Welfare and Spending Effects of Consumption Stimulus Policies

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Motivation

- Fiscal policies that aim to boost consumption spending in recessions have been tried in many countries in recent decades
- A lot of variation in these policies (we study payroll tax cuts, stimulus checks, UI extension):
  - little guidance from traditional RANK models
  - different goals: increase output ('GDP metric') or reduce misery ('welfare metric')

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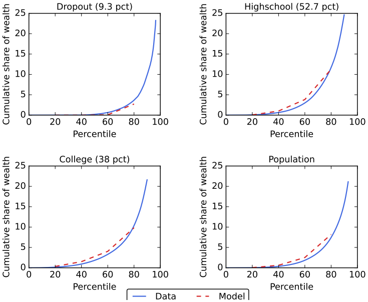
- **This paper:** Develop a heterogeneous agent (HA) model to study effectiveness of policies in fighting recessions
  - heterogeneity (in e.g. wealth, income and/or education) is taken into account
  - Consumers subject to transitory/permanent income shocks and unemployment risk
  - Consistent with micro data
  - Not a HANK model, but aggregate demand multiplier exist during recessions

Model consistent with micro data

Liquid Wealth (Survey of Consumer Finances)



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

Model consistent with micro data

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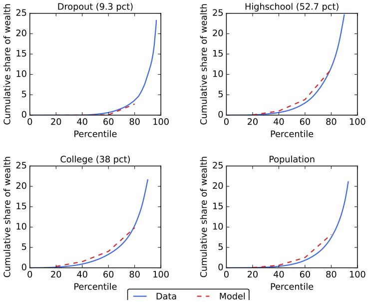
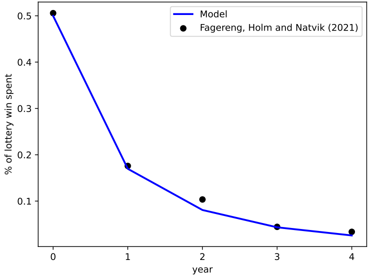


Modeling device: *Ex-ante* heterogeneity in discount factors

Intertemporal MPC from Fagereng, Holm, Natvik (2021)



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

Evaluation of consumption stimulus policies in the US

- Policies we consider:
  - Stimulus check for $1200 (means-tested)
  - Extension of unemployment benefits from 6 months to 1 year
  - Payroll tax cut by 2% for 2 years
- Evaluation criteria:
  - Spending multipliers
  - Welfare (only recession-related welfare impact)

Preview of results

- Welfare measure: Extension of UI benefits is the clear winner
  - Targeted at individuals with high MPCs and high recession-related welfare losses
  - But: higher spending may continue after recession is over
- Spending multiplier: Stimulus check has the highest multiplier
  - Not well targeted, but increases income immediately
- Tax cut
  - Poorly targeted and much spending likely to occur after end of recession

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)
- **Extended unemployment insurance**: Ganong, Greig, Noel, Sullivan and Vavra (2022); Kekre (2022)
- **Welfare measures in HA models**: Bhandari, Evans, Golosov and Sargent (2021); Dávila and Schaab (2022)

Model

Consumer problem

- Education groups: "Dropout", "Highschool" and "College"
- Each group has distribution of discount factors β_i
- Idiosyncratic, stochastic income process $\mathbf{y}_{i,t}$
- Estimated splurge factor ς: $\mathbf{c}_{sp,i,t} = \varsigma \mathbf{y}_{i,t}$

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- 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:

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

(R: exogenous gross interest rate)

Income process

- Income subject to transitory, unempl. and permanent shocks

$$\mathbf{y}_{i,t} = \begin{cases} \xi_{i,t}\mathbf{p}_{i,t}, & \text{if employed} \\ 0.7\mathbf{p}_{i,t}, & \text{if unemployed for} \leq 2\text{q} \\ 0.5\mathbf{p}_{i,t}, & \text{if unemployed} \geq 2\text{q} \end{cases} \tag{3}$$

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

- "Permanent income": $\mathbf{p}_{i,t+1} = \underbrace{\psi_{i,t+1}}_{\text{perm. shock}} \underbrace{\Gamma_{e(i)}}_{\text{educ.-specific growth}} \mathbf{p}_{i,t}$

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- "Permanent income": $\mathbf{p}_{i,t+1} = \underbrace{\psi_{i,t+1}}_{\text{perm. shock}} \underbrace{\Gamma_{e(i)}}_{\text{educ.-specific growth}} \mathbf{p}_{i,t}$
- Employment status is subject to a Markov process
  - Unemployment rate education-specific (doubles in recession)
  - Expected length of unemployment: 1.5q (4q 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

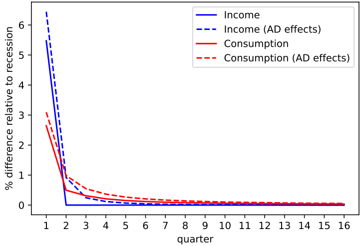
$$\mathbf{y}_{AD,i,t} = AD(C_t)\mathbf{y}_{i,t}. \tag{5}$$

Results

Impulse responses

- Simulate policies in recessions lasting 1 to 20 q
- Construct probability-weighted sum across rec. lengths

Stimulus check:



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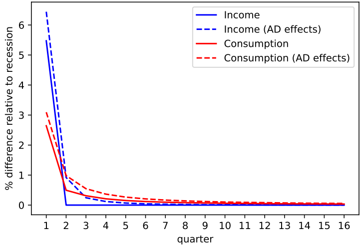
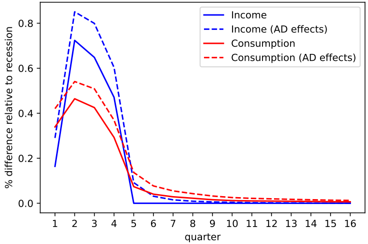
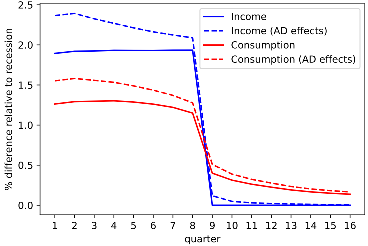


Extension of UI benefits:

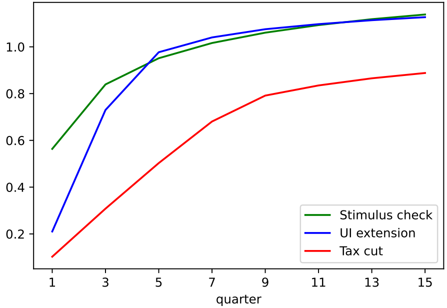


Payroll tax cut:



Multipliers

$$M_t^P = \frac{\text{NPV of induced consumption up to } t}{\text{NPV of the cost of the policy}}$$



	Stimulus check	UI extension	Tax cut
10y-horizon Multiplier (no AD effect)	0.872	0.910	0.847
10y-horizon Multiplier (AD effect)	1.245	1.200	0.999
Share of policy expenditure during recession	100.0%	80.6%	57.6 %

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:

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

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To satisfy principle 3, we calculate

- Net welfare: Subtract the welfare cost of financing the policy
- Recession-based net welfare: Subtract the net welfare impact of policy outside of recession

Details on welfare measure

Welfare results

	Check	UI	Tax Cut
Without AD effects	0.011	0.509	0.002
With AD effects	0.151	1.101	0.056

- 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

Conclusion: Comparing the policies

- Comparison of three consumption stimulus policies in a HA model consistent with data on the distribution of liquid wealth and intertemporal MPCs
- Welfare measure: UI extension is the clear bang-for-the-buck winner
- The stimulus check is less well targeted, but. . .
  - is transferred immediately ensuring that money arrives when it is most valuable
  - is more easily scaled up to provide more stimulus
- The tax cut is both poorly targeted and may yield substantial spending after the recession is over
- Framework can be used to evaluate other candidate policies

Thank you for your attention!

- Access the paper, presentation slides and code at: https://github.com/llorracc/HAFiscal

Appendix

Parameters describing the policies

Parameters describing policy experiments	
Parameter	Value
Change in unemployment rates in a recession	$\times 2$
Expected unemployment spell in a recession	4 quarters
Average length of recession	6 quarters
Size of stimulus check	\$1,200
PI threshold for reducing check size	\$100,000
PI threshold for not receiving check	\$150,000
Extended unemployment benefits	4 quarters
Length of payroll tax cut	8 quarters
Income increase from payroll tax cut	2 percent
Belief (probability) that tax cut is extended	50 percent

Go back

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

- $\mathbf{c}_{it,\text{policy},Rec,AD}$: 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 3 we define $\mathcal{C}(\text{policy}, Rec, AD) =$

$$\left(\underbrace{\frac{\mathcal{W}(\text{policy}, Rec, AD) - \mathcal{W}(\text{None}, Rec, AD)}{\mathcal{W}^c}}_{\text{I}} - \underbrace{\frac{PV(\text{policy}, Rec)}{\mathcal{P}^c}}_{\text{II}}\right)$$
$$- \left(\underbrace{\frac{\mathcal{W}(\text{policy}, 0, 0) - \mathcal{W}(\text{None}, 0, 0)}{\mathcal{W}^c}}_{\text{III}} - \underbrace{\frac{PV(\text{policy}, 0)}{\mathcal{P}^c}}_{\text{IV}}\right)$$

- 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

Robustness: Different replacement rates

- Discount factor distributions:

		Splurge	Dropout		Highschool		College	
			β	∇	β	∇	β	∇
Baseline	$(\rho_b = 0.7,\ \rho_{nb} = 0.5)$	0.306	0.735	0.298	0.924	0.137*	0.984	0.010
Altern.	$(\rho_b = 0.3,\ \rho_{nb} = 0.15)$	0.306	0.609	0.445*	0.890	0.116	0.978	0.016

- Welfare results:

		Stimulus check	UI extension	Tax cut
no AD effects	Baseline $(\rho_b = 0.7,\ \rho_{nb} = 0.5)$	0.011	0.509	0.002
	Altern. $(\rho_b = 0.3,\ \rho_{nb} = 0.15)$	0.043	1.845	0.003
AD effects	Baseline $(\rho_b = 0.7,\ \rho_{nb} = 0.5)$	0.151	1.101	0.056
	Altern. $(\rho_b = 0.3,\ \rho_{nb} = 0.15)$	0.157	2.514	0.048

Robustness: Different interest rates

		Dropout		Highschool		College	
	Splurge	β	∇	β	∇	β	∇
$R = 1.005$	0.307	0.740	0.298	0.927	0.193*	0.989	0.0082
$R = 1.01$ (baseline)	0.307	0.735	0.298	0.924	0.137*	0.984	0.0096
$R = 1.015$	0.307	0.724	0.357*	0.919	0.138*	0.979	0.0105