Fiscal Management of Aggregate Demand: Using New Fiscal Instruments

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- Design of counter-cyclical policies
  - Monetary policy: short-term nominal interest rate
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- A policy-driven approach
  - Quantitative HANK model
  - Effectiveness of various fiscal stabilization packages after a negative demand shock

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- Standard HANK model with three additional components
  - Heterogeneous stochastic discount factors $\rightarrow$ heterogeneous mpc
  - An extensive labor supply margin $\rightarrow$ heterogeneous labor elasticities
  - Unemployment risk of heterogeneous incidence & varying with the cycle

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$\Rightarrow$ Relevant framework to quantify fiscal stabilization packages

- Demand-driven recession
  - Negative shock to marginal utility: unexpected, deterministic, transitory

Fiscal Stabilization Packages

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- Robustness and implementability
  - Comparison to Government Spending **(G)** Package and Consumption Tax Cut **(G)** Package

Literature

- Effects of monetary policy and government spending in HANK models

  Kaplan, Moll, and Violante (2018), Hagedorn, Manovskii, and Mitman (2019), Bilbiie (2020), Auclert, Rognlie, and Straub (2023), Ferriere and Navarro (2024), Alves and Violante (2023)

- Quantitative effects of UI extensions in recessions

  Mitman and Rabinovich (2015), Kekre (2022), Gorn and Trigari (2024), Bardoczy and Guerreiro (2023)

- Optimal fiscal and monetary policy in HANK

  Bhandari, Evans, Golosov, and Sargent (2021), Le Grand and Ragot (2024), McKay and Wolf (2023)

- Stabilization and labor taxes in HANK

  Broer, Druedahl, Harmenberg, and Oberg (2025), Le Grand, Ragot and Bourany (2025)

Environment

A HANK model with some twists

- Households
  - Bond economy with borrowing constraint
  - Stochastic discount factors
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  - Bond economy with borrowing constraint
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- NK block with sticky prices
  - Linear technology in labor
  - Monetary authority implements a standard Taylor rule
- Government
  - Finances spending, transfers, and UI benefits with debt, labor taxes, and capital taxes

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  - AR(1) process for discount factor, productivity and employment status

  - Flat capital tax τ^k, progressive loglinear labor tax (λ_t, τ^ℓ)

    Heathcote, Storesletten, and Violante (2017)

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    + χ to capture household labor income received while in unemployment

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- Monetary authority follows a Taylor rule: $1 + i_t = (1 + \bar{i}) \left(\frac{\Pi_t}{\bar{\Pi}}\right)^{\phi_\Pi}$
- Fiscal authority faces a standard borrowing constraint

$$G_t + (1 + r_t)D_t + T_t + \int \mathcal{B}_t(w_t x)d\mu_t = D_{t+1} + \int \mathcal{T}_t(y_t^\ell, y_t^k)d\mu_t$$

Fiscal rule

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- Fiscal rule with parameter Φ_D for public debt, λ_t clears the budget constraint
  Uhlig (2010)
  - $\Phi_D = 0$ for constant debt, all adjustment in tax level
  - $\Phi_D \to 1$ for constant taxes, all adjustment in debt

Fiscal rule

Calibration

Calibration Overview

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- Technology: $\varepsilon = 7$, $\Theta = 200 \rightsquigarrow$ Phillips curve slope $\varepsilon/\Theta = 0.035$
  Galí and Gertler (1999)
- Government
  - Standard calibration for taxes and unemployment benefits
  - Automatic responses of inflation and debt: $\Phi_\Pi = 1.5$, $\Phi_D = 0.75$

Unemployment Steady State and Business Cycles

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  - Average unemployment rate at 4.3%

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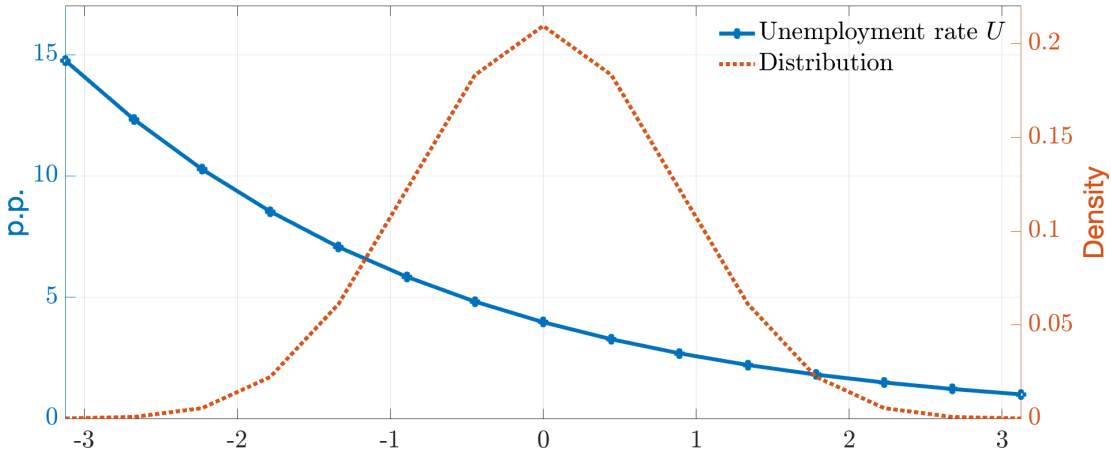
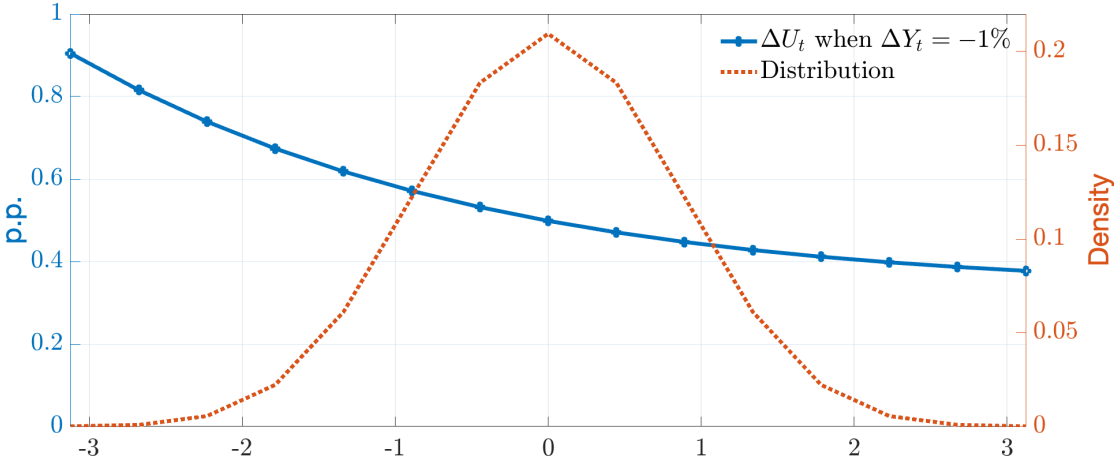
- Okun's law: Okun coefficient $c_{OK} = 0.5$
  Ball, Leigh, and Loungani (2017)
  - Job finding rates decrease (a lot) equally across households
  - Job separation rates decrease (a bit), higher elasticity for high-x households
    + Functional forms: additive fall in separation rates in recession delivers the pattern

