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Search costs and efficiency: Do unemployed workers search enough? ☆

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ABSTRACT

Many labor market policies affect the marginal benefits and costs of job search. The impact and desirability of such policies depend on the distribution of search costs. In this paper, we provide an equilibrium framework for identifying the distribution of search costs and we apply it to the Dutch labor market. In our model, the wage distribution, job search intensities, and firm entry are simultaneously determined in market equilibrium. Given the distribution of search intensities (which we directly observe), we calibrate the search cost distribution and the flow value of non-market time; these values are then used to derive the socially optimal firm entry rates and distribution of job search intensities. From a social point of view, some unemployed workers search too little due to a hold-up problem, while other unemployed workers search too much due to coordination frictions and rent-seeking behavior. Our results indicate that jointly increasing unemployment benefits and the sanctions for unemployed workers who do not search at all can be welfare-improving.

1. Introduction

1.1. Motivation and summary

There exists a significant amount of heterogeneity in terms of the intensity with which workers search for jobs.[1] Understanding the sources and implications of this heterogeneity is important because many of the active labor market policies that we observe aim at increasing job search intensity. Examples include (i) unemployment sanctions, like cuts in the benefits paid to the unemployed who do not engage in active job search (see Abbring et al., 2005), (ii) counseling and monitoring, like advising long term unemployed workers on how to draft application letters (see van den Berg and van der Klaauw, 2006), (iii) financial aids, like subsidizing child care in order to increase the number of actively searching workers

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[1] See Bloemen (2005), Lammers (2008) and van der Klaauw et al. (2003).

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(see Heckman, 1974; Graham and Beller, 1989), or (iv) re-employment bonus schemes (see Meyer, 1996). The evaluation of policy programs of this kind is not easy because, on the one hand, it is difficult to measure job search intensity directly and, on the other hand, a change in the search effort of the treatment group affects the wage distribution and matching rates for the non-treated workers as well so the general equilibrium effects can be substantial. In this paper, we calibrate the primitive parameters of an equilibrium search model with endogenous search intensity and free entry of vacancies. Those primitives are the search cost distribution, the value of home production and the capital cost of vacancy creation. The calibrated values can then be used to calculate the socially optimal search intensities and level of labor market tightness.

Specifically, we consider a discrete-time dynamic labor market with a continuum of identical, infinitely-lived workers and free entry of vacancies. Firms enter the market and post wages to maximize profits. At each point in time, workers are either employed at one of the firms or unemployed. Employed workers stay in their job until their match with the firm is destroyed by some exogenous shock and they become unemployed again. Unemployed workers search for jobs. Since search intensity is the policy parameter of interest, we explicitly model it as the number of jobs workers choose to apply for. For each application submitted, a worker incurs a search cost. This cost captures the necessary effort a worker has to exert in order to successfully apply to a vacancy and possibly generate an offer, such as finding the vacancy, learning about the firm, writing an application letter, and preparing for a potential interview. Since workers differ in their ability to find job opportunities and to generate offers, we assume that search costs differ amongst workers and are drawn from a common non-degenerate cumulative distribution function (cdf). As in Gautier and Moraga-González (2005) (who consider a one-period version of this model with identical workers), wages, the number of applications, and firm entry are jointly determined in a simultaneous-moves game. For the usual reasons, as explained in Burdett and Judd (1983) and Burdett and Mortensen (1998), firms play mixed strategies and offer wages from a continuous wage offer distribution. In our model, equally productive workers earn different wages because of three reasons: (i) some workers have low search costs so, everything else equal, they are better at generating wage offers than high search cost workers, (ii) for a given search cost, some workers receive more job offers than others, and (iii) for a given number of job offers, some receive a better best-offer than others.

Rather than assuming an exogenous specification for a matching function (see the summary of empirical studies in Petrongolo and Pissarides, 2001), the matching process is not only endogenously determined by the firms' and workers' participation decisions, but also by the search efforts of heterogeneous workers. Therefore, in our model, the primitive parameters are not the elasticities of an exogenously specified matching function but the quantiles of the search cost distribution. As in Albrecht et al. (2006), our aggregate matching function is based on micro-foundations and determined by the interplay between two coordination frictions: (i) workers do not know where other workers send their job applications and (ii) firms do not know which workers other firms make employment offers to. These two frictions operate in different ways for different distributions of worker search intensities and have implications on wage determination and firm entry. The empirical distribution of search intensities in combination with our theoretical model gives the distribution of marginal benefits of search. Since a worker continues to send applications till the marginal benefits of search equal the marginal cost, we can use this optimality condition to retrieve the magnitude of search costs for a given search intensity.

To illustrate the difference between our model and models where either the wage distribution or search intensity is exogenous, consider the effects of a policy intervention such as an increase in the minimum wage. A priori, this policy makes search more attractive so one would expect all workers to search harder after the shock. In our model, however, very intensive search will be discouraged because the wage distribution becomes more compressed. Consequently, the matching rate, the job offer arrival rate and the wage distribution are not policy invariant. Moreover, the way these endogenous variables respond to policy changes depends on the primitive search cost distribution.

The various policies mentioned above can be interpreted in this framework as aiming at either changing the marginal benefits of search and or the distribution of search costs. For example, one goal of subsidizing child care is to reduce the fraction of the labor force that does not search at all, while counseling unemployed workers is likely to lower the cost of writing effective application letters and increase the mean number of job applications. Besides policies that aim to directly affect search intensity, redistribution policies like UI insurance, sanctions and minimum wages also affect search intensity indirectly. Without a suitable framework there is no way we can tell whether we should stimulate search intensity for all workers, only for particular groups or not at all.

We calibrate our model to the Dutch labor market. We find that, in the decentralized market equilibrium, too few workers search, while the workers who search on average send too many job applications. The first result can be explained by a standard hold-up problem. Workers typically receive only part of the social benefits of their investments in search and therefore workers with high search cost invest too little in search. The second result on excessive search of the low-search cost workers is due to congestion externalities and rent seeking behavior. Submitting more applications increases the expected maximum wage offer, but workers do not internalize the fact that sending more applications increases the probability that multiple firms consider the same candidate. A final source of inefficiency lies in the entry decisions of vacancies. Given the search and participation strategies of the workers, too few firms enter the market. Quantitatively, our results indicate that the three sources of inefficiency together lead to a market surplus which is approximately 10% lower than in the social optimum. We show that this number is approximately two thirds of the total welfare loss compared to the Walrasian equilibrium and that it is robust to various alternative specifications of our model.

Interestingly, these results suggest that the introduction of a moderate binding minimum wage can be desirable for two reasons: (i) it increases participation in search because the expected wage increases; and (ii) it weakens the rent-seeking