Welfare and Spending Effects of Consumption Stimulus Policies

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Introduction

Motivation

Research question

Approach: Splurge, IMPC, Modell und Simulations

Preview of results

Related literature

Model

Consumer problem

- Each consumer has one eduction type $e(i)$ ("Dropout", "Highschool", "College") and a subjective discount factor β_i
- The consumer faces a stochastic income stream $\mathbf{y}_{i,t}$
- A exogenously given fraction of that income is consumed directly (the 'splurge')

$$\mathbf{c}_{sp,i,t} = \varsigma \mathbf{y}_{i,t} \tag{1}$$

- Given the splurge, remaining consumption $c_{opt,i,t}$ is chosen to to maximize the perpetual-youth lifetime expected-utility

$$\sum_{t=0}^{\infty} \beta_i^t (1-D)^t \mathbb{E}_0 u(\mathbf{c}_{opt,i,t}). \tag{2}$$

where D is the end-of-life probability and u a standard CRRA utility function

Consumer problem - Part II

- The optimization is subject to the budget constraint, given existing market resources $m_{i,t}$ and income state, and a no-borrowing constraint:

$$\begin{aligned} \mathbf{m}_{i,t+1} &= R(\mathbf{m}_{i,t} - \mathbf{c}_{sp,i,t} - \mathbf{c}_{opt,i,t}) + \mathbf{y}_{i,t+1}, \\ \mathbf{a}_{i,t} &\geq 0, \end{aligned} \tag{3}$$

where R is the gross interest factor.

Income process

- Income is subject to transitory, permanent and unemployment shocks
- "Permanent income" p evolves according to

$$\mathbf{p}_{i,t+1} = \psi_{i,t+1}\Gamma_{e(i)}\mathbf{p}_{i,t}, \tag{4}$$

where $\psi_{i,t+1}$ is a shock to permanent income and $\Gamma_{e(i)}$ is the educaton-specific average growth rate of income

- Total income is then subject to the transitory shock $\xi_{i,t}$ and the individual's employment status

$$\mathbf{y}_{i,t} = \begin{cases} \xi_{i,t}\mathbf{p}_{i,t}, & \text{if employed} \\ \rho_b\mathbf{p}_{i,t}, & \text{if unemployed with benefits} \\ \rho_{nb}\mathbf{p}_{i,t}, & \text{if unemployed without benefits} \end{cases} \tag{5}$$

where ρ_x are the status-specific replacement rates.

Employment status and recessions

- Emplyoment status is subject to a Markov process
  - An employed consumer can continue being employed or become unemployed
  - Unless the unemployed consumer beomes employed again, she receives benefits for two quarters
- Recession is given by an MIT shock
  - Unemployment rate doubles in each education group
  - Expected length of unemployment increases from 2 to 4q
  - End of recession occurs as a Bernoulli process calibrated for an avg. rec. length of 6q

Three policies to fight the recession

- Stimulus check
  - Everyone receives a check for \$1,200 in q1 of the recession
  - Check is means-tested: Full check if perm. income $\leq$ \$100k; Falls linearly for higher incomes and zero for those $\geq$ \$150k
- Extended unemployment benefits
  - Unemployment benefits are extended from 2 to 4 q
  - Extension occurs regardless of whether recession ends
- Payroll tax cut
  - Employees payroll tax rate is reduced such that income rises by 2% for 8q

Policies are debt-financed and repayed much later

Aggregate demand effects

- Baseline model: No feedback from aggregate consumption to income
- Extension: We allow for aggregate demand effects from consumption on income during the recession:
- The AD effect is given by

$$AD(C_t) = \begin{cases} \left(\frac{C_t}{\tilde{C}}\right)^{\kappa}, & \text{if in a recession} \\ 1, & \text{otherwise,} \end{cases} \tag{6}$$

where $\tilde{C}$ is the level of consumption in the steady state.

