This paper studies the empirical implications of an equilibrium search model in which firms offer optimal wage-tenure contracts and workers are allowed to change their job for a more profitable career profile. We provide numerical simulations and structural estimation of the Burdett and Coles (2003) equilibrium model. Using numerical simulations and reasonable parameter values, we show the concave shape of the baseline salary scale. Moreover, the functional form of the wage offer and earnings distribution functions and densities are established. We also propose an estimation method in two steps. Our non-parametric estimate of transition parameters are equal to 0.08 and 0.02 for transitions to employment and to non-employment respectively.
1 Introduction

This paper studies the empirical implications of an equilibrium search model in which firms offer optimal wage-tenure contracts and workers are allowed to change their job for a more profitable career profile. We provide a structural estimation and numerical simulations of the Burdett and Coles (2003) model.

The latter contribution adds considerably important elements to the theoretical analysis of equilibrium wage differentials with increasing wage-tenure profiles. Contrary to what is assumed in previous equilibrium search models (e.g., Burdett and Mortensen, 1998), the wage contracts offered in this environment specify wages as a function of tenure. The wage dispersion result comes from the trade-off between reducing quits and offering smooth consumption streams to risk-averse workers. This is basically the main insight of the equilibrium search model. Higher quit probability reduces the employers' expected surplus, so the above trade-off implies a smooth wage-tenure profile.

This framework is of interest for two main reasons. First, estimating the structural parameters of the search model we can exploit equilibrium conditions to analyse the wage distribution. Secondly, it allows to have a further look at the empirical debate regarding the estimate the returns to firm tenure and provide a measure of the relative importance of firm-specific capital and selection effects. In particular, the theoretical framework we adopt allows to clearly distinguish between wage growth due to job-to-job transitions and wage growth due to pure incentive effects. As a result we exclude human capital effects, as productivity in our model is fixed and constant across workers and firms. The dynamic environment considered allows also to shed some light on the evolution of wage inequality over time, and to disentangle the effect of returns to observables versus unobservables characteristics.

We use two sources of data: Italian Administrative archives (INPS) and English Household panel (BHPS). Comparing two very different European countries as Italy and the UK, the paper provides also interesting insights about the role of institutional environments in shaping career profiles and labour market outcomes in general. A similar exercise has been fruitfully performed in a recent paper by Flinn (2002) who estimates the relevant parameters of a search model with on-the-job search for Italy and the US, finding that while cross-sectional wage differentials are remarkably higher in the US, lifetime welfare outcomes are surprisingly similar for the two coun-

\[1 \text{See Altonji and Shakotko (1987), Topel (1991) and Dustmann and Meghir (2004).}
\[2 \text{At this stage we don't even provide any descriptive analysis of the British sample.} \]
tries. Higher labour market mobility, as reflected in structural parameters of the search model, are important in explaining this finding.

Finally, our paper is a first attempt to provide a structural estimation of an equilibrium search model with increasing wage-tenure profiles. Although the empirical literature dealing with structural estimation of search models is now well established (see Eckstein and Van den Berg, 2003 for a survey); to the best of our knowledge, ours represents the first paper that explicitly exploits the closed-form solution proposed for the wage-contracts offer distribution and the equilibrium conditions of the model to estimate returns to tenure. Postel-Vinay and Robin (2002) do assume in the wage setting mechanism is different from the standard Burdett and Mortensen (1998) model and generate wage-tenure effects, however their empirical analysis is mainly based on cross-section evidence and decomposition of wage variance into individual-, firm- and search components.

We first look at first order predictions of the Burdett and Coles (2003) in terms of tenure effects for workers in different quartiles of the wage distribution; then we provide a non-parametric estimation of transition parameters. Finally, we propose the following estimation method for the Burdett and Coles (2003) model. The minimum and maximum observed wage in the sample are consistent estimates of the lower and upper bounds of the distribution of wages posted. Using an utility function of the CRRA type, we provide a structural estimate of the relative risk aversion parameter. The estimation procedure is in five steps (of the model). First we use the non-parametric estimate of structural transition parameters from durations terminating into unemployment and those terminating into another job. Then, we construct the likelihood function and maximise with respect to the risk aversion parameter using previous non-parametric estimates and the theoretical wage offer distribution obtained in Burdett and Coles (2003). Having obtained such an estimate, we then predict the wage offer distribution. We also estimate non-parametrically the wage offer distribution from those observations of workers that accepted the job after unemployment. The latter represents the empirical wage offer distribution. Finally, we evaluate the pure tenure effects by comparing the two distributions and performing statistical tests on moments of the two.

