

Aging and Deflation from a Fiscal Perspective

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Main Results:

- 1 Aging may help to explain the deflation period in Japan
 - Higher longevity causes inflation to drop
 - Lower birth rates cause inflation to rise
 - 2 Higher government debt today causes no burden on future generations.
 - FTPL: price level will adjust to balance discounted fiscal surpluses
 - Higher Government Hurts the OLD \leftrightarrow Traditionally: Higher Debt Puts Bigger Burden on Future Generations
- \Rightarrow good news for the young generation in Japan, Greece, ...

Set-Up:

- 2-period Overlapping Generations Model
- Fiscal Theory of the Price Level (FTPL)
- Voting Model: endogenous fiscal policy
 - 1 Income tax rate
 - 2 Bond issues
- Labor supply and total production independent of fiscal policy:

$$n_t c_t^y + \theta_t c_t^o + (n_t + \theta_t) g_t^c = n_t \bar{l}_t$$

- fiscal policy is just about redistribution
 - Higher taxes τ_t : higher burden on the young
 - Higher government bonds b_t : FTPL implies higher price level \Rightarrow burden on the old
- \Rightarrow some parallels with a pay-as-you-go pension system

Intuition for the redistributive effects of aging:

A decrease in the birth rate n_t implies

- 1 Lower taxes from the young and higher deficits: higher taxes τ_t and higher prices P_t
- 2 Political effect: redistribute from the young to the old (bigger share of voters) with the help of higher taxes and lower prices

Effect of unexpected increase of longevity:

- Old agents are poorer than expected because the return from their savings (perfect annuity markets) has declined
- ⇒ government redistributes from young to old: lower prices

Realistic Implications?

① Real government debt

- is negatively correlated with future real interest rates: $\text{corr}(b_t, r_{t+1}) < 0$
→ observable in the Japan data (for correlation of r_{t+1} with b_t , b_t/y_t , and b_t/b_{t-1})
- is negatively correlated with future inflation: $\text{corr}(b_t, \pi_{t+1}) < 0$
→ observable in the Japan data (for correlation of r_{t+1} with b_t and b_t/y_t , but not for b_t/b_{t-1})
- is negative correlated with government consumption: $\text{corr}(b_t, g_t^C) < 0$
→ not observable in the Japan data (for correlation of g_t^C with either b_t , b_t/y_t , or b_t/b_{t-1})
- is equal to savings of the young generation
→ see figure

Mechanism: Higher debt = higher private savings in capital market equilibrium

⇒ taxes needs to be reduced

⇒ surpluses fall

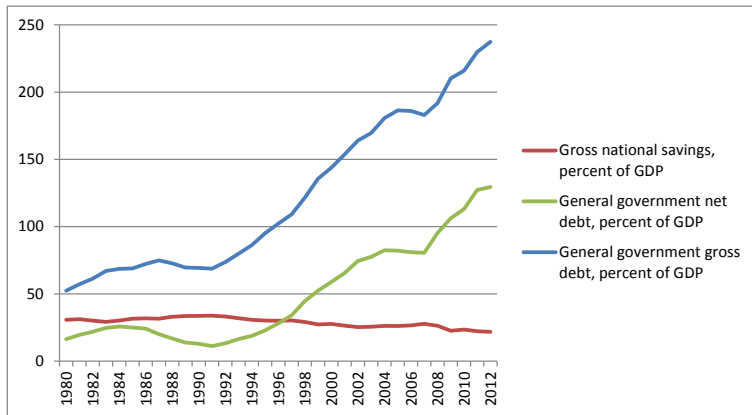
⇒ prices need to rise

- ② Real government debt is no burden on future generations
 - Main Mechanism: Prices increase
 - ⇒ For more realistic length of the election cycle period (e.g. 4 years for the Japanese House of Representatives) price do not adjust completely
 - ⇒ important transition effects

Empirical Evidence on Fiscal Theory of Price Level in general:

- Canzoneri, Cumby, and Diba (AER, 2001), and Cochrane (Econometrica 2001): when a government runs an unexpected deficit, the real market price of its debt increases,
- ⇒ Evidence is suggesting: households expect that the government will make up for the shortfall through increased surpluses in the future

Debt/GDP versus Savings/GDP in Japan



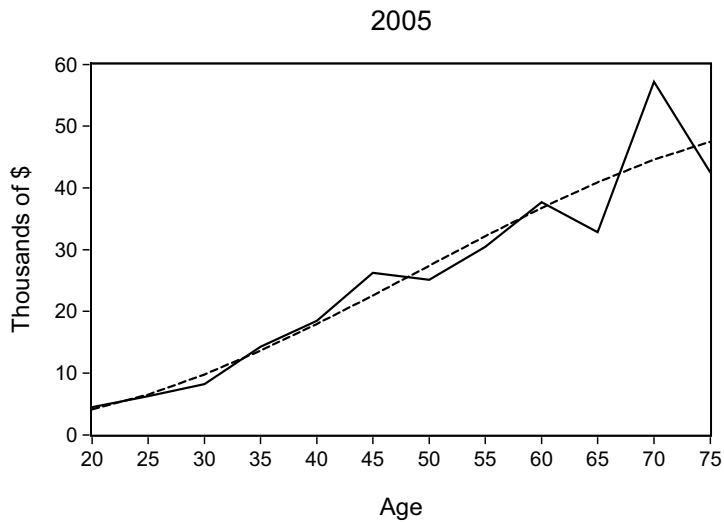
Sensitivity/robustness of results:

- ① Pension/Social Security
 - Aging implies higher expenditures on social security
 - ⇒ Higher deficits
 - ⇒ FTPL: aging implies higher inflation
- ② Quantitative analysis with more realistic preferences, e.g. calibrated to match the Frisch elasticity of labor supply etc.

$$u^y(c, l) = \frac{c^{1-\sigma}}{1-\sigma} - \gamma_0 \frac{l_t^{1+\gamma}}{1+\gamma}$$

- ③ Physical capital, $a_t = b_t + k_t$
 - ⇒ higher government debt crowds out physical capital
 - ⇒ return on capital/government debt increases in equilibrium (without aggregate uncertainty, both assets needs to yield equal returns)
 - ⇒ difficult to reconcile with the main mechanism in the model
- ④ Does the model explain the history of Japan?
 - quantitative simulation exercise
- ⑤ Price adjustment costs neglected
 - No burden of higher debt on future generations: necessary price level adjustments may imply costs, e.g. menu costs, ...

- ① Fujiwara, Teranishi, 'A dynamic new Keynesian life-cycle model: Societal aging, demographics, and monetary policy', JEDC, 2008
 - Gertler (1999) model with elastic labor: asymmetric effects of technology/monetary policy shocks on generations
- ② Heer, McNelis, Maußner, 'The Money-Age Distribution: Empirical Facts and the Limits of Three Monetary Models'. JMacro, 2011
 - 60-period OLG model
 - Different monetary models: Money-in-the-utility, costly-credit, limited participation
 - Implication:
 - ⇒ Aging will cause velocity of money to decline
 - ⇒ For given growth rates of money supply, prices are likely to decrease.



Average Money Holdings

