Labour Economics 18 (2011) 607–623

Contents lists available at ScienceDirect

Labour Economics

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

Endogenous labor force participation and firing costs☆

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ARTICLE INFO

Article history:
Received 21 May 2009
Received in revised form 7 January 2011
Accepted 12 January 2011
Available online 22 January 2011

JEL classification:
E24
J21
J64
J65

Keywords:
Search and matching
Labor force participation
Firing costs

ABSTRACT

I construct a matching model to explain the labor market transition between employment, unemployment and nonparticipation, and evaluate the quantitative effects of firing costs. The model has several features that are distinguished from previous studies: endogenous labor force participation, different job-search decisions and imperfect insurance markets. I find that the model is able to account for the U.S. labor market, especially the gross labor-force transition rates. I also find that firing costs as a type of firing tax have a negative effect on the layoff rate, the job-finding probability and the participation rate. In particular, the effect of a decrease in the job-finding probability is greater than the effect of a decrease in the layoff rate, and this results in an increase in the unemployment-to-population ratio. Finally, firing costs make individuals' job tenures longer and skew the asset distribution to the right.

1. Introduction

Any policy that affects people in one of the three states of employment, unemployment and out-of-the-labor-force (OLF) also affects those in other states, because the employment-to-population ratio, unemployment rate and participation rate are jointly determined. For that reason, this paper builds up a model having both a labor force participation decision and a job search decision, and evaluates the effects of firing costs.

Most existing studies which explain the dynamics of individual labor market decisions have postulated a fixed labor force size and analyzed models having only two labor force states: employment and unemployment. In reality, however, the labor force size is not fixed, because people move not only within the labor force but also into and out of it. The models with only employment and unemployment cannot account for individuals who move in and out of the labor force. In addition, since the unemployed in these models cannot but search for work, the models cannot capture the labor force participation decision through the job search decision, either. In this paper, I introduce another labor force status, *out-of-the-labor-force* (OLF), and make a distinction between unemployment and OLF to fully characterize the possible individual labor force decisions.

There have been other attempts to explain the individual search decisions based on models having employment, unemployment and OLF. Garibaldi and Wasmer (2005), Hæfke and Reiter (2006) and Pries and Rogerson (2009), among others, extend the Mortensen and Pissarides (1994) matching model to incorporate OLF.

The first type of distinction between unemployment and OLF *à la* Garibaldi and Wasmer (2005) and Hæfke and Reiter (2006) is made on the basis of whether a person is searching or not. The unemployed are defined as those who are searching for work, and nonparticipants as those who are not searching for work. Since the unemployed find a job with some probability but nonparticipants thus do not, transitions from OLF to employment are never made. For that reason, Garibaldi and Wasmer (2005) follow a time aggregation bias that the direct flows from OLF to employment are due to misclassification problems. In their model, workers moving from OLF to employment are assumed to have made two distinct transitions, from OLF to unemployment, and from unemployment to employment. On the other hand, Hæfke and Reiter (2006) set the model period to one-week, to enable the monthly transitions from OLF to employment in their model.

The second type of distinction *à la* Pries and Rogerson (2009) is made on the basis of whether a person is searching actively or inactively. The unemployed are defined as those who are searching actively, and nonparticipants as those who are searching inactively. An active search implies a search with high intensity and an inactive search one done with low intensity, so that an active searcher has a high job-finding probability and an inactive searcher a low one.

In this paper, I build up a matching model in which workers are risk-averse and can be employed, unemployed or out of the labor

☆ I thank co-editor, Etienne Wasmer, and anonymous referees for their helpful comments and suggestions. The views expressed herein are those of the author and do not necessarily reflect the views of the Samsung Economic Research Institute.

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doi:10.1016/j.labeco.2011.01.004

force. It is also assumed that there are no available insurance markets. Workers save and accumulate an interest-bearing asset which can be used to smooth their consumption across labor force states. In a stationary equilibrium, then the model is characterized by asset distributions for each labor force state. I show that how much wealth individuals accumulate is one of the important factors determining whether they participate in the labor market. Workers who have employment opportunities decide whether to work or not, while workers who have no employment opportunities decide whether to search or not. The job-finding process has two steps. In the first step, each worker receives a piece of information on possible employment opportunities. Those who have a more promising piece of information is more likely to search, and based on how promising the information is each worker decides whether to search or not. In the second step, workers who decide to search make search efforts and take costly actions. In the model, the search decision then depends on the quality of search signal, meaning "how promising a piece of information is," and on the worker's asset holdings.

I attempt to make labor force classifications consistent with the Current Population Survey (CPS). According to the CPS definition, the unemployed are persons aged 16 years and older who had no employment during the reference week and had made specific efforts to find employment sometime during the four-week period ending with the reference week. The CPS definition of unemployment captures two important features of unemployment. The first is that the unemployed did search for work during the last four weeks before the survey interview. The second is that they were not employed at the time of the interview. In the standard Mortensen and Pissarides (1994) matching model, in which there are only employment and unemployment, the unemployed include both those who have not found employment or have separated and those who are currently looking for work. The law of motion for unemployment from the standard model shows that the current-period unemployment is then determined by the former group, while determining the latter group. To be consistent with the CPS, in this paper, persons in the state of unemployment are defined as those who search but do not find employment.[1] Nonparticipants are on the other hand defined as those who do not search.

