



Lessons for Japan from the U.S. Growth Resurgence

Dale W. Jorgenson
Harvard University

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Three Goals of this Presentation

- **Analyze the sources of recent U.S. economic growth**
 - Incorporate 2002 GDP revisions
 - Evaluate the impact of information technology
 - Jorgenson, Ho, and Stiroh (2002)
 - Oliner and Sichel (2002)
- **Project the potential growth of average labor productivity**
 - Abstract from business cycles by focusing on 1973-1995 and 1995-2000
 - Highlight uncertainties about IT development
- **Project average labor productivity Growth for Japan**
 - Abstract from business cycles by focusing on 1981-1995 and 1995-2000

Reviewing the Historical Record

- **Fundamental Identity**

- Growth of GDP is the sum of growth of hours worked and growth of labor productivity (GDP/hour worked)

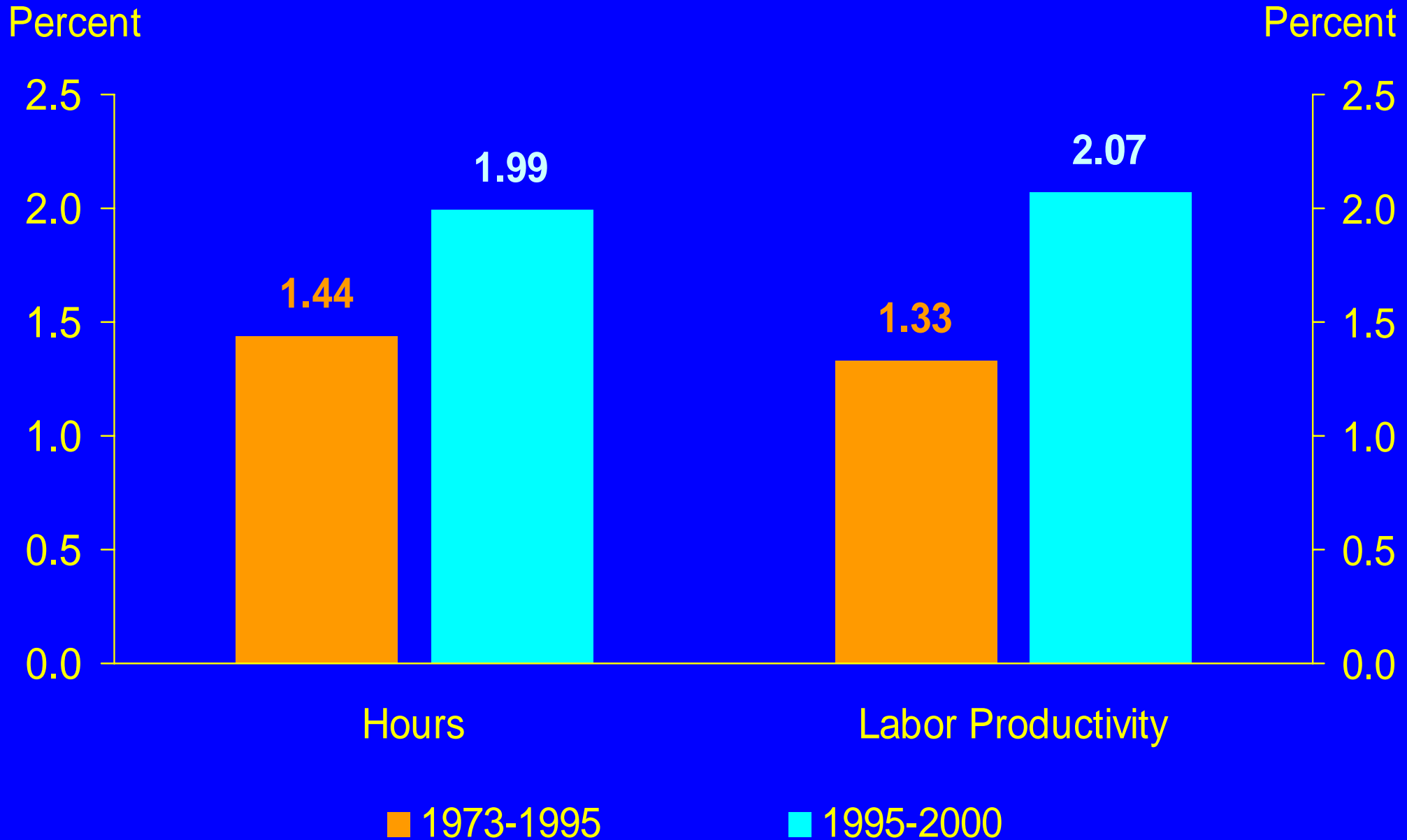
- **Data issues**

- Output defined as gross domestic product (GDP), including government, and household sectors
- Headline BLS productivity figures are for the nonfarm business sector, excluding government, housing, and farm sectors

- **Compare 1995-2000 to 1973-1995**

- Examine sources of output and labor productivity growth
- Incorporate new and revised data on output, investment, and labor input

Hours and Labor Productivity Accelerated after 1995



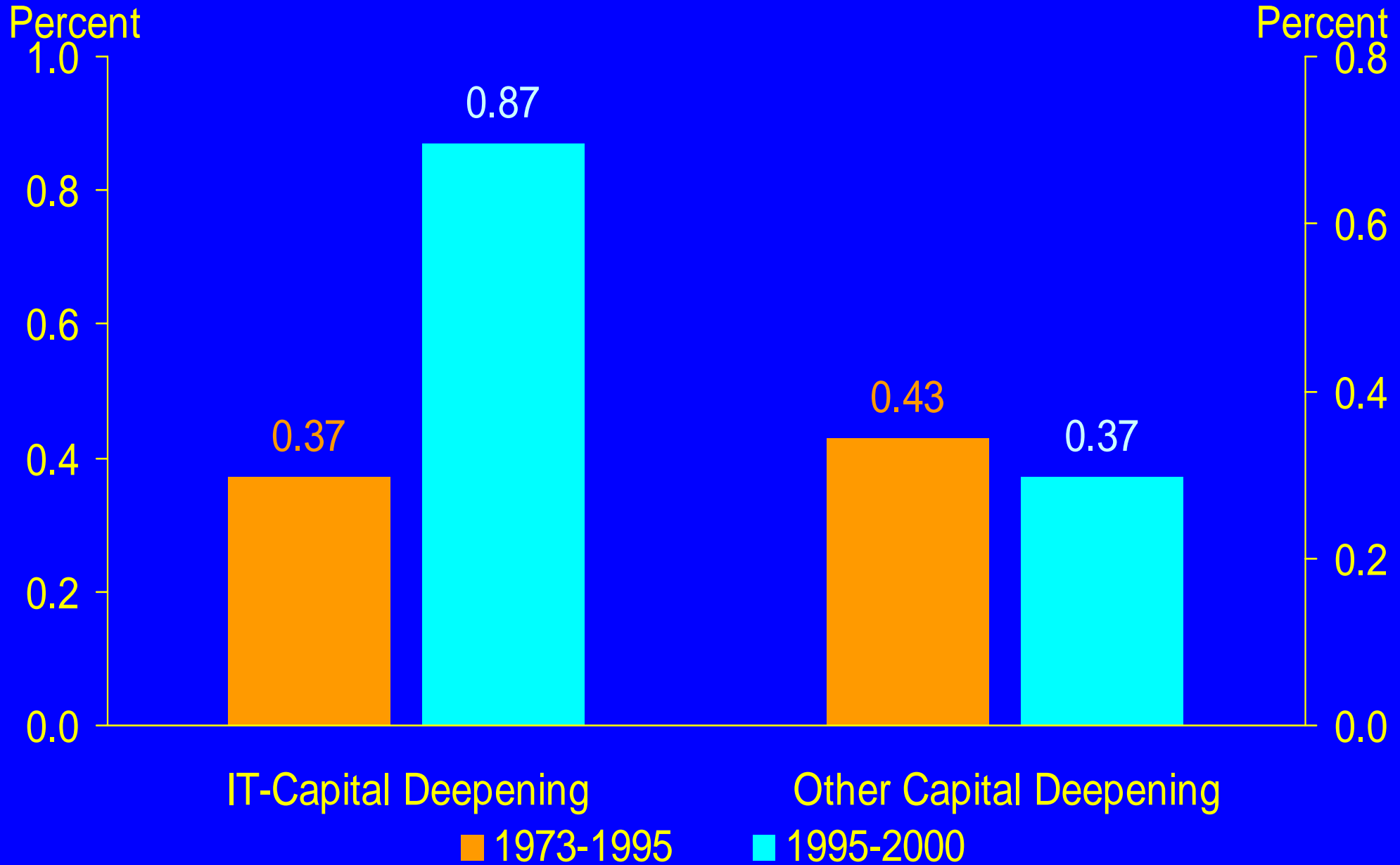
Three Sources of Labor Productivity Growth

