Welfare and Spending Effects of Consumption Stimulus Policies

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Motivation

- Discretionary fiscal policies often used to fight recessions
- A lot of variation in such policies
  - different goals: increase output (a 'GDP metric') or reduce misery (a 'welfare metric')
  - little guidance from traditional RANK models
- **This paper:** Develop a heterogeneous agent (HA) model to study effectiveness of policies
  - Model captures heterogeneities in education, wealth, income, emplyoment status
  - In line with evidence on the *intertemporal marginal propensity to consume* (iMPC) (based on rich micro data from Norway)
  - We allow for aggregate demand multipliers during recessions

Evaluation of consumption stimulus policies in the US

- Policies we consider:
  - Stimulus check for $1200 (means-tested)
  - Extension of unemployment benefits from 2 to 4q
  - Payroll tax cut by 2% for 8q
- Key features of the policies:
  - Targeting
  - Timing of spending (overlap with recession!)
  - Scalability
- Evaluation criteria:
  - Spending multipliers
  - Welfare

Preview of results

- Welfare measure: Extension of UI benefits is the clear winner
  - Targeted at individuals with high MPCs
  - They also tend to have high MU of consumption
  - But: higher spending may continue after recession is over
- Spending multiplier: Stimulus check has the highest multiplier
  - Not well targeted, but increases income immediately
  - Spending happens during recession
  - Also: more easily scaled up
- Tax cut: both poorly targeted and substantial amount of income boost may occur after the recession is over

Related literature

- **Effects of transitory income shocks**: Parker, Souleles, Johnson and McClelland (2013); Broda and Parker (2014); Fagereng, Holm and Natvik (2021); Ganong, Greig, Noel, Sullivan and Vavra (2022)
- **HA models consistent with high MPCs**: Kaplan and Violante (2014); Auclert, Rognlie and Straub (2018); Carroll, Crawley, Slacalek and White (2020); Kaplan and Violante (2022)
- **State dependent multipliers (ZLB)**: Christiano, Eichenbaum and Rebelo (2011); Eggertson (2011); Ramey and Zubairy (2018); Hagedorn, Manovskii and Mitman (2019)
- **Welfare measures in HA models**: Bhandari, Evans, Golosov and Sargent (2021); Dávila and Schaab (2022)
- **Extended unemployment insurance**: Ganong, Greig, Noel, Sullivan and Vavra (2022); Kekre (2022)
- **High MPCs and impatience**: Parker (2017)

Model

Consumer problem

- Education groups: "Dropout", "Highschool" and "College"
- Each group has distribution of subjective discount factors β_i
- Idiosyncratic, stochastic income process $\mathbf{y}_{i,t}$
- Estimated splurge factor ς: $\mathbf{c}_{sp,i,t} = \varsigma \mathbf{y}_{i,t}$
- Remaining consumption $c_{opt,i,t}$ is chosen to maximize utility

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

(D: end-of-life probability, u: stand. CRRA utility func.)

- Budget constraint, given existing market resources $m_{i,t}$ and income state, and a no-borrowing constraint:

$$\mathbf{m}_{i,t+1} = R \underbrace{(\mathbf{m}_{i,t} - \mathbf{c}_{sp,i,t} - \mathbf{c}_{opt,i,t})}_{\geq 0 \text{ (no-borrowing constraint)}} + \mathbf{y}_{i,t+1} \tag{2}$$

(R: exogenous gross interest rate)

Income process

- Income subject to transitory, unempl. and permanent shocks

$$\mathbf{y}_{i,t} = \begin{cases} \xi_{i,t}\mathbf{p}_{i,t}, & \text{if employed} \\ \rho_b \mathbf{p}_{i,t}, & \text{if unemployed with benefits} \\ \rho_{nb}\mathbf{p}_{i,t}, & \text{if unemployed without benefits} \end{cases} \tag{3}$$

($\xi_{i,t}$: trans. shock, p: perm. income, ρ_x replacement rates)

