Is U.S. Monetary Policy “Punishing Saving”?  

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Any opinions expressed here are mine and do not necessarily reflect those of other Federal Open Market Committee participants.
This talk concerns a current monetary policy issue. The analysis is only partially complete and is part of joint work with Aarti Singh and Jacek Suda. The model is for illustrative purposes only and is exploratory. Suggestions for ways to get at the key issues more directly are welcome.
THE STATE OF PLAY

- Policy rate near zero since December 2008.
- Commitments to keep the policy rate near zero far into the future.
- Quantitative easing: outright asset purchases using base money.

*Net effect: very low real interest rates expected far into the future.*
OUR JOB AS ECONOMISTS

- We ask: Could the existing policy be far away from the optimal policy?
- If so, the existing policy may be exacerbating, not mitigating, the situation.
- Change to the proper policy could bring large welfare gains.
- But how could keeping real rates very low be the wrong reaction to a large recession?
CRITICISM

- Contemporary criticisms of current policy include the idea that monetary policy is “punishing savers.”
  - They suggest the income lost to savers is very large, probably dwarfing any other type of benefit coming from a low real interest rate policy.
- Glover, Heathcote, Krueger, and Rios-Rull (2011) consider intergenerational redistribution due to a recession. They find that those late in the life cycle, savers, suffer substantial welfare losses due to depressed real interest rates.
“**Punishing savers**” ... what could it mean?

- Everyone has access to the same investment opportunities.
  - In this sense monetary policy is egalitarian.

- But ... what if there is some important heterogeneity?
- In particular, certain types of households need to borrow, others need to save, and changing real rates disturbs the equilibrium in this market.
  - In short, it is a statement about *economically meaningful borrowing and lending*. 
There are natural savers and natural borrowers in the economy.

Current policy means real rates are very low today and are expected to remain low.

Optimism from the tech bubble led to “overborrowing” and “debt overhang.”

Is the low real rate policy helpful or harmful in this situation?
REAL INTEREST RATES

- 10-year TIPS yield
- 5-year TIPS yield

Percent p.a.
The State of Play

A Story of Debt Overhang

DEBT

Graph 1
Non-financial sector debt

As a percentage of GDP

Real levels, deflated by consumer prices

1 Simple averages for 18 OECD economies. 2 Rebased to 1980 = 100; simple average of 16 OECD economies, including the United States.

A SIMPLE MODEL

- The Fed is perceived as having a lot of influence over real yields.
  - Simply assume it in this model.
- Simple, stripped down structure.
  - But, more elaborate versions could be constructed.
- Three-period life cycle.
- This will create natural borrowers and natural lenders.
**PREFERENCES**

- The preferences of a household entering the economy at date $t$ are

  $$V = \ln c_t(t) + \ln c_t(t+1) - \vartheta \ln \ell_t(t+1) + \ln c_t(t+2).$$  \hspace{1cm} (1)

- No discounting.
- Here $c$ is consumption and $\ell$ is labor supply.
- Households supply one unit of labor inelastically in the first and last period, and $\ell_t(t+1) \approx 1$ in the middle period.
- We consider the limiting case where $\vartheta \rightarrow 0$, the marginal disutility of middle-age labor supply is vanishingly small.
The productivity profile of households entering the economy at date $t$ is

$$\{1, \gamma_t(t+1), 1\}.$$  \hspace{1cm} (2)

Here, $\gamma_t(t+1) > 1$ can be thought of as the level of middle-age productivity.

We think of $\gamma \approx 2 \forall t$ as a baseline.

