# 1 Update - Oct 16th 2021

## 1.1 Long-run NPV multipliers table

The table shows $NPVM(\infty)$.

| Experiment | AD = 0.5 | AD = 0.5 (1st round only) |
|---|---|---|
| UI extension | 1.64[1.56](1.74) | 1.41 |
| Payroll tax cut | 1.21[1.16](1.28) | 1.11 |
| Check | 1.65[1.50](1.62) | 1.39 |

Table 1: Long-run multipliers for new estimation with het. nablas [uniform nabla estimation] (old calibration)

new estimation discount factors:
DiscFacMeanD = 0.87509113
DiscFacMeanH = 0.96597689
DiscFacMeanC = 0.9886787
DiscFacSpreadD = 0.13891492
DiscFacSpreadH = 0.03307152
DiscFacSpreadC = 0.00772621

old estimation discount factors:
DiscFacMeanD : 0.96971 Mean intertemporal discount factor for dropout types
DiscFacMeanH : 0.98628 Mean intertemporal discount factor for high school ty
DiscFacMeanC : 0.98764 Mean intertemporal discount factor for college types
DiscFacSpread : 0.00981 Half-width of uniform distribution of discount factors

Calibration discount factors:
DiscFacMean : 0.986 Mean intertemporal discount factor
DiscFacSpread : 0.0183 Half-width of uniform distribution of discount factors

Reason: The college / HS groups are large and have relatively large betas, so average MPC in the population has gone down.

## 1.2 Share of policy expenditure occuring during recession

For each recession length (1 to 20q) determine the NPV of additional income occuring during the recession (as opposed to the share occuring after the recession)
Sum up those shares across all recession lengths, weighted by the probability of that recession length occuring.

Result:
Share of UI policy expenditure occuring during recession: 68 %
Share of Tax cut policy expenditure occuring during recession: 42 %

Share of Check policy expenditure occuring during recession: 60 %

### 1.3 Three different multiplier definitions

1. Net present value multiplier: The ratio of the NPV of additional consumption to the NPV of policy expenditure up to a certain point in time.

$$NPVM(t) = \frac{NPV(t, \Delta C)}{NPV(t, \Delta G)} \tag{1}$$

   where the net present value of a variable X at horizon t is given by

$$NPV(t, X) = \sum_{s=0}^{t} \left( \prod_{i=1}^{s} \frac{1}{R_i} \right) X_s \tag{2}$$

2. Cummulative multiplier: The ratio of the NPV of additional consumption up to time $t$ to the infinite-horizon NPV of policy expenditure

$$CM(t) = \frac{NPV(t, \Delta C)}{NPV(\infty, \Delta G)} \tag{3}$$

3. Period multiplier: The ratio of additional consumption to policy expenditures at a certain point in time

$$PM(t) = \frac{\Delta C(t)}{\Delta G(t)} \tag{4}$$

   where $\Delta X(t)$ is the difference in the variable $X$ between the no-policy and policy scenario at time $t$.

