

Comments on Three Papers

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The views expressed herein are those of the author
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Common Views

- On-going **demographic changes**:
 - The low birth rate and the aging population
 - Results in **an increase of future government expenditure** (the pension funding gap between benefits and contributions, higher Medicare and long-term care expenditures, etc.)
- **High debt-GDP ratio**:
 - Gross debt-GDP ratio: over 200%
 - Net debt-GDP ratio: over 100%
 - Results in finance difficulties for government

Common Questions

- Why the JGB's interest rate is still **low** in spite of the high debt-GDP ratio?
- **How should the fiscal authority finance** the expected future increase of their expenditure caused by the progress of the aging population?

Definitions of Fiscal Sustainability

- Hoshi and Ito (2013):
 - If **newly issued JGB > the private savings**, then fiscal policy is **not sustainable**.
- Hansen and Imrohoroglu (2013):
 - If the **debt-GDP ratio > 250%**, the government must finance through **imposing a higher tax rate**.
- Braun and Joines (2013):
 - A sustainable fiscal policy is defined as a sequence of government policies, which **satisfies the transversality condition**.

Approaches of Three Papers

- Hoshi and Ito (2013)
 - Simulations based on the definition of **the “ceiling” of debt-GDP ratio**.
- Hansen and Imrohoroglu (2013)
 - Simulations based on **the standard growth model** with bond in utility function and a specific fiscal rule to keep the fiscal sustainability.
- Braun and Joines (2013)
 - Simulations based on **the OLG model** introducing demographic changes and the actual social security programs.

Common Results

- In spite of various definitions of the fiscal sustainability and different approaches, common results are shown from the three papers.
- If the consumption tax rate is raised by 10% in Oct. 2015, according to **the Noda plan, the fiscal sustainability will be not ensured.**
- **Need higher consumption tax rate:**
 - Hoshi and Ito (2013): about 20%
 - Hansen and Imrohoroglu (2013): about 30-40%
 - Braun and Joines (2013): about 30%

Hoshi and Ito (2013)

- Research questions:
 - **When** will the debt-GDP ratio reach the level which causes the sovereign debt crisis?
 - **How high should the consumption tax rate** be to avoid the crisis?
- Approach:
 - Defining **“the ceiling” of the debt-GDP ratio** from the observations of past Japanese macroeconomic-variables data.
 - Drawing **the debt-GDP ratio trajectory** which detects the period that the crisis occurs.

Key Assumption: The “Ceiling”

- The fiscal sustainability is ensured, if the following condition is satisfied:

