The EITC, Tax Refunds, and Unemployment Spells

Online Appendix

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I. A Model of Cash-on-Hand and Job Search

In the Lentz and Tranaes (2005) model, individuals move between employment and unemployment, jointly choosing job search effort and savings. This model has been adapted and used by Card, Chetty, and Weber (2007) and Chetty (2008) in their studies of cash-on-hand and labor market behavior. I borrow liberally from these papers in the following description.

Consider an individual who becomes unemployed at time $t = 0$. She chooses job search intensity s_t , normalized so that s_t is equal to the probability of finding a job in period t . Searching has a cost of $\psi(s_t)$, assumed to be increasing and convex. If the individual finds a job, she starts work immediately and earns an exogenously fixed wage of w in that period. If employed in period t , her consumption is c_t^e . If she does not find a job, she receives a benefit of b from the unemployment insurance system and her consumption is c_t^u . Her flow utility in period t is $u(c_t) - \psi(s_t)$. This individual has a subjective discount rate of δ and faces an interest rate of r . Let A_t denote the value of assets held at the beginning of period t .

If an individual has a job at time t , her value function conditional on having assets A_t at the beginning of the period is

$$V_t(A_t) = \max_{A_{t+1} \geq L} u\left(A_t - \frac{A_{t+1}}{1+r} + w\right) + \frac{1}{1+\delta} V_{t+1}(A_{t+1})$$

where L is a lower bound on assets, consistent with facing a borrowing constraint. If a person has not found a job as of time t , her value function is

$$U_t(A_t) = \max_{A_{t+1} \geq L} u\left(A_t - \frac{A_{t+1}}{1+r} + b\right) + \frac{1}{1+\delta} J_{t+1}(A_{t+1}).$$

Here J_t is the expected value of entering period t without a job, defined as

$$J_t(A_t) = \max_{s_t} s_t \cdot V_t(A_t) + (1 - s_t) \cdot U_t(A_t) - \psi(s_t).$$

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A person who is unemployed chooses search effort to maximize her expected utility. This yields the first order condition

$$\psi'(s_t^*) = V_t(A_t) - U_t(A_t).$$

Intuitively, a person exerts effort just until the marginal cost of search is equal to the marginal benefit of search, the difference between utility in the employed and unemployed states.

This first order condition can be differentiated to show the effect of changes in wealth on search effort. Doing so yields

$$\frac{\partial s_t^*}{\partial A_t} = \frac{u'(c_t^e) - u'(c_t^u)}{\psi''(s_t)}.$$

Lentz and Tranaes show that, with the assumption that utility is additively separable in consumption and search effort, the numerator of this term will be negative. Thus, search effort falls as wealth increases.

Relaxing the assumption of a fixed wage w does not change the prediction that optimal search effort falls as cash-on-hand increases. Suppose instead that with probability s_t an individual is offered a wage of $w \sim w_m + F(w)$. This wage offer is accepted if it is above the individual's reservation wage of R_t . In this case the expected value of entering period t without a job is given by

$$J_t(A_t) = \max_{s_t} s_t \cdot P(w \geq R_t) \cdot E[V_t(w, A_t) | w \geq R_t] + [1 - s_t \cdot P(w \geq R_t)] \cdot U_t(A_t) - \psi(s_t)$$

Optimal search effort satisfies the first order condition $P(w \geq R_t) \cdot E[V_t(w, A_t)] - P(w \geq R_t) \cdot U_t(A_t) = \psi'(s_t)$. Differentiating this expression with respect to A_t and rearranging yields

$$\frac{\partial s_t^*}{\partial A_t} = \frac{P(w \geq R_t) \left[\frac{\partial E[V_t(w, A_t)]}{\partial A_t} - \frac{\partial U_t}{\partial A_t} \right]}{\psi''(s_t)} < 0.$$

The greater the probability that a given wage draw is above the reservation wage, the stronger (in absolute value) the relationship between cash-on-hand and optimal search effort.

