UNIVERSITY OF ABERDEEN

CELMR

What Triggers Multiple Job-Holding? A Stated Preference Investigation

H. Dickey, V. Watson & A. Zangelidis

What Triggers Multiple Job-holding?

A Stated Preference Investigation

H. Dickey♣, V. Watson♦ & A. Zangelidis♠

July 2015

Abstract

This paper examines individuals' preferences for multiple jobholding (moonlighting) and relates this to characteristics of hypothetical primary and secondary jobs using a discrete choice experiment. This is a novel approach to this issue that overcomes the limitations of existing studies that solely rely upon observed moonlighting behaviour, and allows us to investigate the relative importance of competing theoretical explanations of moonlighting. We find that individuals have multiple jobs to respond to financial constraints, and that individuals are attracted to second jobs that allow them to develop new skills, which they may later use to move to a different career pathway.

♣ Economics, Business School, University of Aberdeen, Aberdeen, AB24 3QY, Scotland, UK. email: h.dickey@abdn.ac.uk

♦ Health Economics Research Unit, University of Aberdeen, Forresterhill, Aberdeen, Scotland AB25 9ZD, UK; email: v.watson@abdn.ac.uk

♠ Corresponding author. Economics, Business School, University of Aberdeen, Aberdeen, AB24 3QY, Scotland, UK. Email: a.zangelidis@abdn.ac.uk

What Triggers Multiple Job-holding?

A Stated Preference Investigation

1. Introduction

In this paper we focus on individuals' willingness to hold a second job and study their labour supply decisions when presented with various hypothetical employment scenarios. There has been to date very little empirical analysis of why individuals moonlight because of a lack of data suitable for answering this question. We use the term "moonlighting" liberally to refer to multiple job-holding, without making any implications regarding the legitimacy or the time the described actions take place.

Large micro datasets ask respondents whether they have a second job, but no dataset explicitly gathers information on why individuals choose to hold more than one job. Most datasets focus on revealed preference data and only report second job characteristics for individuals who moonlight. But there are three reasons why an individual will not moonlight and each reason implies a different individual labour supply decisions. These decisions cannot be separately distinguished using existing micro datasets: (1) Individuals are not interested in moonlighting, (2) Individuals would like to moonlight, but they cannot find a second job with attractive features, and (3) Individuals would like to moonlight but they cannot find employment. Furthermore, there are two reasons why an individual cannot find employment in a second job and another individual can. First, observed moonlighters may be more informed or more engaged in the job market, which allows them to identify job opportunities, or they could be more aggressive in their job search. Second, multiple-job-holding is the outcome of a two-step process: an individual queues for a second job, and the employer hires the individual from a pool of applicants. Moonlighters and non-moonlighters may also differ in their employability.

We focus on the individual's decision to moonlight and relate this to (hypothetical) characteristics of the primary job and second job using a form of conjoint analysis, a discrete choice experiment (DCE). This stated preference method elicits individuals preferences for different multiple job combinations. This approach allows us to

investigate the relative importance of competing theoretical explanations for moonlighting. The advantage of this our approach is that it considers all individuals whereas the majority of the literature constrains its attention to only those who are observed holding a second job. This is a novel approach to this issue that overcomes the limitations of the existing studies that solely rely upon second-job searches that are successful.

Data are from primary data collection using a survey of individuals who are employed in the U.K. North Sea oil and gas industry. These workers are chosen because their jobs are characterised by strict hours constraints in a risky work environment. This will help us identify the various motives for holding a second job. Second jobs can help individuals overcome labour supply constraints (Conway and Kimmel, 1998), therefore offshore workers who face restrictions in their working hours may view multiple job-holding as a way to overcome this constraint and increase their labour income. Furthermore, individuals who may be wishing to reduce their exposure to workplace risk may use a second job as a means of learning new skills that will enable them to move to an alternative career pathway (Guariglia and Kim, 2006; Panos *et al*, 2014).

The paper is organized as follows. Section 2 presents the theoretical background of moonlighting and reviews empirical studies on multiple-job-holding. Section 3 discusses methods of data collection, Section 4 presents and discusses the results and Section 5 concludes.

2. Theory and Literature

The standard theoretical framework assumes that an individual's labour supply decisions on both the primary and secondary jobs are based on utility-maximising behaviour. An hours-constrained worker does not work sufficient hours on his primary job to reach the level of income that optimises his utility. For the hours-constrained worker, primary job hours are no longer a choice variable, and the only avenue for working more hours is to take a second job (Conway and Kimmel, 1998). Therefore, in response to an employer's inability to offer enough hours on the primary job, the individual may choose to moonlight in order to achieve his desired income level. In this

2

case, an individual moonlights because he cannot work as many hours as he would like on his primary job.

Early empirical research investigating moonlighting primarily focused on the hours constrained motivation. Early descriptive studies such as Hamel (1967) Guthrie (1969) find that the level of a worker's earnings determines his propensity to moonlight with the incidence of moonlighting declining as the level of earnings rises, and that moonlighting serves primarily to improve living standards, respectively. The first theoretical and empirical treatment of moonlighting was carried out by Shishko and Rostker (1976) who suggest that the supply of labour to a second job fell with primary job earnings. Krishnan (1990) also finds that longer hours and higher income on the primary job deters moonlighting, adding further support to the hours constraints motive for moonlighting.

Apart from the hours constraints motive, the literature has identified some additional motives for moonlighting. The heterogeneous jobs explanation of moonlighting recognises that individuals who do not face an hours-constraint on their primary job may also choose to work a second job. By definition, non-constrained moonlighters are those employees who could work more hours on the primary job if they wished to. Moonlighting arises because the hours of labour supplied to the two jobs are not perfect substitutes. Individuals will choose to moonlight for reasons not connected to primary job hours or earnings. For example, an individual may have a second job to learn about new occupations or gain credentials and experience; to engage in activities that interest them; to gain job satisfaction not received from the primary job; to insure against job insecurity; or to maintain flexible work schedules.

