Discussion of “Optimal Monetary Policy with Redistribution” by Jennifer La’O and Wendy Morrison

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June 8, 2023

Optimal monetary policy with heterogeneous agents

Normative HANK literature: how does heterogeneity change optimal monetary policy?

- Distributional considerations are an important concern for monetary policy.
  [Bhandari-Evans-Golosov-Sargent (2021), Achary-Challe-Dogra (2020), LeGrand-Martin-Baillon-Ragot (2021), Nuno-Thomas (2019), McKay-Wolf (2022), Smirnov (2022), Davila-Schaab (2023),...]
  - Incomplete markets, heterogeneous productivity, idiosyncratic inc. risk, cyclical income risk, nominal rigidities...
  - Redistribution vs. insurance? Redistribution of financial wealth vs. labor income?

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  - Incomplete markets, heterogeneous productivity, idiosyncratic inc. risk, cyclical income risk, nominal rigidities...
  - Redistribution vs. insurance? Redistribution of financial wealth vs. labor income?

Here: Focus instead on **ex-ante heterogeneity/types.**

- Complete markets, heterogeneous productivity, **shocks to the income distribution,** nominal rigidities...

Werning (2007) + Correia-Nicolini-Teles (2008)

- But, also assume **non-contigent linear taxation.**

Optimal Monetary Policy with Redistribution

Great paper!!!

- **Monetary policy with redistribution**: Focus on ex-ante heterogeneity.

Generally **optimal** to **deviate** from **price stability.**

- High markup in high inequality states.
- Result rooted on failure of Diamond-Mirrlees theorem.
  - Incomplete set of tax instruments – tax rates are non-contingent.

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- Result rooted on failure of Diamond-Mirrlees theorem.
  - Incomplete set of tax instruments – tax rates are non-contingent.

This discussion focuses on:

1. Assumptions on available tax instruments are crucial.
2. Implications of progressive versus linear taxation.

A (very) simplified model: static and aggregate shock $s \in \{1, 2, ..., S\}$

Households: $\max \sum \mu_s \left[u\left(c_{i,s}\right) - v\left(\frac{\ell_{i,s}}{\theta_{i,s}}\right)\right]$ s.to $\sum_s q_s \left\{c_{i,s} - \left(1 - \tau_s^n\right) w_s \ell_{i,s} - T_s\right\} = 0$

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Firms: [Monopoly distortion corrected]

- Flexible price: $p_s^{\text{flex}} = P_s w_s$
- Sticky price: $p^{\text{stick}} = \varepsilon_s P_s w_s = \mathbb{E}\left[\Theta_s P_s w_s\right]$
- Using agg price definition

$$w_s = w\left(\varepsilon_s\right) = \frac{1}{\mathcal{M}\left(\varepsilon_s\right)}$$

[Here: Real wage = inverse markup]

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Monetary policy: $M_s = P_s C_s$

Resource constraint: $C_s = \Delta\left(\varepsilon_s\right) L_s$

- $\Delta\left(\varepsilon_s\right) \leq 1$, maximized at $\varepsilon_s = 1$ and concave.

Equilibrium and implementability conditions

Equilibrium equations:

$$\frac{\mu_s u'(c_{i,s})}{\mu_1 u'(c_{i,1})} = \frac{q_s}{q_1}, \qquad \frac{v'\left(\frac{\ell_{i,s}}{\theta_{i,s}}\right)\frac{1}{\theta_{i,s}}}{u'(c_{i,s})} = (1-\tau_s^n)\, w(\varepsilon_s)$$

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Reduce the number of implementability conditions:

1. Must require $\mu_s u'(c_{i,s}) / \mu_1 u'(c_{i,1})$ be constant across i.
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2. Only one labor tax, so $v'\left(\frac{\ell_{i,s}}{\theta_{i,s}}\right)\frac{1}{\theta_{i,s}} / u'(c_{i,s})$ is constant across i.
    - Utility with constant elasticities: $\ell_{i,s} = \omega_{i,s}^{\ell} L_s$, where $\omega_{i,s} = (\omega_i^c)^{-\frac{\gamma}{\eta}}\, \theta_{i,s}^{\frac{1+\eta}{\eta}} / \sum_i \pi_i (\omega_i^c)^{-\frac{\gamma}{\eta}}\, \theta_{i,s}^{\frac{1+\eta}{\eta}}$

