Discussion on “The Effects of Redistribution in TANK models”

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Standard disclaimers apply.
Overview

- Research direction: Make assumptions to simplify NK + (heterogeneous agents) to get analytic/simple expressions

- Models share the same Philips-curve + Taylor-rule

\[
\begin{align*}
\pi_t &= \beta E_t [\pi_{t+1}] + \kappa \tilde{y}_t \\
i_t &= \phi_{\pi} \pi_t + \phi_{\pi E} E_t \pi_{t+1} + \phi_y (\tilde{y}_t + y^n_t - y_{ss}) + \nu_t \\
\tilde{y}_t &= y_t - y^n_t
\end{align*}
\]

- Difference comes from the construction of Euler equation.
Overview

  - Assume two agents (static)
  - One of the agents always consume everything
  - Assumption on labor supply (so that things scale)
  - Zero liquidity

- **PRANK Models** (Acharya-Dogra 2018)
  - No borrowing constraint (income shock is cyclical)
  - Scaling utility function (CARA)

- **a-HANK** (Bilbiie 2019), discounted Euler Equation (McKay et al. 2017), ...
TANK Simplification Intuition

\[ c_t^U = \mathbb{E}_t[c_{t+1}^U] - \frac{1}{\sigma} \left[ i_t - \mathbb{E}_t[\pi_{t+1}] - r_t^n \right] \]

\[ c_t = (1 - \lambda \gamma_t) c_t^U \]

\[ \gamma_t := 1 - \frac{C_t^K}{C_t^U} \]

With no liquidity + particular transfer form

\[ \hat{\gamma}_t = - (\sigma + \varphi) \cdot \Psi(\lambda, \delta, \tau) \cdot \tilde{y}_t \]

Hence, \( c_t = y_t \) terms gain a scaling term in the Euler equation.
TANK Summary

$$\tilde{y}_t = E_t[\tilde{y}_{t+1}] - \frac{1}{\sigma(1 - \Phi)} (i_t - r^n_t - E_t[\pi_{t+1}])$$

$$\pi_t = \beta E_t[\pi_{t+1}] + \kappa \tilde{y}_t$$

$$i_t = \phi \pi_t + \phi E\pi E_t \pi_{t+1} + \phi y(\tilde{y}_t + y^n_t - y_{ss}) + \nu_t$$

$$\tilde{y}_t := y_t - y^n_t$$

- Φ is the only change from introducing two-agent to the standard NK-model.

$$\Phi = \Phi(\lambda, \delta, \tau)$$

λ = fraction of constrained, δ fraction of profits as dividends, and τ fraction of dividend to constrained households.
Assumptions for the Paper

As there are two agents, one can summarize redistribution in the economy with the transfer to the “constrained/Keynesian” households.

transfer to constrained := ...
Assumptions for the Paper

- As there are two agents, one can summarize redistribution in the economy with the transfer to the “constrained/Keynesian” households.

  \[
  \text{transfer to constrained} := \delta \cdot (1 - \tau) D_t + \overline{D} + \ldots
  \]

- It is assumed that \( \overline{D} = 0 \), i.e., assumes a subset of possible redistributions.

- \( \overline{D} = 0 \) means that only the transfers contingent on the level of current profit is allowed.

- Are constrained more likely to receive transfers independent of profit dynamics?
Mckay-Nakamura-Steinsson

- Mckay-Nakamura-Steinsson finds that heterogeneity reduces forward guidance.

- Assumptions on transfers
  - Profit is distributed equally to households $\Rightarrow \tau = \lambda$
  - There are non-zero government transfers contingent on people’s income level. $\Rightarrow \overline{D} \neq 0$

- Since low-skill households are more likely to be constrained in Bewley-Aiyagari-Huggett model, it should map to positive $\overline{D}$, i.e., $\neq 0$.

- Hence, McKay et al. (2016) is not in the set of transfers considered in this paper.

- Transfers in Kaplan-Moll-Violante (2017) more elaborate
More General Transfers?

- We can consider more general transfers with $\overline{D} \neq 0$

$$\tilde{y}_t = E_t[\tilde{y}_{t+1}] - \frac{1}{\sigma(1 - \Phi)} (i_t - r^n_t - E_t[\pi_{t+1}])$$

but ends up with different $\Phi$ and $r^n_t$.

- More complicated expression as the change shows up in two places

- One can go further and have different dependence on parameters

  $$\text{transfer to constrained} := \delta \cdot (1 - \tau) D_t + \overline{D} + \delta_y Y_t + \ldots$$

- At the end of the day, it is still a “two-agent approximation,” i.e., hard to translate HA-transfer schemes into TA-parameters or how good the approximations are.
(McKay et al 2016) Test

How does the model behave differently if you change the distribution of the profits.

\[ T_t = (\Pi_t - \Pi_{ss}) \cdot f(\text{asset, income}) + \Pi_{ss} \cdot g(\text{asset, income}) \]
\[ = (\Pi_t - \Pi_{ss}) \cdot e^{\lambda_a \cdot \text{asset} + \lambda_z \cdot \text{income}} + \Pi_{ss} \cdot e^{\lambda_{a,ss} \cdot \text{asset} + \lambda_{z,ss} \cdot \text{income}} \]

- When \( \lambda_{j,ss} = \lambda_j \), the updated distribution has an impact on the steady-state distribution.
- When \( \lambda_{j,ss} = 0 \), does not impact distribution.
- Disclaimer: Following test based on half a day of playing around
(McKay et al 2016) Test

\[ \lambda_{z,ss} = \lambda_z = \text{given}, \lambda_a = \lambda_{a,zz} = 0 \]
(McKay et al 2016) Test

From analytic expression, equation (72) in paper

- Unfortunately, the relationship isn’t monotone... Our case is $\delta = 1$ and $\tau = ??$
(McKay et al 2016) Test

Baseline: $\lambda' s = 0$, Both: $\lambda_{z,ss} = -0.1$, $\lambda_z = -0.1$, only dynamics: $\lambda_z = -0.1$
(McKay et al 2016) Test

Baseline: $\lambda_s = 0$, Both: $\lambda_{zs,ss} = -1$, $\lambda_z = -1$, only dynamics: $\lambda_z = -1$

- The transfer policy is no longer the same
Conclusion

- Nice that the expressions given in the paper qualitatively move in the same direction as the expression computed without simplifying assumptions.
  - ... “quantitatively” it is implicitly making an assumption on distribution.
  - Still hard to know whether the parameter mapping is proper IF one wants to use it as a sanity check for heterogeneous agent case.

- Given the difference in the transfer schemes, it is not surprising that to get different results under TA- and HA- w.r.t forward guidance puzzle

- Might be interest to see the result with richer transfer scheme.

- Did not have time to cover, but the expression showing “discounting” in the Euler equation if you include the output-gap in the Taylor rule is nice.