Lecture 3
Fiscal policy

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We just introduced the canonical HANK model.

Now: Focus on fiscal policy!

- Switch off all other shocks: TFP $X_t = 1$, no monetary shock $r_t = r = const$
- Focus on **first order** shocks to fiscal policy: $d\mathbf{G} = \{dG_t\}, d\mathbf{T} = \{dT_t\}$ such that

$$\sum_{t=0}^{\infty} (1+r)^{-t} (dG_t - dT_t) = 0$$

- Alternatively: shock $d\mathbf{B} = \{dB_t\}$, $d\mathbf{G} = \{dG_t\}$, and get $d\mathbf{T}$ from

$$d\mathbf{T} = d\mathbf{G} + \left((1+r)\,\mathbf{L} - \mathbf{I}\right) d\mathbf{B}$$

  where $\mathbf{L}$ is lag operator
- Main reference for this class is Auclert et al. (2023b)

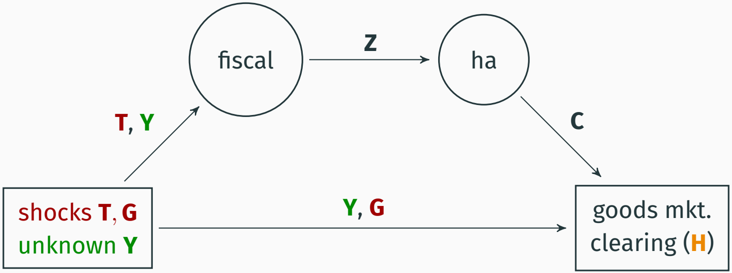
Roadmap

1. The intertemporal Keynesian cross
2. Solving the IKC in our three special cases
3. Using iMPCs to discriminate across models
4. Sufficient statistics beyond the baseline model
5. Fiscal policy in a quantitative environment
6. Takeaway

The intertemporal Keynesian cross

DAG for the economy with only fiscal shocks

Switching off monetary shocks, the DAG is simply:



In this case, $\mathbf{H} = 0$ can be written as

$$\mathbf{Y} = \mathbf{G} + \mathcal{C}(\mathbf{Z})$$

To emphasize that **C** is a function, write it as $\mathcal{C}$. Here, $\mathcal{C}$ is only a function of **Z**.

Next: Analyze this equation “by hand”...

The aggregate consumption function

- We call $\mathcal{C}$ the **aggregate consumption function**

$$C_t = \mathcal{C}_t\left(Z_0, Z_1, Z_2, \ldots\right) = \mathcal{C}_t\left(\{Z_s\}\right)$$

  It's a collection of ∞ many nonlinear functions of ∞ many Z's!

- It usually also depends on the path of real interest rates, but those are assumed to be constant
- Using the DAG, we can substitute out Z and write goods market clearing as

$$Y_t = G_t + \mathcal{C}_t\left(\{Y_s - T_s\}\right)$$

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- Given shocks $\{dG_t, dT_t\}$, must have

$$dY_t = dG_t + \sum_{s=0}^{\infty} \frac{\partial \mathcal{C}_t}{\partial Z_s} \cdot (dY_s - dT_s) \tag{1}$$

→ Response dY_t **entirely** characterized by the **Jacobian** of $\mathcal{C}$ function:

$$M_{t,s} \equiv \frac{\partial \mathcal{C}_t}{\partial Z_s} \qquad \left(= \mathcal{J}_{t,s}^{\mathbf{C},\mathbf{Z}}\right)$$

We call these **intertemporal MPCs**

- $M_{t,s}$ = how much of an income change at date s is spent at date t
- Note: All income is spent at some point, so $\sum_{t=0}^{\infty}(1+r)^{s-t}M_{t,s} = 1$

The intertemporal Keynesian cross

- Rewrite equation (1) in vector / matrix notation:

$$d\mathbf{Y} = d\mathbf{G} - \mathbf{M}d\mathbf{T} + \mathbf{M}d\mathbf{Y} \tag{2}$$

- This is an **intertemporal Keynesian cross**
  - entire complexity of model is in $\mathbf{M}$
  - with $\mathbf{M}$ from data, could get $d\mathbf{Y}$ without model!
    (there is a “correct” $\mathbf{M}$ out there, but it’s very hard to measure...)

Connecting to the standard Keynesian cross...

- Standard IS-LM theory postulates $C_t = \mathcal{C}(Y_t - T_t)$ plus market clearing, so

$$\mathcal{C}(Y_t - T_t) + G_t = Y_t$$

  Differentiate around steady state with constant Y, T, G:

$$dY_t = dG_t - mpc \cdot dT_t + mpc \cdot dY_t$$

  where $mpc = \mathcal{C}'(Y - T)$. This is the static Keynesian cross.

- The intertemporal Keynesian cross is a vector-valued version of this
- HANK models tend to revive & microfound IS-LM logic

Solving the intertemporal Keynesian cross

- How can we solve (2)? Rewrite as

$$(\mathbf{I}-\mathbf{M})\, d\mathbf{Y} = d\mathbf{G} - \mathbf{M} d\mathbf{T} \tag{3}$$

- Standard Keynesian cross solution:

$$dY_t = \left(1 + mpc + mpc^2 + \cdots\right)(dG_t - mpc \cdot dT_t) = \frac{dG_t - mpc \cdot dT_t}{1 - mpc}$$

  Can we do the same, inverting $(\mathbf{I}-\mathbf{M})$? **Not so fast!**

- Why? Multiply both sides of (3) by: $\mathbf{q} \equiv (1, (1+r)^{-1}, (1+r)^{-2}, \ldots)'$

$$\mathbf{q}'(\mathbf{I}-\mathbf{M})\, d\mathbf{Y} = 0 \qquad\qquad \mathbf{q}' d\mathbf{G} - \mathbf{q}'\mathbf{M} d\mathbf{T} = \mathbf{q}' d\mathbf{G} - \mathbf{q}' d\mathbf{T} = 0$$

  both left and right hand side have "**zero NPV**" !

