

Job Search Behavior Among the Employed and Non-Employed¹

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March 2017

¹The views expressed in this paper solely reflect those of the authors and not necessarily those of the Federal Reserve Bank of Chicago, New York nor those of the Federal Reserve System as a whole.

Motivation

Job search takes a central role in search models of the labor market and has important macro implications

- ▶ Labor force surveys such as the Current Population Survey (CPS) typically only collect information on job search of non-employed workers.
 - ▶ Still, little is known about the job offer process for the unemployed: offers, acceptance rates
- ▶ Around two thirds of jobs are filled with people who are not considered *searchers* in the CPS
 - ▶ Even less known about on-the-job search: search incidence, search effort
 - ▶ No representative survey since the Employment Opportunities Pilot Projects (EOPP) in 1980

Much of what we do not know is important for theories of labor market search and matching

What We Do

1. Design and implement a special survey on job search
 - ▶ Supplement to NY Fed's *Survey of Consumer Expectations* which focuses on job search behavior and outcomes for all individuals, *regardless* of employment status
 - ▶ Questions cover search behavior (effort, employer contacts, etc.), nature, number, and characteristics of job offers, reservation wage under various circumstances

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2. Examine *job search behavior of the employed and non-employed*
 - ▶ How do search effort, outcomes vary by LFS?
 - ▶ On what margins is search behavior different?
 - ▶ Effort, efficiency, offers received, etc

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 - ▶ How do search effort, outcomes vary by LFS?
 - ▶ On what margins is search behavior different?
 - ▶ Effort, efficiency, offers received, etc
3. Implications for search theory
 - ▶ Set-up and calibrate variations of the basic job-ladder model

Findings

- ▶ On-the-job (OTJ) search is pervasive
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- ▶ Search more efficient OTJ than while unemployed
 - ▶ Relative to unemployed, employed exert lower effort, but have higher contact rate, job offer rate and *better* offers
 - ▶ Despite poorer offers, unemployed more likely to accept offers
- ▶ Connection to theory
 - ▶ Accounting for differences in effort, search efficiency, offers improves model's fit to *old and new* facts

→ Relieves the tension between *value of non-market time* and *frictional wage dispersion*

Related Literature

Unemployment and job search

- ▶ Search effort and duration: Jones (1988), Machin and Manning (1999), van den Berg-van Ours (1996), Krueger and Mueller (2011), Faberman and Kudlyak (2014)
- ▶ Job seeker heterogeneity and stigma effects: Blanchard and Diamond (1994), Hornstein (2012), Kroft, Lange, Notowidigdo (2013)
- ▶ Cyclicity of job search: Shimer (2004), Mukoyama, Patterson, and Şahin (2016)

On-the-job search

- ▶ Active search among employed: Fallick and Fleischmann (2004), Fujita (2012)
- ▶ Differences between employed, unemployed search: Holzer (1987), Blau and Robins (1990), Krueger and Mueller (2010), Mueller (2010)
- ▶ Wage dispersion in search models: Burdett and Mortensen (1998), Christensen et al. (2005), Hornstein, Krusell, and Violante (2011), Sorkin (2015), Hall and Mueller (2016), Bagger and Lentz (2016)

Measurement

Data: *Survey of Consumer Expectations (SCE)*

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 - ▶ Core questions focus on expectations on macroeconomic and household level variables
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- ▶ Supplemental annual surveys fielded in October 2013, 2014, 2015
 - ▶ Detailed data on labor force status, work history
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- ▶ Three samples:
 - ▶ Full Sample: $N = 2,900$ observations
 - ▶ Sub-Sample 1: $N = 1,030$ *employed* individuals: hiring process that led to the current job
 - ▶ Sub-Sample 2: $N = 650$ individuals who *received a job offer* within the last six months

Comparison of the SCE and the CPS

Demographics	SCE Labor (2013-15)	Current Population Survey		
		Oct. 2013	Oct. 2014	Oct. 2015
Percent Male	48.9	51.4	51.4	51.3
Percent White	72.5	64.1	63.4	63.2
Percent Married	65.5	51.8	51.6	51.3
Percent with College Degree	32.9	33.5	33.9	35.1
Percent aged 18-39	35.0	38.5	39.1	39.0
Percent aged 40-59	49.7	50.1	49.8	49.1
Percent aged 60+	15.2	11.4	11.7	12.0

