	1.028	0.831	0.519
Flexitime	-0.215	0.486	-0.234	0.168
Other Flexible	0.195	0.958	0.720	0.512

Notes: *** p<0.01, ** p<0.05, * p<0.1. MWP's are expressed as fraction of real mothly earnings. MWP's for each characteristic are obtained using coefficients from table A1.2, columns 3 and 5. MWP's for Flexitime and Other Flexible are obtained using coefficients from the same tatable, columns 4 and 6; Standard Errors are obtained using Delta Method