Too rich to do the dirty work? Job quality, search and wealth

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Abstract

This paper uses panel data on jobs and windfalls to investigate the impact of wealth on job choices in a framework of multidimensional jobs. In a labour market characterised by informational frictions, windfalls (lottery wins, inheritance...) are expected to affect job durations differentially depending on job quality (here measured by subjective job satisfaction). The impact of unanticipated wealth shocks on the demand for job characteristics can be reconstructed to test the hypothesis that rich people are more interested in good quality jobs. Tracking transitions after wealth shocks (both between jobs and to non-participation) provides a new strategy for assessing demand for non-monetary job characteristics.

A preliminary model allowing for endogenous changes in wealth (i.e. capital accumulation) in a qualitative labour market is sketched. The implications of allowing workers to save part of their earnings in a job search model are considered. (This is work in progress.)

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In November 2009 seven Hewlett Packard contract workers working in a British Telecom callcenter together won around 40 million pounds in the lottery. The workers were aged from 19 to over 60, some had been working in their current job for many years, others had only just joined after finishing school. They learnt of their winnings on Monday morning. By Monday evening all had resigned.

Would you give up your job if you had won? The hypothesis of this paper is that the answer to this question reveals something about workers' attitude to their workplace that is often difficult to observe: to what extent workers value their work *per se*, i.e. independent of the remuneration.

Sudden wealth changes can teach us something interesting about job choice. The role of wealth in the labour market is not often considered, although a considerable - and in some countries rising[1] - amount of income accrues in the form of unearned income. Wealth, it is often assumed, is derived from the labour market and does not influence it. In order to test this hypothesis, viz that labour market choices are related to wealth by a shift in preferences - non-monetary characteristics becoming more important - we use both choice and subjective data. Important unearned income may be derived in the form of lottery wins, inheritances and life insurance payouts. The second part of this paper looks at evidence on workers' reaction to such occasions in a framework where workers care about good wages and good working conditions - and have to search for jobs that have them. The third part introduces a more general framework that allows for wealth-accumulation (work in progress). We first turn to a review of the literature on wages, working conditions and wealth.

1 Wealth and the Search for Good Jobs

1.1 Job satisfaction and Job search

To what extent wage determination is influenced by "hedonic" factors has interested economists at least since Adam Smith formulated the basic prediction that employers would have to pay workers more to fulfill less satisfying tasks.

[1] As Picketty (2009) has suggested in a recent study on the evolution of inheritance in France

The classical marginalist interpretation is provided by Rosen (1986) who makes use of the basic competitive condition that the price of a product (here unobserved job characteristics) equals the marginal rate of substitution between it and money (here wages). Thus he shows that the price of job characteristics can be recovered from the wage differentials that workers accept for different job characteristics - under certain conditions. That these conditions are rarely satisfied has been noted by many economists: bad quality jobs often do not pay better.

Several authors have explored potential causes of the lack of wages to compensate for differential working conditions. In general these have turned either around unobserved heterogeneity in productivity or frictions in the labour market. Given that wage dispersion appears fairly important even when we control for worker and firm fixed effects using the best available datasets (e.g. Abowd et al. (1999)), the literature indicates that there is an important role for both of these factors. Different strategies have been used to try to assess the preference for job characteristics without directly using hedonic wage regressions:

Recent household surveys have included direct questions on job satisfaction and well-being, i.e. provide subjective data. These data can in theory allow an estimation of the impact of different job characteristics on reported well-being. Clark (2001) shows that data on job satisfaction predict quitting behaviour in the UK, and that it can be used to establish "what matters most in a job". Clark (1998) find that dissatisfied German workers, too, are more likely to quit. Bonhomme and Jolivet (2008) exploit the fact that some job mobility is involuntary and other job mobility not to argue that this can help identify the marginal willingness to pay for subjectively evaluated job characteristics.

In a job search framework, firms have limited monopoly power and wages may not show compensating differentials (Hwang et al. (1998)). However under certain conditions - for example in the standard Burdett-Mortensen search model (Burdett and Mortensen (1998)) - several authors have noted that identification of workers' marginal willingness to pay for job amenities is ensured if we have information on job durations as well as on wages and job characteristics. This provides for a fairly straightforward way of estimating this structural parameter in absence of a general equilibrium model. In this vein, van Ommeren et al. (2000) estimate the marginal willingness to pay for commuting distance in the Netherlands and Gronberg and Reed

(1994) use US data including a description of certain working conditions [2]. The fact that job satisfaction reduces job turnover rates has been noted for a long time (early papers are Hamermesh (1977) and Freeman (1978)). In this context, the job search framework then provides a method for estimating the associated marginal willingness to pay for better quality jobs.

1.2 Wealth in Job search

It is not straight-forward to include wealth-accumulation into models of job market search. Whilst it has been known for a long time that wealth has an impact on labour market participation , there are as yet few models of job search that include an analysis of the role of non-labour income. The difficulty arises because capital accumulation will in general influence workers behaviour in all aspects of the labour market: Analysing a model where job quality is purely monetary (high-paid and low-paid jobs) Algan et al. (2005) show that workers optimal labour market strategy consists of accumulating wealth in bad jobs and quitting in order to focus on job search for a good job - even if this means accepting a bad job again later on if no good job is found. Thus reservation wages will generally be a function of individuals' wealth holdings (see e.g. Lentz and Tranaes (2005), Lise (2007))

Taking into account wealth may be particularly relevant if we consider a labour market with more than one-dimensional jobs: capital allows workers to smooth utility by accumulating capital even though utility from job characteristics cannot be stored. This implies that the option value of a job with equal instantaneous utility is higher if it contains a higher monetary component. The value of a particular bundle of wage and working condition will then depend on the distribution of wages and working conditions and not only on the level of utility offered by the bundle.

An exogenous change in wealth holdings would directly influence individuals choices in a static framework by influencing the marginal utility of income. A simple form of the composite utility-function assumes additivity of the monetary utility of a job (wages) and the non-monetary component:

$$u(m, y) = u_1(m) + u_2(y) \tag{1}$$

[2] One variable concerned extreme heat, cold, vibrations; another described frequent crawling, crouching, kneeling; repetitive tasks where dummied and finally jobs including heavy lifting.

Where m is (log) income and y a measure of qualitative aspects of an employment - night work , job security or commuting time (see van Ommeren et al. (2000)). Empirical work has generally focussed only on labour income, but the argument of the function $u_1(.)$ can be enlarged to encompass savings and unearned income, i.e. returns to wealth.

Firstly, including wealth into an analysis of the relationship between working conditions and wages may explain some of the heterogeneity of the relationship between working conditions and wages.

Secondly, allowing for the possibility of saving should influence the set of accepted jobs - in a very loose sense, the possibility of spreading consumption over time allows for intertemporal compensation between high-paying jobs with low working conditions and low-paying jobs with good working conditions. To put it another way: there is a further reason for accepting a high-paying but cumbersome job: future periods in an agreeable employment environment can be financed by current-period savings.

Finally, in the framework of job choices, identifiable shocks to incomes or working conditions which may help identify the responsiveness (job quitting) are rather rare[3]. Once we take into account wealth, however, shocks to the monetary component of the utility function that may be expected to influence job choice are much more easy to identify: lottery wins, inheritance and other transfers may be considerable out-of-equilibrium events.

2 Labour Market Responses to Windfalls

This section investigates the impact of exogenous changes to wealth on job choice using panel data on windfalls, job durations, wages and working conditions. It is found that workers are differentially affected by wealth shocks, with more satisfied workers showing a significantly different reaction than less satisfied workers.

The basic assumption of job search models concerns the type of friction in the labour market: Workers do not have access to a full range of job offers at any point in time but rather job offers arrive according to a random process (which workers may influence by increasing their search intensity). Workers'

[3] An interesting study that avoids this problem is Bonhomme and Jolivet (2008) who compare forced and voluntary mobility.

acceptance strategy [4] then forms workers' labour demand for different (discrete) sets of wage-hour and wage-amenities packages. The characteristics of the accepted jobs and the job duration in jobs are the sources of information about the different components of labour demand. In a parametrised model job duration data can directly identify labour demand parameters of interest.