- Intuition: present value of *mpc* is 1, dY is 0/0... What to do?

Solving the intertemporal Keynesian cross in asset space

- Let $\mathbf{K} = -\sum_{t=1}^{\infty} (1+r)^{-t} \mathbf{F}^t$ where $\mathbf{F}$ is the forward operator. Multiplying:

$$\mathbf{K}(\mathbf{I} - \mathbf{M})\, d\mathbf{Y} = \mathbf{K}(d\mathbf{G} - \mathbf{M}d\mathbf{T})$$

now, $\mathbf{K}(\mathbf{I} - \mathbf{M})$ may be invertible (!)

Theorem

There exists a unique solution to the IKC for any $d\mathbf{G}, d\mathbf{T}$ satisfying $\mathbf{q}' d\mathbf{G} = \mathbf{q}' d\mathbf{T}$, iff $\mathbf{K}(\mathbf{I} - \mathbf{M})$ is invertible. Then, the solution is:

$$d\mathbf{Y} = \mathcal{M}(d\mathbf{G} - \mathbf{M}d\mathbf{T})$$

where $\mathcal{M} \equiv (\mathbf{K}(\mathbf{I} - \mathbf{M}))^{-1}\mathbf{K}$ is a bounded linear operator ("multiplier")

- Why **K**? Recall buget constraint:

$$a_{it} + c_{it} = z_{it} + (1 + r)\, a_{it-1}$$

  Aggregating and defining $A_{ts} = \frac{\partial A_t}{\partial Z_s}$, we have:

$$(\mathbf{I} - (1 + r)\, \mathbf{L})\, \mathbf{A} = \mathbf{I} - \mathbf{M}$$

  Now, $\mathbf{K} = -\sum_{t=1}^{\infty} (1 + r)^{-t}\, \mathbf{F}^t$ is left inverse of $(\mathbf{I} - (1 + r)\, \mathbf{L})$ so

$$\mathbf{A} = \mathbf{K}\, (\mathbf{I} - \mathbf{M})$$

- IKC rewrites:

$$\mathbf{A}\, (d\mathbf{Y} - d\mathbf{T}) = \mathbf{K}\, (d\mathbf{G} - d\mathbf{T}) = d\mathbf{B} \tag{4}$$

  where $\{dB_t\}$ is the path of government debt
- This is the asset market clearing condition!
- Solving in the asset market is also numerically more stable

Winding number test

- We have:

$$\mathbf{A} = \mathbf{K}\left(\mathbf{I} - \mathbf{M}\right)$$

  how do we know when **A** is invertible?

  1. Analytical models: **A** has closed form solution, can check directly
  2. Quantitative models: **A** has "quasi-Toeplitz" structure

$$A_{t,s} \underset{t,s\to\infty}{\to} a_{t-s}$$

- (Generic) invertibility iff "winding number" of $a\left(z\right) = \sum_{j=-\infty}^{\infty} a_j z^j$ is zero
- This is sequence-space equivalent of Blanchard-Kahn condition
  - For recursive (Toeplitz) models see Onatski (2006)
  - For stationary het. agent (quasi-Toeplitz) models see Auclert et al. (2023a)

The balanced budget multiplier

- Suppose $d\mathbf{G} = d\mathbf{T}$ (balanced budget) and $\mathrm{wind}\,(\mathbf{K}\,(\mathbf{I} - \mathbf{M})) = 0$ (determinacy)
- **Result**: We always have $d\mathbf{Y} = d\mathbf{G}$!
- Irrespective of **all** household heterogeneity, holds for any path of spending
- IS-LM antecedents: Gelting (1941), Haavelmo (1945)
- Proof is trivial: $d\mathbf{Y} = d\mathbf{G}$ is unique solution to

$$d\mathbf{Y} = (I - \mathbf{M}) \cdot d\mathbf{G} + \mathbf{M} \cdot d\mathbf{Y}$$

Deficit financed fiscal policy

- With deficit financing $d\mathbf{G} \neq d\mathbf{T}$ we have

$$d\mathbf{Y} = d\mathbf{G} + \underbrace{\mathcal{M} \cdot \mathbf{M} \cdot (d\mathbf{G} - d\mathbf{T})}_{d\mathbf{C}} \tag{5}$$

  Consumption $d\mathbf{C}$ depends on **primary deficits** $d\mathbf{G} - d\mathbf{T}$

- Interaction term: Deficits matter precisely when $\mathbf{M}$ is "large"
  (in practice "large" will mean very different from RA model)
- **Next:** Go over three examples and then compare multipliers to full HA model
- Define:
  - initial multiplier: dY_0/dG_0
  - cumulative multiplier: $\frac{\sum(1+r)^{-t} dY_t}{\sum(1+r)^{-t} dG_t}$