- **Capital deepening**
 - Investment provides more and better capital to workers.
- **Labor quality growth**
 - Increase in the proportion of more productive workers.
- **Total factor productivity (TFP) growth**
 - TFP defined as output per unit of capital and labor inputs.

What Changed after 1995?

- **Capital deepening increased**
 - IT capital input accelerated.
 - Non-IT capital input decelerated.

Stronger IT Capital Deepening

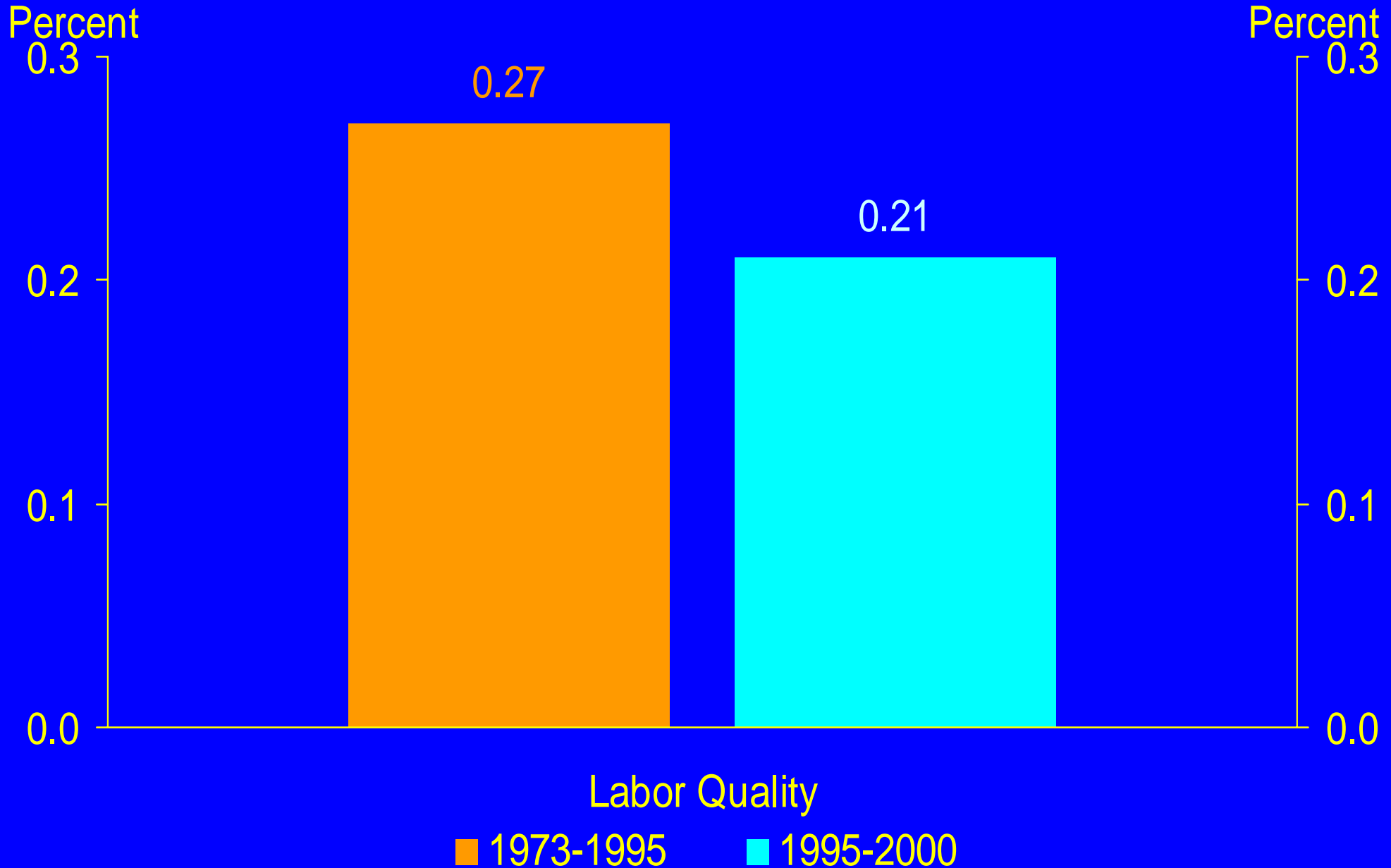


Average annual share-weighted growth rate.

What Changed after 1995?