$$b_t \leq \frac{s_{t-1} + a_{t-1}}{1 + \Delta(nGDP)_{t-1}}$$

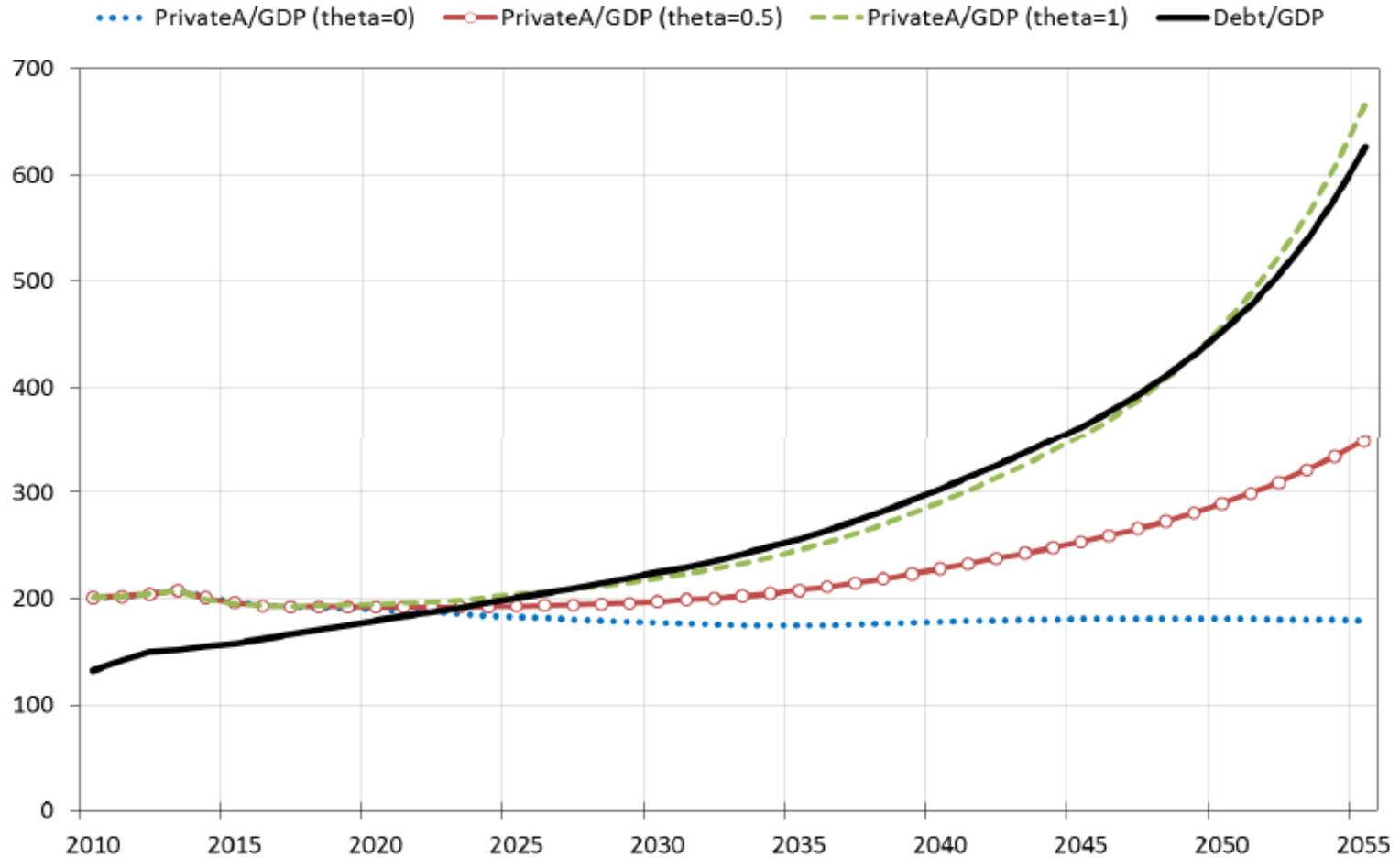
- The RHS indicates the “ceiling” of the debt-GDP ratio.
- The ceiling is the sum of the private (flow) savings and private financial asset holdings.
- The idea is as follows:
 - If the LHS > the RHS, then
 - Newly issued JGB is solely absorbed by **foreign investors**.
 - JGB yield suddenly **rises up**.
 - **Fire selling** of JGB occurs (the “crisis”)

Main Results

- Unfortunately, **the Noda plan is not sustainable**:
 - This paper provides strong warnings: The crisis will come **in only a decade**, even if the Noda plan could be completed.
 - Consumption tax rate of **20%** is needed.

