Clashing Theories of Unemployment

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Phelps and Winter (1970)

A landing on the non-Walrasian continent has been made. Whatever further exploration may reveal, it has been a mind-expanding trip: We need never go back to

$$\dot{p} = \alpha(D - S)$$

and

$$q = \min(D, S)$$

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The DMP model

Zero recruiting profit: $h(u)J = \gamma$

Wage determination: $J = \tilde{J}(u, x)$

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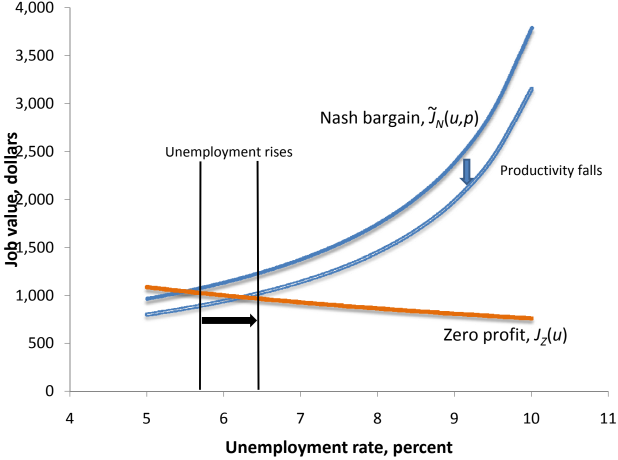
DMP Account of an Increase in Unemployment Caused by a Decline in Productivity



Doubts

Shimer, *AER*, 2005: Requires grossly unrealistic decline in productivity for plausible parameter values

Productivity is not a plausible source of prolonged slumps

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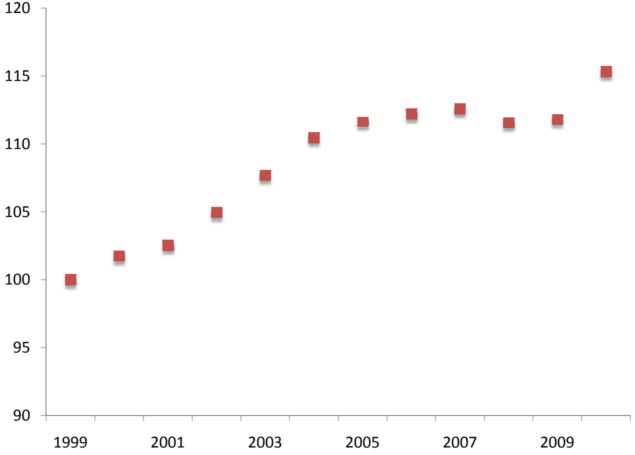
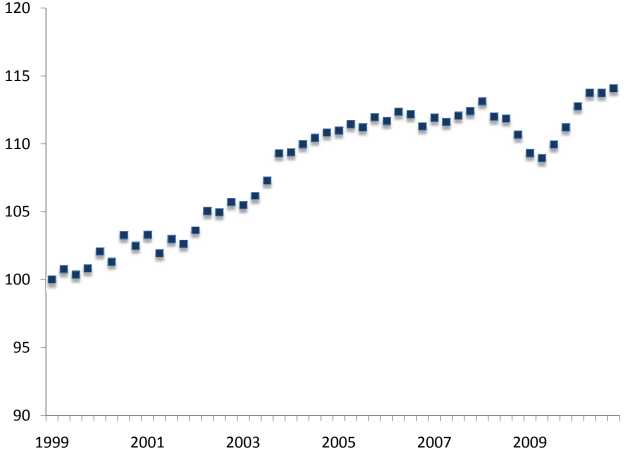
BLS Annual Total Factor Productivity