- **Capital deepening increased**
 - IT capital input accelerated
 - Non-IT capital input decelerated
- **Labor quality growth slowed**
 - Unemployment rate plummeted
 - Labor force participation rate increased

Labor Quality Contribution Slowed

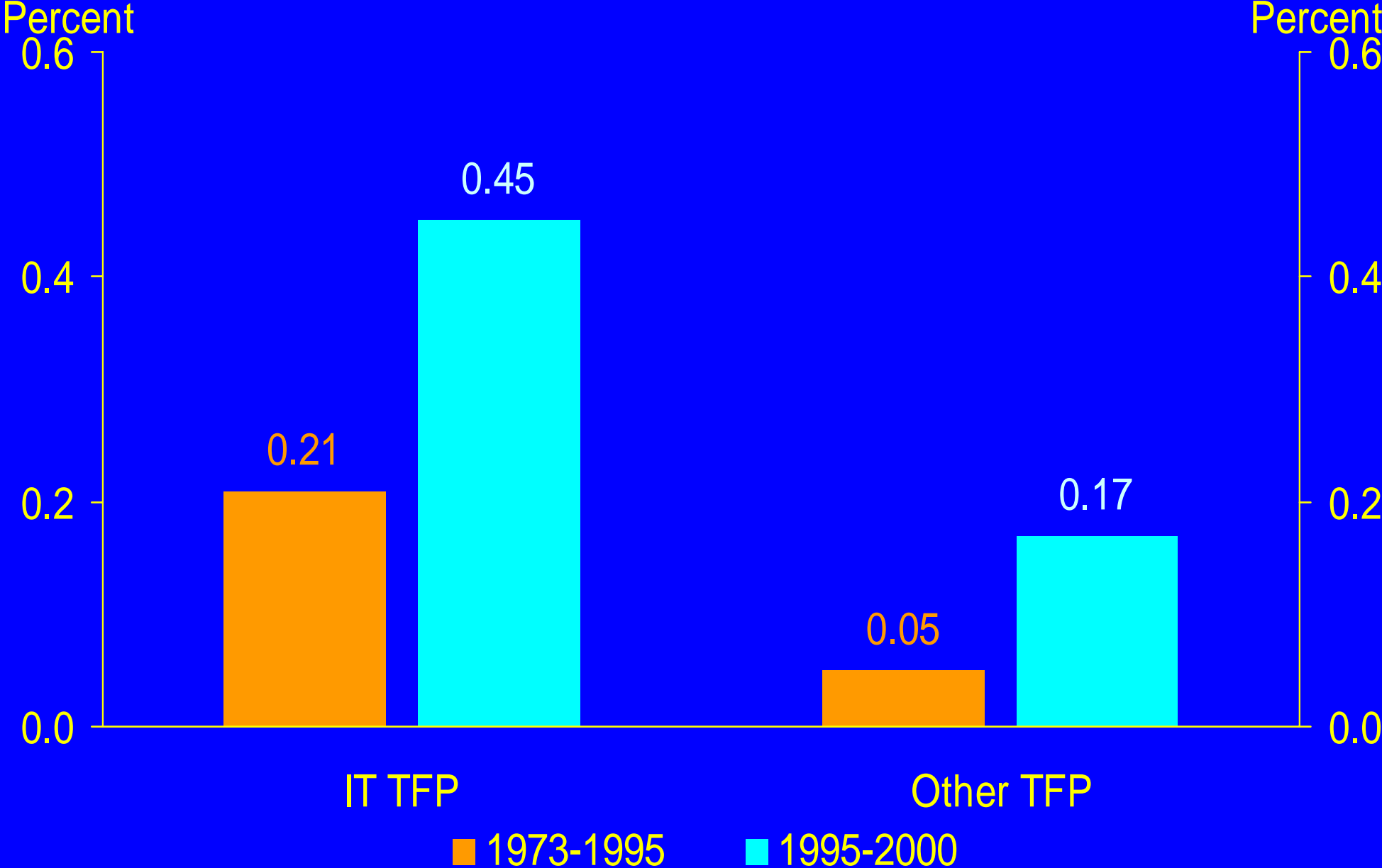


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What Changed after 1995?

- **Capital deepening increased**
 - IT capital input accelerated
 - Non-IT capital input decelerated
- **Labor quality slowed**
 - Unemployment rate plummeted
 - Labor force participation rate increased
- **TFP growth accelerated**
 - **Productivity in IT production rose**
 - **Productivity in Non-IT production also rose**

Faster TFP Growth



Average annual share-weighted growth rate.

IT Drove the U.S. Productivity Revival

1995-2000
Less
1973-1995

Growth in Labor Productivity

0.74

Capital Deepening, IT- Inputs

0.50

Capital Deepening, Other

-0.06

Labor Quality

- 0.06

TFP, IT- Production

0.24

TFP, Other

0.12

0.74

Projecting Productivity Growth

- **Two key assumptions to remove transitory effects**
 - Output and reproducible capital grow at the same rate
 - Hours growth matches labor force growth
- **Three scenarios**
 - Pessimistic
 - Base Case
 - Optimistic

Two Sets of Assumptions

- **Alternative assumptions vary across scenarios**
 - TFP growth in IT production
 - TFP growth elsewhere in the economy
 - Capital quality growth
- **Common assumptions in all scenarios**
 - Hours and labor quality growth from demographic projections
 - Capital, labor, and IT output shares at historical averages

Calibrating Alternative Assumptions

- **Base Case scenario**
 - “*International Technology Roadmap for Semiconductors*”
 - Eventual reversion to 3-year product cycle
 - Use 1990-2000 averages

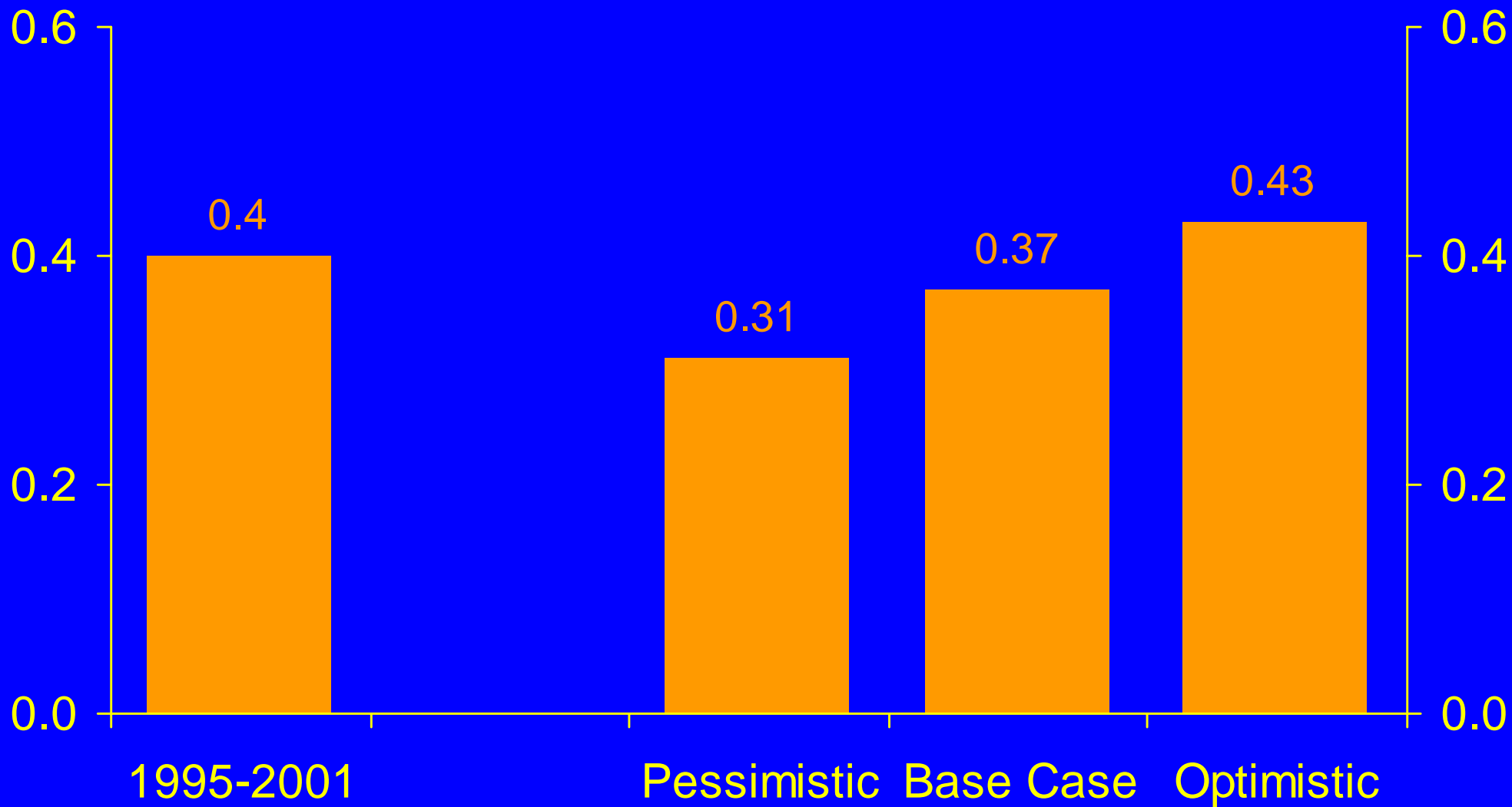
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 - 1995-2000 averages continue

