Household Heterogeneity and Monetary Policy

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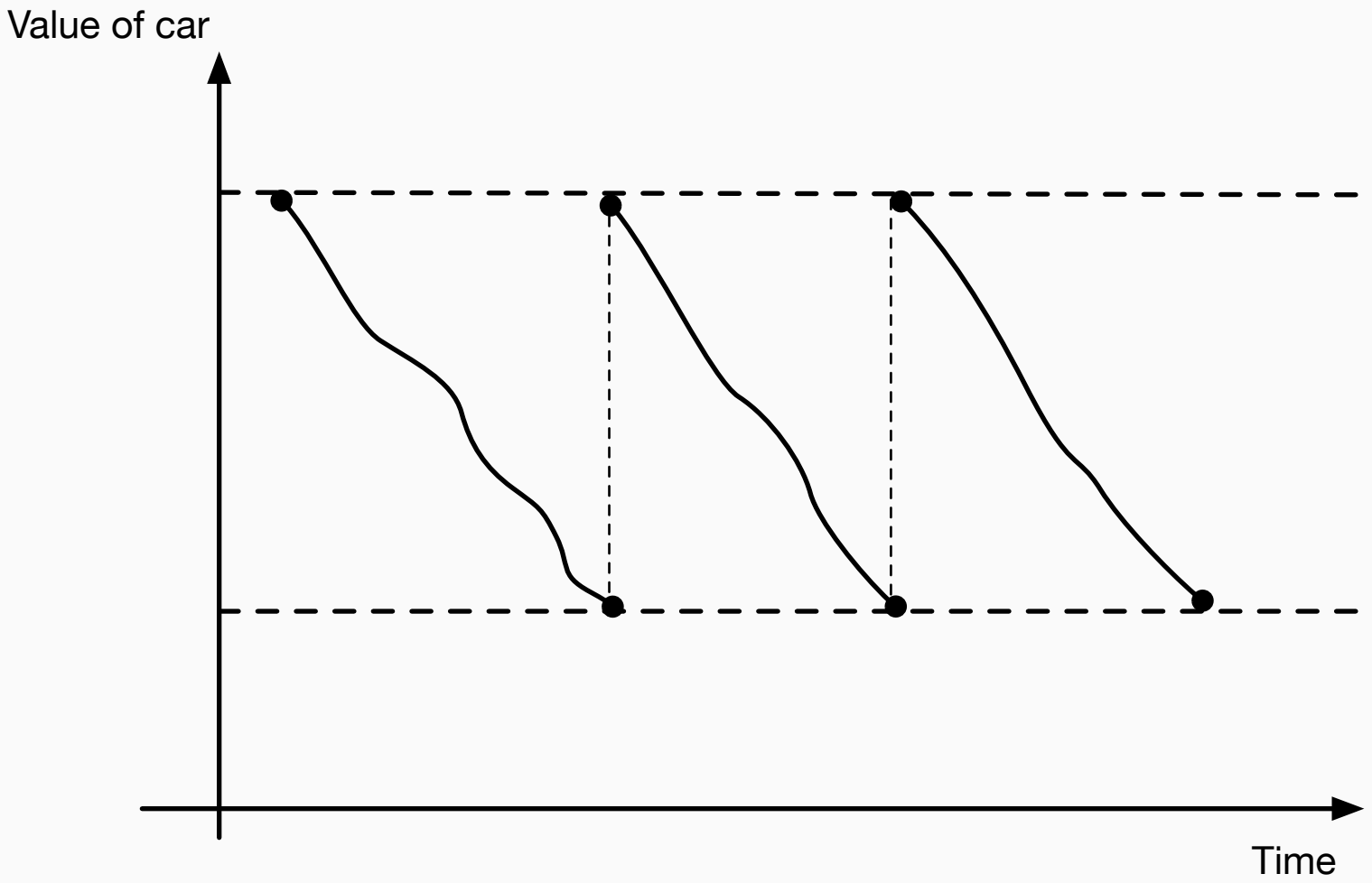
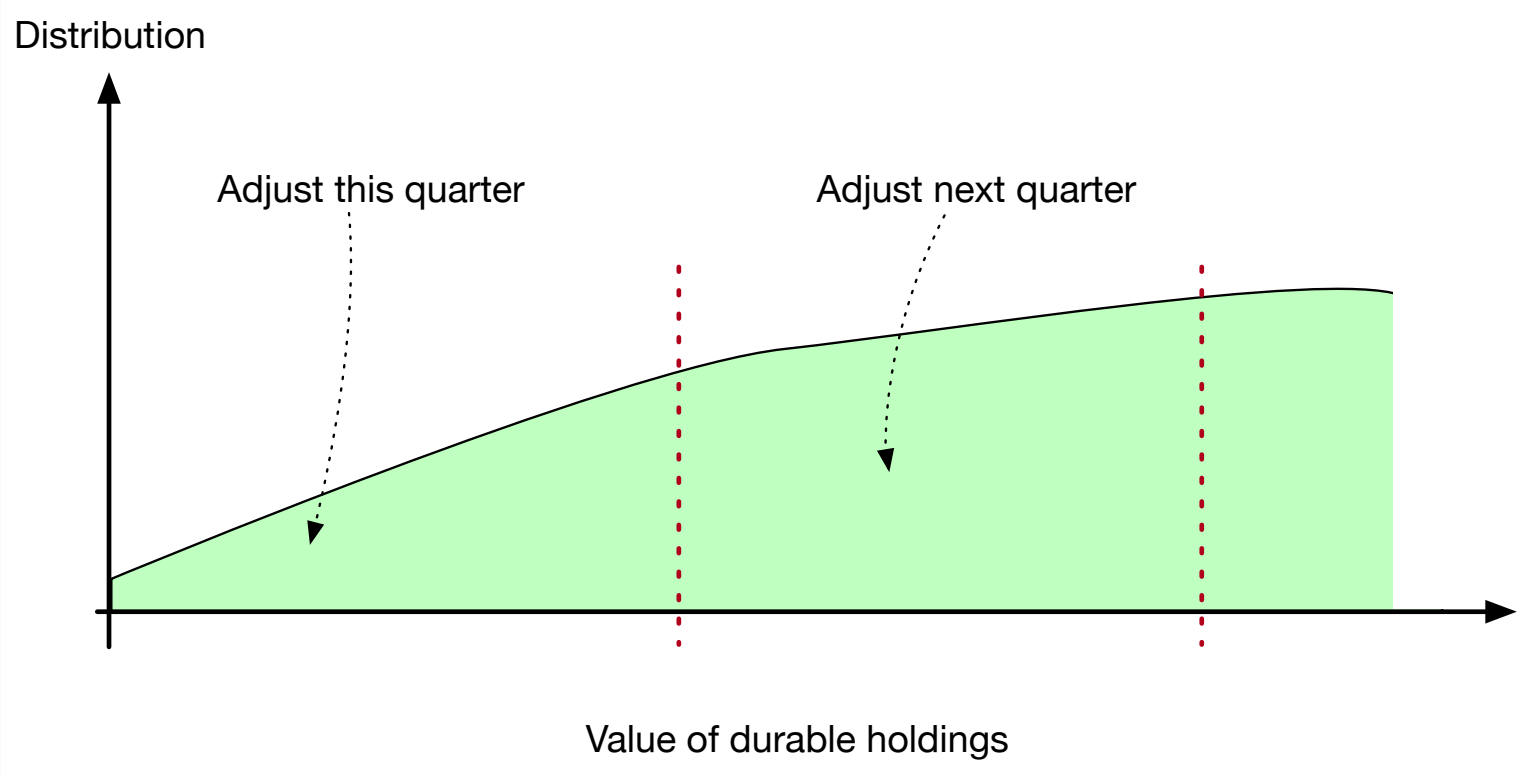