2.1 A Basic Model of Quality Job Search

The key assumption about the market is that workers cannot choose from the full set of job offers. Job offers arrive stochastically (at some Poisson rate λ) and we can allow for job search intensity. Define $s*(v(m,y))$ as the optimal search effort (a FOC from a function $e(s)$) given the characteristics of the current job ($v(m,y)$t. Allowing for on-the-job search then gives employed workers two reasons for leaving a job: With some probability δ they lose their job and with a probability $\lambda\ s(v(m,y))\overline{F}(v(m,y))$ they receive a job offer whose value exceeds the value of their current job offer, where $F(.)$ is the cdf of the value of a job to the worker (assuming homogeneous tastes across workers).

Workers care about consumption c, job quality y and not searching too much s. In this part, we assume that wealth is exogenous, so that wealth accumulation is not possible and all (unearned and earned) income is consumed. With no saving or dissaving $c = m = ra + w$.

$$u(c,y) = u(m,y) \tag{2}$$

In a given job $j(w,y)$ with wage w and working conditions y we then have the following instantaneous utility function:

$$u(m,y) = max_s\left[m(a,w) + y - e(s)\right] \tag{3}$$

Job offers $j(w,y)$ at wage w and quality y arrive stochastically at rate $\lambda s(u(m,y))$ (for workers and unemployed).

Assuming that job offers arrive at rate $\lambda s(u(m,y))$ for workers and unemployed allows the unemployed to have a higher job offer arrival rate - if they show a higher search intensity. The advantage of this set-up is that workers acceptance strategy will only depend on the instantaneous utility of a job: As the job offer arrival rate does not (exogenously) differ across

[4] In practice, most models imply a reservation wage as optimal strategy.

employment and unemployment, workers do not forego any option value by accepting a job offer with higher instantaneous utility: In the current framework the value of a job does not influence the value of future job offers [5]. In the case of one-dimensional jobs, where instantaneous utility corresponds to the offered wage, this implies that workers exit rate into other jobs will be governed by a reservation wage corresponding to the current wage level. In the more general framework with several job attributes, workers will move when the instantaneous utility of a job exceeds the current level.

If we make the further simplifying assumption that workers become unemployed at an exogenous poisson rate δ, the job leaving rate can be given as:

$$\theta(u(m,y)) = \delta + \lambda \; s^*(u(m,y)) \; \overline{F}(u(m,y)) \tag{4}$$

where $\overline{F}(.) \equiv 1 - F(.)$ and $F(.)$ is the distribution of instantaneous utilities from job offers which depends only on the joint distribution of wages and working conditions.

The job leaving rate varies over different levels of current job quality...

$$\frac{\partial \theta}{\partial y} = \frac{\partial u}{\partial y} \left[\frac{ds}{du} \; \lambda \overline{F}(u) + \frac{d\overline{F}(u)}{du} \lambda \; s(u(w,y)) \right] \tag{5}$$

... and over different levels of current wage:

$$\frac{\partial \theta}{\partial w} = \frac{\partial u}{\partial w} \left[\frac{ds}{du} \; \lambda \overline{F}(u) + \frac{d\overline{F}(u)}{du} \lambda \; s(u(w,y)) \right] \tag{6}$$

Putting the two together:

$$\frac{\partial \theta / \partial y}{\partial \theta / \partial w} = \frac{\partial u / \partial y}{\partial v / \partial w} \tag{7}$$

Following Gronberg and Reed (1994) we can thus estimate the marginal willingness to pay for job attributes by considering the differential job exit rates for different jobs, since the right-hand side of (7) is the marginal rate of substitution between wages and working conditions, i.e. the marginal willingness to pay for better working conditions y.

[5] This is no longer the case once we allow for counter-offers, as firms with higher productivity will be more predisposed to match offers, thus certain offers can be used by workers to raise their own wage without workers moving firms.

Thus regression analysis of job duration data can be used to make inference on this economically interesting statistic.

2.2 Wealth shocks in Quality Job Search

Considering that the workers' utility function includes not wages but all forms of income, then we can state the conditions under which wealthier individuals will show different MWPs than less wealthy individuals.

$$\frac{\partial}{\partial a}\left[\frac{\partial\theta/\partial y}{\partial\theta/\partial w}\right] = \frac{\partial}{\partial a}\left[\frac{\partial u/\partial y}{\partial u/\partial m}\right] \tag{8}$$

$$\frac{\partial}{\partial a}\left[\frac{\partial u/\partial y}{\partial u/\partial w}\right] = \frac{u_{y,m}\, u_m \;-\; u_{mm}\, u_y}{[u_m]^2} \tag{9}$$

Under standard assumptions of the form of the monetary utility function (concavity, i.e. diminishing marginal utility of income), expression (9) is positive. Consider an additice specification such as (1): Then $u_{ym} = 0$ and as $u_{mm} < 0$, (9) will be positive [6]. The reasoning for this is that the marginal utility of extra income is less important to individuals with a higher level of wealth. In the words of Gomes et al. (1997), "wealthy agents will be choosier" [7]. The MWP should thus increase after an exogenous change in wealth.

Sudden changes in non-labour income are expected to influence the marginal willingness to pay for non-monetary working conditions: rich workers will be less tempted to take on a cumbersome job given that their marginal utility of extra income is lower[8].

[6] When might more wealthy individuals show lower marginal willingness to pay for non-monetary job characteristics? This would require $u_{ym} < u_{mm}\frac{u_y}{u_m}$, i.e. that the marginal utility of better working conditions falls very fast as wealth increases. Most utility functions assume strategic complementarity, however, such that the cross-derivative is positive.

[7] The same effect has been interpreted as wealthy agents being prepared to do more risky jobs - see Danforth (1979)

[8] Lise (2007) also discusses a role for wealth in the marginal cost of search which may rise as a result of increased wealth which may counterbalance some of the decreased utility of search: if searching for a job is more costly for the rich. I see little relevance for such a search cost function, however.

2.3 Data

We use the British Household Panel Survey (a comparison with German data from the GSOEP is planned). This survey covers a sample of around 10,000 persons broadly representative of the British population over 17 yearly waves from 1991 onwards (with replacement of attrition) per wave.

Our main variables of interest are windfalls, subjective job satisfaction, job duration and wages, as well as demographic and firm control variables. Job market data falls in two categories: In every wave, workers are firstly asked about the characteristics of their current job, including a subjective evaluation of working conditions and detailed information on earnings. Secondly, workers are asked about changes in their position within a firm (e.g. promotion), changes of employer or labour market status (unemployment spells) in the preceeding year. This allows us to attribute a wage, working condition and duration to many jobs.

For reasons outlined below, we focus on individuals for which we have multiple observations who encounter at least one windfall during the panel observation period. For this subsample we have information on 10386 completed job spells from 3488 workers.

Given the specific factors involved in choosing retirement, the sample is restricted to those aged between 16 and 50, with an average age of 34 years. The sample is 49 percent female, 51 pct are married and average level of education is around 12 years (corresponding to an A level qualification, i.e. a relatively educated sample). 2 percent of the male and 30 percent of the female sample work part time. The main sectors are manufacturing (18 percent of workforce), sales and retail (14 pct), health and social services (14 pct); office work and real estate (12 pct); public administrative workers (12 pct); education (8 pct); transport, communications, gas and electricity (8 pct); finance (6 pct) and construction workers (5 pct).

Job characteristics and durations

The measure of job duration used here is duration in a firm, such that within-firm mobility does not constitute job-to-job mobility. The data is coded with reference to jobs (not firms) but results were not very sensitive to the two definitions. In the rest of the paper we refer to movement between firms as "job-to-job" mobility. The advantage of considering total duration of a worker with a particular firm rather than in a particular job position is that the assumption of random job offer arrivals appears more realistic

for job offers from other firms: promotions are most certainly endogenous to workers' behaviour. As a result, however, there may be some fluctuation in the wages and working conditions within a job (as workers change jobs within a firm). This appears acceptable given our estimation strategy (focussing on differential quitting rates) if we use information on the *last available* wage and working conditions before a worker left a job.

