Discussion for Session 2

Masashi Saito, Bank of Japan

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1. Demographic issues

2. Points raised by presenters and implications for the G20 quantification exercise
Potential Growth Rate in Japan


Sources: Cabinet Office; Bank of Japan; Ministry of Internal Affairs and Communications; Ministry of Health, Labour and Welfare; Ministry of Economy, Trade and Industry, etc.
Breakdown of Potential Growth Rate in Japan

<table>
<thead>
<tr>
<th>Year</th>
<th>Total factor productivity</th>
<th>Capital stock</th>
<th>Number of employed</th>
<th>Labor hours</th>
<th>Potential growth rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>2.5%</td>
<td>3.0%</td>
<td>4.0%</td>
<td>5.0%</td>
<td>4.5%</td>
</tr>
<tr>
<td>1984</td>
<td>-1.0%</td>
<td>0.5%</td>
<td>1.5%</td>
<td>-1.0%</td>
<td>0.5%</td>
</tr>
<tr>
<td>1985</td>
<td>2.0%</td>
<td>2.5%</td>
<td>3.0%</td>
<td>3.0%</td>
<td>2.0%</td>
</tr>
<tr>
<td>1986</td>
<td>1.5%</td>
<td>2.0%</td>
<td>2.5%</td>
<td>2.0%</td>
<td>1.5%</td>
</tr>
<tr>
<td>1987</td>
<td>1.0%</td>
<td>1.5%</td>
<td>1.0%</td>
<td>1.0%</td>
<td>1.0%</td>
</tr>
<tr>
<td>1988</td>
<td>0.5%</td>
<td>0.0%</td>
<td>-0.5%</td>
<td>-1.0%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

Note: The total factor productivity is estimated by the Research and Statistics Department, Bank of Japan. For the estimation procedures, see "The New Estimates of Output Gap and Potential Growth Rate," Bank of Japan Review Series, 2006-E-3. Figures for the first half of fiscal 2014 are those of 2014/Q2.

Sources: Cabinet Office; Bank of Japan; Ministry of Internal Affairs and Communications; Ministry of Health, Labour and Welfare; Ministry of Economy, Trade and Industry, etc.
Headwinds from Demographics Expected to Continue

Note: The rates of change in the number of workers from 2014 onward are calculated using the projected future population (medium variant) and the projected labor force participation rates (assuming that the labor force participation rates in each age/sex group remain the same as those in 2013). Sources: Cabinet Office; Ministry of Internal Affairs and Communications; National Institute of Population and Social Security Research.
Already tells us something about the effects of demographics

But we can go one more step deeper:

• What are the fundamental forces behind the fall in capital growth and the labor inputs?
  ➢ TFP, or demographics?

• Implications of demographics for the demand side (consumption and investment)?
Simple Dynamic General Equilibrium Analysis with Two Fundamental Forces

- **TFP growth**, estimated independently

- **Demographic change**
  - Movements in the ratio of working-age population to total population
  - In the process of aging, this ratio to falls
Ratio of Working-age Population to Total Population

United Nation’s forecast after 2010.
United Nation’s forecast after 2010.
Key Assumptions in the Model

• Two types of consumers, one working, the other not working. The ratio between the two changes according to the data on the ratio of working-age population to total population

\[ E_0 \sum_{t=0}^{\infty} \beta_h \{ u_{y,t} N_t^y + u_{o,t} (N_t - N_t^y) \} \]

• Income earned by workers are distributed to non-workers, like a family or social security system

• Consumers and firms are forward looking and optimize

• No nominal rigidities: output in the model can be interpreted as both actual and potential output
Real Interest Rate (Simulated with Only Demographics)

Real Interest Rate (Simulated with Both Demographics and TFP)

Impact of Demographics on the Demand Side

• Dynamic Channel
  ➢ When the ratio of working to total population is expected to fall, future income per capita is expected to decrease. Current working-age population decide to consume less and save more, leading to fall in the real interest rate and GDP growth rate.

• Static Channel
  ➢ As the labor force decreases, the return on investment falls and discourages investment.
Implications

• Some of the labor market reforms are designed to deal with demographic issues
  ➢ (eg.) Increasing labor force participation, changing the retirement age

• These measures are expected to influence both supply and demand
Points Raised by Presenters and Implications for the G20 Quantification Exercise

(1) How to Phase in Reforms in the Quantification?

• G20 approach assumes gradual learning until 2018

• If full implementation becomes immediately credible, a large confidence effect even in the short run. Does this make the GDP impact larger than “2.1%”?  

• Gradual learning assumption may be justified if it implicitly takes into account the “compliance” and “coverage” issues

  ➢ May still be overestimating the GDP impact if compliance and coverage are not 100% in 2018
(2) Non-monotonicity

- G20 methodology assumes monotonic relationship between EPL and labor productivity
- “optimal” level of regulation is country- and time-specific
(3) Reform Measures with Opposite Supply and Demand Effects

- G20 methodology may not be able to handle this because of the “two-step approach”:
  - First step: estimate the impact of policy measures on the supply side (TFP, labor participation, NAIRU)
  - Second step: introduce supply shocks to GE model to get demand impact

- Any favorable shocks to TFP or labor participation will have favorable impact on consumption and investment in standard models
(4) Budgetary Implications of Labor Market Measures

• Some labor market measures require budget

• Because of the two-step approach, it is difficult for the G20 methodology to take this into account
  ➢ In the second step, only supply shocks (such as TFP and labor participation) are introduced into the model, regardless of fiscal implications

  ■ Overestimating the GDP impact if many consumers are Ricardian

  ■ Underestimating the GDP impact if many consumers are liquidity constrained
(5) Wage Flexibility

• After Spain’s labor market reforms, wages became more flexible and employment became more stable
  ➢ Implications for medium-term growth?
  ➢ Through which supply-side channels? (TFP, labor participation, NAIRU)