More recent research has investigated alternative moonlighting motives. For instance, the dynamics of moonlighting are investigated by Kimmel and Conway (2001) for the U.S. and Böheim and Taylor (2004) for Great Britain. They find evidence of multiple motives for moonlighting, with the hours constraints motive being the most common. Böheim and Taylor find that moonlighting is persistent over time and conclude that hours constraints is unsatisfactory as an explanation for moonlighting. Patterns of mobility into and out of second jobs over time are examined by Paxson and Sicherman (1996), who conclude that moonlighting is a dynamic process with most workers

experiencing moonlighting at some point in their working lives, and that the hours constraints explanation for moonlighting fails to account for the fact that over time workers can avoid hours constraints by searching for new jobs. Bell *et al.* (1997) investigate if moonlighting acts as a "hedge" against unemployment, but little evidence is found to support this motive for moonlighting. Evidence from transition economies suggests that moonlighting is likely to be transitory and correlated with future job mobility. Guariglia and Kim (2006) find that moonlighting is transitory and generally associated with career shifts, and Panos, Pouliakas and Zangelidis (2014) suggest that moonlighting may facilitate job transition by acting as a stepping stone towards new primary jobs, particularly self-employment.

The motivations for multiple job-holding amongst offshore workers in the North Sea oil and gas industry are investigated by Dickey, Watson and Zangelidis (2011) using the same sample of individuals as used in this paper. This study differs in several important respects. Dickey *et al* (2011) focussed only on the sub-sample of respondents who had two jobs and explored what may induce people to hold a second job for financial reasons as opposed to other non-pecuniary motives. This analysis used revealed preference data from the questionnaire. This study uses stated preference data from all respondents to the survey and allows us to identify individuals' preferences for different multiple job combinations. The respondents are presented with a number of scenarios describing a primary job and a potential second job. Respondents are asked to state whether they would take a second job conditional on the first job. This paper provides a new and unique contribution to the existing literature on multiple job-holding by the novel application of a discrete choice experiment, a stated preference method. Specifically, the methodological strategy allows us: (i) to use the full sample and explore why individuals seek a second job, rather than restricting the attention to actual realisations of second job-holding that involve individuals queuing for a second job and being selected by an employer; (ii) to pursue a more in-depth analysis of the work specific characteristics that appeal to individuals seeking a second job; and (iii) to calculate marginal rates of substitution and place a monetary value on features like job security, type of contract and other job characteristics.

4

3. The data

We collect data on working conditions and moonlighting behaviour using a survey individuals employed in the U.K. North Sea oil and gas industry. This industry plays an important role in the U.K.'s labour market by providing 480,000 jobs to individuals across the U.K., including 100,000 highly skilled jobs in Scotland. Offshore oil work is characterised by constrained working hours[1], risky working conditions[2], regular long periods of onshore time (during which they are not working in their primary job)[3], and high wages. Offshore workers may moonlight to overcome primary job labour-income constraints. Yet, offshore jobs tend to be well-paid jobs, and thus, individuals may not moonlight for financial or hours-constraint reasons, but rather for non-pecuniary reasons.

While the sample consists of a specific population within a particular industry, this study has broader relevance because the sample allows us to study multiple job-holding within the context of an industry that is strictly hours constrained with a hazardous working environment, and which encompasses the different motivations for holding more than one job. For instance, offshore workers may moonlight as a means to overcome labour supply restrictions, or as a way to obtain new skills and move to another career. The behaviour and motivations for multiple job-holding will be similar to multiple job-holding amongst workers in emergency services (firemen, policemen), the armed forces, and workers in the fishing and mining industries. For an investigation of moonlighting within the fisheries sector, see Dickey and Theodossiou (2006).

---

[1] The European Union working time regulations that came into force in 2003 impose a time constraint on offshore employees who are not able to freely adjust their working hours (Individuals may agree to work more than 48 hours per week, but the maximum number of working hours allowed over a 52 week period is 2304). Consequently offshore employees are labour-income constrained in their primary job.

[2] The Health and Safety Executive (HSE) (Key Programme 3: Asset Integrity Programme) raised concerns about worker safety in the UK oil and gas industry (HSE, 2007)

[3] In our sample, workers typically work four-week rotations. During which they spend two weeks offshore and two weeks onshore.

We investigate individuals' decisions to moonlight and relate this to characteristics of the primary job and second job using a form of conjoint analysis, a discrete choice experiment. This method originated in marketing research and has been applied to transportation research, and in environmental and health economics to elicit preferences for non-market goods (Kanninen, 2007). To date, the application of discrete choice experiments to labour market behaviour is not widespread (see Kristensen and Johansson; 2008, and Panos and Theodossiou; 2013, for studies that have adopted a job vignettes approach). Discrete choice experiments are based on Lancaster's theory of value (Lancaster, 1966), and can be used to estimate the trade-offs that individuals make between the dimensions of goods and services.

The first stage in designing a discrete choice experiment is the definition of the attributes or characteristics of the good or service. We define the good as an employment package consisting of a primary job and a potential second job. The characteristics of both the primary and the secondary job are selected to cover the range of possible moonlighting motivations suggested by the theoretical literature and to be realistic representations of the choices that offshore workers may face. An initial set of primary and second job characteristics were identified from the theoretical literature. These were refined in an iterative manner following a series of face-to-face interviews with key organisations in the U.K. oil and gas industry (including United Kingdom Offshore Operators Association (UKOOA), Step Change In Safety, and the AMICUS and OILC trade unions). During the interviews, the authors discussed the relevance of the identified characteristics to offshore workers and asked if any important characteristics of offshore work were omitted.

Based on the theoretical literature and interviews we describe the primary job using four characteristics; job security, job safety, offshore working time, and household financial situation. Similarly, the second job is described using four characteristics; type of second job, job satisfaction, new career and wages. Having selected the characteristics to include in the discrete choice experiment, levels or realisations must be attached to each of the characteristics. These levels should be plausible descriptions of primary and second jobs that offshore workers could have. The levels should cover the possible range for each of the characteristics, and each level should be described in a way that is meaningful to respondents. Below we define each of the characteristics and their

6

corresponding levels and then we relate these characteristics to the theoretical literature. A summary of the attributes and levels and how these relate to the moonlighting motivations proposed on the existing literature is also provided in Appendix A.

The primary job was described by four characteristics. If individuals moonlight as a hedging strategy against unemployment then the **job security** of the primary job is a relevant characteristic. Offshore workers are typically employed on one of three types of contract that differ in security; temporary contract (lasting less than 12 months), fixed term contract (lasting between one and three years), and permanent contract. Consequently, the attribute job security described by these three contract types is included in the discrete choice experiment.

