A Model of the Consumption Response to Fiscal Stimulus Payments

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Working Paper

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Motivation

- **Fiscal stimulus payments** (tax rebates)
  - Typically small, anticipated, temporary, lump-sum.
  - Households spend 20 − 40% of tax rebates on non-durable consumption in the quarter they receive it.

- It is difficult to replicate this observation with:
  - A standard life-cycle model
  - A standard (life-cycle) Bewley model

- A Baumol-Tobin money-demand model in a **life-cycle incomplete-market** economy:
  - Agents can invest both in a liquid asset and an illiquid asset
  - The illiquid asset has higher return but a transaction cost

⇒ Generates **two types of constrained households**
The 2001 Tax Rebate

*Economic Growth and Tax Relief Reconciliation Act* (May 2001)

- An average decrease of 3% of the marginal income tax rate
- Changes gradually phased in over 2002 – 2006, ”sunset” in 2011
- Advance refund:
  - Announced in June, checks sent July-September 2001
  - Sequence based on the two digits of SSN
  - 92 million taxpayers received a rebate check, with 72 million receiving the maximum amount ($600 for married couples)
- Total payout was $38b: 1.7% of quarterly Y
- Recession

Johnson, Parker and Souleles (2006, 2009)

- Consumer Expenditure Survey
- Additional question about the timing and amount of the rebate check
The response of consumption to tax rebates (JPS)

Estimation:

\[
\Delta c_{it} = \sum_{s} \beta_{0,s} \text{month}_{s} + \beta_{A} X_{i,t-1} + \beta_{2} R_{i,t} + \epsilon_{i,t}
\]  

(1)

where \(\Delta c_{i,t}\) is the change in nondurable expenditures, \(X_{i,t-1}\) a vector of demographics, \(R_{i,t}\) the dollar value of the rebate

\[=> \]  \(\beta_{2}\) is the "rebate coefficient"
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\[\Rightarrow \beta_2 \text{ is the "rebate coefficient"}\]

Results:

- Rebate coefficient \(\beta_2\) between 0.2 and 0.4
- \(\beta_2\) is not equal to the MPC

To generate a large value for \(\beta_2\), a model must feature at the same time:

- A large MPC out of transitory shocks
- A low MPC out of the news of the shock
Environment

- Continuum of *households* indexed by $i$: work for $J^w$ periods, live as retiree for $J^r$ periods.

- **Preferences:** $E_0 \sum_{j=1}^{J} \beta^j \frac{c_{ij}^{1-\gamma} - 1}{1-\gamma}$ (exogenous labor supply)

- **Earnings:** $\log y_{ij} = \chi_j + \alpha_i + z_{ij}$ when working, $p(Y_{jw})$ retired

- Two assets:
  - *Liquid* asset $m_{ij} \geq 0$ with return $R^m \equiv \frac{1}{q^m}$
  - *Illiquid* asset $a_{ij} \geq 0$ with return $R^a \equiv \frac{1}{q^a} > R^m$ and transaction cost $\kappa$
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- Government budget constraint:

$$G + \sum_{j=J^w+1} p(Y_{J^w})d\mu_j + \left(\frac{1}{q^g} - 1\right) B = \tau^c \sum_{j=1}^J \int c_j d\mu_j + \sum_{j=1}^J T(y_j, a_j, m_j) d\mu_j$$

- No aggregate uncertainty
### Value functions

**State:** \( s_j = (a_j, m_j, \alpha_j, z_j) \).

**Value function:** \( V_j(s_j) = \max\{V_j^0(s_j), V_j^1(s_j)\} \)
Value functions

+ **State:** $s_j = (a_j, m_j, \alpha_j, z_j)$.
+ **Value function:** $V_j(s_j) = \max \{ V_j^0(s_j), V_j^1(s_j) \}$

If not adjusting the illiquid asset:

$$V_j^0(s_j) = \max_{c_j, m_{j+1}} u(c_j) + \beta \mathbb{E}_j V_{t+1}(s_{j+1}) \text{ s.t.}$$

$$q^m m_{j+1} + (1 + \tau^c) c_j = y_j(s_j) - T(s_j) + m_j$$

$$q^a a_{j+1} = a_j$$

$$m_{j+1} \geq 0$$

If adjusting the illiquid asset:

$$V_j^1(s_j) = \max_{c_j, m_{j+1}, a_{j+1}} u(c_j) + \beta \mathbb{E}_j V_{t+1}(s_{j+1}) \text{ s.t.}$$

$$q^m m_{j+1} + q^a a_{j+1} + (1 + \tau^c) c_j = y_j(s_j) - T(s_j) + m_j + a_j - \kappa$$

$$a_{j+1} \geq 0, \quad m_{j+1} \geq 0$$
+ EE of a working household, who is unconstrained and does not adjust:

\[ u'(c_j) = \beta R^m u'(c_{j+1}) \]

+ EE between two adjustment dates \( j \) and \( j + N \):

\[ u'(c_j) = (\beta R^A)^N u'(c_{j+N}) \]
A deterministic example (with a higher $R^a$)

Lifecycle of a wealthy "hand-to-mouth" agent in a two-asset model
Distribution of liquid and illiquid wealth (SCF 2001)

- Median liquid assets: $2,700; Median illiquid assets: $70,000.

- 6% hand-to-mouth in net worth; 30% in liquid wealth.
Calibration

Quarterly model

- **Demographics**: \( J^w = 38, J^r = 20 \).
- **Preferences**: \( \gamma = 1, \beta \) to match the median illiquid wealth in SCF.
- **Earnings heterogeneity** (*PSID* 1969-96) to match level and growth of earnings inequality.
- **Initial Asset Position**: SCF 2001.
- **Asset returns** (micro data 1960-2009): \( R^m = -1.1\% \), \( R^a = 6.2\% \).
In quarter $t = 0$, the government announces a tax rebate of $500 paid out at $t = 0$ (group A) or $t = 1$ (group B).

After 10 years, permanent additional proportional earning tax.

Additional environment changes in 2001:
- Bush tax cuts (with expected sunset or not)
- 2001-2002 recession
Rebate coefficient in the model
Hand-to-mouth households

(c) Fraction of hand-to-mouth households

(b) Average marginal propensity to consume
Heterogeneity in rebate coefficients

![Histogram of Rebate Coefficients](image1)

![Percentile of Rebate Coefficient Distribution](image2)
Robustness Checks

- Timing of announcement
- Transaction costs
- Sunset
- Credit
- Size of the rebate
- Matching distribution of wealth?
If agents can borrow against a transitory shock, MPC could be smaller

If agents can borrow at the news of the rebates, rebate coeff could be smaller
A large rebate decreases the rebate coefficient:
- Loosens the budget constraint
- Some agents pay the transaction cost and reduce consumption
A model able to generate large responses to fiscal stimulus payments
- both in terms of MPC and in terms of rebate coefficient.

Could be used to address the 2008 episode of fiscal stimulus payments?
- Empirical evidence: rebate coefficients are between half and 2/3 of the size of the 2001 estimates.