Discussion of "The Fiscal Multiplier" by Marcus Hagedorn, Iourii Manovskii and Kurt Mitman

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A crucial macro question

- What is the effect of a fiscal expansion ($G \uparrow$ or $\tau \downarrow$) on GDP?
- One of the most important questions in business cycle macro
  - Positive: predict the effect in bad times or in good (now)
  - Normative: should the gov spend more and when?
- Enormous literature, both empirical and theorical, with important dialogue between the two:
  - Theory generates testable predictions
  - Empirical results inform the theory
- **This paper** builds on new theoretical advances in the field ("HANK" models) and proposes new testable predictions
  - First to focus specifically on fiscal policy: very natural application!

What is known about the fiscal multiplier

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- Clearly not one number, but a set of partial derivatives:

$$m_{t,s} = \left. \frac{\partial Y_t}{\partial G_s} \right|_{\Theta}$$

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   - Typical to summarize by assuming path for G, e.g. $G_s = Ge^{-\theta s}$
   - Then focus (here) on $m_t = \frac{\partial Y_t}{\partial G}$, especially $m_0 = \frac{\partial Y}{\partial G}$
   - Can then be connected to regressions of Y_t on G_t

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   b) Monetary policy $\rightarrow$ standard NK model

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   d) How gov adjusts the budget $\rightarrow$ if Ricardian equivalence fails
   e) State of the economy $\rightarrow$ MPCs, wealth distribution, etc.

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3. **Contribution #1**: new eqbm selection criterion (cf Hagedorn 2016)

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3. **Contribution #2**: quantitative evaluation of importance of d) & e)

Fiscal multipliers at the ZLB and the HMM selection criterion

Equilibrium selection at the ZLB

- Interest rate pegs such as ZLB generate indeterminacy
- Take standard NK model [Werning, Cochrane] with zero natural rate

$$\begin{aligned} \dot{c}_t &= \widehat{\sigma}^{-1}\left(i_t - \pi_t\right) \\ \rho\pi_t - \dot{\pi}_t &= \kappa\left(c_t + \left(1-\Gamma\right)g_t\right) \end{aligned}$$

  Here $c_t \equiv \frac{dC_t}{Y}$, $g_t \equiv \frac{dG_t}{Y}$, $\widehat{\sigma}^{-1}$ is rescaled EIS, output $y_t = c_t + g_t$
- In flexible price case $\kappa = \infty$ so

$$dY_t = dC_t + dG_t = \Gamma dG_t$$

  Output multiplier is static, $m = \Gamma = \frac{\widehat{\sigma}}{\phi + \widehat{\sigma}} \in (0,1)$ with $\phi^{-1} \equiv$ Frisch (standard neoclassical wealth effect)

HMM equilibrium selection criterion

- Consider now sticky prices $\kappa < \infty$ and peg $i_t = 0$

$$\begin{aligned} \dot{c}_t &= -\widehat{\sigma}^{-1}\pi_t \\ \rho\pi_t - \dot{\pi}_t &= \kappa\left(c_t + (1-\Gamma)\, g_t\right) \end{aligned} \tag{1}$$

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  - Standard selection: $c_T = 0$ at some T
  - Fiscal theory selection (Cochrane): $\pi_0 = 0$. Resolves some puzzles.

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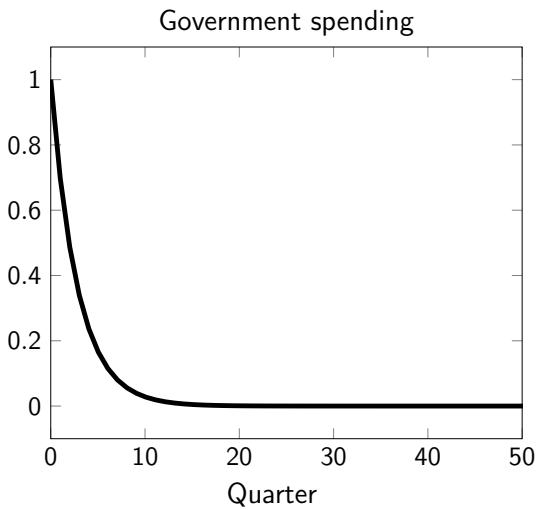
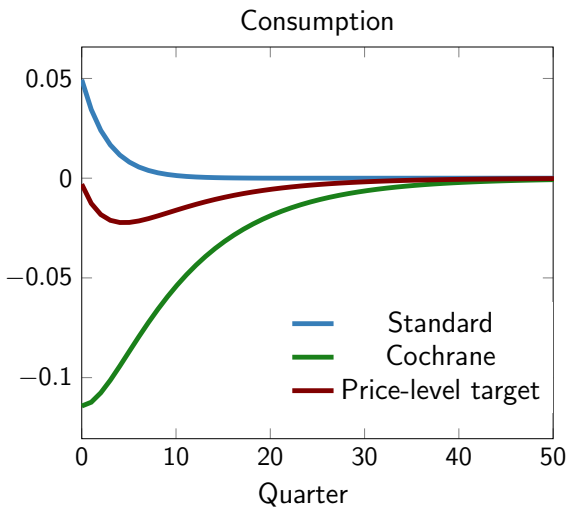
  - **HMM**: equivalent to long run nominal anchor $P_\infty = P^*$
- Clear implication for fiscal multiplier: integrate (1) to see