Fernald's Quarterly Total Factor Productivity



Two wage determination specifications

$$\tilde{J}_N(u) = 0.5\frac{p - z}{r + 0.5\phi(u) + s}$$

$$\tilde{J}_R = \frac{p - w}{r + s}$$

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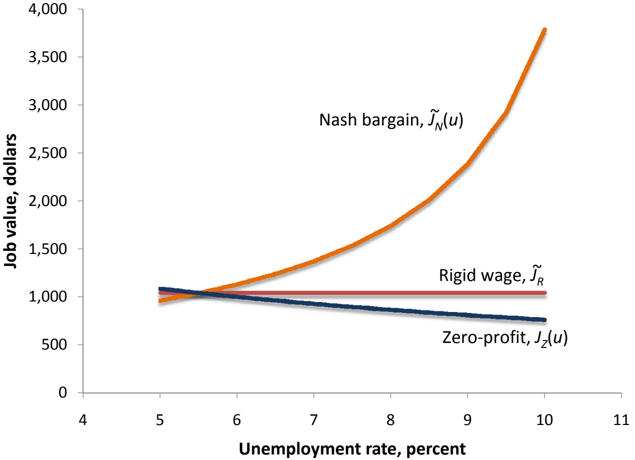
Alternative Views of Equilibrium Unemployment



Job value

$$L = \frac{M^*}{1-\beta(1-s)}$$

$$W(k,0) = \bar{w}M^* + \beta\cdot(1-s)\pi(k,0)^{-\omega}[(1-\rho)W(k',0) + \rho W(k',\bar{g})].$$

$$W(k,\bar{g}) = \bar{w}L$$

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Zero hiring profit

$$h(u)J = \gamma$$

$$h(u) = h_0 + h_1 u$$

$$u(k,0) = \frac{\frac{\gamma}{J(k,g)} - h_0}{h_1}$$

$$u(\bar{g}) = u^*$$

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Related literature on the interest-rate bound

Krugman (*BPEA*, 1998), Eggertsson-Woodford (*BPEA*, 2003), Christiano, Eichenbaum, and Rebelo (*JPE*, 2011), Guerrieri-Lorenzoni (2011), and Eggertsson-Krugman (2011)

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Corridor monetary policy

$$R_r \leq R_n \leq R_\ell$$

$$R_n = R_p = .5(R_r + R_\ell)$$

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Inflation

Treat inflation as a free variable, even when a Taylor rule might actually influence its value.

For some purposes, I take the inflation ratio as given.

Investigate the inflation ratio that would reconcile the DMP model and the product-market model.

Sidestep the truly difficult question of what determines the rate of inflation.

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Fisher equation

$$R_f = \frac{R_n}{\pi}$$

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Driving force of negative interest: exogenous purchases

Consumers or other agents have suffered temporary exogenous cutback in purchases, will pop back to normal at some future time

$$\text{Prob}[g' = \bar{g} | g = 0] = \rho$$
$$\text{Prob}[g' = \bar{g} | g = \bar{g}] = 1$$
$$.$$

Production and material balance

$$v = \frac{\gamma s n}{h(u)}$$

$$n^{\alpha} k^{1-\alpha}$$

$$n^{\alpha} k^{1-\alpha} + (1-\delta)k = c + kx + \frac{\kappa}{2} k x^2 + v + g$$

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Capital adjustment cost

$$\frac{\kappa}{2} k x^2$$

$$\max_x \; q \cdot (x+1)k - \frac{\kappa}{2} k x^2 - (x+1)k$$

$$\kappa x = q - 1$$

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Returns and Euler equation

$$R(k,g,g') = \frac{(1-\delta)q' + (1-\alpha)n'^{\alpha}k'^{-\alpha}}{q}$$

$$m(k,g,g') = \beta\left(\frac{c'}{c}\right)^{-\frac{1}{\sigma}}$$

$$\mathbb{E}_{g=0}\,(mR) = (1-\rho)m(k,g,0)R(k,g,0) + \rho m(k,g,\bar{g})R(k,g,\bar{g}) = 1$$

$$\mathbb{E}_{g=\bar{g}}\,(mR) = m(k,g,\bar{g})R(k,g,\bar{g}) = 1$$

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Risk-free interest rate

$$R_f(k,0) = \frac{1}{\mathbb{E}_{g=0}\ (m)} = \frac{1}{(1-\rho)m(k,0,0)+\rho m(k,0,\bar{g})}$$

$$R_f(k,\bar{g}) = \frac{1}{\mathbb{E}_{g=\bar{g}}\ (m)} = \frac{1}{m(k,\bar{g},\bar{g})}$$

