Real-Time Search in the Laboratory and the Market

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Web Appendix

Online Appendix A: Laboratory Implementation of Continuous Time Offer Arrival

The realized duration between two successive offers was generated by pseudo-random number draws from a Uniform distribution defined on [0, 1] using the inverse-CDF method. That is, in an environment in which the rate of arrival of offers was λ, draw a (pseudo) random number, x. Treat x as a probability, and find the value of t (the duration time) that corresponds to that probability. Since

$$P(T \leq t|\lambda) = 1 - \exp(-\lambda t)$$

when T has a negative exponential distribution, then define the (pseudo) random waiting time associated with the draw x as

$$t = -\frac{\ln(1-x)}{\lambda}.$$

The specific functional form for the probability density of arriving offer w is

$$f(w \mid \alpha, \beta) = \alpha\beta w^{\beta-1} e^{-\alpha w^{\beta}}.$$

This density implies a probability mass of wages exceeding threshold w of

$$1 - F(w) = \exp(-\alpha w^{\beta}).$$

Online Appendix B: Estimation of the Hazard Function

The hazard function estimation is performed as follows. The nonparametric estimator of the hazard function is given by

$$\hat{h}(t) = d(t)/R(t),\ t = 1, 2, ..., T,$$

where T is the last time in which a sample member is observed to exit a search spell, $d(t)$ is the number of individuals who exited from search at duration t, and $R(t)$ is the number who had not competed their search spell by duration t. $R(t)$, which is the number of individuals at risk of leaving unemployment at duration t, contains both individuals with right-censored spells of search (whose exact exit dates are not observable) that lasted at least t weeks, as well as those individuals with completed spells whose exit dates are t or greater. In the experimental data, there are no right-censored search spells, while in the NLSY97 data there are a large number.

The function $\hat{h}$ can exhibit a substantial amount of instability, particularly over areas in the sample space where the risk set is small (i.e., larger values of t). This makes regions of increasing and decreasing duration dependence difficult to identify. Following the methods described in Wang (2005), we smooth the function $\hat{h}(t)$ using a local linear smoother. The estimate of the hazard at duration t is given by

$$\hat{a}_0(t) = \arg\min_{a_0, a_1} \sum_{i=1}^{T} R(i) K((t-i)/q)\{\hat{h}(i) - (a_0(t) + a_1(t)(i-t))\}^2,$$

where K is the standard normal kernel, q is a bandwidth parameter that we have chosen as reported in Figure 2, and $a_0(t)$ and $a_1(t)$ are parameters chosen by the smoothing algorithm to fit a local linear polynomial to the raw hazard. (See Wang 2005 for a motivation for this functional form). The smoothed hazard value at time t is simply approximation $\widehat{a}_0(t)+\widehat{a}_1(t)(i-t)$ evaluated at $i = t$, hence $\hat{a}_0(t)$. In the NLSY97 data, $T = 52$ weeks, capturing up to one year of unemployed search. In the experimental data, $T = 52$ seconds. This time limit captures the vast majority of exits from the search state in the experimental data. For both the experimental and nonexperimental data, we present plots of the estimated hazard for two values of the smoothing parameter b, which were 4 and 8.

TABLE A.1—NO WAIT-COST RESERVATION WAGE DESCRIPTIVES BY NUMBER OF OFFERS, POOLING OVER ENVIRONMENTS.

		Total Offers in Trial				
Offer #	Measure	1	2	3	4	5
1	*Mean*	6.48	10.80	11.05	18.34	16.81
	Median	5.00	7.75	9.25	18.50	15.00
	SD	6.60	10.82	8.80	15.92	15.47
	$n =$	289	122	54	30	75
2	*Mean*	–	8.32	9.87	17.66	16.36
	Median	–	7.00	8.50	15.00	15.00
	SD	–	6.79	7.23	16.15	14.11
	$n =$		122	54	30	75
3	*Mean*	–	–	7.52	17.45	16.94
	Median	–	–	5.00	15.50	14.90
	SD	–	–	6.72	16.43	15.97
	$n =$			54	30	75
4	*Mean*	–	–	–	13.85	16.07
	Median	–	–	–	11.00	15.00
	SD	–	–	–	9.37	15.34
	$n =$				30	75
5	*Mean*	–	–	–	–	14.76
	Median	–	–	–	–	10.00
	SD	–	–	–	–	15.14
	$n =$					75

TABLE A.2—WAIT-NO COST RESERVATION WAGE DESCRIPTIVES BY NUMBER OF OFFERS, POOLING OVER ENVIRONMENTS.

		Total Offers in Trial				
Offer #	Measure	1	2	3	4	5
1	*Mean*	7.25	11.87	11.19	11.58	24.72
	Median	5.60	10.00	10.00	9.45	12.00
	SD	8.72	12.89	8.04	7.95	31.56
	$n =$	265	142	62	42	59
2	*Mean*	–	7.80	9.20	11.69	24.96
	Median	–	6.90	7.00	9.45	10.50
	SD	–	6.16	7.29	9.58	31.93
	$n =$		142	62	42	59
3	*Mean*	–	–	7.48	9.75	23.34
	Median	–	–	4.75	8.10	12.00
	SD	–	–	6.73	7.77	31.19
	$n =$			62	42	59
4	*Mean*	–	–	–	8.47	20.60
	Median	–	–	–	6.90	12.00
	SD	–	–	–	6.30	24.96
	$n =$				42	59
5	*Mean*	–	–	–	–	16.91
	Median	–	–	–	–	10.00
	SD	–	–	–	–	21.32
	$n =$					59