Discussion of ‘Debt, Deleveraging, and the Liquidity Trap’ by G. Eggertsson and P. Krugman

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Outline of discussion

- Brief review of the paper
- Comments on:
  - debt limits
  - the role of fiscal policy
  - some empirical issues
Why does the natural rate of interest decline below zero?

- Krugman (1998)
  - Exogenous
  - Declining working population; Low productivity growth; Equity premiums

- Jung, Teranishi, and Watanabe (2001)
  - Exogenous
  - Debt-overhang; Credit crunch

- Eggertsson and Woodford (2003)
  - Exogenous
  - Preference shock

- Some attempted to endogenize a drop in the natural rate of interest by using a variable capital model (Christiano 2005; Takamura, Kudo, and Watanabe 2006), but did not discuss the source of the drop.
Two inequality constraints

- Borrowing limit:
  \[ D_t^b \leq \bar{D} \]

- ZLB constraint:
  \[ i_t \geq 0 \]
Two period endowment economy

- Two types of households: savers and borrowers
- Two periods: short-run and long-run
- No production
- Prices are fully flexible
- The model is identical to the one in Krugman (1998) except that the representative household was assumed there.
Short-run response to a deleveraging shock

\[ C^b_S = \frac{1}{2} Y + \frac{D^{low}}{1 + r_S} - D^{high} \]

\[ C^s_S = \frac{1}{\beta} \frac{1}{1 + r_S} C^s_L \]

\[ C^s_L = \frac{1}{2} Y + (1 - \beta) D^{low} \]

\[ C^s_S + C^b_S = Y \]

\[ 1 + r_S = \frac{\frac{1}{2} Y + D^{low}}{\beta \frac{1}{2} Y + \beta D^{high}} \]

\[ 1 + i_S = (1 + r_S) \frac{P_L}{P_S} \geq 1 \]
Contribution of the paper: Fisherian debt deflation

Real debt ⇒ \[ 1 + r_S = \frac{\frac{1}{2}Y + D^{\text{low}}}{\beta \frac{1}{2}Y + \beta D^{\text{high}}} \]

Nominal debt ⇒ \[ 1 + r_S = \frac{\frac{1}{2}Y + D^{\text{low}}}{\beta \frac{1}{2}Y + \beta \frac{B^{\text{high}}}{P_S}} \]

Prices go down
⇒ Higher real burden
⇒ Borrowers consume less
⇒ Natural rate of interest falls endogenously
⇒ The ZLB constraint is more strongly binding
⇒ Further decline in prices
Permanent versus temporary liquidity traps

- Keynes (1936); Benhabib et al (2002)
- Svensson (2001): “a temporary liquidity trap”
- Woodord (2003): “the problem of a country like Japan at present may not be so much as that it has fallen into a self-fulfilling deflationary trap, despite the existence of an equilibrium with stable prices if only expectations were to coordinate upon it, as that a temporary reduction in the equilibrium real rate of return has made stable prices incompatible with the zero bound on nominal interest rates”

The paper gives a reason to believe that the trap is a temporary one: the natural rate of interest stays low only until debt is paid down to the new upper limit
Comment #1: Exogenous debt limits
Demand and supply in the bond market

Debt limit drops from 300 to 200

Real interest rate $1 + r$

$Y = 1000$
$\beta = 0.8$
$D_{\text{high}} = 300$
$D_{\text{low}} = 200$

ZLB

Savers' demand for bonds
Borrowers' supply of bonds

Demand and supply for bonds
Demand and supply in the bond market

Debt limit drops from 300 to 50

Real interest rate $1+r$

Excess demand

ZLB

$Y = 1000$

$\beta = 0.8$

$D_{high} = 300$

$D_{low} = 50$

Savers' demand for bonds

Borrowers' supply of bonds

Demand and supply for bonds
Klein, L. R., *The Keynesian Revolution*, 1947
The analysis starts with the assumption that the new debt limit for borrowers is 50.

It turns out that, savers want to lend 160 in equilibrium.

Excess demand in the bond market, implying excess supply in the goods market.

The amount the savers are willing to lend in equilibrium is not consistent with the debt limit initially set by someone.

This implies that debt limit is not determined by the savers. It must be someone else that determine the debt limit. Who? Banks? Regulators?
Comment #2: Fiscal policy
Monetary policy can deal with a deleveraging shock by creating a rise in expected inflation. One way to achieve this is to raise the inflation target temporarily.

This would only work if the higher target is credible. However, “achieving such credibility isn’t easy” (p.20).

The authors argue that fiscal policy is still effective, and more effective than standard models suggest.
A.3 Government

Fiscal policy is the purchase of $G_t$ of the Dixit-Stiglitz aggregate and the collects taxes $T_t^s$ and $T_t^b$. For any variations in $T_t^b$ or $G_t$ we assume that current or future $T_t^s$ will be adjusted to satisfy the government budget constraint. Monetary policy is the choice of $i_t$. We assume it follows the Taylor rule specified in the text.
No debt limits for the government

\[ C_S^g = D_S^g \]

\[ D_S^b \leq D^{low} \]

\[ C_S^b = \frac{1}{2} Y + \frac{D^{low}}{1 + r_S} - D^{high} \]

\[ C_S^s = \frac{1}{2} Y - \frac{D^{low}}{1 + r_S} + D^{high} - C_S^g \]

\[ 1 + r_S = \frac{\frac{1}{2} Y + D^{low}}{\beta \frac{1}{2} Y + \beta D^{high} - C_S^g} \]
No debt limits for the government

\[ C^g_S = D^g_S \]

\[ D^b_S \leq D^{low} \]

\[ C^b_S = \frac{1}{2} Y + \frac{D^{low}}{1 + r_S} - D^{high} \]

\[ C^s_S = \frac{1}{2} Y - \frac{D^{low}}{1 + r_S} + D^{high} - C^g_S \]

\[ 1 + r_S = \frac{\frac{1}{2} Y + D^{low}}{\beta \frac{1}{2} Y + \beta D^{high} - C^g_S} \]

Savers set the debt limit on the sum of private and public debts

\[ C^g_S = D^g_S \]

\[ D^b_S + D^g_S \leq D^{low} \]

\[ C^b_S = \frac{1}{2} Y + \frac{D^{low}}{1 + r_S} - D^{high} - D^g_S \]

\[ C^s_S = \frac{1}{2} Y - \frac{D^{low}}{1 + r_S} + D^{high} \]

\[ 1 + r_S = \frac{\frac{1}{2} Y + D^{low}}{\beta \frac{1}{2} Y + \beta D^{high}} \]
Monetary policy can deal with a deleveraging shock by creating a rise in expected inflation. One way to achieve this is to raise the inflation target temporarily. This would only work if the higher target is credible. However, “achieving such credibility isn’t easy” (p.20). The authors argue that fiscal policy is still effective, and more effective than standard models suggest.

Fiscal policy is effective only when the government has high credibility so that there is no debt limit for the government. However, this may not be true. “Every economy faces a fiscal limit—a point beyond which tax collections can no longer rise and government expenditures cannot be further reduced” (Davig and Leeper 2010).
Comment #3: Empirical issues
Inflation and policy rates in Japan

- CPI Inflation
- Overnight Call Rate
Price Levels in Japan

Log CPI (1970=1)

- Blue line: CPI Total
- Red line: CPI Goods
- Green line: CPI Services