The rest of the paper is organised as follows. In the next Section we briefly review the literature and provide an exposition of the Burdett and Coles (2003) equilibrium search model. We also highlight the important novelties introduced in the theoretical field and novel implications for the empirical analysis. In Section 3, after briefly describing the sample, we describe our estimation methodology and our preliminary results. For purposes of comparison, we also provide results of returns to tenure using the same
dataset using IV methods. Finally we discuss some further steps for this research.

2 Equilibrium Search with Wage-Tenure Contracts

The basic Burdett and Mortensen (1998) equilibrium search model provides a rationale for wage differentials across identical workers and firms in an environment in which search frictions matter. If workers are allowed to search on-the-job, and firms engage in dynamic competition posting fixed-wage contracts, the resulting endogenous wage distribution is necessarily dispersed. The main result of the model still holds even if workers and/or firms are heterogeneous. In fact, heterogeneity is needed to get a satisfactory fit of the wage distribution (Bontemps et al., 2000; Bowlus et al., 2001). However, the assumption of a fixed-wage contract is clearly at odds with the increasing and concave wage-tenure profile that we observe in the data and the fact that most jobs do allow for promotions and wage growth over the duration of the match.³

Moreover, in this environment, separations are due to quits or exogenous job destruction. As Mortensen (2003) discusses, quits are not efficient from the employer point of view, as rents are lost upon separation. Postel-Vinay and Robin (2002) explicitly address the issue modelling the wage formation as a sequential auction mechanism in which heterogeneous firms compete for workers matching outside offers. Their model provides a theory of intra-firm wage dispersion and wage dynamics over workers' career with wage-tenure effects. However, the main criticism for their modelling strategy is related to the difficulty of observing outside offers and then matching those offers. In particular, the matching strategy seems to be a difficult assumption in labour markets in which workers are homogeneous, unlike some academic labour markets.

Stevens (2004) provides a different mechanism for the increasing wage-tenure profile. Assuming firms offer take-it-or-leave-it wage contracts and workers are risk neutral, she demonstrates that the optimal contract is in two steps. First workers are paid a wage strictly lower than their marginal product, then after a probation period, their are paid their marginal product. In this environment, no turnover results, and the distribution of contracts degenerates to a single common contract, i.e., no cross employer wage dis-

³In this Section we leave aside other theories that are able to explain the concave wage-tenure profile and we just concentrate on the search approach.
persion survives. On the other hand, wage dispersion inside the rm is due to different employment durations.

Burdett and Coles (2003) re-establish the equilibrium wage dispersion outcome assuming workers are risk averse and are liquidity constrained. Employers offer wage-tenure contracts that trade-off a step profile (backloading of wages) to reduce employees’ quit probability with a ‘latter one that smooths consumption* ows. In this model, both intra and inter-rms wage dispersion exist. The former is related to different tenure across workers at the same rm, while the latter emerges from a mixed strategy equilibrium in which rms offer different initial wage offers and make the same pro®ts. A salient feature of the model is the existence of a common baseline salary scale that provides different starting points for wage-tenure contracts.

In what follows we describe the Burdett and Coles (2003) equilibrium search framework. The model is set in continuous time and the focus is on steady states. Workers and rms are homogeneous and each match produces ow revenue p. Workers are allowed to search o® and on-the-job; however, the Poisson arrival rate of o®ers is assumed to be equal across states and equal to . Firms offer wage contracts specifying the future wage at each level of tenure at that rm. The rate of time preference is assumed equal to zero for both workers and rms. Firms maximise steady state ow pro®ts. Workers are risk averse, liquidity constrained and in®nitely lived. Jobs are exogenously destroyed at rate . The latter is also the in®ow of new workers into the market. Finally b is the value of leisure and p > b > 0.

3 Empirical Analysis

3.1 Simulation Results

In this Subsection, we provide some results from numerical simulations of the Burdett and Coles (2003) model. In particular we look at equilibrium as de®ned in Theorem 2 without reporting any proof. We use a standard utility function of the CRRA type

\[ u(w) = \frac{w^{1/\gamma} - 1}{1 - 1/\gamma}. \]

In the empirical analysis we provide a structural estimate of the relative risk aversion parameter 1/3. [Note that if u(w) = ln w, then 1/3 = 1.] The

4In this respect, this result is close in spirit to Diamond (1971).