As an example, a worker is observed during waves 4-6 at the same employer and provides information on job satisfaction and working conditions. In wave 7 the worker reports having moved from her previous employer and provides information on working conditions and earnings at her new employer. Since the worker provides the exact end date of the job we have precise information on job duration. We do not use time-varying covariates in the estimation and characterise this job by the wage and working conditions reported in wave 6 (last interview before the end of the job). We only assume that working conditions remain constant from the time of the last interview until movement away from the job (maximum one year).

For reasons to be explained below (see section (2.5)), we exclude individuals for whom we only have one spell. We have exact dates on multiple job durations per individual (on average 2.8 job observations). Censoring may be an issue given that for the longest spells we have no end-date, but this concerns very few spells as there is considerable mobility in the British labour market over the period studied. Many more spells are censored as individuals drop out of the panel for unknown reasons. For these we assume random censoring.

The measure used for non-monetary job characteristics is the answer to the question "How satisfied are you with your job *in itself*", with potential answers ranging from "1 - not at all satisfied" to "7 - completely satisfied". The presence of other questions relating specifically to satisfaction with financial rewards should rassure us that the dimension of job quality measured here relates exclusively to factors other than remuneration, as the theoretical model requires.

Windfalls

We focus on the reported windfalls for lottery winnings, gambling gains, inheritances, life insurance and accident payouts and money received as a

result of building society conversion [9]. The assumption made here is that these windfalls were not anticipated such that no behavioural changes can be made prior to the windfall.

We have no information on the exact date of the windfall, and assume that the windfall occured at the beginning of an observation period (between two waves). If a worker reports having received a windfall in the preceeding period and also reports job mobility, we thus assume that the windfall occured before the mobility decision. This assumption ensures that windfalls are not anticipated as a result of our recording scheme. To the extent that windfalls do not occurr at the beginning of a period (i.e. actually occurr after other events), any effects of windfalls will occurr in later waves - i.e. we can test for lagged effects in later waves.

We focus on respondents who record some windfall earnings over the period of the panel, and for all windfalls apart from building society conversions we have information on the exact amount. For building society conversion earnings we can only use a dummy variable - payouts here varied considerably . The majority of windfalls is small, with a large spike (and median) of 100 pounds [10] and a majority of this results from lottery winnings, gambling and inheritances. Whereas lottery winnings tend to be small, with a recorded mean of 150 pounds, accident (237 pounds) and life insurance (584 pounds) but especially inheritances (2294 pounds) are larger, as table (1) shows. Whilst most windfalls appear fairly small compared to earnings, table (3) shows that 5 percent of windfalls exceed annual earnings of workers.

Transitions

All labour market transitions may be affected by the change in wealth. In particular, we may wish to distinguish transitions within the labour market from transitions to non-participation. We observe voluntary transitions to another job, to university, retirements, jobs ending as workers have a baby or for other family reasons. We also observe involuntary transitions - redundancies, sacking or end of part-time jobs. In order to keep sample

[9] This is somewhat of a British peculiarity: After the financial Big Bang of the early 1990s a number of building societies (basically consumer cooperatives) demutualised to become banks. In the process, considerable windfalls were distributed to customers. The deregulation of the banking sector was a sudden policy change making it very likely that these earnings qualify as windfalls. There was some speculative behaviour (joining building societies in the hope of demutualisation), but often clauses were enacted to avoid payouts to recently joined-up members.

[10] All monetary values provided are deflated to their values in 2000

Table 1: Size of windfalls received

	Inherit.	Lottery	Life ins.	Accident ins.	Total
1-1000 pounds	98	2255	50	41	2695
1000-5000 pounds	158	78	198	148	627
5000-10000 pounds	79	8	32	23	149
10000-50000 pounds	115	2	42	11	183
50000+ pounds	35	1	5	1	49

Note: Windfall receipts in wave 5 were not separated into categories but form part of the total

Table 2: Size of Windfalls as fraction of annual earnings

	Inherit.	Lottery	Life ins.	Accident ins.	Total
1-10 percent	141	2264	78	61	2,788
10-50 percent	153	69	184	122	578
50-100 percent	67	8	29	29	139
100+ percent	124	3	36	12	198

Note: Windfall receipts in wave 5 were not separated into categories but form part of the total

Table 3: Transitions

	number of spells	percent
to new job	1985	16.47
to unemployment	1107	9.19
to university	83	0.69
retirement	24	0.20
family-related	229	1.90
health-related	170	1.41
other	1512	12.55
censored	6940	57.59
total	12050	100

sizes reasonable, we do not allow for all potential transitions in a competing risk framework. Rather, we focus on voluntary labour-market transitions as transitions to another job or to take up studies and exclude involuntary and family-related movements. The choice of studying as a labour market choice appears in line with the human capital literature[11]: First, taking up studies may be a step in order to find a more satisfying job. Second, it represents a risky choice (as returns to studying are uncertain) - and higher levels of wealth may reduce the degree of risk aversion, increasing the likelihood of making this transition after a windfall.

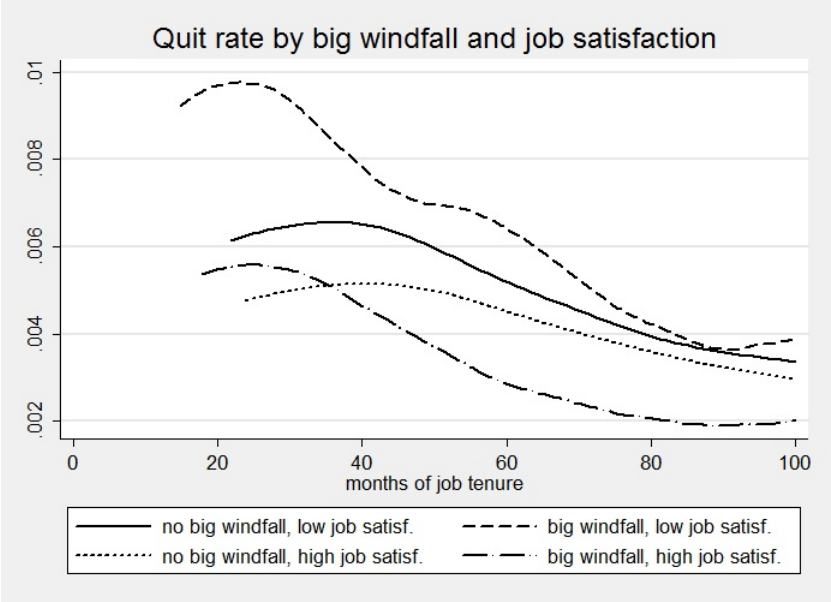
2.4 Descriptive Statistics

In this part we focus on job-to-job mobility in the labour market, following the theoretical model in which job-to-unemployment transitions are exogenous. A model encompassing both the participation decision and the choice in the labour market would be a possible extension - although data constraints may be fairly tight.

The focus of this part of the paper is on the interaction between job satisfaction and wealth shocks in influencing transition decisions. Figure (1) gives the hazard rates by receipt of a large windfall (defined as a windfall greater than 2000 pounds) and by job satisfaction (high job satisfaction de-

[11]Note, however, that changes in human capital are ruled out by our model, in which the choice of a certain job must not influence future job offers. Thus theoretically we must focus on the consumptive role of university: a high y and low w.

Figure 1: Moving to another job: by Windfall and Job Satisfaction
Large windfall here defined as windfall greater than 2000 pounds



fined as "nearly completely" or "completely satisfied" workers), focussing on the first 100 months of a job (increasing standard errors make interpretation of later periods unhelpful). Without conditioning on other factors, there is some evidence that workers' response to insatisfactory working conditions is importantly mediated by wealth - here in the form of windfall earnings: the difference in hazard rates is much larger for workers who received a windfall than for workers who did not.

The fact that the impact of wealth shocks on mobility decisions varies across groups with different levels of job satisfaction provides a first starting point for a more rigorous causal analysis.

2.5 Estimation framework

We are interested in establishing a causal relationship of windfalls on the job-leaving rate , and in particular a potential differential effect of windfalls by different levels of job satisfaction.