The heterogeneous jobs argument states that individuals in jobs with high risk of accidents may get a second job as a "way out" of their primary job. The extraction of oil and gas (both volatile substances) in the often harsh offshore environment means that offshore work can be risky. The **job safety** of the primary job was expressed by three levels; low risk of work related accidents, medium risk of work related accidents, high risk of work related accidents.

One way in which offshore workers hours/income are constrained is by the shifts that they work. These shifts are characterised by regular long periods of onshore time. At the time of data collection companies were changing their shift patterns. Based on the interviews **working time** was identified as an important primary job characteristic to respondents. Based on the proposed changes **working time** was described by two levels; two-weeks onshore and two weeks offshore, and three weeks onshore and two weeks offshore.

The fourth primary job characteristic is the **household's financial situation** this captures the household's need, and was expressed qualitatively. Explicit quantitative income levels for this characteristic were avoided because how well a specified income satisfies a household's needs depends on the household composition. To ensure that the **household's financial situation** was interpreted in the same way by all respondents three levels were chosen; income is not enough to cover regular expenses, income is just enough to cover regular expenses, income is enough to cover regular expenses and have

7

some savings. We deliberately specify household financial situation instead of earnings from the primary job because this variable is more informative since individuals may come from households varying in size and composition, and therefore the salary earned may not accurately reflect their overall financial capacity.

The second job is also described by four characteristics. In the characteristics of the second job we distinguish between salaried and non-salaried employment, thus **type of second job** can take three levels; self-employed, part-time employee, full-time employee. The **job satisfaction** derived from the second job was expressed as two levels. The second job was either "a job you enjoy" or a job that "doesn't offer any particular satisfaction". The opportunities that the second job provides to gain skills and experience that would help individuals to start a **new career** were expressed by two levels; the second job would either provide an opportunity to "gain experience to start a new career" or would not provide an opportunity to gain experience to start a new career. The income from the second job was expressed as the **wages** earned per onshore period. The calculation of the weekly wages from the second job will depend on whether the **working time** in the primary job provided two weeks onshore or three weeks onshore. Similarly, if the **wages** from the second job were expressed as weekly wages, total earning would also be affected by the **working time** in the primary job. The **wages** were explicitly defined in quantitative terms as a continuous variable to allow the marginal rates of substitution between wages in the second job and the other primary and secondary job characteristics to be calculated. The **wages** were described by six levels £300, £600, £900, £1200, £1500, and £1800 per onshore period (the range was based on the distribution of second job earnings reported in the British Household Panel Survey).

The characteristics of the primary job and second job are combined to define a primary plus second job employment 'package'. To calculate the relative importance of each of the primary and second job characteristics in a respondent's decision to moonlight, respondents are asked to imagine that they are employed in the primary offshore job specified and then state if they would take the second job as described. **Figure 1** provides an example of this choice. Discrete choice experiments have typically presented respondents with choice sets containing two or more packages and asked them to select their most preferred package. This multiple-choice format is not suitable

8

for our research question because we are interested in how the characteristics of both the primary job and second job affect the respondent's moonlighting decision. Thus, to be able to identify the effect of each of these characteristics in individuals' decision, characteristics of both jobs should be included in the discrete choice experiment. We do not present two (or more) primary and second job packages and asked individuals to select the package they would prefer, because in this case the moonlighting decision cannot be separated from the primary job decision. We aim to mimic reality by assuming that individuals hold a primary job and then have the decision to take on a second job or not.

[Figure 1]

In total the discrete choice experiment includes eight job characteristics. A full factorial combination of these characteristics and their levels results in 3,888 primary and potential second job packages. These are too many to ask any one respondent to evaluate. Thus the number of packages must be reduced for the questionnaires. The reduced number of packages needs to provide sufficient data to permit estimation of the relative importance of each characteristic, and when the number of packages is reduced the characteristics of support should not be correlated with each other. To select the job packages to present in the questionnaire from the set of all possible combinations we used experimental design theory and an orthogonal main effects plan (Cox, 1958; Sloane – website). This reduced the number of combinations to 36. Due to the possibility of respondent fatigue, these were more combinations than we wanted to include in one questionnaire. Thus, we split the 36 packages into two sets of 18 packages. Discrete choice experiments typically ask respondents to make between 8 and 32 choices (Kanninen, 2007; Bech et al, 2010). The task's complexity for respondents may be increasing in the number of choices, and respondents may become fatigued as they progress through the choices (Swait and Adamowicz, 2001). Furthermore, longer questionnaires on average have lower response rates (Dillman 2001). One solution is spread the choices over several versions of the questionnaire with a sub set of choices in each version. However, the effect of complexity, respondent fatigue, and longer questionnaires on response rates must be balanced with the possibility of a low or zero response rate to one or more questionnaire versions; an outcome that would prevent the DCE data from being analysed. To assign the packages to one of the two sets we

9

added an additional two level variable to the experimental design. By assigning packages to each of two sets in this way we ensured that attribute levels were balanced and orthogonal both within and across sets (Hensher et *al.*, 2006).

From the two sets of 18 choices, we developed two questionnaires, which were identical except for the DCE choices (see Appendix B). Data were collected using self-completed questionnaires. For the design of the questionnaires the authors consulted key organisations in the Oil and Gas industry, including United Kingdom Offshore Operators Association (UKOOA), Step Change In Safety, and the AMICUS and OILC trade unions. The questionnaires were distributed, through the offshore installation managers (OIMS) of 152 different UK North Sea offshore installations, to a random sample of 760 offshore workers in January 2007. This represents approximately 96% of all the UK North Sea offshore installations. Data collection took place over three months. In addition to the stated preference data, the questionnaire collected information about the personal characteristics and job characteristics of the respondents.