5In the paper, Burdett and Coles (2003) assume workers are ®nitely lived and have a probability of death every period. We slightly change the model to take into account of empirical transitions towards a more plausible non-employment state.
equilibrium defines a baseline salary scale of the form
\[
\frac{dw}{dt} = p \pm p w \int_0^w \frac{u'(x)}{x} \, dx;
\]
subject to \( w = w_0 \) at \( t = 0 \). The parameters used for the simulation are reported in the Table 1 below. In this specification, while the risk aversion parameter is arbitrary chosen, transition rates are reported to match empirical results from the equilibrium search literature; in particular, the order of magnitude is the one found in most studies. In Figure 1 we report the evolution of the baseline salary scale. Its concave profile is immediately clear, and different parameters' settings do not change the qualitative results. On the worker's side, the model predicts that the expected value of employment, reported in Figure 2, increases over time and is given by the following expression
\[
\frac{dV_s}{dt} = \frac{p + p w}{2} \int_0^w \frac{u'(x)}{x} \, dx;
\]
Expected profits per worker are reported in Figure 3 and are given by the expression
\[
i = \frac{p + p w}{(p + p w)}(p + p w); \tag{3}
\]
for \( w > w_0 \). The equilibrium wage offer and earnings distribution functions are reported in Figure 4. Their analytical expressions are as follows
\[
K(w) = \frac{p + p w}{p + p w} \int_0^w \frac{u'(x)}{x} \, dx; \tag{4}
\]
\[
F(w) = \begin{cases} 1 & \frac{p + p w}{p + p w} \int_0^w \frac{u'(x)}{x} \, dx; \\ \frac{p + p w}{p + p w} \int_0^w \frac{u'(x)}{x} \, dx & \end{cases} \tag{5}
\]
where the latter has a mass point at \( w \) where
\[
F(w) = \frac{p + p w}{p + p w} \int_0^w \frac{u'(x)}{x} \, dx.
\]
The support of wages paid \( [w; \bar{w}] \) is non-degenerate and implies \( w < b, \bar{w} < p \) satisfying

\[
\frac{\pm w^2}{w} + \frac{p}{p - w} = \frac{p - \bar{w}}{p - \bar{w}}.
\]  

(6)

\[
u(w) = u(b) \cdot \frac{p}{p - w} \int_{-\infty}^{+\infty} \frac{w}{p - x} u(x) dx.
\]

(7)

The equilibrium wage offer and earnings densities are reported in Figures 5 and 6 respectively using the expressions below

\[
k(w) = \frac{\pm (p - w)^{1+\alpha}}{(p - w)^2}.
\]

(8)

\[
f(w) = \frac{\pm w u^q(w)}{u(w)^2} \frac{Z w}{p - w} u(w) \int_{-\infty}^{+\infty} \frac{u(x)}{(p - x)} dx.
\]

(9)

As in the original Burdett and Mortensen (1998) model, the shape of the earnings density is at odds with the one observed in the data and further research is required to provide a satisfactory fit of the Burdett and Coles (2003) model to the data.

After providing basic simulation results of the model we then analyse its quantitative implications in terms of wage growth due to job-to-job transitions and tenure effects. Using 5,000 replications we simulate workers’ careers using the baseline model as described above. Our finding indicates that over the working life about 30% of wage growth is due to transition effects, while the remaining 70% is due to tenure effects.

3.2 Data and Sample

The data used in this study is from the Italian Administrative Social Security Archive (INPS).\(^6\) Detailed information about labour market histories of workers employed in the private sector is available for the period 1985-1996. Demographic characteristics of workers are matched with relevant information about the firm they are currently working at, as sector of activity, average number of employees and age of firm. Given the longitudinal structure of the data, it is possible to track the entire career of workers and easily

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\(^6\)See Casavola et al. (2000) for a complete description of the dataset.
Figure 1: Wages under the Baseline Salary Scale

Figure 2: Expected Value of Employment under the Baseline Salary Scale
Figure 3: Expected Profit per Worker under the Baseline Salary Scale

Figure 4: Wage Offer and Earnings Distribution Functions
Figure 5: Wage Offer Density