- ▶ Very similar demographic composition in the CPS and the SCE

Comparison of the SCE and the CPS

Labor Force Status	SCE Labor		CPS
	Search Def.	BLS Def.	
Employment-Population Ratio	0.761 (0.008)	0.761 (0.008)	0.743 (0.001)
Unemployment Rate	8.0 (0.5)	5.3 (0.5)	5.0 (0.1)
Labor Force Participation Rate	82.8 (0.7)	80.5 (0.7)	78.2 (0.1)

- ▶ Very similar LFS composition in the CPS and the SCE (after accounting for different definitions)

Job Search

Definition of Labor Force Status

We define the labor force status (U, E, N) as close as possible to the CPS.

BLS Definition: Non-employed who actively looked for work in the last four weeks and are available within the next seven days to start work are classified as unemployed by the Bureau of Labor Statistics (BLS).

SCE Definition: We classify those who actively looked for work as those that either sent at least one job application within the last four weeks or said they looked for work while reporting at least one *active search* method—generally anything more than perusing job postings or updating one's resume—in the survey.

Search Methods

Job Search by Labor Force Status: Extensive Margin

Job search behavior			
	<i>E</i>	<i>U</i>	<i>N</i>
% active search, last 4 weeks	23.3 (0.9)	99.5 (0.6)	2.1 (0.7)
% with positive search time, last 7 days	20.5 (0.8)	85.3 (2.8)	2.6 (0.8)
% applying to ≥ 1 vacancy, last 4 weeks	19.8 (0.8)	92.3 (2.1)	1.8 (0.6)
Number of observations	2,302	165	430

- ▶ Labor force status defined similarly to the CPS
- ▶ Search is pervasive among employed workers

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Job Search by Labor Force Status: Intensive Margin

Mean hours and applications, conditional on search

	<i>E</i>			<i>U</i>	<i>N</i>
	All	Looking	Not looking	All	All
Hours searching last 7 days	1.18 (0.09)	4.30 (0.29)	0.05 (0.01)	8.40 (0.74)	0.07 (0.04)
Applications sent last 4 weeks	1.22 (0.13)	4.58 (0.48)	0 (—)	8.08 (1.23)	0.08 (0.06)
# of observations	2,028	515	1,513	165	430

- ▶ Unemployed workers search harder (8.4 hours per week) than the employed (1.2 hours per week)
- ▶ Despite the average lower search effort of the employed, employed searchers who are looking for new work spent around 4.3 hours per week on job search

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Job Search Outcomes by Labor Force Status

Mean contacts and offers, last 4 weeks

	<i>E</i>			<i>U</i>	<i>N</i>
	All	Looking	Not looking	All	All
Mean contacts	0.74 (0.08)	1.86 (0.28)	0.34 (0.04)	1.27 (0.23)	0.11 (0.03)
Mean unsolicited offers	0.046 (0.007)	0.048 (0.01)	0.046 (0.009)	0.047 (0.017)	0.052 (0.022)
Mean offers	0.18 (0.01)	0.43 (0.04)	0.08 (0.01)	0.38 (0.08)	0.08 (0.03)
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- ▶ Employed looking for new work receive the greatest number of employer contacts.
- ▶ Unsolicited offers seem to be equally likely across different LFS
- ▶ Unemployed search about seven times harder but generate only twice the offer rate

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Distribution of Search Effort and Outcomes

	<i>E</i>			<i>U</i>	<i>N</i>
	All	Looking	Not Looking	All	All
% of population	73.6	19.6	54.0	7.4	19.0
% of application	59.5	59.5	0.0	39.5	1.0
% of offers	75.2	48.7	26.5	16.3	8.5
% of unsolicited offers	71.9	19.7	52.1	7.4	20.8
# of observations	2,028	515	1,513	165	430

- ▶ Unemployed make up around 7% of the sample, 40% of applications but only 16.3% of offers
- ▶ Employed not looking make up 54% of the sample and 26.5% of offers mostly due to unsolicited contacts and referrals

