Transfers vs Credit Policy: Macro Policy Trade-offs during Covid-19

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Policy Discussions

Health Policy + Self Protection $\Longrightarrow$ Suppression of Sectors

- ⋆ Sectoral impact of policy responses
  - (i) Supply restrictions on social prone production
  - (ii) Demand restrictions on social prone production
- ⋆ Through demand, effects can spill-over to other sectors
  - Reallocation shock
  - Aggregate demand shock

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Policy Tradeoffs $\Longrightarrow$ Widely Used Policy Mix

- ⋆ Aggregate Demand Externalities:
  - clear goals but, issue is implementation
- ⋆ Lump-sum transfers
- ⋆ Credit Stimulus
- ⋆ Unemployment Insurance

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Framing of Analysis $\Longrightarrow$ Same Gov Budget

- ⋆ Where more bang for buck?
- ⋆ Speed?

Things Inside the Talk

Focus on Household Side Policies

Key Features of Model

- ⋆ Continuous time, two production sectors
- ⋆ Demographics
  - (i) Banks, households, and consolidated government
- ⋆ One-time shock (unexpected but anticipated)
  - (i) Asymmetric demand shock: Covid-19
  - (ii) Policy responses
- ⋆ Aggregate demand externalities
  - (i) Nominal rigidity
  - (ii) Uninsured employment risk

Illustrate with numerical examples

Main Takeaway

Answer depends on extent of financial depth

(i) Credit policy: greater kick, the wider credit limits

(ii) Transfer policy and UI: greater kick, the narrower credit limits

	Natural Borrowing Limit	Zero Borrowing Limit
Credit Policy	✓	✗
Transfer Policy	✗	✓
UI	✗	✓

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	Natural Borrowing Limit	Zero Borrowing Limit
Credit Policy	✓	✗
Transfer Policy	✗	✓
UI	✗	✓

- Intuition: goal is to target policy to highest MPC
  - transfers: not targeted
  - UI: targets unemployed, but not necessarily the poor
  - Credit policy limited by financial depth

Related Literature

Macroeconomic implications of COVID-19

- Alvarez et al (2020), Atkeson (2020), Berger et al (2020), Bethune and Korinek (2020), Bognanni et al (2020), Bonadio et al (2020), Brotherhood et al (2021), Buera et al (2020), Caballero and Simsek (2020), Chari et al (2020), Eichenbaum et al (2020), Fajgelbaum et al (2020), Farboodi et al (2020), Glover et al (2020), Guerrieri et al (2020, 2021), Jones et al (2020), Kaplan et al (2020), Kruger et al (2020), Moser and Yared (2020), ...

Heterogeneous-agent New-Keynesian models

- Alves et al (2020), Auclert (2019), Auclert et al (2018), Auclert et al (2020), Beraja et al (2019), Berger et al (2019), Bigio and Sannikov (2021), Bilbiie (2008), Bilbiie (2020), Broer et al (2020), Doepke and Schneider (2006), Farhi and Werning (2019), Gali (2015), Greenwald (2018), Hagedorn et al (2019), Kaplan et al (2018), McKay et al (2016), Werning (2015), Wong (2019), ...

Outline for section 2

HOUSEHOLDS

Two goods:

- akin to Guerrieri et al. (2020)
- c_t^r remotely consumed/produced
- c_t^s socially consumed/produced

Preferences ($1/\gamma$ is IES)

$$\mathbb{E}\left[\int_0^\infty e^{-\rho t}\left(x_t^{1-\gamma}-1\right)/\left(1-\gamma\right)dt\right],$$

w/ bundle

$$x_t=\left(\alpha^{1/\epsilon}c_t^{r\,1-1/\epsilon}+\left(\left(1-\alpha\right)\beta_t\right)^{1/\epsilon}c_t^{s\,1-1/\epsilon}\right)^{\epsilon/(\epsilon-1)}.$$

ASYMMETRIC DEMAND SHOCK

β_t: lockdown policy or fear of pandemic

(i) produces endogenous discount shock

$$\mathbb{E}\left[\int_0^\infty e^{-\rho t - \xi_t} U(c_t)\, dt\right],$$

$$\text{where } \xi_t = -\frac{1-\gamma}{\epsilon - 1} \ln\left[(1-\alpha)\beta_t + \alpha\right]$$

Condition $(1-\gamma)/(\epsilon-1) > 0$ guarantees $\frac{\partial \xi_t}{\partial \beta_t} < 0$

(ii) reallocation shock

$$c_t^r = \frac{\alpha}{(1-\alpha)\beta_t + \alpha} c_t$$

$$c_t^s = \frac{(1-\alpha)\beta_t}{(1-\alpha)\beta_t + \alpha} c_t$$

Production and Employment Dynamics

Production linear in aggregate employment: $c_t^r + c_t^s = 1 - U_t$

- perfect labor reallocation

Employed e_t and unemployed u_t

- uninsurable idiosyncratic risk $z \in \{u, e\}$

Transition probabilities

$$\Gamma_t^{eu} = \nu^{eu} + \phi_t^+ \text{ and } \Gamma_t^{ue} = \nu^{ue} - \phi_t^-,$$

