Deleveraging

The economy consists of two groups of people, either "patient" or "impatient". Under the same parameter values as Carroll and Toche (2009) except that severance payment $\varsigma = 4$ and death rate $\mathsf{D} = 0.05$, "patient" group is calibrated to have time preference rate $\vartheta = 0.0206$ so that their target wealth is 12, while "impatient" group is calibrated to have $\vartheta = 0.1061$ so that their target wealth is -2 (running debt).

We consider three experiments focusing on how saving rate evolves under different kinds of shocks.

1. Credit Cycle
   We consider an experiment with a gradual increase and then an abrupt decrease of severance payment. More concretely, before 2001, severance payment is equal to the baseline value, 4. From 2002 to 2007, severance payment gradually increases, $\varsigma_{2002} = \varsigma_{2001} + \eta_\varsigma, \varsigma_{2003} = \varsigma_{2001} + 2\eta_\varsigma, ..., \varsigma_{2007} = \varsigma_{2001} + 6\eta_\varsigma$. There is an abrupt reversal of severance payment at 2008, say, $\varsigma_{2008} = \varsigma_{2001}$ and remains at the baseline level from then on.

   We calibrate $\eta_\varsigma = 0.35$ so that debt level of impatient group is 2.6 at 2007. Figure 1 characterizes saving dynamics over such a credit cycle. Both groups cut their saving rate during credit boom, because higher severance payment makes people less painful when losing jobs. At 2008 when there is a sudden credit crunch, both groups increase their saving rate aggresively in order to have a higher target wealth.

2. Expansion of Growth Expectation
   Before 2001, growth expectation is equal to the baseline value, 0. Growth expectation increases to η_g from 2002 to 2007. Since 2008, growth expectation drops back to its original level, 0. Notice that the "actual" growth rate is always set to be zero, which means people are over-optimistic from 2002-2007. Given parameter values above, η_g is calibrated to be 0.0363.

   Figure 2 characterizes saving dynamics under expansion of growth expectation, which is qualitatively similar to result of the first experiment. When people are over-optimistic about future, their saving rate is lower. When their expectaion becomes consistent with actual growth rate again, their saving rate becomes even higher in order to recover original target wealth.

3. Decrease of Unemployment Expectation
   Before 2001, unemployment rate expectation is equal to the baseline value, 0.005. Unemployment rate expectation decreases to $0.005 - \eta_\mho$ from 2002 to 2007. Since 2008, unemployment rate expectation increases to its original level, 0.005. "Actual" unemployment rate is always set to be 0.005, which means people are over-optimistic from 2002-2007.

Notice: We assign $\eta_{\mho} = 0.0041$ for less patient group to have a debt level of 2.6 at 2007, and $\eta_{\mho} = 0.0019$ for more patient group to avoid violation of growth impatience condition.

Figure 3 characterizes saving dynamics during the period when people underestimate unemployment rate. Clearly, when people are optimistic about future employment, they tend to cut their saving; when they realize low unemployment rate is not the truth, they suddenly increase savings and adjust their target wealth to original level.