Steady State Unemployment in the Distribution



Unemployment and the Business Cycle Okun's law



Investigating the Calibration **Household responses**

- Marginal propensities to consume (mpc) Parker, Souleles, Johnson, and McClelland (2013), Kaplan and Violante (2014), ...
  - Compute mpc out of a $500 rebate: average quarterly mpc at 0.13
  - Decline with wealth: from 0.20 to 0.03 from 1st to 4th wealth quartile
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- Labor elasticities decline with income
  Triest (1990), Eissa and Liebman (1996), Kleven and Kreiner (2006), Meghir and Phillips (2010), ...
  - Compute labor responses to a 1% change in after-tax rate: average annual elasticity at 0.30 Erosa, Fuster, and Kambourov (2016)

Income quartile	1	2	3	4
Labor elasticity	0.44	0.34	0.25	0.22

mpc Micro labor elasticity

Investigating the Calibration Tax shocks

- Further investigate aggregate effects of tax shocks
- Compute tax multipliers as in Mertens and Ravn (2013)
  - Tax multiplier at about ≈ 0.7 in the model, vs. ≈ 2 in the data
- Replicate a tax shock on bottom-90 vs. top-10 as in Zidar (2019)
  - Tax cut on bottom-90 increases employment by 1% in the model vs. above 3% in the data
  - Tax cut on the top-10 has no effects

$\Rightarrow$ Conservative calibration regarding tax responses

Recession

Benchmark No Fiscal Stabilization

- Recession induced by a negative demand shock: $(1-\omega_t)u(c_t, n_t)$
  - ω_0 such that $\Delta Y_t = -0.1\%$ on impact
  - Reverts to $\omega = 0$ with persistence $\rho_\omega = 0.75$ at the quarterly level
- Unexpected, transitory, perfect foresight: a 'MIT' shock

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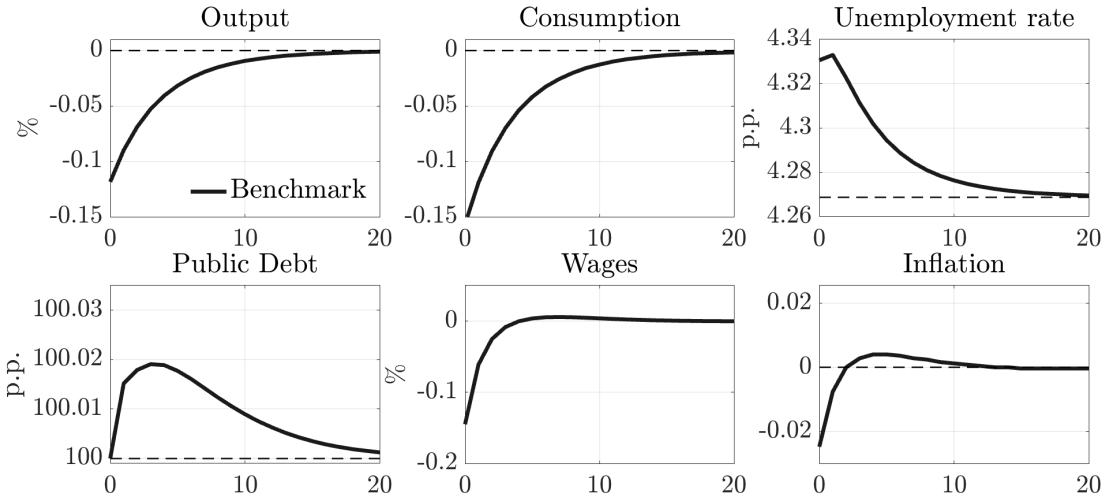

Three Fiscal Stabilization Packages TT Package

- A Targeted Transfer **(TT)** Package
  - Design to mimic checks sent in 2008: For all low-income households, based on last-year income
  - An "automatic stabilizer" flavor: Phase out over time with persistence ρ_ω

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  - Calibration such that *total cost* equals a one-time check of $\$200$ to all households
    + Initial check at $y=0$ is $m_0 = \$900$
    + Quick phase-out at $\chi = 12$: only 20% households receive more than $\$50$ at $t=0$

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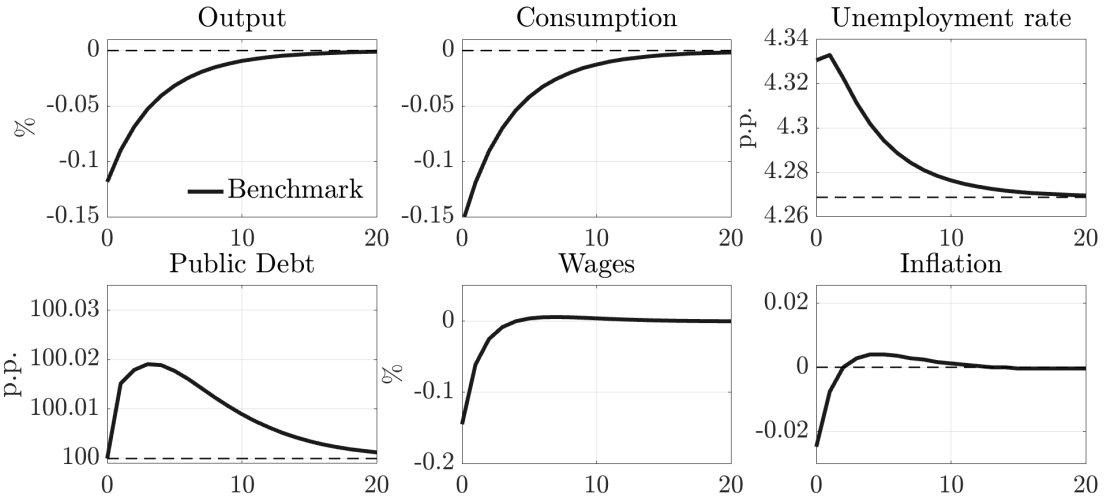
  - Calibration such that equals a one-time lump-sum check of $\$200$
    - + Initial maximum check of $\$800$, slower phase-out at $\chi = 6$

Stabilization Packages Impulse Response Functions



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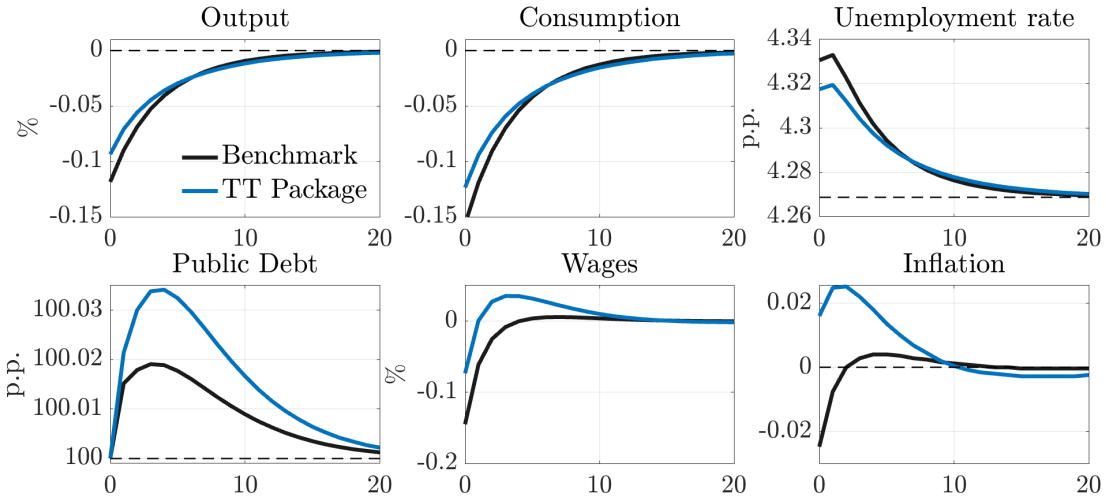

