HAFiscal project paper outline

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1 Introduction

2 Model

3 Estimation and calibration

3.1 Estimation of the "splurge" factor

There is much evidence from analysis of micro data, that people tend to "splurge" on changes to their income. We defining splurging as the free spending of available income without concern for intertemporal maximization of utility. As we will show, a model allowing for splurging performs well at capturing the shorter and longer term response of consumption to income shocks.

Lottery experiment Fagereng et al. TO DO: Cite paper correctly, look up how results are presented in other papers by Chris.

Targets In this section we estimate the splurge factor, the mean discount rate across the population as well as its spread to match two empirical moments.

First, we match the steady-state distribution of liquid wealth in the model to its empirical counterpart. Due to the lack of data on the liquid wealth distribution in Norway, we resort to the corresponding data from the US - assuming that liquid wealth inequality is comparable across these countries. Specifically, we impose as targets the cummulative liquid wealth share at the 20th, 40th, 60th and 80th income percentile, which equal 0%, 0.4%, 2.5% and 11.7%. Hence, 87.3% of the total liquid wealth is held by the top income quintile. The data is plotted in figure 1. Second, we take from Fagereng et al. the marginal propensity to consume out of a one-period income shock. We not only target the contemporaneous respone of consumption to the income shock, but also the subsequent impact on consumption in years one to four after the income shock. The MPCs from Fagereng et al. are plotted in figure 2.

Parameterization To do: Look up the calibration source for each of these moments, possibly email Chris and Edmund about it

- LivPrb, Source?
- Rfree, UnemPrb from NORA
- IncUnemp, Source?
- PermShkStd, TransShkStd, Source?

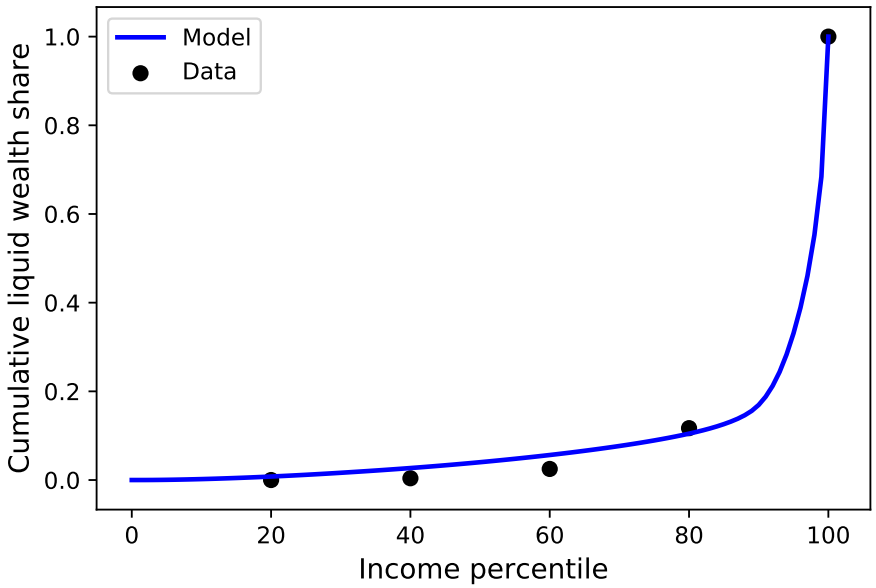

Figure 1: Distribution of liquid wealth across income groups

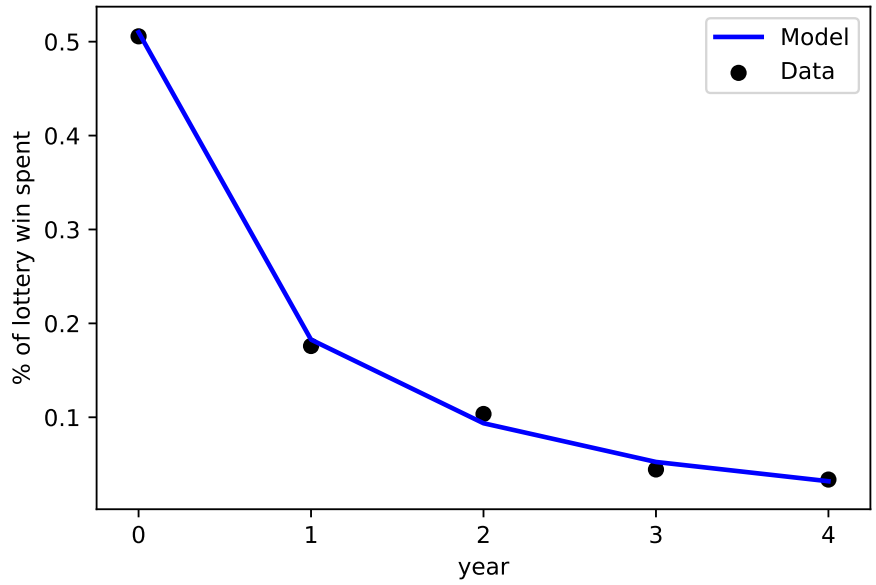

Figure 2: Aggregate marginal propensity to consume in response to a lottery in year zero

