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Directed search over the life cycle ☆

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ABSTRACT

We develop a life-cycle model of the labor market in which different worker–firm matches have different quality and the assignment of the right workers to the right firms is time consuming because of search and learning frictions. The rate at which workers move between unemployment, employment and across different firms is endogenous because search is directed and, hence, workers can choose whether to seek low-wage jobs that are easy to find or high-wage jobs that are hard to find. We calibrate our theory using data on labor market transitions aggregated across workers of different ages. We validate our theory by showing that it predicts quite well the pattern of labor market transitions for workers of different ages. Finally, we use our theory to decompose the age profiles of transition rates, wages and productivity into the effects of age variation in work-life expectancy, human capital and match quality.

1. Introduction

The US economy displays a great deal of labor reallocation, in the sense that workers move frequently between employment, unemployment and across different employers. For example, the rate at which unemployed workers become employed (henceforth, the UE rate) is close to 25 percent per month, the rate at which employed workers become unemployed (the EU rate) is approximately 0.5 percent per month, and the rate at which workers move from one employer to another (the EE rate) is approximately 1.8 percent per month.[1] However, these aggregate transition rates hide dramatic differences in the extent of labor reallocation for workers of different ages. For example, among workers of age 20 to 25, the monthly UE rate is 28 percent, the EU rate is 1.5 percent and the EE rate is 3.5 percent. Among workers of age 40 to 45, the monthly UE rate

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[1] The figures reported in this introduction are constructed from the 1996 panel of the U.S. Census' Survey of Income and Program Participation (SIPP) for men with a high school degree. We refer the reader to Section 3 for further details about the data.

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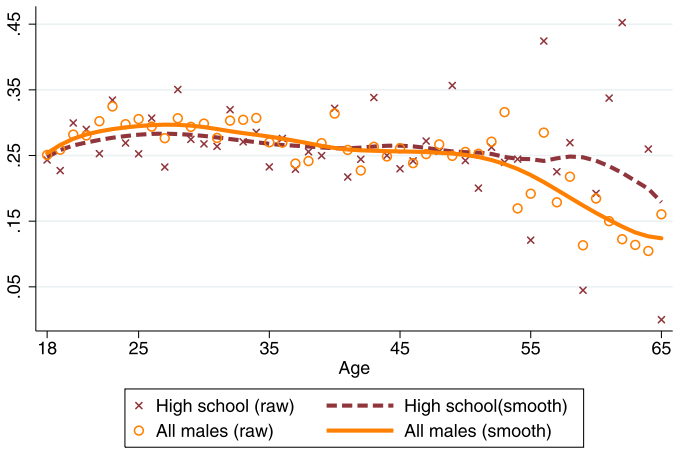

Fig. 1. UE lifecycle profile.

is 25 percent, the EU rate is 0.4 percent and the EE rate is 1.8 percent. And among workers of age 55 to 60, the monthly UE, EU and EE rates are, respectively, 18 percent, 0.2 percent and 1.5 percent.

The purpose of this paper is to explain the differences in the extent and pattern of labor reallocation of young, middle-aged and old workers. To this end, we develop a life-cycle model of the labor market in which different worker–firm matches have different productivity and the allocation of the right workers to the right firms is a time-consuming process because of search frictions in the spirit of Mortensen (1970) and learning frictions in the spirit of Jovanovic (1978). On one side of the labor market, firms choose how many and what type of vacancies to open, where the type of a vacancy is defined by the conditions under which it hires a worker and by the value of the employment contract that it offers to a new hire. On the other side of the labor market, both employed and unemployed workers choose which type of vacancy to seek. In this sense, the search process is directed. The workers and the firms who seek and offer the same type of vacancy come together through a frictional process described, in reduced form, by a constant return to scale matching function. When workers and firms match, they begin production and eventually learn the quality of their union.

In equilibrium, all workers face a choice between searching for vacancies that offer relatively higher wages and searching for vacancies that are relatively easier to find. The choices faced by a particular worker depend on his age and experience. Specifically, if the age and experience of the worker make him a more valuable production partner, he will face a higher probability of finding vacancies offering any value. The preferences of a particular worker over the probability of finding a vacancy and the value offered by a vacancy depend on the worker's employment position (i.e., unemployment or employment in a match of a given quality). Specifically, if the worker is in a more valuable employment position, he will have a stronger preference for vacancies that offer higher value and are harder to find. Overall, the age, experience and employment position of a worker determine his optimal search strategy and, consequently, the velocity at which he moves across employment states.

We calibrate the model using aggregate data on labor reallocation, such as the unconditional mean of the UE, EU and EE rates and the mean of the EU and EE rates conditional on tenure. The calibration reveals that there is a great deal of heterogeneity in the quality of firm–worker formed matches. For example, a match in the 90th percentile of the quality distribution is approximately 3 times more productive than a match in the 10th percentile. The search frictions that slow down the process of assignment of the right workers to the right firms are modest, in the sense that workers are almost always able to search the labor market and that firms pay a relatively small cost to open new vacancies. For example, the expected vacancy cost that a firm has to incur to hire a middle-aged unemployed worker is approximately equal to 2 months of the worker's output. Similarly, the learning frictions are modest, in the sense that firms and workers learn rather quickly the quality of their match. On average, it takes 4 months for a firm and a worker to learn the quality of their match. Overall, the large heterogeneity in match quality and the modest search and learning frictions add up to generate a rather time-consuming process of assignment of the right workers to the right firms.

In order to validate the calibrated model, we use data on labor reallocation disaggregated according to the workers' age. In particular, we show that the calibrated model predicts quite well the mean of the UE, EU and EE transition rates conditional on the workers' age. We then use the model to decompose the overall effect of age on the transition rates into the effect of three characteristics that differ between older and younger workers: work-life expectancy,[2] experience and selection into matches of different quality. We find that the decline in the UE rate experienced by workers between the ages of 50 and 65 (see Fig. 1) is mainly due to the decline in the workers' work-life expectancy, which reduces their value to the firms as production partners. We find that the decline in the EU rate experienced by workers between the ages of

[2] Throughout the paper, we define work-life expectancy as the expected time before a worker exits the labor market.

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