Solving the IKC in our three special cases

Let's get an intuition for all this in the RA model. Last lecture we derived consumption function for RA model when $\beta(1+r)=1$

$$C_t = (1-\beta)\sum_{s\geq 0}\beta^s Z_s + ra_{-1}$$

In particular

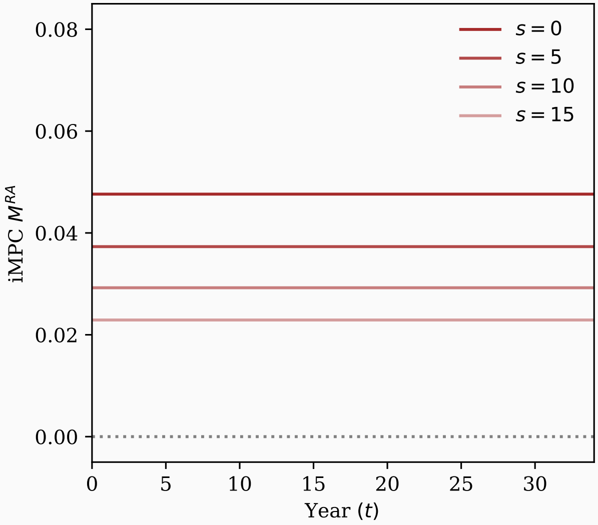
$$M_{t,s} = \frac{\partial C_t}{\partial Z_s} = (1-\beta)\beta^s$$

Thus iMPC matrix is given by

$$\mathbf{M}^{RA} = \begin{pmatrix} 1-\beta & (1-\beta)\beta & (1-\beta)\beta^2 & \cdots \\ 1-\beta & (1-\beta)\beta & (1-\beta)\beta^2 & \cdots \\ 1-\beta & (1-\beta)\beta & (1-\beta)\beta^2 & \cdots \\ \vdots & \vdots & \vdots & \ddots \end{pmatrix} = \frac{\mathbf{1}\mathbf{q}'}{\mathbf{1}'\mathbf{q}}$$

Easy to verify that $\mathbf{q}'\mathbf{M} = \mathbf{q}'$, and also that $\mathbf{M}\mathbf{w} = 0$ for any zero NPV $\mathbf{w}$

Representative-agent model



Fiscal policy in RA model

- Let's solve the IKC for the RA model
- Calculate:

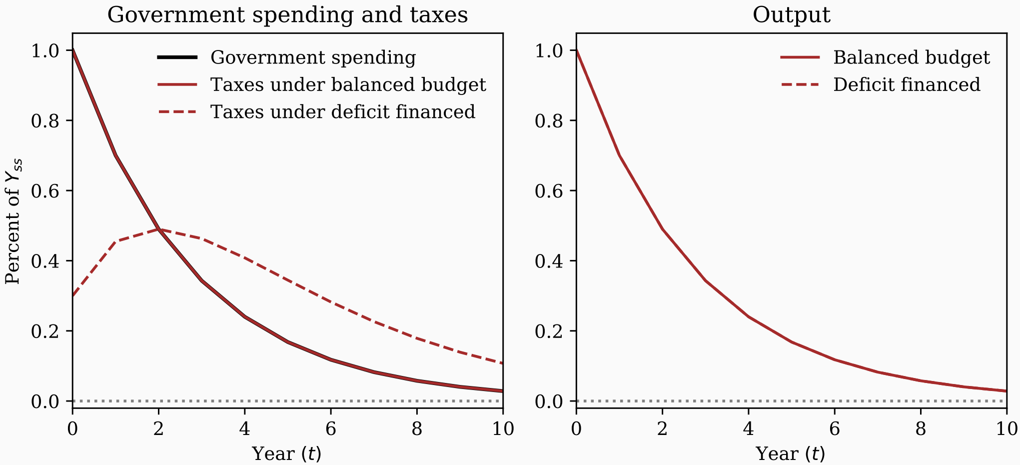
$$
\begin{aligned}
d\mathbf{C} &= \mathcal{M} \cdot \mathbf{M} \cdot (d\mathbf{G} - d\mathbf{T}) \\
&= \mathcal{M} \cdot (1 - \beta)\, \mathbf{1q}' \,(d\mathbf{G} - d\mathbf{T})
\end{aligned}
$$

  But government budget balance implies $\mathbf{q}' \,(d\mathbf{G} - d\mathbf{T}) = 0$! So:

$$
d\mathbf{Y} = d\mathbf{G}
$$

- Can prove this directly, too (eg Woodford 2011).
- **Deficits are irrelevant in RA!**

Impulse response to dG shock in RA model



Two agent model

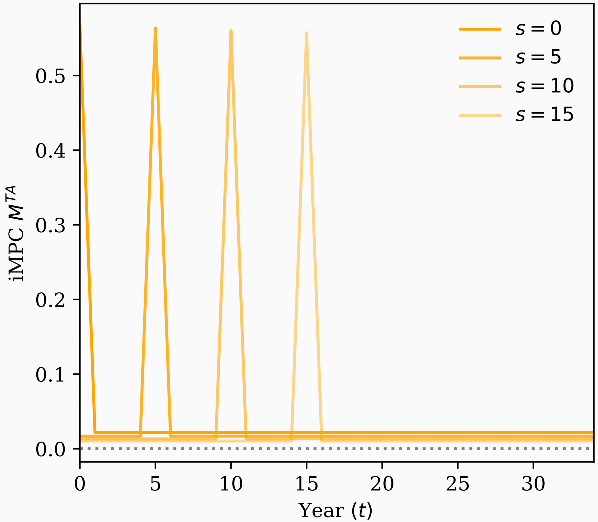
- $1-\mu$ share of agents behave like RA agent, μ are hand to mouth