Calibrating Alternative Assumptions

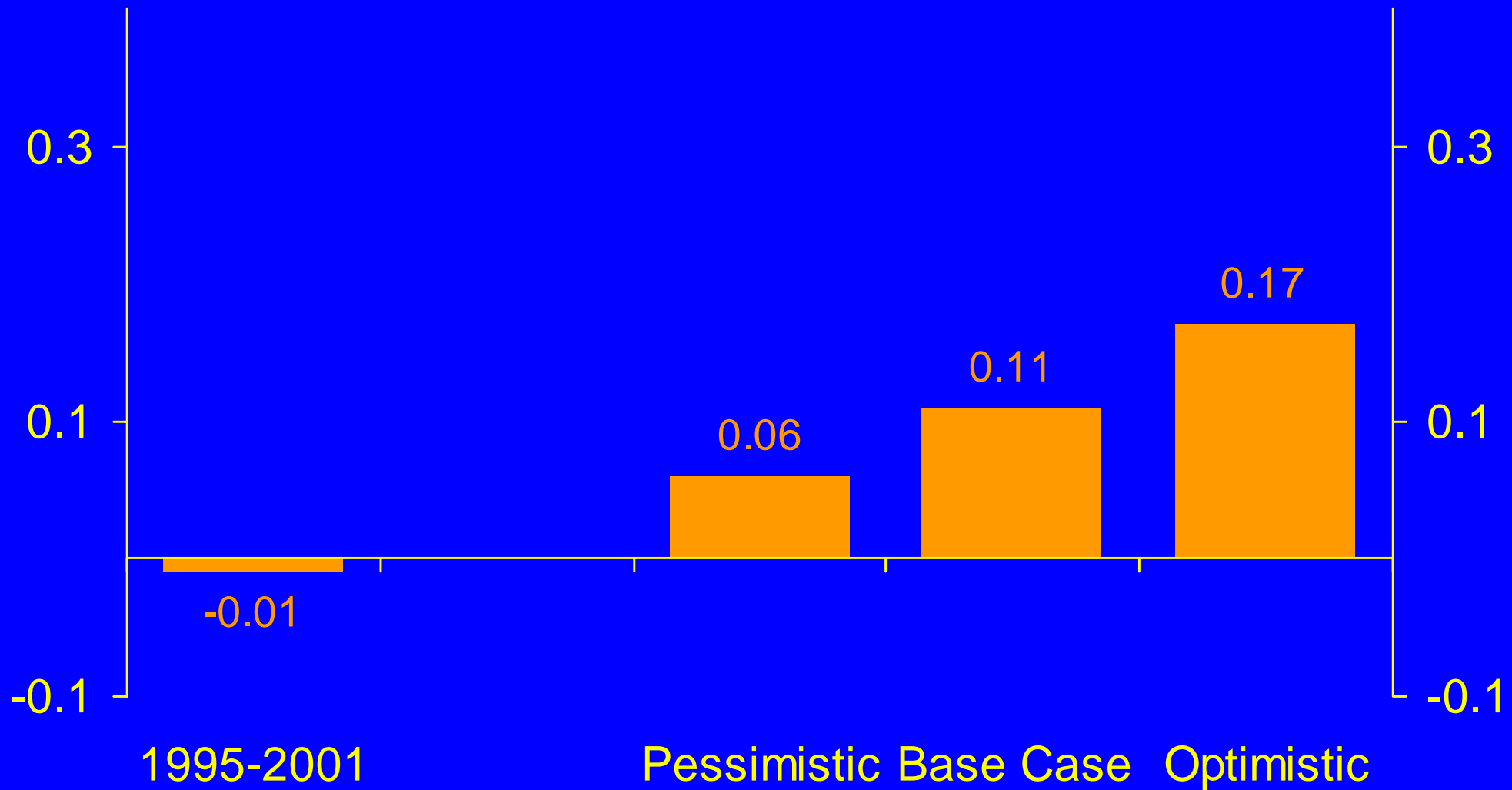
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- **Pessimistic scenario**
 - Revert to 1973-1995 averages

