Discussion on “Inflation and the Price of Real Assets”
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What the paper is about

**Facts:** in the 70s the US experienced

1. a drop in household wealth/GDP
2. portfolio reallocation from equity to real estate

**This paper:** OLG model with rich portfolio decision to match micro household data

**Key ingredients:**

- change in the households distribution due to baby boom
- higher and more dispersed expected inflation
- pessimistic expectations for growth and equity returns
In summary

Temporary Equilibrium

Drop in wealth/income

Portfolio Reallocation

Temporary Equilibrium

- consider a representative consumer with access to $J$ assets

- for now take as given $\{R_t^j\} \sim F$ iid

- optimization problem

\[
V(w_t) = \max \ u(c_t) + \beta E[V(w_{t+1})]
\]

subject to

\[
c_t + \sum_j a_t^j \leq w_t \text{ and } w_{t+1} = \sum_j R_{t+1}^j a_t^j
\]

where $a_t^j \equiv p_t^j \theta_t^j$

- optimal behavior:

\[
p_t^j \theta_t^j = s(F) \alpha_t^j (F) w_t
\]
Temporary Equilibrium (continued)

- given process for supply \( \{ \bar{\theta}_t^j \} \) and for dividends \( \{ d_t^j \} \)
- market clearing requires
  \[
  p_t^j \bar{\theta}_t^j = s(F) \alpha^j(F) \sum_j (p_t^j + d_t^j) \bar{\theta}_t^j - 1
  \]
- Temporary Equilibrium: solve for \( \{ p_t^j \} \) given \( F \)
Temporary Equilibrium vs REE

• REE: solve for $F$ fixed point (if it exists)

$$R^j_{t+1} \sim \frac{p^j_{t+1} + d^j_{t+1}}{p_t^j}$$

• maybe REE requires additional state variables...

• Temporary Equilibrium could also be defined with some predictability of returns

• for example some agents may buy more houses when they see low $p_t/d_t$...
Heterogeneity

- TE model aggregates nicely, so one can focus on heterogeneity

\[ s(F_i) \alpha^j(F_i) = \sum_i s_i(F_i) \alpha^j_i(F_i) \frac{w_i}{\sum_k w_k} \]

- agents \( i \) differ by age, financial and human wealth endowment, beliefs
Paper Strategy

- focus on a sequence of temporary equilibria that are initialized at the beginning of each period

for each period:

1. initialize the joint distribution of asset and income endowments using SCF
2. initialize beliefs on returns and income using historical data and surveys
3. infer the aggregate supply of assets, bonds, and housing using FFA
4. find the equilibrium prices and wealth for that period
Saving Rate and Asset Prices

- aggregate wealth quite sensitive to saving rate

\[ p_t \theta_t = s_t (p_t + d_t) \theta_{t-1} \]

- Lucas tree with log utility

\[ p_t = \beta (p_t + d_t) \]

- aggregate wealth/income

\[ \frac{\text{wealth}}{\text{income}} = \frac{p_t \theta_t}{d_t \theta_{t-1}} = \frac{s_t}{1 - s_t \theta_{t-1} / \theta_t} \]

- sensitivity to saving rate

\[ \frac{d \log \frac{\text{wealth}}{\text{income}}}{d \log s_t} = \frac{\theta_t}{\theta_t - s_t \theta_{t-1}} > 1 \]
Drop in Wealth/Income in the 70s

- in the ’70s big drop in average saving rate mainly due to baby boomers!

- drop in wealth/income in the 70s mainly due to drop in saving rate:

<table>
<thead>
<tr>
<th>Year</th>
<th>Data</th>
<th>Model</th>
<th>Model: Only $s_t$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1968</td>
<td>2.41</td>
<td>2.44</td>
<td>2.44</td>
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<tr>
<td>1978</td>
<td>2.08</td>
<td>2.11</td>
<td>2.18</td>
</tr>
</tbody>
</table>
Fixed Supply

- shocks to saving rate seem to have amplified effect if supply is fixed

- more generally:

\[ p_t \Theta(p_t) = s_t (p_t + d_t) \theta_{t-1} \]

- if \( \Theta'(p_t) > 0 \) effect on wealth/income is dampened
Asset Supply and Asset Prices

- aggregate wealth quite sensitive to assets supply

- if supply decreases, prices have to increase if demand did not change

- + multiplying effect of demand due to higher wealth

- similar for changes in bonds supply (drop in the 70s)

- but changes in bond supply may go together with changes in expected taxes...

- quantitatively not important channel
Portfolio Rebalancing

- higher expected inflation $\rightarrow$ higher taxes on stocks and bonds
- younger expect higher inflation and borrow more $\rightarrow$ housing can be more levered up
- lower stock return expectations $\rightarrow$ drop in equity price/dividend
Disagreement in Expectations

- two types of risk-neutral consumers: young and old
- two types of assets: bonds and trees
- bonds have return $1 + i - \pi^e$ and trees have expected return $R$
- young have higher inflation expectations: $\pi^Y > \pi^O$
- imagine
  \[ 1 + i - \pi^Y < R < 1 + i - \pi^O \]
- the old will invest only in bonds and the young will borrow from the old and invest in trees
Leverage

- now two types of trees with same expected return: equity and houses

- borrowing limit and only houses used as collateral

\[ b \geq -\phi h \]

- young invest 1 dollar in equity → gets \( R \)

- young invest 1 dollar in houses \( h \) he can also borrow extra \( \phi h \) dollars and buy

\[ h = \frac{1}{1 - \phi} \]

- then the return is

\[ \frac{R - \phi (1 + i - \pi^Y)}{1 - \phi} > R \]