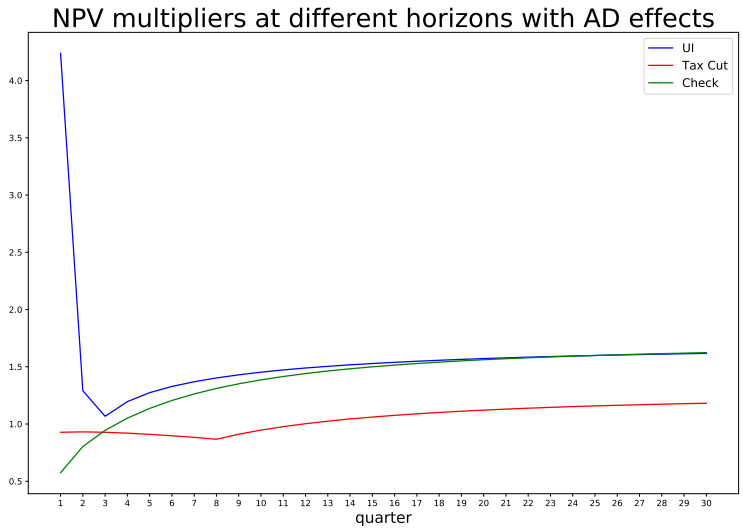


Figure 1: Net present value multipliers at horizon 1 (impact multiplier) to 30

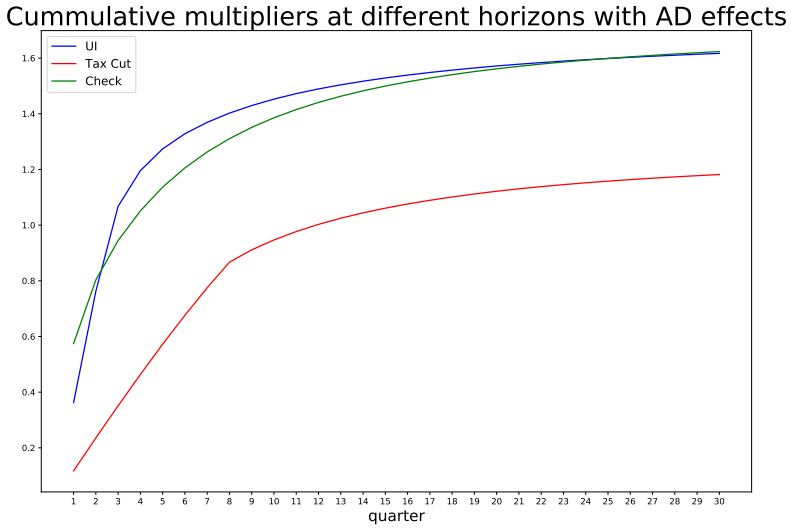


Figure 2: Cummulative multiplier

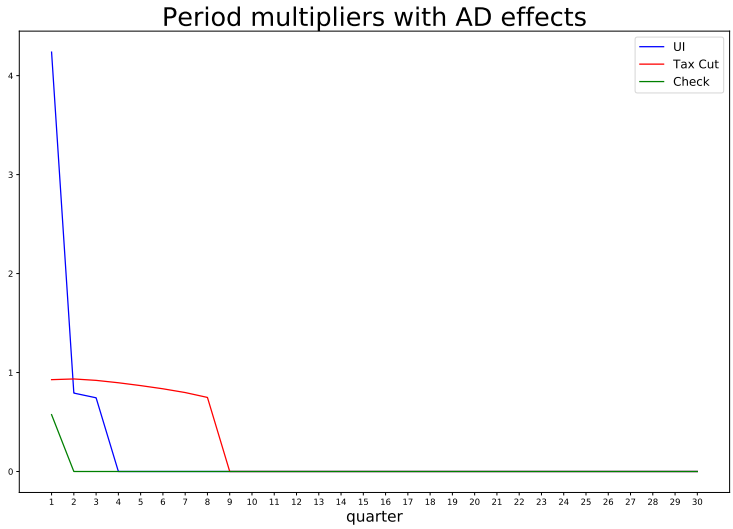


Figure 3: Period multiplier

## 1.4 Response of income / consumption in experiments

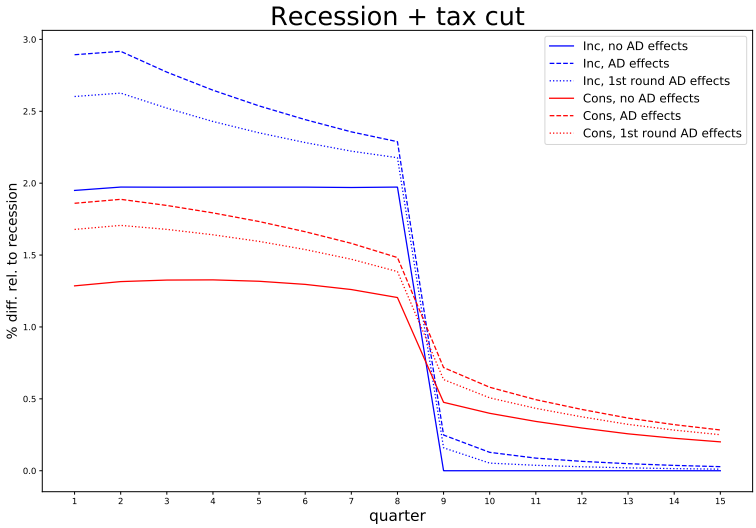


Figure 4

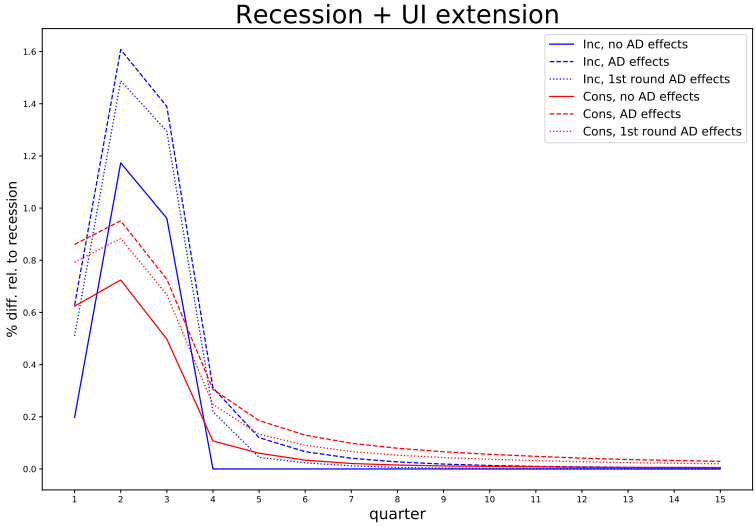


Figure 5

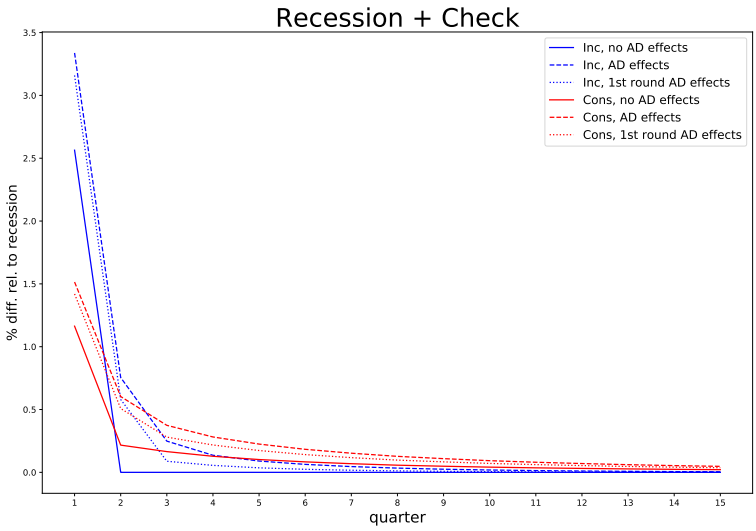
Recession + Check
Inc, no AD effects
Inc, AD effects
Inc, 1st round AD effects
Cons, no AD effects
Cons, AD effects
Cons, 1st round AD effects
% diff. rel. to recession
quarter
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

Figure 6