TFP Contribution from IT



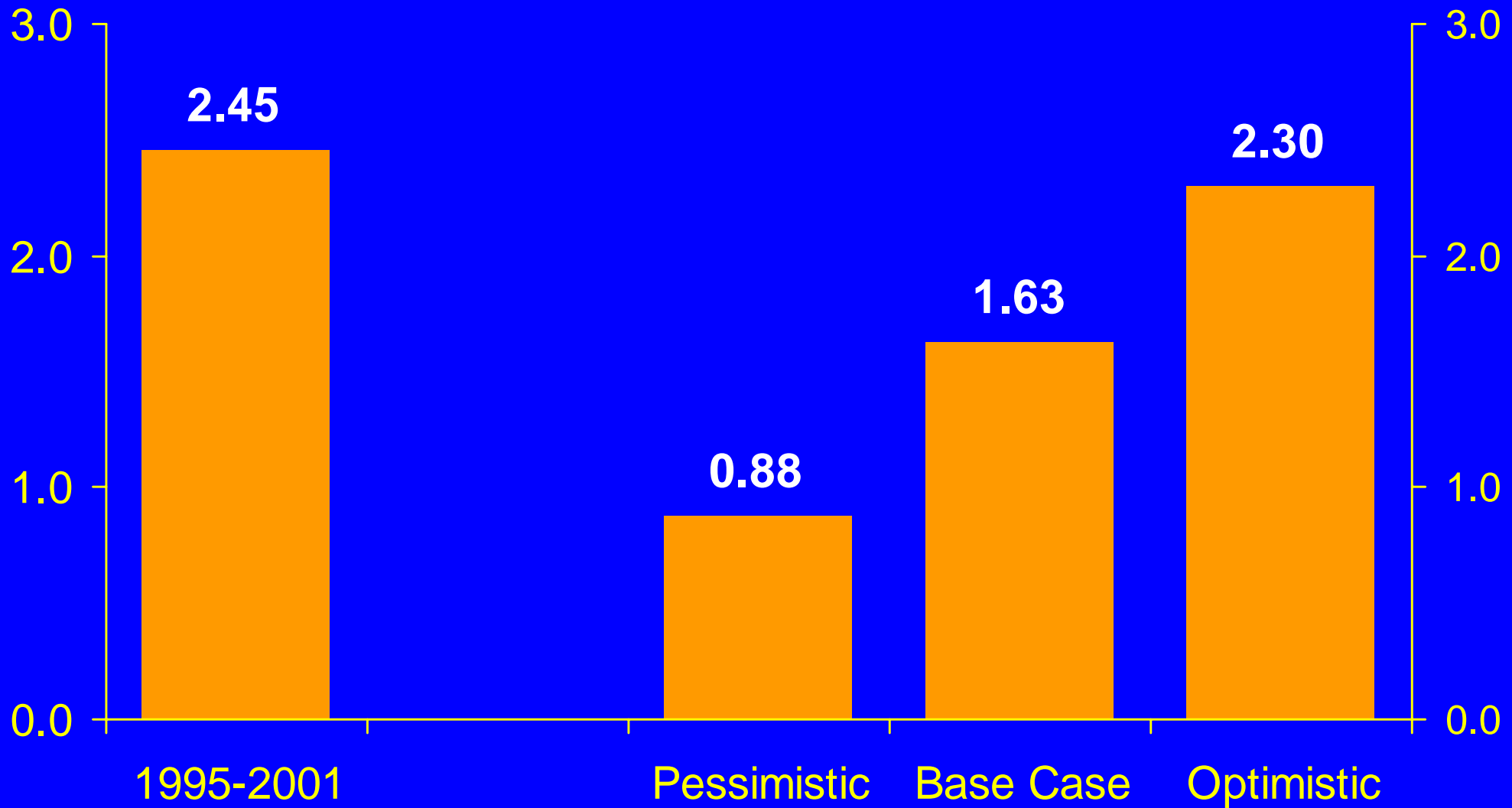
Average annual percentage.

Other TFP Contribution



Average annual percentage.

Capital Quality Growth

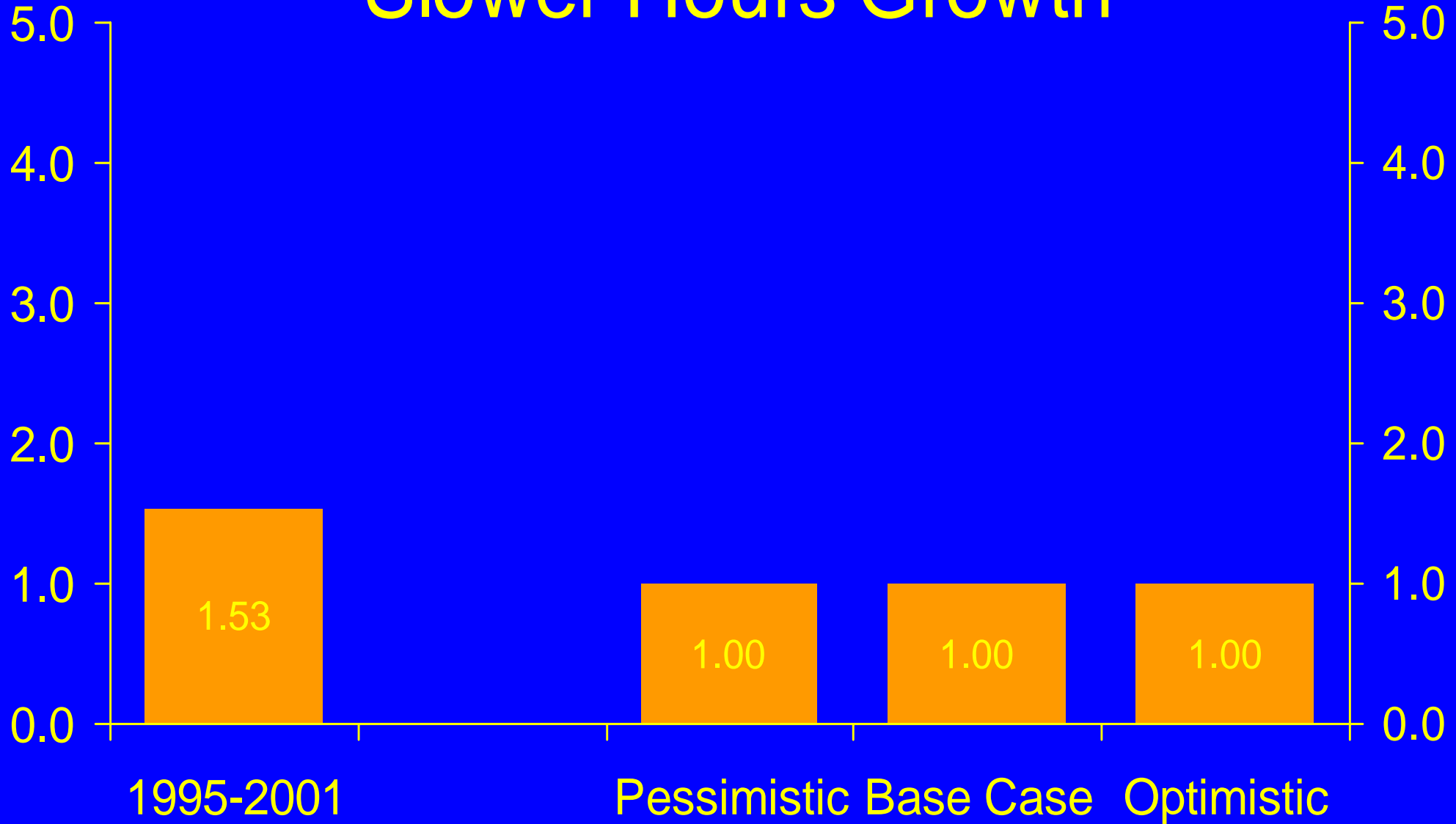


Average annual percentage.