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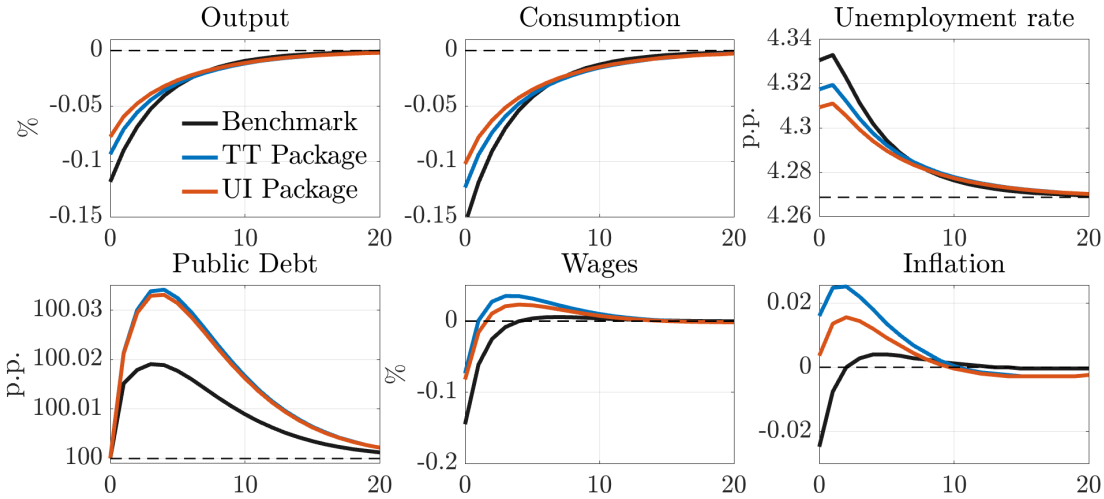

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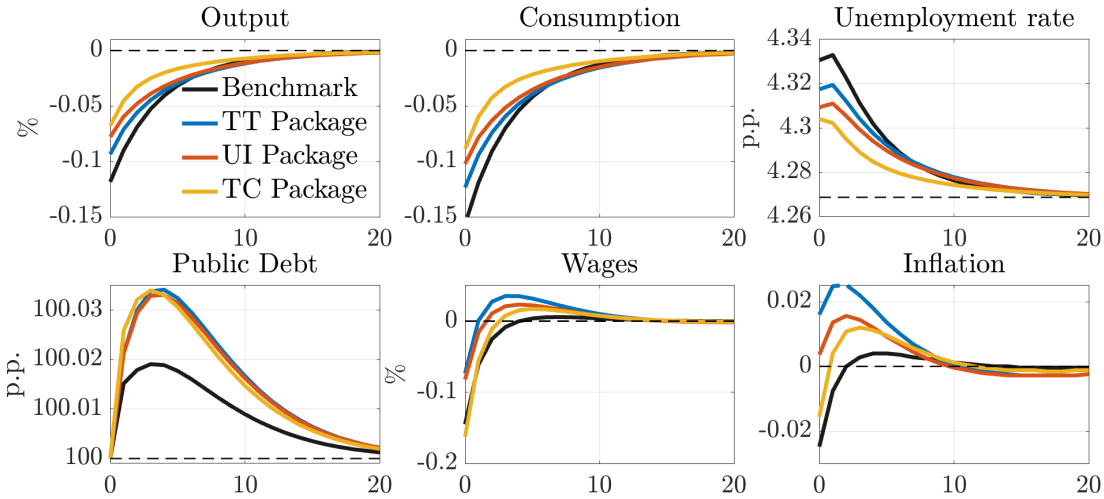
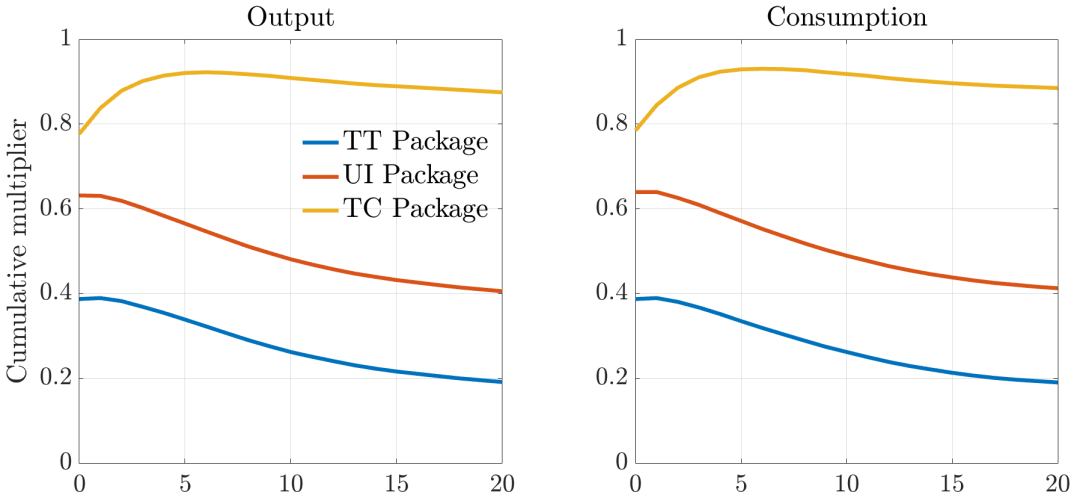


Stabilization Packages Multipliers



Stabilization Packages Decomposition

- Decomposition between *consumption channel* and *labor channel*

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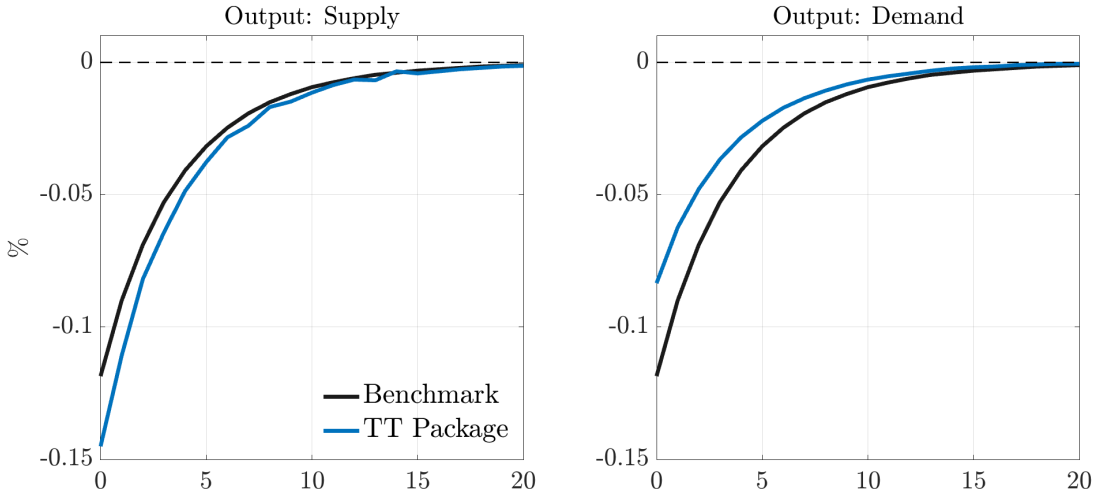
- Decomposition between *consumption channel* and *labor channel*
  - Use equilibrium prices and taxes and unemployment risk of the no-stabilization benchmark

$$\{r_t^b, w_t^b, \lambda_t^b, \pi_{\eta,t}^b, d_t^b\}$$

  - Compute for each package TT, UI, TC
    - + Supply output $Y_t^s = L_t$ using households' labor supply policy
    - + Demand output $Y_t^d = C_t + \Theta_t + G_t + f$ using households' consumption policy