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Model for $g = \bar{g}$

Constant unemployment rate of 5.5 percent

No inflation

Only one unknown function, $x(k, \bar{g})$

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Model for $g = 0$

Full model: The risk-free nominal return ratio, $R_n(k, 0)$, takes on a specified value $\bar{R}$ (1 in the case of the zero lower bound), and the inflation ratio function $\pi(k, 0)$ and unemployment $u(k, 0)$ are equilibrium objects.

Product-market model: The nominal return ratio $R_n(k, 0) = \bar{R}$ and the inflation ratio function $\pi(k, 0)$ are given, and unemployment $u(k, 0)$ is an equilibrium object not controlled by the DMP labor-market model.

Labor-market model: The inflation ratio function $\pi(k, 0)$ is given, and unemployment $u(k, 0)$ is an equilibrium object controlled by the DMP labor-market model by itself.

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Parameters for full model

Elasticity of output with respect to labor $\alpha = 0.646$, utility discount $\beta = 0.9997$ at a quarterly rate, capital deterioration $\delta = 0.0188$ per quarter, capital adjustment cost $\kappa = 8$, the intertemporal elasticity of substitution $\sigma = 0.5$, and the labor turnover rate $s = 3 \times 0.04 = 0.12$ per quarter.

To generate a negative interest rate in the no-bound model and a binding lower bound in the model with a bound, the process for government purchases is $\bar{g} = 0.234$ (5 percent of stationary output) and probability of remaining at zero of $\rho = 0.9$, so the expected growth of g is 0.5 percent of stationary output per quarter.

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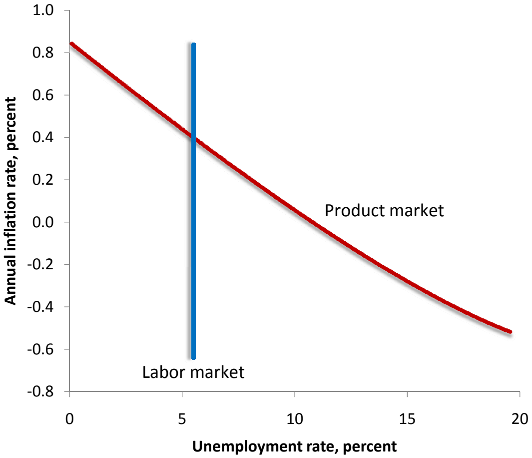
Equilibrium without sticky nominal wages