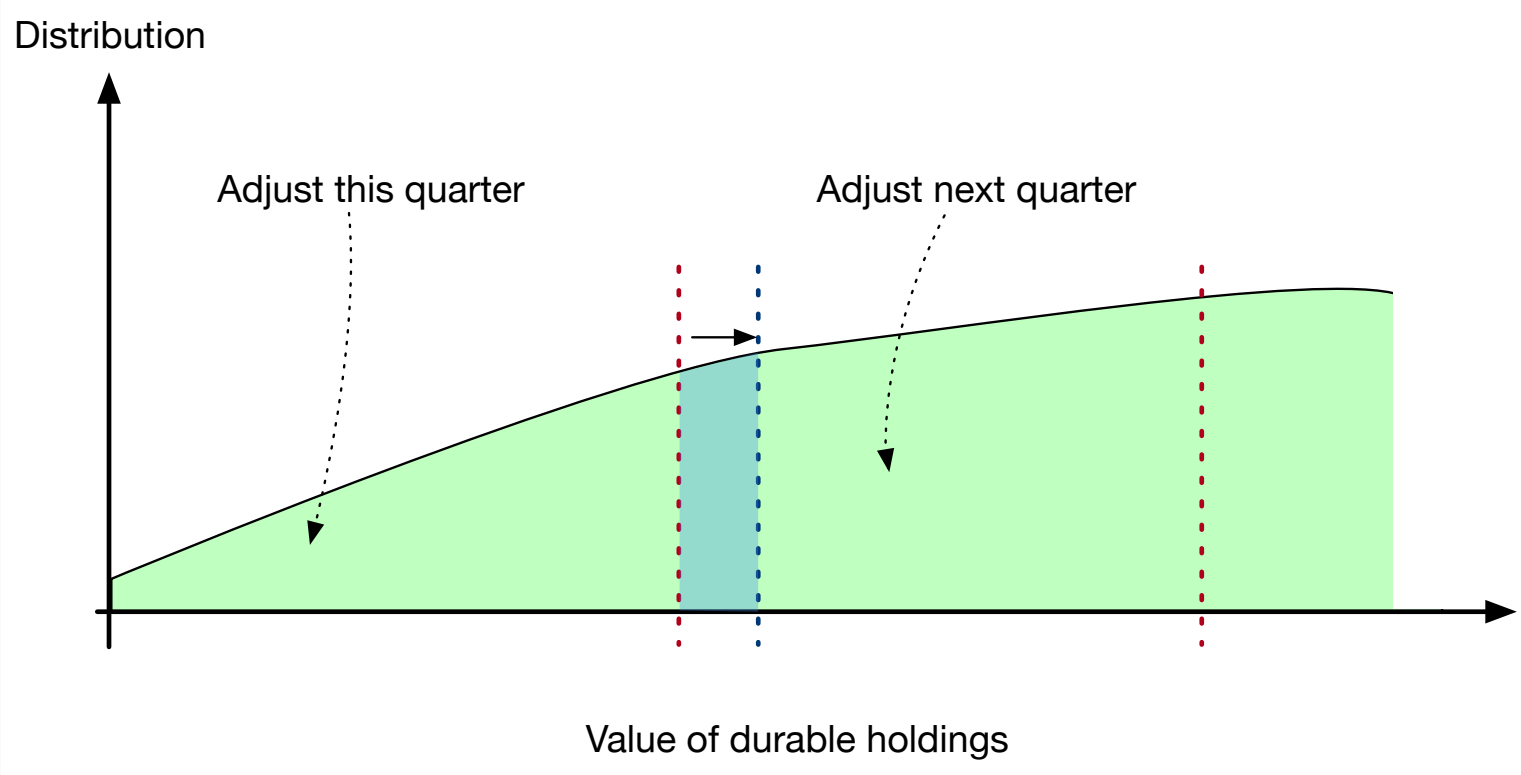
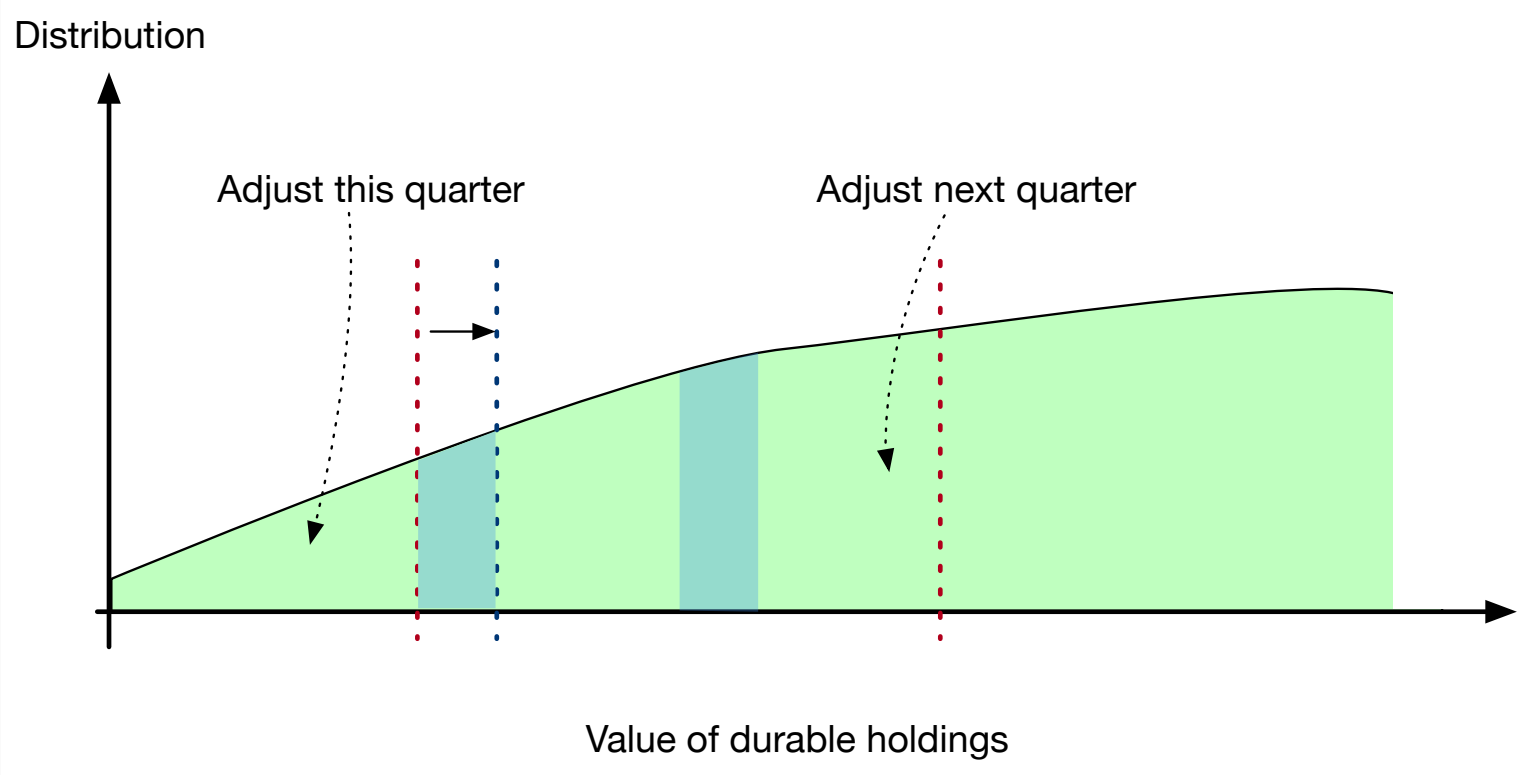