- "Permanent income": $\mathbf{p}_{i,t+1} = \underbrace{\psi_{i,t+1}}_{\text{perm. shock}} \underbrace{\Gamma_{e(i)}}_{\text{educ.-specific growth}} \mathbf{p}_{i,t}$
- Emplyoment status is subject to a Markov process
  - Unemployment rate education-specific (doubles in recession)
  - Expected length of unemployment: 2q (doubles in recession)
- Recession is given by an MIT shock; end of recession as a Bernoulli process (avg. length of 6q)

Aggregate demand effects

(as in Krueger, Mitman and Perri, 2016)

- Baseline: 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

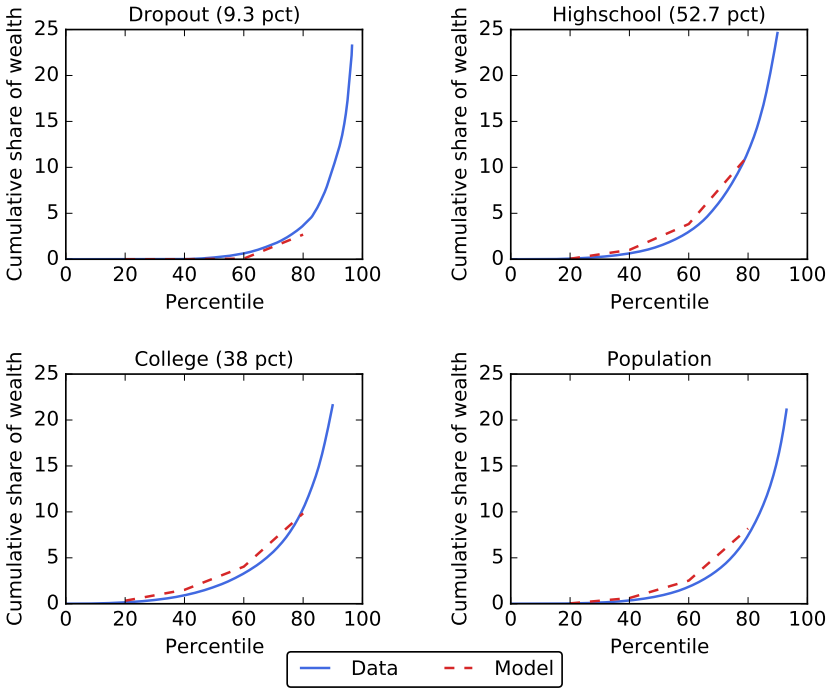
$$AD(C_t) = \begin{cases} \left(\frac{C_t}{\tilde{C}}\right)^{\kappa}, & \text{if in a recession} \\ 1, & \text{otherwise,} \end{cases} \tag{4}$$

  where $\tilde{C}$ is the level of consumption in the steady state.
- Idiosyncratic income in the extension model is then given by

$$\mathbf{y}_{AD,i,t} = AD(C_t)\mathbf{y}_{i,t}. \tag{5}$$

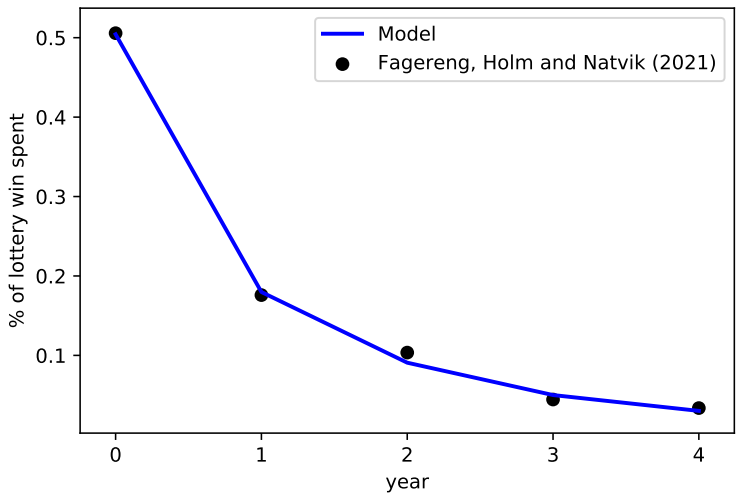
Model consistent with micro data

SCF liquid wealth (Kaplan and Violante, 2014)



