Household Heterogeneity and Monetary Policy

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The views expressed here are those of the authors and do not necessarily reflect the position of the Federal Reserve Bank of Minneapolis, or the Federal Reserve System.
Distribution

Adjust this quarter

Adjust next quarter

Value of durable holdings
Distribution

Adjust this quarter

Adjust next quarter

Value of durable holdings
Lumpy durable consumption in monetary transmission

• Transmission mechanism: accelerate adjustments

• Three observations above are overturned:
  • Stimulating today leaves fewer to adjust later
    ⇒ History of rates matters
  
  • Marginal household considers adjust today vs. next period
    ⇒ Current rates matter more than future rates
  
  • Effects partly determined by mass near adjustment threshold
    ⇒ Demand less sensitive to stimulus in recessions
Textbook representative agent model

\[ y_t = -\frac{1}{\sigma} r_t + E_t y_{t+1} \]

- History of rates irrelevant
- Perfect substitution with future rates:
  \[ y_t = -\frac{1}{\sigma} E_t \sum_{s=0}^{\infty} r_{t+s} \]
  \[ \Rightarrow \text{ELB not really a problem} \]
- All interest rate cuts stimulate by \( 1/\sigma \)
Intertemporal shifting and policy space

- Textbook model: stimulus *creates* demand.

- Durables model: stimulus *shifts* demand from future.

- Stimulating now reduces future ammunition.

- Ammunition already reduced by
  - weaker forward guidance
  - cyclical policy effectiveness.
Model elements

- Households heterogeneous in
  - labor income
  - financial assets/debt
  - durable holdings
- Consume non-durables and service flow from durable stock
- Durable holdings subject to
  - fixed adjustment cost
  - depreciation and maintenance costs
  - operating costs
  - taste shocks
- Monetary policy
  - sticky wages $\Rightarrow$ Phillips curve
  - interest rate rule
1% (ANNUALIZED) CUT FOR 1 QUARTER
LOW-FOR-LONGER POLICIES

Output, % deviation from steady state

-1
-0.5
0
0.5
1
1.5
2
2.5
3

Quarters

0 1 2 3 4 5

2% Cut for 2 Quarter
1% Cut for 4 Quarters
0.5% Cut for 8 Quarters
• How much can the central bank raise current output?

• Cut real rate by 2.5% for four quarters.
  • 2.5% approximate level of current estimates of long-run $i^\ast$.
  • Four quarters ⇐ some ability to commit.

• Current output increases by 6.0%.

• Textbook model: future rates perfect substitute for current.
  • Output rises by $0.8 \times 0.025 \times 4 = 8.0\%$. 
History Matters

Output, % deviation from steady state

Quarters

Output

Annualized Real Rate

Output

Annualized Real Rate

Quarters
Summary of policy space

- Now suppose we already had four quarters stimulus.

⇒ Current output rises by 3.7%. 
Recession: permanent income shock

- Once and for all drop in TFP.
  - Estimate trend in CBO measure of potential GDP from 2000Q4 through 2007Q3.

- Calculate average deviation from trend from 2007Q4 onwards.

⇒ 4.5% decline in permanent income.
PERMANENT INCOME SHOCK

![Graph showing output deviation from new steady state over quarters for different scenarios: Recession, Recession + current stimulus, Recession + past stimulus, Recession + past stimulus + current stimulus. The y-axis represents the percentage deviation from the new steady state, and the x-axis represents quarters. The graph illustrates the impact of different stimulus scenarios on output during recessions.]
Effect of stimulus falls in recession
## Summary of policy space

<table>
<thead>
<tr>
<th>Experiment</th>
<th>Policy space</th>
</tr>
</thead>
<tbody>
<tr>
<td>Textbook model</td>
<td>8.0%</td>
</tr>
<tr>
<td>Lumpy durables, normal times</td>
<td>6.0%</td>
</tr>
<tr>
<td>Four quarters previous stimulus</td>
<td>3.7%</td>
</tr>
<tr>
<td>Recession, no prev. stimulus</td>
<td>3.1%</td>
</tr>
<tr>
<td>Recession &amp; prev. stimulus</td>
<td>1.6%</td>
</tr>
</tbody>
</table>
Evidence on Stimulus Reversals

Monthly Purchases to Average 2008 Monthly Purchases Ratio
High versus Low CARS Exposure Cities

Cumulative Difference in Auto Sales
High minus Low CARS Exposure Cities
Takeaways

- Intertemporal shifting of demand.
  - Justification for policy space concerns.
  - Points to a particular risk-management approach.

- Effects of policy depend on the circumstances of households.
  - Good reason to monitor distributions of income, assets, etc.