Optimal Unemployment Insurance and Cyclical Fluctuations

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Unemployment Insurance and Business Cycles

- In normal times, unemployment benefits typically provide replacement rate (47% average) for 26 weeks.
- In recessions, federal extended benefits provide an additional 13 weeks of benefits. In severe recessions, these are extended further: up to 99 weeks in high unemployment states recently.
- What should be the optimal pattern (level, duration) of unemployment insurance over the cycle when workers put forth unobservable search effort?
- How would this affect outcomes? Level and duration of unemployment in booms and recessions. Tradeoff increased insurance with less information in a recession.

What We Do

- Study optimal unemployment insurance contracts with moral hazard due to unobservable search effort.
- Continuous time version of Hopenhayn-Nicolini (1997), with business cycles and multiple unemployment spells.
- Consider exponential utility and cost case that can be solved explicitly.
- Show how to implement optimal contract via simple instruments.
- In a calibrated version of the model, switching from current system to optimal reduces unemployment rates 2.5% points in recessions, cuts durations by 50%, less cyclicality.
- Extending benefits has small impact on current system, but replacing system has large impact.

The Model

- All jobs pay wage ω. Exogenous separations.
- Workers are risk averse, put forth search effort a, consume c. No outside consumption when unemployed.

$$\max_{\hat{a} \in A} E^{\hat{a}} \left[\rho \int_0^\infty e^{-\rho t} u(c_t, \hat{a}_t)\, dt \right] \tag{1}$$

- Unemployment agency minimizes transfers b_t s.t. to providing given utility, incentive constraint. Note $b_t = c_t$ in unemp, $b_t = c_t - \omega$ when employed. Allow risk averse.

$$\max_{(c,a) \in C} E^{a} \left[-\rho \int_0^\infty e^{-\rho t} v(b_t)\, dt \right]$$

Business Cycles

- Business cycle: boom is a period of high job finding rates, low unemployment rates.
- Business cycle state: $s_t \in \{G, B\}$.
- Poisson arrival intensity of a job is:

$$q_s(a_t) = q_{s0} + q_s a_t, \quad q_B(a) < q_G(a)$$

- Exogenous separation intensity: $p_B > p_G$
- Aggregate state intensity: $\lambda_B > \lambda_G$.

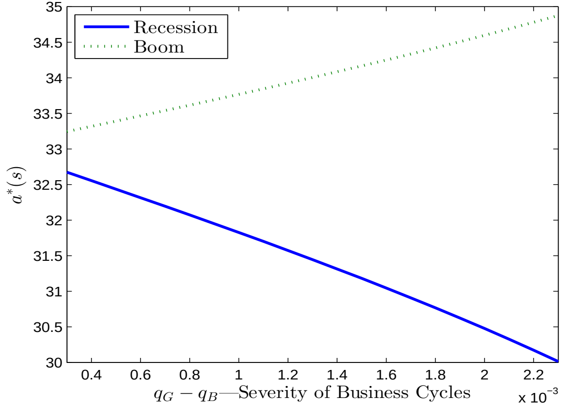
Optimal Contracts

- Solve for optimal contracts recursively, with promised utility W as state variable. Maximize agency utility subject to incentive constraint.
- First order approach valid, simplifies incentive constraint.
- Typically require numerical methods, but special case with exponential utility and cost is solvable.

