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ABSTRACT

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A thorny problem in identifying the determinants of reservation wages and particularly the role of continued joblessness in their evolution is the simultaneity issue. We deploy a natural control function approach to the problem that involves conditioning elapsed duration on completed unemployment duration in the reservation wage equation. Our analysis confirms that the use of elapsed duration alone compounds two separate and opposing influences. Only with the inclusion of completed duration is the negative effect of continued joblessness on reservation wages apparent. For its part, the completed duration coefficient suggests that higher reservation wages negatively influence the probability of exiting unemployment.

JEL Classification: J64, J65

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1 Introduction

The question of whether reservation wages are constant or declining through time is of no small interest. In particular, the constant reservation wage hypothesis provides a useful and parsimonious way of recouping the structural parameters of the optimal job search model. However, on the rather few occasions on which the hypothesis has been tested in the past it has typically been rejected (see Kiefer and Neumann, 1979). On the other hand, failure to reject the hypothesis in more recent treatments, falls far short of a ringing endorsement of theory. The problem in a nutshell in both cases is that the reservation wage and unemployment duration may be simultaneously determined.

One way to tackle the endogeneity problem is to instrument for unemployment duration in the reservation wage equation using variables that are unlikely to have additional effects on reservation wages. Instruments chosen in the literature include dummies for marital status, presence of an outstanding mortgage, and schooling (e.g. Addison, Centeno, and Portugal, 2004).[1]

The principal problem with this approach is generic and concerns the fragility of available instruments. In the present treatment, therefore, we propose an alternative approach that sidesteps the problem, exploiting the distinction between ongoing and completed spells. As is well known, information on the distribution of elapsed duration is not representative of the distribution the unemployed population: long jobless durations will be overrepresented (length-bias sampling). Alternatively put, elapsed duration is driven by completed duration. In order to obtain an unbiased estimate of the effect of elapsed duration on reservation wages, therefore, we need to condition upon on completed duration. Irrespective of the point reached in the jobless spell, we can then get a fix on the impact of incremental unemployment on reservation wages uncontaminated by simultaneity (i.e. the fact that those still unemployed will have high reservation wages as higher reservation wages cause higher ultimate duration). Hence we deploy two unemployment

[1] Others have sought to instrument for reservation wages in the unemployment duration equation, using either unemployment insurance benefits (Jones, 1988) or this variable supplemented with dummies for marital status and presence of school-age children (Prasad, 2003).

regressors in the reservation wage equation: the individual's elapsed duration and, in addition, his/her completed duration.

Our interest is in testing whether an individual's reservation wage declines over the course of a jobless spell and not strictly whether the magnitude of the reservation wage determines completed duration. In this sense, our treatment is analogous to that of Abraham and Farber's (1987) test of the tenure-earnings model, wherein completed job duration (in our case, completed jobless duration) instruments for current tenure (elapsed duration) taken in conjunction with that variable. So we are testing for declining reservation wages in the framework of a search model. Admittedly, that model does not assume stationary reservation wages, and hence will inevitably entail some further elaboration of the underlying model, but fully accepts the line of causation running from reservation wages to (completed) jobless duration.

To anticipate our central finding, we report that reservation wages only decline with elapsed jobless duration conditional on completed duration. Otherwise, the association is statistically insignificant. Our secondary result, as it were, is that the association between completed duration and reservation wage is positive and well determined, on secure standard search-theoretic reasoning.

2 The estimation approach

Let W denote the reservation wage, Z a vector of observed exogenous variables (individual and calendar effects), U backward recurrence time, and ϵ explanatory unobserved variables. V will represent continuing duration of stay in the state of unemployment (forward recurrence time), so that a complete unemployment spell will have duration $S = U + V$.

We want to estimate the model

$$W = \alpha' Z + \beta U + \epsilon,$$

with the additional equation

$$U = \gamma' Z + \delta V + \omega$$

and the restrictions

$$E[\omega|Z,V]=0 \quad \text{and} \quad E[\epsilon|Z,V,\omega]=E[\epsilon|\omega].$$

(See Heckman and Robb, 1985; Newey, Powell, and Vella, 1999; Matzkin, 2004.)

