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Optimal unemployment insurance in an estimated job search model with savings

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Abstract

This paper estimates a job search model with savings on Danish micro data that include observations on wealth and wages. Controlling for extensive observed and unobserved worker characteristics heterogeneity, the estimation relates observed unemployment spells to the model implied hazard rate for each worker. The model estimates are sensible and fit the data well. Optimal UI policy is determined in the estimated model as a trade-off between insurance provision and distortion of search incentives. The analysis emphasizes an important policy sensitivity to the interest rate and the importance of including transitional dynamics in the analysis.

JEL classification: D1; D9; E2; E6; J4; J6

Keywords: Job search; Savings; Optimal Unemployment Insurance; Micro data estimation

1. Introduction

The paper estimates a job search model with savings on Danish unemployment spell data and determines optimal unemployment benefit levels for the estimated model. In the model, an unemployed worker decides on how intensely to search for a new job based on a comparison of the marginal search cost and the net gain of moving from unemployment into employment. The worker can insure against income fluctuations through savings but the insurance will necessarily be imperfect due to the nature of the income process, imperfect asset markets, and the presence of borrowing constraints. Unemployment benefits provide additional insurance but adversely affect the worker's incentives to search for employment. The optimal policy study is focused on the trade-off between providing insurance beyond the worker's ability to self-insure through savings and the adverse impact on the worker's job search incentives. The core of the identification of the model is based exactly on these relationships by relating the worker's observed savings, unemployment benefits, and earnings when employed to observed unemployment durations.

The model estimation successfully captures the key relationships in the data. Notably, wealthier individuals are observed to experience longer unemployment durations which is explained by the model through a negative relation-

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ship between the choice of search intensity and savings.[1] Furthermore, for a given benefit level data show a U-shaped relationship between unemployment duration and the wage level of the worker. While not widely recognized, this type of relationship is quite natural in a sequential job search model with savings where shifts of the wage offer distribution imply both substitution and income effects with opposing impacts on the search decision.[2] Both of these relationships are robust to conditioning on observed and unobserved worker characteristics. They are both important identifiers of the curvature of the utility of consumption function. The estimate implies a constant relative risk aversion coefficient of 2.21.

The role of unemployment benefits is in the paper purely one of providing insurance against consumption fluctuations at the cost of distorting search incentives.[3] Papers such as Baily (1978), Flemming (1978), Hansen and Imrohoroglu (1992), and Wang and Williamson (2002) have studied this question in models with savings. However, it is a common feature of these papers as well as the broader literature on optimal unemployment insurance that the use of savings as a self insurance instrument has been seriously curtailed. In studies where savings are allowed, the return to savings is often set at such a low rate that holding savings is costly and consequently the option to use savings as a self-insurance instrument has low value.

I find that the optimal benefit policy is highly sensitive to the relationship between the interest rate and the subjective discount rate. Specifically, the optimal benefit level ranges from a 43% replacement rate for an interest rate almost equal to the subjective discount rate to an 82% replacement rate for a zero interest rate. The sensitivity of savings to the level of the interest rate is a well known result in the consumption-savings literature. However since savings and unemployment insurance are not often studied together, the high sensitivity of unemployment insurance design to the interest rate and subjective discount rate is rarely emphasized.

As also argued in Joseph and Weitzenblum (2003), rather than simply comparing steady states, I find that once savings are included in the optimal policy analysis, one must include transitional dynamics in order to avoid a serious downward bias in the optimal unemployment benefit results. I quantify the downward bias which can be as large as 10 percentage points in the optimal replacement rate.

The analysis of the job search model with savings is complicated by the inability to establish global concavity of the value functions. Danforth (1979) shows that in the special case where employment is an absorbing state, one can characterize the reservation wage choice in relation to the degree of absolute risk aversion of the utility function. In the case of decreasing absolute risk aversion, the reservation wage choice will be increasing in wealth. Flemming (1978) and Acemoglu and Shimer (1999) are examples of the constant absolute risk aversion case combined with the assumption that search costs are monetary, and that there is no lower bound on wealth.[4] In this case, the search choice is unaffected by wealth and the results for this special case do generalize to the case in which employment is not an absorbing state. However in general, once employment is no longer an absorbing state, construction of characterization theorems of the worker's search and savings choices is made difficult because the value functions may not be globally concave. Lentz and Tranæs (2005) establish characterization theorems for the search intensity model for the more general case where search costs can be non-monetary.

The paper is structured as follows. In Section 2 the model and its key characteristics are presented. Section 3 presents the estimation strategy, data, and estimation results. Based on the results of the estimation, the paper proceeds by determining optimal benefit levels at an individual level in Section 4.1 and Section 4.2 considers optimal group wide insurance schemes. Finally, Section 5 concludes.

[1] This relationship has previously been established on Danish, Dutch and French data in Lentz and Tranæs (2004), Bloemen and Stancanelli (2001) and Algan et al. (2001), respectively.

[2] The intuition for the non-monotonocity is similar to the interpretation of income and substitution effects associated with wage changes in the labor supply literature. Sequential search and directed search models without savings imply monotone relationships between unemployment duration and the wage.

[3] Studies such as Acemoglu and Shimer (1999) emphasize efficiency issues associated with providing unemployment benefits.

[4] Acemoglu and Shimer (1999) assume a directed search technology. Jobs differ with respect to their wage and the worker can choose which job to apply for. Higher-wage jobs will have longer queues and a choice of a higher probability of moving into employment (a choice of a lower wage job) is associated with a future income loss.