Figure 1 Saving Dynamics over Credit Cycle

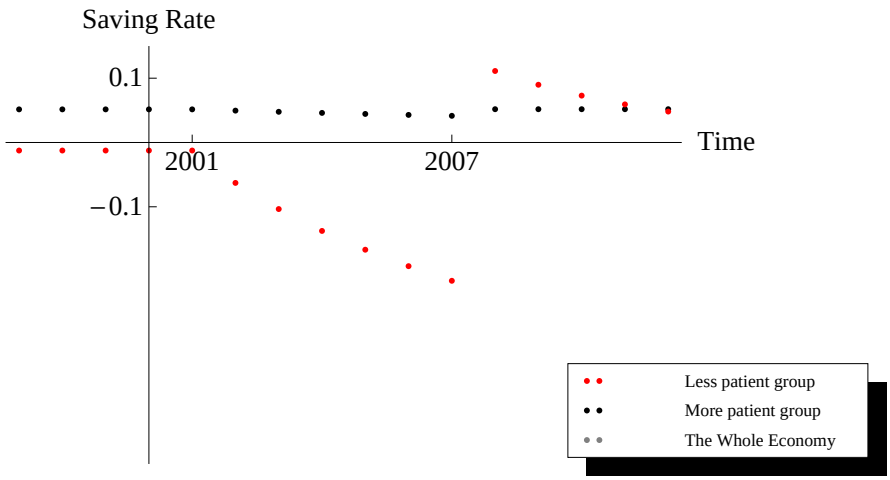


Figure 2 Saving Dynamics under Expansion of Growth Expectation

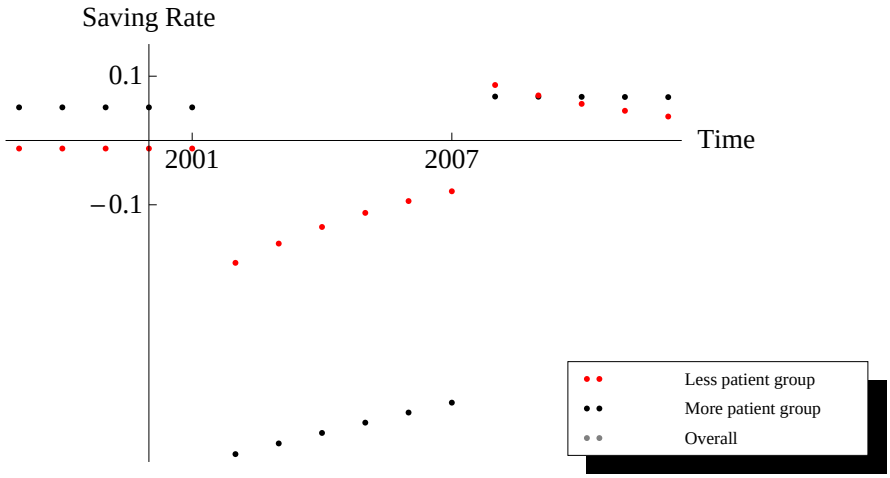
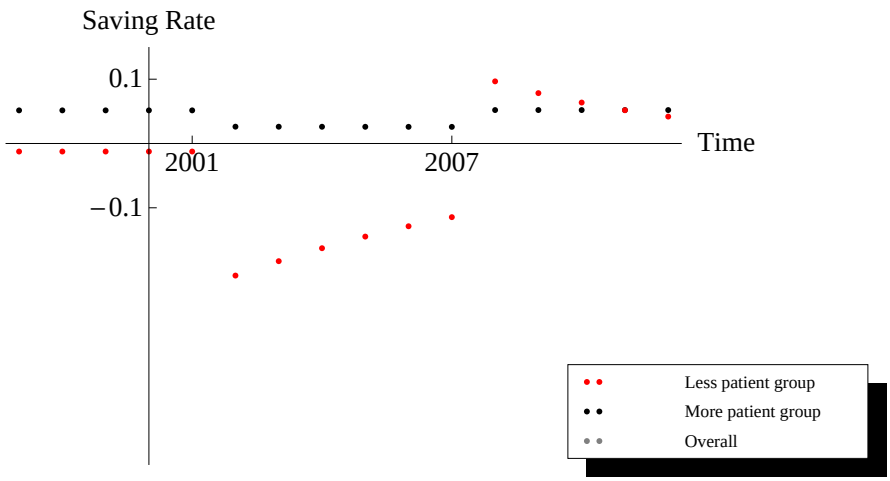


Figure 3 Saving Dynamics under Optimism about Unemployment Expectation



References

Carroll, Christopher D., and Patrick Toche (2009): "A Tractable Model of Buffer Stock Saving," *NBER Working Paper Number 15265*, http://econ.jhu.edu/people/ccarroll/papers/ctDiscrete.