

# The “Lost” 90s in Japan

Hayashi and Prescott

# Two Developments

1. There was **a fall in the growth rate of TFP** (total factor productivity), which is a source of economic growth that is not explained by the increases in labor and capital.
2. There was **a decline in the working hours per week** from 44 to 40 hours.

# Japan 1990-2000

1. The growth of real GDP per working-age person shows a less-than-trend performance.
2. Workweek falls due to the revision of the Labor Standards Law.
3. Capital/labor ratio increases as the rate of return declines.
4. Government share increases while private investments decrease.

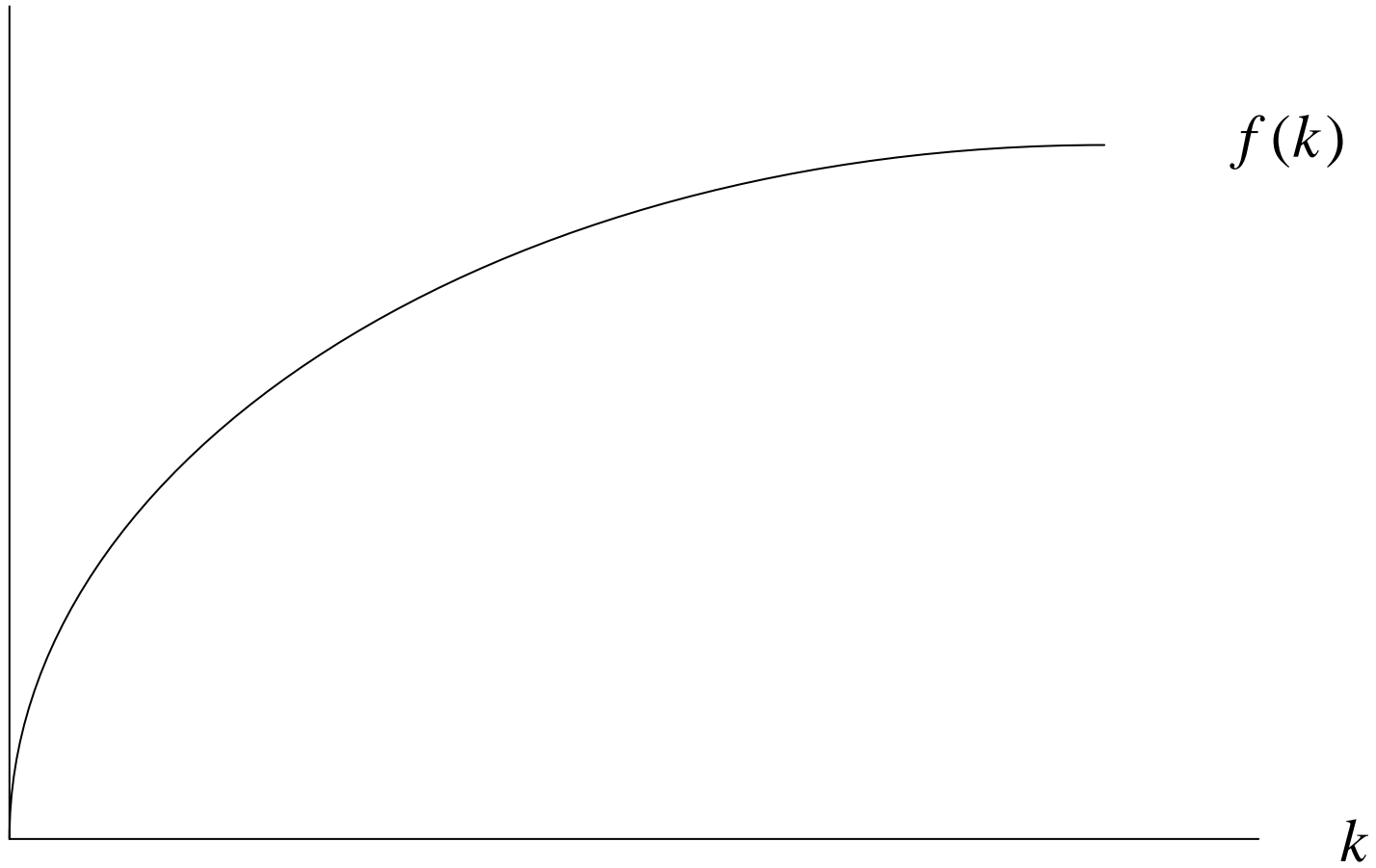
# The Neoclassical Growth Theory

- Output per adult  $y$  can be decomposed into four factors:
  1. TFP
  2. Workweek
  3. Employment rate
  4. Capital intensity