- Idiosyncratic income in the extension model is then given by

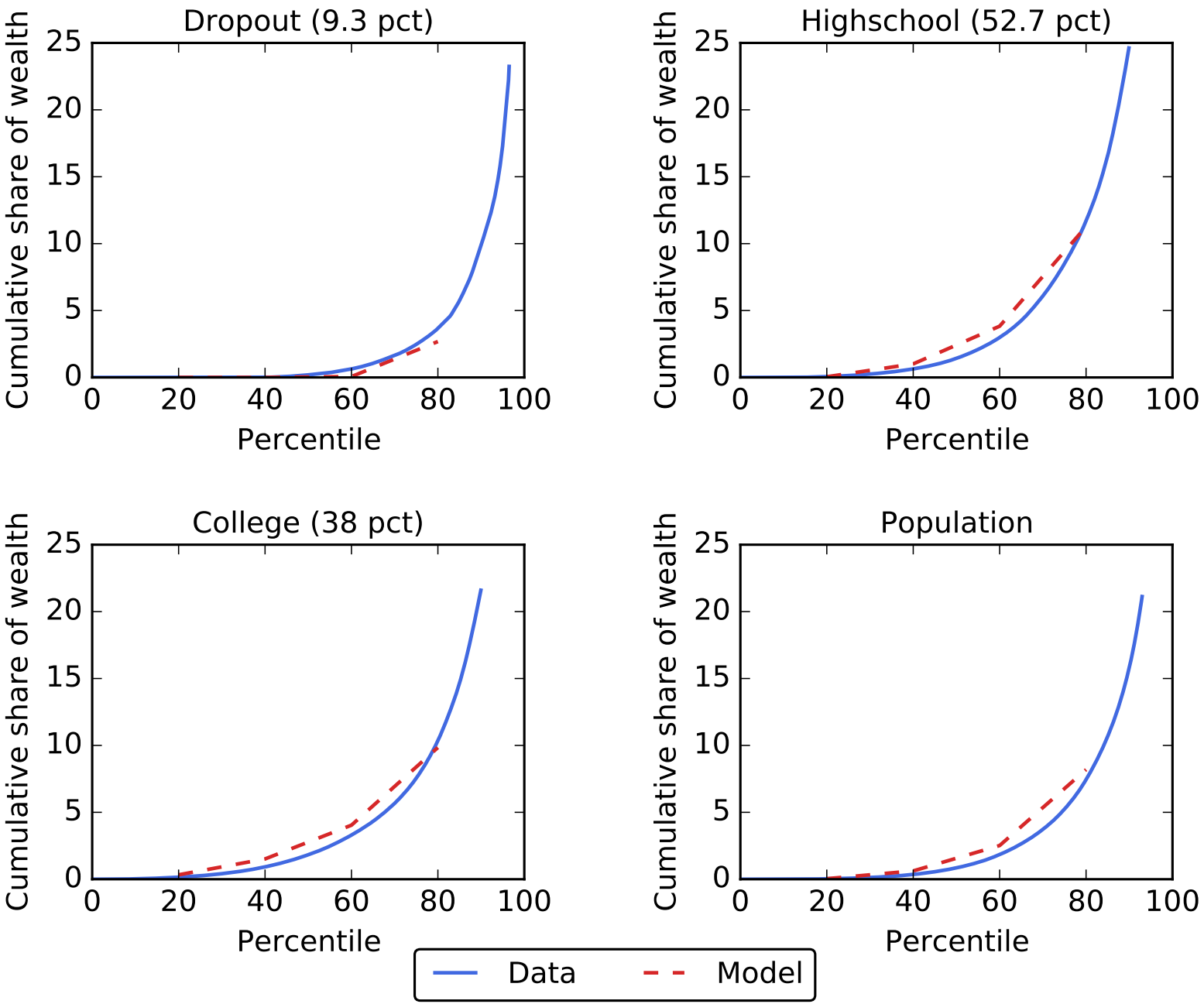
$$\mathbf{y}_{AD,i,t} = AD(C_t)\mathbf{y}_{i,t}. \tag{7}$$

Parametrization

Parametrization approach

Describe in bullet points parametrization strategy

The Lorenz Figure



Results

Impulse responses for stimulus check

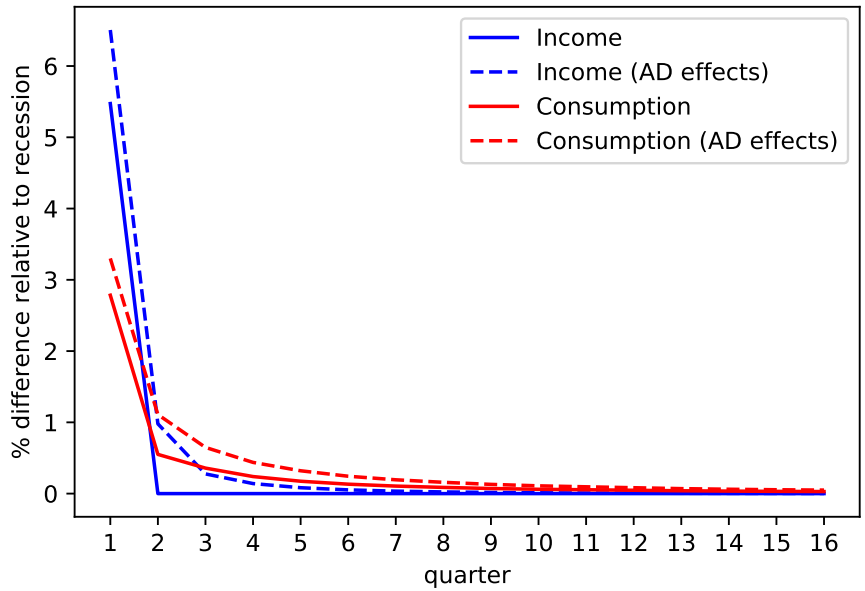


Figure: Impulse responses of aggregate income and consumption to a **stimulus check** during recessions

