Firing Taxes, Unemployment Insurance and Aggregate Fluctuations: The Role of Monetary Policy

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Introduction

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- Firing tax is paid by the firms in case of dismissal
- Simulation shows: Extended model helps reconcile the SMM with the data

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- Embedded in a microfounded US-style unemployment benefits system based on Albertini & Fairise (2013, JEDC)

Model

Model I: Overview

Based on New Keynesian model of Krause & Lubik (2007, JME), ingredients:

- Large family max. utility over consumption sequences of differentiated goods

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- **Unemployed workers receive unemployment benefits financed via firing taxes**

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- Inelastic labor supply, home production and unemployment benefits Max:

$$U = E_0 \sum_{t=0}^{\infty} \beta^t \left[\frac{C_t^{1-\sigma} - 1}{1 - \sigma} \right], \tag{1}$$

subject to intertemporal period budget constraint

$$C_t + \frac{B_t}{P_t} = \mathscr{W}_t + R_{t-1} \frac{B_{t-1}}{P_t} + b_t + h^b u_t + \Pi_t + T_t. \tag{2}$$

Model II: Large Family

CES aggregate of differentiated goods

$$C_{it} = \left(\frac{P_{it}}{P_t} \right)^{-\varepsilon} C_t. \tag{3}$$

Standard Euler:

$$C_t^{-\sigma} = \beta R_t E_t \left[\frac{P_t}{P_{t+1}} C_{t+1}^{-\sigma} \right]. \tag{4}$$

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- Firms maximization problem:

$$\Pi_{i0} = \mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \frac{\lambda_t}{\lambda_0} \left\{ \frac{P_{it}}{P_t} y_{it} - \mathscr{W}_{it} - c v_{it} - \frac{\psi}{2} \left(\frac{P_{it}}{P_{it-1}} - \pi \right)^2 Y_t - \Phi(\tilde{a}_{it}) \right\} \tag{5}$$

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- Production Function

$$y_{it} = n_{it} H(\tilde{a}_{it}) \text{ where } H(\tilde{a}_{it}) = \mathbb{E}[a | a \geq \tilde{a}_{it}], \quad (6)$$

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subject to demand and production function and employment evolution:

$$n_{it+1} = (1 - \rho_{it+1})(n_{it} + v_{it} q(\theta_t)).$$

F.O.C.s after imposing symmetry across firms

$$
\begin{aligned}
n_t: \quad & \zeta_t = \varphi_t A_t H(\tilde{a}_t) - \frac{\partial \mathscr{W}_t}{\partial n_t} \\
& + \mathbb{E}_t \beta_{t+1} (1-\rho_{t+1}) \zeta_{t+1} - \Phi(\tilde{a}_t) \\
v_t: \quad & \frac{c}{q(\theta_t)} = \mathbb{E}_t \beta_{t+1} \zeta_{t+1} (1-\rho_{t+1}) \\
\tilde{a}_t: \quad & \frac{\partial \rho(\tilde{a}_t)}{\partial \tilde{a}_t} \zeta_t (n_{t-1} + v_{t-1} q(\theta_{t-1})) = \varphi_t A_t n_t \frac{\partial H(\tilde{a}_t)}{\partial \tilde{a}_t} \\
& - \frac{\partial \mathscr{W}_t}{\partial \tilde{a}_t} - [1 + \beta(1 - \theta_{t-1} q(\theta_{t-1}))] \frac{\partial \Phi(\tilde{a}_t)}{\partial \tilde{a}_t} \\
P_t: \quad & 1 - \psi(\pi_t - \pi)\pi_t + \mathbb{E}_t \beta_{t+1} \left[\psi(\pi_{t+1} - \pi) \pi_{t+1} \frac{Y_{t+1}}{Y_t} \right] \\
& = \varepsilon(1 - \varphi_t).
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- Wages set by individual Nash bargaining process
- Total wage bill of ind. productivity dependent wages:

$$\mathscr{W}_{it} = n_{it} \int_{\tilde{a}_{it}}^{\infty} w_t(a) \frac{f(a)}{1 - F(\tilde{a}_{it})}. \tag{8}$$

Model V: Wage Setting

- Wages set to

$$\underset{w}{\operatorname{argmax}} \left(W_t(a_t) - U_t\right)^{\eta} \left(J_t(a_t) - V_t + \Phi(\tilde{a}_t)\right)^{1-\eta},$$

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Model VI: Unemployment Benefits Insurance

Experience rating system: Employers contribute to cost of unemployment insurances

- Firing tax per worker $\propto$ fiscal cost of an unemployed worker

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- Intraperiod budget constraint

$$\Phi(\tilde{a}_t) = (1 - n_t) b_t = (1 - \rho^x) \rho_R \mathscr{W}_t^n + \rho^x \rho_R \mathscr{W}_t \tag{12}$$