The productivity $\gamma$ would be explicitly stochastic in a more elaborate version.
Output at date $t$ is given by

$$Y(t) = C(t)$$

$$= 1 + \gamma_{t-1}(t) \ell_{t-1}(t) + 1$$

$$= c_{t-2}(t) + c_{t-1}(t) + c_t(t)$$
**CAPITAL AS A SUBTEXT**

- In today’s version there are only consumption loans.
- However, the model easily accommodates capital in positive supply.
- Punishing saving might then be understood to reduce the level of capital and output.
- Aside: There is no outside asset in this version.
  - The condition for a valued outside asset is that first period income is greater than third period income, which does not hold here since I have set them equal.
**BUDGET CONSTRAINTS**

- The budget constraints of a household entering the economy at date $t$ are

  $$c_t(t) \leq 1 + b_t(t) \quad (6)$$
  $$c_t(t + 1) + a_t(t + 1) \leq \gamma_t(t + 1) \ell_t(t + 1) - R(t)b_t(t) \quad (7)$$
  $$c_t(t + 2) \leq 1 + R(t + 1)a_t(t + 1) \quad (8)$$

- Here $b_t(t) > 0$ is the amount of borrowing, $a_t(t + 1)$ is the amount of assets held into the last period, $R(t)$ is a gross interest factor from date $t$ to $t + 1$.

- I have assumed debt must be repaid. For the implications of endogenous debt constraints in a related framework, see Azariadis and Lambertini (*RES*, 2003).
**HOUSEHOLD CHOICES**

- These assumptions imply \( c_t (t + 1) = R(t) c_t (t) \), 
  \( c_t (t + 2) = R(t) R(t + 1) c_t (t) \), and
  \[
  c_t (t) = \frac{1}{3} \left[ 1 + \frac{\gamma_t (t + 1) \ell_t (t + 1)}{R(t)} + \frac{1}{R(t) R(t + 1)} \right]. \tag{9}
  \]

- The households would prefer to consume \( 1/3 \) of the present discounted value of three-period income in each period of life.

- To fix ideas, in the baseline steady state \( \ell = 1, \gamma_t (t + 1) = 2 \forall t \), and \( R = 1 \). Then \( c = 4/3 \) in each life cycle stage.
The equilibrium condition is

$$a_{t-1}(t) = b_t(t).$$ \hfill (10)

The saving, or asset-holding, of the middle-aged finances the borrowing of the entering generation.

On the right hand side is borrowing:

$$b_t(t) = \frac{1}{3} \left[ 1 + \frac{\gamma_t(t+1)\ell_t(t+1)}{R(t)} + \frac{1}{R(t)R(t+1)} \right] - 1 \hfill (11)$$

The partial derivative w.r.t. $R(t)$ is negative, so that lower real interest rates increase the amount of borrowing, all else equal.
On the left hand side is middle-aged saving,

\[
\begin{align*}
 a_{t-1}(t) &= \gamma_{t-1}(t) \ell_{t-1}(t) + R(t-1) \\
 &\quad - 2R(t-1) \frac{1}{3} \left[ 1 + \frac{\gamma_{t-1}(t) \ell_{t-1}(t)}{R(t-1)} + \frac{1}{R(t-1)R(t)} \right].
\end{align*}
\] (12)

The partial derivative w.r.t. \( R(t) \) is positive, so that lower real interest rates discourage saving, all else equal.

This could be viewed as “low real interest rate policy punishes saving.”

Thus the model has some of the flavor of the criticism discussed earlier.
Suppose labor supply is inelastic, so that middle-age labor supply is 1 \( \forall t \).

Suppose middle-age productivity \( \gamma_t (t + 1) = 2 \forall t \).

This means total income is 4 units, two of which are earned in the middle period.

Then the steady state interest factor \( R = 1 \) solves equation (10).
Consumption and saving in the steady state

In this steady state, households smooth consumption exactly:

\[ c_{t-2}(t) = c_{t-1}(t) = c_t(t) = \frac{4}{3} = \bar{c}. \]  \hspace{1cm} (13)

Households are moving the extra unit of middle-age income to first and third period consumption.

To do this, they need to borrow \( b = 1/3 = \bar{b} \) in the first period.