$$u(c,a) = -\exp(-\theta_A(c - h(a))), \quad v(c) = \exp(\theta_P c)$$

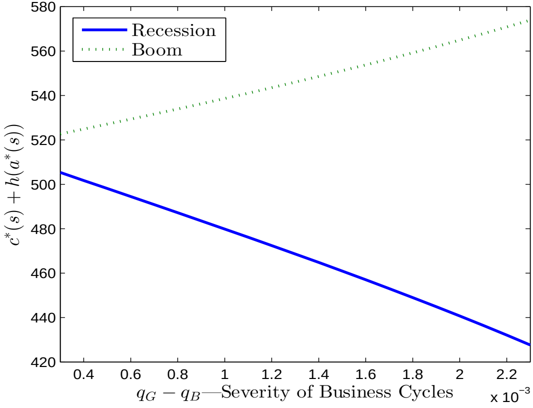
  Permanent jobs $p_s = 0$. Linear finding: $q_s(a) = q_s a$.
- Employed worker value then independent of agg state.
- Unemployed search effort is state-dependent but independent of W: $a = a^*(s)$.
- Proportional utility adjustment when find a job $W' = w_J(s)W$ or state switches $W' = w_S(s)W$.

Effort: $a^*(s)$.



Recession
Boom
35
34.5
34
33.5
33
32.5
32
31.5
31
30.5
30
$a^*(s)$
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
$q_G - q_B$—Severity of Business Cycles
x 10^{-3}

Consumption constants: $c^*(s) + h(a^*(s))$.



Implementing the Optimal Contract

- So far direct implementation, specifying consumption as a function of promised utility. Tie promised utility to wealth.
- Now consider agent consumption-savings-effort problem. Wealth when employed:

$$dx_t = [\rho x_t - c_t + b^e]dt.$$

ρ interest rate, b^e after-tax wage: both constant

- Unemployed wealth, jumps when find job or state switches:

$$dx_t = [r(s_t)x_t - c_t + b^u(s_t)]dt + B(s_t)\Delta s_t^J + A(s_t, x_t)\Delta s_t^S.$$

state-dependent interest rate $r(s)$, benefit $b^u(s)$, payment on switch of job $B(s)$ or state $A(s, x)$

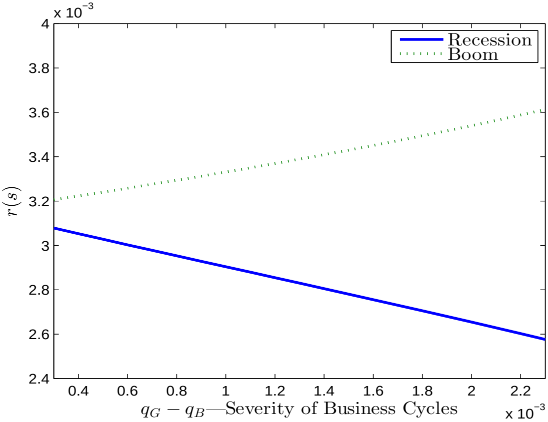
The Implementation

- The policy that implements the contract:

$$
\begin{aligned}
r(s) &= -\rho u(c^*(s)) \\
b^u(s) &= -\frac{\mu_W(s)}{r(s)\theta_A} - \frac{1}{\theta_A}\log\frac{r(s)}{\rho} + h(a^*(s)) \\
B(s) &= -\frac{\log(w_J(s_t))}{r(s_t)\theta_A} \\
A(s,x) &= \left(\frac{r(s)}{r(s')} - 1\right)x - \frac{\log(w_S(s))}{r(s')\theta_A}.
\end{aligned}
$$

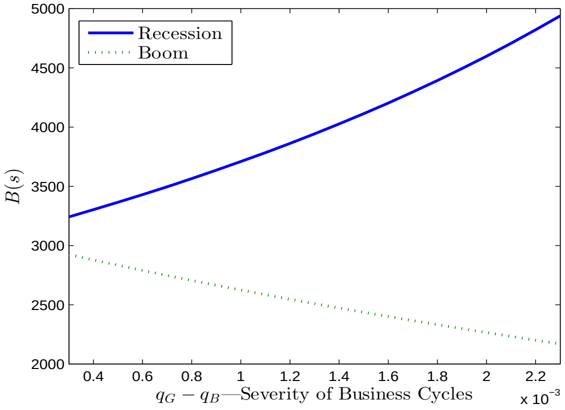
- Constant benefits (in each state): Shimer-Werning (2008)
- Unemployment savings accounts: Feldstein and Altman (2007)
- Re-employment bonus: Robins and Spiegelman (2001).
- Payment on change of aggregate state

Interest rate: $r(s)$.