- Natural rates $\{\nu^{ue}, \nu^{eu}\}$, endogenous adjustment rate ϕ

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Real income :

$$dw_t = y_t(z)\,dt + T_t dt,$$

- lump-sum transfers T_t
- labor income $y_t(z)$
- $y_t(e) = (1 - \tau^l)$ and $y_t(u) = b_t$, is time varying unemployment insurance

Savings and Credit Policy

The law of motion for real wealth s follows

$$ds_t = \left(r_t a - r_t^l l - c_t\right) dt + dw_t,$$

Borrowing limit: $s_t \geq \bar{s}, \bar{s} \leq 0$.

Spread $\sigma_t > 0$ is the credit policy instrument (loan subsidy):

$$r_t^l = r_t + \kappa - \sigma_t.$$

- Banks are competitive with free entry.
- In Bianchi-Bigio and Bigio-Sannikov: open-market operations controls spread
  - take implementation as given

Household Problem

H-HJB

Household Problem is:

$$\rho V(z,s,t) = \max_{\{c\}} e^{-\xi_t} U(c) + \underbrace{V'(z,s,t)}_{\text{prec. demand}} [r_t(s)\, s - c + y(z) + T_t]$$
$$+\Gamma_t^{zz'} \underbrace{[V(z',s,t) - V(z,s,t)]}_{\text{employment risk}} + \dot{V}(z,s,t).$$

subject to $s \geq \bar{s}$.

Evolution of Wealth

Real Wealth KFE

$$\partial_t f_t(e,s) = -\partial_s\left[\mu_t(e,s) f_t(s)\right] - \left[\nu^{eu} + (\phi_t)^+\right] f_t(e,s) + \left[\nu^{ue} - (\phi_t)^-\right] f_t(u,s),$$

$$\partial_t f_t(u,s) = -\partial_s\left[\mu_t(e,s) f_t(s)\right] - \left[\nu^{ue} - (\phi_t)^-\right] f_t(u,s) + \left[\nu^{eu} + (\phi_t)^+\right] f_t(e,s),$$

Aggregate Demand Block

Phillips curve

$$\dot{\pi}_t = \rho\left(\pi_t - \pi_{ss}\right) - \kappa\left(U_{ss} - U_t\right),$$

"Modified Keynsian" block of Bigio-Sannikov (ϕ_t ensures clearing):

$$\dot{U}_t = \left[\nu^{eu} + \phi_t^+\right](1 - U_t) - \left[\nu^{ue} - \phi_t^-\right] U_t.$$

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Taylor rule

$$i_t^m = i_{ss}^m + \eta \cdot \left(\pi_t - \pi_{ss}\right)$$

Banks + Consolidated Government

Banks: issue deposits A_t^b and hold loans L_t^b + reserves

- role: passthrough entity

Consolidated Government:

- policies: UI, transfers, credit policy, Taylor rule (background)
- financed by purchasing loans + issuing gov debt
- implement via open market operations, debt issuance, et al
- alternative saving and borrowing instruments to households

Consolidated Gov Budget:

$$\underbrace{\dot{\mathcal{E}}_t}_{\text{gov real NAP}} = r_t \mathcal{E}_t + \underbrace{\left(\tau^l \left(1 - U_t\right) - b_t U_t\right)}_{\text{UI}} - \underbrace{\sigma_t \int_0^{\bar{s}} s \left[f_t\left(u, s\right) + f_t\left(e, s\right)\right] ds}_{\text{credit subsidy}} \underbrace{-T_t}_{\text{transfer}}.$$

$\mathcal{E}_t$ real net asset position (NAP)

- Net surplus/deficit of consolidated gov

Market Clearing

Financial market:

$$\underbrace{-\int_{\bar{s}}^{0} s\left[f_t(e,s)+f_t(u,s)\right]ds}_{\text{real loans}} = \underbrace{\mathcal{E}_t}_{\text{gov real NAP}} + \underbrace{\int_{0}^{\infty} s\left[f_t(e,s)+f_t(u,s)\right]ds}_{\text{real deposits}}$$

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Goods and labor:

$$1-U_t \equiv Y_t = C_t \equiv \int_{\bar{s}}^{\infty}\left[\sum_{z\in\{u,e\}} c_t^r(z,s) f(z,s,t) + c_t^s(e,s) f(e,s,t)\right] ds,$$

Outline for section 3

Conjectured: Ricardian Proposition

Conditions for "Ricardian Equivalence"

Suppose $\sigma_t \equiv 0$ and natural borrowing limit $\bar{s}$, let transfers and UI serve as collateral:

$$s_t^{(a)} = s_t + h_t$$

$$\bar{s}_t^{(a)} = \bar{s} + h_t$$

and

$$h(t) \equiv \int_t^{\infty} \exp\left(-\int_t^{\nu} r_z dz\right)\left[T_\nu - \tau^l(1-U_\nu) + b_\nu U_\nu\right] d\nu = \mathcal{E}_t.$$

Then, $\{T_t, \mathcal{E}_t\}$ satisfies Ricardian Equivalence.