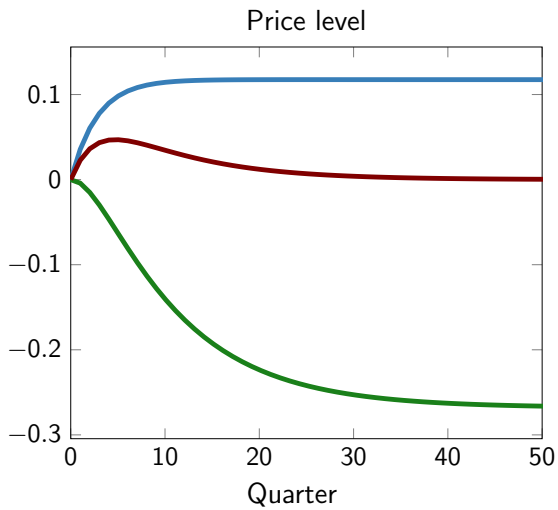
$$c_0 = \widehat{\sigma}^{-1} \log\left(P_\infty / P^*\right) = 0$$

so selection equivalent to directly choosing $m = 1$

Three selections using HMM shock and parameters







Why equivalent to price level targeting?

- This is the same equilibrium as the one picked in the standard model by replacing ZLB $i_t = 0$ by a **price level targeting policy**

$$i_t = \phi \log \left(P_t / P^* \right)$$

  then taking $\phi \to 0$
- Why? HANK model $\simeq$ RA model with bond in utility

$$\dot{c}_t = \widehat{\sigma}^{-1} \left(i_t - \pi_t + \frac{v' \left(\frac{B}{P_t} \right)}{u' \left(c_t \right)} \right)$$

- HMM policy: constant long-run level of nominal bonds B
- $P_t \uparrow$ lowers real value of liquid assets, first-order equivalent to $i_t \uparrow$
- This is not fiscal theory. It's price level targeting.

Conclusion on equilibrium selection

- Several conclusions in the paper stem from this assumption:
  - eg, eliminate the "paradox of flexibility"

1. Would be nice to separate from those that are *special* to HANK
   - Assume long run fiscal policy sets $\frac{B}{P}$ or $\frac{B}{Y}$
   - Show Taylor rule and ZLB results w/ standard selection criterion

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3. Given large assumed price + wage rigidities + ZLB + this selection, in many experiments the real rate is essentially constant ($r_t = r^*$)
   - **Great:** Model results rely on responsiveness of consumption to incomes—to which it is calibrated, not to r—to which it is not.

Fiscal policy in this HANK model

HMM assumptions

- HMM work with HANK model featuring
  - One asset on household side
  - Rigid prices (as in much of literature) + **rigid wages** (newer)
  - Capital investment with quadratic adjustment costs
- Model matches empirical evidence on MPCs—annual MPC $\simeq 0.4$.
- Main findings:
  1. Fiscal multiplier < 1 if financed by lump-sum, > 1 if deficit financed
  2. Deficit financing "crowds out" capital investment
  3. "Multipliers similar in a liquidity trap vs not"
- Rest of discussion: go over assumptions and findings

Sticky wages

- Much of the previous HANK literature has assumed flexible wages
- In Auclert-Rognlie, we showed that this created a key challenge: these models cannot simultaneously match large MPCs in data without generating either
  1. very large marginal propensities to earn
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  - Moves households off their short-run labor supply curves...
  - ...so requires a rationing assumption for increases in labor demand H_t
  - **HMM**: income of individual with skill e_t