Putting it All Together

- **Demographic projections put hours growth at 1.0% per year in all scenarios**

Slower Hours Growth

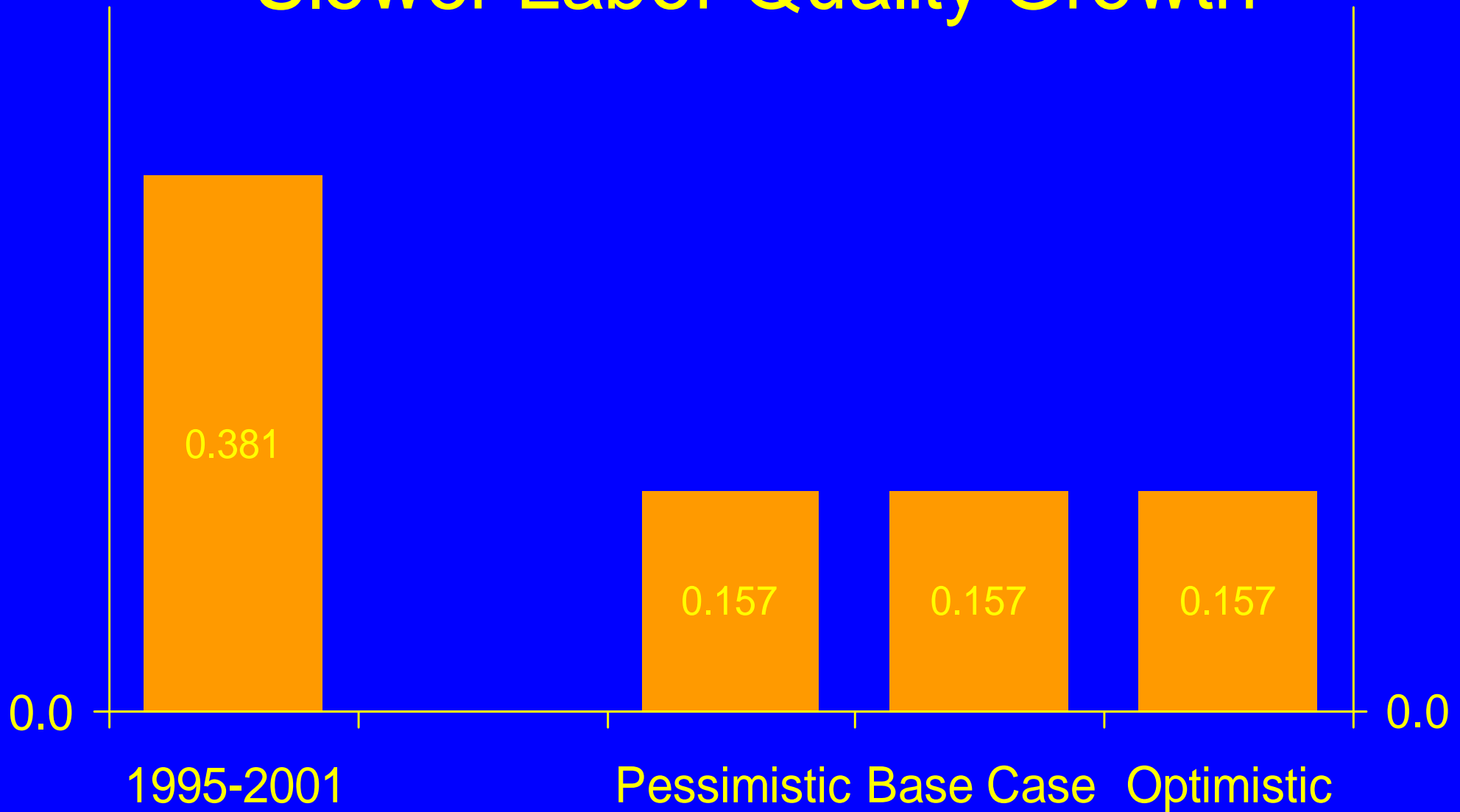


Average annual growth rate.

Putting it All Together

- Demographic assumptions put hours growth at 1.0% per year in all scenarios
- Labor quality growth continues to slow
 - 0.157% in all scenarios

Slower Labor Quality Growth

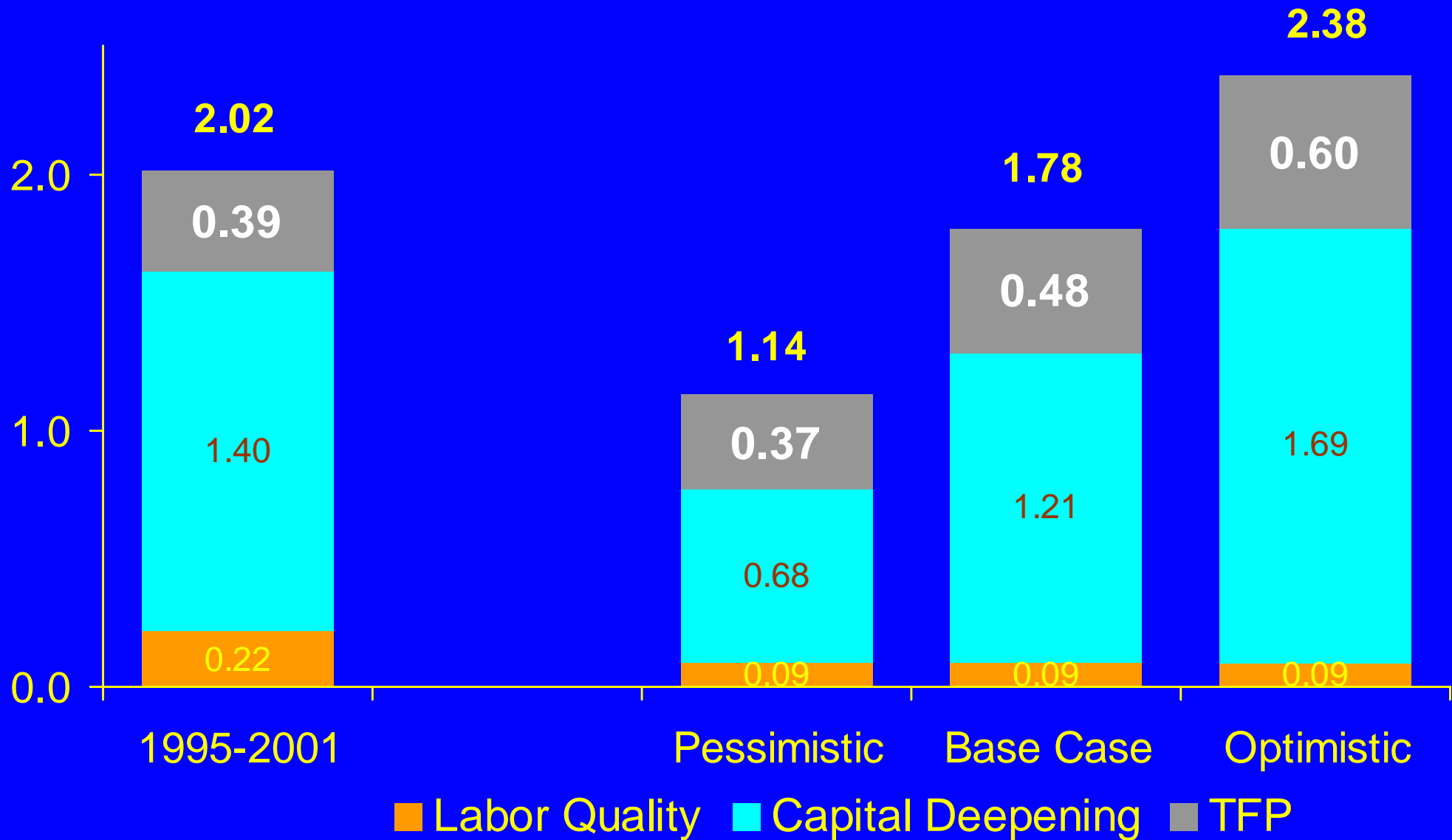


Average annual growth rate.