This could be viewed as pulling some housing consumption forward.

*How much they wish to borrow depends on their expectations of middle period income.*

The middle-aged save \( \bar{a} = 1/3 \) to finance the borrowing of the entering households.
The role of policy

- We postulate that the policy authority controls the sequence \( \{R(t)\} \).
- Equation (10) then determines middle period labor supply in a small neighborhood of \( \ell = 1 \).
- This environment has interesting features, but I do not think it has an interesting general equilibrium in its current form.
- Instead, I will use the model to tell a story of debt overhang.
The economy is initially in the baseline steady state with $\gamma = 2$.

News arrives. The society now expects high middle period productivity $\gamma_s (s + 1) > 2, \forall s > t$.

They also expect to supply $\ell_s (s + 1) = 1$, a normal amount of labor, $\forall s > t$.

Accordingly, entering households now wish to borrow more to smooth consumption.
A narrative, part 1.5

- The policymaker maintains $R = 1$ and creates expectations for the future at this value.
- Current labor supply adjusts to $\ell_{t-1}(t) > 1$ in order to clear the market for loans.
- The entering generation gets to borrow the desired amount.
- This sounds like ... “The tech boom causes increases in borrowing for housing services consumption.”
A NARRATIVE, PART 2

- At the next date, the news turns out to be false.
- Middle period productivity is now understood to be $\gamma = 2 \forall t$.
- The middle-age group now has a “debt overhang” which is “too large” given actual middle age income.
  - The middle-age group has to pay back debt $b > \bar{b}$.
- At $R = 1$, the middle-age group has to either work more, $\ell > 1$, consume less, $c < \bar{c}$, and/or save less, $a < \bar{a}$, for their third period.
A NARRATIVE, PART 2.5

- The entering group has expectations of middle age productivity at $\gamma = 2$ and labor supply at $\ell = 1$.
- They wish to borrow the steady state amount, which is $\bar{b}$.
- At $R = 1$, the amount they wish to borrow is more than the amount the middle-age group is likely to save, because of “debt overhang.”
Question: Should the policymaker lower the real interest rate below the steady state level, making $R(t) < 1$, in this situation?

I think the answer is no.
The lower real interest factor would discourage additional saving by the middle-aged.

And, the lower real interest factor would encourage greater than the steady state level of borrowing by the entering generation.

This would make it *more difficult* to clear the market for loans.

- Policy would be exacerbating the natural tensions in this situation.

If there were capital in the model it may also reduce capital formation.

*So low real interest rates, R(t) < 1, would be “punishing saving” in a way that may have important welfare consequences.*
This narrative offers one way to think about the sources and implications of “debt overhang.”

However, this narrative does not establish an equilibrium.

The narrative also does not establish an optimal policy against which alternatives can be compared.
**RELATED WORK**


- Guerrieri and Lorenzoni (2011) consider an Aiyagari model in which borrowers smooth idiosyncratic labor income shocks, subject to a borrowing constraint.
  
  - A tighter constraint causes real interest rates to fall, and households deleverage by consuming less.

- In the present model, a suddenly tighter borrowing constraint would not create a “debt overhang.”
  
  - There would be “too little” borrowing given preferences and income patterns. The middle-aged would have “too much saving.”
  
  - This may suggest, incorrectly, that more middle-age consumption is warranted. More consumption would be warranted only for the young generation, but they are borrowing constrained.
CONCLUSION

- In this talk I looked at a model environment that contains some interesting features.
- The features include a vital economic role for borrowing and lending.
- The amount of desired borrowing depends on future income, leaving it susceptible to news shocks.
- Too much borrowing can occur if the news signal is not confirmed.
- Low real interest rates are probably unhelpful in resolving the difficulty associated with debt overhang, and may be welfare-reducing.
- This could be interpreted as saying current G-7 monetary policy is far from optimal.
- The discussion here stops short of establishing an equilibrium or an optimal policy.