Discussion of "Achieving Price Stability ..." by R. Hall and R. Reis

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Two Comments

- Interesting and provocative paper.

- I have two comments:

1. What is the mechanism?

2. Reserves are perpetuities - and why that might matter

WHAT IS THE MECHANISM?

A Mysterious Mechanism

- Somehow, the existence of an arbitrage opportunity in the asset market forces the price level to change in the goods market.

- How does this work exactly?

- In my view, the authors need to provide more clarity on this point.

My Understanding of the Mechanism

- Assume that, **in equilibrium**, there exist households:
  - with positive consumption in period t and period $(t+1)$
  - who are unconstrained in their holdings of some financial asset with **nominal gross** return R_{t+1} from period t to period $(t+1)$.
  - hold a positive amount of reserves (electronic dollars)

- Note: the nominal gross return is potentially random from the point of view of period t.

Marginal Indifference in Equilibrium

- Given these assumptions ...

- The relevant households are marginally indifferent in period t between current consumption and the financial asset.

- This means, in turn, that they are marginally indifferent between:

  - period t consumption

  - a (possibly random) period $(t+1)$ consumption payoff $\frac{R_{t+1}P_t}{P_{t+1}}$.

- Here, P_{t+s} is the price level in period $t+s, s = 0, 1$.

The Payoffs to Reserves

- The central bank makes the following commitment.

- The holder of a dollar of reserves at the end of period t receives $\$\frac{R_{t+1}P_t}{P_t^*}$ of reserves to take into period $(t+1)$.

  - P_t^* is the desired price level in period t

  - As in Hall-Reis, reserves are one-period assets.

How Hall-Reis Price Level Targeting Works (I Think)

- Suppose $P_t > P_t^*$.

- Consider a trade of consumption for reserves.
  - ϵ units of period t consumption $\Rightarrow \epsilon P_t$ dollars of period t reserves
  - $\Rightarrow \epsilon P_t R_{t+1} \frac{P_t}{P_t^*}$ dollars of reserves in period $(t+1)$.
  - $\Rightarrow \epsilon \frac{P_t R_{t+1}}{P_{t+1}} \frac{P_t}{P_t^*}$ units of consumption in period $(t+1)$
  - which is greater than $\epsilon \frac{R_{t+1} P_t}{P_{t+1}}$ units of consumption in period $(t+1)$.

- Remember: households were marginally indifferent between period t consumption and $\frac{R_{t+1}P_t}{P_{t+1}}$ units of period $(t+1)$ consumption.

- So, if $P_t > P_t^*$, they are made strictly better off by giving up consumption for reserves.

  – That demand for reserves drives down the price level P_t.

- Conversely, if $P_t < P_t^*$, they are made better off by buying consumption with reserves.

  – That demand for goods drives up the price level P_t.

Equilibrium: $P_t = P_t^*$.

Lingering Concerns

- **Concern 1**: I assumed that in equilibrium, some households were unconstrained in their holdings of reserves and in their holdings of some other financial asset.

- **Concern 2:** Implicitly, I assumed that both the nominal financial asset and reserves have positive value (so that $0 < R_t < \infty$) in equilibrium.

- Are these assumptions necessarily valid, given Hall-Reis mechanism?

- **(Related) Concern 3:** My analysis was pretty vague.

- It would be better to have a more explicit model of goods/asset exchange to clarify what happens when P_t differs from P_t^*.

- This analysis would be most compelling if, a la Bassetto 2002, it broke free of the black box of Walrasian exchange.

- Of course: this is a comment about much of the literature about indeterminacy/determinacy in macroeconomics.

RESERVES ARE PERPETUITIES

Reserves Last Forever

- In Hall/Reis, reserves are extinguished at the end of a period.
- This isn't true in reality.
- Much as in Hall (1997), bank reserves are actually perpetual bonds with adjustable coupon payments.
  - along with option to exchange for currency ... but let's ignore that.

Hall-Reis with Perpetual Reserves

- Suppose a dollar reserve held at end of period t makes an interest payment of:

$$r_t P_{t+1}/P_t^* + (P_{t+1}^*/P_t^*) - 1$$

dollar reserves at the end of period $(t+1)$.

- Here, r_t is the real yield (known in period t) on a TIPs bond from period t to period $(t+1)$.

- P_{t+s}^* is the desired price level in period $(t+s), s = 0, 1$.

- P_{t+1} is the actual price level in period $(t+1)$.

- The arbitrage-free goods price ξ_t of this consol satisfies the linear diff eq'n:

$$\xi_t = V_t(r_t/P_t^* + \xi_{t+1}P_{t+1}^*/P_t^*)$$

where V_t is valuation operator.

- Suppose it is common knowledge at date t that $\xi_{t+1} = 1/P_{t+1}^*$ with probability one.

- Then: $\xi_t = V_t(r_t/P_t^* + 1/P_t^*) = V_t(1 + r_t)/P_t^* = 1/P_t^*$.

- We have a recursive application of Hall-Reis argument.

More Subtleties Emerge

- In some sense, we can extend Hall-Reis argument to the more realistic case in which reserves are perpetual bonds.

- But the argument now:
  - hinges on the credibility of the *future* price level target.
  - relies on banks demanding similar one-year holding period returns on a short-term TIPs and a perpetual real floating-rate bond.

- These seem like more delicate foundations.

Recommended Responses to My Two Comments

- Response 1: The paper should be a lot clearer about the nature of the mechanism that rules out equilibria in which P_t does not equal P_t^*.
  - at a bare minimum, it needs some intuitive discussion of this issue along the lines that I describe.

- Response 2: Model reserves (more realistically) as perpetual instruments and discuss how one might deal with the resultant subtleties.