Putting it All Together

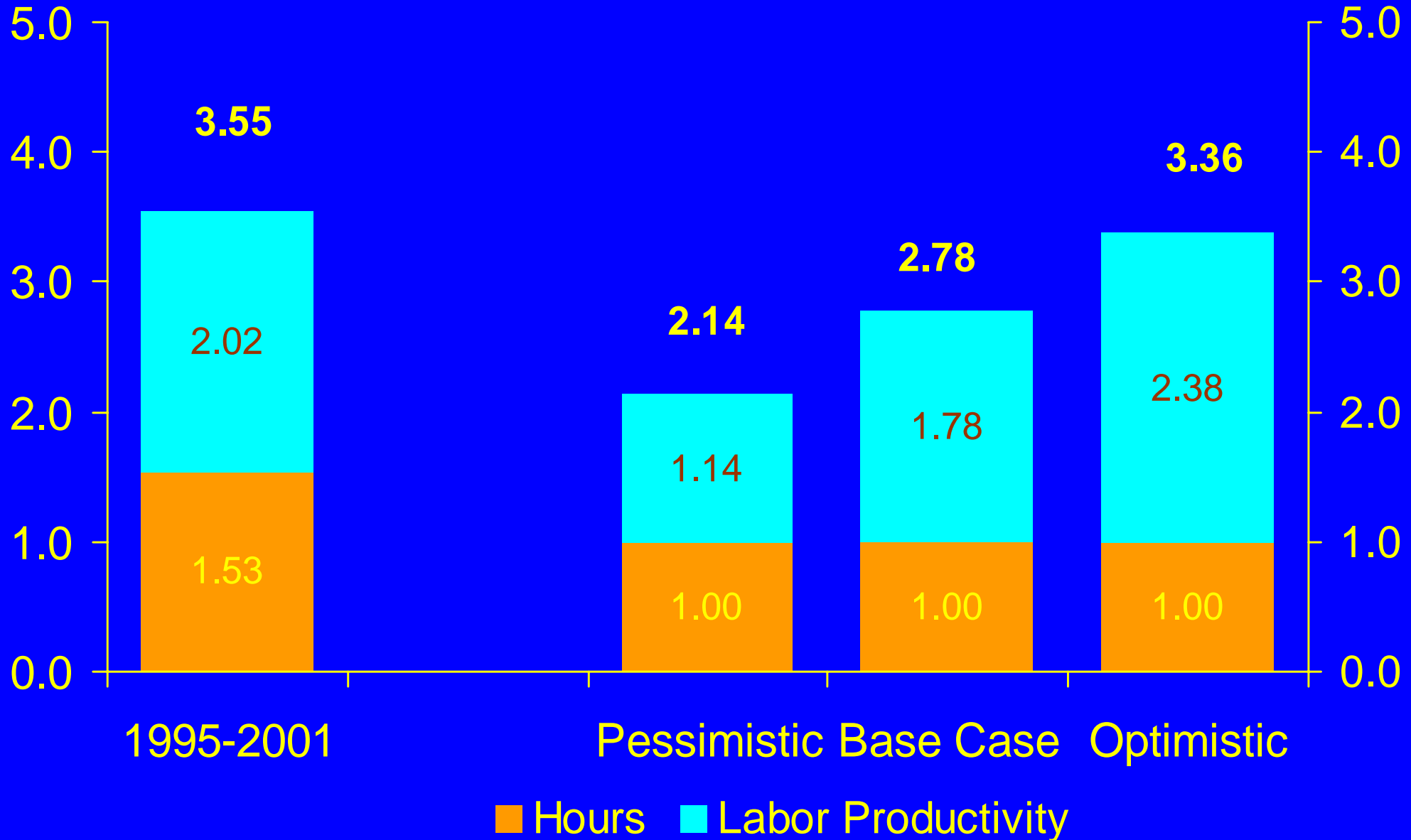
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- Labor quality growth continues to slow – 0.157% in all scenarios
- **Alternative assumptions about capital quality and TFP growth – Pessimistic, Base Case, and Optimistic**

Range of Labor Productivity Projections



Average annual share weighted growth rate.

Range of Output Projections



Average annual growth rate.

Projection Summary

- **Base Case productivity below 1995-2000, due to slower capital deepening, and less labor quality growth**
- **Slower output growth due to reduced growth in hours and labor productivity**
- **Future of information technology is the key**
 - Drives IT-related TFP and capital quality growth
 - Considerable uncertainty remains