II. Additional Tables and Figures

FIGURE A.1. SURVIVAL FUNCTIONS, LOW EDUCATION SAMPLE

(a) Women

(b) Men

Note: The sample is restricted to individuals with at most a high school degree. For women, a Cox test rejects equality of the survival curves with a p-value of 0.0091. For men, a Cox test cannot reject equality of the survival curves. The p-value is 0.7328.

TABLE A.1—EFFECT OF RESTRICTIONS ON NUMBER OF SPELLS IN SAMPLE

	Women	Men
Total unemployment spells	78,376	71,904
Dropping spells including temporary layoff	66,248	58,121
Dropping spells with no active search	25,602	27,828
Dropping cases of insufficient work history	21,016	23,059
Imposing age 20-64 restriction	17,617	19,271
Dropping spells > 52 weeks	15,119	17,591
Imposing earnings restriction	8993	9692
Dropping non-parents	3985	2383
Dropping cases with missing data	3708	2173
Imposing low-education restriction	2288	1577

Note: This table reports the number of unemployment spells remaining in the sample after each restriction is imposed. The second-to-last row is the baseline sample.

TABLE A.2—COMPARING UNEMPLOYMENT SPELLS BY MONTH OF ENTRY, LOW EDUCATION SAMPLE

	Women			Men		
	Means		Predicting	Means		Predicting
	Feb	Other	Feb Start	Feb	Other	Feb Start
	(1)	(2)	(3)	(4)	(5)	(6)
Age	32.6	32.1	0.001 (0.005)	34.7	33.4	0.0008 (0.005)
Age Squared			-0.00002 (0.00007)			-3.55·10 ⁻⁶ (0.00007)
% White	71.4	64.4*	0.009 (0.012)	77.5	84.4	-0.027 (0.021)
% Married	29.0	28.8	-0.007 (0.013)	78.7	76.1	-0.003 (0.016)
Number of Kids	1.9	1.9	-0.002 (0.006)	2.2	2.0**	0.010 (0.007)
Own Earnings, Previous 3 Months	3173	3116	5.96·10 ⁻⁶ (6.36·10 ⁻⁶)	4388	4100	9.42·10 ⁻⁷ (9.00·10 ⁻⁶)
Imputed Hourly Wage	7.83	8.05	-0.00009 (0.001)	9.20	9.48	-0.0008 (0.001)
Potential Weekly UI Benefit	127	132	3.88·10 ⁻⁶ (0.0001)	175	165	0.0002 (0.0002)
Pre-Unemp Job Tenure (Weeks)	39.4	40.1	-0.0008*** (0.0002)	50.1	43.3*	-0.0001 (0.0002)
% with Job Tenure Censored	29.6	27.6	0.065*** (0.016)	29.2	32.8	0.004 (0.017)
Annual Unemp Rate	5.3	5.3	0.014 (0.010)	5.6	5.5	0.025 (0.013)
Mean Net Liquid Wealth	1164	3856	-4.91·10 ⁻⁸ (9.17·10 ⁻⁸)	53	2435	-3.59·10 ^{-7*} (2.12·10 ⁻⁷)
Median Net Liquid Wealth	0	0		0	0	
Spell Included UI Receipt	19.6	20.4		24.2	25.7	
Mean Duration (Weeks)	21.3	17.4***		15.1	14.5	
N	164	2124	2288	124	1453	1577
R ²			0.060			0.110

Note: Stars in columns 2 and 5 indicate a significant difference in means relative to the previous column. Stars in columns 3 and 6 indicate statistical significance of a regression coefficient. The regressions in columns 3 and 6 also include fixed effects for year, state, pre-unemployment industry, and calendar month first observed in the SIPP. All dollar amounts are in real 2007 values.

