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## Essays in Labor and Product Market Search

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## Summary and conclusions

This thesis consists of four chapters on search theory. Chapter 2 is the most applied one. It studies collective wage bargaining in a search model with two sided heterogeneity and on-the-job search. This chapter compares collective bargaining agreements (CBA) with a decentralized bargaining outcome case. Under CBA, a union chooses a pay-scale schedule and the firm can select a wage from this pay scale after observing match quality. An advantage of collective bargaining agreements is that search and business-stealing externalities can be internalized, since firms do not internalize the output loss of the firms they poach a worker from. Absent CBA, output can be excessive. A disadvantage of CBA is that it takes more time before an optimal allocation is reached. Under the decentralized bargaining, a worker always receive a fixed share ( $\beta$ ) of the match surplus, which is defined as the additional value generated by the match compared to the worker being unemployed and the job being vacant. What the most desirable system is, depends on the worker's bargaining power ( $\beta$ ) and the relative efficiency of on- versus off- the job search. Job flow data from the Netherlands and the US are used to infer the empirical values of the relative efficiency of on- versus off- the job search, and find for both countries that as long as  $\beta$  lies between 0.1 and 0.7, CBA is less desirable.

Chapter 3 considers a market in which sellers compete for heterogeneous buyers by posting selling mechanisms. Buyers can observe all posted mechanisms before deciding where to visit. The number of buyers that visit a

seller depend on the the queue length in a stochastic way, which is referred to as the meeting technology. This chapter analyzes how the properties of the meeting technology affect the sorting of buyers across sellers and the posted mechanisms. A new function,  $\phi(\mu, \lambda)$ , is introduced, which specifies the probability for a seller to meet at least one buyer from a given subset, where  $\mu$  is the relative measure of buyers in the given subset and  $\lambda$  is the relative measure of all buyers. This new function is a one-to-one transformation of the meeting technology and helps to clarify and extend many of the existing results in competing auctions. This chapter shows that: (i) a separate submarket for each type of buyer is the efficient outcome if and only if meetings are bilateral, i.e.,  $\phi(\mu, \lambda)$  is linear in  $\mu$ , (ii) a single market with all buyer types is the efficient outcome if and only if  $\phi(\mu, \lambda)$  is concave in  $(\mu, \lambda)$ . Both outcomes can be decentralized by sellers posting auctions combined with an appropriate fee or subsidy. The fee will internalize the externalities imposed by buyers on each other. Finally, different classes of meeting technologies like invariance and non-rivalry are expressed in terms of  $\phi$  and a Venn diagram shows how they relate to each other.

Chapter 4 considers the efficiency of firm entry in a model with on-the-job search where firms have private information on productivity. In each period before entry, firms observe a signal indicating potential productivity (this allows me to treat ex post and ex ante heterogeneity as special cases). Firms will only enter the market if their private signals are higher than a threshold. Both unemployed and employed workers receive job offers according to a meeting technology. Unlike Chapter 3, firms do not in general ex ante observe the terms of trade; they learn it after meeting a worker. Thus search is random. This chapter shows that whether the decentralized equilibrium is efficient depends on the meeting technology. If additional firm entry does not affect the meeting probabilities of existing firms (as under the urn ball), then the search equilibrium is efficient; if it decreases (increases) the meeting probabilities of existing firms, then in equilibrium there will be too much (little) firm entry. I consider not only wage posting but all wage mechanisms that have the following properties: i) in the absence of switching costs, workers will always move to the more productive firms, ii) the firm with productivity equal to the workers' value of leisure (the lowest productive firm) receives zero.

Chapter 5 considers the effects of a statutory minimum price in a random search model with price posting. Some countries apply this for gasoline, food, or books. In the price posting model, sellers post and commit to the posted price. If buyers can receive two or more price offers at the same time, they choose the lowest price or in case of a tie-break, they randomize. Thus sellers face a positive probability to compete with each other. No seller will post a price equal to his or her reserve value because there is always some chance of selling at a higher price, which will result in a positive expected profit. Also, there can not exist mass point in the market price distribution because then a small profitable downward deviation is always possible. Thus there will be pure market price dispersion (Burdett and Judd (1983)). I show that with a minimum price, the price distribution will have a mass point. If the minimum price is sufficiently high, the price distribution will become degenerate. The reason why the mass point exists is that at a (binding) minimum price, small downward deviations are no longer possible. Furthermore, it is not attractive to offer a price just above the mass point because the selling price is almost the same as at the minimum price while the selling probability is substantially lower. Therefore, firms either post the minimum price or substantially higher prices. Consequently, there will be a gap in the market price distribution.