Economic Modelling 47 (2015) 280–291

Contents lists available at ScienceDirect

Economic Modelling

journal homepage: www.elsevier.com/locate/ecmod

Work hour mismatches and on-the-job search ☆

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ARTICLE INFO

Article history:
Accepted 6 March 2015
Available online 24 March 2015

Keywords:
On-the-job search
Wage bargaining
Work hour mismatch
Hold-up problem

ABSTRACT

This paper constructs an on-the-job search model with work hour mismatches. In this model, there are two types of jobs that differ in output per hour, and workers are also heterogeneous with respect to preferences for the working hours. This heterogeneity may generate mismatch between worker's preference and job's type. Because worker's preference is changed by exogenous shocks, workers can eliminate mismatch by two ways: (i) moving to a suitable job by a job-to-job transition and (ii) waiting to change their preference. Those ways are consistent with empirical findings (e.g., Euwal, 2001; Johnson, 2010; Reynolds and Aletraris, 2006). The model shows that job-to-job transitions are less frequent than its efficient level, and hiring subsidies can lead to socially efficient allocation of workers.

1. Introduction

Today, work hour mismatches are one of the most important problems in labor markets. For instance, about a third of all U.S. workers say they would like to work either more or fewer hours than currently worked at the same hourly wage rate. This fact is clearly inconsistent with the standard neoclassical theory that assumes that a worker can choose her working hours either directly by choosing working hours within a job or indirectly by choosing a job in a frictionless labor market.

Many empirical studies suggest the importance of job-to-job transitions to eliminate work hour mismatches because the variance of the change in working hours is higher for the movers than for the stayers.[1] These studies also suggest that a free choice of working hours within a job is not possible and/or unavailable, and workers must move to new jobs to change their working hours. However, many labor economists have emphasized the importance of labor market friction which prevents workers from moving to more suitable jobs. In fact, empirical evidence (see for example, Euwals, 2001; Johnson, 2011) indicates that labor market frictions help to explain the existence of work hour mismatches. Further, Reynolds and Aletraris (2006) suggests that some people reduce or eliminate mismatches in another way, that is by changing their preference of working hours.

Motivated by these empirical studies, this paper provides an on-the-job search model that incorporates fluctuations in labor supply preferences. In the model, workers can eliminate the mismatch in two ways: (i) by moving to a suitable job by a job-to-job transition or (ii) by changing their labor supply preferences. This paper demonstrates that the fluctuations in the labor supply preference are a source of inefficiency for job-to-job transitions, which will be the contribution of this paper to the field of on-the-job search literature. The job-to-job transitions and its efficiency have been extensively studied by many researchers[2] because in the real economy, a large proportion of workers who move to new jobs do not experience unemployment (see Blanchard and Diamond, 1989).

In this paper, we develop a tractable on-the-job search model. There are two types of workers, and one type's opportunity costs of work are

☆ I would like to thank an anonymous reviewer for a number of recommendations that improved the paper. I also thank James Albrecht, Koichi Futagami, Ryouichi Imai, Hiroshi Kitamura, Noritaka Kudoh, Toshihiro Matsumura, Ryousuke Okazawa, Fumio Ohtake, Masaru Sasaki, Yasuhiro Sato, Takashi Simizu, Katsuya Takii, Susan Vroman, and the participants of the Osaka Workshop on Economics of Institutions and Organizations, the Search Theory Workshop, the 2009 Japanese Economic Association Spring encounter at Kyoto University, the Applied Macro/Micro-economics and Econometrics at Hokkaido University, the Human Economy Study sectional encounter at Chuo University, the Theoretical and Quantitative Economics Seminar at Osaka Prefecture University, and the Econometric Society Australasian Meeting at the University of Adelaide, and the 28th Annual Conference of the European Society for Population Economics for their helpful comments and suggestions. Only the author is responsible for the views expressed and mistakes made.