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3. Resource constraints and the following constraints:

$$\sum_s \mu_s \left\{ u'(c_{i,s})\, c_{i,s} - v'\left(\frac{\ell_{i,s}}{\theta_{i,s}}\right)\frac{\ell_{i,s}}{\theta_{i,s}} \right\} = \overline{T}$$

Ramsey optimum

The problem is: $\max_{\{\sum_i \pi_i \omega_i^c = 1\}} \sum_i \lambda_i \sum_s \mu_s \left[u\left(\omega_i^c C_s\right) - v\left(\frac{\omega_{i,s}^\ell L_s}{\theta_{i,s}}\right)\right]$ subject to

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1. $\Delta'\left(\varepsilon_s\right) = 0 \Leftrightarrow \varepsilon_s = 1.$ [Diamond-Mirrlees (1971) prod. efficiency]
   - **Price stability** is optimal $P_s = P$. [Corrreia-Nicolini-Teles (2008)]

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2. Optimal **labor tax**:

$$1 - \tau_s^n = \frac{\sum_i \eta_i^c \left\{\lambda_i + \varphi_i \left(1 - \gamma\right)\right\}}{\sum_i \eta_{i,s}^\ell \left\{\lambda_i + \varphi_i \left\{1 + \eta\right\}\right\}}, \qquad \eta_{i,s}^\ell \equiv \frac{\eta_i^c}{\omega_i^c} \left(\frac{\theta_{i,s}^{\frac{1+\eta}{\eta}} \alpha_i^{-\frac{\gamma}{\eta}}}{\sum_j \pi_j \alpha_j^{-\frac{\gamma}{\eta}} \theta_{j,s}^{\frac{1+\eta}{\eta}}} \right).$$

   - Generally, **failure** of **uniform labor taxation across states** (despite constant elasticities). [Werning (2007)]
   - Ex-ante average tax rate on individual i:

$$\overline{\tau}_i^n \equiv \frac{\sum q_s w_s \ell_{i,s} \tau_s^n}{\sum q_s w_s \ell_{i,s}} = \frac{\sum \frac{q_s w_s L_s}{\sum q_s w_s L_s} \omega_{i,s}^\ell \tau_s^n}{\sum \frac{q_s w_s L_s}{\sum q_s w_s L_s} \omega_{i,s}^\ell} = \overline{\tau}^n + \mathbb{COV}_i \left(\tau_s^n, \frac{\omega_{i,s}^\ell}{\overline{\omega}_i^\ell} \right)$$

So, why deviate from price stability?

Paper: Crucially, assume non-contingent taxes $\tau_s^n = \tau^n$. Additional constraint:

$$\frac{v'\left(\frac{\ell_{i,s}}{\theta_{i,s}}\right)\frac{1}{\theta_{i,s}}}{u'\left(c_{i,s}\right)}\frac{1}{w\left(\varepsilon_s\right)} = \frac{v'\left(\frac{\ell_{i,1}}{\theta_{i,1}}\right)\frac{1}{\theta_{i,1}}}{u'\left(c_{i,1}\right)}\frac{1}{w\left(\varepsilon_1\right)}$$

Proportional income shocks: uniform labor taxation is optimal ⇒ constraint does not bind.

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Shocks to (log-)inc. dispersion: Target **state-contingent markup.**

- **Approx. state-contingent** taxes using ε_s to impose wedge between wage and productivity.
  - How? **Price instability**. So, Diamond-Mirrlees (1971) fails...
- Is it optimal to fully replicate previous? No, because of Tack Yun distortion: $C_s = \Delta\left(\varepsilon_s\right) L_s$.
- **Low real wage** (high markup) in states with **high inequality**.