No Impact of Credit Policy

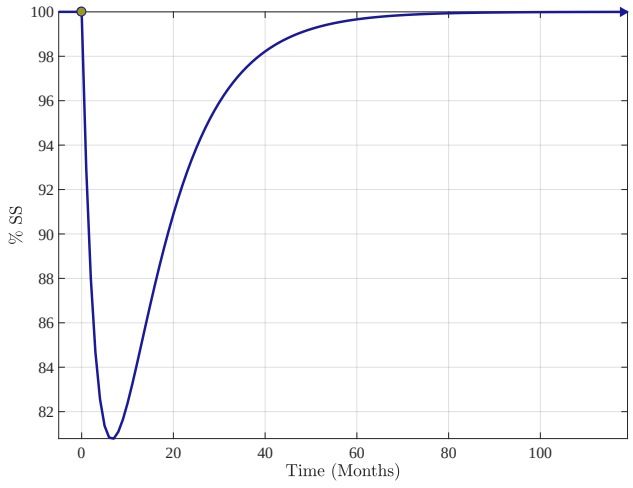
Let $\bar{s} = 0$ then credit policy has no impact.

Outline for section 4

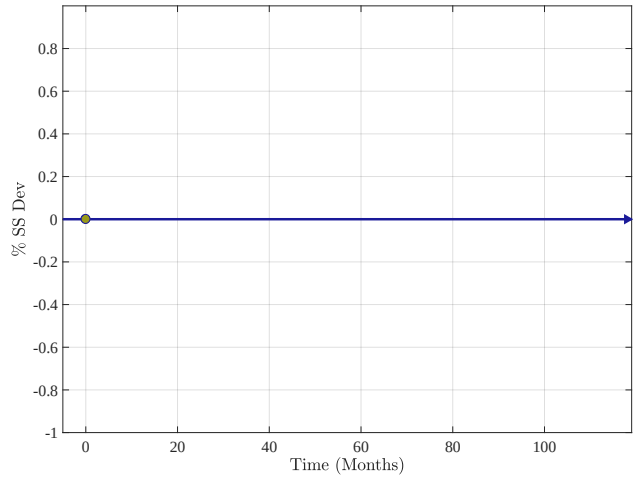
Flexible Prices

(Neutral Benchmark)