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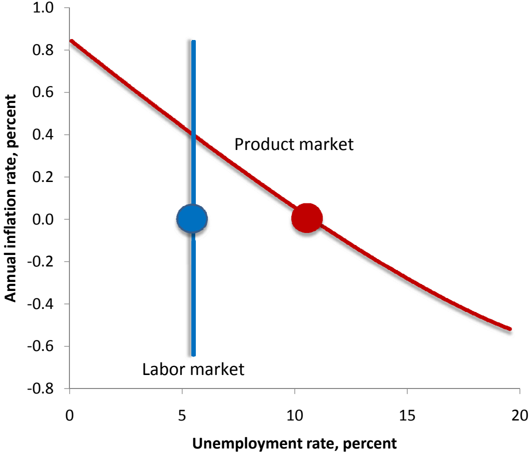
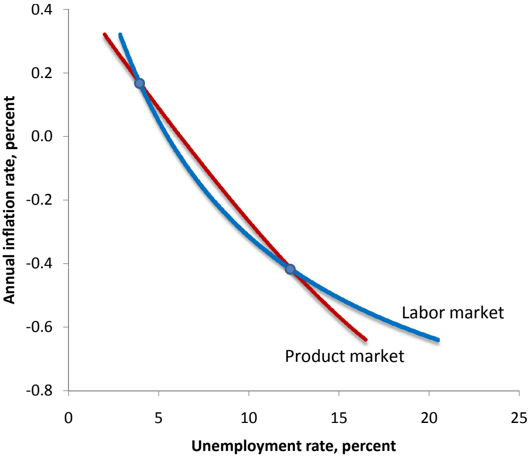
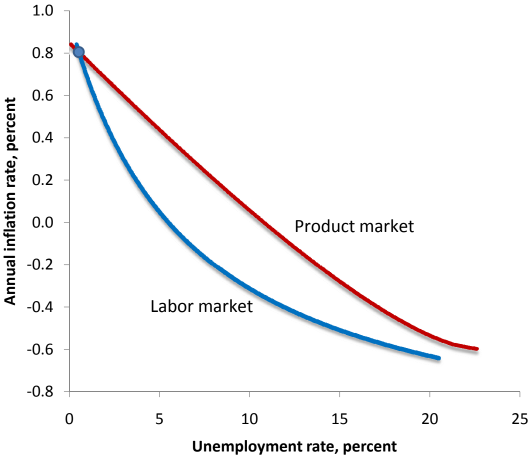


1.0
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
-0.6
-0.8
Annual inflation rate, percent
Product market
Labor market
0
5
10
15
20
Unemployment rate, percent

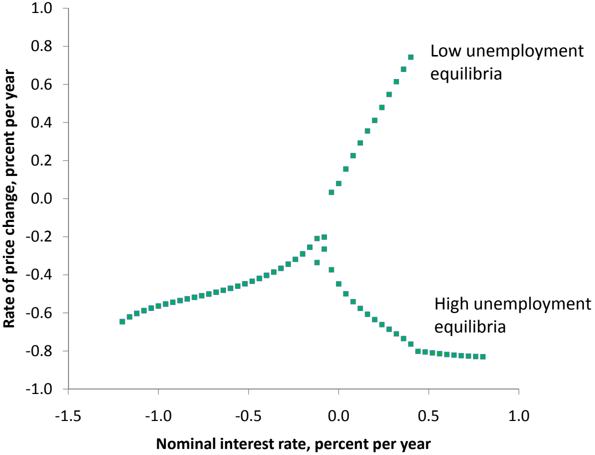
Equilibrium with sticky nominal wages



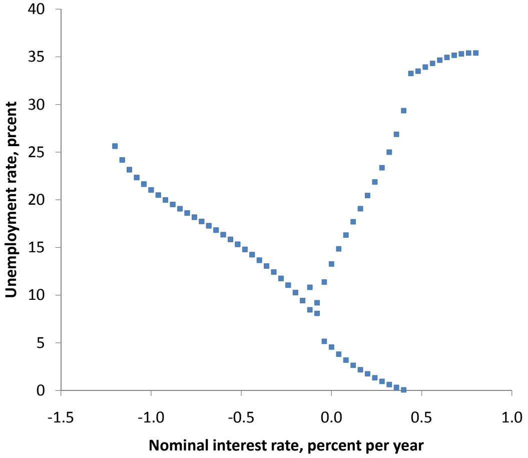
Equilibrium with Sticky Nominal Wages and Larger Increase in Exogenous Purchases