  $\Rightarrow$ **M** matrix is simple linear combination

$$\mathbf{M}^{TA} = (1-\mu)\mathbf{M}^{RA} + \mu\mathbf{I}$$

- Issue: Only strong **contemporaneous** spending effect

iMPCs in TA model



Fiscal policy in TA model

- In Keynesian cross:

$$\left(\mathbf{I}-\mathbf{M}^{TA}\right) d\mathbf{Y} = d\mathbf{G} - \mathbf{M}^{TA} d\mathbf{T} \quad \Leftrightarrow \quad \left(\mathbf{I}-\mathbf{M}^{RA}\right) d\mathbf{Y} = \frac{1}{1-\mu}\left[d\mathbf{G} - \mu d\mathbf{T}\right] - \mathbf{M}^{RA} d\mathbf{T}$$

  This equation has same shape as for RA, hence:

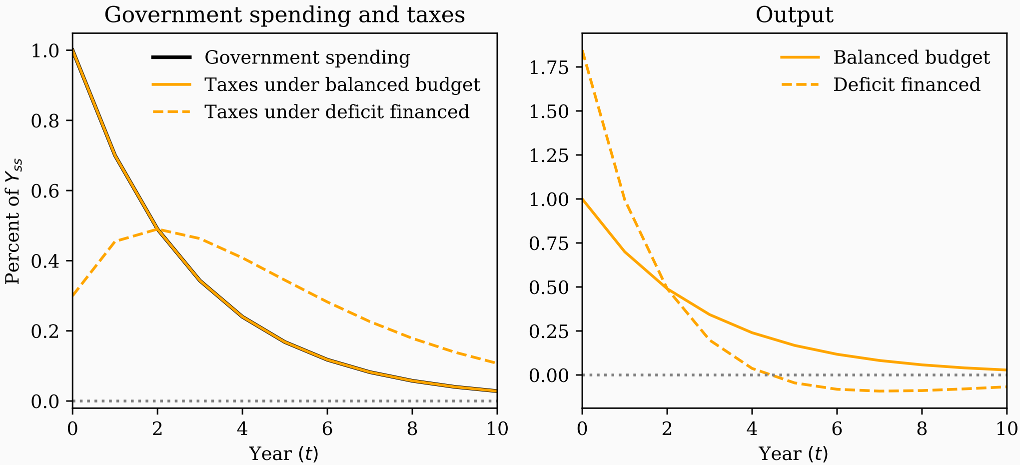
$$d\mathbf{Y} = \frac{1}{1-\mu}\left[d\mathbf{G} - \mu d\mathbf{T}\right]$$

- cf classic Keynesian cross: spending multiplier $1/(1-\mu)$ and transfer multiplier $\mu/(1-\mu)$. So: μ is "effective" MPC, ignoring RA
- Can also write:

$$d\mathbf{Y} = d\mathbf{G} + \frac{\mu}{1-\mu} \underbrace{\left[d\mathbf{G} - d\mathbf{T}\right]}_{\text{primary deficit}}$$

- Only **current** deficit matters. Initial multiplier can be large $\in [1, \frac{1}{1-\mu}]$, but cumulative multiplier is always equal to 1!

Impulse response to dG shock in TA model



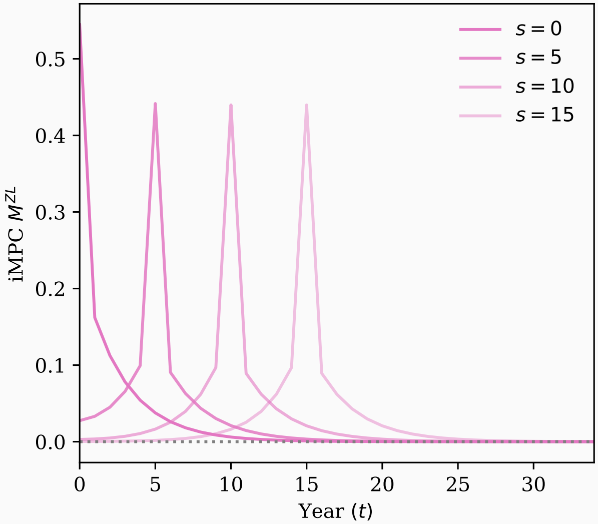
- What about iMPCs in the ZL model?
- We can calculate (see IKC paper)

$$M_{t0}^{ZL} = \mu \mathbf{1}_{t=0} + (1-\mu)\left(1 - \frac{\lambda}{1+r}\right) \cdot \lambda^t$$

$$M_{0s}^{ZL} = (1-\mu)\frac{1-\beta\lambda}{\beta(1+r)} \cdot (\beta\lambda)^s$$

- Intuitively, it's a mix of a "constrained agent" with mass μ and agents that spend down assets at constant rate λ
    - Latter are also the iMPCs of a bond-in-utility model (and an OLG model!)
- Note, given known M_{00} and M_{10}, can solve for μ and λ

see also Bilbiie (2021)



Fiscal policy in ZL model

- Can solve above model explicitly

$$dY_t = \underbrace{\frac{1}{1-\mu}\left[dG_t - \mu dT_t\right]}_{\text{as in TA model}} + \underbrace{\frac{\beta(1+r)-1}{1-\mu} dB_t + (1+r)\frac{1-\beta\lambda}{1-\mu}\left(\frac{1}{\lambda}-1\right)\sum_{s=0}^{\infty} dB_{t+s}}_{\text{new terms}}$$