4. Analysis of the discrete choice experiment

Analysis of discrete choice experiment data is based on random utility theory (RUT) (McFadden, 1973). We assume that that there are two alternatives for the individual to moonlight or not. Thus, the indirect utility function for respondent *n* can be written as

$$u_{in} = u_i(\mathbf{z_n}, \varepsilon_{in})$$

where i = 1 when the respondent moonlights and i = 0 when the respondent does not moonlight. The determinants of utility are represented by z_n a multidimensional vector which includes a vector of primary job characteristics x^p and a vector of second job characteristics x^s. We assume that the individual knows his preferences with certainty, but these preferences contain elements that are unobservable by the researcher, ε_{in}. We assume that respondents will moonlight when the change in utility from u_{1n} to u_{0n} is positive. The multidimensional vector z_n is assumed to be linear-in-parameters. By using an orthogonal main effects plan to select the profiles included in the discrete choice experiment, we assume that the utility function is linear in parameters. Thus, we can identify the main effect of each characteristic, but interaction terms between

10

characteristics are confounded. By assuming the additive stochastic component ε_{in} is independent and identically distributed (IID) extreme value type 1, a logit model is used for estimation. The probability that respondent, n, in choice set t chooses to moonlight in second job j with characteristics x_j^s given the characteristics of the primary job x_j^p is:

$$P_{n\,t}(moonlight_j|\,\mathbf{z}_{nj}) = \frac{1}{1 + e^{-\beta x_{nj}}}$$

However, each respondent makes up to 18 choices and we have panel data. Thus, ε_{in} may not be independently distributed due to error correlations within the set of choices made by the same respondent. To allow for this, we estimate a random effects logit.

$$P_{n\,t}(moonlight_j|\,\mathbf{z}_{nj}) = P(x_{nj}\beta + v_n)$$

The models above assume that the parameters β are the same for all respondents, i.e. respondents on average have the same preferences. In addition, preference heterogeneity can be incorporated into this model using a random parameters panel logit model (Train, 2001). The random parameters model assumes that β_n is a vector of coefficients for individual n representing the individual's tastes. This model considers the likelihood of observing a sequence of choices. This is represented as the product of the logit probabilities.

$$S_n = \prod_t^T \{P_{n\,t}(moonlight_{jt}|\,x_{jt}^p)\}$$

The coefficients can vary across the population with density $f(\beta)$. If β_n were known to the researcher, then the probability of respondent n making a sequence of choices S_n would be conditional on β_n. As this is not the case, the probability of observing a sequence of choices is the integral over all possible values of β_n.

$$P_n = \int S_n(\beta)f(\beta)d(\beta)$$

In this case, the coefficients may vary over respondents but are constant for all choices made by the same respondent. To estimate the random parameters logit, the researcher must first specify the independent variables that vary across the population and the

distribution of each of the random coefficients. Most applications of the random parameters logit to date have specified $f(\beta)$ as normal or log-normal.

A random parameters logit model where the constant term is specified as random with a normal distribution is an approximation to the random effects logit. We compare the random effects logit, with a random parameters logit where the constant is specified to have a normal distribution, and a random parameters logit where preference heterogeneity is incorporated by specifying that the coefficients of all attributes in the discrete choice experiment are random. The fit of the models is compared using the Akaike Information Criterion (AIC).

5. Results

A total of 330 individuals completed and returned questionnaires. This represents a 43% response rate[4]. Of these 330 respondents to the questionnaire, 314 respondents were male. Given the low number of female respondents we focus the analysis of the discrete choice experiments on male respondents. **Table 1** reports demographic and job characteristics for the sample of male respondents[5]. The profile of the average respondent is that of a male worker, aged 44, who is married or co-habitats and has a child.

[Table 1]

---

[4] Most applications of discrete choice experiments have elicited the public's (or a relevant group's) willingness to pay for public goods such as the environment or health care, or for transportation. For existing studies response rates vary widely from less than 20% (for studies of the general public's preference for public goods) to over 90% (for studies of patients' preferences for health care). As with all survey research, non-response bias is a concern.

[5] Typically studies compare the characteristics of respondents with the characteristics of the population of interest, in our case offshore workers in the UK oil and gas industry. To the authors knowledge, no official data from the oil and gas industry sector are available that describe the characteristics of offshore workers. However, an inspection of the demographic characteristics of the sample of the individuals employed in the "extraction of crude petroleum and natural gas" sector and the "service activities incidental to oil and gas extraction excluding surveying" sector (available in the British Household Panel Survey) did not uncover notable differences to the sample characteristics of this study.

In the discrete choice experiment respondents were asked a series of 18 choices, resulting in a panel dataset of 5,652 observations. Respondents were roughly equally split over the two versions of the questionnaire (167 respondents to version 1 and 147 respondents to version 2). Even though respondents were asked to complete 18 choices there was little evidence of item non-response. The number of missing values for each choice question across both versions of the questionnaire is reported in Appendix B, this ranges from zero to a maximum of 3. Furthermore, there is no evidence of higher item non-response rates to later choices in the discrete choice experiment. We acknowledge that this is a crude proxy for respondent fatigue. It is possible that the variance of responses increases over the choices. However, all respondents completed the choices in the same order so it is not possible to identify more subtle effects of fatigue. The proportion of respondents stating that they would moonlight in the specified second job (given the primary job) varied over choices in the discrete choice experiment (Appendix B): for example, 4.82% of respondents would moonlight in the package presented in choice 3 of version 1, while 86.14% of respondents would moonlight in the package presented in choice 7 of version 1. Overall of the choices, 51.22% of respondents stated they would moonlight.

Table 2, Model 1 reports the results of the random effects logit model where the dependent variable is whether the respondent stated they would moonlight or not[6]. All attributes included in the discrete choice experiment (except for income from the second job) are categorical and thus are coded as dummy variables. While income for the second job was presented as one of six levels, we include this in the model as a continuous variable in order to permit the calculation of marginal rates of substitution. This is in line with applications of discrete choice experiments. We explored model specifications that included terms to estimate the effect of respondents' socioeconomic characteristics on their propensity to moonlight. These variables were not significant and thus were omitted from reported models. We also explored whether people tend to

---

[6] The model was re-estimated using a random parameters repeated discrete choice model where only the constant term was specified as random with a normal distribution. This is an approximation to the random effects logit and the results from both models were qualitatively similar. The estimates are available upon request from the authors.

respond differently to hypothetical scenarios depending on their current employment conditions using interaction terms. We find no supporting evidence and do not report the interactions terms in the presented results.