In Garibaldi and Wasmer (2005) and Hæfke and Reiter (2006), the employed are those who have an employment opportunity and decide to work. Only those who were either working (employed) or looking for work (unemployed) last month can be classified as employed this month. The labor force classification made in my model, however, is based on matching outcomes, not worker's decisions, and the employed are persons who did search and did find employment along with those who have been working. Some of those classified as OLF last month can be employed this month. I do not need to assume that people make inframonthly transitions because they do so in my model.

As in Petrongolo and Pissarides (2001) and Garibaldi and Wasmer (2005), it could be argued that the direct path from OLF to employment is a measurement problem: A worker who is classified as OLF at time $t-1$ survey and is classified as employed at time t survey does definitely search for a job between the two surveys. However, this is not captured by measurements because workers who currently have a job are not asked what they did before their hiring. This measurement problem is successfully captured and detected by the redefined labor force classification of the model in which the unobserved action between OLF and employment is explicitly described.[2]

If people are assumed to make inframonthly transitions following Garibaldi and Wasmer (2005) and Hæfke and Reiter (2006), unemployment should be interpreted with caution. Suppose that the model period is set to two-weeks. In a stationary state, then the unemployed are defined as persons who search for two weeks. Only some of them, particularly persons who have made an unemployment-to-unemployment transition, have been job-searching for four weeks. A conflict arises between the model definition and the CPS definition of unemployment.

Another rationalization discussed by Garibaldi and Wasmer (2005) is that low search intensity, below a minimum threshold in the choice of search intensity, is not detected by labor force surveys. Some workers with low search intensity are then classified as OLF. Since these individuals are actually job-searchers, they find jobs with low probability, and make OLF-to-employment transitions. This is exactly what Pries and Rogerson (2009) assume in their model, in which OLF defined as inactive search is associated with a lower but non-zero job finding probability. However, such models in which OLF capture only passive searchers could be misspecified because the fraction of passive searchers to the actual OLF is very small is evidenced by Jones and Riddell (1999).

A novel feature of the model is that workers are risk-averse and the asset market is incomplete. In the standard matching models, however, workers are risk-neutral, and individual labor force participation decisions are determined by worker's market or nonmarket productivity, not by worker's wealth. Several empirical studies on the relationship between wealth distribution and labor market participation decisions demonstrate that wealth decreases the probability of transitioning into employment because wealth increases reservation wages, and reduce the number of persons who are willing to accept the current market wages.[3] For example, Bloemen and Stancanelli (2001), using Dutch data, find that higher levels of wealth result in higher reservation wages, and higher reservation wages are associated with a lower employment probability. Similarly, Algan et al. (2003), using French panel data, show that more wealth decreases unemployment duration and increases the probability of quits to unemployment. Alexopoulos and Gladden (2006), using U.S. data, confirm that wealth increases reservation wages and decreases the probability of transitioning into employment.[4] The fact that individuals have very different amounts of assets should not be ignored, in particular, when their labor market transitions are analyzed. The model is characterized by asset distributions for each labor force state, which affect individual's participation decision as well as job search decision by interacting with both math-specific productivity and search signal quality.

I begin by evaluating a variant of Pries and Rogerson (2009)'s model, in which workers are risk-averse, the asset market is

[1] Krusell et al. (2009) define the unemployed as those who would like to work at the given market wage rate but are not able to find employment.

[2] Like Garibaldi and Wasmer (2005), I do not allow that "jobs bump into people", either.

[3] The empirical studies are based on Danforth (1979) framework, in which the unemployed look for work and receive wage offers from a non-degenerate distribution, and the employed do not become unemployed. The reservation wage is the wage that makes individuals indifferent between accepting a job offer and rejecting it. Danforth (1979) shows that when preferences give rise to additively separable utility functions and display decreasing absolute risk aversion, individuals' reservation wages are increasing in the amount assets they hold. The probability that an individual accepts a job offer, on which the reservation wage has a negative impact, decreases as the individual's asset holdings increase. Therefore, Danforth (1979)'s model predicts that "the rich search longer."

[4] There are also theoretical studies on the relationship between wealth distribution and labor market participation decisions which include Gomes et al. (2001), Chang and Kim (2006) and Krusell et al. (2009). Gomes et al. (2001) analyze the non-convex labor supply properties in an incomplete market, but they do not distinguish unemployment from nonparticipation. Chang and Kim (2006) map individuals to aggregate labor supply functions, but they do not consider frictional unemployment. Krusell et al. (2009), the study closest to my work, construct a model of participation, unemployment and employment. They focus on persistent idiosyncratic shocks playing a critical role in accounting for labor market flows, whereas I look into the quality of the search signal and its relationship with wealth distribution.