Three Fiscal Stabilization Packages Decomposition



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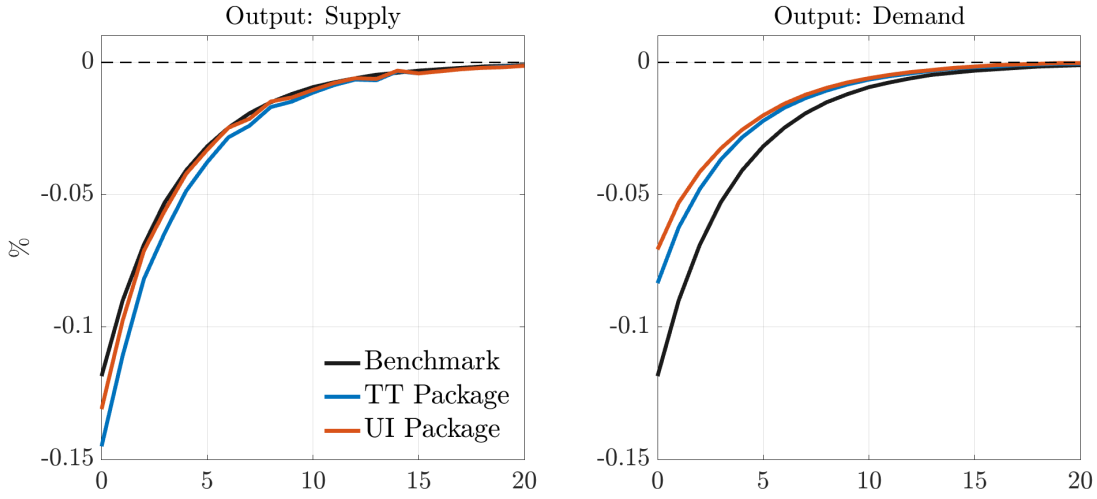

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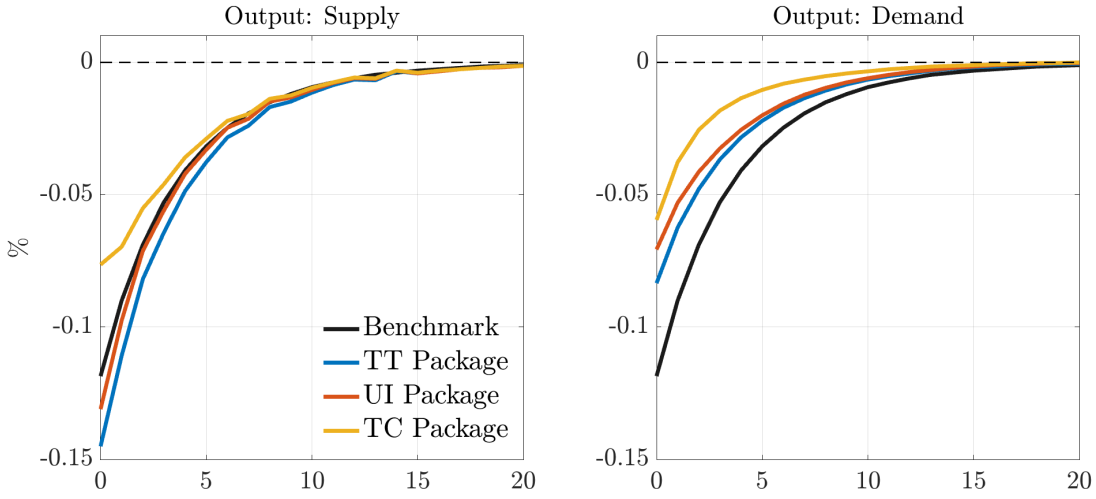

Taking Stock

- Temporary tax credits are an effective fiscal stimulus
  - Implement labor tax cuts targeted to low-income workers
- Caveats on the quantification of the UI package
  - Do not internalize the negative incentive effects on job search [overestimate]
  - Abstracts from heterogeneity between recipients and non-recipients [underestimate]

Investigating the Results

1. Role of public debt
2. Distributional effects across packages
3. Implementability
4. (Alternative rules for monetary policy)
5. (Deeper recessions)
6. (Steeper elasticities)

1. Role of Public Debt

- Compute benchmark and stabilization output paths with constant debt $\Phi_D = 0$

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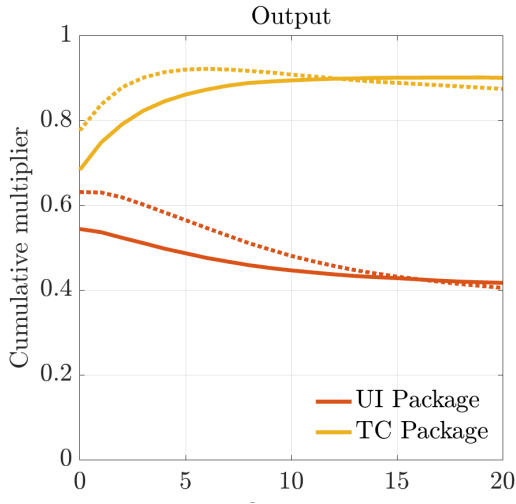

1. Role of Public Debt

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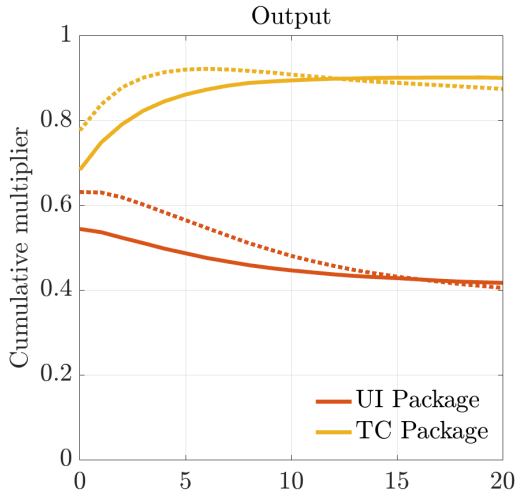
- TC Package No Debt $\equiv$ temporary shock in labor tax progressivity

  $\Rightarrow$ Stabilizes the economy



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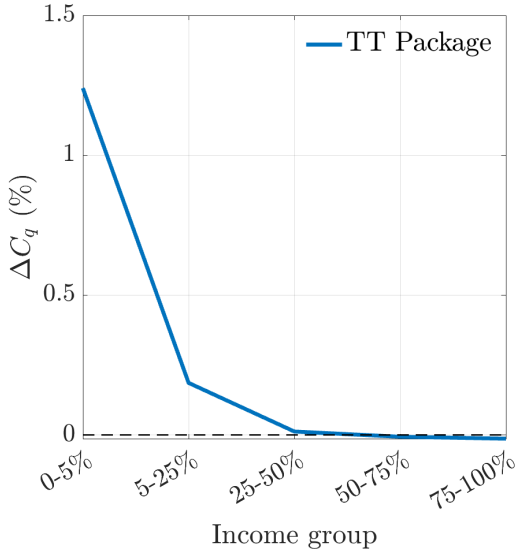