- Without aggregate demand effects: the first quarter's income is 5.5% higher; consumption jumps by 3%
- With aggregate demand effects: first quarter income is 6.5% higher; consumption elevated for longer time

Impulse responses for extension of unemployment benefits

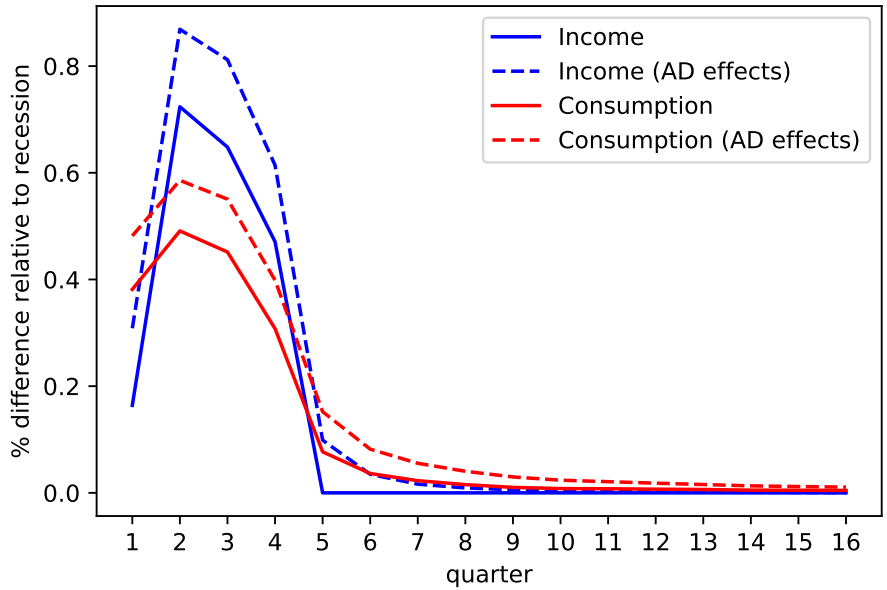


Figure: Impulse responses of aggregate income and consumption to a **UI extension** (benefit duration increases from 6 to 12 months) during recessions

- Without aggregate demand effects: quarterly income increases by max 0.7 percent, consumption response shows anticipation of longer duration
- With aggregate demand effects: extra boost to income by 0.2 percent, consumption stays elevated for longer time

Impulse responses for payroll tax cut

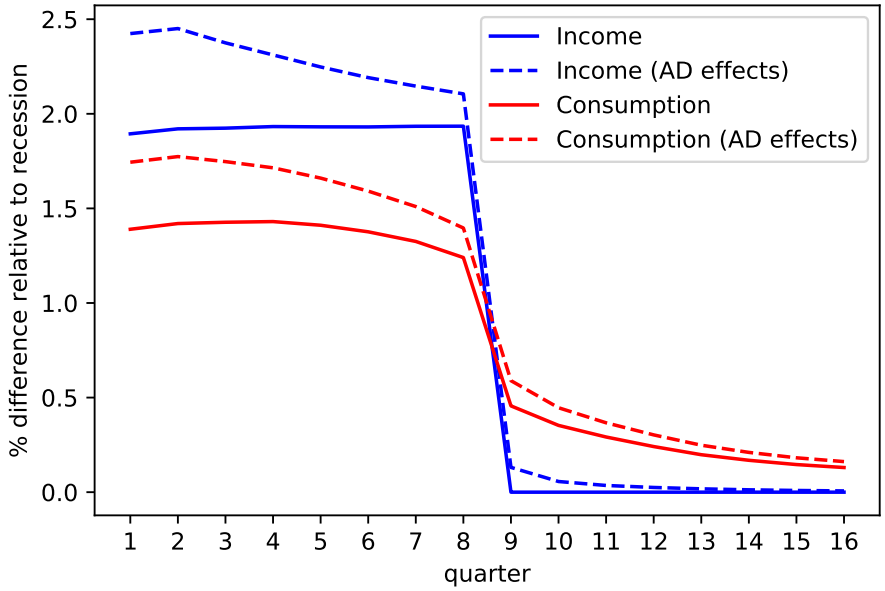


Figure: Impulse responses of aggregate income and consumption to a **payroll tax cut** lasting eight quarters during recessions

- Without aggregate demand effects: income rises by close to 2 percent; Consumption jumps by 1.5 percent and drops sharply after the income decline.
- With aggregate demand effects, income rises by 2.5 percent, declines steadily as the recession's likelihood decreases