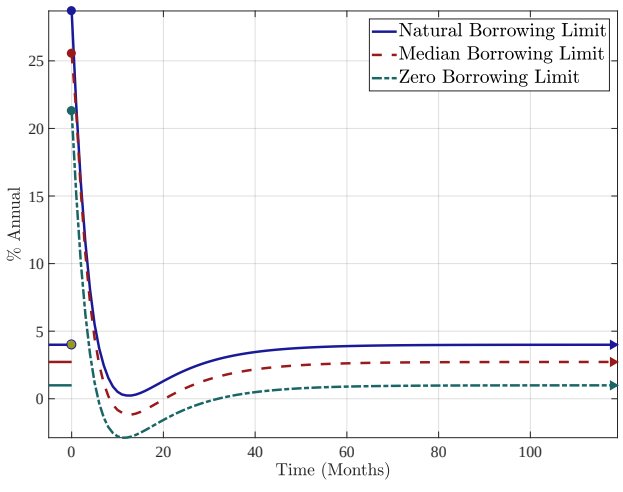
Flexible Prices - Sectoral Reallocation



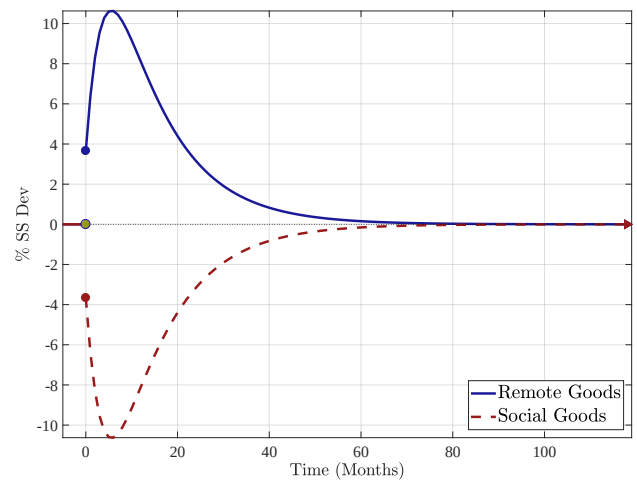
(1) Shock $\beta\ (t)$



(2) Output Y_t



(3) Real Rates

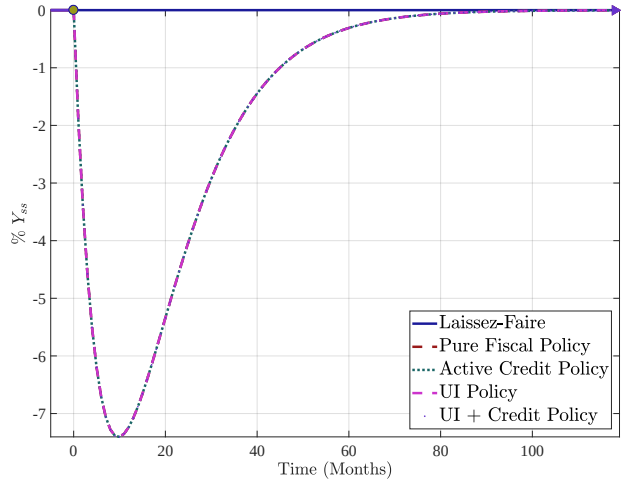


(4) Consumption C_t^r and C_t^s

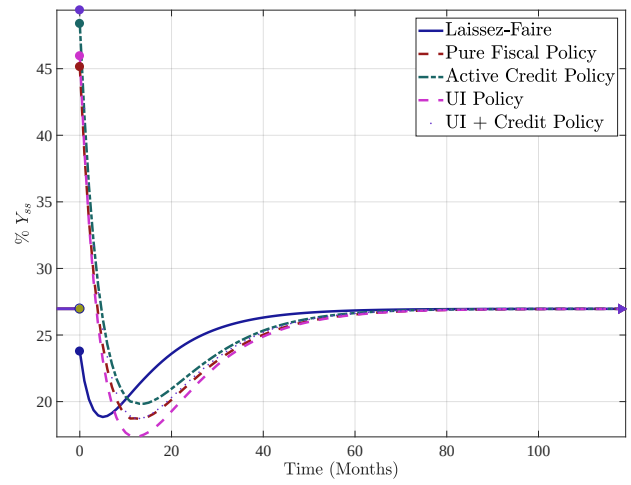
Wage Rigidity

(Policy Effects)

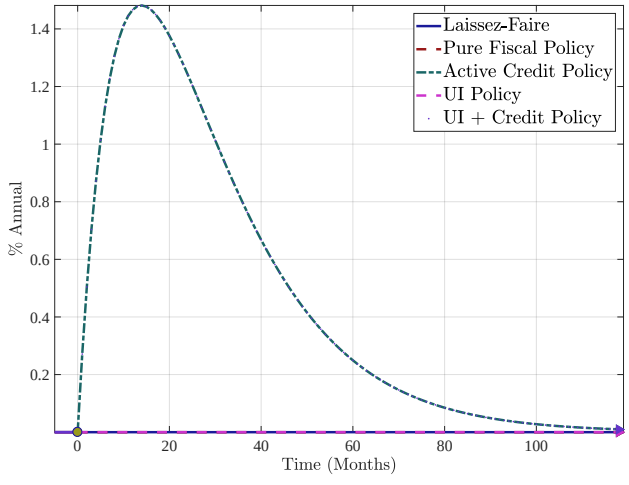
Four Policies



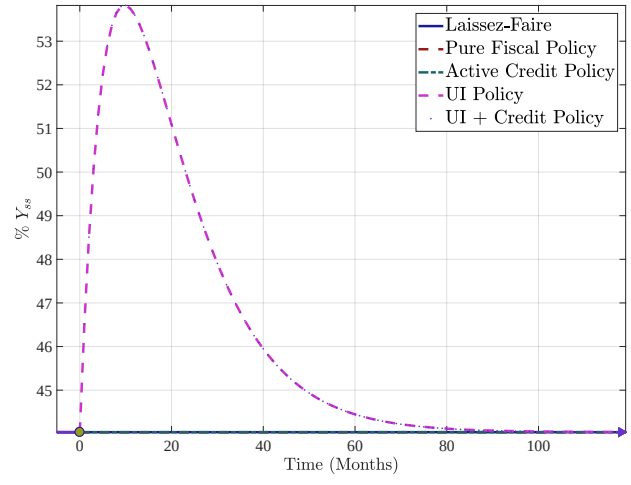
(1) Gov Net Asset Position $\mathcal{E}_t$