A couple of remarks are in order.

1. U and V are, in general statistically dependent (Lancaster, 1990, 94). The exception occurs when the flow of entrants in unemployment is exponential (conditional on Z). Then $\delta=0$.

2. The second equation together with the moment restrictions characterizes the endogeneity of U for W: For given U, higher reservation wages induce higher continuing durations (an implication of basic job search theory) which, being correlated with elapsed durations, establish the reverse causation mechanism.

Now notice that

$$\begin{aligned} E[W|Z,U,V] &= \alpha'Z+\beta U+E[\epsilon|\omega] \\ &= \alpha'Z+\beta U+\mathrm{CF}(\omega) \\ &= \alpha'Z+\beta U+\mathrm{CF}(U-\gamma'Z-\delta V) \end{aligned}$$

for some function $\mathrm{CF}(\cdot)$, the so-called control function (Heckman and Robb, 1985).

Assuming that $\mathrm{CF}(\cdot)$ is linear (as would be the case if (ϵ,ω) were jointly normally distributed), that is $\mathrm{CF}(\omega)=\lambda\omega$, we may write (substituting $V=S-U$),

$$\begin{aligned} E[W|Z,U,V] &= \alpha'Z+\beta U+\lambda(U-\gamma'Z-\delta(S-U)) \\ &= \tilde{\alpha}'Z+\tilde{\beta}U+\tilde{\delta}S, \end{aligned}$$

where the $\tilde{(\cdot)}$ denotes obvious tranformations of the original parameters. This regression can be estimated by OLS.[2]

[2] A simple (but rather telling) alternative specification, and one that avoids by construction the endogeneity of unemployment duration, would be to use the ratio between elapsed and completed unemployment duration as a regressor. Estimation of this model generated a negative and statistically significant coefficient for the ratio variable.

3 Data

Our data are taken from the first six waves of the European Community Household Panel (EHCP), 1994-99. The ECHP is a survey based on a standardized questionnaire administered annually to a representative panel of households and individuals in 15 EU member states and offers detailed information on the respondent's labor market experience, inter al. (see EUROSTAT, 1999). We used data for 13 of the countries, excluding Luxembourg and Sweden, where it is not possible to follow individuals through time.[3]

The key pieces of information taken from the survey are reservation wages and elapsed duration. In the EHCP each individual actively looking for work is asked two questions pertaining first to desired hours of work and second to the minimum income required to work these hours. The actual questions asked are these: *Assuming you could find regular work, how many hours would you prefer to work in this new job?* and *What is the minimum net monthly income you would accept to work [these number of] hours a week in this new job?* We construct an hourly net reservation wage, computed as the ratio of desired net monthly income to the optimal number of hours. This variable is deflated by the respective national consumer price index.

The other crucial variables are the duration of the current unemployment spell and its ultimate duration. The ECHP sampling procedure considers only jobless spells of individuals with previous work experience for whom we are able to identify the onset of unemployment by month and year. Given that, with one exception, we know the month and year of the interview we compute elapsed duration as the period from the point of job loss up to the interview. (That one exception is Germany, for whom we assume that all the interviews were conducted in October.) As far as completed duration is concerned, since we can follow the individual between surveys up to the point of reemployment, we can simply add the residual calendar months spent unemployed in the subsequent interval to compute elapsed

[3]The countries are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Portugal, Spain, The Netherlands, and the United Kingdom.

duration.

In the present exercise, we were interested in using most the parsimonious model consistent with a declining reservation wages. Accordingly, the RHS arguments additional to elapsed and completed duration were limited simply to a gender dummy, three schooling dummies, four age dummies, five time dummies, and thirteen country dummies. We also deployed a continuous measure of the overall unemployment rate at the time of the survey.[4]

4 Findings

Summary results of fitting the reservation model separately for elapsed duration and completed duration are given in the first two columns of Table 1. The elasticity of reservation wages with respect to elapsed duration is negative but statistically insignificant at conventional levels. The point estimate is tiny, suggesting that a 1 percent increase in the duration of an ongoing spell is associated with a 0.002 percent decrease in reservation wages. For its part, the elasticity of the reservation wage with respect to completed duration is positive but again small in magnitude (0.004) and statistically insignificant as well.