Multipliers when aggregate demand effects are present

$$M_t^P = \frac{\text{Net present value of policy-induced consumption up to } t}{\text{Net present value of the cost of the policy}}$$

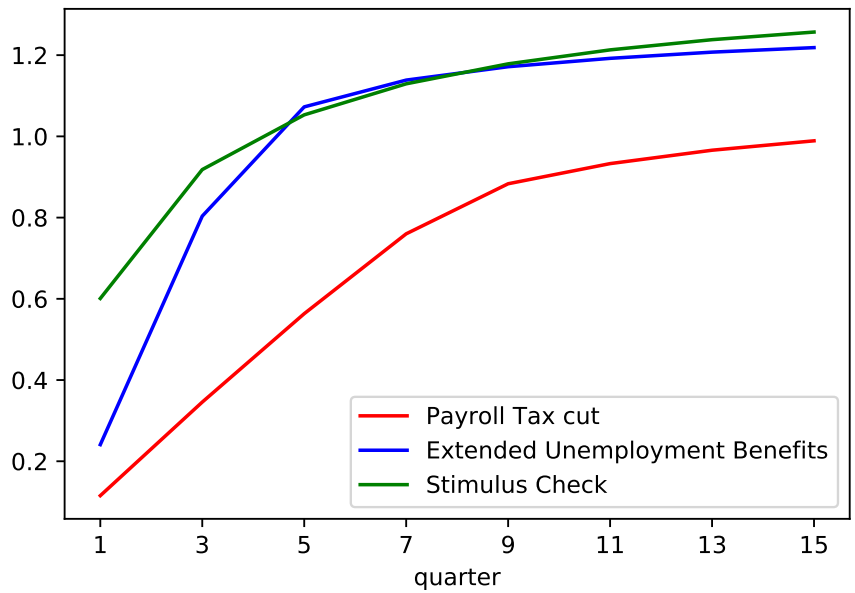


Figure: Cumulative multipliers over time

	Tax Cut	UI extension	Stimulus check
Long-run Multiplier	1.079	1.275	1.339
Policy expenditure during recession	57.6%	80.6%	100.0 %

Welfare measure construction

Guiding principles

1. Each consumer is valued equally by the social planner
2. Utility from splurge in the same way as other spending
3. No social benefit to the policies outside of a recession

Simple aggregation of consumer util. only satisfies principle 1 & 2:

$$\mathcal{W}(\text{policy}, Rec, AD) = \frac{1}{N} \sum_{i=1}^{N} \sum_{t=0}^{\infty} \beta_S^t u(\mathbf{c}_{it,\text{policy},Rec,AD})$$

- $\mathbf{c}_{it,\text{policy},Rec,AD}$: consumption paths (including splurge) for each consumer / policy
- $Rec \in \{1, 0\}$: recession indicator, $AD \in \{1, 0\}$: AD ind.
- $\beta_S = 1/R$: social planner's discount factor

Welfare measure construction II

To satisfy principle 2 we define $\mathcal{C}(\text{policy}, Rec, AD) =$

$$\Bigg(\underbrace{\frac{\mathcal{W}(\text{policy}, Rec, AD) - \mathcal{W}(\text{None}, Rec, AD)}{\mathcal{W}^c}}_{\text{I}} - \underbrace{\frac{PV(\text{policy}, Rec)}{\mathcal{P}^c}}_{\text{II}} \Bigg)$$

$$- \Bigg(\underbrace{\frac{\mathcal{W}(\text{policy}, 0, 0) - \mathcal{W}(\text{None}, 0, 0)}{\mathcal{W}^c}}_{\text{III}} - \underbrace{\frac{PV(\text{policy}, 0)}{\mathcal{P}^c}}_{\text{IV}} \Bigg)$$

- I: Policy-induced increase in agg. welfare (in bp of SS-cons.)
- II: Cost of policy $\Leftrightarrow$ I - II: Net agg. welfare increase
- III - IV: Net welfare impact of policy outside of recession
- $\mathcal{C}$ measures only welfare effects beyond pure redistribution

Welfare results

	Check	UI	Tax Cut
$\mathcal{C}(Rec, \text{policy})$	0.011	0.580	0.002
$\mathcal{C}(Rec, AD, \text{policy})$	0.171	1.266	0.065

- All policies adjusted to the fiscal size of the UI extension
- Interpretation: A welfare gain of x $\Leftrightarrow$ social planner is indifferent between
  - the stimulus policy being implemented in response to a recession and
  - a permanent increase in the baseline consumption of the total population by x basis points (0.01% of baseline cons.)
- All policies much more effective when mulitplier present
- UI extension is clear bang-for-the-buck winner (but limited scalability)

Robustness

List here all robustness checks performed

Conclusion: Comparing the policies

Draw conclusions based on results

Appendix

Appendix I