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[1] See for example, Altonji and Paxson (1985, 1988), Kahn and Lang (1991), Dickens and Lundberg (1993), Stewart and Swaffield (1997), Euwals (2001), Martinez-Granado (2005), and Blundell et al. (2008).

[2] For example, Burdett et al. (2004) demonstrated that the level of job-to-job transitions exceeded the optimal level because workers made excess effort in their on-the-job search. Gautier et al. (2010) showed that on-the-job search models have additional externalities besides the well-known congestion externalities. Bandopadhyay and Chaudhuri (2011) studied the interaction between inflow of foreign capital and job-to-job transitions. Finally, Gavrel et al. (2012) analyzed the impacts of the minimum wage on the job-to-job transitions from the low-productivity sector to the high-productivity sector.

http://dx.doi.org/10.1016/j.econmod.2015.03.009
0264-9993/

higher than those of the other type. There also exist two job types with type one's marginal productivity of working hours being higher than that of type two. The instantaneous surplus of the job–worker match between a worker with low opportunity costs and a job with high marginal productivity is then higher than the match between this worker and a job with low marginal productivity. Likewise, the instantaneous surplus of the job–worker match between a worker with high opportunity costs and a job with low marginal productivity is higher than the match between this worker and a job with high marginal productivity.

A key assumption of this model is that the types of workers and the opportunity costs of working hours switch back and forth. A change in hours for housework is a typical example that supports this assumption. The necessary hours for housework depend on the family situation. The opportunity costs of a worker with a small child may be high because the worker must spend more time to care for the child. In general, by shocks such as childbirth and marriage, both the hours for housework and the opportunity costs of work are changed.

In this model, there are three types of equilibria: the turnover equilibrium (TE), the stay-in-type-*L* job equilibrium (SLE), and the stay-in-type-*S* job equilibrium (SSE). These equilibria are characterized by workers' decisions on job-to-job transitions (called turnover decisions). In the TE, workers try to move to a good match when the current match becomes a bad match. In the SLE and the SSE, each type of a worker continues to stay in her or his incumbent jobs regardless of her or his type. Moreover, in the TE, mismatches are eliminated by both job-to-job transitions and changes in labor supply preferences, while in the SLE and the SSE, mismatches are eliminated only by changes in labor supply preferences. This paper first shows that the parameter domain of the TE increases with the workers' bargaining power and job contact rates because the effectiveness of job-to-job transitions increases.

Second, this paper demonstrates that the market equilibrium may be socially inefficient even though the turnover decisions are privately efficient. More formally, there are parameter sets under which the market equilibrium should be the TE to maximize the social surplus, but is instead the SLE or the SSE. The reason behind the above phenomenon is the hold-up problem, which means that the turnover decisions have implications for not only incumbent and poaching jobs, but also for other vacant jobs that will poach workers in the future. In the steady state equilibrium, other vacant jobs can gain a positive value only in the TE because these jobs can poach workers only in the TE. However, these jobs cannot influence the turnover decisions, and workers then ignore the capital gain of these jobs. Only if the worker has full bargaining power, the market equilibrium would be socially efficient because the hold-up inefficiencies would disappear.

Similar to this model, as in other studies (e.g., Cahuc et al., 2006; Pissarides, 1994), workers do not take into account the benefits of other vacant jobs, but the TE remains socially efficient. This is because in their models, the workers and the social planner always prefer to move to good matching jobs. In this model, the worker may stay in a bad match rather than move to a (temporarily) good match because the worker's value in a (seemingly) good match may be lower because of a low continuation value after the preference shocks on the new match.