Comparative Statics: Severity of Business Cycle $q_G - q_B$

Re-employment bonus: $B(s)$.



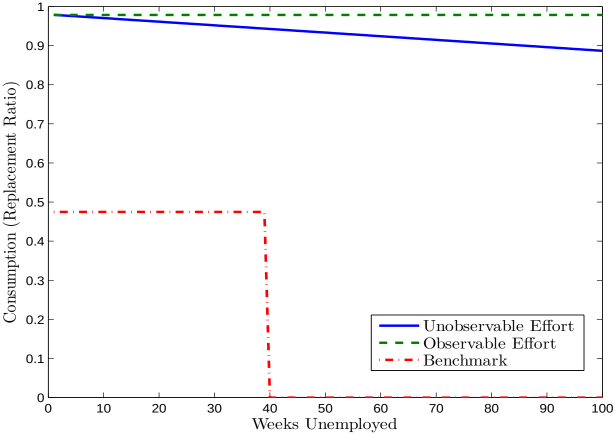
A Quantitative Example

- Analyze quantitative impact of unemployment insurance reform in a calibrated model.
- Reintroduce separations and multiple unemployment spells.
- Agency risk neutral $v(c) = c$, workers have separable power utility:
$$u(c, a) = \frac{c^{1-\gamma}}{1-\gamma} - \frac{a^{1+\phi}}{1+\phi}$$
- Calibrate model under a stylized version of the current system ("benchmark contract"): fixed benefit at 47% of wages for 26 weeks in booms, 39 weeks in recessions.
- Match mean finding rates in boom, recession, elasticity of unemp duration w.r.t benefit

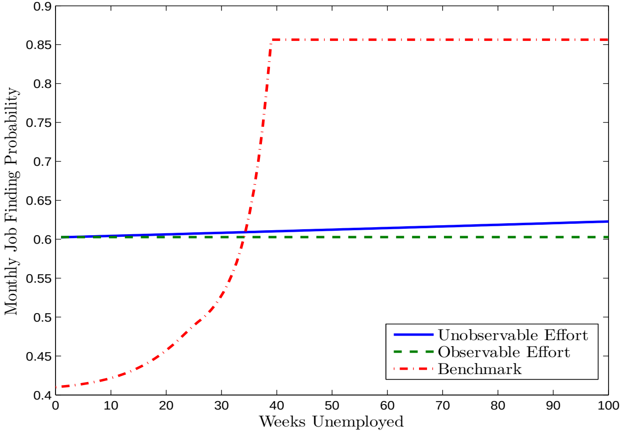
Summary Statistics

	Benchmark		Optimal	
	Boom	Recess	Boom	Recess
Unemp. Rate (%)	5.33	6.57	3.60	4.00
Unemp. Duration (weeks)	6.21	7.33	4.44	4.67
Finding Rate (month)	0.49	0.41	0.64	0.61
Separation Rate (month)	0.033	0.035	0.033	0.035
Net Cost/Worker (% of ω)	2.50	3.09	1.95	2.21