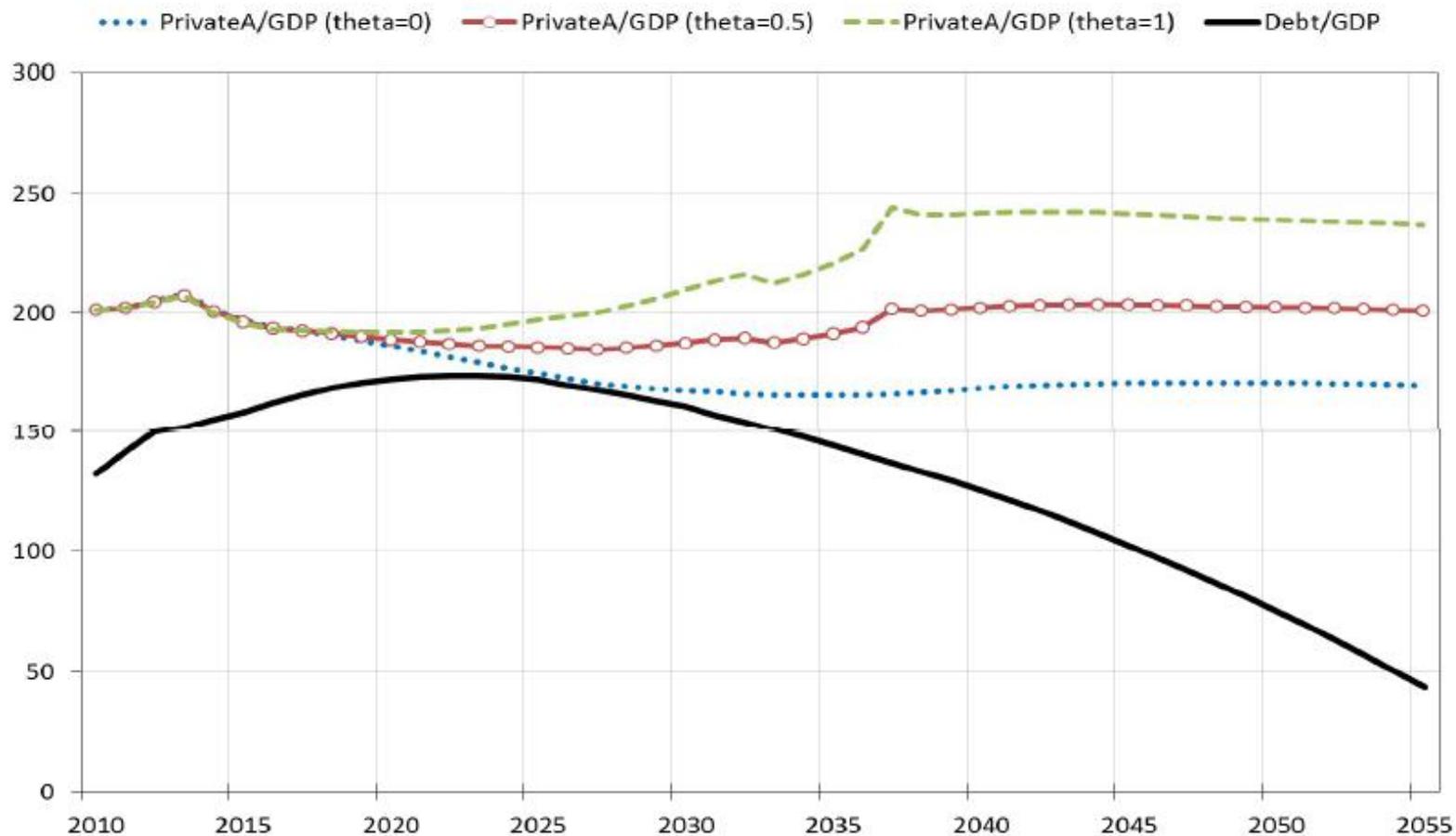
Main Results (cont'd.)

Figure 6: Moderate growth and Consumption tax rate 10%



Main Results (cont'd.)

Figure 8: Moderate growth and Consumption tax rate 20%



Comments

- On the background of the **home bias** assumption in defining the ceiling level of the debt-GDP ratio,
 - Is there **a difference in the investment behavior of domestic residents and foreign residents?**
 - If there is, what could the difference be from?
 - Relatively **higher confidence in the Japanese government from domestic residents** (who hold over 90% of outstanding JGB) than from foreign investors (denoted in this paper).
 - Does **the bond in the utility function of the domestic investors** assumed by the next paper, Hansen and Imrohoroğlu (2013), help the justification of the difference between domestic and foreign investors?

İmrohoroğlu, Kitao and Yamada (2013)

- Research questions
 - How net debt-GDP ratio evolves in the long-term and what will contribute to the magnitude of the JGBs?
 - Measuring the impact of various policy experiments for net debt-GDP ratio.
- Approach
 - Large scale **OLG model (accounting model) based on micro-data**
 - Considering individuals differ in **age, gender, employment type, earnings, and asset holdings.**
 - Incorporating **Japanese pension system in detail** (accounting the social security reform act in 2004).

Main Results

- In the current policy unchanged, **net debt-GDP ratio can go 490% in 2060.**
- Net debt-GDP ratio is decomposed into (i) pension deficit, (ii) non-pension deficit, and (iii) interest payment. Pension and non-pension deficit contribute about 4% of GDP each. But eventually, interest payment dominates net borrowing requirement.
- **Consumption tax increasing by 20%** reduces net debt-GDP ratio by 305% in 2060.
- A new pension rule of **a combination of raising the retirement age to 70 and reducing benefits by 10%** reduces net debt-GDP ratio by 315% in 2060.
- Increase of **Female Labor Force Participation (FLFP)** reduces net debt-GDP ratio by 296% in 2060.