(2) Transfer T_t

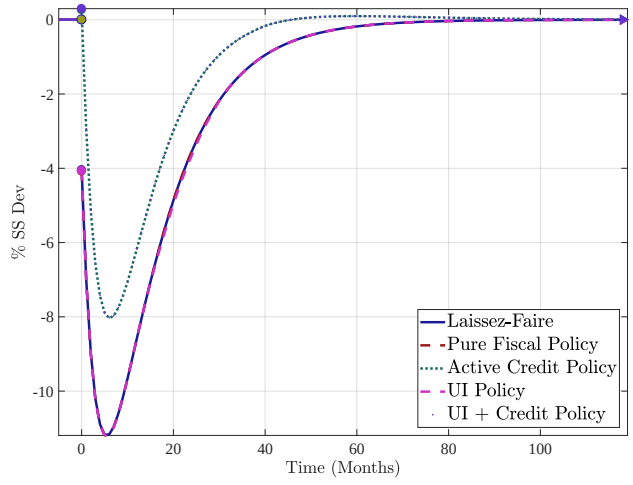


(3) Credit Subsidy σ_t



(4) Unemployment Insurance b_t

Natural Debt Limit



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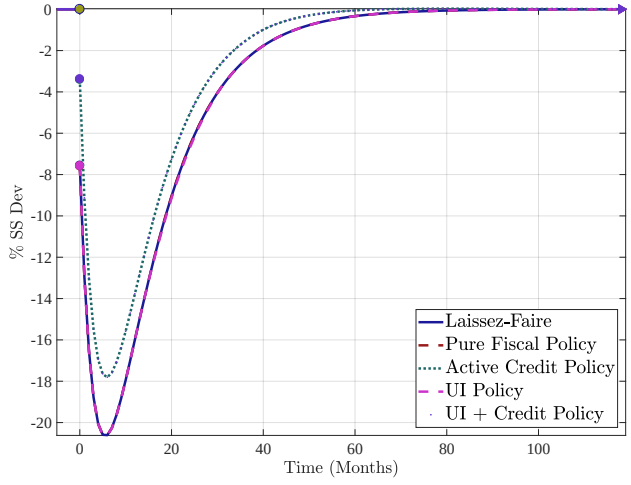
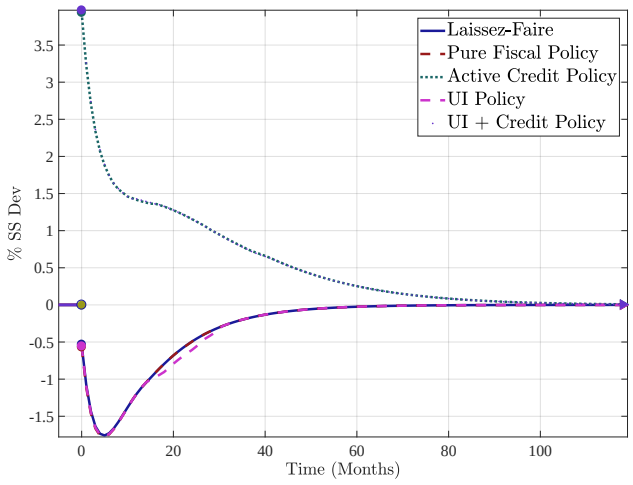
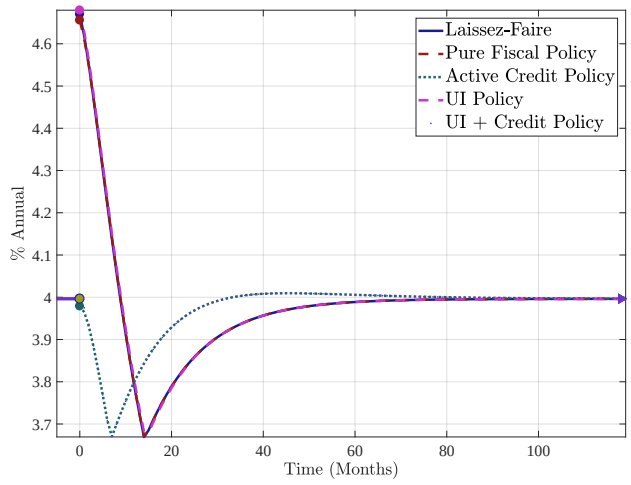