Value of car
Time


Distribution
Adjust this quarter
Adjust next quarter
Value of durable holdings


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
    $\Rightarrow$ History of rates matters
  - Marginal household considers adjust today vs. next period
    $\Rightarrow$ Current rates matter more than future rates
  - Effects partly determined by mass near adjustment threshold
    $\Rightarrow$ Demand less sensitive to stimulus in recessions

Textbook representative agent model

$$y_t = -\frac{1}{\sigma} r_t + \mathbb{E}_t y_{t+1}$$

- History of rates irrelevant
- Perfect substitution with future rates: $y_t = -\frac{1}{\sigma} \mathbb{E}_t \sum_{s=0}^{\infty} r_{t+s}$
  $\Rightarrow$ ELB not really a problem
- All interest rate cuts stimulate by $1/\sigma$

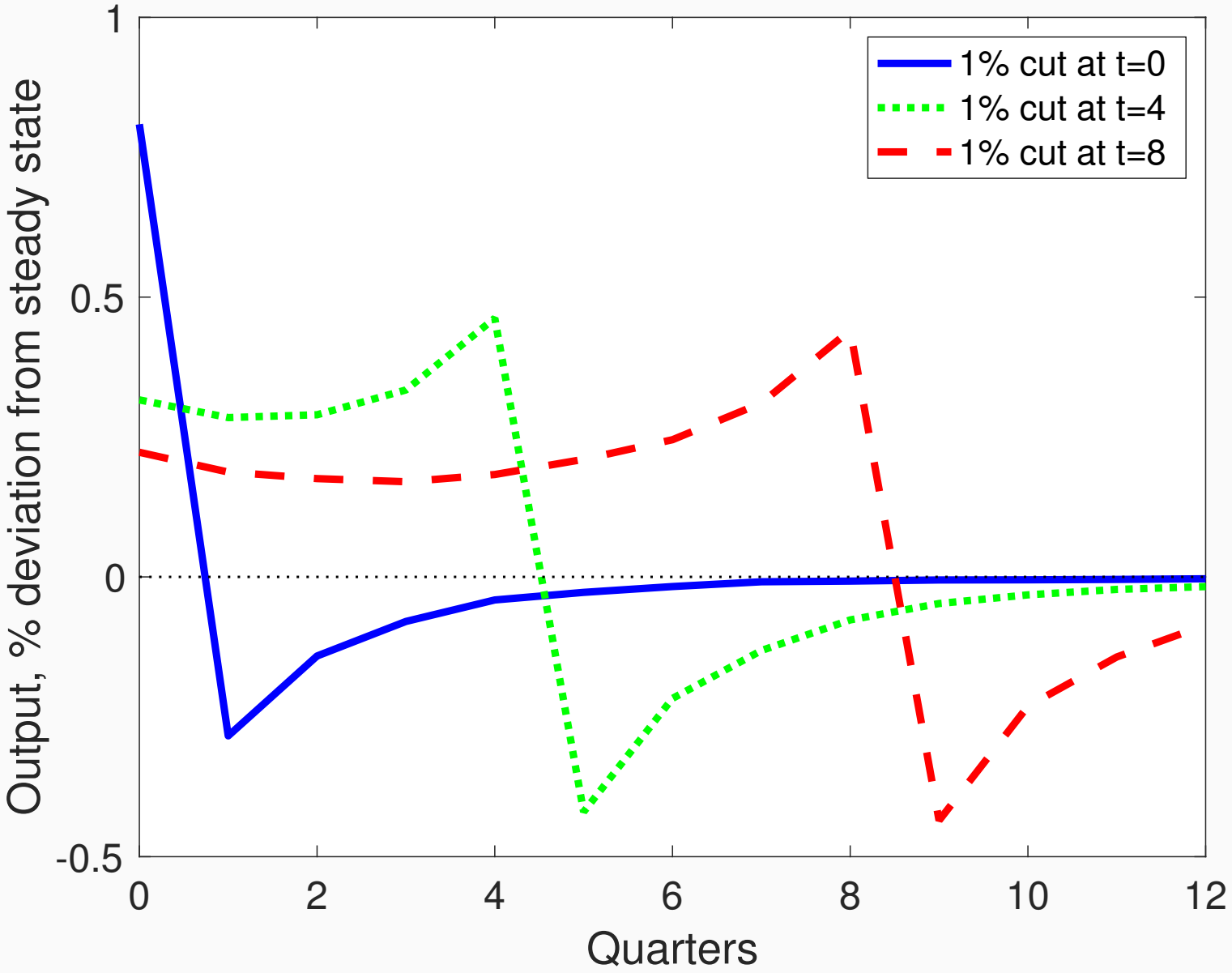
Intertemporal shifting and policy space

- 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.

