Japan’s Lost Decade

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1. The Miserable Performance
2. Our Basic Idea
3. Details of the Model
4. Model’s Prediction
1. Miserable Performance in the 90s

- GDP per working-age population (Figure 1)

- Other Important Stylized Facts
  - Figure 2: Capital/Output ratio went up
  - Figure 3: Robust investment
  - Figure 4: hours worked declined sharply
Figure 1: Japan's GNP per working-age pop relative to 2% trend, 1990=100
Figure 2: K/Y went up
Figure 3: Robust Investment

Corporate Investment / GNP

Change in bank loans / GNP
Figure 4: Hours Worked Declined
2. The Basic Idea

- Two Important Developments
  1. Hours worked declined (Figure 4)
  2. TFP growth declined from (Table 1)

- Basic idea (show visually)
Table 1: Growth Accounting

\[ Y = A \ K^\theta \ (h \ E)^{1-\theta} \]

where \( h = \) hours worked, \( E = \) employment, \( N = \) working-age population.

\[ Y / N = A^{1/(1-\theta)} \times \left( \frac{K}{Y} \right)^{\theta/(1-\theta)} \times h \times \frac{E}{N} . \]

Accounting for Japanese Growth per Person Aged 20-69

<table>
<thead>
<tr>
<th>Period</th>
<th>Y/N</th>
<th>Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>1960-1973</td>
<td>7.2%</td>
<td>6.5%</td>
</tr>
<tr>
<td>1973-1983</td>
<td>2.2%</td>
<td>0.8%</td>
</tr>
<tr>
<td>1983-1991</td>
<td>3.6%</td>
<td>3.7%</td>
</tr>
<tr>
<td>1991-2000</td>
<td>0.5%</td>
<td>0.3%</td>
</tr>
</tbody>
</table>
old steady state path

level-down

slowdown in TFP growth

1990
3. Details of the Model

**Technology**

\[ Y = A \ K^\theta (h \ eN)^{1-\theta} \]

**Households**

\[ \sum_{t=0}^{\infty} \beta^t N_t \ U(c_t, h_t, e_t) \]

\[ U(c_t, h_t, e_t) = \log c_t - g(h_t)e_t \]

\[ C_t + X_t \leq w_t h_t e_t N_t + r_t K_t - \tau (r_t - \delta) K_t - \pi_t \]

\[ i_t = (1 - \tau) (r_{t+1} - \delta) \]

**Closing the Model**

\[ C_t + X_t + G_t = Y_t \]

\[ K_{t+1} = (1 - \delta) K_t + X_t \]
4. Model’s Prediction

Output: Data vs. Model
K/Y: Data vs. Model

Data vs. Model
Japan didn’t catch up until after WW2

Real Private GNP per Working-age Population, 1885-2000
Japan’s log GNP for 1885 = 0
The Reason is TFP

Japan's log TFP (1885=0)
No People in Agriculture was constant

Employment in Agriculture, 1885-2001
Theory of TFP


- Level of economy-wide log TFP (1885=0)
- Agriculture's employment share (%)
- Prewar vs. postwar
It’s Banks and Households

![Graph showing ratio to GDP for nonfinancial corporations and finances + households from 1990 to 2000.](image)

- **Nonfinancial corporations**: [Graph line representation]
- **Finances + households**: [Graph line representation]