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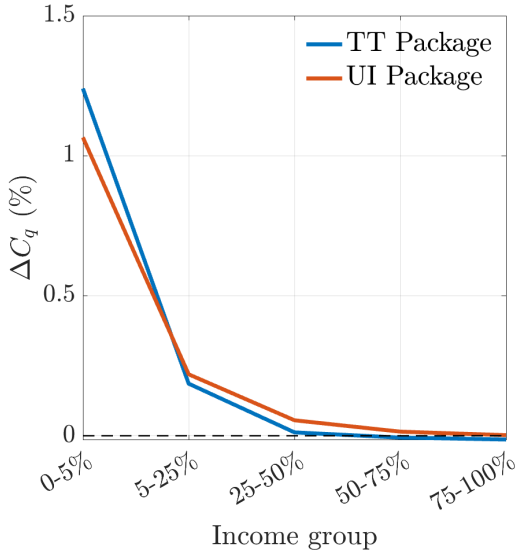

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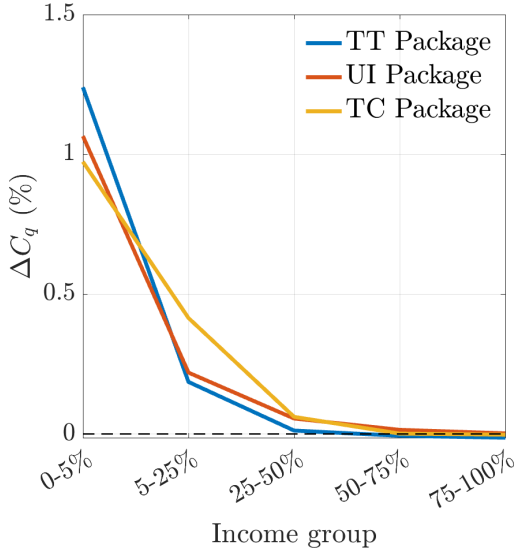

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- Systematic fluctuations in payroll taxes could implement the TC package
  - Easy to implement, would appear on the paycheck of workers every month

Spending, Checks, and Consumption Taxes

Further Fiscal Packages G and T packages

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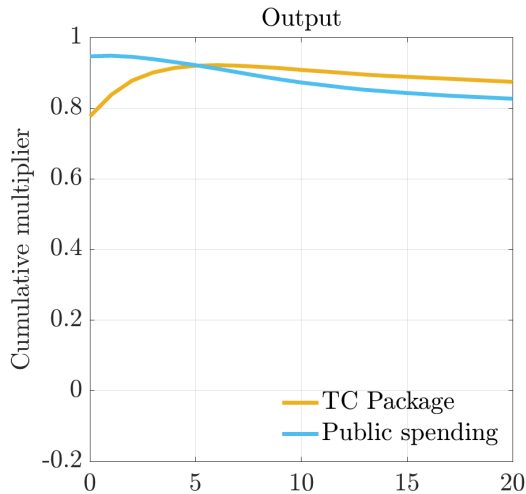
– Public spending generates large output multiplier



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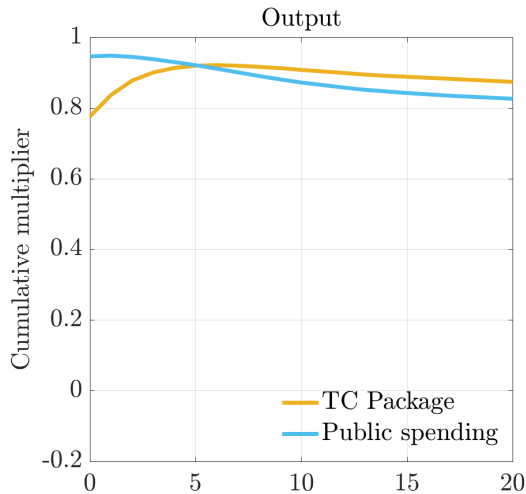

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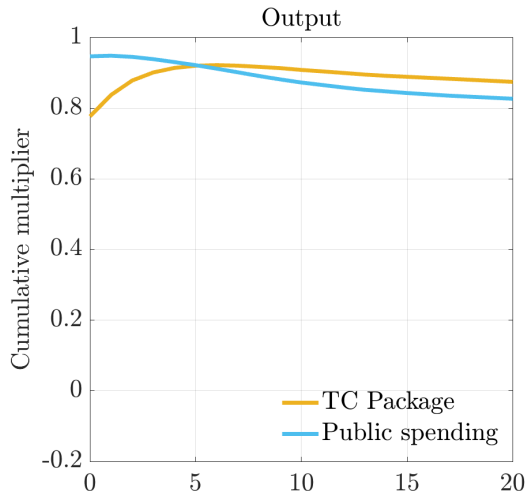

Further Fiscal Packages G and T packages

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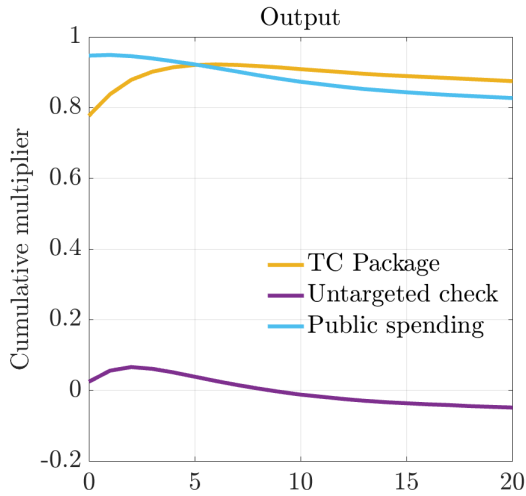
- Lump-sum check has modest stabilization properties



Fiscal Stabilization Packages Revisited

- Trade-off between effectiveness and welfare
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- Should we consider Consumption Taxes?
  - Policy proposal (Blanchard, 2024)
  - Some recent examples: UK 2009, Germany 2021
    Blundell (2009), Benzarti, Carloni, Harju, & Kosonen (2020), Bachmann, Born, Goldfayn-Frank, Kocharkov, Luetticke, & Weber (2025)

Consumption Tax Cut $\tau^{\mathbf{c}}$ package

- Consumption taxes can bypass the trade-off between effectiveness and welfare

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- Consider two labor market arrangements
  - Extensive margin labor supply decision (and flexible wages)
  - Sticky-wage model with unions and homogenous labor supply
    Auclert Rognlie and Straub (2023, 2024, 2025)

An Equivalence Result $\mathbf{G}$ vs. $\tau^{\mathbf{c}}$

Consider two fiscal packages:

- A government spending (expansion) stimulus $\{\hat{G}_t\}_{t=0}^T$
  - Fiscal cost $\{R_t^g = \hat{\mathbf{G}}_{\mathbf{t}}^{\mathbf{g}} - G\}_{t=0}^T \Rightarrow$ allocations, prices & taxes $X^g \equiv \{Y_t^g, \pi_t^g, r_t^g, w_t^g, \lambda_t^g\}_{t=0}^T$
- A consumption tax (cut) stimulus $\{\hat{\tau}_t^c\}_{t=0}^T$
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- **Proposition:** Assume $U = \log c - v(n)$, and $R_t^c = R_t^g \ \forall t$. Then:
  - Output, prices and taxes are identical: $X^g = X^c$;
  - Private consumption: $C_t^c = C_t^g + G_t^g - G \Rightarrow$ Crowding-in of private consumption

An Equivalence Result Intuition

- Using the budget constraint to replace c in the household's problem,

$$(1+\tau_t^c)c_t = a_t + y_t^\ell + y_t^k - \mathcal{T}_t + d_t + ... - a' = RHS(n, a')$$
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with log preferences, delivers

$$V_t(a, x, .) = \max_{n, a'} \left\{ \log\left(y_t^\ell + y_t^k - \mathcal{T}_t + d_t + ... - a'\right) - Bh + \beta \mathbb{E}_t V_{t+1}(a', x', .) \right\} - \log(1+\tau_t^c)$$