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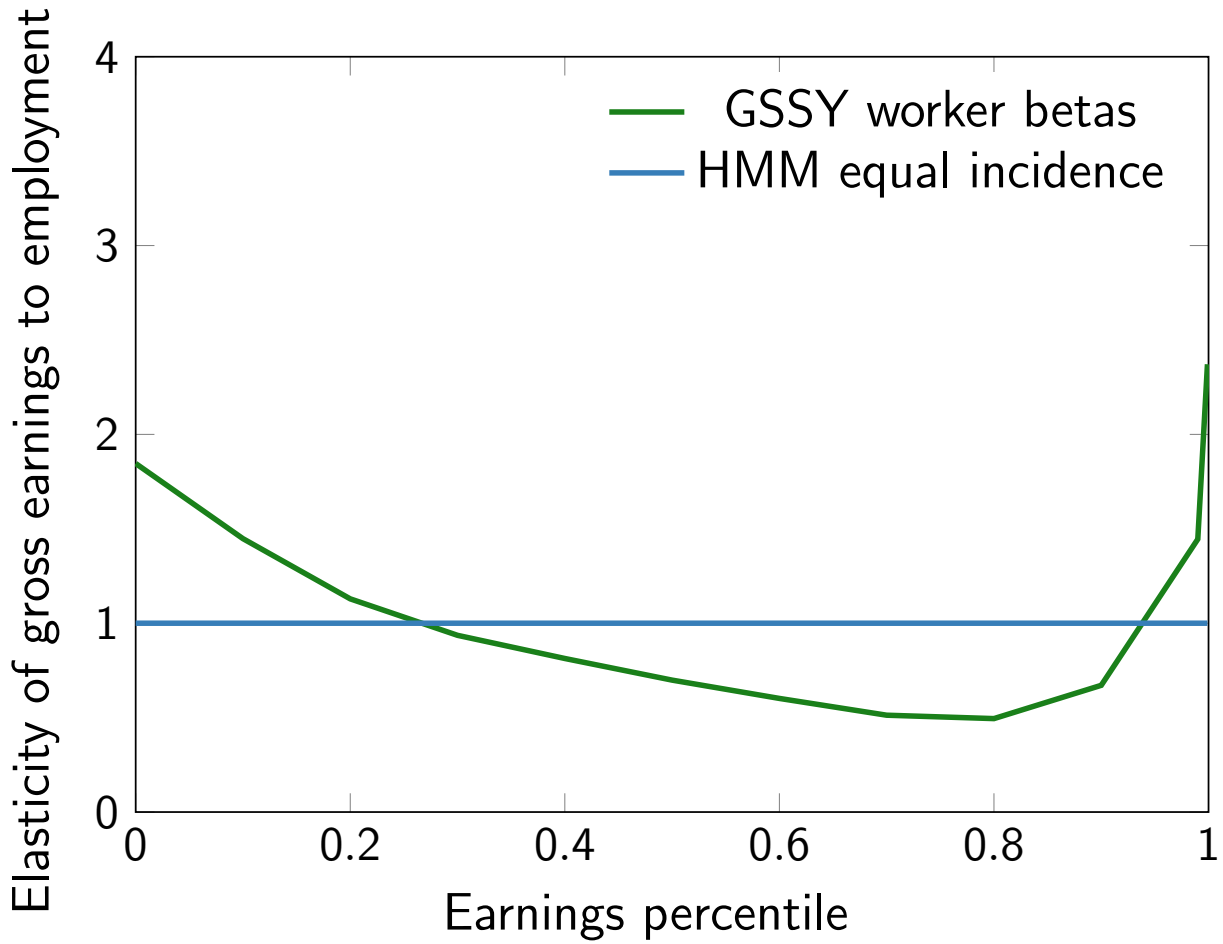
  - Implicit equal-incidence assumption

Worker beta evidence

- At odds with worker beta findings in Guvenen et al. Can be relaxed.



A balanced-budget benchmark for the multiplier

Proposition (Auclert-Rognlie-Straub)

Assume 1) constant-r monetary policy 2) no capital 3) government taxes contemporaneously so that all net-of-tax individual incomes $y_t(e)$ are affected in proportion. Then the fiscal multiplier is 1 **at every date**

$$\frac{\partial Y_t}{\partial G_s} = 1_{s=t}$$

- So heterogeneity is **neutral** for effects of fiscal policy!