Ceteris paribus, there is a disinclination to moonlight, as indicated by the statistically significant negative constant term. All job characteristics included in the discrete choice experiment have a statistically significant effect on the probability that a respondent would state he was willing to moonlight, except working time. Thus, respondents would moonlight to overcome financial constraints which they may face, but financial motives are not sufficient to explain this labour market behaviour: heterogeneous-jobs motives are also important in the decision to hold a second job.

[Table 2]

Working on a temporary contract (lasting less than 12 months) relative to a fixed term contract (lasting between 1-3 years) in the primary job significantly increased the probability of moonlighting, suggesting that individuals would get a second job as a way to insure against job insecurity. Relative to a primary job with low risk of injury, a primary job with a high risk of injury increased the probability of moonlighting.

Relative to household income from the primary job 'not being enough', household income levels of 'just enough' and 'more than enough' had a negative effect on the probability of moonlighting: this is evidence of the financial motives behind moonlighting. Relative to a full-time second job, a part-time second job and a self-employed second job both increased the probability of moonlighting. A finding that may be interpreted as evidence that individuals may hold a second job in order to maintain flexible work schedules.

Respondents were more likely to state that they would moonlight if the second job provided job satisfaction, and similarly if the second job offered an opportunity to gain experience to start a new career. This is an indication that workers may view second job-holding as a means of obtaining new skills that would enable them to exit their current primary offshore job and pursue alternative employment pathways. The earnings from the second job had a positive effect on respondents' probability of stating they would moonlight. The results of the random effects logit indicate that approximately 45% of the variance in the model is from the panel-level variance (ρ=0.448).

14

Table 2, Model 2 reports the results of the second random parameters logit model, where all coefficients except earnings from the second job, and the constant were specified as random. There were no strong a-priori reasons to restrict the sign of the coefficients to be either positive or negative, thus normal distributions were specified for all variables. The constant term is fixed (not specified as random) to aid model identification. We use the results of the model to calculate the marginal rates of substitution between a change in attribute levels and earnings from the second job. Thus, the coefficient of the earnings attribute is fixed, to aid the calculation of these marginal rates of substitution (Train, 2001). Simulation was performed using 2000 Halton draws.

Compared to the random effects logit model, the random parameter logit models have improved model fit, indicated by the lower (absolute) value of the log likelihood at maximisation and lower value of the Akaike Information Criteria. The parameter estimates from the logit and random parameters logits are not directly comparable because parameter estimates and model variances are confound in discrete choice models. In Model 2, for all attributes the standard deviation is significant at the 1% level; this indicates that preferences vary in the sample. With respect to the primary and second job characteristics which were statistically significant in the logit model the results are qualitatively the same. Consider the attributes that were not significant in the logit model (permanent contract, medium risk, and working time), in the random parameters logit model the mean is not significant but the standard deviation is significant. This implies that within the sample these variables have opposing effects on respondents' probability to moonlight.

The estimated means and standard deviations indicate the share of the population that place a positive or negative value on job attributes (**Table 3**). The mean and the standard deviation of the normally distributed parameter are obtained from the estimates. These are then converted to a standard normal distribution, by dividing the mean estimate by the standard deviation estimate resulting in z, this gives the equivalent point for the mean in a standard normal distribution. Given the standard normal distribution has mean 0 and is symmetric, one can calculate the amount of the distribution between 0 and z and add this to or subtract this from 0.5 (depending on the sign of the coefficient) to determine the proportion of the parameter distribution

15

that is positive and negative. Consider the distribution of the estimated coefficient for part-time (compared to full-time) second job, the estimated mean is 0.389 and the estimated standard deviation is 1.078, thus 64% of the distribution is positive and 36% of the distribution is negative. This implies that a part-time second job is preferred to a full time second job for about two thirds of the sample and one third of the sample would prefer a full-time to a part-time second job. Similarly, over three quarters of the sample would prefer a second job that would give them the opportunity to develop new skills and pursue a new career, and a second job that offers them job satisfaction.

[Table 3]

The ratio of the first job characteristics coefficient to the second job earnings coefficient is a measure of the amount of monetary compensation required in the second job to make respondents' utility equivalent to the base category for that attribute. The marginal rates of substitution for the random parameters logit[7] are presented in **Table 4**. For instance, to compensate workers for a temporary contract compared to a fixed contract, an individual needs to earn £260 more from their second job, ceteris paribus. Similarly the ratio of the second job characteristics coefficient to the second job earnings coefficient is a measure of respondents' willingness to pay for these characteristics compared to the base category for that attribute. All other things equal, respondents are willing to pay £413 in order to be self-employed in their second job. In other words being self-employed, compared to being a full-time employee, in the second job is equivalent to earning £413 more from that job. This is a novel approach in the literature that enables us to tease out the multiple motives for holding a second job and sheds more light on their relative importance by assigning a monetary value to both primary and secondary job characteristics. One of the interesting outcomes is that individuals appear to highly value the job satisfaction they receive from the second job, and the opportunity to use a second job as a way to gain new experience and start a new career. This is an important finding because it suggests that secondary employment can act as an incubator for new skills and labour market experience, and highlights the

---

[7] This is the authors' preferred estimate. The marginal rates of substitution based on the random effects logit model are also available upon request.

possibility of human capital spillover effects between primary and secondary jobs. Furthermore, it may potentially be an indicator of quit intentions from the offshore industry.

[Table 4]

We calculated the marginal rates of substitution to eliminate scale parameter confound found in binary choice models and to present the coefficients into a meaningful metric. In considering the results one should focus on the relative, rather than the absolute, magnitude. The absolute magnitude may be inflated by two factors. First, the sample is drawn from a high-paid sector and thus respondents may have a lower marginal utility of income than the population. Second, studies have indicated that stated preference studies are prone to hypothetical bias (List and Gallet, 2001; Blumenschien et al, 2008). Two studies have empirically investigated the correspondence between hypothetical and real valuations elicited using discrete choice experiments and these give conflicting results. Carlsson and Martinsson (2001) find no significant differences in donations to an environmental charity. Lusk and Schroeder (2004) find significant differences in the probability of purchase for certified beef steaks. However, they find no significant difference in marginal rates of substitution. More evidence exists for the comparison of hypothetical and actual valuations obtained using the contingent valuation stated preference method. These studies typically report higher valuations when questions asked are hypothetical rather than real (Liljas and Blumenschein, 2000; List and Gallet, 2001). This evidence should be kept in mind when interpreting the marginal rates of substitution calculated from the discrete choice experiment.