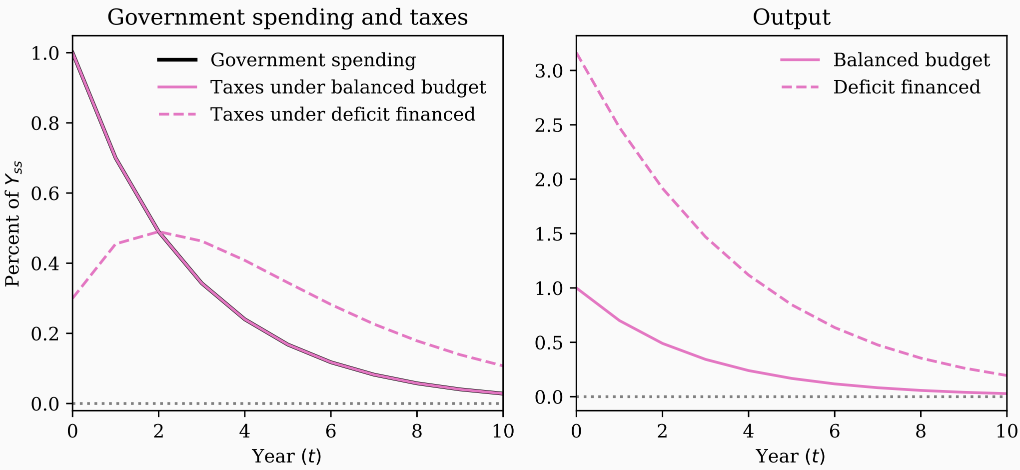
  Future fiscal policy extremely powerful here.

- Why? Dynamic income-consumption feedback from “spending down” effect
- In particular, can show:

Theorem

Holding β, r, and M_{00} fixed in the ZL model, a higher M_{10} increases the cumulative multiplier whenever $d\mathbf{B} \geq 0$ and $dB_t > 0$ for some t.

Impulse response to dG shock in ZL model



Using iMPCs to discriminate across models

Nested models of households

Household i solves:

$$\max \mathbb{E}\left[\sum_{t\geq 0}\beta^t \left\{u\left(c_{it}\right) - v\left(n_{it}\right) \qquad \right\}\right]$$

$$c_{it} + a_{it}^{liq} = z_{it} + (1+r)(1-\zeta)a_{it-1}^{liq} - d_{it}\cdot 1_{\{adj_{it}=1\}}$$
$$a_{it}^{illiq} = (1+r)a_{it-1}^{illiq} + d_{it}\cdot 1_{\{adj_{it}=1\}}$$

- RA: no risk in e (or complete markets)
- TA: share μ of agents with $c_{it} = z_{it}$
- HA-one: one account model, constraint $a_{it} \geq 0$
- HA-two: two account model w. $\Pr(1_{\{adj_{it}=1\}}) = \nu < 1, \zeta > 0, a_{it}^{illiq} \geq 0, a_{it}^{liq} \geq 0$
- BU/WU: no risk in e, extra additive term $\chi\left(a_{it}\right)$ in utility

Household i solves:

$$\max \mathbb{E}\left[\sum_{t\geq 0} \beta^t \left\{u\left(c_{it}\right) - v\left(n_{it}\right) + \chi\left(a_{it}\right)\right\}\right]$$

$$c_{it} + a_{it} = z_{it} + (1 + r)a_{it-1}$$

- RA: no risk in e (or complete markets)
- TA: share μ of agents with $c_{it} = z_{it}$
- HA-one: one account model, constraint $a_{it} \geq 0$
- HA-two: two account model w. $\Pr(1_{\{adj_{it}=1\}}) = \nu < 1, \zeta > 0$, $a_{it}^{illiq} \geq 0$, $a_{it}^{liq} \geq 0$
- BU/WU: no risk in e, extra additive term $\chi\left(a_{it}\right)$ in utility

Measuring aggregate iMPCs using individual iMPCs

- Object of interest: **(aggregate) iMPCs**

$$M_{t,s} = \frac{\partial \mathcal{C}_t}{\partial Z_s}$$

  where $C_t = \int c_{it} di$ and $Z_s = \int z_{is} di$

- Direct evidence on $M_{t,s}$ is hard to come by for general s
- More work on column $s = 0$ (unanticipated income shock)
  - Can write

$$M_{t,0} = \int \underbrace{\frac{z_{i0}}{Z_0}}_{\text{income weight}} \cdot \underbrace{\frac{\partial c_{it}}{\partial z_{i0}}}_{\text{individual iMPC}} di$$

  $\rightarrow$ aggregate iMPCs are **weighted individual iMPCs**

Obtain date-0 iMPCs from cross-sectional microdata

- Two sources of evidence on $\frac{\partial \mathbb{E}_0[c_{it}]}{\partial z_{i0}}$:

1. Fagereng Holm Natvik (2021) measure in Norwegian data

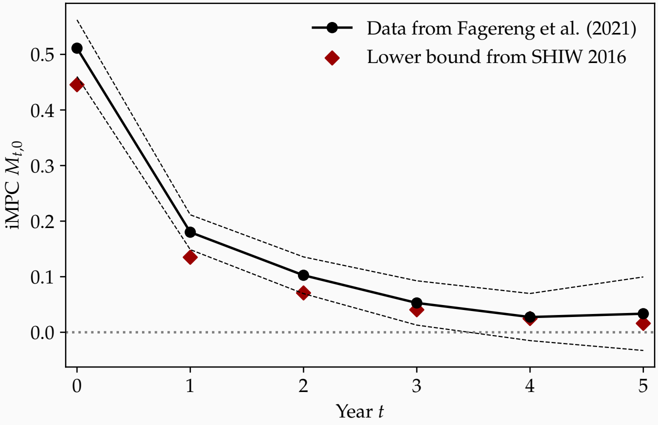
$$c_{it+k} = \alpha_i + \tau_{t+k} + \gamma_k \text{lottery}_{it} + \delta X_{it} + \epsilon_{it}$$