Comments

- This paper decomposes the determinants on the net debt-GDP ratio into three factors (pension deficit, non-pension deficit, and interest payment).
- A new pension rule (a combination of raising the retirement age to 70 and reducing benefits by 10%) improves the net debt-GDP ratio significantly **by reducing the pension deficit**.
- Since early 2000's, there becomes a big problem that **citizens who have signed up but are delinquent in their basic pension payments increase (especially people who belong to the category 1)**. If this problem is implemented into the simulation, how large is the impact on the pension deficit (and on the net debt-GDP ratio)?

Hansen and İmrohorođlu (2013)

- Research questions:
 - Why is JBG's return still so low despite the higher level debt-GDP ratio?
 - Given the future increase of government spending due to the progress of the aging population, how much tax increasing is needed to keep the steady state of the debt-GDP ratio ?
- Approach:
 - Two additional assumptions are added to the standard growth model
 - Bond in utility
 - Fiscal policy rule

Key Assumption 1: Bond in Utility

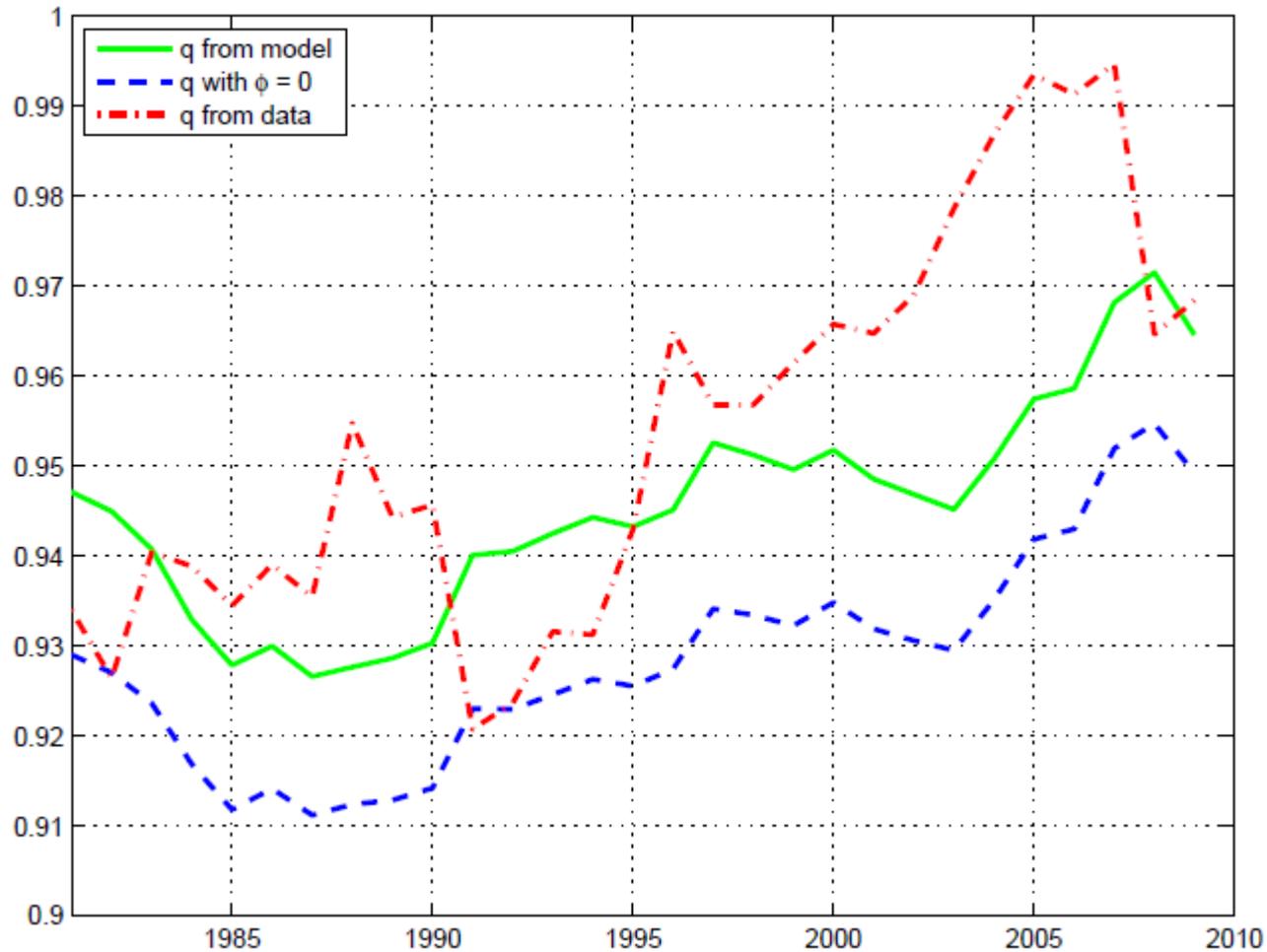
Household's period utility function:

