Lessons for Japan from the U.S. Growth Resurgence

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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)

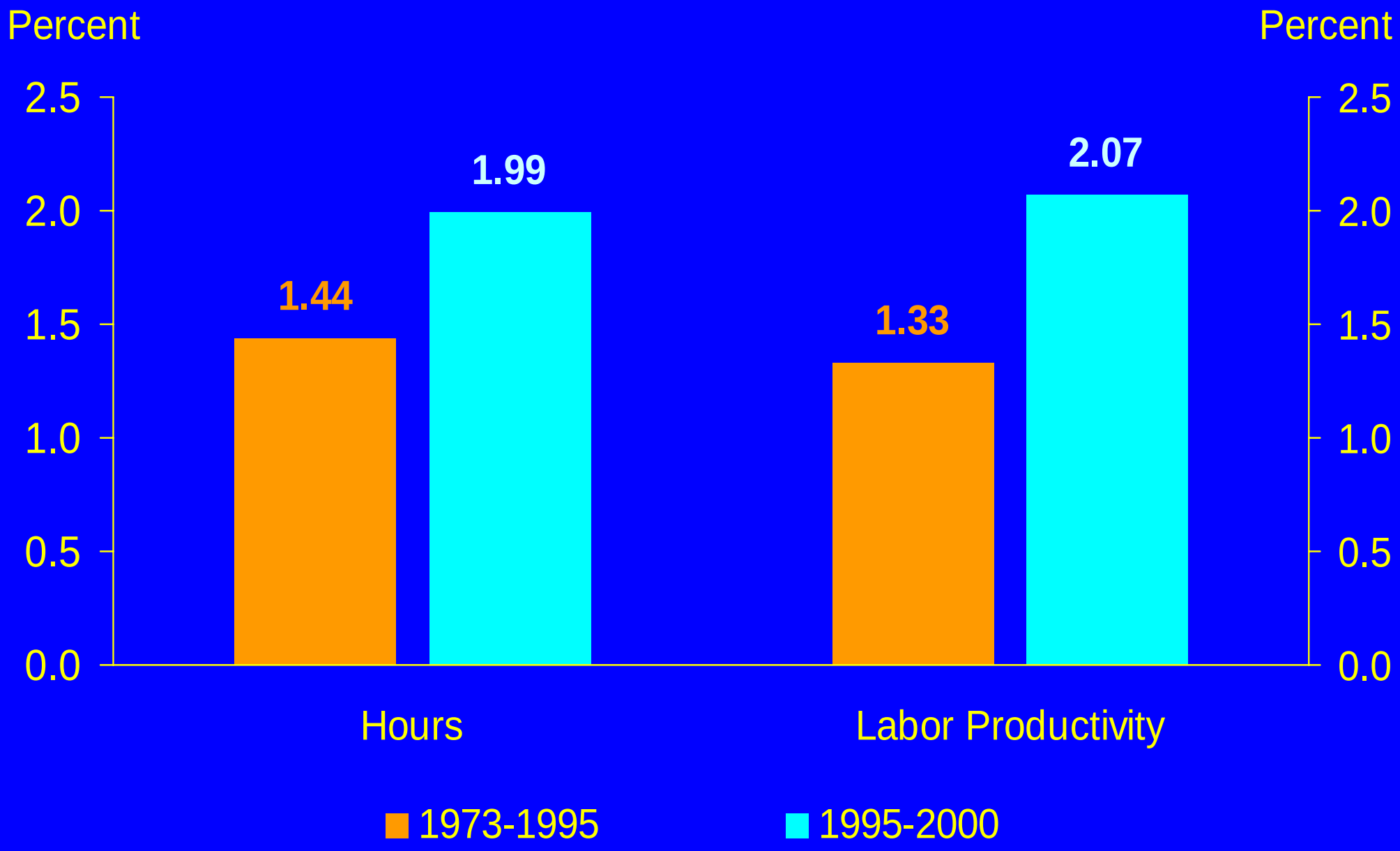
- **Project the potential growth of average labor productivity**
  - Abstract from business cycles by focusing on 1973-1995 and 1995-2000
  - Highlight uncertainties about IT development