A number of papers, starting with Adamowicz et al (1994), have explored merging stated preference and revealed preference responses to draw on the advantages of both types of data. We collected revealed preference data on respondents moonlighting and characteristics of the first and second job corresponding to those included in the discrete choice experiment. However, only 17 respondents reported moonlighting (similar rate to the national level). Including these observations in a joint model does not change our results.

6. Conclusion

Our paper contributes to the largely unexplored issue of why individuals hold multiple jobs. Theoretical models of moonlighting suggest there are two reasons for individuals to hold a second job: financial motives (hours-constraints) and non-pecuniary motives (heterogeneous jobs). We assess the relative importance of these motives using a discrete choice experiment. We investigate this using purposefully collected stated preference data from offshore oil and gas workers. This is a novel approach that allows us to identify the possible reasons for why individuals may look for a second job, and that overcomes the limitations of the existing literature that relies only upon observed multiple job holders. The offshore workers were chosen because of their strict hours constraint and their exposure to a risky work environment.

Second jobs are found to enable individuals to overcome financial constraints and increase their labour income. In addition, workers are also attracted to second jobs because they provide an opportunity to develop new skills that workers may later use to move to a different career pathway. Second job-holding may therefore be an informative indicator as it may reveal individuals' intentions to exit the offshore industry.

In contrast to previous studies such as Bell *et al* (1997), we do find evidence that moonlighting may be a hedging strategy against job insecurity in the primary job. Further, our study highlights specific job characteristics of second jobs that are appealing to those who moonlight for non-pecuniary reasons. The flexibility of the work schedule and the perceived level of job satisfaction from the secondary employment are important determinants of individuals' decisions to hold a second job. Our findings contribute to a better understanding of this labour market behaviour and demonstrate the usefulness of purposefully collecting data to investigate labour market phenomenon that are not adequately covered by existing large scale panel datasets.

References

Adamowicz, W., Louviere, J., & Williams, M. (1994). 'Combining Revealed and Stated Preference Methods for Valuing Environmental Amenities'. *Journal of Environmental Economics and Management*, 26, 271–292.

Bech, M., Kjaer, T., & Laudisen, J. (2010). 'Does the number of choices sets matter? Results from a web survey applying a discrete choice experiment'. *Health Economics*.DOI: 10.1002/hec.1587.

Bell, D. N. F., Hart, R.A. & Wright, R.E. (1997). 'Multiple job-holding as a 'hedge' against unemployment'. CEPR discussion paper series No. 1626.

Blumenschein, K., Blomquist, G., Johannesson, M., Horn, N. & Freeman P. (2008). 'Eliciting willingness to pay without bias: Evidence from a field experiment'. *The Economic Journal*, 118, 114-137.

Böheim, R. & Taylor, M.P. (2004). 'And in the evening she's a singer with the band – Second jobs, plight or pleasure?' IZA Discussion Paper No. 1081.

Carlsson, F. & Martinsson, P. (2001). 'Do hypothetical and actual marginal willingness to pay differ in choice experiments?' *Journal of Environmental Economics and Management*, 41, 179-92.

Conway, K. & Kimmel, J. (1998). 'Male labor supply estimates and the decision to moonlight'. *Labour Economics*, 5, 135-166.

Cox, D. R. (1958). *Planning of Experiments*, New York: John Wiley and Sons.

Dickey, H. & Theododdiou, I. (2006). 'Who has two jobs and why? Evidence from rural coastal communities in west Scotland'. *Agricultural Economics*, 34, 291-301.

Dickey, H., Watson, V. & Zangelidis, A. (2011). 'Is it all about money? An examination of the motives behind moonlighting'. *Applied Economics*, 43, 3767-3774.

Dillman, D. (2000). Mail and internet surveys: The tailored design method. John Wiley and Sons.

Guariglia, A. & Byung-Yeon K. (2006). 'The dynamics of moonlighting in Russia: What is happening in the Russian informal economy'. *Economics of Transition*, 14, 1-45.

Guthrie, H.W. (1969). 'Teachers in the moonlight'. *Monthly Labour Review*, 92, 28 – 31.

Hamel, H.R. (1967). 'Moonlighting – An economic phenomenon'. *Monthly Labour Review*, 90, 17 – 22.

Heineck, G. & Schwarze, J. (2004). 'Fly me to the moon - The determinants of secondary jobholding in Germany and the UK'. IZA Discussion Paper No. 1358.

Health and Safety Executive (2007). *Key programme 3: Asset integrity programme. A report by the offshore division of HSE's hazardous installations directorate.* http://www.hse.gov.uk/offshore/information.htm.

Hensher, D., Rose, J. & Greene, W. (2006). *Applied Choice Analysis*, Cambridge MA: Cambridge University Press.

Kanninen, B. J. (Ed.) (2007). Valuing Environmental Amenities Using Stated Choice Studies: A Common Sense Approach to Theory and Practice. Dordrecht, The Netherlands: Springer.

Kimmel, J. & Conway, K.S. (2001). 'Who moonlights and why? Evidence from the SIPP'. *Industrial Relations*, 40, 89-120.

Krishnan, P. (1990). 'The economics of moonlighting: A double self-selection model'. *Review of Economics and Statistics*, 72, 361-7.

Kristensen, N. & Johansson, E. (2008). 'New evidence on cross-country differences in job satisfaction using anchoring vignettes'. *Labour Economics,* 15, 96 – 117.

Lancaster, K. (1966). 'A new approach to consumer theory'. *Journal of Consumer Theory*, 74, 132-157.

Liljas, B. & Blumenschein, K. (2000). ,On hypothetical bias and calibration in cost benefit studies'. *Health Policy*, 52, 53-70.

List, J. A. & Gallet, C. A. (2001). 'What experimental protocol influence disparities between actual and hypothetical stated values?' *Environmental and Resource Economics,* 20, 241-54.

Lusk, J. L. & Schroeder, T. C. (2004). 'Are choice experiments incentive compatible? A test with quality differentiated beef steaks'. *American Journal of Agricultural Economics*, 86, 467-482.