Modelling device: *Ex-ante* heterogeneity in discount factors

iMPC from Fagereng, Holm, Natvik (2021)



Modelling device: 'Splurge' in consumption, i.e. exogenously given fraction of income directly consumed

Results

Impulse responses for stimulus check

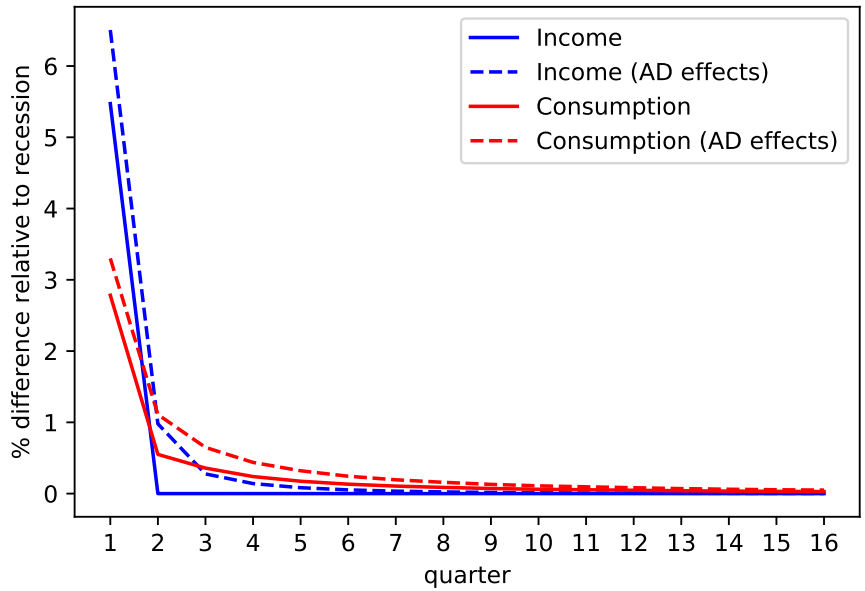


Figure: Impulse responses of aggregate income and consumption to a **stimulus check** during recessions

- 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

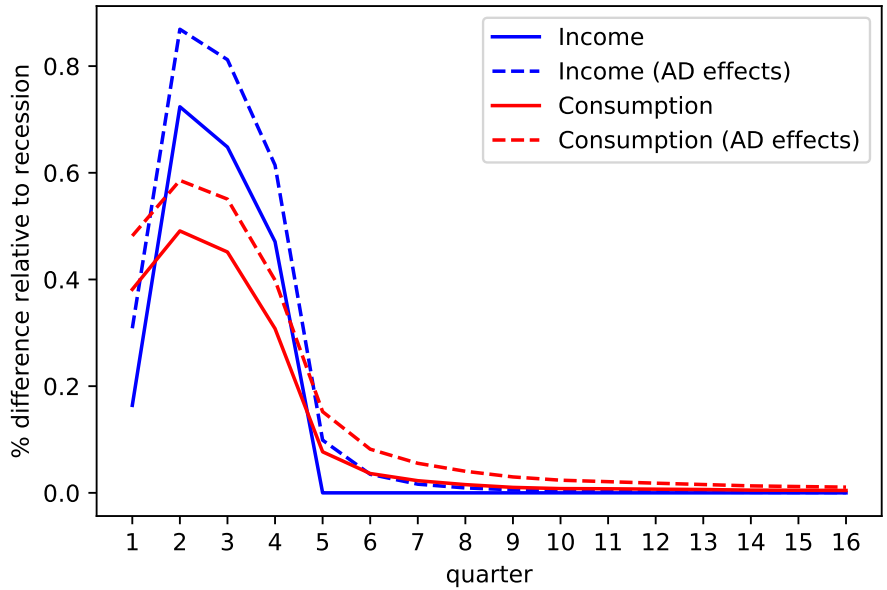


Figure: Impulse responses of aggregate income and consumption to a **UI extension** (benefit duration increases from 6 to 12 months) during recessions