Figure 6: Earnings Density
Table 2: Descriptive Statistics

<table>
<thead>
<tr>
<th></th>
<th>all</th>
<th>employed</th>
<th>quits</th>
<th>layoffs</th>
</tr>
</thead>
<tbody>
<tr>
<td>monthly wage</td>
<td>2941:52</td>
<td>2923:75</td>
<td>2961:99</td>
<td>2801:36</td>
</tr>
<tr>
<td></td>
<td>(754:86)</td>
<td>(754:13)</td>
<td>(686:71)</td>
<td>(1126:9)</td>
</tr>
<tr>
<td>tenure</td>
<td>6:58</td>
<td>2:82</td>
<td>7:47</td>
<td>2:22</td>
</tr>
<tr>
<td></td>
<td>(3:76)</td>
<td>(2:10)</td>
<td>(3:42)</td>
<td>(2:18)</td>
</tr>
<tr>
<td>non-empl. duration</td>
<td>{}</td>
<td>{}</td>
<td>{}</td>
<td>1:81</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(1:75)</td>
</tr>
<tr>
<td>observations</td>
<td>9801</td>
<td>621</td>
<td>8079</td>
<td>1101</td>
</tr>
</tbody>
</table>

Durations are expressed in years. Monetary values are in 000s of Italian Lira. St dev in parenthesis.

construct the variables object of study. Information about daily and yearly wages are available as the total number of days paid during the year, allowing to construct a measure of monthly wage directly comparable across workers. From the dataset, we extract a subsample of workers that entered the labour market between 1985 and 1995. In particular, we focus on blue collars male workers in the metal industry, between 15 and 50 years of age. We look at average wage growth for two groups of workers: stayers and movers. We calculate average annual (monthly) wage growth for the first group. For the second we calculate the percentage wage increase when having their first job-to-job transition and then calculate average wage growth afterwards (what we call tenure effect). For the group of movers we want the percentage of wage increase due to job-to-job transition and the share due to tenure effect.

3.3 Results

We consider a sample of 9,801 male blue-collar workers employed in manufacturing in 1991. We distinguish between movers and stayers. We take the sample of workers in 1991 and consider their status at that moment: employed or unemployed. Around 89% of them are currently employed. Descriptive statistics are in Table 2.

The first step of our analysis is the estimation of raw returns to tenure using a standard OLS estimator.\(^7\) We estimate the following regression

\[
\log w_i = \beta_1 + \beta_2 \text{tenure}_i + \beta_3 \text{tenure}^2_i + \beta_4 \text{quantile}_i + \beta_5 \text{ten}_i \text{quant}_i + \epsilon_i
\]

\(^7\)Needless to say, we are well aware of standard endogeneity problems we had to deal with for unbiased estimates. At this stage, we consider our linear regressions as descriptive evidence.
where \( i \) is a disturbance error. We start regressing the wage on a quadratic in tenure and then add the other regressors, the position in the wage distribution and an interaction term for the position in the distribution and tenure. In the first three columns of Table 3 we show regression results for the all sample, then in the remaining columns we run the same regressions separately for employed and unemployed workers. For unemployed people, we consider tenure they had before unemployment.

Our estimates show that tenure has always a positive statistically significant effect on wages; the expected concave shape of the wage-tenure profile is also found with a negative sign for tenure squared. One additional year of tenure increases wage by around 1% in the all sample. However, some differences emerge among currently employed and unemployed workers. As far as employed workers are concerned, it is no surprise to find that their current wages are higher if tenure is higher. However, the result for unemployed workers is quite striking. Our results show that when they find a job, the effect of previous tenure on their re-employment wages is positive indicating that firm-specific capital in transferable and they don't seem to incur any big loss upon losing their previous jobs. This result is at odds with many studies that show that previous tenure has a negative effect on re-employment wages.

Controlling for the position in the wage distribution (columns 2 and 3) we observe a sharp reduction in the magnitude of the tenure effect (for the whole sample it drops from 0.018 to 0.002) and a clear positive effect on the wage. In other words we (trivially) verify that higher positions in the wage distribution are associated with higher wages. Moreover, comparing workers in the same part of the distribution, we find that higher tenure always increases wage.

In Table 4 we run the same regression as in equation (10) considering only the sample of currently employed workers. We distinguish between those that quit at the end of the period and those that are laid-off or end up to unemployment. Again, separating the sample we do observe interesting differences. First, we find that the tenure effect is twice as high for quitters than for lay-offs (0.034 against 0.016). This result is compatible with the first order prediction of the Burdett and Coles (2003) model that predicts steeper wage-tenure profiles to retain workers. This is the incentive effect firms have to exploit to avoid workers to leave. Controlling for the position in the wage distribution we observe that tenure doesn't have any significance in explaining wages.