TABLE A.3—PRE-UNEMPLOYMENT INDUSTRY, BY MONTH OF ENTRY, LOW EDUCATION SAMPLE

	Women		Men	
	Feb	Other	Feb	Other
Construction	1.1	1.0	25.7	24.1
Manufacturing	13.7	13.8	15.3	17.2
Wholesale Trade	4.7	3.2	8.5	3.7
Retail Trade	16.0	17.6	14.1	10.9
Transportation	1.9	1.9	2.4	4.5
Administration	3.9	7.8**	4.3	7.9*
Education Services	1.7	2.0	0.0	1.2***
Health Services	14.9	13.3	1.1	1.8
Accommodation, Food Services	23.2	18.9	8.0	7.0
Other Services	3.3	4.2	5.9	5.6
Other Industry	15.7	16.3	14.8	16.1

Note: Stars indicate a significant difference across the preceding two columns. Those with a missing value for pre-unemployment industry are placed in the other industry category.

TABLE A.4—ADDITIONAL SPECIFICATIONS

	All		Pooling Women and Men				
	Women (1)	All Men (2)	(3)	All Ed Levels (4)	(5)	(6)	HS Grads or Less (7) (8)
Feb Start	0.010 (0.113)	-0.063 (0.160)	-0.005 (0.095)	-0.070 (0.074)	-0.258 (0.194)	-0.005 (0.116)	-0.188* (0.102) -0.248 (0.240)
Feb Start · HS Grad Or Less	-0.277* (0.146)	0.104 (0.193)					
Feb Start · Female			-0.162 (0.117)			-0.287* (0.147)	
Feb Start · Married				-0.066 (0.114)		0.051 (0.142)	
Feb Start · Primary Earner					0.169 (0.203)		0.094 (0.251)
HS Grad Or Less	-0.142*** (0.046)	-0.213*** (0.058)	-0.174*** (0.034)	-0.174*** (0.034)	-0.175*** (0.035)		
Female			-0.253*** (0.041)	-0.265*** (0.040)	-0.261*** (0.040)	-0.209*** (0.051)	-0.230*** (0.051)
Married	-0.124*** (0.048)	-0.029 (0.062)	-0.082** (0.037)	-0.077** (0.039)	-0.075* (0.041)	-0.065 (0.047)	-0.066 (0.050)
Primary Earner					0.016 (0.060)		-0.018 (0.072)
Number of Spells	3708	2173	5881	5881	5881	3865	3865

Note: The table reports coefficients from hazard models. Standard errors, clustered at the person level, are in parentheses.

TABLE A.5—VARIATION BY SIZE OF EITC, WOMEN OF ALL EDUCATION LEVELS

	EITC Dollar Value (1)	EITC Value in lns (2)	With All (Month Start · EITC) Terms (3)	February Entrants Only (4)
Feb Start	-0.099 (0.066)	-0.013 (0.084)	-0.027 (0.084)	
Feb Start · EITC Value (\$1000s)	-0.031 (0.037)		-0.081* (0.046)	
EITC Value (1000s)	-0.014 (0.014)		0.035 (0.031)	-0.045 (0.064)
Feb Start · EITC Value (lns)		-0.026* (0.014)		
EITC Value (lns)		-0.006 (0.006)		
Number of Spells	8310	8310	8310	564

Note: The table reports coefficients from hazard models. Standard errors, clustered at the person level, are in parentheses. The value of the EITC is calculated using information on the number of children an individual has and the level of her own plus her spouse's earnings. The value of the EITC is measured in thousands of real 2007 dollars. The specification in column 3 includes a full set of *Month Start · EITC Value* interactions, with July as the omitted month.

TABLE A.6—EFFECTS ON JOB QUALITY, WOMEN OF ALL EDUCATION LEVELS

	Dependent Variable			
	Wage Growth (1)	Log Wage (2)	Paid Hourly (3)	Full Time (4)
Feb Start	-0.044 (0.080)	0.037 (0.060)	-0.011 (0.030)	0.029 (0.048)
HS Grad Or Less	-0.047 (0.037)	-0.138*** (0.030)	0.018 (0.014)	-0.039* (0.021)
Pre-Unemployment Controls				
Log Wage		0.137*** (0.028)		
Paid Hourly			0.233*** (0.029)	
Full Time				0.325*** (0.021)
N	2605	2605	2871	2876

Note: The table reports coefficients from OLS regressions. Standard errors, clustered at the person level, are in parentheses.