Model VII: Central Bank + Solution

Taylor Rule:

$$\left(\frac{i_t}{\bar{i}}\right) = \left(\frac{\pi_t}{\bar{\pi}}\right)^{\phi_t} \left(\frac{Y_t}{\bar{Y}}\right)^{\phi_y} \exp(\varsigma_t) \tag{13}$$

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Compare simulated data with BC-frequency statistics from Krause & Lubik (2007, JME)

Results

Results I: IRFs

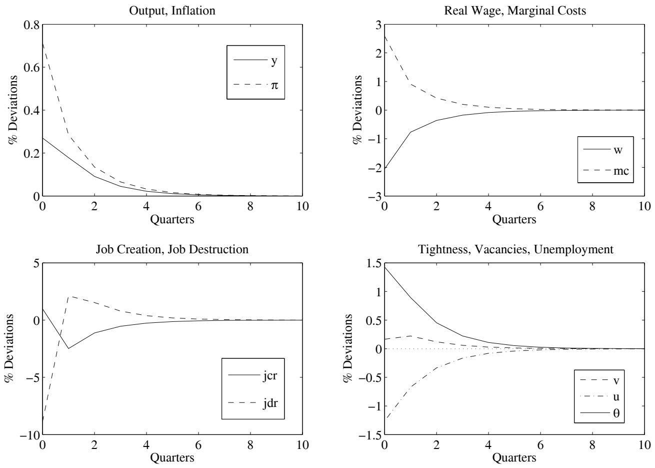

Figure : Impulse responses to 1% interest rate shock: Experience rating model

Results II: IRFs

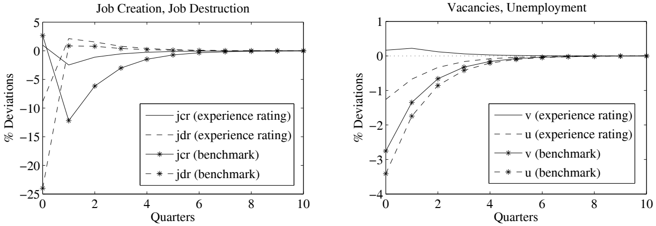

Figure : Impulse responses to an interest rate shock: Model comparison

Results III: BC Stats

Table : Empirical and simulated business cycle properties in the U.S.

	US Economy	Benchmark Model	Experience Rating
Standard Deviations:			
Output	1.62	0.912	0.340
Inflation	1.11	0.211	2.303
Real Wage	0.69	0.555	6.565
Unemployment	6.90	4.339	4.350
Vacancies	8.27	3.465	0.915
Tightness	14.96	0.877	5.185
Job Creation	2.55	15.729	8.712
Job Destruction	3.73	26.354	27.318
Correlations:			
U,V	−0.95	0.999	−0.898
JCR,JDR	−0.36	−0.234	−0.591
Autocorrelations:			
Output	0.87	0.567	0.604
Inflation	0.66	−0.113	0.413

Note: Std. deviations of all variables relative to the std. deviation of output

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JCR,JDR	−0.36	−0.234	−0.591
Autocorrelations:			
Output	0.87	0.567	0.604
Inflation	0.66	−0.113	0.413

Note: Std. deviations of all variables relative to the std. deviation of output

Conclusion

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- We develop a DSGE model with search and matching frictions and incorporate microfounded firing taxes
- Creates countervailing employment adjustment costs along the destruction margin
- Helps reconcile SMM with data
    - Generates the negative correlation between vacancies and unemployment
    - Reduces the excess sensitivity of layoffs
    - Strengthens the negative correlation of job creation and job destruction

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1. More BC-Labor analysis: Investigate unemployment benefits, inflation dynamics and transmission process of nominal shocks in detail

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Parameter	Description	Value
β	Discount factor	0.99
σ	Relative risk aversion coefficient	2
ε	Elasticity of substitution	11
ψ	Adjustment cost parameter	30
π	Steady state inflation	1
$\bar{q}$	Steady state job filling rate	0.7
μ	Search elasticity of matches	0.4
η	Worker's bargaining power	0.5
$\bar{u}$	Steady state unemployment rate	0.2
ρ_R	Replacement ratio	0.4

Table : Calibration 1

Parameter	Description	Value
e	Experience rating index	0.65
$\bar{\rho}$	Steady state separations	0.1
ρ^x	Exogenous steady state separations	0.068
μ_{LN}	Mean of c.d.f of productivity	0
σ_{LN}	Variance of c.d.f of productivity	0.12
ϕ_π	Taylor rule parameter on inflation	1.5
ϕ_y	Taylor rule parameter on output	0.5/4
ρ_i	AR(1) interest rate shock parameter	0.49
σ_i	Standard deviation of interest shock	0.0623

Table : Calibration 2

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