McFadden, D. (1973). 'Conditional Logit Analysis of Qualitative Choice Behaviour'. In P. Zarembka (Ed), *Frontiers in Econometrics*. New York: Academic Press.

Panos, G.A., Pouliakas, K. & Zangelidis, A. (2014). 'Multiple job holding, skill diversification and mobility'. *Industrial Relations: A Journal of Economy and Society*, 53, 223 – 272.

Panos, G.A. & Theodossiou, I. (2013). 'Reciprocal loyalty and union mediation'. *Industrial Relations: A Journal of Economy and Society*, 52, 645 – 676.

Paxson, C. & Sicherman, N. (1996). 'The dynamics of dual job holding and job mobility'. *Journal of Labor Economics*, 14, 357 – 393.

Shishko, R. & Rostker, B. (1976). 'The economics of multiple job holding'. *American Economic Review*, 66, 298 – 308.

Sloane, N. J. A. A library of orthogonal arrays (website) http://www.research.att.com/~njas/oadir/index.html

Train, K. (2001). *Discrete Choice Methods with Simulation*. Cambridge, MA: Cambridge University Press.

Figure 1: Example of a primary and second job package, and the choice that respondents were asked to make

Current job characteristics and financial situation	Second job characteristics
• **Fixed-term** contract (lasting between 1 and 3 years) • **High risk** of work related accidents • You spend 2 weeks offshore and 3 weeks onshore • The household income is just enough to cover regular household needs	• You would be **full time** (usually more than 30 hours per month) • The job would not offer you any particular satisfaction • You would **gain experience to help you start a new career,** or build up a new business outside the oil industry • The usual monthly take home earnings are **£300**
If your current job and financial situation were as described on the left hand side above, would you take up the second job described? ○ ○ yes no	

Table 1: Demographic and job characteristics for male only sample

	Mean/%
Individual & household characteristics	
Average age (years)	44.2
Household size	3.0
Married/living together	84%
No. of children in household	0.76
No. of contributors to household income	1.7
Education	
Up to secondary school education	23%
Diploma/Vocational qualifications	60%
University degree	11%
Postgraduate degree	4%
Annual household income	
Less than £15,000	1%
£15,000-£19,999	1%
£20,000-£24,999	3%
£25,000-£29,999	14%
£30,000-£39,999	20%
£40,000-£49,999	18%
£50,000-£59,999	42%
Financial Situation	
Living comfortably	42%
Doing alright	44%
Just about getting by	12%
Finding it quite difficult	1%
Finding it very difficult	1%
Primary job	
Monthly net pay	3096.5
Hours worked per day	13.0
Days worked per month	15.1
Temporary contract	4%
Fixed contract	7%
Permanent contract	89%
Preference over work hrs: more	0.03
Preference over work hrs: same	0.27
Preference over work hrs: less	0.70
No. of observations	314

Table 2: Results of discrete choice experiment for logit model and random parameters logit model

		Model 1: Random effects logit	Model 2: Random parameters logit (constant and 2nd job income fixed)	
		Coefficient (SE)	Coefficient (SE)	Standard Dev. (SE)
Type of contract[a]	Permanent	0.062 (0.086)	0.088 (0.115)	0.912*** (0157)
	Temporary	0.216*** (0.087)	0.260** (0.111)	0.059*** (0.218)
Job safety[b]	Medium risk	0.023 (0.085)	0.098 (0.114)	0.947*** (0.157)
	High risk	0.243*** (0.087)	0.319*** (0.122)	0.938*** (0.167)
Working time		-0.054 (0.071)	0.003 (0.099)	0.868*** (0.119)
Household income[c]	Just enough	-1.010*** (0.088)	-1.254*** (0.131)	1.147*** (0.149)
	More than enough	-1.944*** (0.093)	-2.231*** (0.132)	0.961*** (0.156)
Type of 2nd job[d]	Part-time	0.225*** (0.088)	0.389*** (0.121)	1.078*** (0.157)
	Self-employed	0.287*** (0.086)	0.413*** (0.111)	0.826*** (0.162)
2nd Job satisfaction[e]		1.037*** (0.075)	1.311*** (0.119)	1.175*** (0.133)
New career		0.827*** (0.072)	0.979*** (0.117)	1.319*** (0.136)
2nd job earnings (per onshore period)		0.001*** (0.000)	0.001*** (0.000)	
Constant		-1.883*** (0.173)	-2.451*** (0.181)	
σ_υ		1.634 (0.088)		
ρ		0.448 (0.027)		
Log (l)		-3341.83	-2901.86	
N		5577	5577	
Akaike Information Criterion		6709.66	5851.72	

Notes: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. a Omitted level: Fixed term contract; b omitted level: Low risk; c omitted level: not enough income; d omitted level: Full-time employment; e omitted level: doesn't offer any particular satisfaction; f omitted level: will not gain experience to start new career; g omitted level: no formal qualifications.

Table 3: Proportion of sample population with positive/negative coefficient for each job characteristic based on the random parameter logit estimates

Attribute	Level	Positive	Negative
Type of contract[a]	Permanent	50	50
	Temporary	50	50
Job safety[b]	Medium risk	50	50
	High risk	64	36
Working time		50	50
Household income[c]	Just enough	13.8	86.2
	More than enough	1	99
Type of 2nd job[d]	Part-time	64	36
	Self-employed	69	31
2nd Job satisfaction[e]		86.6	13.4
Entrepreneurial activities[f]		77.1	22.9

Notes: a Omitted level: Fixed term contract; b omitted level: Low risk; c omitted level: not enough income; d omitted level: Full-time employment; e omitted level: doesn't offer any particular satisfaction; f omitted level: will not gain experience to start new career; g omitted level: no formal qualifications.

Table 4: Marginal rates of substitution calculated using the random parameter logit estimates

Attribute	Level	Mean (£ per month)
Type of contract[a]	Permanent	.
	Temporary	260
Job safety[b]	Medium risk	.
	High risk	319
Working time		.
Household income[c]	Just enough	1254
	More than enough	2231
Type of 2nd job[d]	Part-time	389
	Self-employed	413
2nd Job satisfaction[e]		1311
Entrepreneurial activities[f]		979
Constant		2451

Notes: a Omitted level: Fixed term contract; b omitted level: Low risk; c omitted level: not enough income; d omitted level: Full-time employment; e omitted level: doesn't offer any particular satisfaction; f omitted level: will not gain experience to start new career; g omitted level: no formal qualifications.