(2) Social Goods C_t^s

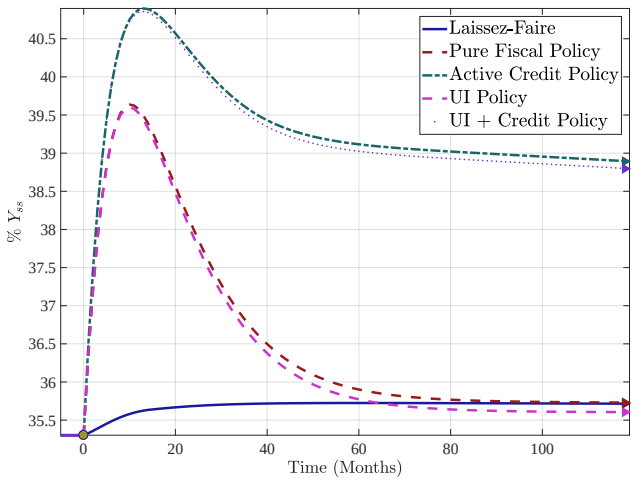


(3) Remote Goods C_t^r

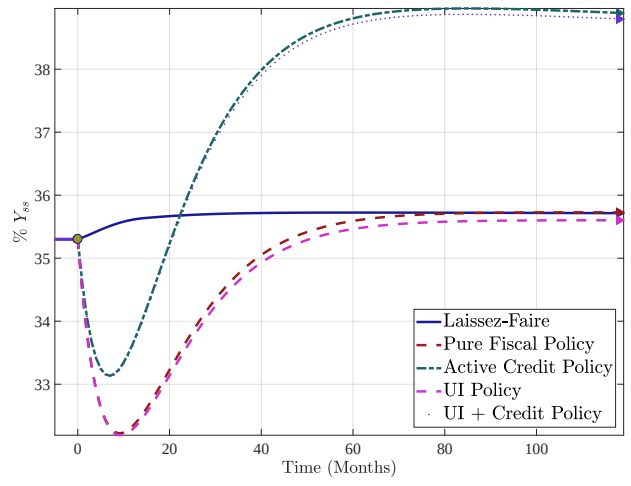


(4) Real Deposit Rate

Natural Debt Limit - Credit Variables

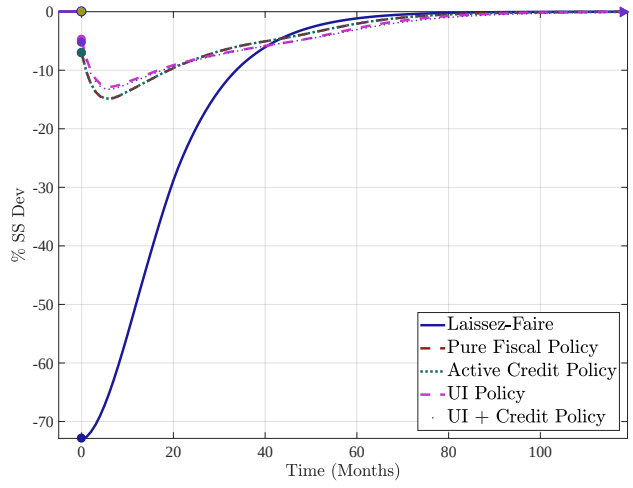


(1) Bank Deposits A_t



(2) Bank Loans L_t

Zero Debt Limit



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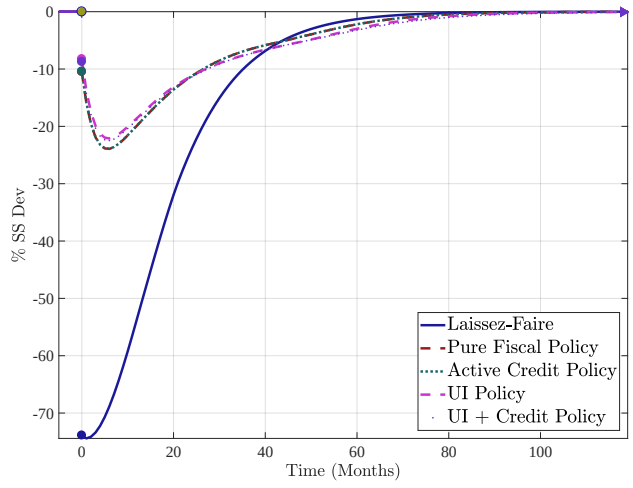
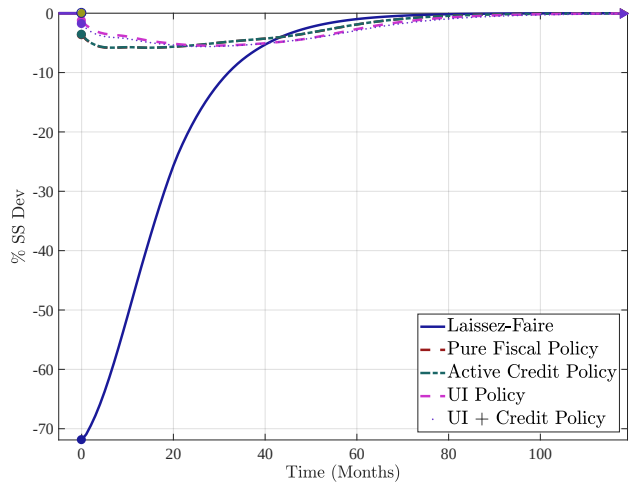
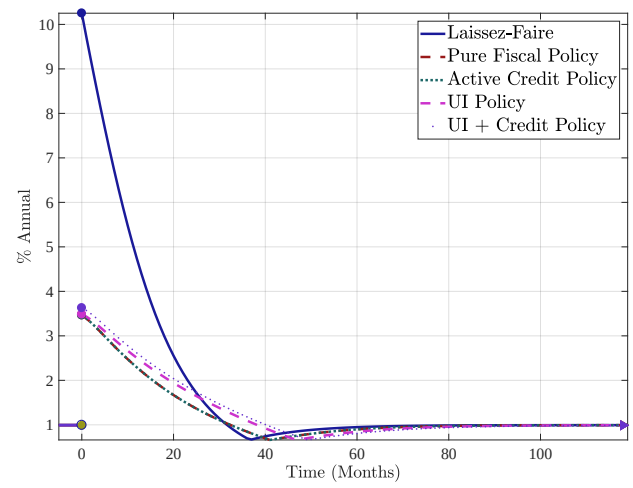