The theoretical model presented in section (2.1) suggests that the opti-

mal strategy for the worker is stationary, such that the reservation utility is not adjusted over time. The optimal strategy consists of comparing current job characteristics with job characteristics of a job offer, not looking further into the future[12]. This implies an exponential distribution of completed durations in a particular firm. Allowing for unobserved heterogeneity we have a mixed proportional hazard (MPH) specification, where unobservables and covariates enter multiplicatively in the hazard. The first estimation strategy presents follows this route.

Whilst the exponential framework is the reduced form corresponding to the theoretical predictions (in particular, stationarity), the restriction of "no duration dependency" is restrictive in light of potential non-stationarity in job search models [13]. Within the MPH specification, the Cox partial likelihood method (CPL) provides a more flexible functional form that allows us to relax the assumption of hazard rates that are invariant over time (conditional on covariates). As long as the term specifying duration dependency enters multiplicatively (e.g. as in a Weibull model) CPL consistently estimates the coefficients of interest - for any time-varying baseline hasard.

Finally, the MPH assumption - viz, that unobservables, time-dependence and covariates each enter multiplicatively in the hazard - may be thought of as restrictive: In particular, it implies that only current values of the covariates x influence the hazard rate. There is, for example, no reason to constrain the effect of wealth shocks to be contemporaneous - as long as it is not anticipated. One way of including such an effect is to include lagged variables of the covariates. A different approach is taken by the Accelerated Failure Time (AFT) specification, which focuses not on the hazard rate but completed duration as the dependent variable. This formulation has been largely eschewed by economists interested in the hazard rate. Since we are not interested in the hazard rate per se, but on (changes in) the determinants of job leaving, we can compare the MPH with the AFT formulation. It assumes linearity of effects not with respect to the (log) hazard rate, but with respect to the log durations, and nests the exponential and Weibull models - allowing us to test the restriction on duration dependence of the exponential model.

Heterogeneity

[12] This excludes the case where workers renegotiate their contracts, or firms match workers' outside offers. In this case not only the instantaneous utility of a job would be of interest, but firms' ability to match future offers (see e.g. Postel-Vinay and Robin (2002))

[13] See van den Berg (2001) for a review of the issue.

As is well-known, unobserved heterogeneity is a particular issue in duration models (see Van den Berg (2001) for a review). Three measures are employed here to minimise the potential for misspecification:

First, we allow for gamma-distributed individual effects. Differential "frailty" will tend to have a significant influence on coefficient estimates.

Second, since random effects models of duration data can be sensitive to functional form assumptions, we restrict our sample to individuals for which we have at least two spells of employment. The issue of misspecification is much less severe in the case of multiple spell data (see van den Berg (2001) for an extensive review of the issues).
Third, we focus only on individuals who at some time in the sample receive a wealth shock. This should ensure consistent results even if the population of individuals unexpectedly winning the lottery or inheriting wealth is different from those who do not play the lottery and have no rich relatives. As a result of such selection we may have unobserved heterogeneity taking forms not allowed by the parametrisation of our models. The results thus focus on the subpopulation who over the course of the panel are observed to have received a windfall (the treated), and estimate the impact of the wealth shock on these. This implies a "treatment of the treated" framework in which unobserved heterogeneity is unlikely to be driving the impact of wealth shocks on labour market behaviour.

The Exponential model

The stationarity of the theoretical model implies that individuals' hazard rate evolves only as a result of changes in the reservation utility. Only changes in the determinants of the reservation wage - in particular the wealth situation - will then lead to changes in the hazard rate over time. Further controls x_0 for individual characteristics (age, education, marital situation etc.) as well as work-specific characteristics (part-time work, industry dummies etc.) are included (see below). For a spell s of an individual i we then have:

$$\theta_s = exp(\underline{x_s}'\underline{\beta} + \eta_{i(s)}) \tag{10}$$

where $\underline{x}_s'\beta = \beta_1\ m_s + \beta_2\ y_s + \underline{x}_{0s}'\underline{\beta_3}$ our focus is on the change in the coefficients β_1 and β_2 as a result of the wealth shock.

Conditional on the random effect, the density of duration of spell s for individual $i(s)$ is given by (11), where we focus on individuals who experience

at least two spells (where x is allowed to vary between spells), so that $S \geq 2$:

$$f_s(t_s, \underline{x}_s|\underline{\beta}, \eta) = exp(\underline{x}'_s\underline{\beta} + \eta_{i(s)})\ exp(-t_s\ exp(\underline{x}'_{i(s),s}\underline{\beta} + \eta_{i(s)})) \tag{11}$$

Integrating out the individual effects over the distribution of unobservables (here $g \sim gamma(k, \sigma)$) gives the following likelihood:

$$L(\underline{\beta}|t_{s=1...S}, \underline{x}_{s=1...S}) = \prod_{s=1}^{s=S} \int_{-\infty}^{\infty} f_s(t_s, \underline{x}_s|r_i) dG_\eta(r) \tag{12}$$

The Cox Proportional Hazard model

The Cox Proportional hazard model (CPH) allows for time-dependent baseline hazard rates. The procedure is semi-parametric in the sense that the baseline (unobserved) hazard (θ_0 in (13)) is not estimated and the partial likelihood estimates of the coefficients (β) are nonetheless consistent. The parametric formulation of (13) also supposes that the covariates - amongst others here income and job satisfaction - have a constant influence on the hazard rate over different job durations.

$$\theta_s(t_s|x_s) = \theta_0(t_s)\ exp(\beta_1\ m_s + \beta_2\ y_s + \underline{x}'_s\underline{\beta}_3 + \eta_{i(s)}) \tag{13}$$

Or, defining $\xi_i = exp(\eta_i)$:

$$\theta_s(t_s|x_s) = \theta_0(t_s)\ \theta_1(m_s, y_s, x_s)\ \xi_{i(s)} \tag{14}$$

The intuition for the partial likelihood is - for a spell j - to use the conditional probability that spell j ends, given risk set R^j defined as the set of spells ending at or after j. Due to the proportionality assumption, the baseline hazard - assumed to be the same for all individuals - drops out.

Thus we write the partial likelihood conditional on the individual effects as:

$$L_s^{PL}(\underline{\beta}|t_{s=1...S}, \underline{x}_{s=1...S}) = \prod_{s=1}^{s=S} \frac{\theta_1(m_s, y_s, x_s)\ \xi_{i(s)}}{\sum_{r \in R^s} \theta_1(m_r, y_r, x_r)\xi_{i(r)}} \tag{15}$$

The CPH model buys semiparametric identification at the cost of efficiency: Only the ordering of job durations influences the likelihood, not the precise timing - so not all information is used for estimation.

For ξ it is possible to assume a discrete (non-parametric) distribution (à la Heckman and Singer (1984)) or follow a fixed-effects strategy (see Lindeboom and Kerkhofs (2000)). We here follow the parametric route - as mentioned, multiple observations per individual somewhat weaken the strong assumptions on orthogonality between random effects and other explanatory variables. For the likelihood this implies integrating out the individual effect as in (12).

The Generalised Gamma framework

In this accalerated failure-time formulation, the dependent variable is job duration rather than the job hazard rate. It is assumed that the impact of the covariates on extra job duration (rather than on the hazard rate) is constant over the observation period. The CPH gives rise to a distribution of job durations according to (16)[14], or - including unobserved heterogeneity across individuals - (17).

$$\ln t_s = -\ln(\theta_{0s}) - \underline{x}_s'\underline{\beta} + \epsilon_s \tag{16}$$

$$\ln t_s = \alpha - \underline{x}_s'\underline{\beta} + \epsilon_s + \eta_{i(s)} \tag{17}$$

As is well-known, heterogeneity will generate negative time-dependance in the hazard rate as a result of differential frailty even if the hazard rate is actually constant over time. If we make the random effects assumption that η is independent of the other covariates $(y, m, \underline{x})$ it is possible to model the joint distribution of η and ϵ flexibly using a gamma distribution, where μ in (18) is distributed gamma(k,δ) with shape k and scale δ.

$$\ln t_s = \alpha - \underline{x}_s'\beta_3 + \sigma\mu_s \tag{18}$$

It can be shown that this formulation nests the exponential, lognormal and Weibull duration models for specific values of the parameters (k, σ) - see Gronberg and Reed (1994). For example, if there is no unobserved heterogeneity the joint error term is distributed according to the extreme value distribution and the model is equivalent to the exponential duration regression with constant hazard. In the Weibull case the generalised gamma generates the appropriate duration-dependent hazard rate.