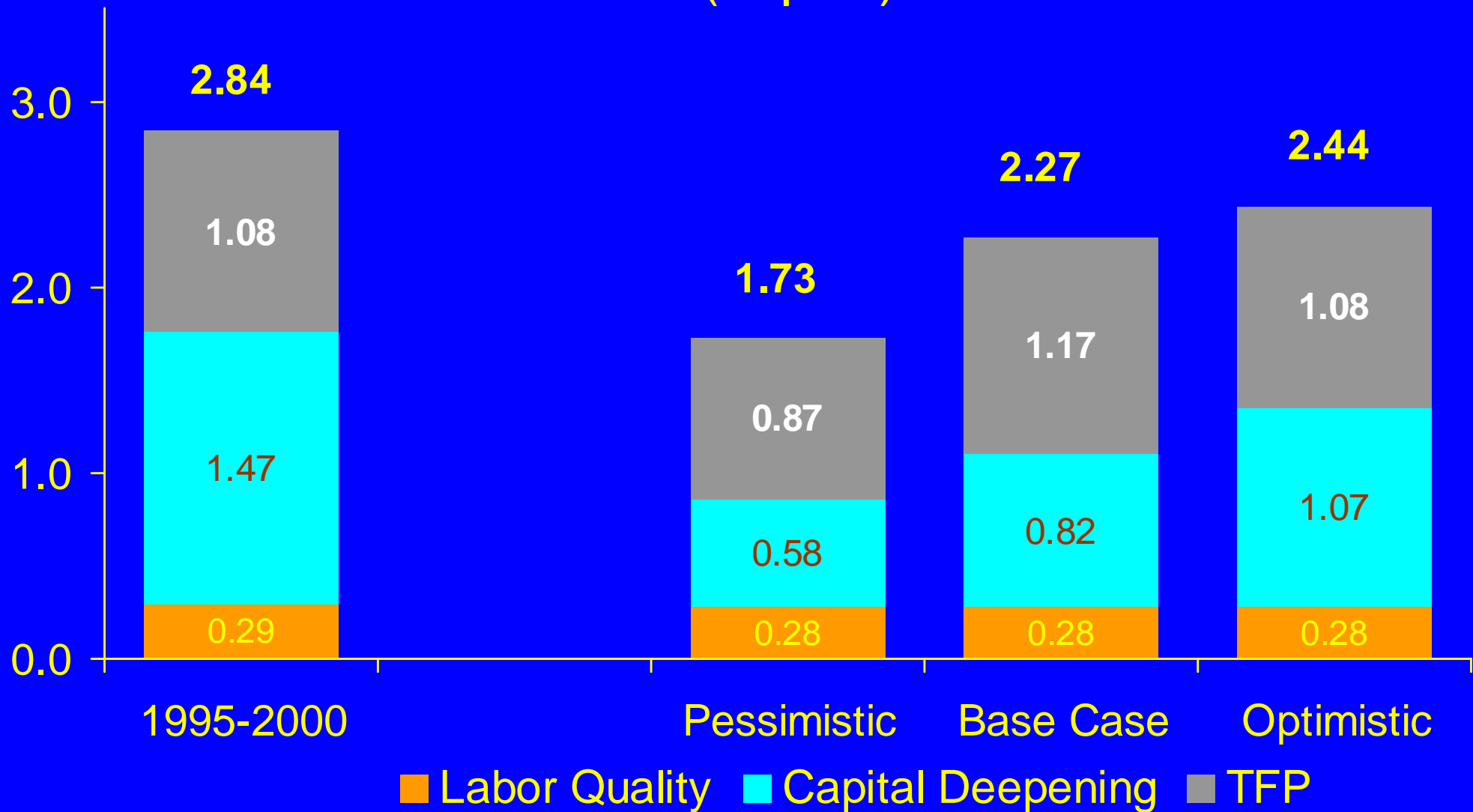
Lessons For Japan

- **Demographic assumptions put hours growth at -0.55% per year in all scenarios**
- **Labor quality growth continues to rise at 0.49% , the average for 1995-2000, in all scenarios**
- **Alternative assumptions about capital quality and TFP growth – Pessimistic, Base Case, and Optimistic**

Alternative Assumptions

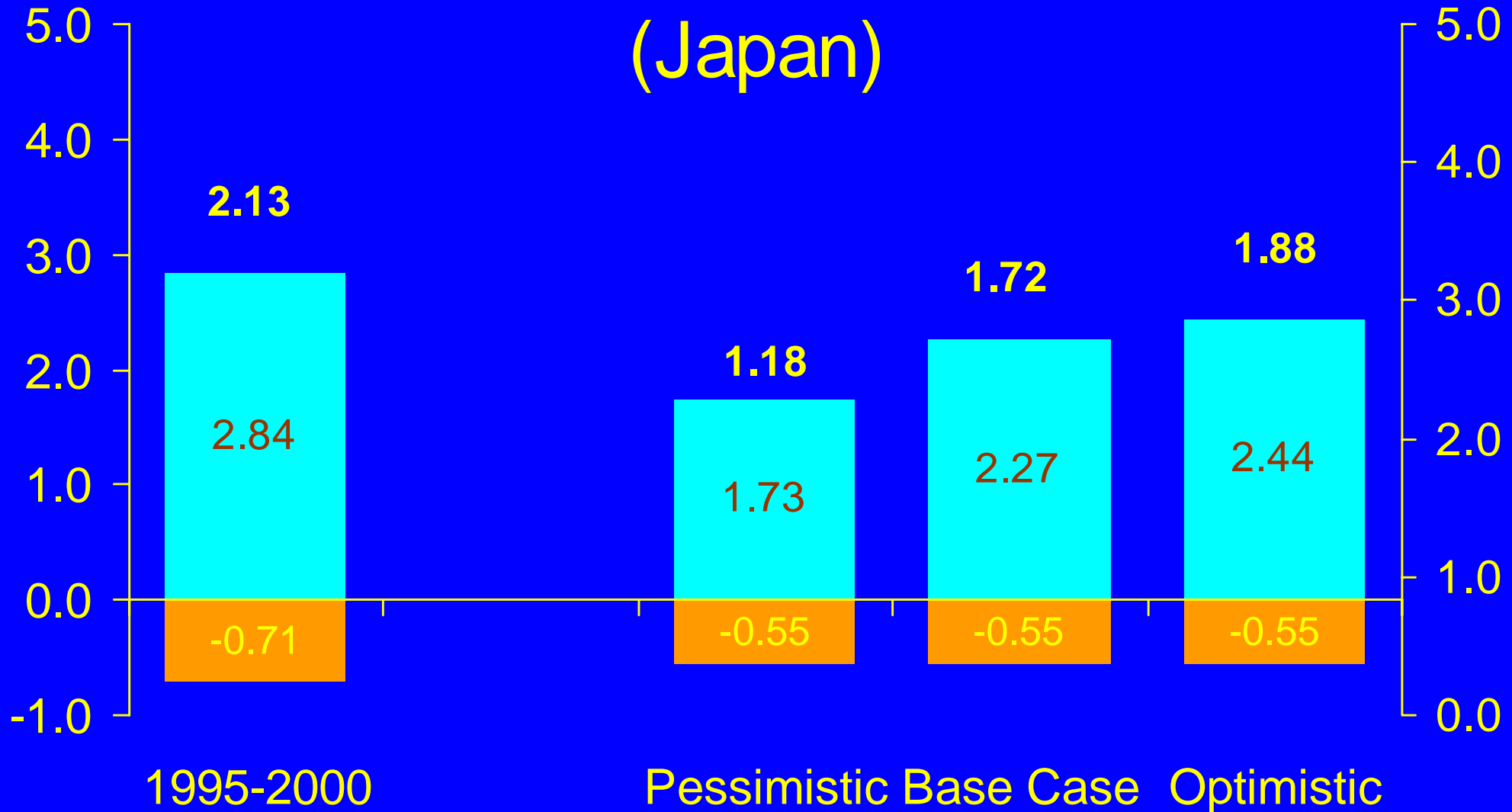
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 - Revert to 1995-2000 averages
- **Pessimistic scenario**
 - 1990-2000 averages continue

Range of Labor Productivity Projections (Japan)



Average annual share weighted growth rate.

Range of Output Projections (Japan)



Average annual growth rate. ■ Hours ■ Labor Productivity

Conclusions

- **Labor productivity growth for the U.S. will be lower than 1995-2000, but higher than 1973-1995.**
- **Labor productivity growth for Japan will also be lower than 1995-2000, and lower than 1980-1995.**
- **Output growth for the U.S. will be considerably lower than 1995-2000, and about the same as 1973-1995.**
- **Output growth for Japan will be lower than 1995-2000, and lower than 1980-1995.**