Our paper is related to several studies. First, this paper addresses the issue of working hours in the frictional labor market. Pissarides (2007) and Kudoh and Sasaki (2011) also address this issue using the job search model. However, in these studies, authors assume ex-ante homogeneous workers and then rule out work hour mismatches. Second, we study the efficiency of job-to-job transitions and demonstrate that the fluctuation of worker type is a source of inefficiency. Kiyotaki and Lagos (2007) demonstrate that job-to-job transitions are inefficient in the on-the-job search model with replacement hiring, which is ruled out in this paper. In another study with a frictionless labor market, Bertola (2004) finds that the level of job-to-job transitions is below the efficient level when workers are risk-averse; this differs from the present paper, wherein workers are risk-neutral. Felli and Harris (1996) construct a job turnover model with learning about the job-specific skills of workers and shows that turnover decisions are socially inefficient. However, they considered only the case in which wages are determined by the Bertrand wage competition game. In this paper, wages are determined by the more general bargaining game of Cahuc et al. (2006). This paper can then consider the effect of workers' bargaining power on efficiency and demonstrates that turnover decisions are socially efficient if workers have a monopolistic bargaining power.

The rest of this paper is organized as follows. Section 2 presents the basic model. Section 3 defines the market equilibrium. Section 4 addresses the social planner problem with job-to-job transitions and the policy implications. In Section 5, we extend the basic model to free entry and the other bargaining game. Finally, Section 6 concludes.

2. The basic model

We consider a continuous-time search model with on-the-job search and wage bargaining. In this model, there is a unit mass of workers and a large number of jobs.

At any instant, workers are either of type *l* or *s*. While type-*l* workers prefer to work full-time, type-*s* workers prefer to work part-time. Formally, a worker allocates her unit mass of time between market work, h, housework, t_i, and leisure, $1 - h - t_i$. While h is endogenously determined, t_i is exogenously determined and depends on the worker type. We assume that $0 \le t_l < t_s$, which means that type-*s* workers must spend more time on housework than type-*l* workers.

The instantaneous utility of a type-$i \in \{l,s\}$ worker is defined by a quasi-linear function as $w + u(1 - h - t_i)$, where w is wages, and $u(\cdot)$ is the utility of leisure, assuming that $u' > 0$, $u'' < 0$. Because $t_l < t_s$, for any h, $u'(1 - h - t_s)$ is then higher than $u'(1 - h - t_l)$, which means that the marginal disutility from the working hours of type-*s* workers is higher than that of type-*l* workers. In other words, the opportunity cost of type-*s* workers is higher than that of type-*l* workers.

There are two types of jobs, full-time jobs (denoted as L) and part-time jobs (denoted as S). According to Acemoglu (2001), a type-$j \in \{L,S\}$ job must buy capital k_j with constant running costs ρ. If a type j job employs a type i worker, the job can obtain the instantaneous profits $F(k_j, h) - w - \rho k_j$, where w is wages, and $F(k_j, h)$ is the production function. Further, we assume that $F_k, F_h > 0$, $F_{kk}, F_{hh} < 0$, and $F_{hk} > 0$, which means that capital and working hours are complementary in production. Throughout this paper, we assume that $k_L > k_S$, which implies that not only the marginal productivity but also the running costs of type-*L* jobs are higher than those of type-*S* jobs.

A key assumption of this model is that while a job's type is constant throughout its life, a worker's type switches by exogenous shocks. $\pi_{ii'}$ $\left(i \neq i' \in \{l,s\}\right)$ is the Poisson arrival rate of a shock by which a worker's type switches from i to i'. As shown in the next section, a suitable job type for a worker may also change by this shock.

2.1. Turnover process

When an employed worker contacts a new vacant job, she decides whether to move to the poaching job after they have observed each other's type. More formally, an on-the-job searcher can contact a type-j vacant job with an exogenous Poisson rate $p_j \in [0, \infty)$. If an employed worker contacts a new job (called the poaching job), her employment contract may be negotiated between her and the poaching job, and she decides whether to move to the job.

Assume that an employed worker who contacts a poaching job can move to the job with zero moving cost. Additionally, employed workers can search on the job with a very small search cost,[3] by which employed

[3] Postel-Vinay and Robin (2004) discussed the case of endogenous search intensity.