- BoroCnstArt is set to -0.8. This means the borrowing constraing amounts to 80% of quartarly permanent income, hence 20% of year permanent income. Source ?
- PermGroFacAgg is set to 1.5%, Source?
- Tage, Tsim

4 Fiscal policy simulations

We consider the following fiscal policy experiments

- Payroll tax cut: Employed individuals benefit from a 2 percentage points lower payroll tax cut. The tax cut is unanticipated and usually lasts for 8 quarters. However, there is a 50% chance, that the policy is extended by another 8 quarters if the recession is still ongoing in the 8th quarter of the payroll tax cut.
- Unemployment insurance extension: The duration of the unemployment insurance is doubled from 2 to 4 quarters. Agents, that are unemployed when the policy is implemented thus receive up to 4 quarters of unemployment insurance. The policy is unanticipated and active only for one quarter.
- Stimulus check: Each individual, independent of employment status, receives an unanticipated payment of \$1200 in one quarter. However, the check is only paid out fully to individuals with a permanent yearly income smaller than 100,000 and not at all to those with a income greater than 150,000. Those within the two thressholds receive a share of the full stimulus check amount proportionate to their position within threshholds.[1]

4.1 Impulse responses

[1] For this income group, the check amount is given by $\$1200(1 - \frac{Income - 100{,}000}{50{,}000})$. For example, an individual with a permanent yearly income of 110,000 receives 80% of the stimulus, i.e. \$960.

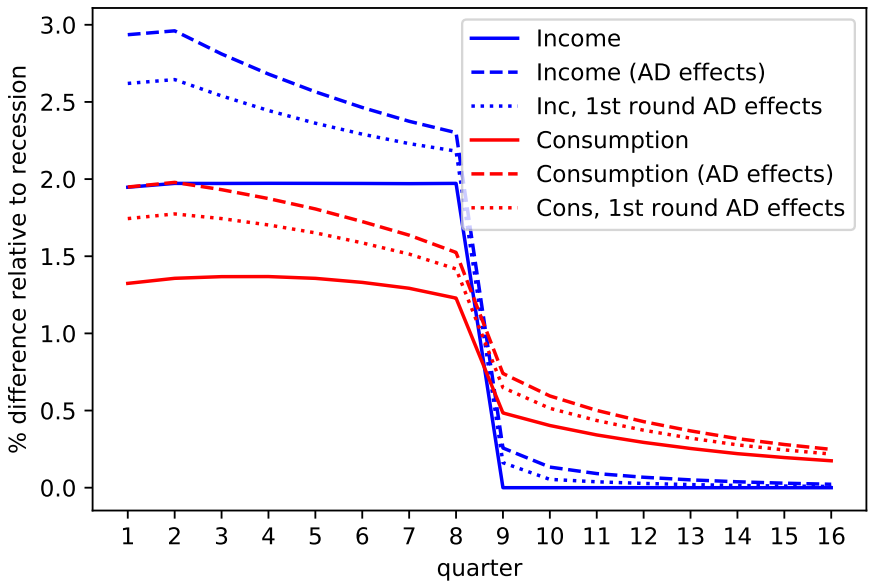

Figure 3: Impulse responses of aggregate income and consumption to a pay roll tax cut during a recesssion lasting eight quarters with and without aggregate demand effects