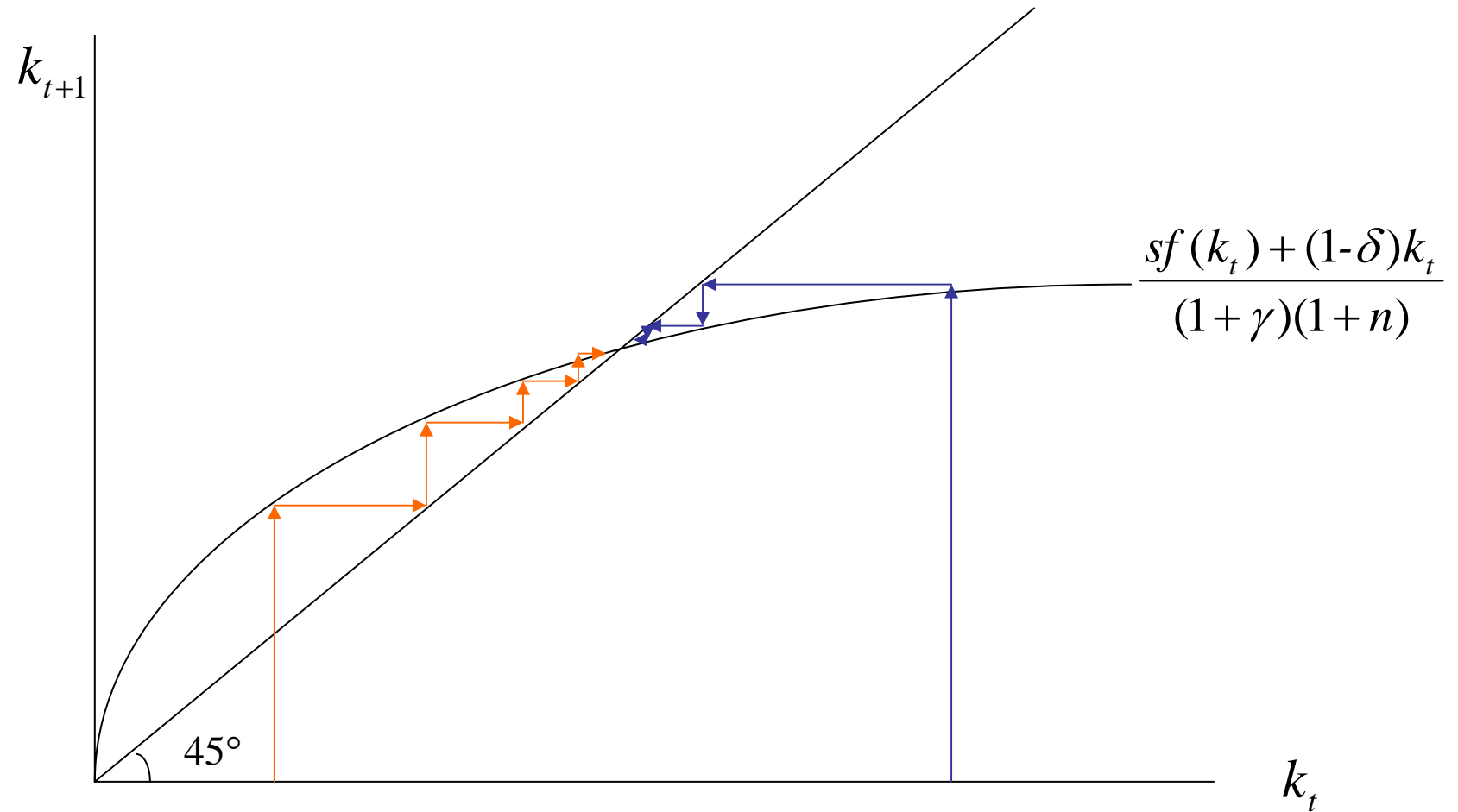
# Growth Accounting (TABLE 1)

- Except for 73-83, the TFP growth accounts for the most part of the sources of Japan's economic growth.
- There is a dramatic decline in TFP growth in the early 1990s.
- Both the workweek length and the employment rate have been declining.