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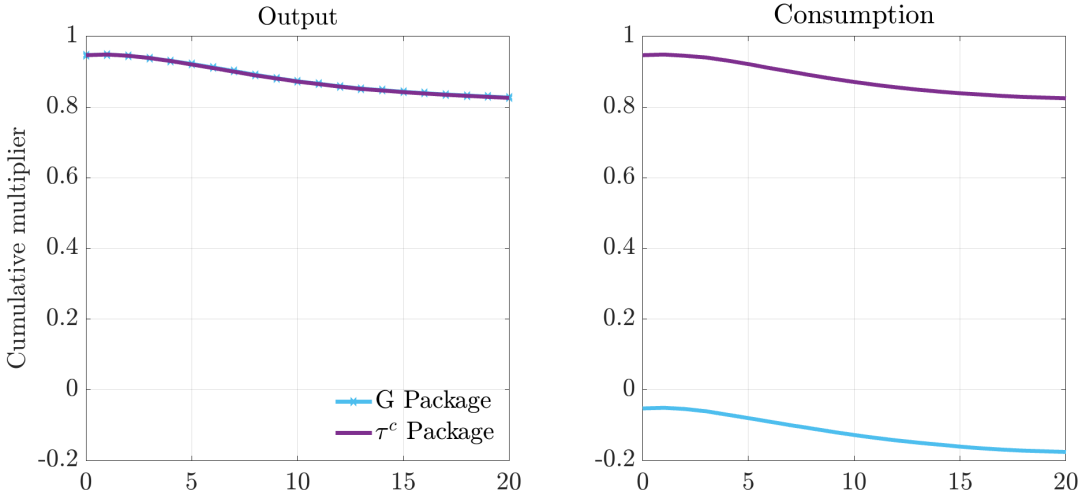
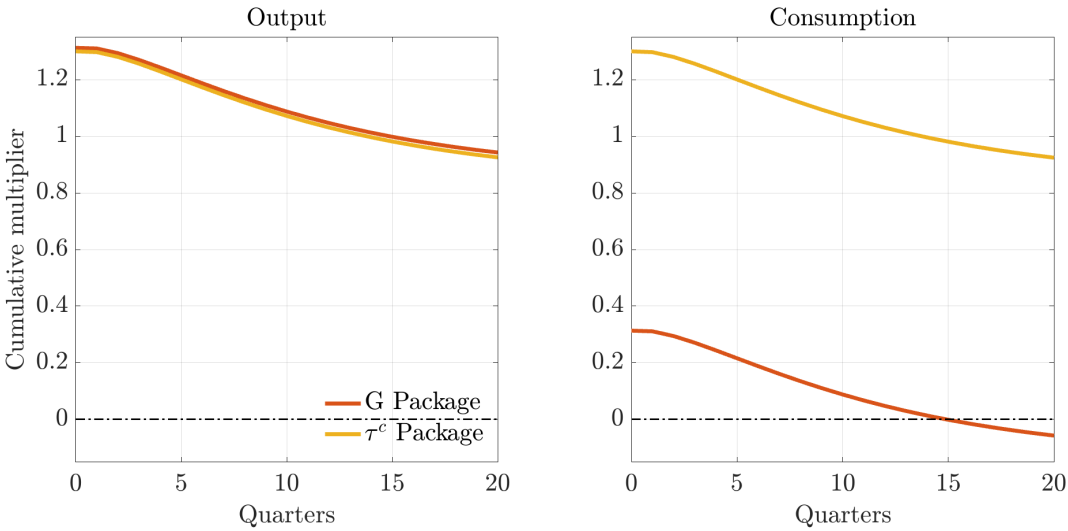
- Robust to: capital, sticky wages, also in RANK, etc.

Stabilization: G vs. τ^c Extensive Margin Labor Supply



Stabilization: G vs. τ^c Sticky Wages, Unions and Homogeneous Labor Supply



Stabilization: A Systematic Rule? $\tau_t^c = \tau^c - c^c \Delta Y_t$

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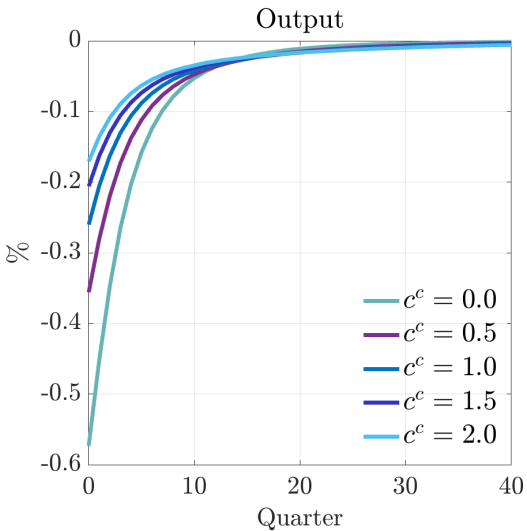

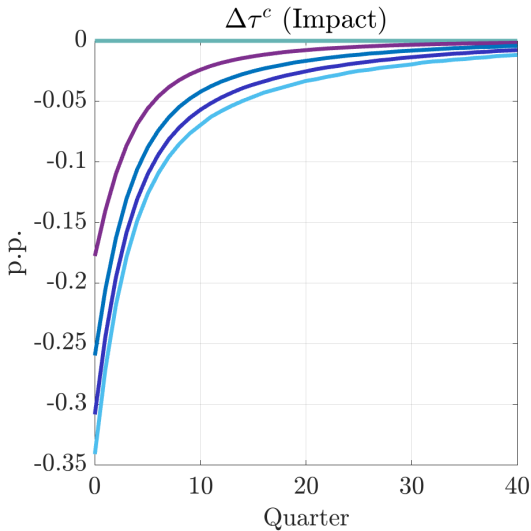

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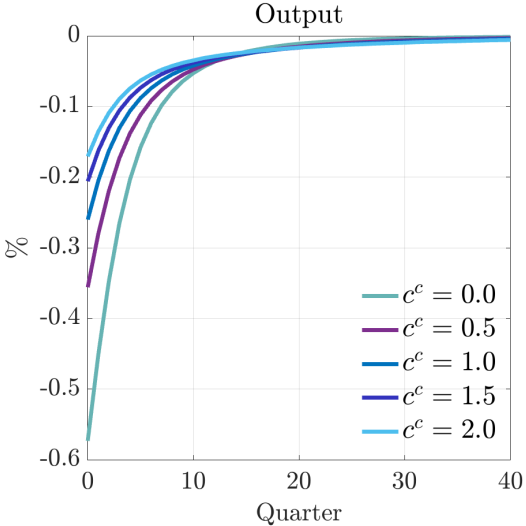

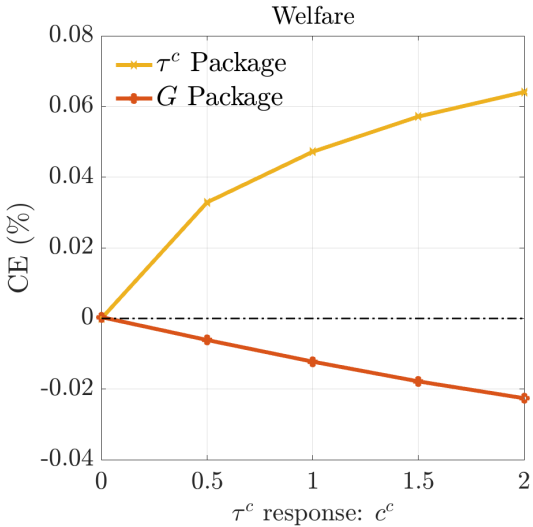

Stabilization: G vs. τ^{c} Taking Stock

- Consumption taxes as automatic stabilizers?
  - Bypass the trade-off between effectiveness and welfare
  - Easy to implement, high pass-through, salient

Stabilization: $\mathbf{G}$ vs. $\tau^{\mathbf{c}}$ Taking Stock

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- What next?
  - Formula away from log case
    - Bound $Y_t^g - Y_t^c$ with MPE/wealth effects and labor elasticities
  - Welfare: larger gains when the recession falls more on the poor?
    - Design of Okun's law

Conclusion

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- A temporary targeted labor tax cut can stabilize the economy
  - Operates also through consumption and labor supply responses

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- A temporary targeted labor tax cut can stabilize the economy
  - Operates also through consumption and labor supply responses
- A temporary consumption tax cut may work even better?