$$\ln C_t + \alpha \frac{h_t^{1+1/\psi}}{1 + 1/\psi} + \phi \ln(\mu_t + B_{t+1})$$

- If $\phi = 0$, then capital return = bond return.
- If $\phi > 0$, then capital return $>$ bond return (capital price $<$ bond price) which explains **why the JBG return is so low** (JGB price is so high) .

Key Assumptions 1: Bond in Utility

Bond and capital prices



Key Assumption 2: Fiscal Policy Rule

- Fiscal policy rule:

Fiscal authority must finance d_t from additional tax increasing

$$d_t = \kappa \iota_t (b_t - \bar{b}\bar{y})$$

$$\text{where } \iota_t = \begin{cases} 1, & \text{if } \frac{B_s}{Y_s} \geq b_{max}, \text{ for some } s \leq t \\ 0, & \text{otherwise} \end{cases}$$

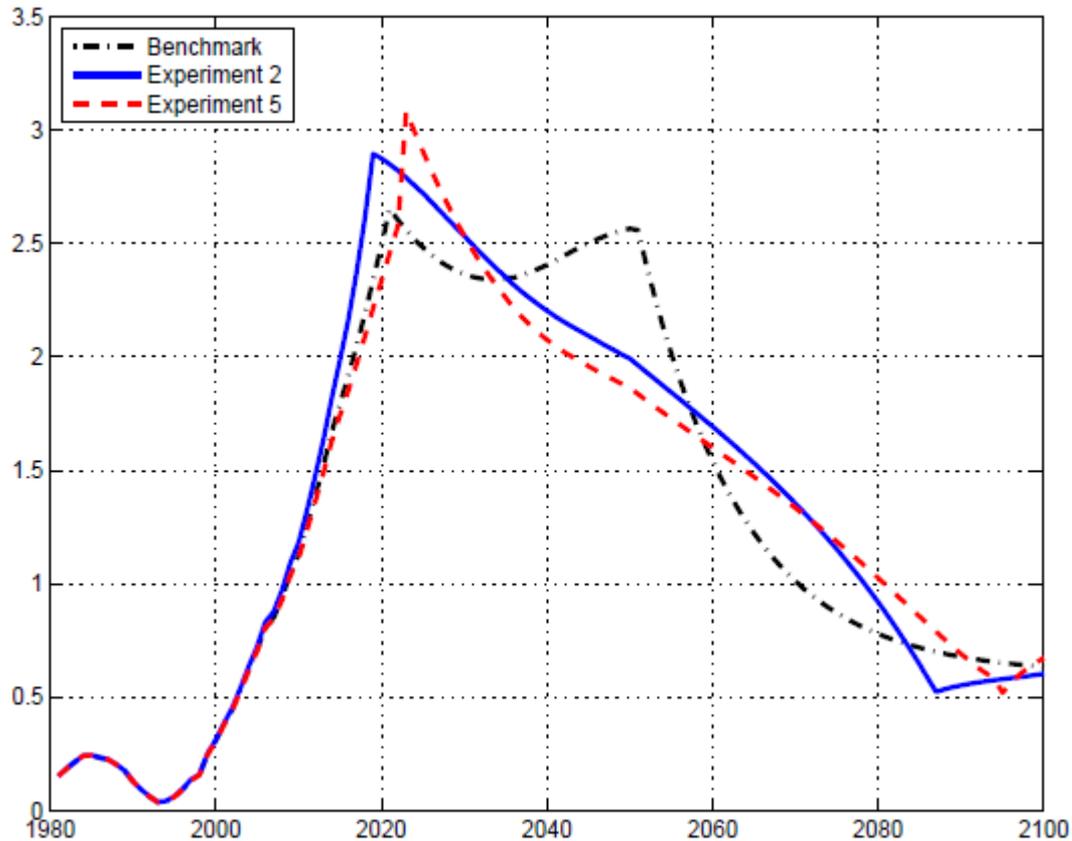
- d_t is financed by
 - (i) **lump-sum** tax (the baseline case), or
 - (ii) **consumption** tax, or
 - (iii) **labor income** tax.
- κ is a required portion of self-financing (i.e. tax increasing) if the government borrows beyond the steady state level, \bar{b} .