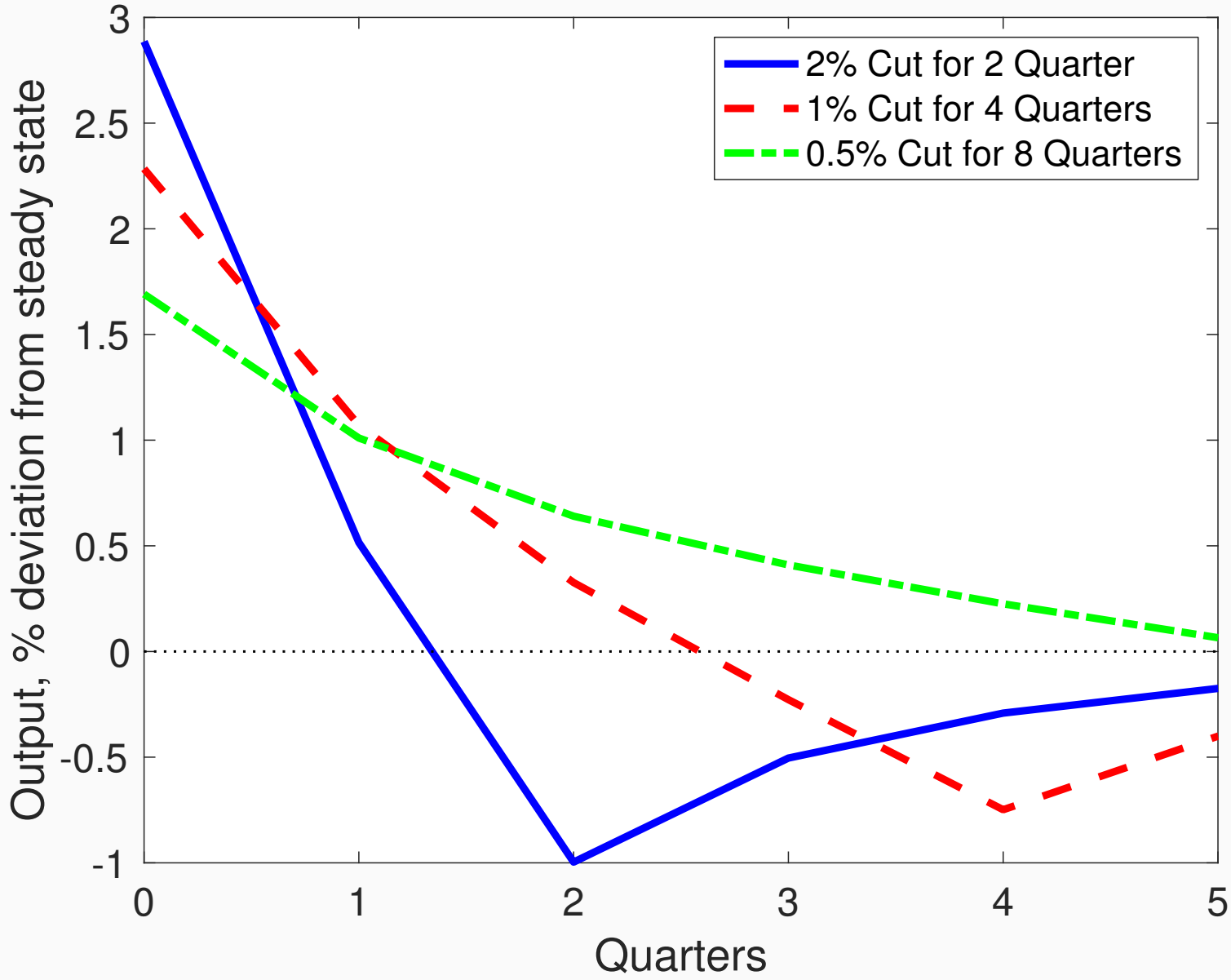
Model elements

- 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



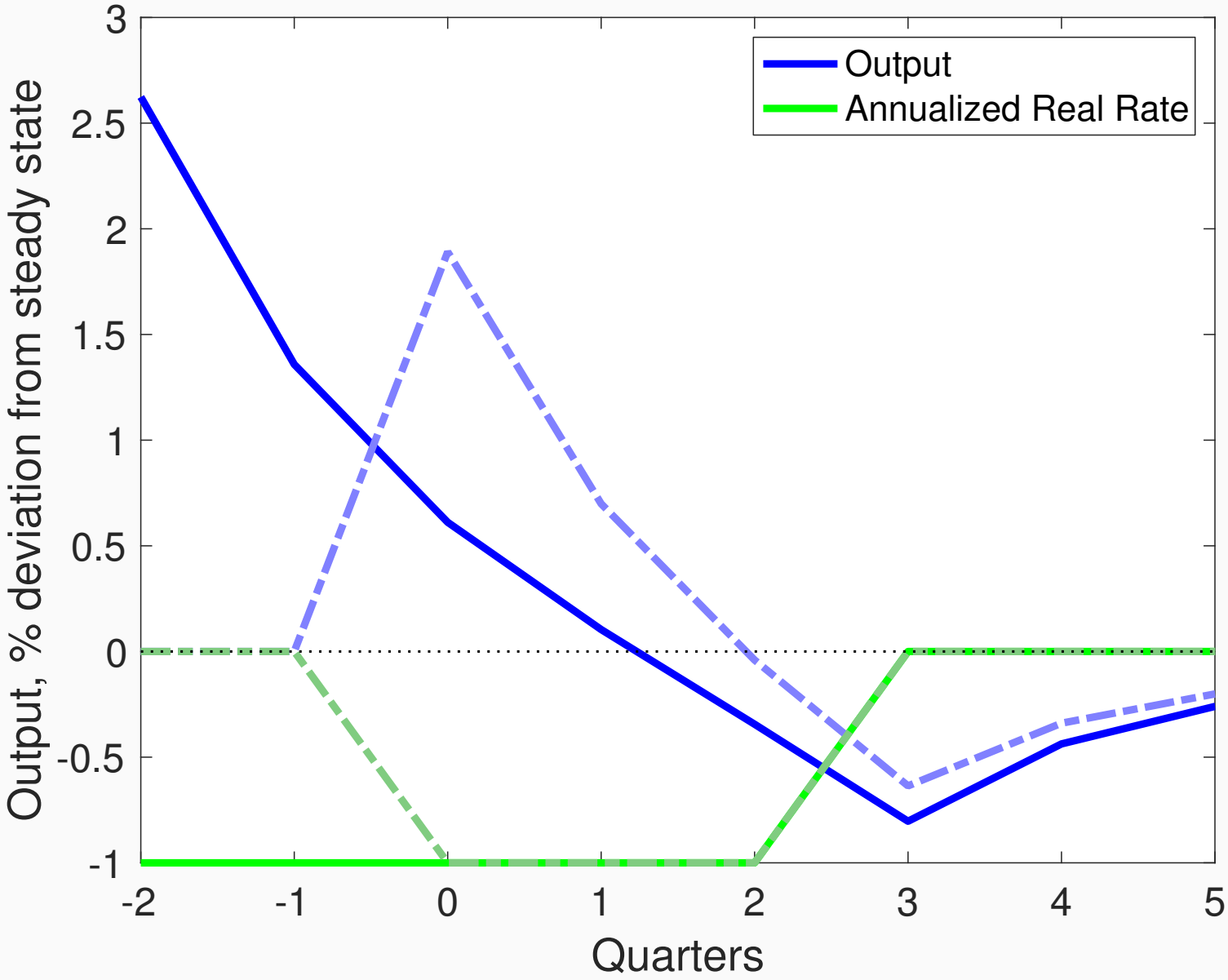
LOW-FOR-LONGER POLICIES



Summary of policy space

- 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^*.
