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 theoretical, 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

- What is “the” fiscal multiplier?
- Clearly not one number, but a set of partial derivatives:

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

- Many multipliers, one for each pair \( t, s \)
- Typical to summarize by assuming path for \( G_s \), e.g.
- Then focus (here) on \( m_{t,0} = \frac{\partial Y_t}{\partial G} \)
- Can then be connected to regressions of \( Y_t \) on \( G_t \)

- Depend on model parameters and policy \( \Theta \), in particular
  - a) Factors affecting labor supply → neoclassical models
  - b) Monetary policy → standard NK model
  - c) Equilibrium selection → if m.p. not sufficiently responsive
  - d) How gov adjusts the budget → if Ricardian equivalence fails
  - e) State of the economy → MPCs, wealth distribution, etc.

- Contribution #2: quantitative evaluation of importance of d) & e)
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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 \( m_0 = \frac{\partial Y}{\partial G} \)
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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

\[
\begin{align*}
\dot{c}_t &= \hat{\sigma}^{-1} (i_t - \pi_t) \\
\rho \pi_t - \dot{\pi}_t &= \kappa (c_t + (1 - \Gamma) g_t)
\end{align*}
\]

Here \( c_t \equiv \frac{dC_t}{Y} \), \( g_t \equiv \frac{dG_t}{Y} \), \( \hat{\sigma}^{-1} \) 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, \( m = \Gamma = \frac{\hat{\sigma}}{\phi + \hat{\sigma}} \in (0, 1) \) with \( \phi^{-1} \equiv \text{Frisch} \) (standard neoclassical wealth effect)
HMM equilibrium selection criterion

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

\[
\begin{align*}
\dot{c}_t &= -\hat{\sigma}^{-1}\pi_t \\
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(1)

- Dynamical system with 2 jump variables but only 1 positive root, so need one extra condition
  - Standard selection: $c_T = 0$ at some $T$
  - Fiscal theory selection (Cochrane): $\pi_0 = 0$. Resolves some puzzles.
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- Standard selection: \( c_T = 0 \) at some \( T \)
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- **HMM**: equivalent to long run nominal anchor \( P_\infty = P^* \)

Clear implication for fiscal multiplier: integrate (1) to see

\[
c_0 = \hat{\sigma}^{-1} \log \left( \frac{P_\infty}{P^*} \right) = 0
\]

so selection equivalent to directly choosing \( m = 1 \)
Three selections using HMM shock and parameters

**Government spending**

- Quarter
- Government spending

**Consumption**

- Quarter
- Consumption

- Standard
- Cochrane
- Price-level target

**Price level**

- Quarter
- Price level
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:

$$i_t = \phi \log \left( \frac{P_t}{P^*} \right)$$

then taking $\phi \to 0$

- Why? HANK model $\simeq$ RA model with bond in utility:

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

- 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 ≃ 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
2. very large fiscal multipliers
which are both are at odds with data.

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...so requires a rationing assumption for increases in labor demand $H_t$

HMM: income of individual with skill $e_t$

$$y_t (e_t) = (1 - \tau_t) W_t H_t e_t + T_t$$
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$$y_t(e_t) = (1 - \tau_t) W_t H_t e_t + T_t$$

- Implicit equal-incidence assumption
- 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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\[
\frac{\partial Y_t}{\partial G_s} = 1_{s=t}
\]

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 $\tau$ 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
Deficit financing appears to crowd out investment

This is due to the specification of monetary policy

With quadratic adjustment costs, aggregate investment dynamics are

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

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

- $0.25$
- $0.15$
- $0.1$
- $0.05$
- $0.05$

Average MPE

Government spending multiplier

Sticky prices
Sticky wages