Which instruments and how?

Avail. Inst.	Labor taxes	Monetary policy	Note
1. $T_{i,s}, \tau^n_{i,s}$	$\tau^n_{i,s} = 0$	Price stability	All redistribution with $T_{i,s}$

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4.	T_s, τ^n_s	$1 - \tau^n_s = \frac{\sum_i \eta^c_i \{\lambda_i + \varphi_i(\mathbf{1}-\gamma)\}}{\sum_i \eta^\ell_{i,s} \{\lambda_i + \varphi_i\{\mathbf{1}+\eta\}\}}$	Price stability	$\tau^n_s \uparrow$ in high inequality states Approx 3.: $\overline{\tau}^n_i = \overline{\tau}^n + \mathbb{COV}_i\left(\tau^n_s, \frac{\omega^\ell_{i,s}}{\overline{\alpha}^\ell_i}\right)$ Prop. shocks: $\overline{\tau}^n_i = \overline{\tau}^n$ always!

Proportional shocks: cannot change ex-ante avg. tax rates.

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5.	T_s, τ^n	...	State-cont. markup	$\mathcal{M}(\varepsilon_s) \uparrow$ with $\uparrow$inequality states Unless proportional shocks Approximate 4.

Progressive taxation

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Simple changes to the Ramsey problem:

$$\max \sum_i \lambda_i \sum_s \mu_s \left[u\left(\omega_i^c C_s\right) - v\left(\frac{\omega_{i,s}^{\ell} L_s}{\theta_{i,s}}\right)\right]$$

subject to

$$\sum_s \mu_s \left\{u'\left(\omega_i^c C_s\right)\omega_i^c C_s - \frac{1}{1-p} v'\left(\frac{\omega_{i,s}^{\ell}}{\theta_{i,s}} L_s\right)\frac{\omega_{i,s}^{\ell}}{\theta_{i,s}} L_s\right\} = \overline{T}, \qquad C_s = \Delta\left(\varepsilon_s\right) L_s$$

where $\omega_{i,s}^{\ell}$ is also affected by p...

Progressive taxation

Price stability still optimal. Optimal tax level:

$$1-\tau_s = \frac{\sum_i \eta_i^c \left\{\lambda_i + \varphi_i \left(1-\gamma\right)\right\}}{\sum_i \eta_{i,s}^{\ell} \left\{\lambda_i + \varphi_i \frac{1+\eta}{1-p}\right\}} L_s^p, \qquad \eta_{i,s}^{\ell} \equiv \frac{\eta_i^c}{\omega_i^c} \left(\frac{\theta_{i,s}^{\frac{1+\eta}{\eta+p}} \left(\omega_i^c\right)^{-\frac{\gamma}{\eta+p}}}{\sum_j \pi_j \left(\omega_j^c\right)^{-\frac{\gamma}{\eta+p}} \theta_{j,s}^{\frac{1+\eta}{\eta+p}}} \right)^{1-p}$$

1. Progressivity ($p > 0$): decreases the concern with shocks to $\theta_{i,s}$.
2. **New**: $1-\tau_s$ also depends on aggregate labor L_s.
   - Lower taxes ($\tau_s \downarrow$) in states with high labor L_s.

$\Rightarrow$ Proportional income shocks are no longer sufficient for $\tau_s = \tau$!

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Q1: Optimal monetary policy when τ_s is constrained?

Q2: What if we allow even more freedom in designing labor income taxes?

Conclusions

Great paper!!!

- **Monetary policy with redistribution**: Focus on ex-ante heterogeneity.

Generally **optimal** to **deviate** from **price stability.**

- High markup (low real wage) in high inequality states.
- Result rooted on failure of Diamond-Mirrlees theorem.
  - Incomplete set of tax instruments – tax rates are non-contingent.
  - Also, failure of uniform labor taxation due to shocks to relative productivities.

This discussion focused on:

1. Assumptions on available tax instruments are crucial.
2. Implications of progressive versus linear taxation.