Wage Outcomes

Hiring Process of the Currently Employed

- ▶ Survey asks retrospective questions of the employed about how they were hired
 - ▶ Search process and starting wage
- ▶ Also asks about characteristics of previous job
 - ▶ Can be used to account for selection based on unobservable worker characteristics
- ▶ Finally, asks LFS at time of hire
 - ▶ Quit immediately to new job
 - ▶ Laid off but immediately hired
 - ▶ Hired after non-employment spell

Wages on the Current and Previous Jobs by LFS

Real wages on the current and previous jobs

	Hired from Employment		Hired from non-employment
	Quit	Laid off	
Starting Wage	\$24.90 (0.92)	\$19.21 (1.13)	\$17.42 (0.84)
Starting Wage Conditional on observables	\$24.16 (0.82)	\$20.40 (0.92)	\$20.48 (0.72)
Starting Wage Conditional on observables, previous job	\$24.51 (0.73)	\$21.87 (0.79)	\$19.95 (0.66)
Ending Wage of Previous Job	\$22.12 (0.89)	\$20.74 (1.49)	\$22.74 (1.41)
# of Observations	616	143	271

- ▶ Hires from non-employment are paid lower wages than those hired from a quit (around 20%)
- ▶ While previous wages look very similar conditional on observables, difference still remains for the current wage (around 17%)

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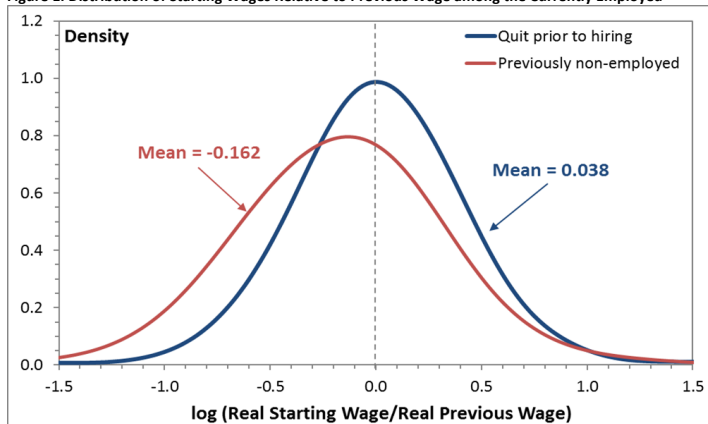
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Wages Relative to Previous Wages by LFS

Figure 1. Distribution of Starting Wages Relative to Previous Wage among the Currently Employed



- ▶ Around 57% of hires from a quit move to a higher paying job while it is 40% for hires from non-employment
- ▶ The relative wage distribution of workers hired from a quit dominates the distribution of those hired from non-employment

Job Offers and Accepted Jobs

- ▶ Have detailed information on offers received
 - ▶ About one-quarter of sample received an offer in the last 6 months
 - ▶ Respondents did not have to report searching to be asked about offers (done to examine role of unsolicited offers)
- ▶ Questions cover
 - ▶ Offer characteristics: offer wage, hours, benefits
 - ▶ How offer came about
 - ▶ Whether offer was accepted, rejected
 - ▶ Whether offer involved bargaining, pay was known
- ▶ Examine by LFS at time of offer: employed full-time and non-employed

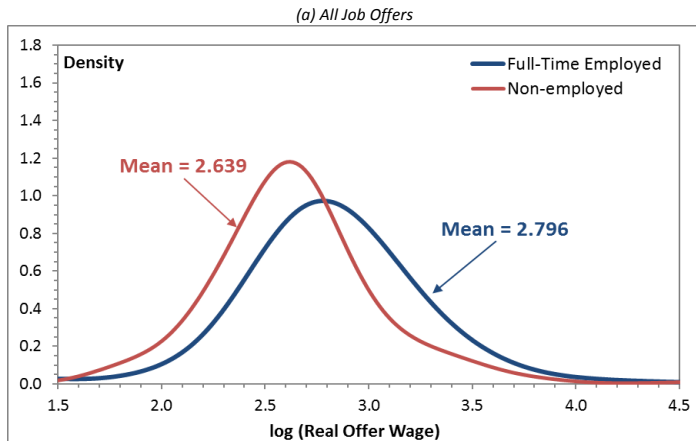
Characteristics of Best Job Offers

Characteristics of Best Offers

	Full-time Employed	Non-employed
Mean wage of job offer	\$27.11 (1.72)	\$15.68 (1.01)
Mean wage Conditional on observables	\$23.90 (1.44)	\$18.24 (1.05)
Mean wage Conditional on observables, prior job, and state urate	\$23.21 (1.36)	\$17.78 (0.96)
# of Observations	378	165

- ▶ Employed workers more likely to be offered higher wages

Distribution of Job Offers



- ▶ Even after controlling for observable worker and job characteristics, the previous wage, aggregate conditions, non-employed face worse employment opportunities.