[14] See Kalbfleisch and Prentice (1980)

2.6 Results

In both the Exponential and Generalised Gamma estimation methods it is found that wage and working conditons both significantly increase job durations. To read the results, recall that the dependent variable in the generalised gamma framework is completed job duration and the dependent variable in the Exponential and Cox proportional hazards model is the job leaving rate (thus equivalent coefficients in the two frameworks will be of different signs). The Cox proportional hazard with shared frailties was not estimated with the full sample due to computational issues *(work in progress)*, thus results without frailty are given. In line with the initial hypothesis, it is found that the impact of windfalls is significantly less important for highly satisfied workers, i.e. that the interaction effect is significant. In table (4) the effect is shown using a non-linear paramtric function of the windfall, whereby the significant positive sign of the quadratic amounts to a significant impact in the range of variable values: The mean windfall will increase the (negative) impact of job satisfaction on the hazard rate (the joint coefficient of job satisfaction and the interaction terms) by 0.31 for a value of job satisfaction of one standard deviation below the mean value of job satisfaction (a value of 4), whereas the impact of the windfall will be 0.51 for workers with a value of job satisfaction one standard deviation above the mean (the highest value, 7). This means that the windfall has an impact on reducing job quitting rates in a good job similar to that of raising the wage by more than one standard deviation. By contrast, workers who are unsatisfied with their work will increase their job leaving rate on receipt of a windfall - in fact, the coefficients imply this will be the case for the lowest levels of job satisfaction.

Table (5) uses a piece-wise linear function to attempt to differentiate the impact of windfalls by different size categories. Sample sizes for these categories are not large, thus the groupings are relatively broad. The three groupings are chosen to allow reliable estimates even in the highest windfall category (for windfalls above 15000 pounds). Unsurprisingly, relatively small windfalls of up to 5000 pounds are found to have no significant impact on labour market behaviour. Perhaps surprisingly, however, is that large windfalls are not significant either - the overall significant interaction effect in the parametric formulation appears to be driven by medium-sized windfalls of between 5000 to 15000 pounds. In neither the non-linear parametric (table (4)) nor the piecewise linear formulation (table (5)) of the windfall effect do we find a significant impact of windfalls on the role of earnings on

the rate of job leaving: wages remain as important after a large windfall as they do before. However, since the relative importance of wages has decreased, the marginal willingness to pay for a satisfying job has increased.

Table (6) sheds some light at what may be driving the surprising finding that medium windfalls have a significant impact on job leaving whilst large windfalls do not: if windfalls are expressed as a percentage of annual income, it is found that only windfalls in the category corresponding to over 50 percent of annual income impact on job leaving via differential appreciation of the importance of job satisfaction - and, contrary to tables (4),(5), also wages. Whilst the coefficient of job satisfaction increases in magnitude from -0.088 to -0.309, the impact of earnings on quitting becomes less, moving from -0.526 to -0.38: both of these interaction effects (significant at the 95 pct level in the exponential and generalised gamma framework - *Cox results with frailty are pending*).

Unobserved heterogeneity is significant (the coefficients on the shape and scale parameters are significantly different from 1) thus the model does not reduce to the exponential regression model.

2.7 Marginal Willingness to pay

The significant interaction effect implies that the marginal willingness to pay for job quality increases significantly after a windfall. As hypothesized by the basic model, the wealth shock acts as a preference-shifter. Whereas the fact that the wealth-shocks influence the parameters is consistent with basic model, we might expect one or both coefficients for wages and working conditions to be affected by wealth-shock, depending on the specified utility-function.

Using the basic formulation (7) we can now calculate estimates for the marginal willingness to pay (MWP) comparing the situation with and without a windfall. From (7) and noting that estimated coefficients refer to the log wage we have:

$$MWP = \frac{\tilde{\beta}_y}{\tilde{\beta}_w}\, w \tag{19}$$

In order to illustrate the impact of a windfall we concentrate on the results from table (6) and assume a windfall representing more than 50 pct of annual income. The interaction effects indicate that such a windfall will

Table 4: Job leaving as a function of wage, job satisfaction, big windfalls and controls (see table footnote)

	Exponential $\hat{\beta}$ (s.e)	General Gamma $\hat{\beta}$ (s.e)	Cox PH *(provisional: no frailty)* $\hat{\beta}$ (s.e.)
Log Wage (LW)	-0.528***	0.488***	-0.484***
	(0.053)	(.055)	(0.055)
Job Satisfaction (JS)	-0.089***	0.083***	-0.082***
	(0.015)	(.015)	(0.015)
Log Windfall (WF)	-0.323	0.143	-0.242
	(0.359)	(0.320)	(0.321)
WF squared (WF^2)	0.050	-0.027	0.042
	(0.045)	(0.04)	(0.039)
WF*JS	0.0252*	-0.026*	0.030**
	(0.015)	(0.013)	(0.013)
WF^2*JS	-0.004**	-0.004**	-0.004***
	(0.002)	(0.001)	(0.001)
WF*LW	0.021	-0.002	0.009
	(0.038)	(0.034)	(0.034)
WF^2*LW	-0.002	0.004	-0.001
	(0.004)	(0.06)	(0.004)
Shape($1/\kappa$)		0.340***	
		(0.058)	
Scale(σ)		1.255***	
		(0.033)	

Controls: age,age^2,education,$education^2$, 13 industry dummies, 4 family situation dummies, working hours, part-time dummy;
Sample size: $N = 3488; N * S = 10386$
Significance levels:10 pct(*),5 pct(**),0.1 pct(***)

Table 5: Job leaving as a function of wage, job satisfaction, piecewise linear windfall and controls (see table footnote)

	Exponential	General Gamma	Cox PH *(provisional: no frailty)*
	$\hat{\beta}$ (s.e)	$\hat{\beta}$ (s.e)	$\hat{\beta}$ (s.e.)
Log Wage (LW)	-0.528***	0.489***	-0.483***
	(0.053)	(0.052)	(0.052)
Job Satisfaction (JS)	-0.085***	0.072***	-0.069***
	(0.015)	(0.014)	(0.013)
Windfall (WF1)	0.471	-0.564	0.670
	(.719)	(0.544)	(0.540)
Windfall (WF2)	-0.138	0.206	-0.111
	(0.282)	(0.235)	(0.238)
Windfall (WF3)	0.059	-0.054	0.056*
	(0.037)	(0.034)	(0.031)
JS*WF1	-0.041	-0.026	-0.028
	(0.028)	(0.021)	(0.021)
JS*WF2	-0.024**	0.023**	-0.019*
	(0.012)	(0.011)	(0.009)
JS*WF3	-0.001	0.001	-0.001
	(0.001)	(0.001)	(0.001)
LW*WF1	-0.017	0.032	-0.045
	(0.075)	(0.057)	(0.057)
LW*WF2	0.030	-0.037	0.025
	(0.029)	(0.025)	(0.025)
LW*WF3	-0.005	0.004	-0.004
	(0.003)	(0.003)	(0.003)
Shape($1/\kappa$)		0.326***	
		(0.059)	
Scale(σ)		1.259***	
		(.033)	

Windfalls: W1: 1-5000 pounds (N*S: 3466); W2:5000-15000 (N*S: 279); W3:15000+ (N*S: 204);
Controls: age,age^2,education,education^2, 13 industry dummies, 4 family situation dummies, working hours, part-time dummy;
Sample size: $N = 3488; N * S = 10386$
Significance levels:10 pct(*),5 pct(**),0.1 pct(***)

Table 6: Job leaving as a function of wage, job satisfaction, different windfalls relative to income and controls (see table footnote)