  - Four quarters $\Leftarrow$ 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



Summary of policy space

- Now suppose we already had four quarters stimulus.

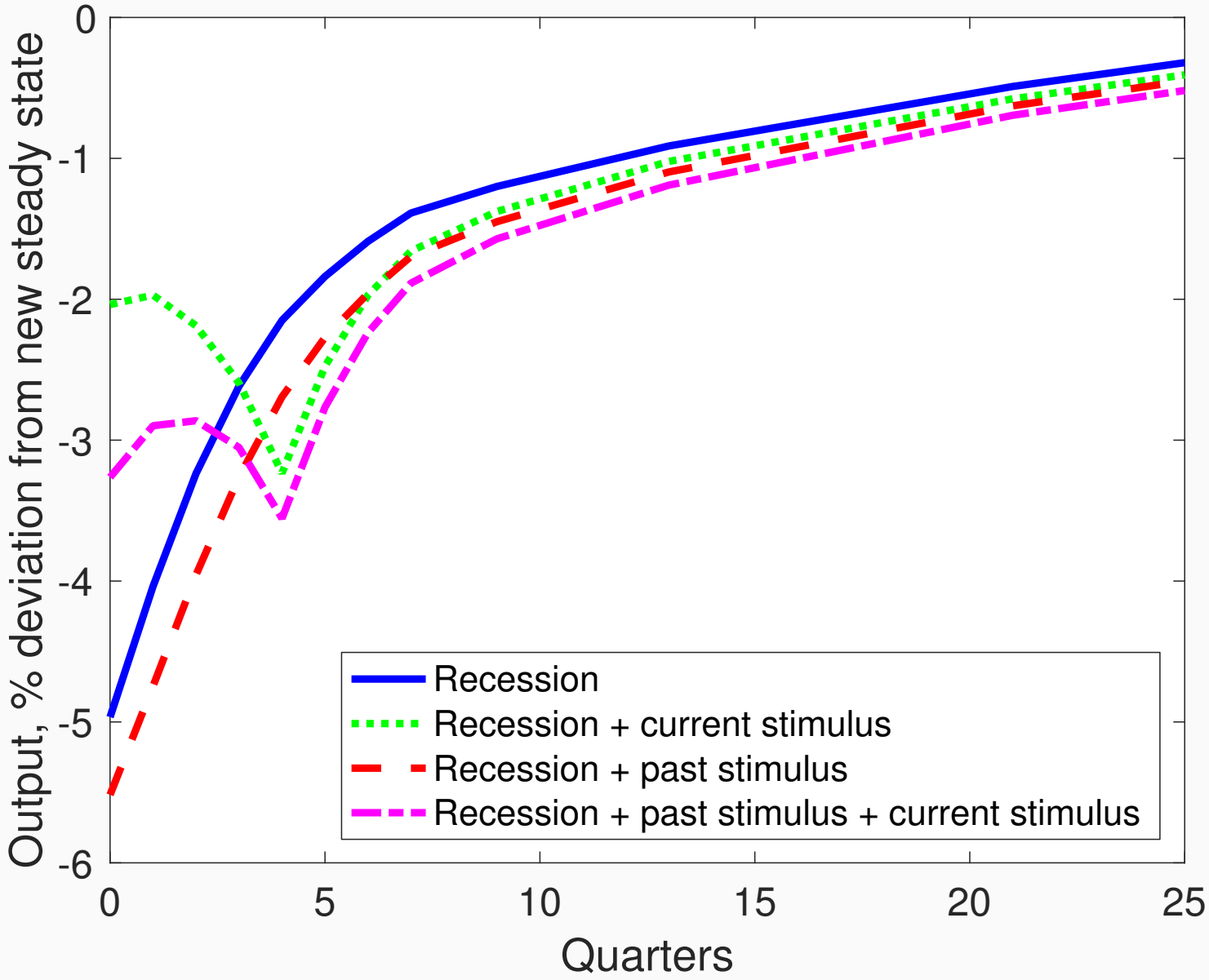
  $\Rightarrow$ Current output rises by 3.7%.