Our results suggest that tenure effects and transition probabilities can play different roles for workers in different part of the wage distribution. To further investigate this, we run a regression separately for workers in each
### Table 3: Wage Regressions I

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Employed</th>
<th>Unemployed</th>
</tr>
</thead>
<tbody>
<tr>
<td>tenure</td>
<td>0.018</td>
<td>0.014</td>
<td>0.033</td>
</tr>
<tr>
<td>(7.83)</td>
<td>(5.51)</td>
<td>(2.95)</td>
<td>(2.75)</td>
</tr>
<tr>
<td>tenure(^2)</td>
<td>-0.000</td>
<td>0.000</td>
<td>-0.001</td>
</tr>
<tr>
<td>(-0.61)</td>
<td>(0.00)</td>
<td>(-3.36)</td>
<td>(-2.72)</td>
</tr>
<tr>
<td>quantile</td>
<td>0.075</td>
<td>0.073</td>
<td>0.075</td>
</tr>
<tr>
<td>(251.9)</td>
<td>(126.7)</td>
<td>(123.7)</td>
<td>(71.13)</td>
</tr>
<tr>
<td>ten£ quant</td>
<td>-0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>(-9.29)</td>
<td>(-2.73)</td>
<td>(-2.73)</td>
<td>(1.66)</td>
</tr>
<tr>
<td>obs</td>
<td>9801</td>
<td>9801</td>
<td>9801</td>
</tr>
<tr>
<td>R(^2)</td>
<td>0.07</td>
<td>0.89</td>
<td>0.89</td>
</tr>
<tr>
<td>F</td>
<td>412.27</td>
<td>23207</td>
<td>17578</td>
</tr>
</tbody>
</table>

Dependent variable: log of monthly wage. t-statistics in parentheses.

### Table 4: Wage Regressions II: Employed Workers

<table>
<thead>
<tr>
<th></th>
<th>Quits</th>
<th>Layoffs</th>
</tr>
</thead>
<tbody>
<tr>
<td>tenure</td>
<td>0.034</td>
<td></td>
</tr>
<tr>
<td>(1.88)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>tenure(^2)</td>
<td>i 0.003</td>
<td></td>
</tr>
<tr>
<td>(i 0.60)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>quantile</td>
<td>0.075</td>
<td></td>
</tr>
<tr>
<td>(70.40)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ten£ quant</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>(0.25)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>obs</td>
<td>621</td>
<td></td>
</tr>
<tr>
<td>R(^2)</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>23.95</td>
<td></td>
</tr>
</tbody>
</table>

Dependent variable: log of monthly wage. t-statistics in parentheses.
quartile of the wage distribution and check the effect of tenure. Results are in Table 5.

The undoubtely interesting result is that tenure effects are strong and significant only for workers in the bottom part of the wage distribution. Estimations for the all sample indicate that returns to tenure become negative for workers at the top of the distribution. Again interesting differences emerge when comparing employed and unemployed workers. In particular, we observe that the statistical significance of our coefficient is very low for quitters and for all workers but in the first quartile. This probably indicates that tenure profiles have to be steeper in this part of the distribution to avoid workers to quit.

Before proceeding to structural estimation, in Table 6 below we report non-parametric estimates of our transition parameters with average wages for separate groups. We calculate the inverse of the duration of employment and unemployment. Our results show that the arrival rate of offers when unemployed is higher than the same rate for employed workers indicating that search is more effective in that state (0.16 against 0.07). The job destruction rate is estimated to be around 2% per month. Since the theoretical model has a common arrival rate of offers \( \lambda = \lambda_0 = \lambda_1 \), we proceed calculating \( \lambda \) as a weighted average between \( \lambda_0 \) and \( \lambda_1 \); where weights are proportion...
of workers in the two states (11% and 89% respectively). Our estimate of \( \beta \) is 0.08. In Table 6 we also report figures for average wages of workers in each state. As expected, workers that were previously unemployed earn a lower wage indicating that the distribution of wages for employed workers is shifted to the right. Interestingly, the average wage for quitters is lower and the average wage of workers that terminate their job into non-employment, indicating that on average workers with lower wages are more likely to quit.

### 3.4 Estimation Method

In what follows we describe our estimation method.

1. **The minimum wage** and maximum observed wage in the sample are consistent estimates of the lower and upper bounds of the distribution of wages posted in the model. In the theoretical model, the "foot on the door effect" implies that \( \bar{w} < b \). Moreover, \( \bar{w} < p \).