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- So heterogeneity is **neutral** for effects of fiscal policy! Why?
  1. Gov spending increases pre-tax incomes
  2. Gov increases taxes at the same time, which reduces post tax incomes
  3. Under assumption 3), these effects cancel exactly for *everyone*
  4. r_s unchanged + $y_s(e)$ unchanged $\Rightarrow$ c_t unchanged $\Rightarrow$ $dC_t = 0$ at all t

Main deviations from neutrality in HMM

- **HMM result 1**: Fiscal multiplier < 1 if tax financed.
  - This is because gov adjusts **lump-sum taxes**.
  - Start from benchmark ($G \uparrow$, $\tau \uparrow$), with multiplier of 1
  - Combine with reduction in τ paid for by reduction in T
  - 2nd part redistributes from low to high-y agents, so contractionary

- **HMM result 2**: Fiscal multiplier > 1 if deficit financed.
  - This is because agents are **non-Ricardian**.
  - Combine effect 1 with reduction in T today, increase in future T
  - Latter effect is exactly the "transfer multiplier", and is expansionary

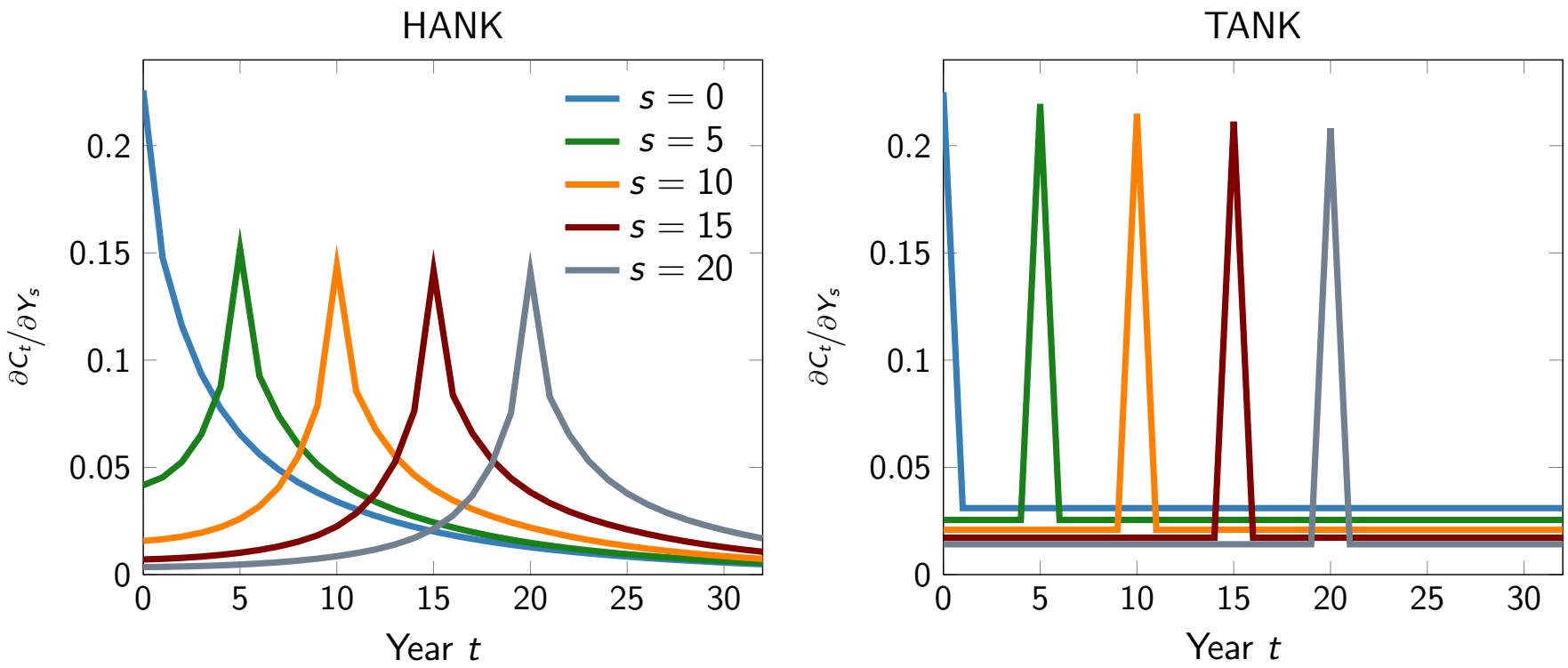
Crowding out

- Deficit financing appears to crowd out investment
- This is due to the specification of monetary policy
- With quadratic adjustment costs, aggregate investment dynamics are

$$d\left(I_t - \delta K_{t-1}\right) = \epsilon_I I \sum_{s=0}^{\infty} \left(\frac{1}{1+r}\right)^{s+1} \left\{dMPK_{t+s+1} - dr_{t+s}\right\}$$