- **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



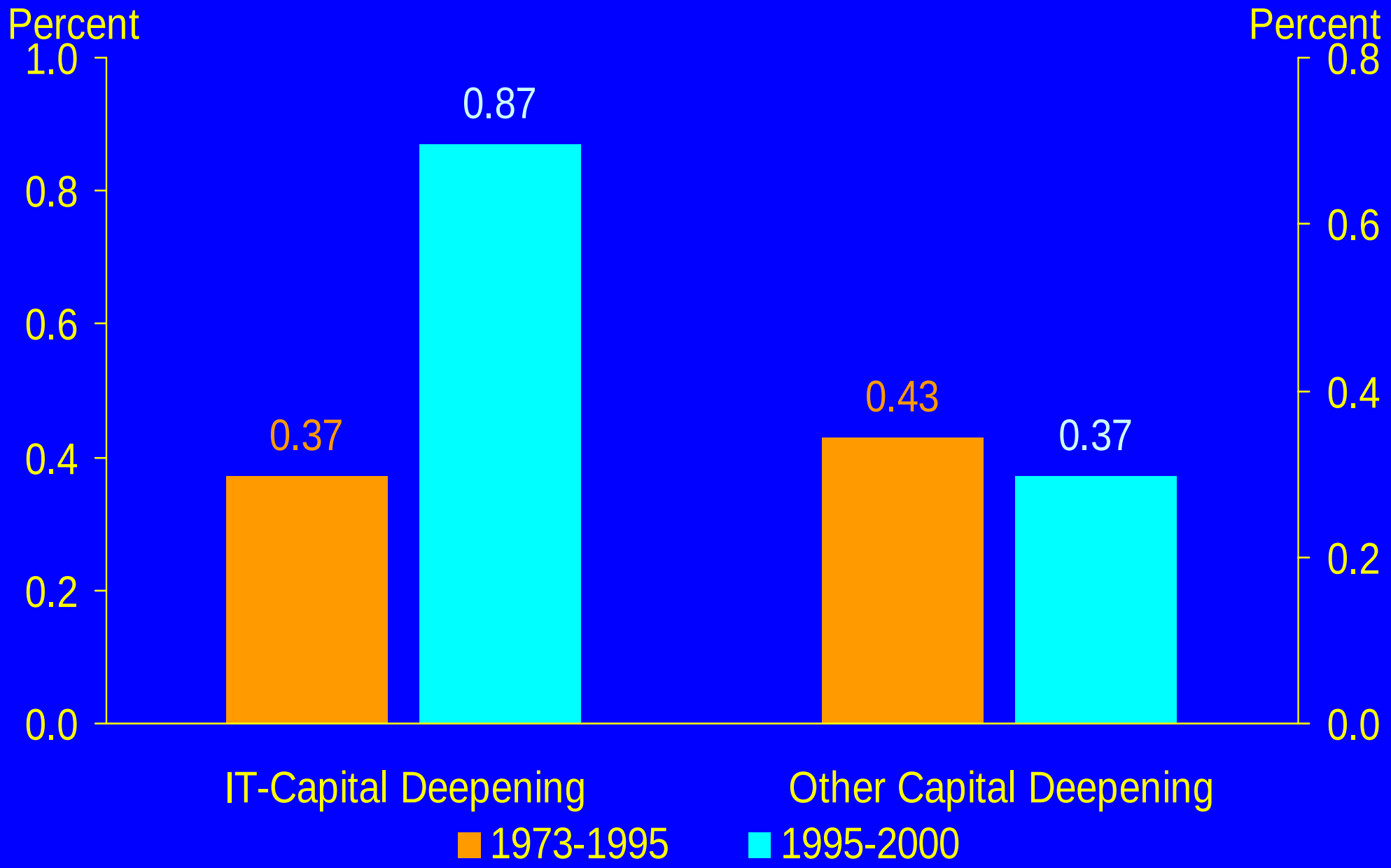
Three Sources of Labor Productivity Growth