(2) Social Goods C_t^s



(3) Remote Goods C_t^r



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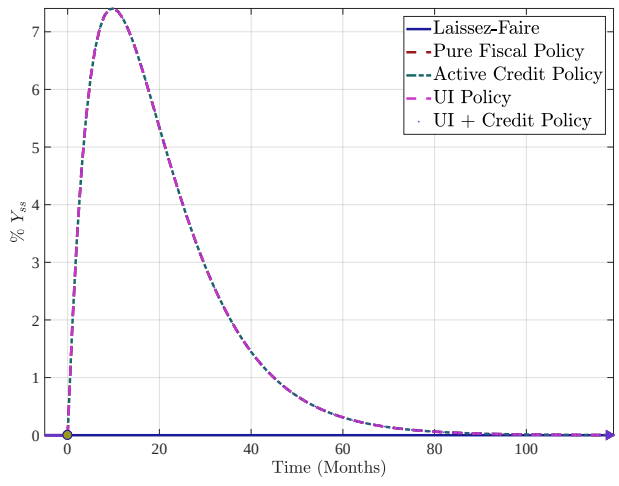

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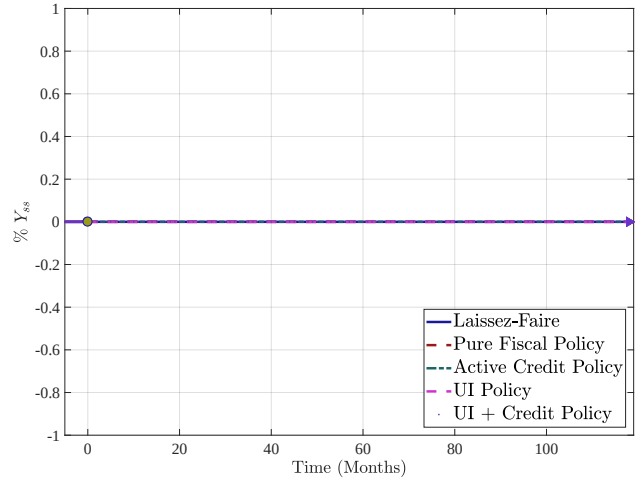

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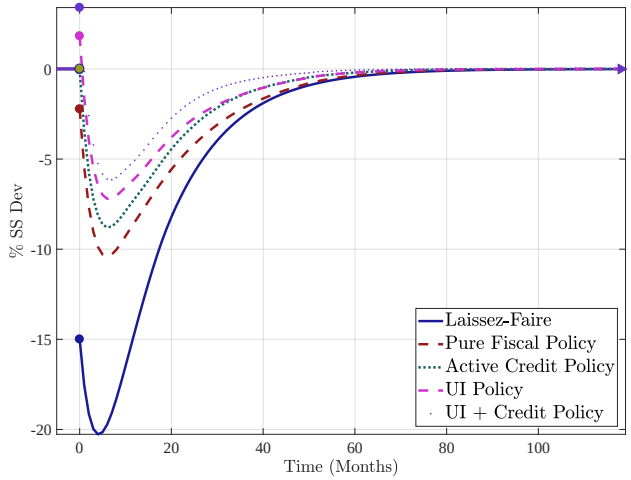
Moderate Debt Limit



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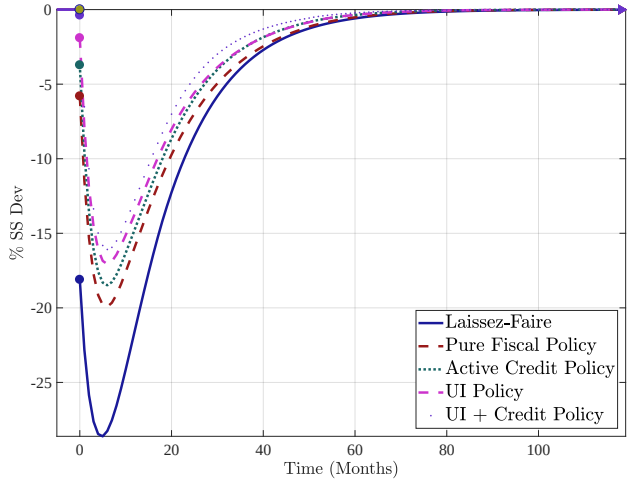