Thank you!

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Fiscal Rule

- Public debt adjusts as a function of Φ_D

$D_{t+1} = (1-\phi_D)D + \phi_D\left(\hat{G}_t - \tau^k r_t A_t - \mathcal{R}_t^\ell\right)$, where

  - $\hat{G}_t$ captures total government expenditures, including debt repayments

    $\hat{G}_t = G_t + T_t + \mathcal{U}_t + (1+r_t)D_t$

  - $\mathcal{R}_t^\ell$ captures fiscal revenues at steady-state labor tax schedule

    $\mathcal{R}_t^\ell = w_t L_t - \lambda \int (w_t x h_t(a,x,\eta,\beta))^{1-\tau^\ell} d\mu_t(a,x,\eta,\beta)$

Return

Steady State Households

- Quarterly model calibrated to liquid wealth

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Steady State **Households**

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- Stochastic $\beta \in \{\bar{\beta} - \Delta,\ \bar{\beta},\ \bar{\beta} + \Delta\}$, duration of 50 years
  Krusell and Smith (1998)
  - $\bar{\beta}$ s.t. $r \equiv 3.5\%$ annually
  - Δ s.t. top-quintile liquid wealth $\approx 90\%$ (SCF)

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- Productivity $(\rho_x, \sigma_x) = (0.989, 0.287)$
  Chang and Kim (2007)

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Steady State Firm and government

- Technology: $\varepsilon = 7$, $\Theta = 200 \rightsquigarrow$ Phillips curve slope $\varepsilon/\Theta = 0.035$

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- Dividends redistributed linearly in x: $d_t(x) = \bar{d}_t x$

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- Government
  - Capital tax $\tau_k = 35\%$, labor income tax progressivity $\tau_\ell = 0.1$

    Chen, Imrohoroglu, and Imrohoroglu (2007), Heathcote, Storesletten, and Violante (2017), Ferriere, Grübener, Navarro, and Vardishvili (2023)
  - Spending $G/Y = 10\%$, transfers $T/Y = 8\%$, debt $D/Y = 100\%$

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  - Capital tax $\tau_k = 35\%$, labor income tax progressivity $\tau_\ell = 0.1$
    Chen, Imrohoroglu, and Imrohoroglu (2007), Heathcote, Storesletten, and Violante (2017), Ferriere, Grübener, Navarro, and Vardishvili (2023)
  - Spending $G/Y = 10\%$, transfers $T/Y = 8\%$, debt $D/Y = 100\%$
  - Unemployment benefits: $\zeta = 0.4$, $\mathcal{R} = 0.5$, $\overline{ui} = 60\%\bar{y}$
    $\chi = 0.15$ to match $C_u/C_e \approx 75\%$
    Kekre (2022), Gorn and Trigari (2024)

Return

Steady State **Firm and government**

- Technology: $\varepsilon = 7$, $\Theta = 200 \rightsquigarrow$ Phillips curve slope $\varepsilon/\Theta = 0.035$
  Galí and Gertler (1999)

- Dividends redistributed linearly in x: $d_t(x) = \bar{d}_t x$
  Farhi and Werning (2019)

- Government
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  - Automatic responses of inflation and debt: $\Phi_\Pi = 1.5$, $\Phi_D = 0.75$

Return

Dividends

- Assume dividends linearly distributed on x

$$\delta_t = \sum_x \tilde{\delta}_t(x)\pi(x) = \sum_x \left(\frac{\delta_t}{\mathbb{E}[x]}x\right)\pi(x)$$

  - Minimize wealth effects of fluctuations in dividends

    Farhi and Werning (2020)

Return

Steady State **Unemployment**

- Job finding rates and separation rates across hourly wage distribution

Return

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- Job finding rates are constant in the distribution
  Mueller (2017)
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  - Monthly separation rates of $\approx 1.4\%$ and 0.7% below and above median, respectively

  $\Rightarrow$ $\pi_\eta(u|\ell, x) = \phi_0 x^{\phi_1}$, with $\phi_0 = 0.029$ and $\phi_1 = -0.446$

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- Average unemployment rate at 4.3% with unequal incidence in the distribution

Return

Unemployment and the Business Cycle

- Okun's law type of relation between output and unemployment
  - Okun coefficient $c^{OK} = 0.5$

    Ball, Leigh, and Loungani (2017)

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- Job separation rates decrease with ΔY_t
  - *Elasticity* of separation rates to aggregate unemployment larger for above-median workers
    Mueller (2017)
    + Homogeneous additive increase in separation rates

Unemployment and the Business Cycle Okun's law

- Finding and separation rates distribution depend on U_t Mueller (2017)
  - Finding rate elasticity decreases homogeneously with ΔY_t

$$\log \pi_{\eta,t}(\ell|u,x) = \log \pi_{\eta}(\ell|u) - \log\left(1 - \bar{\phi}_e \Delta Y_t\right)$$

  - Separation rate elasticity increases with ΔY_t

$$\pi_{\eta,t}(u|\ell,x) = \pi_{\eta}(u|\ell,x) - \bar{\phi}_u \Delta Y_t x^{-\phi_{u,x}}$$

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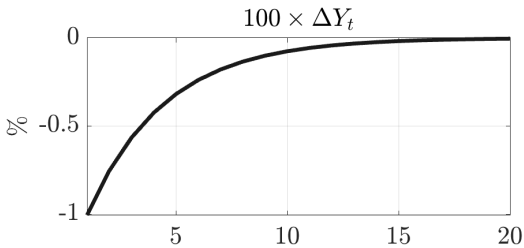
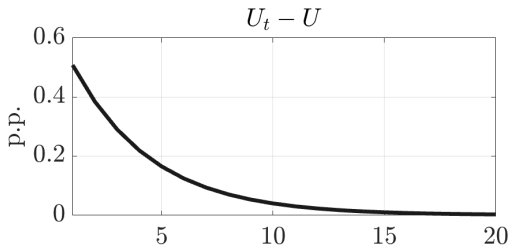
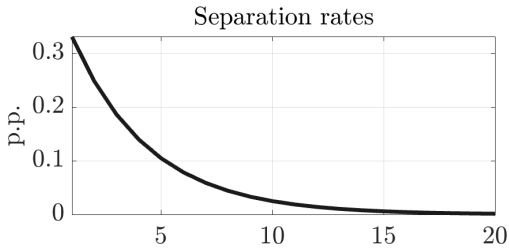
  - Joint calibration:
    - $\bar{\phi}_e$ s.t. finding elasticity to $U \approx -0.6$
    - $\phi_{u,x} = 0$ elasticity of separation rates larger for above-median workers
    - $\bar{\phi}_u = 0.33$ to get $c_{OK} = 0.5$