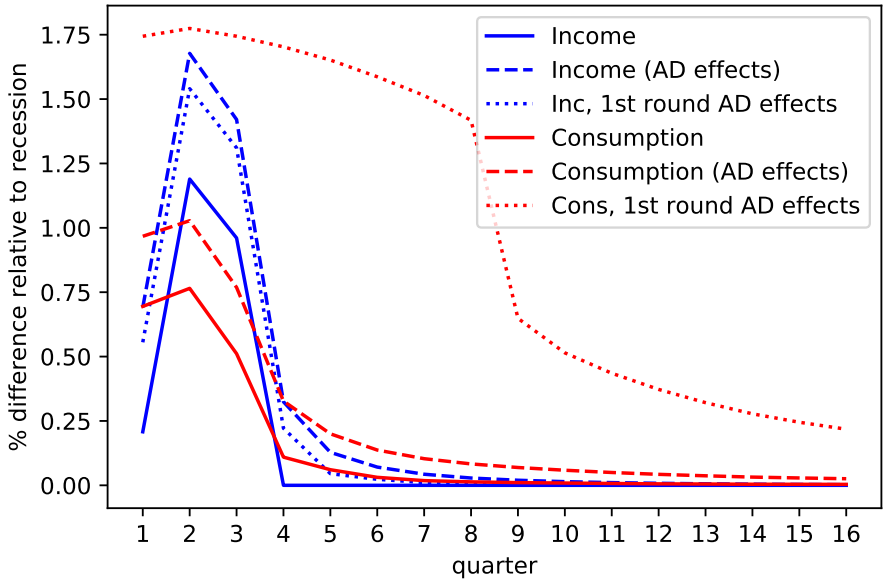

Figure 4: Impulse responses of aggregate income and consumption to a UI extension during a recesssion with and without aggregate demand effects

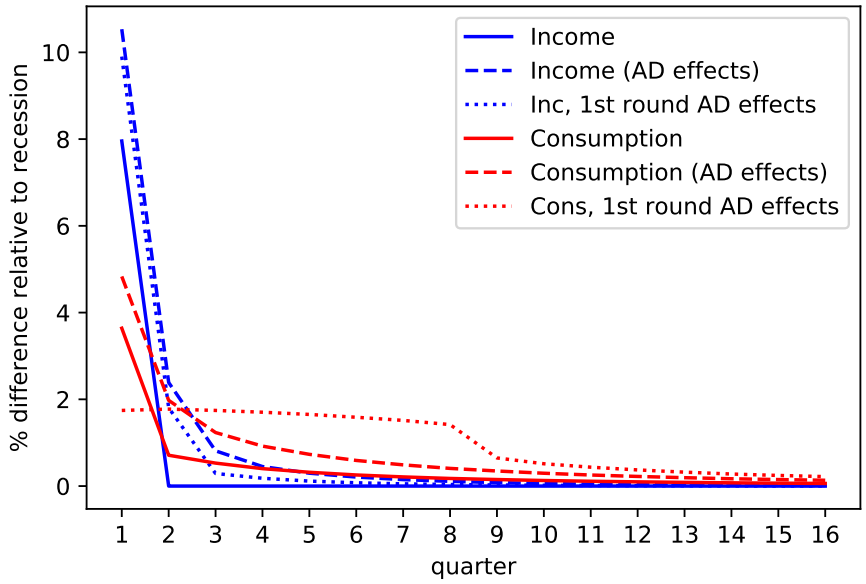

Figure 5: Impulse responses of aggregate income and consumption to a stimulus check during a recesssion with and without aggregate demand effects

4.2 Multipliers

Definitions:

- The *net present value (NPV)* of a variable X at horizon t is given by

$$NPV(t, X) = \sum_{s=0}^{t} \left(\prod_{i=1}^{s} \frac{1}{R_i} \right) X_s \tag{1}$$

- The *cummulative multiplier (CM)* of a policy is given by

$$CM(t) = \frac{NPV(t, \Delta C)}{NPV(T_{max}, \Delta G)} \tag{2}$$

where ΔC is the additional aggregate consumption spending in the policy scenario relative to the baseline and ΔG is the government expenditures caused by the policy.

	Tax Cut	UI extension	Stimulus check
Multiplier (with AD effects)	1.218	1.700	1.674
Multiplier (with only 1st round AD effects)	1.105	1.444	1.396
Share of policy expenditure during recession	43.0%	69.0%	60.7 %

Table 1: Multipliers as well as the share of the policy ocurring during the recession for the three policies considered

	Tax Cut	UI extension	Stimulus check
Recession lasts 2q	1.054	1.573	1.526
Recession lasts 4q	1.161	1.625	1.651
Recession lasts 8q	1.374	1.762	1.803

Table 2: Multipliers (with AD effects) for different recesssion lengths for the three policies considered