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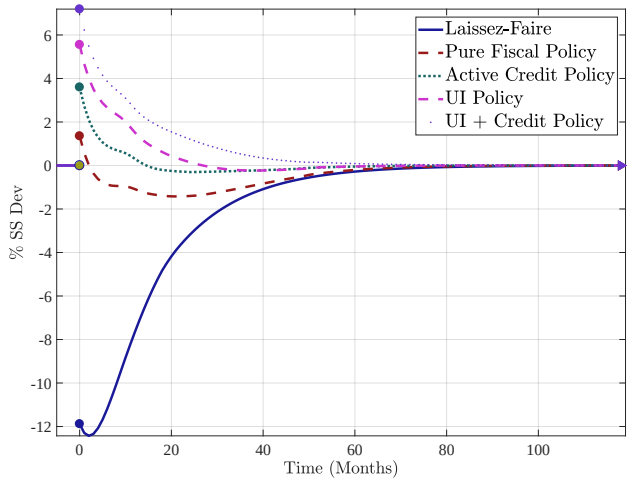

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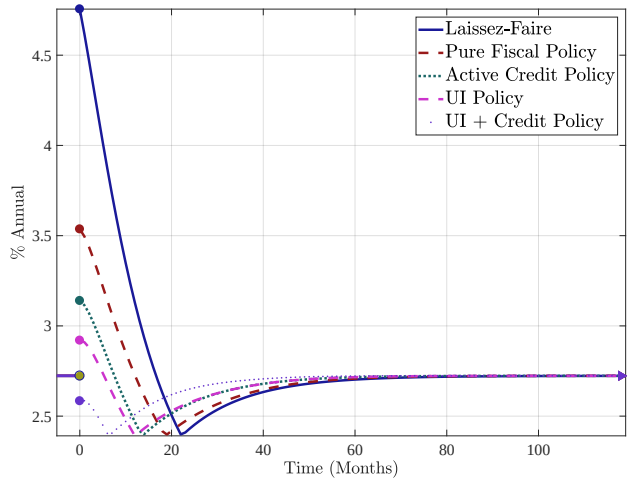
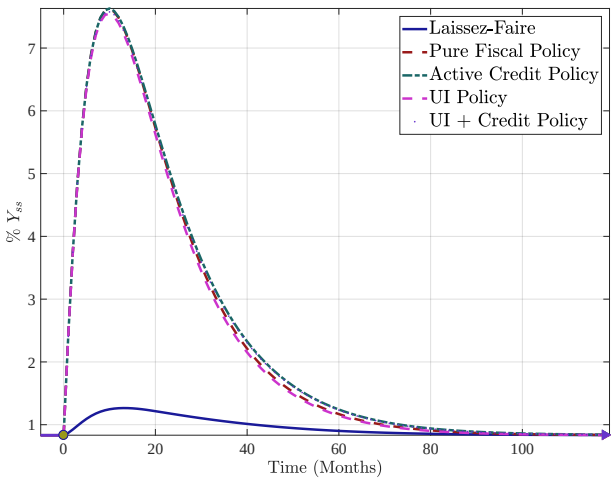


(4) Real Deposit Rate

Figure: Nominal Rigidity and Policies: Real Variables

Moderate Debt Limit



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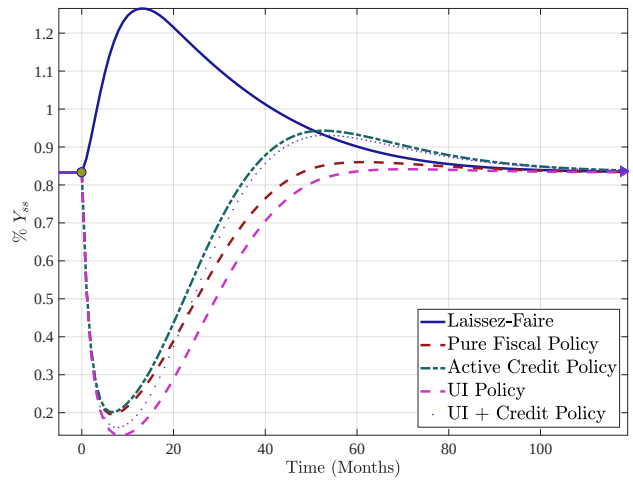

(2) Bank Loans L_t

Final Remarks

The best use of the mix between transfers, credit policy and UI depends on the borrowing limit.

Works in progress

- frictional reallocation of labor across sectors
    - relative price effect
- optimal policy combination

Thank you!