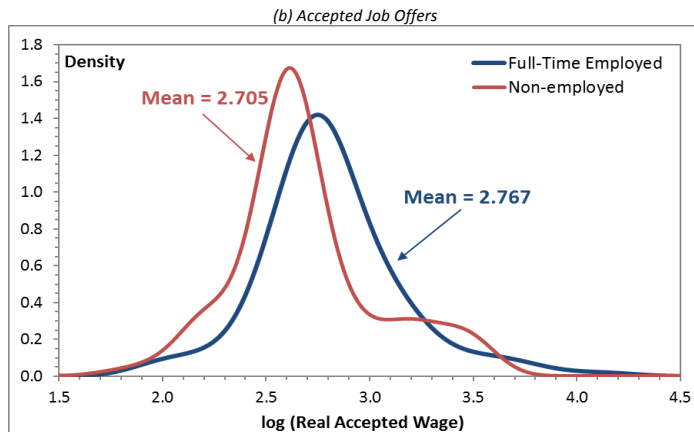
Characteristics of Accepted Job Offers

Characteristics of Accepted Offers

	Full-time Employed	Non-employed
% accepted	29.4 (2.3)	54.7 (3.9)
Mean wage	\$31.64 (4.35)	\$14.69 (1.55)
Mean wage Conditional on observables	\$27.84 (3.74)	\$20.93 (1.41)
Mean wage Conditional on observables, prior wage and hours	\$24.32 (3.07)	\$20.27 (1.35)
# of Observations	114	86

- ▶ Offered wages lower for the non-employed even after controls but they have higher acceptance rates.

Distribution of Accepted Job Offers



Taking the Data to the Model

Summary of Empirical Findings

- ▶ Job search is pervasive among employed workers
- ▶ Unsolicited offers are important
- ▶ Unemployed search harder than employed workers but search is less effective for them
- ▶ Unemployed workers receive lower paid wage offers but they are more likely to accept them

Connect with frictional model of OTJ search with endogenous search effort. Follow Christensen et al. (2005), with extensions to allow for differing

- ▶ search effort and efficiency by LFS
- ▶ job offer distributions by LFS

Framework

- ▶ Workers can search while employed (e) or unemployed (u), exert effort to increase job-offer arrival rate
- ▶ Allow for unsolicited offers
- ▶ Search effort, s_i , has increasing convex cost, $c(s_i)$
- ▶ Job offers arrive at rate $\lambda_i(s_i)$ where i is labor force status
- ▶ Wage offers drawn from distribution $F^i(w)$, support $\{\underline{w}, \bar{w}\}$
- ▶ Existing matches end exogenously at rate δ

Value Functions

Worker's value of employment:

$$rW(w) = \max_{s_e \geq 0} \left\{ w - c_e(s_e) + \lambda_e(s_e) \int [\max(W(x), W(w)) - W(w)] dF^e(x) - \delta[W(w) - U] \right\}$$

Value of unemployment:

$$rU = \max_{s_u \geq 0} \left\{ b - c_u(s_u) + \lambda_u(s_u) \int ([\max[W(x), U] - U]) dF^u(x) \right\}$$

Search Choice

Search Technology

Cost of search by LFS:

$$c_u(s_u) = \kappa_u s_u^{1+\frac{1}{\gamma}}$$

$$c_e(s_e) = \kappa_e s_e^{1+\frac{1}{\gamma}}$$

Job offer arrival rates by LFS:

$$\lambda_u(s_u) = \alpha_u + \beta_u(s_u)$$

$$\lambda_e(s_e) = \alpha_e + \beta_e(s_e)$$

Model Parametrization

Parameters

Parameter	Value	Source
r	0.9966	annual 4% discount rate
δ	0.015	EU transition rate, CPS
γ	1.19	Christensen et al. (2005)
(μ_y, σ_y)	(0, 0.24)	Hall and Mueller (2015)