Recession: permanent income shock

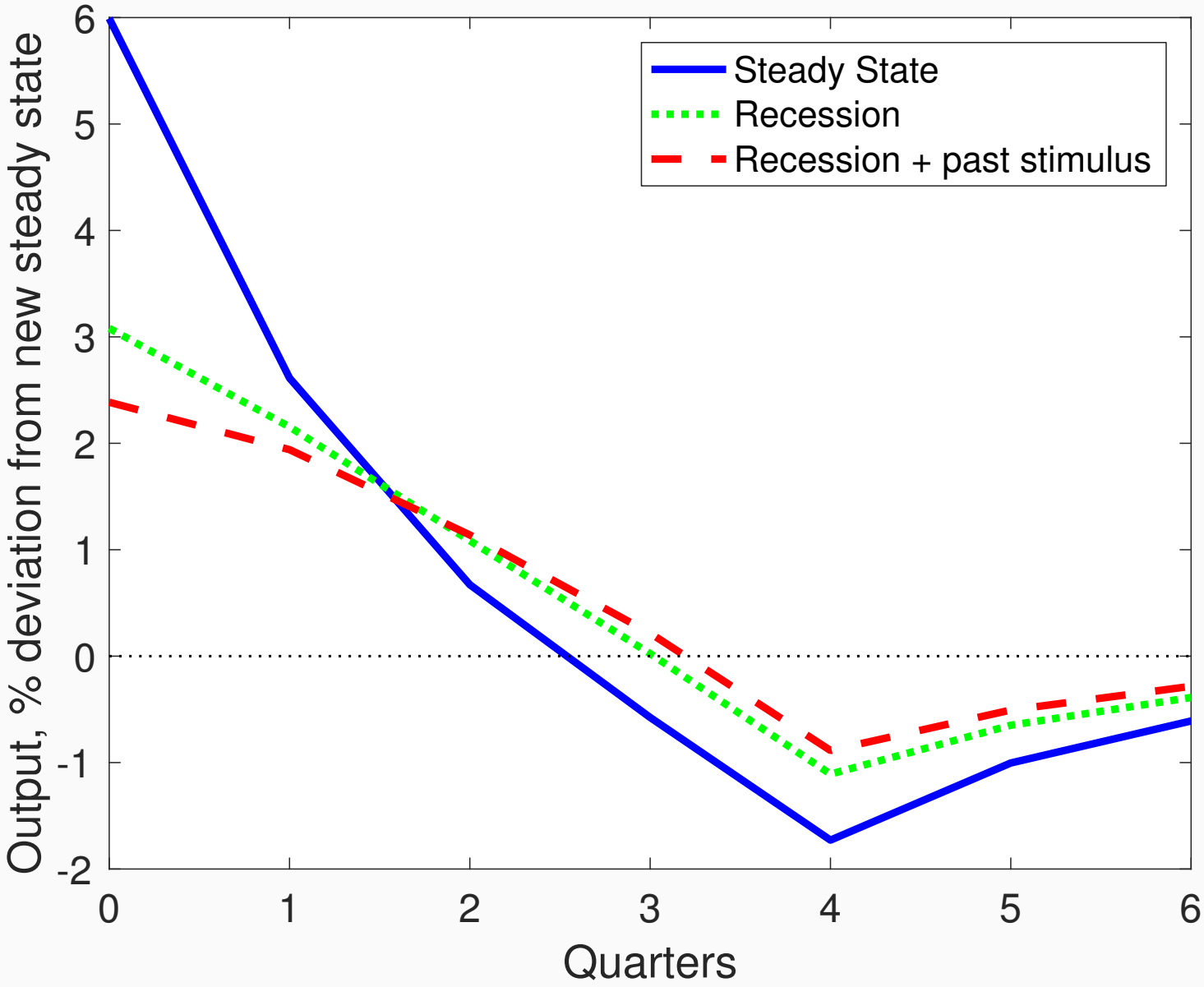
- Once and for all drop in TFP.
  - Estimate trend in CBO measure of potential GDP from 2000Q4 through 2007Q3.
  - Calculate average deviation from trend from 2007Q4 onwards.