   - Weighting by income in year of lottery receipt $\Rightarrow M_{t,0}$

2. Italian survey data (SHIW 2016) on $\frac{\partial c_{i0}}{\partial z_{i0}}$

   - Lower bound for $M_{t,0}$ using distribution of MPCs
   - Example: income-weighted average of $(1 - MPC_i)MPC_i \Rightarrow$ lower bound for $M_{1,0}$

iMPCs in the data: first column $M_{0,t}$



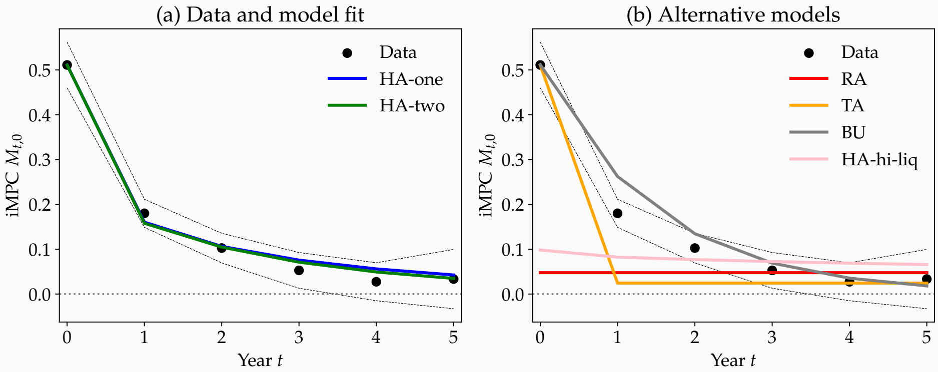
- Annual $M_{0,0}$ consistent with evidence from other sources

Compare iMPCs across models

Calibration

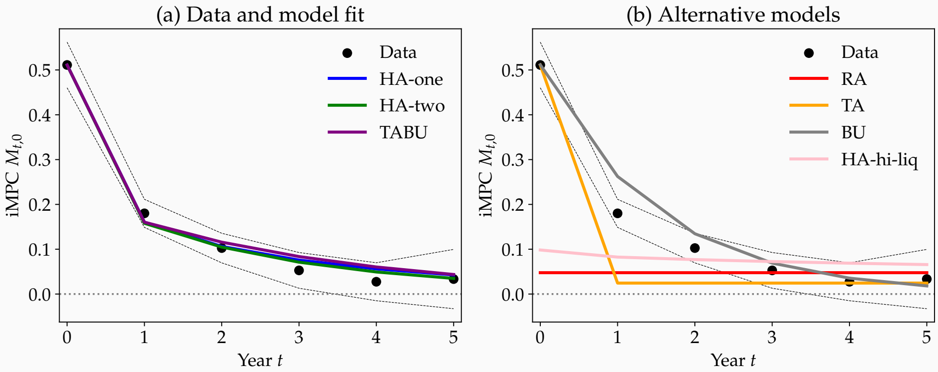
- Models with standard calibration $r = 5\%$, $EIS = 1$, $A/Y = 4.1$ [Kaplan-Violante]
  - RA, calibrated to $r = 5\%$
  - HA-hi-liq: one-asset HA, calibrated to $\frac{A}{Y}$
- Models with one free parameter, calibrated to match $M_{0,0}$
  - TA: adjusting share of hand-to-mouth μ
  - BU: adjusting curvature $\chi''(A)$
  - HA-one: adjusting level of assets A
  - HA-two: adjusting Calvo freq of adjustment ν

iMPCs across models



- Useful discrimination device! Rule in HA-one and HA-two, out others
- Can a tractable model fit too?

iMPCs across models including TABU



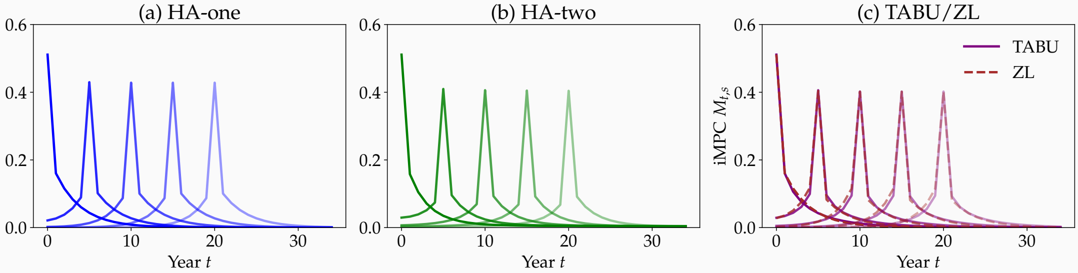
- Yes! TABU provides another great fit (parameterize with $M_{0,0}$ and $M_{1,0}$)
- Why? TABU has same first column as *zero* liquidity model (vs HA-one ~ 0)

What about non-date-0 iMPCs?

- Existing evidence useful for response to date-0 income shocks, $\{M_{t,0}\}$
- What about response to future shocks?