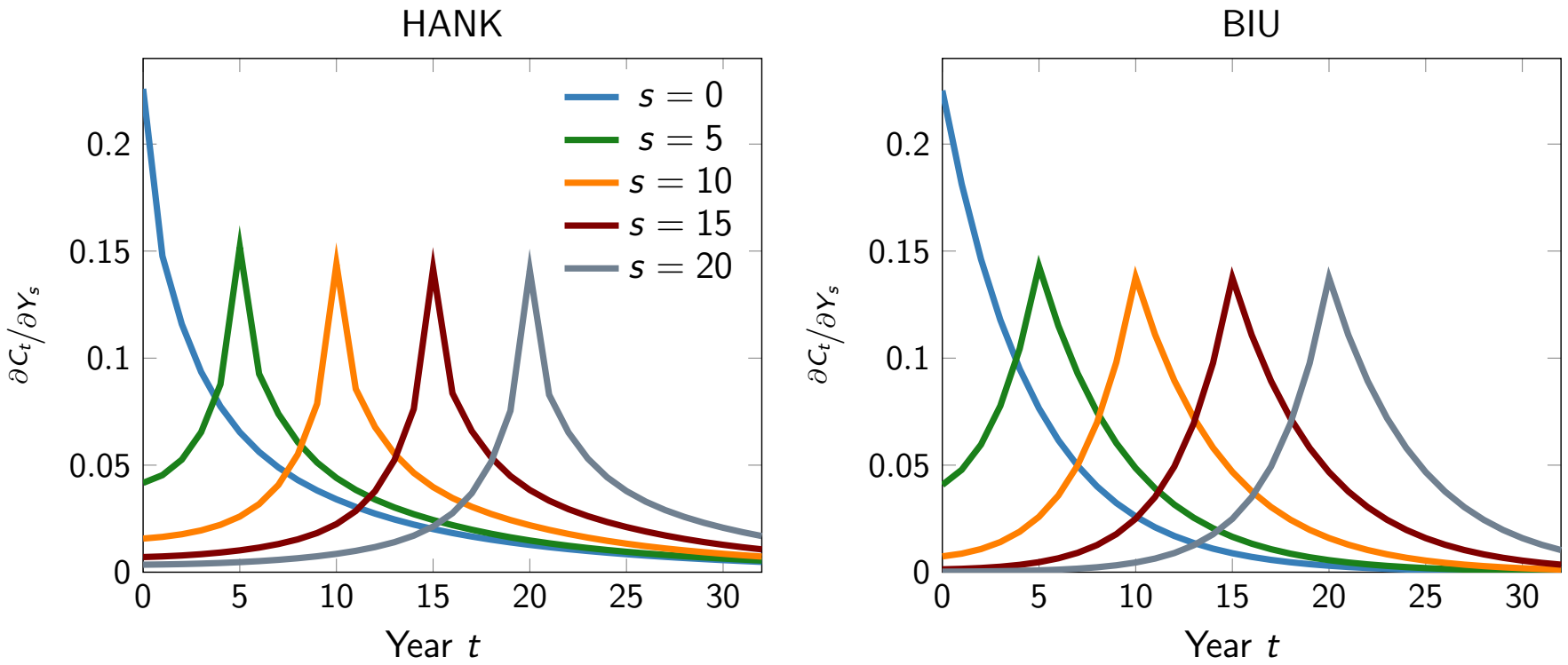
- Everything works through *either* future MPK or future r
- $G \uparrow$ pushes up future employment and therefore future MPK
- Crowding out likely occurs because $r \uparrow$
  - **Very nice** and testable mechanism: deficit financing raises r...
  - ... which in turn crowds out investment

HANK vs TANK comparison



- These impulse responses are exactly the right thing to look at:
  - Sufficient statistics for multipliers *and* equilibrium determinacy [Auclert-Rognlie-Straub]

HANK vs Rep agent with bonds in utility



- A bond in utility model gets closer: useful alternative to HANK?