Main Results

- **Consumption tax** rate needs to be increased by **about 40%** to reach the steady state level of debt-GDP ratio.
- If the government finances the future increase of expenditure by **labor income tax**, **higher welfare cost must be imposed**.

Main Results (cont'd.)

Debt-GDP Ratio



Comments

- How structural is the structural parameter, ϕ ?
 - ϕ_t is calibrated from using FOC and actual data, then the averaged value (calculated as about 0.06) is used for the simulation.
 - Is calculated ϕ_t stable or unstable in the sample period ? Especially, does ϕ_t rise at the downward period of bond returns?
 - Is there any empirical support on the bond in utility function?

Comments (cont'd.)

- The debt-GDP ratio seems to be more **volatile in the baseline case than in the consumption tax case.**
 - When the household preference is specified as the bond in the utility function, second approximation of the utility function around steady state (along with balanced growth path) will be concerned with the volatility of JGB holdings.

Braun and Joines (2013)

- Research questions:
- Given the demographic change (the low birth rate and the aging population) and the high debt-GDP ratio,
 - Is the Abenomics sustainable?
 - If not, are there alternative plans?
 - How will taxes have to evolve?
- Approach: the standard **OLG model** which is an extended model of Braun, Ikeda and Joines (2008)
 - Introducing **demographic changes**
 - Taking account **the 2004 social security reform act.**

Introducing Demographic Changes

$$\begin{bmatrix} N_{1,t+1} \\ N_{2,t+1} \\ N_{3,t+1} \end{bmatrix} = \begin{bmatrix} (1 + n_{1,t}) & 0 & 0 \\ \varphi_{1,t} & 0 & 0 \\ 0 & \varphi_{2,t} & 0 \end{bmatrix} \begin{bmatrix} N_{1,t} \\ N_{2,t} \\ N_{3,t} \end{bmatrix}$$

- $n_{1,t}$: **time-varying birth rate** can capture the decline of the number of children
- $\varphi_{j,t}$: **time-varying survival rate** can capture the aging.

Introducing Social Security System

- Social security program based on **2004 SS reform act**.
- Benefits are linked to contributions using Japan's formula
 - **Real wage growth** indexation
 - **Inflation** indexation
 - Minus indexation adjustment of **changes in the number of contributors**
 - Minus indexation adjustment for **longer life expectancy**
- Funding gap covered out of government revenue.

Main Results

- Abenomics is **not sustainable**.
- So, alternative policies are considered here with
 - Lowering government purchases
 - Pre-announce **an increase of the medical copayment to retirees to 30% in year 2051**.
- Results:
 - Consumption tax of 10% until 2051.
 - the debt-GDP ratio stabilizes immediately and falls.
 - Maximum value of the consumption tax is **29%**.
 - There are **intergenerational conflicts**: Both the 1920 and 1940 cohorts receive more in benefits than they pay out taxes. On the other hand, cohorts born in 1980 and 2000 pay the highest net costs.

Comments

- This paper implements **a realistic pension system** based on 2004 SS reform act.
- This paper shows an increase of the medical copayment matters on the fiscal sustainability.
- Moderate inflation is also important due to partial indexation of SS benefits.
- How large is the impact that **the Abenomics cannot achieve 2% annual inflation rate?**

References

- Braun, R. A., Ikeda, D. and D. H. Joines, (2009). “The saving rate in Japan: Why it has fallen and why it will remain low,” *International Economic Review*, **50**(1), 291-321.
- Hansen, G. and S. Imrohoroglu, (2013). “Fiscal reform and government debt in Japan: A neoclassical perspective,” NBER Working Paper 19431.
- Imrohoroglu, S. and N. Sudo (2011). “Will a growth miracle reduce debt in Japan?,” *Economic Review*, Hitotsubashi University, **62**(1), 44-56.
- Imrohoroglu, S., Kitao, S. and T. Yamada (2013). “Achieving Fiscal Balance in Japan,” Hunter College Department of Economics Working Papers 441.