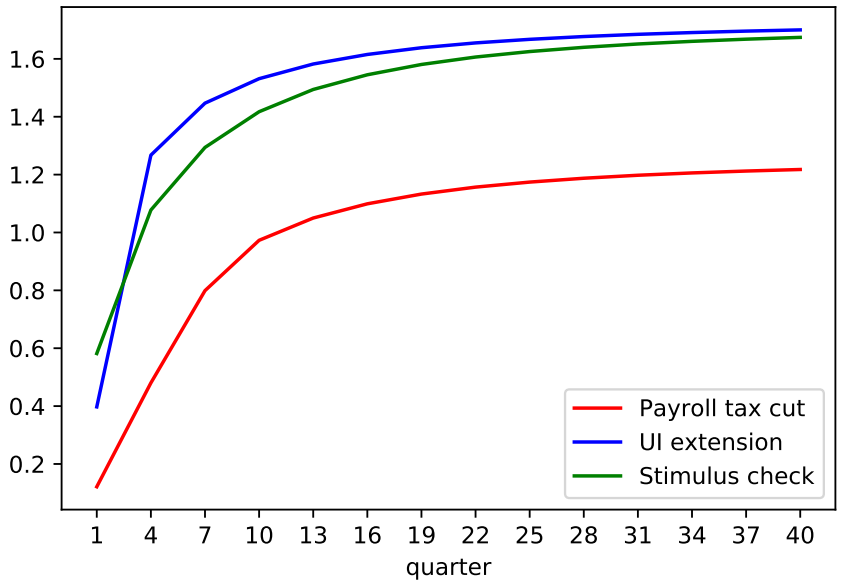

Figure 6: Cummulative Multiplier as a function of the horizon in quarters for the three policies considered. Policies are implemented during a recession with AD effects active

5 Welfare analysis

We want to convert welfare units to consumption units. A proportional increase in every agents' consumption in the baseline by fraction x, in welfare, is equal to:

$$x\frac{1}{N}\sum_{i=1}^{N}\sum_{t=0}^{\infty}D^t c_{it,\text{base}}u'(c_{it,\text{base}}) \tag{3}$$

where c_{it} is consumption (including the splurge) of agent i at time t and D is the social planner's discount rate. N is the number of agents.

The cost of such an increase is

$$x\frac{1}{N}\sum_{i=1}^{N}\sum_{t=0}^{\infty}R^{-t}c_{it,\text{base}} \tag{4}$$

Define

$$\mathcal{W}^c = \frac{1}{N}\sum_{i=1}^{N}\sum_{t=0}^{\infty}D^t c_{it,\text{base}}u'(c_{it,\text{base}}) \tag{5}$$

$$\mathcal{P}^c = \frac{1}{N}\sum_{i=1}^{N}\sum_{t=0}^{\infty}R^{-t}c_{it,\text{base}} \tag{6}$$

Aside - with log utility, $\mathcal{W}^c = \frac{1}{N}\sum_{i=1}^{N}\sum_{t=0}^{\infty}D^t = \frac{1}{1-D}$

We will assume that a government expenditure of size F with welfare benefit $\mathcal{W}$ will be funded by a proportional consumption tax of size $\frac{F}{\mathcal{P}^c}$ resulting in a welfare loss of $\frac{F}{\mathcal{P}^c}\mathcal{W}^c$. The overall welfare benefit will be equivalent to consumption units:

$$\mathcal{C} = \frac{\mathcal{W}}{\mathcal{W}^c} - \frac{F}{\mathcal{P}^c} \tag{7}$$

There is also an 'unseen' cost to the government policy exactly equal to implementing the policy in normal times.

Define welfare of a policy as:

$$\mathcal{W}(\text{policy}, AD, Rec) = \frac{1}{N}\sum_{i=1}^{N}\sum_{t=0}^{\infty}D^t u(c_{it,\text{policy},AD,Rec}) \tag{8}$$

So the consumption equivalent of a policy implemented in recession is:

$$\begin{aligned}\mathcal{C}(\text{policy}, AD, Rec) = &\left(\frac{\mathcal{W}(\text{policy}, AD, Rec) - \mathcal{W}(AD, Rec)}{\mathcal{W}^c} - \frac{PV(\text{policy}, Rec)}{\mathcal{P}^c}\right) \\ &- \left(\frac{\mathcal{W}(\text{policy}) - \mathcal{W}(\text{base})}{\mathcal{W}^c} - \frac{PV(\text{policy})}{\mathcal{P}^c}\right)\end{aligned} \tag{9}$$

Table 3 shows results for this method. Note that the policy expenditures of each policy have been equalized.

6 Conclusion

A Appendix section example

	Check	UI	Tax Cut
$\mathcal{C}(Rec, \text{policy})$	0.208	3.954	0.005
$\mathcal{C}(Rec, AD, \text{policy})$	0.953	5.748	0.113

Table 3: Consumption Equivalent Welfare Gains in Basis Points