However, as is apparent from the penultimate column of the table, when both duration variables are included in the reservation wage equation, each is statistically significant. And indeed each elasticity is sharply higher: -.015 and .024, respectively. Conditioning on completed duration, then, there is every indication of a small but nontrivial and well-determined decline in reservation wages over the course of joblessness. The positive association between completed duration and reservation wages is of course indicative of the reverse line of causation running from reservation wages to jobless duration.

As noted above, the specifications in Table 1 include 13 country dummies. If, however, country heterogeneity may be expected to assist in the identification of the impact of unemployment duration on reservation wages, we might usefully drop

[4] We also experimented using a variable identifying the order of distinct unemployment spells as well as the receipt (or otherwise) of unemployment insurance benefits. In neither case, however, were the results reported below disturbed by their inclusion.

the country dummies. In the final column of the table, therefore, we provide results for the correct specification, including both duration measures but omitting the country fixed effects. Compared with the results in the preceding column, it can be seen that the point estimates for the duration measures strengthen in absolute magnitude.

	Specification			
Variable	(1)	(2)	(3)	(4)
U	-0.002		-0.015	-0.025
	(0.002)		(0.004)	(0.005)
S		0.004	0.024	0.070
		(0.004)	(0.006)	(0.007)
Country dummies	Yes	Yes	Yes	No
R^2	0.418	0.418	0.419	0.166
number of observations	10003	10003	10003	10003

Table 1: The Determinants of Reservation Wages. Robust Standard Errors in parenthesis. The regressions also include a continuous unemployment rate variable, a gender dummy, 3 Schooling, 4 age, and 5 year dummies.

As a robustness check, we re-ran the preferred reservation wage equation by gender, with and without country dummies. The summary results are given in Table 2. We see that, conditioning on completed duration, reservation wages are decreasing in ongoing joblessness for both males and females. The results are however stronger, in terms of both absolute magnitude and statistical significance for males, as indeed is the reverse line of causation running from reservation wage to unemployment duration. On this occasion, however, removing the country dummies yielded almost identical point estimates by gender.

5 Conclusions

The fact that reservation wages and unemployment duration are simultaneously determined has preoccupied analysts in this area and arguably would have proven more disruptive had direct information on reservation wages been more readily available. In the present treatment, we have been able to exploit such information

Variable	Males		Females	
U	-0.020	-0.025	-0.009	-0.024
	(0.006)	(0.007)	(0.005)	(0.006)
S	0.031	0.071	0.016	0.071
	(0.010)	(0.011)	(0.008)	(0.010)
Country dummies	Yes	No	Yes	No
R^2	0.371	0.154	0.468	0.155
number of observations	5181	5181	4822	4822

Table 2: The Determinants of Reservation Wages by Gender. Robust Standard Errors in parenthesis. The regressions also include a continuous unemployment rate variable, a gender dummy, 3 Schooling, 4 age, and 5 year dummies.

to demonstrate how the true effect of the unemployment experience on reservation wages can be modeled. The approach which is to condition elapsed duration on completed duration is analogous to that used by Abraham and Farber (1987) in addressing the bias attaching to the pro-productive tenure argument in the augmented Mincerian earnings function, which we have formally approached as an omitted variables problem. We have shown that reservation wages are declining over the course of the unemployment or jobless spell. While rejecting the assumption of stationary reservation wages, we note that the elasticity/elasticities of reservation wage with respect to elapsed duration are rather small and, further, that there is well-determined direct association between completed duration and reservation wages which is to be construed as higher reservation wages lead to higher jobless duration. By failing to control for completed jobless duration we conflate the two opposing effects.

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