Consumption Over Unemployment Spell: Recession

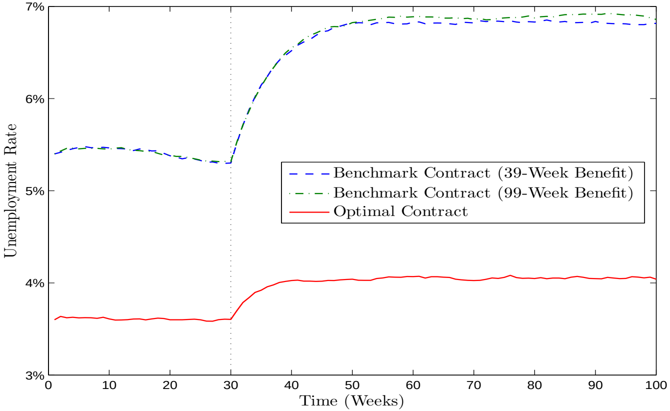


Job Finding Rates Over Unemployment Spell: Recession



Recession and Extended Benefits

Simulate long recession and compare benefits extension.
Benchmark: 5.3% ⇒ 6.7%, 99-Week: 5.3% ⇒ 6.8%.
Optimal: 3.6% ⇒ 4.0%.



Conclusion

- Unemployment insurance should vary over business cycle: insurance/incentive tradeoff changes in boom/recession.
- We characterize optimal benefits provision over the cycle.
- Exponential utility and cost case solvable in closed form. Allows us to characterize features of contract.
- Optimal contract implementable via simple instruments, with some precedence in literature and practice.
- In calibrated model, unemployment relatively insensitive to benefit duration in current system.
- But large impact on unemployment of reform. Lower rates, shorter durations, less cyclicality.

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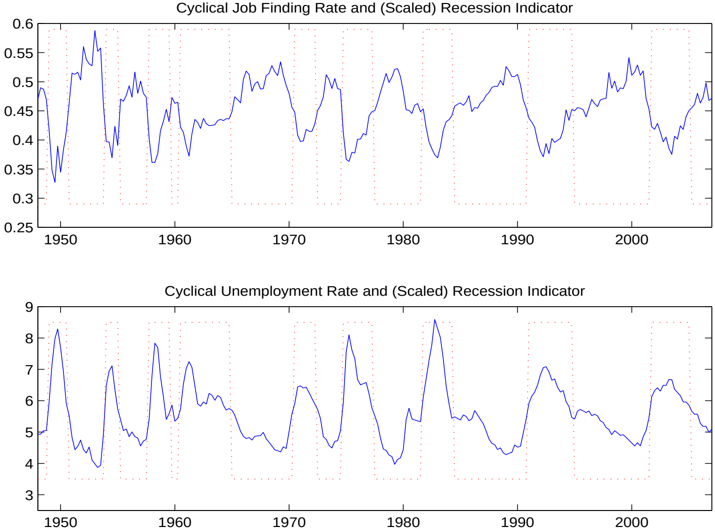
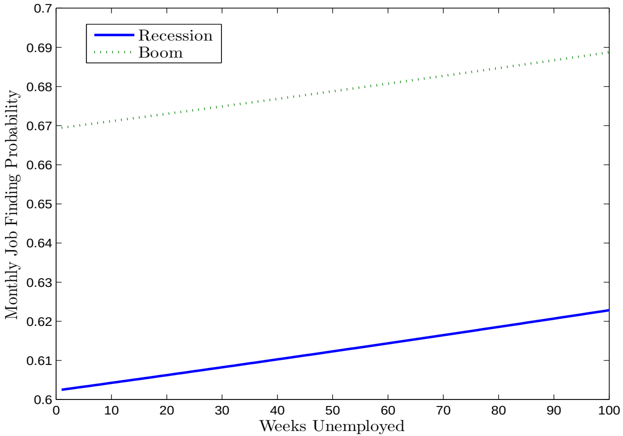
Cyclical Job Finding and Unemployment Rates



Calibrated Parameter Values

Parameter	Value	Target	Value
λ_G	0.0173	Transition Prob	0.933
λ_B	0.0233	Transition Prob	0.911
q_G	0.0038	Finding Rate	0.487
q_B	0.0035	Finding Rate	0.411
ϕ	0.16	Unemp elasticity	0.72
γ	0.5	Hopenhayn-Nicolini	0.5
ρ	0.001	Annual discount	0.05
ω	495	Median annual wage	25,737

Job Finding Rates Over Unemployment Spell



Consumption Over Unemployment Spell