	Exponential $\hat{\beta}$ (s.e)	General Gamma $\hat{\beta}$ (s.e)	Cox PH *(provisional: no frailty)* $\hat{\beta}$ (s.e.)
Log Wage (LW)	-0.526***	0.488***	-0.487***
	(0.051)	(0.054)	(0.051)
Job Satisfaction (JS)	-0.088***	0.093***	-0.086***
	(0.016)	(0.016)	(0.015)
Windfall 0-10pct (W10pct)	0.016	-0.054	-0.086
	(0.032)	(0.031)	(0.259)
Windfall 10-50pct (W50pct)	-0.030	0.044	0.176
	(0.058)	(0.056)	(0.177)
Windfall 50+ pct (W50+pct)	-0.221*	0.207***	0.439
	(0.102)	(0.093)	(0.292)
JS*W10pct	0.016	-0.054*	0.043
	(0.032)	(0.031)	(0.028)
JS*W50pct	-0.030	0.044	-0.052
	(0.058)	(0.056)	(0.059)
JS*W50+pct	-0.221**	0.207**	-0.182**
	(0.102)	(0.093)	(0.087)
LW*W10pct	-0.004	0.011	-0.010
	(0.024)	(0.029)	(0.024)
LW*W50pct	0.036	-0.023	0.041
	(0.041)	(0.041)	(0.041)
LW*W50+pct	0.139**	-0.116**	0.114**
	(0.059)	(0.052)	(0.051)
Shape($1/\kappa$)		0.328***	
		(0.059)	
Scale(σ)		1.259***	
		(.033)	

Windfalls: W10pct: 0-10 pct of annual income (N*S: 2788); W10pct: 10-50 pct (N*S: 578); W50pct: 50+ pct (N*S: 337)
Controls: age,age^2,education,education^2, 13 industry dummies, 4 family situation dummies, working hours, part-time dummy;
Sample size: $N = 3488; N * S = 10386$
Significance levels:10 pct(*),5 pct(**),0.1 pct(***)

Table 7: MWP for higher job satisfaction

	No Big Windfall	Big Windfall
Generalised Gamma	1764.64	8388.65
CoxPH	1768.66	7200.13

impact both the coefficient of wages and job satisfaction, doubly increasing the marginal willingness to pay.

The results reported in table (7) indicate a five-fold increase in the marginal willingness to pay for good quality jobs. Figures are based on median yearly earnings of 10000 pounds (used for calculation according to (19)) such that the change in marginal willingness to pay represents a move from 15 pct of earnings to 90 pct of earnings - a very high figure indeed. However, given that the median big windfall is over 15000 pounds the figure may appear more reasonable. *Further work is currently underway to ascertain the robustness of this figure.*

Fairly similar results are obtained whether the coefficients are estimted in separate regressions (for populations with and without windfall) or whether interactions terms are used as in tables (4),(5), (6).

Gender differences in responses to windfalls

A preliminary finding is that when the sample is split between women and men there appear to be significant differences: Windfalls influence women via job satisfaction only, in line with the findings reported above - results are only marginally significant, however (as a result of sample size, it is presumed).

For men we find that windfalls impact the job leaving rate directly too - i.e. independent of the level of job satisfaction. The interaction effect on job satisfaction is less significant and resulting differentials in marginal willingness to pay are thus smaller for the male population, as comparison of tables (8), (9) shows.

The interpretation of these differences is not. Maybe more long-term careers less fragmented by baby breaks could imply that job leaving rates are more steady for med - but we do find a significant impact of windfalls on male quit rates.

Table 8: Women's MWP for high job satisfaction

	No Big Windfall	Big Windfall	
			N=2425, N*S=5164
Generalised Gamma	1886.29	8669.54	
CoxPH	1977.61	7528.30	

Table 9: Men's MWP for high job satisfaction

	No Big Windfall	Big Windfall	
			N=2621, N*S=5222
Generalised Gamma	1618.12	6766.97	
CoxPH	1490.80	4741.80	

The current finding can be compared to recent evidence presented by Guven et al. (2009) who find that gaps in happiness importantly influence marriage survival - and that women are more sensitive in this field too. The current finding would run counter the cliché of family being more central in women's lives and work centrality being higher for men: at least on one dimension - sensitivity to subjective working conditions - females appear to be more sensitive. It may for example be that part-time workers react behaviourally different - as these are overwhelmingly female (only 8 pct male part-time workers in the sample) this may account for the gender differences found.

3 Job-to-job transition evidence

The previous section only considered individuals' job satisfaction in their current job and argued that windfalls have an impact on the relative importance of monetary and non-monetary job characteristics. For some individuals moving jobs we observe levels of job satisfaction and wages prior and after windfall receipt: For these we can test whether wages and job satisfaction in the chosen jobs conform to the pattern expected here: i.e. that job satisfaction is a more important factor of choice for individuals who received a windfall than for those that did not.

If indeed the impact of windfall on job leaving rates is moderated importantly by job satisfaction, we should expect job satisfaction to increase more for those individuals who change job after a wealth windfall than for people moving jobs without having had a windfall. Framing the comparison

(control group) is not obvious here: on the one hand we would like to show that windfalls are indeed leading people less happy with their jobs to move jobs and thus - amongst those who received a windfall - we want to compare movers to non-movers. On the other hand, moving to a new job is generally associated with important wage gains, such that we want to compare movers who received windfall gains with those who did not. This explains the structure of figures (2), (3) and (4).

As a result of data constraints[15] the sample is considerably reduced in this section. We observe many people moving jobs for whom we have no information on job characteristics in a period which we can be sure to be situated after the windfall and move.

We compare the evolution of job satisfaction and wage earnings of 66 persons who received a windfall of at least 1000 pounds but did not move jobs, 1046 persons who moved jobs but did not receive any windfall and 178 individuals who received a windfall of at least 1000 pounds and subsequently moved jobs.

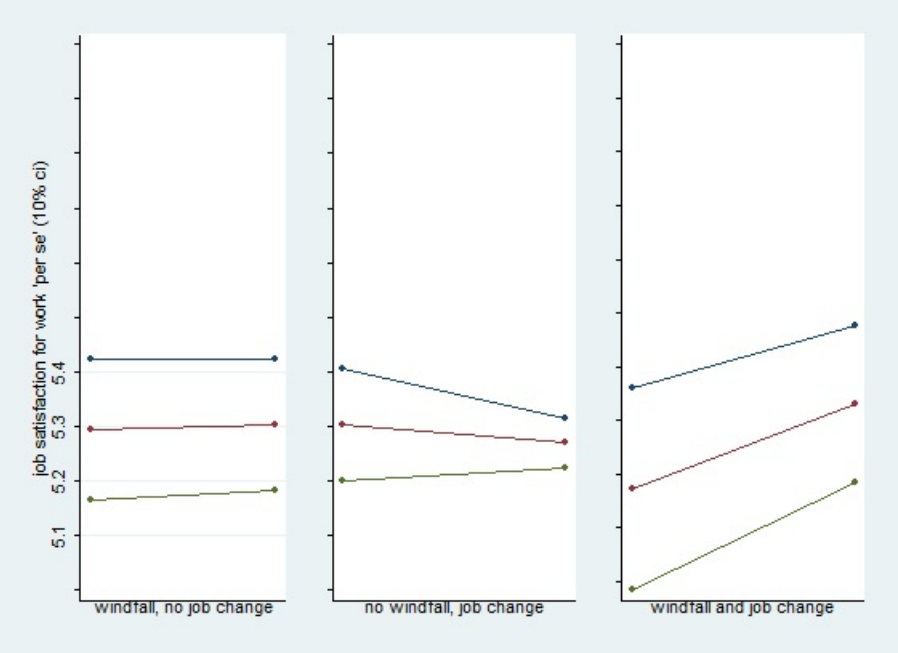
Selection processes are working on all of the samples: For example, if we take a long period - say 3 years after the windfall shock - and attempt to compare those who stayed in their job and did not change jobs to those who changed jobs it is certain that the group of non-changers includes many whose working conditions happened to improve over the time - independent of the windfall. Thus the shortest possible time period in which individuals definitely had the opportunity of moving jobs (i.e. in the next observed wave) is best. As noted, here a two-year window is required between observations (as the exact timing of the windfall receipt is unknown).