- **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

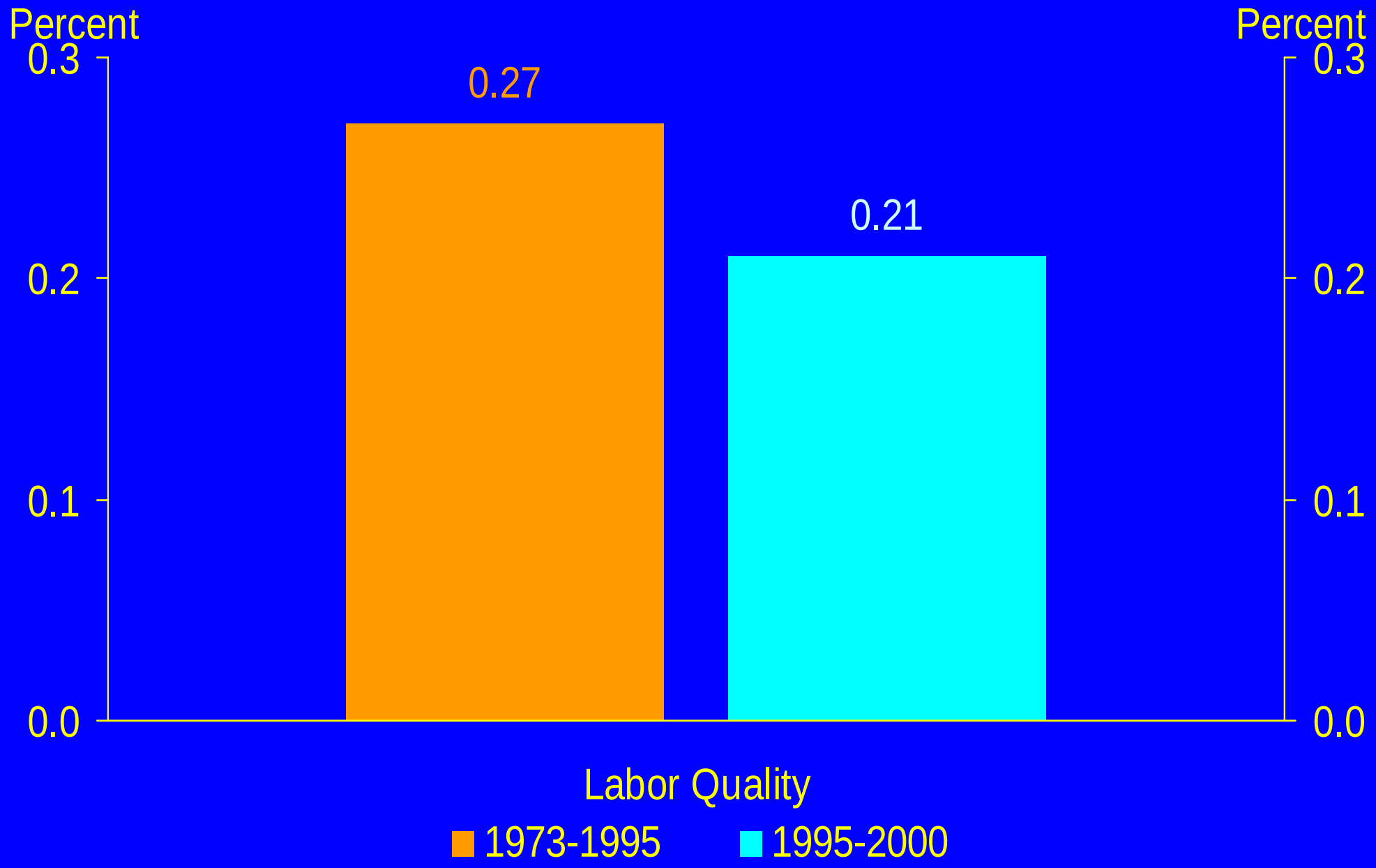


Average annual share-weighted growth rate.