Model Calibration

Compare three versions of the model

1. Exogenous offer arrival model, $s_U = s_e(w) = 1$
2. Endogenous search effort with differences in search effort and efficiency by LFS
3. Endogenous search effort with differences in search effort, efficiency and wage offer distributions by LFS

Targeted Moments

	Moments in the data	Exogenous Search Effort	Endogenous Search Effort Same dist'n	Endogenous Search Effort Different dist'n
Mean search effort of U	1.00	—	1.00	1.00
Mean search effort of E	0.15	—	0.15	0.15
Mean monthly offer rate of U	0.38	0.38	0.38	0.38
Mean monthly offer rate of E	0.18	0.18	0.18	0.18
Mean acceptance rate of U	0.56	0.56	0.56	0.56
Job-finding rate of U	0.21	0.21	0.21	0.21

Model Calibration: Parameters

Each model is calibrated to match the same set of moments.

Calibrated Values				
Parameter	Exogenous Search Effort	Endogenous Search Effort Same dist'n	Endogenous Search Effort Different dist'n	Target
α_e	0.175	0.046	0.046	Offer arrival rates in survey
α_u	0.377	0.047	0.047	
β_e	0	0.854	0.854	Offer arrival rates in survey
β_u	0	0.330	0.330	
k_e	--	1.055	1.453	Relative search effort in survey
k_u	--	0.269	0.146	

Efficiency of Search by LFS

Does efficiency of search vary by labor force status? Recall that job-offer arrival rate is $\lambda_i(s_i) = \alpha_i + \beta_i s_i$.

- ▶ When identified off the exogenous search model using job offer arrival rates:

$$\frac{\lambda_e}{\lambda_u} = \frac{0.18}{0.38} = 0.47$$

- ▶ When identified off the endogenous search model:

$$\frac{\beta_e}{\beta_u} = \frac{0.854}{0.330} = 2.58$$

→ Employed job seekers are more efficient in generating offers.

Model Outcomes

	Moments in the data	Exogenous Search Effort	Endogenous Search Effort Same dist'n	Endogenous Search Effort Different dist'n
Mean acceptance rate of E	0.294	0.111	0.135	0.179
Job-to-job transition rate	0.030	0.019	0.024	0.032
Mean search cost of U		—	0.269	0.146
Mean search cost of E		—	0.053	0.073
Mean Wage		1.451	1.504	1.731
$b/E(w)$		0.355	0.717	0.826
$b/E(w)$ (net of $c(s)$)		0.355	0.574	0.768
Mean-min wage ratio		1.493	1.548	1.774

The model with endogenous job search effort does better in matching:

- ▶ the acceptance rate of employed
- ▶ the job-to-job transition rate

Frictional Wage Dispersion and Value of Non-work

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$b/E(w)$ (net of $c(s)$)	0.355	0.574	0.768
Mean-min wage ratio	1.493	1.548	1.774

- ▶ Without on-the-job search, negative values of non-work, and low wage dispersion (Hornstein, Krusell, and Violante 2011)
- ▶ Allowing for on-the-job search brings the value of non-work closer to 0.4 with improvement in mean-min ratio
- ▶ Endogenous job search with differences in search technology further relieves the tension

Frictional Wage Dispersion and Value of Non-work

The endogenous job search model calibrated to match the SCE facts does not need low values of non-work to generate reasonable wage dispersion:

- ▶ Traditional models require a low (often negative) value of unemployment to rationalize observed transition rates from U to E .
- ▶ With on-the-job search workers can continue to search for a better job.
- ▶ Our findings suggest
 - ▶ Offer arrival rate while employed is reasonably high
 - ▶ Employed workers seem to have access to a better search technology
 - ▶ Employed workers seem to be sampling from a better wage distribution
- ▶ As a result, unemployed do not need a very low value of non-work to leave unemployment for a job

The Role of Labor Force Status

Why do employed seem to be doing better in terms of job offers?
There are various possibilities (not necessarily mutually exclusive)

- ▶ Partially directed search: Employed are more selective in their applications
- ▶ Human capital depreciation: Workers lose their skills during non-employment spells
- ▶ Bargaining channel: Employed are in a better position to obtain a higher share of the match surplus
- ▶ Signaling/discrimination against un/non-employed: Employers prefer employed workers