Figure (2) shows that job satisfaction for work "per se" increased on average for job changes occuring after windfall receipt (right panel) whilst they remain stable for individuals not moving (left panel) [16] and - maybe surprisingly - also for individuals moving without having received a wind-

[15] we do not know the exact time of the receipt of windfall wealth. For the previous analysis, we assumed the shock occured at the beginning of the year to avoid anticipation issues. However, we here need to make a judgment on whether a job change occured after or before a windfall. Thus we take observations for which we know that the job change occured after the windfall.

[16] So far we had assumed that working conditions throught a workers' career at a firm are stable - this is not always the case of course when multiple data points for an individual in the same job are available, as the right panel of figure (2) acknowledges. The fact that variation over time here is relatively limited may reassure us.

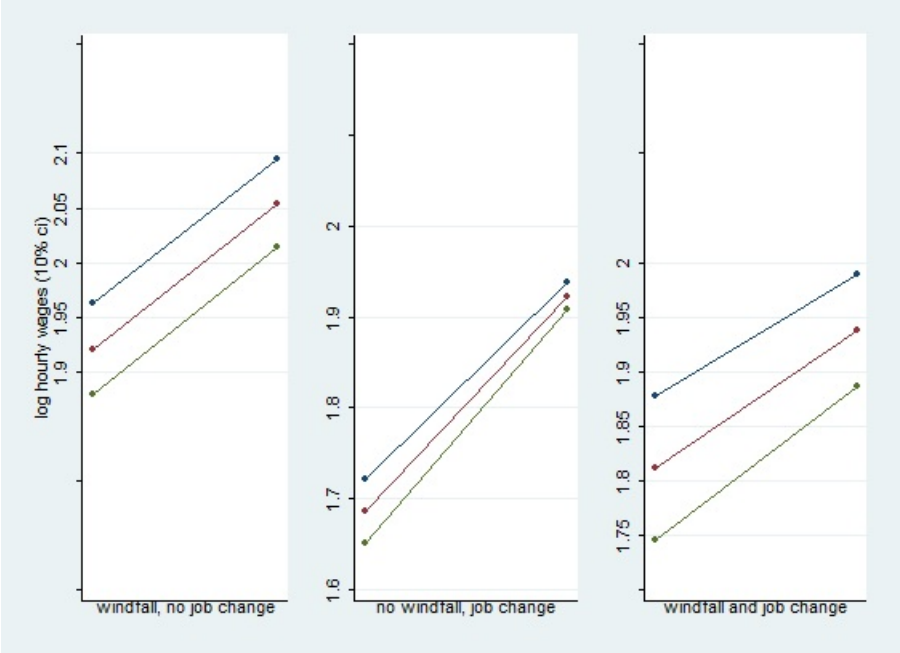
Figure 2: Evolution of job satisfaction for three types of transition



fall (central panel). However, as a result of small sample size, the bands for standard errors imply none of these changes are significant over the two-year window analysed.

Similarly, figures (3), (4) give the evolution of log (hourly) wages for individuals who receive a windfall and do not move (left panel), individuals who move jobs without having received a windfall (central panel) and individuals who move after receiving a windfall. The most obvious finding is that people are moving away from bad-paid jobs: On a common scale the mean wage is significantly lower for movers - independent of windfall receipt. Furthermore, in figure (3) we find that wage growth over the period is most significant for movers who do not receive windfall gains (central panel). Given that we are comparing transitions which occured at different points in time with different underlying productivity growth patterns, we correct for this by discounting average wage growth in the whole sample population observed between the particular points in time of any one transition. Figure (4) is thus more easy to interpret: We find that only movers who did not receive a windfall wage gain (central panel) receive a significant wage gain

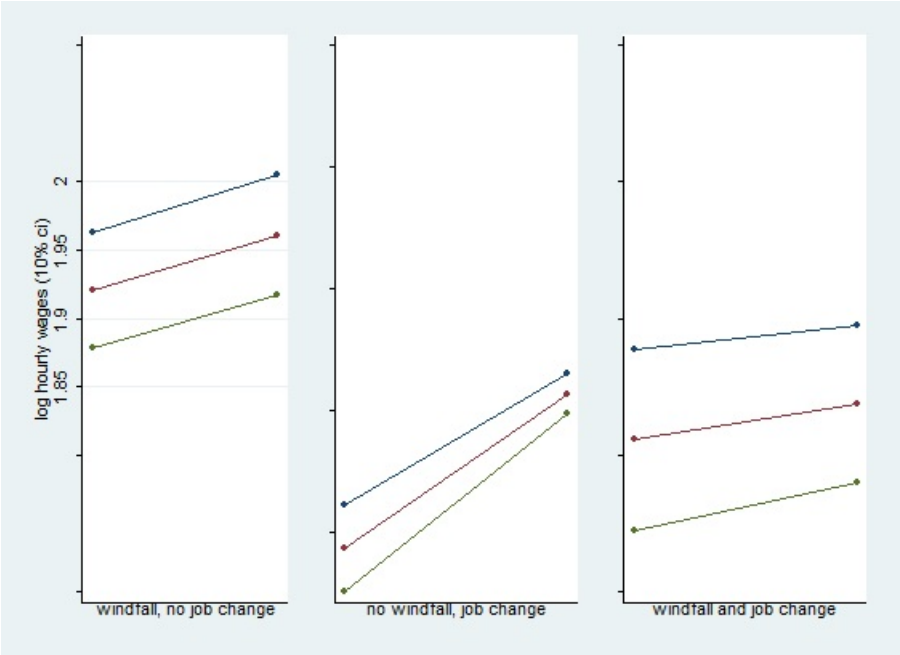
Figure 3: Evolution of hourly wage for three types of transition



over and above average wage growth: mean log earnings increase only little (and insignificantly) for the movers who received a windfall - potentially indicating that their move was less motivated by earnings than that of the other movers. Workers who received a windfall and did not move had higher earnings and some (insignificant) wage growth - potentially indicating that workers with good promotion prospects decided not to move despite the windfall gains.

Whilst the data do not allow us consistent estimation given small sample sizes, the evidence on transitions does provide some suggestive evidence in favour of the argument that workers whose wealth suddenly increases may be more sensitive to non-monetary factors when making choices about jobs than other workers.

Figure 4: Evolution of hourly wage for three types of transition controlling for wage growth



4 Wealth accumulation and Job search

The basic job search modelling framework does not include asset accumulation by workers. The potential for wealth to impact on labour market outcomes has been noted in several papers (Algan et al. (2005), Lentz et al. (2005))

Why might asset accumulation matter? For a welfare analysis the possibility of consumption smoothing should make a considerable difference: faced with stochastic shocks risk averse agents would like to engage in precautionary savings. With respect to the degree of inequality that the exogenous job offer arrival rates imposes on individuals this may be reduced or enforced by allowing for asset accumulation... Thus allowing for asset accumulation may for example influence optimal tax policies with respect to labour and capital taxation if policy-makers care about earnings and welfare inequality.

Considering a labour market with non-monetary job characteristics it can be noted that whilst consumption can be smoothed by saving assets, but utility from job satisfaction cannot. This suggests an additional motive for saving: being able in the future to choose higher quality job with lower earnings. Furthermore, more risk averse agents will show different rates of substitution between job quality and wages as they prefer the security that only higher earnings can provide.

Algan et al. (2003) provide an example of a model of job choice and savings dynamics in which job offers consist of high-paid and low-paid jobs and individuals use wealth accumulation to smooth consumption over the stochastic labout market processes. Asset accumulation here leads to cycles of accumulating wealth, quitting job to search for better jobs (a higher rate of job offer arrival for unemployed is assumed) and a positive probability of accepting low-paid jobs when assets fall below some threshold.