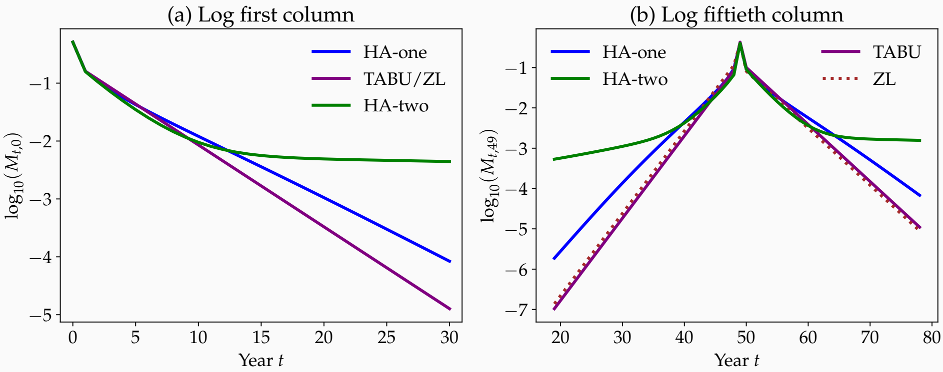
$\rightarrow$ rely on calibrated models fitting iMPCs to fill in the blanks

Response to other income shocks



- Reassuring: all models that fit first column imply similar later columns

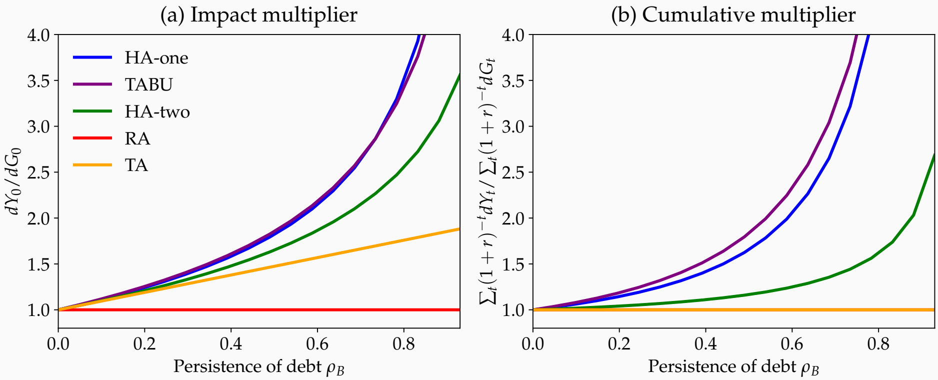
Zooming in



- Zooming in, some subtle differences appear...
- This will turn out to matter quantitatively (though not qualitatively)

Simulate model responses for more general shocks

- Parametrize: $dG_t = \rho_G dG_{t-1}$ and $dB_t = \rho_B \left(dB_{t-1} + dG_t\right)$, vary ρ_B [with $\rho_G = 0.76$]



- Data-consistent iMPCs $\Rightarrow$ cumulative multipliers above 1, rise with ρ_B
- HA-two multipliers below HA-one $\sim$ TABU (long-term savers more ricardian)

Sufficient statistics beyond the baseline model

Broader models

- In broader models, IKC no longer enough to characterize equilibrium
- But if heterogeneity is all at household level, still 3 sufficient statistics:

$$d\mathbf{C} = \mathbf{M} d\mathbf{Z} + \mathbf{m}^{cap} dcap + \mathbf{M}^r dr$$

- $\mathbf{m}^{cap}$ is response of C to capital gains, $\mathbf{M}^r$ to interest rate changes
- Some data on former, not much on latter! Yet we prove: [cf Werning, 2015]

Theorem

For RA, TA, HA-one, and HA-two, if EIS $= 1$ and equal initial porfolio shares:

$$\mathbf{M}^r = -C\left(\mathbf{I} - \left(1 - \frac{rA}{C}\right)\mathbf{M}\right)\mathbf{U} + (1+r)A\,\mathbf{m}^{cap}\mathbf{1}'$$

where $\mathbf{U}$ the matrix with ones on and above the diagonal

- iMPCs still sufficient statistics, provided you include capital gains!

Fiscal policy in a quantitative environment

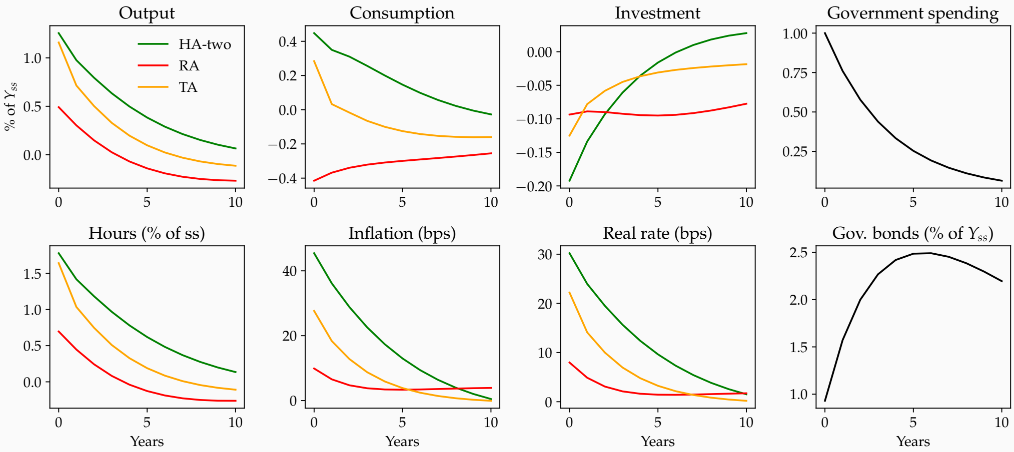
Additional elements relative to the IKC environment...