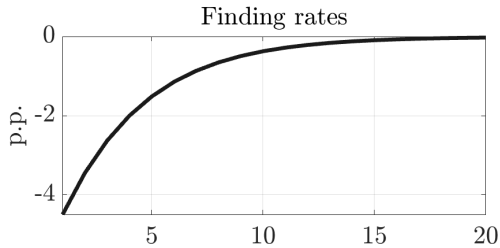
Return

Unemployment and the Business Cycle Okun's law









Return

Labor elasticities **Two approaches**

- Labor elasticities decline with income
  - Compute labor responses to a temporary tax shock
    Erosa, Fuster, and Kambourov (2016)
    - + Annual hours response to a 1% change in after-tax rate for one year
    - + Aggregate labor elasticity is 0.30, declining with income
  - Simulate steady-state model annually and run applied-micro regression
    Rogerson and Wallenius (2009), Chang and Kim (2006)
    - + Estimate b_1 in $\log h_{in} = b_0 + b_1 \log \tilde{w}_{in} - b_2 \log c_{in} + \varepsilon_{in}$
    - + Aggregate labor elasticity is 0.45, declining with income

Income quartile	1	2	3	4
Labor elasticity: tax shock	0.44	0.34	0.25	0.22
Labor elasticity: regression	0.56	0.59	0.50	0.26

Return

Marginal propensities to consume **Distribution x wealth**

- Marginal propensities to consume decline with wealth

Wealth quartile	1	2	3	4
mpc	0.20	0.15	0.07	0.03

Return

Deeper Recessions Bigger Fiscal Packages

- Consider a recession of about 1% on impact – compared to 12bp on impact in the baseline
- Implement fiscal packages costing $\$1500$ per household

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- TC Package in the first quarter: equal to $\$1100$ per month for the bottom 5%, $\$500$ per month for the 5-15%
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- Multipliers are similar to the baseline

Return

Robustness Monetary policy: Same real rate

- Fiscal packages affect inflation differently
  - Monetary policy and real rate differ
- Compare packages under benchmark real rate

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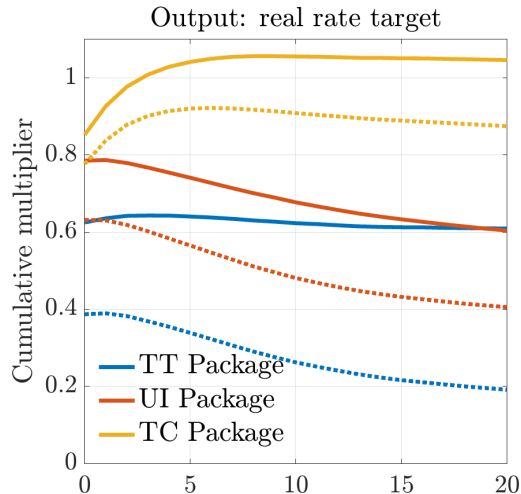
Robustness Monetary policy: Same real rate

- Fiscal packages affect inflation differently
  - Monetary policy and real rate differ
- Compare packages under benchmark real rate
- TC package remains most effective
  - Larger multipliers than with Taylor rule
  - Especially for the TT package, less for the TC package



Return

Robustness More accommodative monetary policy

- Effectiveness of fiscal packages depend on constraints on monetary policy

- Consider a richer Taylor rule:

$$\ln\left(\frac{1+i_{t+1}}{1+\bar{i}}\right) = \Phi_{\Pi}\ln\left(\frac{\Pi_t}{\bar{\Pi}}\right) + \Phi_Y \ln\left(\frac{Y_t}{\bar{Y}}\right)$$

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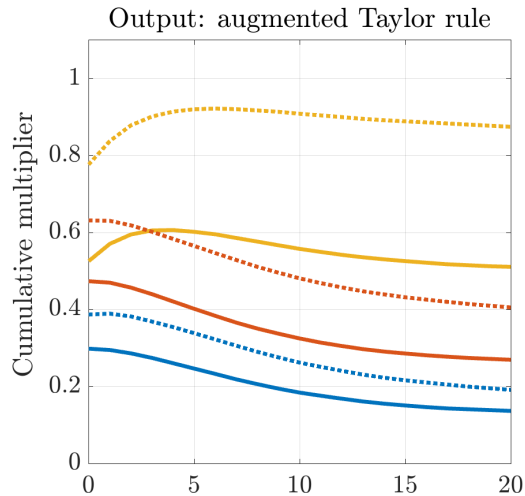
– TC package remains most effective
  – Lower multipliers than with Taylor rule



Return

Robustness Steeper labor elasticities

– Lower variance ρ_h to reach steeper labor elasticities

  + 0.75 at Q1 (regression), 1.1 (tax shock)

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- Closer to evidence on effects of tax shocks
  - + Tax multipliers at 1.25 (model) vs. > 2 Mertens and Ravn (2013)
  - + Bottom-90 tax cut increases employment by 2.7% (model) vs. 3% Zidar (2019)
- All other targets $\approx$ identical (mpc at 0.10)

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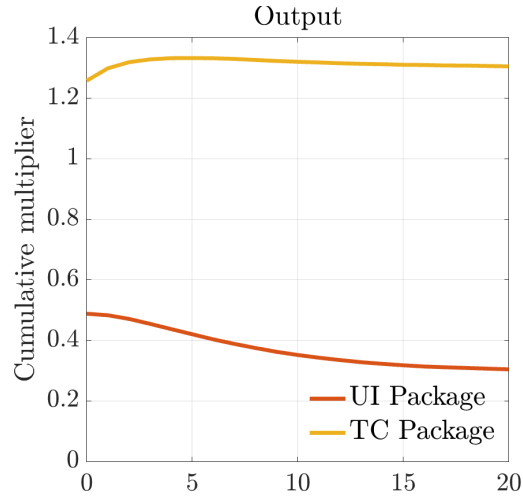
■ TC Package $\Rightarrow$ **large output** multiplier



Return

Robustness Sticky wages

- Alternative modeling of nominal rigidities with sticky wages
  Erceg, Henderson, and Levin (2000) Ferriere and Navarro (2024)
  - Two-layer structure with a labor packer and labor unions

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- Competitive labor packer
  - Produces a final labor bundle combining labor from unions $N_t = \left(\int_0^1 n_{kt}^{\frac{\varepsilon-1}{\varepsilon}} \right)^{\frac{\varepsilon}{\varepsilon-1}}$

  $\Rightarrow$ Implies labor demand $n_{kt}^d = (W_{kt}/W_t)^{-\varepsilon} N_t$, where $W_t = w_t P_t$

- Monopolist labor unions
  - Set wages w_t subject to adjustment cost
  - Hire households labor in a competitive market at wage rate w_t^h

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- Theorem: Under linear labor technology, **equivalence** between price and wage stickiness

Robustness Sticky wages

- Labor union maximization problem

$$J_t^w(W_{kt-1}) = \max_{W_{kt}, n_{kt}} \left\{ d_{kt}^w + \frac{1}{1+r_{t+1}} J_{t+1}^w(W_{kt}) \right\} \quad \text{s.t.}$$

$$d_{kt}^w = \left(\frac{W_{kt}}{P_t} - w_t^h \right) n_{kt} - \Theta_t^w(W_{kt}, W_{kt-1}) - f_w$$

$$n_{kt} = \left(\frac{W_{kt}}{W_t} \right)^{-\varepsilon_w} N_t$$

$$\Theta_t^w(W_{kt}, W_{kt-1}) = \frac{\Theta^w}{2} \left(\frac{W_{kt}}{W_{kt-1}} - \bar{\Pi} \right)^2 N_t$$

$\Rightarrow$ Implies a standard wage Philipps Curve