Expanding the basic model put forward in section (2.1) requires taking an explicitly dynamic perspective as we cannot abstract from the intertemporal factors as we could in the simple model. Following Lise (2007), assume that workers are allowed to determine an additional state variable a. Workers then try to maximise

$$E_0 \int_0^\infty e^{-\rho t}[u(c_t, y_t) - e(s_t)]dt \tag{20}$$

subject to the budget constraint

$$da = [ra + w_{1,0} - c]dt \tag{21}$$

where the stochastic labour market with frictions implies the law of motion of earnings for employed

$$dw_1 = dq_{\lambda s} 1 \left(W(a, j(wr_1, yr) \geq W(a, j(w_1, y))\right)(wr_1 - w_1) + (w_0 - w_1)d_{q\delta} \tag{22}$$

where W is the value of the employed state. Similarly for unemployed workers

$$dw_0 = dq_{\lambda s} 1 \left(W(a, j(wr_1, yr) \geq U(a)\right)(wr - w_0) \tag{23}$$

where $j(w, y)$ is an index of job values with cdf $F_j(.)$

This implies the following value functions for the unemployed state

$$\rho U(a) = max_{c,s} \left\{ u(c, y_0) - e(s) + U_a(a)\left[ra + w_0 - c\right] + \lambda s \int_0^\infty max\left[W(a, jr) - U(a), 0\right] dF_j(jr) \right\} \tag{24}$$

and the employed state:

$$\rho W(a, j) = max_{c,s} \left\{ u(c, y) - e(s) + W_a(a, j)\left[ra + w - c\right] \right.$$
$$\left. + \lambda s \int max\left[W(a, jr) - W(a), 0\right] dF_j(jr) + \delta\left[U(a) - W(a, j)\right] \right. \tag{25}$$

The model cannot easily be solved analystically. Can we show that optimal behaviour in this setting also implies that the job leaving rate will be differentially impacted by differences in wealth holdings - exogenous and/or endogenous? The difficulty lies in the fact that it is no longer an inoccuous choice for an individual to accept a job which has higher instantaneous utility: In order to build up assets, individuals may accept a job with a lower instantaneous utility under certain conditions. As a result, the "reservation utility" that we posited in the simple model does not, in general, follow through into the world of endogenous savings.

Using first-order conditions for optimal search we can however characterise the optimal consumption growth path (i.e. optimal savings) for an employed worker in a job $j(w,y)$ as follows [17]:

$$\frac{\dot{c}}{c} = \frac{1}{\gamma(c)}\left[r-\rho+\delta\left(\frac{u'_c(c_0,y_0)}{u'_c(c,y)}-1\right)-\lambda s\left(\overline{F}_j(j)-\int_j^{\bar{j}}\frac{u'_c(c,y(jr))}{u'_c(c,y)}dF_j(jr)\right)\right]-\frac{u'_y\ \dot{y}}{\gamma(c)} \tag{26}$$

where $\gamma(c)$ is the CRRA parameter for risk aversion. The δ-term in (26) gives precautionary savings related to the unemployment risk: An increase in y increases this term if the marginal utility of consumption rises with better working conditions. A worker with higher y has more to lose and thus saves more. The λs-term gives the expected career utility increase: higher values reduce savings to smooth consumption. Workers with higher y may be expected to gain less and therefore save more.
Is it then the case that workers with higher rates of job satisfaction can be expected to show higher savings rates, creating an empirically testable prediction? The expected career utility effects actually depend on the joint distribution of working condition and wages. If the two are independently distributed, the analysis goes through and savings rates should be higher for workers in jobs with higher job satisfaction. However, there are good reasons to suspect that profit-maximising firms set wags that depend on working conditions. More particularly, to the extent that there are compensating differentials the two will be negatively correlated. In order to sign the effect we thus need to take a position on firms' wage policies - or rather, workers expectations of the joint distribution of working conditions and wages. *(Work in progress.)*

Job mobility in our framework depends on workers searching for better jobs - in order for wealth to affect workers differentially according to their levels of job satisfaction we need to show either that the set of acceptable jobs changes differentially or that search effort changes differentially: conjointly the two will influence the job leaving rate. Using first-order conditions on the value functions, (27) characterises optimal search:

$$e'(s) = \lambda\int_{j(w,y)}^{j(\overline{w},\overline{y})}\frac{\frac{u'_c}{j_w}+\frac{u'_y}{j_y}+(ra+w(jr)-c)\left(\frac{u''_{cy}}{j_y}+\frac{u''_{cc}}{j_w}c_w\right)}{\rho+\delta+\lambda s\overline{F}_j(jr)}\overline{F}_j(jr)djr \tag{27}$$

[17] See Lise (2007).

Search intensity decreases with higher wages and working conditions as it is assumed that fewer job offers provide better pay and job characteristics than the current job. It can also be found that search intensity decreases with assets iff $\left(\frac{u''_{cy}}{j_y} + \frac{u''_{cc}}{j_w}c_w\right) < 0$. Since it might be expected that u'_c decreases with w, decrease will be greater for higher level of y (if $\frac{\partial u''_{cy}}{\partial y} < 0$). Then wealth shocks affect happy people more - which is precisely the prediction we have in the simple model for exogenous wealth shocks.

We have been able to show that search intensity can be expected to decrease more for more satisfied workers after a windfall. This will imply differential job leaving rates if the set of accepted job bundles can be characterised. This, however, requires us to take a stance on (workers expectations about) firms' wage policies and move to a general equilibrium model.

It is hoped that this part can be elaborated on further.

4.1 Implications and open questions

We have seen that workers' acceptance criterion of jobs depends on the expected offer distribution of w and y - e.g. any reservation wage $R_w(w, y)$ depends on y and its distribution vice-versa for a reservation quality. Future work will attempt to work through the implications of setting a particular wage policy. For example, complete compensating differentials implies a deterministic joint distribution of w, y. This would allow us to recover the joint offer distribution from the realised wage-quality pairs. This will, however, not be the case in a labour market with frictions.

Since the value of a job will in general depend on workers' asset level, an important question in any wage policy is firms' information set about workers: Do firms know workers' asset levels? Wage policies that do not condition on workers' asset levels will typically not be optimal - and this might be a reason for a discriminatory wage policy towards certain groups.

5 Conclusion and Further Research Directions

This paper has focused on the impact of wealth in a model of quality job search. Using British panel data it has been found that the degree to which wealth influences mobility decisions depends on the degree of job satisfaction individuals have in a particular job. The way in which the labour market

distributes utility may depend importantly not only on human capital and luck (as models of the labour market focussing on productivity and frictions imply) but also on non-human capital. The basic finding should be relevant to a number of researchers interested in the interactions between inequality, unearned income and subjective wellbeing in the labour market.

Behavioural changes in preferences over job characteristics were found to be particularly significant when large windfalls were defined in relation to earnings - in line with much research on the importance of reference points in the appreciation of individuals' conditions, especially for earnings. Since such reference points have found to be subject to adaptation over time, the effects found here may only be temporary - but in a frictional labour market, job moves may lead to persistent changes in flows of earnings and job satisfaction.

Intriguing differences in the effect were found between women and men, raising questions for future research.

Fully exploiting the panel dimension of the data we compared individuals for whom we observe windfalls, job movements and associated levels of earnings and job satisfaction and found suggestive evidence (in a small sample) that earnings do increase less and job satisfaction increases more for individuals who decide to move jobs after receiving a windfall gain. In other words, wealth buys good quality jobs.

The argument in this paper has furthermore argued that choice data - on job leaving rates after a wealth shock - are significantly related to job satisfaction. In the current dataset, subjective and choice data could be compared to ascertain this effect. An interesting extension would attempt to validate the effect in order to use this strategy in datasets without subjective data. For the large administrative panels that have precise information on earnings (including non-labour earnings) we could then test differential leaving and relate these to different job characteristics. The difficulty lies in the adequate treatment of wealth in a context where windfalls may not be observed, an issue that section (4) attempted to address in a provisional manner.

Allowing for workers to save a fraction of their income complicates the basic prediction of the job search model. Whilst labour economists have sometimes exaggarated the proportion of wealth accumulation from the

labour market (rather than from inheritance etc.) it nevertheless remains a desirable feature of any model based on dynamic optimisation to allow individuals to save. The importance of workers' expectations over the joint distribution of wages and working conditions, as well as firms' knowledge of workers' assets for a richer analysis has been stressed.

Given that job values differ according to assets (whether these arise as a result of saving from labour earnings or from unearned income) it will clearly be in firms' interest to discriminate by asset-holdings of workers. This is but one of several future directions of research that can be taken from here.

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