Calibration

- **Government:**
  - still has spending shock $dG_t = \rho_G dG_{t-1}$ and fiscal rule $dB_t = \rho_B \left(dB_{t-1} + dG_t\right)$
  - now follows Taylor rule $i_t = r + \phi\pi_t$, $\phi > 1$
- **Supply side:**
  - Cobb-Douglas production, $Y_t = K_t^{\alpha} N_t^{1-\alpha}$
  - K_t subject to quadratic capital adjustment costs
  - sticky prices à la Calvo, $\pi_t = \kappa^p mc_t + \frac{1}{1+r_t}\pi_{t+1}$
- **Two reasons for lower multipliers** relative to IKC environment:
  - distortionary taxation & crowding-out of consumption and investment via r

Sizable output response to deficit-financed G in HA-two

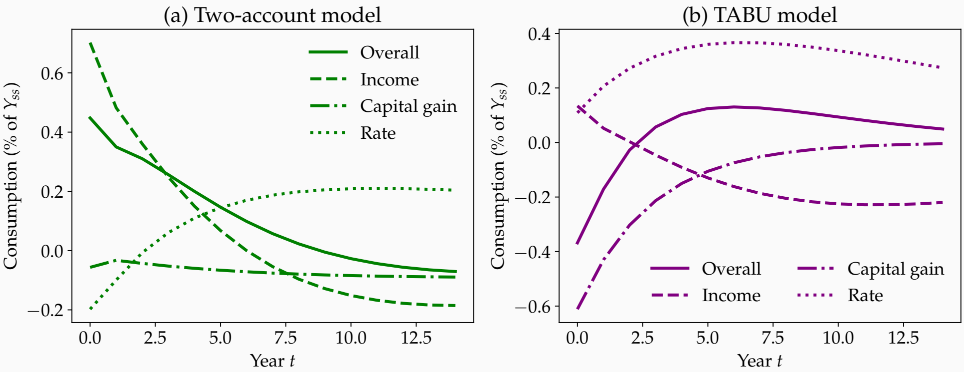
▸ Other



Calibration: $\rho_G = 0.76$, $\kappa^w = 0.03$, $\kappa^p = 0.23$, $\phi = 1.5$; vary ρ_B in $dB_t = \rho_B \left(dB_{t-1} + dG_t\right)$

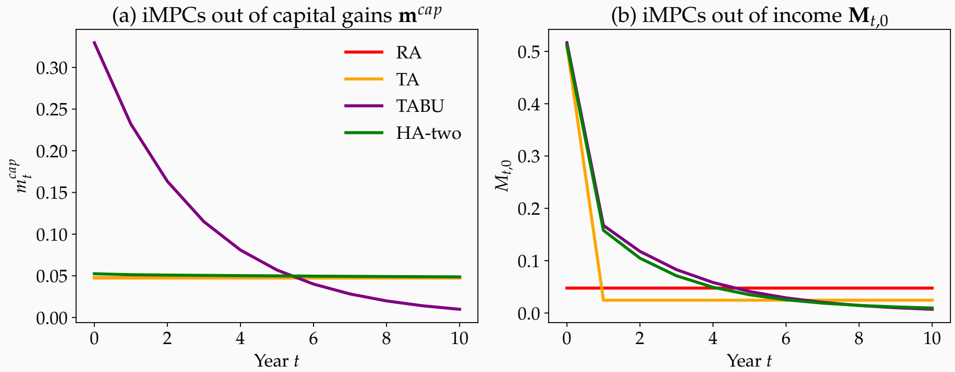
Output response shaped by iMPCs from income and capital gains

▸ Impulse



Calibration: $\rho_G = 0.76$, $\rho_G = 0.93$, $\kappa^w = 0.03$, $\kappa^p = 0.23$, $\phi = 1.5$

Tractable models calibrated to income MPCs imply implausibly large $\mathbf{m}^{cap}$!



- Empirical evidence suggests MPC out of capital gains small , $\sim$RA
  [di Maggio, Kermani and Majlesi 2018, Chodorow-Reich-Nenov-Simsek 2021, ...]

Summary: TA, HA-two have large **initial** deficit-financed multipliers

graph

Initial multipliers $\frac{dY_0}{dG_0}$

Fiscal rule	Model	RA	TA	TABU	HA-one	HA-two
bal. budget	IKC	1.0	1.0	1.0	1.0	1.0
	quantitative	0.5	0.4	0.3	—	0.5
deficit-financed	IKC	1.0	1.9	5.6	6.9	3.6
	quantitative	0.5	1.2	0.4	—	1.3

Calibration: $\rho_G = 0.76$, $\kappa^w = 0.03$, $\kappa^p = 0.23$, $\phi = 1.5$

. . . but only HA-two has large **cumulative** multipliers in quantitative model

Cumulative multipliers $\frac{\sum_t (1+r)^{-t} dY_t}{\sum_t (1+r)^{-t} dG_t}$

Fiscal rule	Model	RA	TA	TABU	HA-one	HA-two
bal. budget	IKC	1.0	1.0	1.0	1.0	1.0
	quantitative	0.4	0.3	0.2	—	0.4
deficit-financed	IKC	1.0	1.0	15.5	16.6	2.7
	quantitative	-0.4	0.5	0.8	—	1.3

Calibration: $\rho_G = 0.76$, $\kappa^w = 0.03$, $\kappa^p = 0.23$, $\phi = 1.5$

Takeaway

Fiscal policy in HANK

- Fiscal policy in HANK is very different from RANK and TANK
- Why? Large **off-diagonal iMPCs**: households spend down past savings
- Consequence: deficit financing has persistent effects on output
    - Both initial **and** cumulative fiscal multipliers are large
- Let's see this in action in the tutorial!

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