# The Neoclassical Production Function

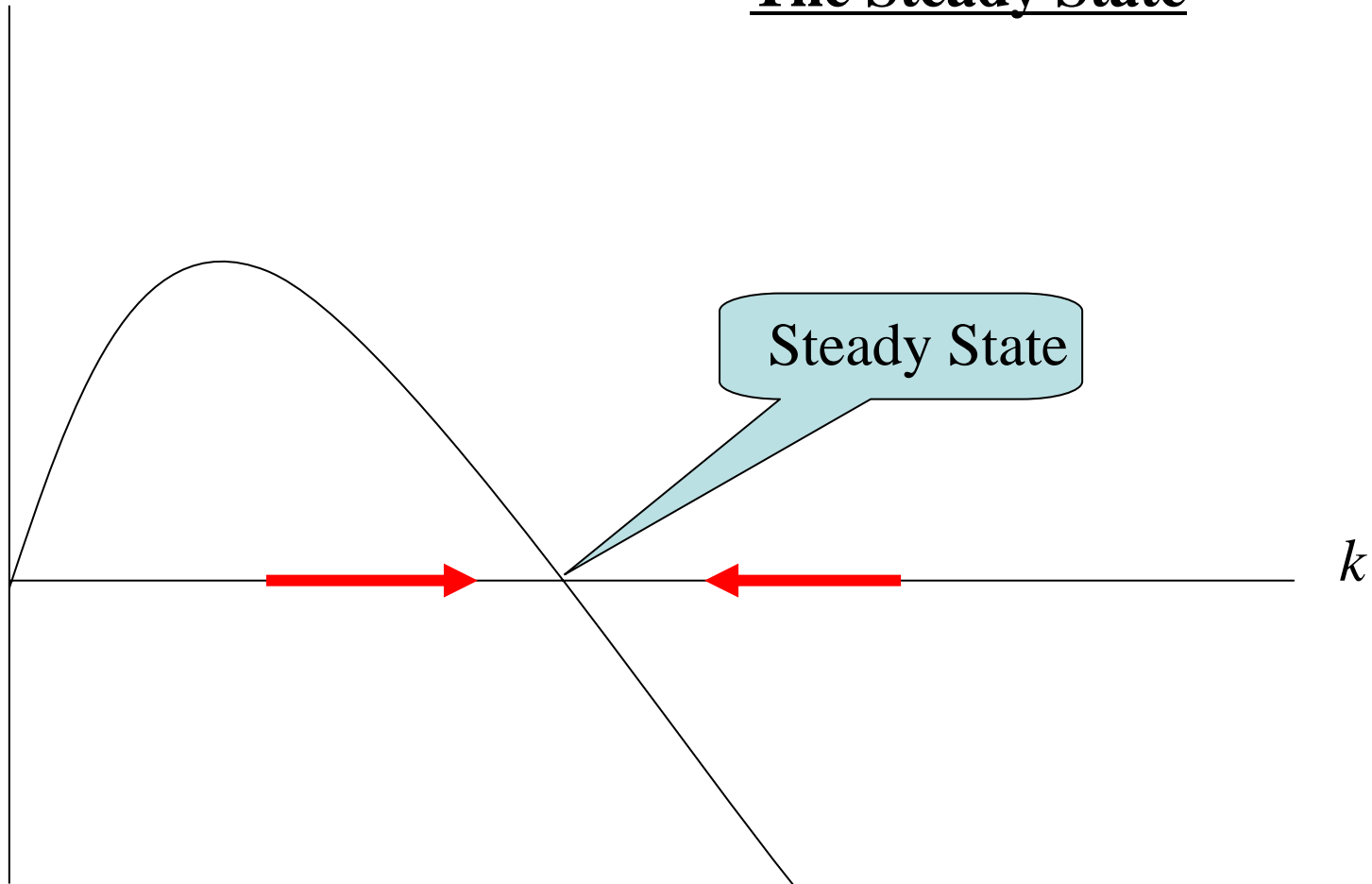


# The Transitional Dynamics



$k_{t+1} - k_t$

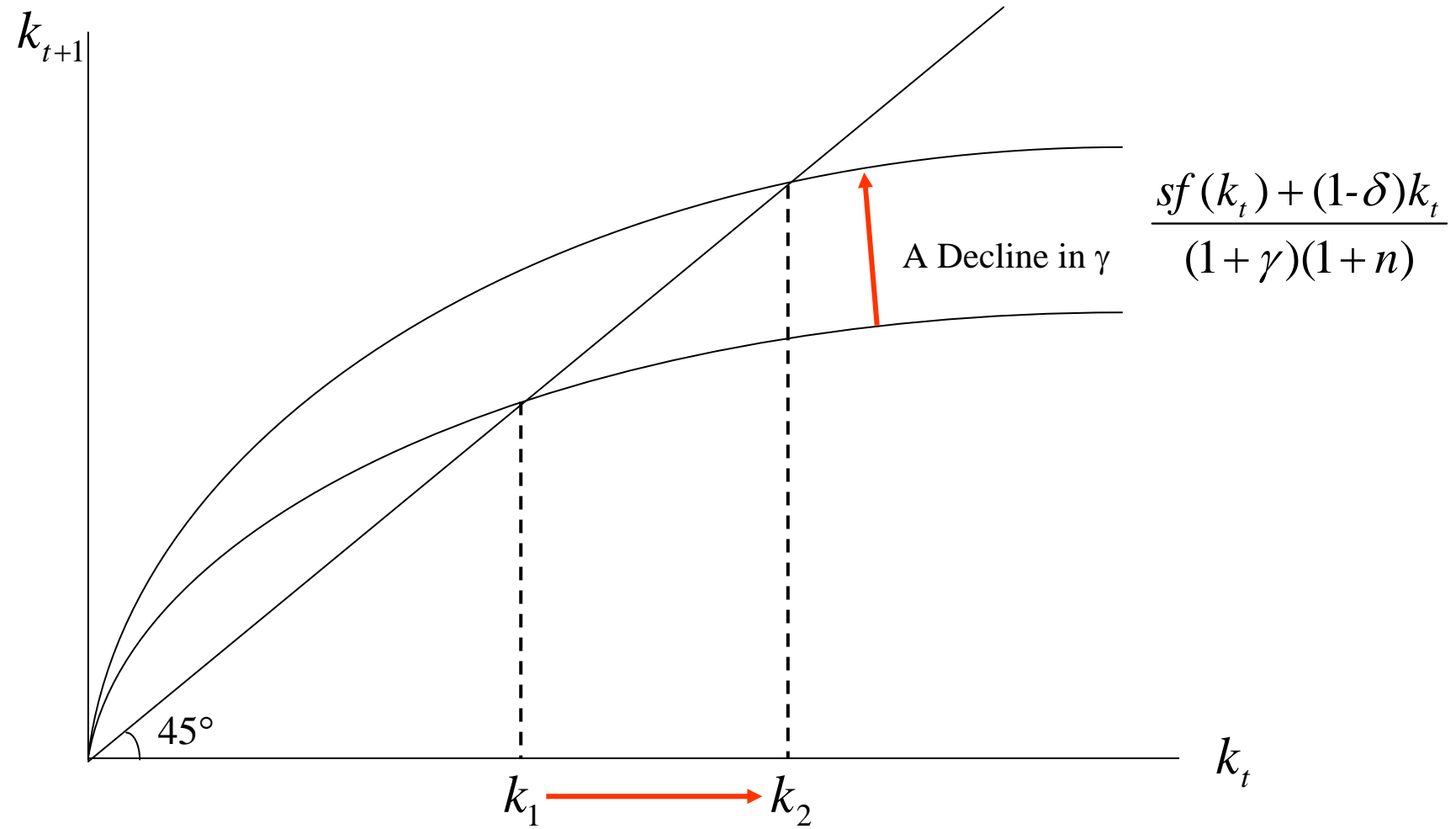
## The Steady State



$$\frac{sf(k_t) - (\gamma + n + \gamma n + \delta)k_t}{(1 + \gamma)(1 + n)}$$



## A Decline in $\gamma$



# Calibration

- We can simulate the growth performance of Japan in a neoclassical growth model, by appropriately choosing the parameter values.
- The calibrated model uses the following exogenous variables ( $A$ ,  $N$ ,  $h$ ,  $\psi$ ):
  - TFP ( $A$ ) grows at 0.29% a year.
  - There is no population growth ( $N=0$ ).
  - $h$  decreases from 44 to 37.
  - The government share  $\psi=15\%$ .