The Role of Labor Force Status

Characteristics of Best Offers	Full-time Employed	Non-employed
% that involved bargaining	43.8 (2.6)	24.4 (3.4)
% with a counter-offer	14.2 (1.8)	—
# of Observations	378	165

Characteristics of Accepted Offers	Full-time Employed	Non-employed
% accepted as only option	2.5 (1.5)	26.9 (5.3)
% that involved bargaining	39.3 (4.6)	15.7 (3.9)
% with a counter-offer	18.0 (3.6)	—
# of Observations	114	86

- ▶ Some evidence for the bargaining channel in our survey

Concluding Remarks and Future Work

- ▶ On-the-job (OTJ) search is pervasive
- ▶ Search more efficient OTJ than while unemployed
- ▶ Accounting for differences in effort, search efficiency, offers substantially improves model's fit to *old and new* facts

→ Relieves the tension between *value of non-work time* and *frictional wage dispersion*

Future Work:

- ▶ Role of heterogeneity
- ▶ Directed search considerations
- ▶ Role of non-wage amenities
- ▶ Nature and role of counter offers

Job Search Methods

- ▶ Contacted an employer directly online or through e-mail (1)
- ▶ Contacted an employer directly through other means, including in-person (2)
- ▶ Contacted an employment agency or career center, including a career center at a school or university (3)
- ▶ Contacted friends or relatives (4)
- ▶ Contacted former co-workers, supervisors, business associates (5)
- ▶ Contacted current employees at other companies (6)
- ▶ Applied to a job posting online (7)
- ▶ Applied to a job opening found through other means, including help wanted ads (8)
- ▶ Checked union/professional registers (9)
- ▶ Looked at job postings online (10)
- ▶ Looked at job postings elsewhere, including help wanted ads (11)
- ▶ Posted or updated a resume or other employment information, either online or through other means (12)
- ▶ Other (Please specify): (13)

Optimal Search Effort

$$\frac{c'_u(s_u)}{\lambda'_u(s_u)} = \beta \int_r^{\bar{w}} [W(z) - U] dF_y^u(z)$$

$$\frac{c'_e(s_e)}{\lambda'_e(s_e)} = \beta \int_w^{\bar{w}} [W(z) - W(w)] dF_y^e(z)$$

and rearranging gives

$$\frac{\kappa_u(1 + \frac{1}{\gamma})}{\beta_u} s_u^{\frac{1}{\gamma}} = \beta \int_r^{\bar{w}} [W(z) - U] dF_y^u(z)$$

$$\frac{\kappa_e(1 + \frac{1}{\gamma})}{\beta_e} s_e^{\frac{1}{\gamma}} = \beta \int_w^{\bar{w}} [W(z) - W(w)] dF_y^e(z)$$

Optimal Search Effort

$$s_u^* = \left(\frac{\beta_u}{\kappa_u \left(1 + \frac{1}{\gamma}\right)} \beta \right)^\gamma \left(\int_r^{\bar{w}} [W(z) - U] dF_y^u(z) \right)^\gamma$$

$$s_e^*(w) = \left(\frac{\beta_e}{\kappa_e \left(1 + \frac{1}{\gamma}\right)} \beta (1 - \sigma) \right)^\gamma \left(\int_w^{\bar{w}} [W(z) - W(w)] dF_y^e(z) \right)^\gamma,$$

Back

Roles of Differences in Search Technology and Wages

We allow

- ▶ cost and efficiency of search to depend on labor force status
- ▶ wage offer distribution to vary by labor force status.

Both improve the performance of the model.

	Exogenous Search Effort	Endogenous Search Effort Same Search Technology	Endogenous Search Effort Different Search Technology	Endogenous Search Effort Diff Search Tech and Wage Dist'n
$b/E(w)$	0.355	0.656	0.717	0.826
$b/E(w)$ (net of $c(s)$)	0.355	0.449	0.574	0.768
Mean-min wage ratio	1.493	1.507	1.548	1.774
β_e	0	0.330	0.854	0.854
β_u	0	0.330	0.330	0.330
k_e	--	0.335	1.055	1.453
k_u	--	0.335	0.269	0.146

Back