$\Rightarrow$ 4.5% decline in permanent income.

PERMANENT INCOME SHOCK



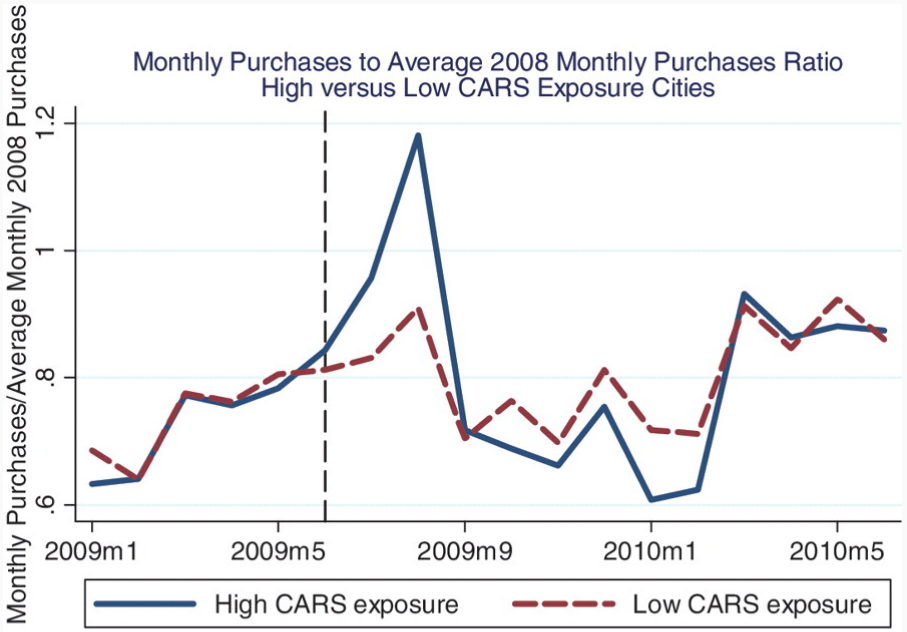
EFFECT OF STIMULUS FALLS IN RECESSION

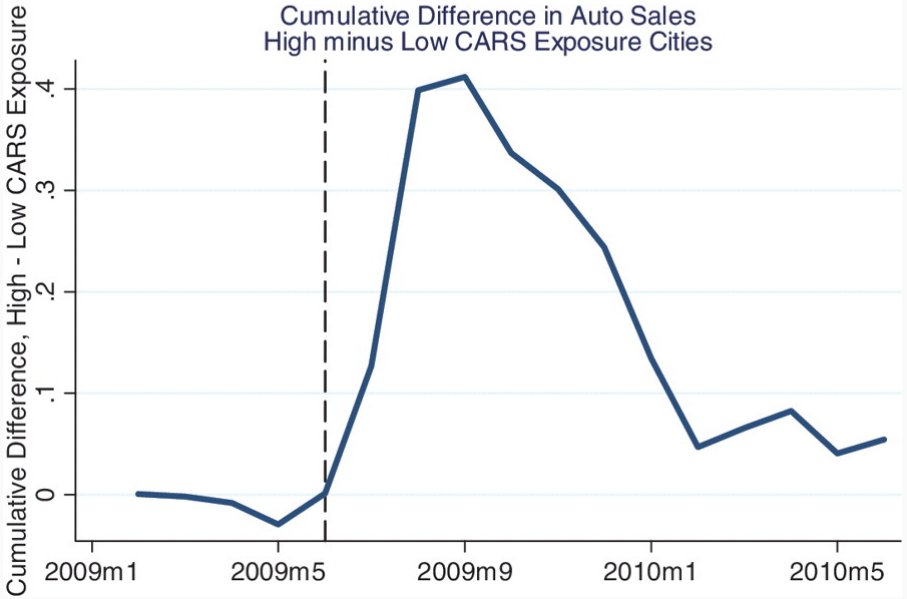


Summary of policy space

Experiment	Policy space
Textbook model	8.0%
Lumpy durables, normal times	6.0%
Four quarters previous stimulus	3.7%
Recession, no prev. stimulus	3.1%
Recession & prev. stimulus	1.6%

Evidence on Stimulus Reversals





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.