- 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

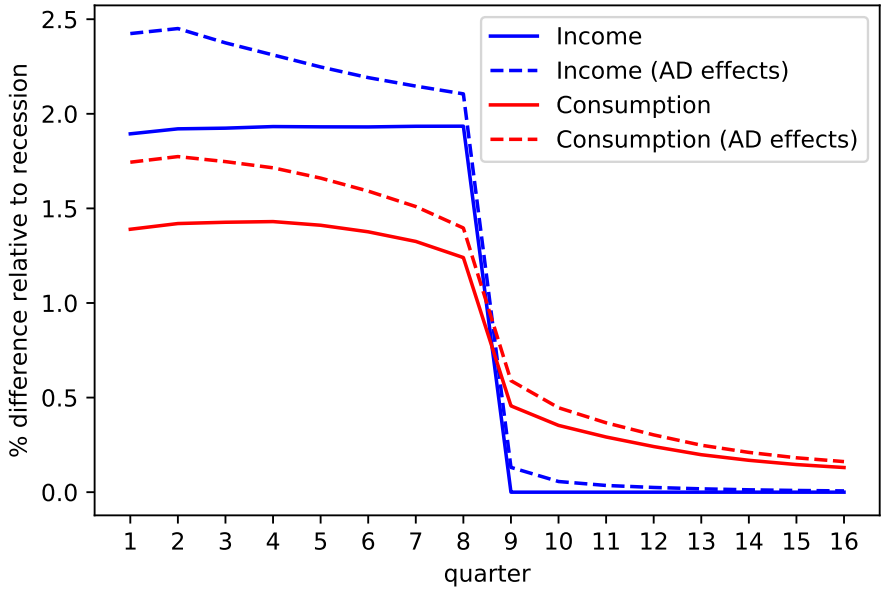


Figure: Impulse responses of aggregate income and consumption to a **payroll tax cut** lasting eight quarters during recessions

- 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

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

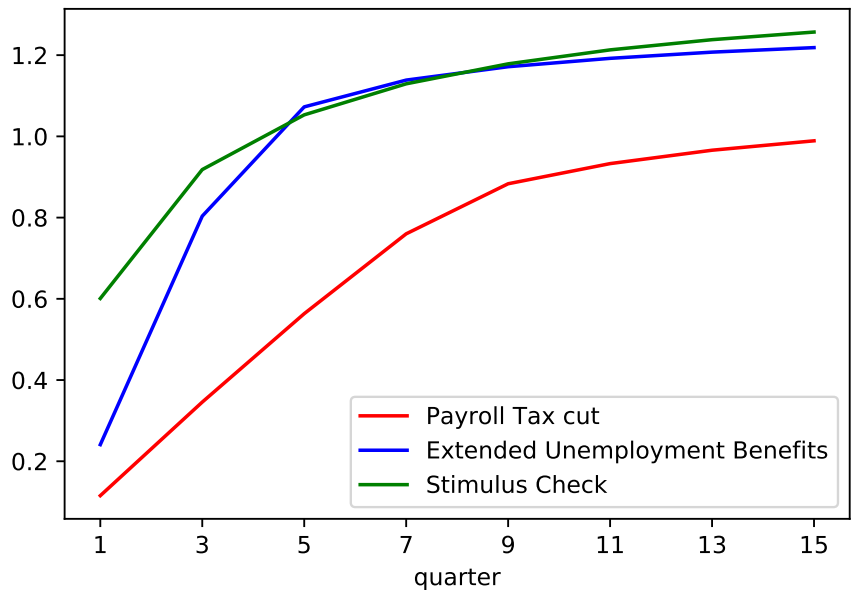


Figure: Cumulative multipliers over time

	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
$\mathcal{C}(\text{policy}, Rec, 0)$	0.011	0.580	0.002
$\mathcal{C}(\text{policy}, Rec, AD)$	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