Appendix A: Description of attributes and levels of discrete choice experiment

Attributes	Levels		Motivation for moonlighting
Primary job			
Job security	(i)	temporary contract (lasting less than 12 months)	Hedging strategy against unemployment (Bell *et al.*, 1997)
	(ii)	fixed term contract (lasting between one and three years)	
	(iii)	permanent contract	
Job safety	(i)	low risk of work related accidents	Heterogeneous jobs (Paxson and Sicherman, 1996; Kimmel and Conway, 2001; Böheim and Taylor, 2004)
	(ii)	medium risk of work related accidents	
	(iii)	high risk of work related accidents	
Working time	(i)	two-weeks onshore and two weeks offshore	Hours constraints/financial motives (Krishnan, 1990)
	(ii)	three weeks onshore and two weeks offshore	
Household's financial situation	(i)	income is not enough to cover regular expenses	Hours constraints/financial motives (Krishnan, 1990)
	(ii)	income is just enough to cover regular expenses	
	(iii)	income is enough to cover regular expenses and have some savings	
Secondary job			
Type of second job	(i)	self-employed	Heterogeneous jobs (Paxson and Sicherman, 1996; Kimmel and Conway, 2001; Böheim and Taylor, 2004)
	(ii)	part-time employee	
	(iii)	full-time employee	
Job satisfaction	(i)	"a job you enjoy"	Heterogeneous jobs (Paxson and Sicherman, 1996; Kimmel and Conway, 2001; Böheim and Taylor, 2004)
	(ii)	a job that "doesn't offer any particular satisfaction"	
New career	(i)	the second job would either provide an opportunity to "gain experience to start a new career"	Heterogeneous jobs (Guariglia and Kim, 2006; Panos *et al.*, 2014)
	(ii)	the second job would not provide an opportunity to gain	

		experience to start a new career	
Wages	Per onshore period:		
	(i)	£300	
	(ii)	£600	Hours
	(iii)	£900	constraints/financial
	(iv)	£1200	motives (Krishnan, 1990)
	(v)	£1500	
	(vi)	£1800	

Appendix B: Summary of the discrete choice experiment design and responses by questionnaire version

Version 1

First Job   Second job

Choice No	Job security	Job safety	Working time*	Financial situation	Type of 2nd job	Job satisfaction	New career	Income	Moonlight (%)	Missing
1	Fixed term	Low	2/2	Not managing	Self employed	Yes	Yes	600	71.95	2
2	Temporary	Low	2/2	Can save	Full time	Yes	Yes	900	49.70	1
3	Temporary	Low	2/3	Can save	Self employed	No	No	300	4.82	0
4	Permanent	Medium	2/3	Not managing	Full time	Yes	No	300	40.36	0
5	Permanent	Medium	2/3	Just managing	Self employed	Yes	Yes	1800	78.79	1
6	Permanent	Medium	2/2	Can save	Part time	No	No	1200	27.88	1
7	Temporary	High	2/3	Not managing	Part time	Yes	Yes	1200	86.14	0
8	Permanent	High	2/3	Not managing	Self employed	Yes	No	900	71.69	0
9	Fixed term	High	2/2	Just managing	Part time	No	No	300	12.12	1
10	Permanent	High	2/3	Just managing	Part time	No	Yes	600	42.42	1
11	Fixed term	Medium	2/2	Can save	Self employed	Yes	Yes	1500	65.64	3
12	Fixed term	Medium	2/2	Not managing	Part time	No	No	1800	67.48	3
13	Fixed term	Low	2/3	Just managing	Full time	Yes	Yes	1200	62.42	1
14	Permanent	High	2/2	Can save	Full time	Yes	No	600	21.34	2
15	Fixed term	Low	2/3	Can save	Part time	No	No	1500	27.61	3
16	Temporary	Medium	2/3	Just managing	Full time	No	Yes	900	43.56	3
17	Temporary	Low	2/2	Just managing	Self employed	No	No	1800	54.27	2
18	Temporary	High	2/2	Not managing	Full time	No	Yes	1500	79.88	2

Notes: * 2/2 denotes the level two weeks offshore and two weeks onshore, and 2/3 denotes the level two weeks offshore and three weeks onshore

Version 2

First Job   Second Job

Choice No	Job security	Job safety	Working time*	Financial Situation	Type of 2nd job	Job satisfaction	New career	Income	Moonlight (%)	Missing
1	Fixed	High	2/2	Just	Full time	No	Yes	300	27.40	1
2	Temporary	Medium	2/2	Just	Self employed	Yes	No	1200	66.44	1
3	Fixed	Medium	2/3	Save	Part time	No	Yes	900	33.56	1
4	Temporary	High	2/3	Save	Part time	Yes	Yes	1800	75.42	1
5	Temporary	Medium	2/2	Save	Full time	No	No	600	12.41	2
6	Fixed	Low	2/3	Not	Full time	No	No	1200	56.25	3
7	Permanent	Low	2/2	Just	Part time	Yes	Yes	1500	72.11	0
8	Temporary	Low	2/3	Just	Part time	Yes	No	600	42.47	1
9	Permanent	Low	2/3	Save	Self employed	Yes	Yes	300	32.19	1
10	Fixed	High	2/3	Save	Full time	Yes	No	1800	56.85	1
11	Permanent	Low	2/2	Not	Part time	No	No	900	57.93	2
12	Temporary	Medium	2/2	Not	Part time	Yes	Yes	300	61.81	3
13	Permanent	Medium	2/3	Just	Full time	Yes	No	1500	61.11	3
14	Fixed	High	2/2	Just	Self employed	Yes	No	900	58.33	3
15	Permanent	High	2/2	Save	Self employed	No	Yes	1200	41.67	3
16	Fixed	Medium	2/3	Not	Self employed	No	Yes	600	53.10	2
17	Temporary	High	2/3	Not	Self employed	No	No	1500	72.41	2
18	Permanent	Low	2/2	Not	Full time	No	Yes	1800	76.71	1

Notes: * 2/2 denotes the level two weeks offshore and two weeks onshore, and 2/3 denotes the level two weeks offshore and three weeks onshore

29