# Findings

- The calibrated model well approximates the actual data of the Japanese economy.
  - Slowdown in real GDP growth (Fig. 6)
  - Rise in capital/output ratio. (Fig. 7)
  - Decline in the after-tax rate of return. (Fig. 8)

# Was Investment Constrained?

- The “Credit Crunch” hypothesis:
  - Firms cannot invest as much as they want, because there is a limit on the amount they can borrow.
- This hypothesis seems to be convincing because the collapse of bank loans occurred in the same period, due to the BIS regulation on the banks’ equity capital ratio.

## ASSETS

## LIABILITIES

|                        |                |
|------------------------|----------------|
| Loans and other Assets | Deposits       |
|                        | Equity capital |

### Bank's Balance Sheet

Japan's banks have been heavily in debts, due to the insufficient development of capital markets.

BIS regulation:  
Equity capital must be higher than 8% for international business

# The National Accounts

- The dramatic decline in the output share of domestic investment did not occur in the non-financial corporate sector. (Fig. 9)
- Investment held up despite the collapse of bank loans in the 1990s. Other sources of funds replaced bank loans.
  - Firms gave the money back to banks in 1990s. (TABLE III)

# Small Non-financial Corporations

- Small firms could be affected by the collapse of bank loans, due to its difficult access to open-market funding. (Fig. 10)
- Even for small firms, investment held firm despite the collapse of bank loans.
- Small firms continued to *increase* land holdings in the 1990s. (TABLE IV)
- Small firms held cash and deposits as a buffer against the deep decline in bank loans. (Fig.11)

# Cross-Sectional Regressions

- Is there evidence that recession is caused by a credit crunch?
- We run regressions across prefectures such as

$$\text{GDP growth rate} = \beta_0 + \beta_1 \times \text{bank loan growth rate}$$

- The positive coefficient is significant only for 1996-98 recession. (TABLE V)
- The “credit crunch” hypothesis is not relevant for the decade-long stagnation.



# Conclusion

- Japan's decade-long recession is well calibrated by a neoclassical growth model with a declining productivity growth.
- There is no convincing evidence for the “credit crunch” hypothesis.
- Perhaps the low productivity growth is the result of a policy that subsidizes inefficient firms and declining industries.

# Prosperity and Depression

Edward C. Prescott  
with Figures and Tables

# USA, France, and Japan

- Prosperity and depressions are relative concepts.
- Today, France and Japan are depressed relative to the US, in the sense that their output per working-age person is 30 percent less.
- However, France and Japan are depressed in different reasons.

# Why is USA relatively prosperous?

- USA is prosperous relative to France because there is less distortion in the trade-off between consumption and leisure. (USA people work in longer hours than French people.)
- USA is prosperous relative to Japan because production efficiency is higher.
- The most part of differences in income per working-age person comes from labor and productivity factors. (TABLE 2)

# France

- France is depressed relative to USA because of the labor factor.
- Market time is 30 percent lower in France than in USA.
- However, French workers worked 10% longer than US workers in 1970s.
- Labor supply is depressed by the higher *marginal* tax rate in France. (TABLE 4)

# Japan

- International income differences are in large part accounted for by differences in TFP.
- Japan experienced a growth miracle in 1960-1972, when the annual productivity growth rate was 4.5% higher than the trend.
- However, the productivity growth in 1990s was -1.7% less than its trend. (TABLE 5)

# Trading Clubs

- Some European countries (Belgium, France, Germany, Italy, and the Netherlands) are prosperous relative to their trend-corrected levels of the prewar period. (TABLE 1)
- They are the original EU countries, and agree not to protect their inefficient producers.

# Other Factors that Enhance Productivity

- Financial system reforms.
- Competition from other ways of transportation.
  - Competition from railroads increased the efficiency of water transportation in late 19<sup>th</sup> century.
  - Competition from interstate highway systems increased the efficiency of railroads in late 20<sup>th</sup> century.