2. **The utility function is of the CRRA type**

\[
u(w) = \frac{w^{1 - \theta}}{1 - \theta}
\]

In the empirical analysis we provide a structural estimate of the relative risk aversion parameter \( \frac{3}{4} \) [Note that if \( u(w) = \ln w \), then \( \frac{3}{4} = 1 \)]

2. **The estimation procedure is in steps (t of the model):**

1. Get a non-parametric estimate of \( \pm \) and \( \beta \) from durations terminating into unemployment and those terminating into another job. We call them \( b_{\pm} \) and \( b_{\beta} \).

2. We construct the likelihood function and maximise with respect to \( \frac{3}{4} \) using non parametric estimates of the transition parameters \( b_{\pm} \) and \( b_{\beta} \) and the theoretical \( F(w) \) obtained by BC. The likelihood for employed workers is the multiplication of the probabilities below

\[
\log L(\frac{3}{4}) = \frac{1}{n} \sum_{i=1}^{n} \sum_{j=1}^{n} \bar{k}(w)[\pm + , (1_i F(w))] \exp f_i [\pm + , (1_i F(w))] g_i (\pm , (1_i F(w))] \left[ 1_i + 1_i \right] \mathrm{d} w
\]

where

\[
e = \frac{1}{\beta + \pm}
\]

15
is the sampling probability. The equilibrium wage earnings density is obtained by differentiating $K(w)$ in the paper and is equal to

$$k(w) = \frac{\pm}{2} \frac{(p_i w)^{1+\epsilon}}{(p_i w)^{3+\epsilon}}.$$  \hspace{1cm} (11)

Employed durations are assumed to be exponentially distributed, and

$$1_i F(w) = \frac{\pm}{p_i w} \int_{1_i}^{p_i w} \frac{1}{2u^q(w)} \frac{u^q(w)}{p_i w (p_i w - x)} \, dx.$$  \hspace{1cm} (12)

Finally the common productivity parameter is a weighted average of the upper and lower bounds of the wage offer distribution, where weights depend on transition parameters.

$$p = \frac{1}{1 - \pm} \frac{1}{\pm \pm \pm \pm}$$  \hspace{1cm} (13)

3. Having $b_1, b_2, b_3$, then predict $F(w)$; call it $dF(w)$; [At this stage it is also possible to structurally estimate all the three parameters again, we don't do it now.]

4. Estimate non parametrically $F(w)$ from those that accepted the job after unemployment. [We do it using a standard empirical cdf.]

5. Compare the two distributions and perform statistical tests on moments of the two.


4 Comments

In this paper, we study the empirical implications of an equilibrium search model in which firms offer optimal wage-tenure contracts and workers are allowed to change their job for a more profitable career profile. We offer a very preliminary exposition of the structural estimation approach and first numerical simulations of the Burdett and Coles (2003) model.
The latter contribution adds considerably important elements to the theoretical analysis of equilibrium wage differentials with increasing wage-tenure profiles. Contrary to what is assumed in previous equilibrium search models (e.g., Burdett and Mortensen, 1998), the wage contracts offered in this environment specify wages as a function of tenure. The wage dispersion result comes from the trade-off between reducing quits and offering smooth consumption streams to risk averse workers basically following the main insight of the basic equilibrium search model. Higher quit probability reduces the employers expected surplus, so the above trade-off implies a smooth wage-tenure profile.

Using data from Italian Administrative archives (INPS), we propose the following estimation method for the Burdett and Coles (2003) model. The minimum and maximum observed wage in the sample are consistent estimates of the lower and upper bounds of the distribution of wages posted. Using an utility function of the CRRA type, we provide a structural estimate of the relative risk aversion parameter. The estimation procedure is in five steps (fit of the model). First we get a non-parametric estimate of structural transition parameters from durations terminating into unemployment and those terminating into another job. Then, we construct the likelihood function and maximise with respect to the risk aversion parameter using previous non-parametric estimates and the theoretical wage offer distribution obtained in Burdett and Coles (2003). Having obtained such an estimate, we then predict the wage offer distribution. We also estimate non-parametrically the wage offer distribution from those observations of workers that accepted the job after unemployment. The latter represents the empirical wage offer distribution. Finally, we evaluate the pure tenure effects by comparing the two distributions and performing statistical tests on moments of the two.
References