Liquidity traps and state dependence

- "Liquidity trap multipliers similar to regular multipliers"?
  - We expect: ZLB vs Taylor rule
  - HMM: ZLB vs ZLB!
- Those are the *same* under rep agent, so this is *not* solving a puzzle
- However, what these results show is that the model has limited state dependence for given monetary policy. This is interesting.

Conclusion

- Very nice and ambitious paper!
  - First fiscal policy contribution to HANK, will likely be very influential
- Monetary policy specification not that plausible or canonical
  - Consider more standard alternatives for comparability with prior work
- Framework generates new testable implications
  - Flesh them out for future empirical work!

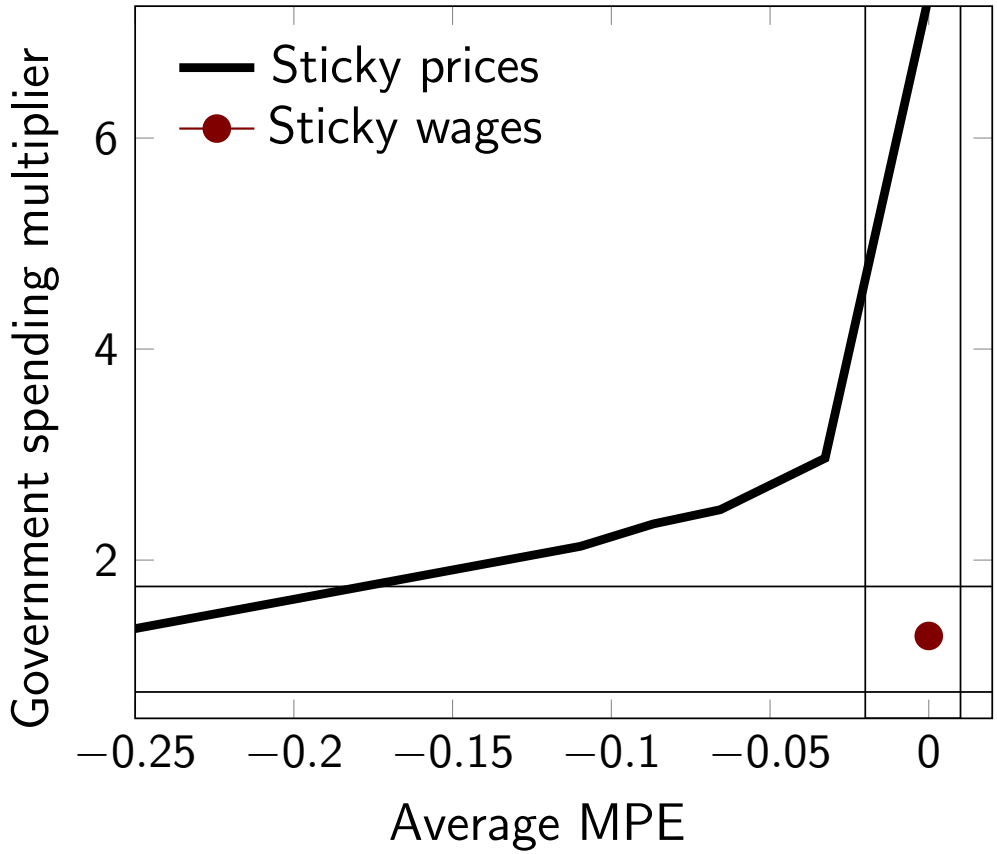
Thank you!

References

- Auclert and Rognlie "Inequality and Aggregate Demand", wp 2016
- Auclert and Rognlie "Labor Supply and Multipliers: a Dilemma for New Keynesian models", wp 2018
- Auclert, Rognlie and Straub "Stimulus and Amplification", wp 2018
- Auclert, Rognlie and Straub "The Intertemporal Keynesian Cross", wp 2018
- Guvenen, Schulhofer-Wohl, Song, and Yogo "Worker betas", AER P&P 2017

Labor supply and multipliers

- Consider HANK model with sticky prices calibrated to hit MPC=0.4
- Vary degree of complementarity between c and n in utility. Find:



MPE range from Cesarini et al (2017). Fiscal multiplier range from Ramey (2011). Back