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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- **Labor quality slowed**
  - Unemployment rate plummeted
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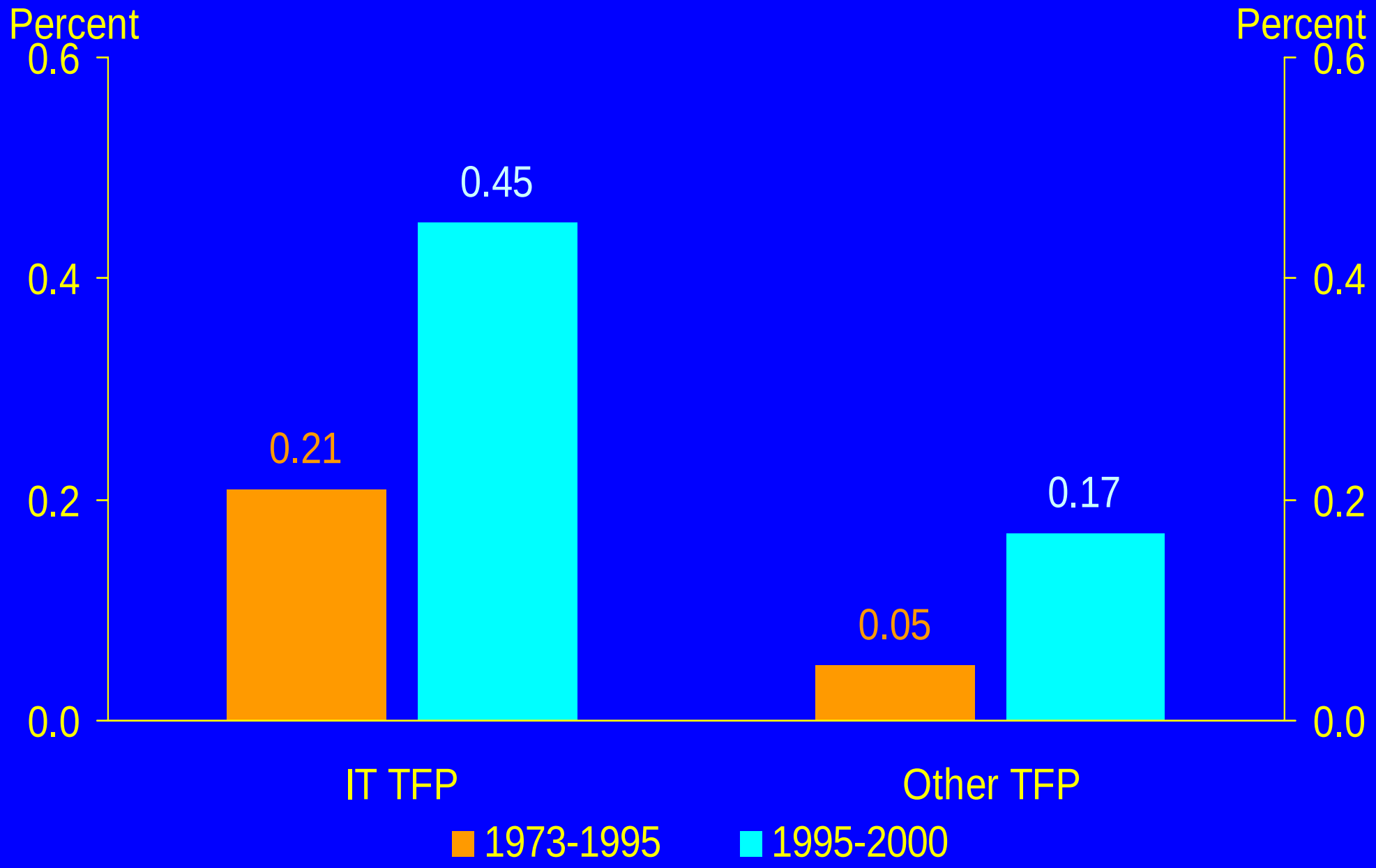
- **TFP growth accelerated**
  - **Productivity in IT production rose**
  - **Productivity in Non-IT production also rose**