Equilibrium rates of price change given the nominal interest rate



Equilibrium unemployment rates given the nominal interest rate



Other approaches to reconciliation

Variations in market power

Excess supply in the product market

The flexible unemployment hypothesis

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Flexible unemployment

$$\tilde{J}_F(u) = \frac{\gamma}{h(u)}$$

$$h(u)\frac{\gamma}{h(u)} = \gamma$$

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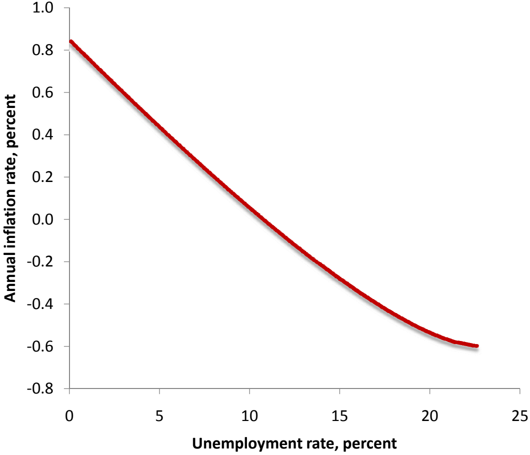
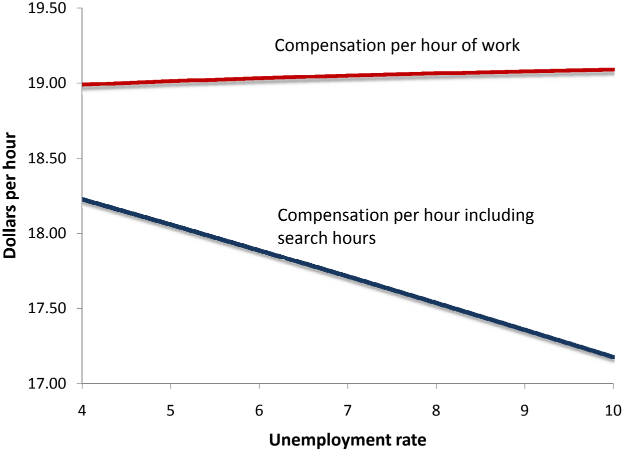
Unemployment as a function of inflation under the flexible unemployment hypothesis



Relation between Hourly Compensation and Unemployment



Shifts of the zero-profit curve as causes of recessions

$$J_t = \frac{\gamma}{h_t}$$

$$h_t = \frac{H_t}{21V_t}$$

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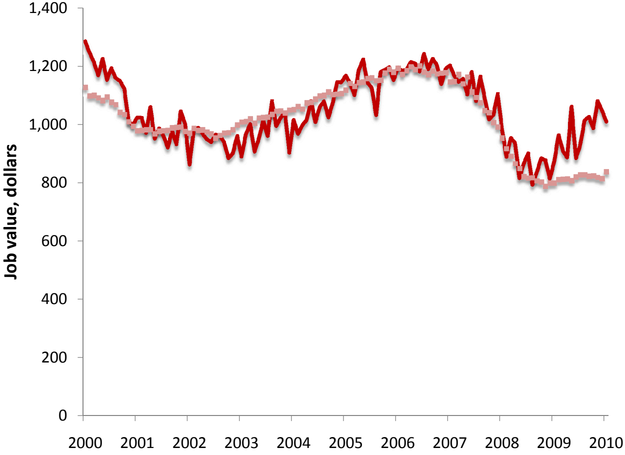
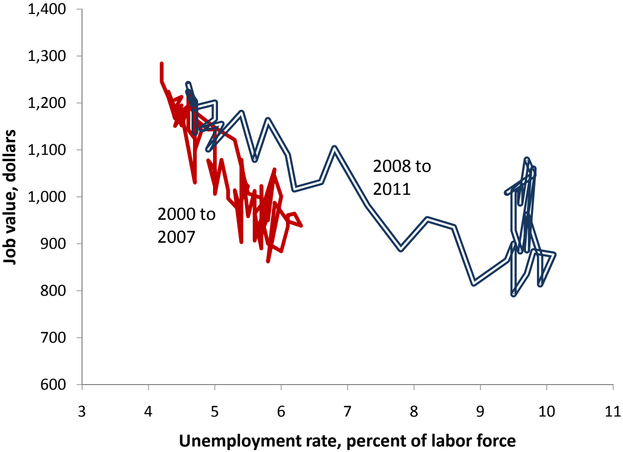
Job Value Calculated from JOLTS



Job Value J Plotted against Unemployment



Job Value J Plotted against the Unemployment/Vacancy Ratio