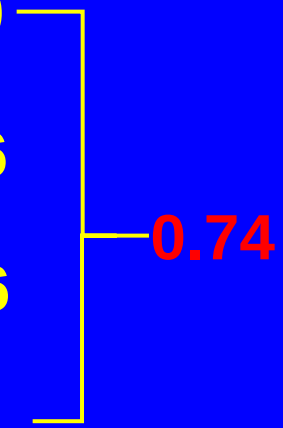
Faster TFP Growth



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**



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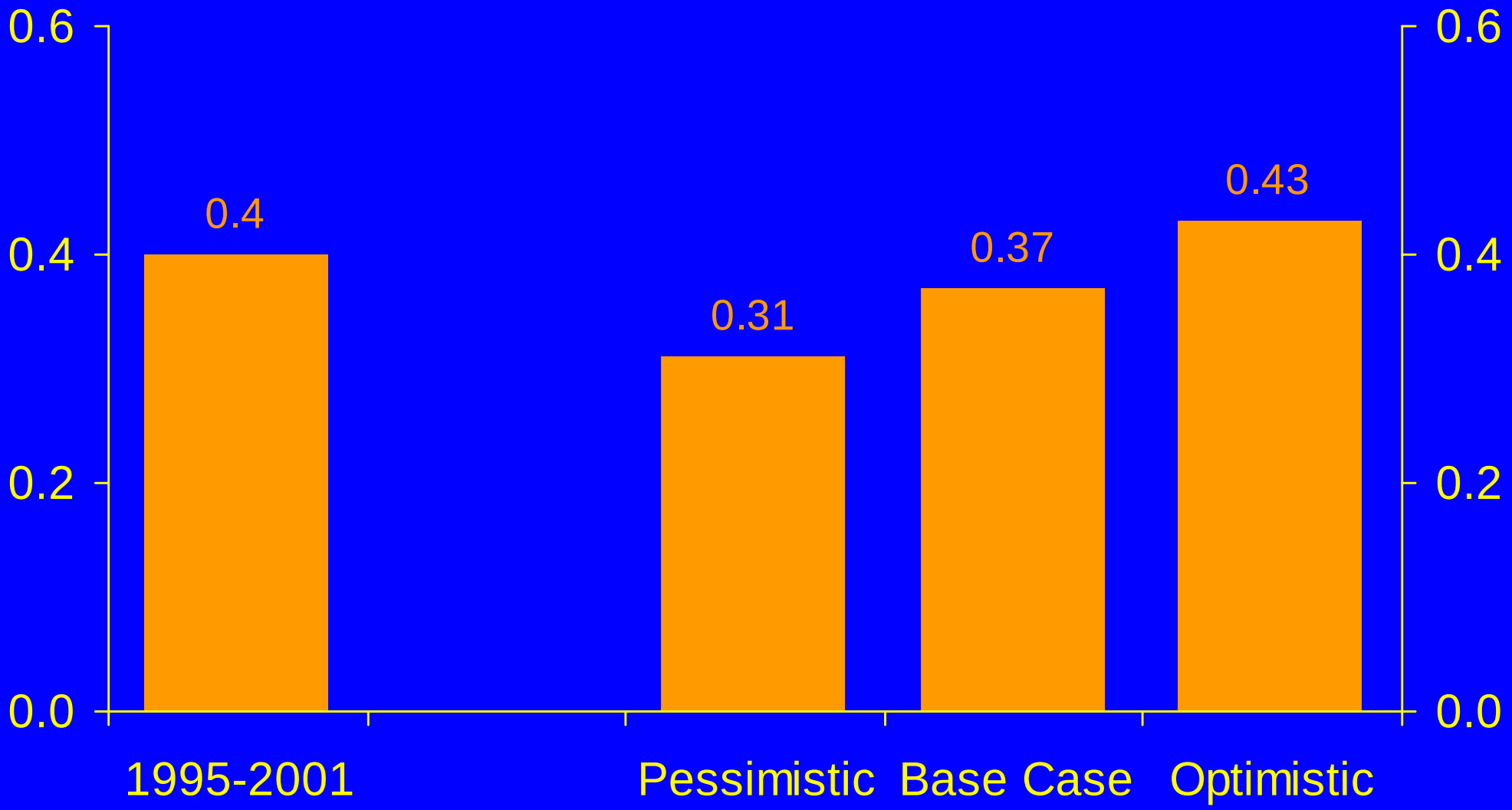
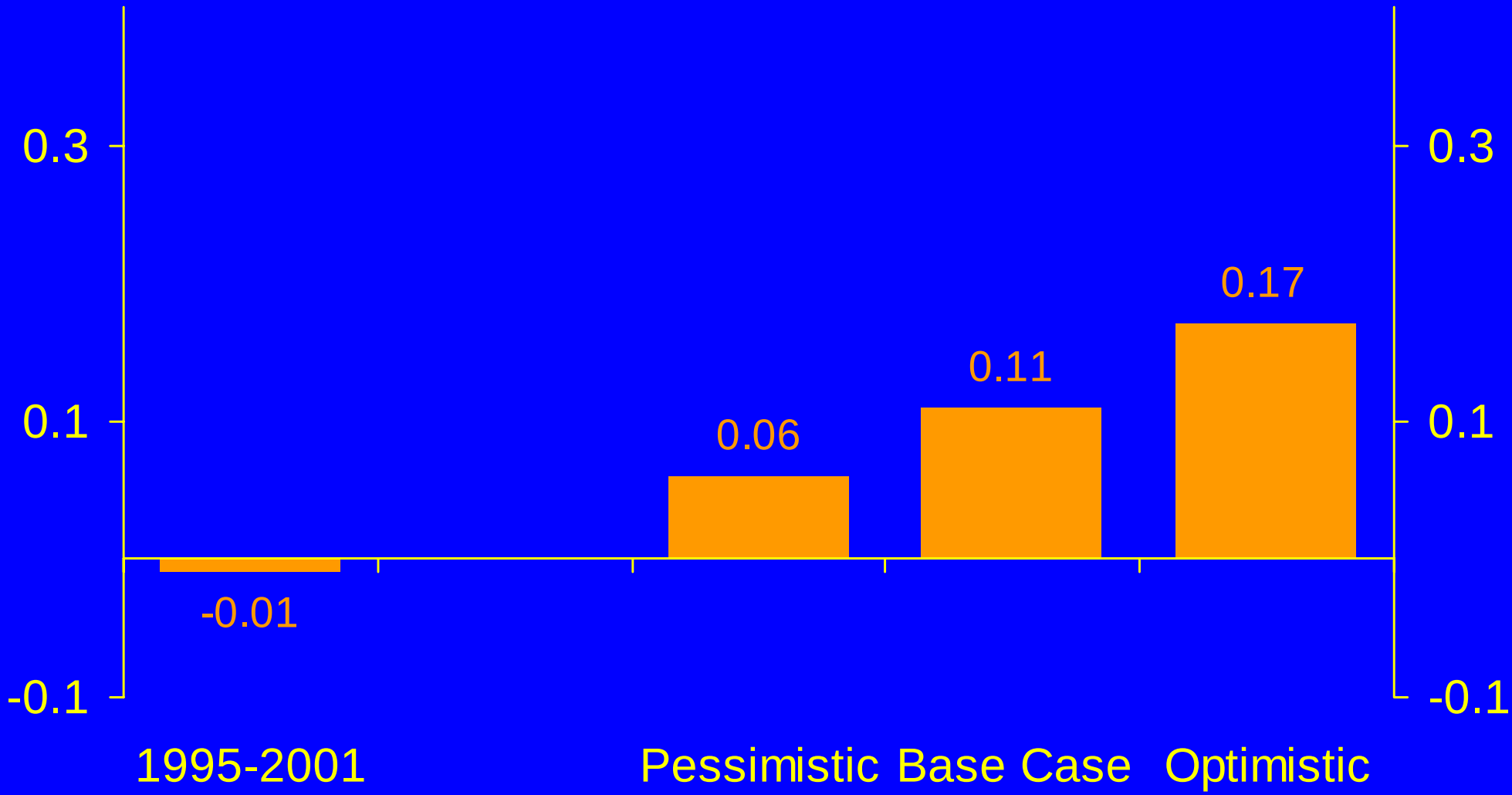
- **Pessimistic scenario**
  - Revert to 1973-1995 averages

TFP Contribution from IT



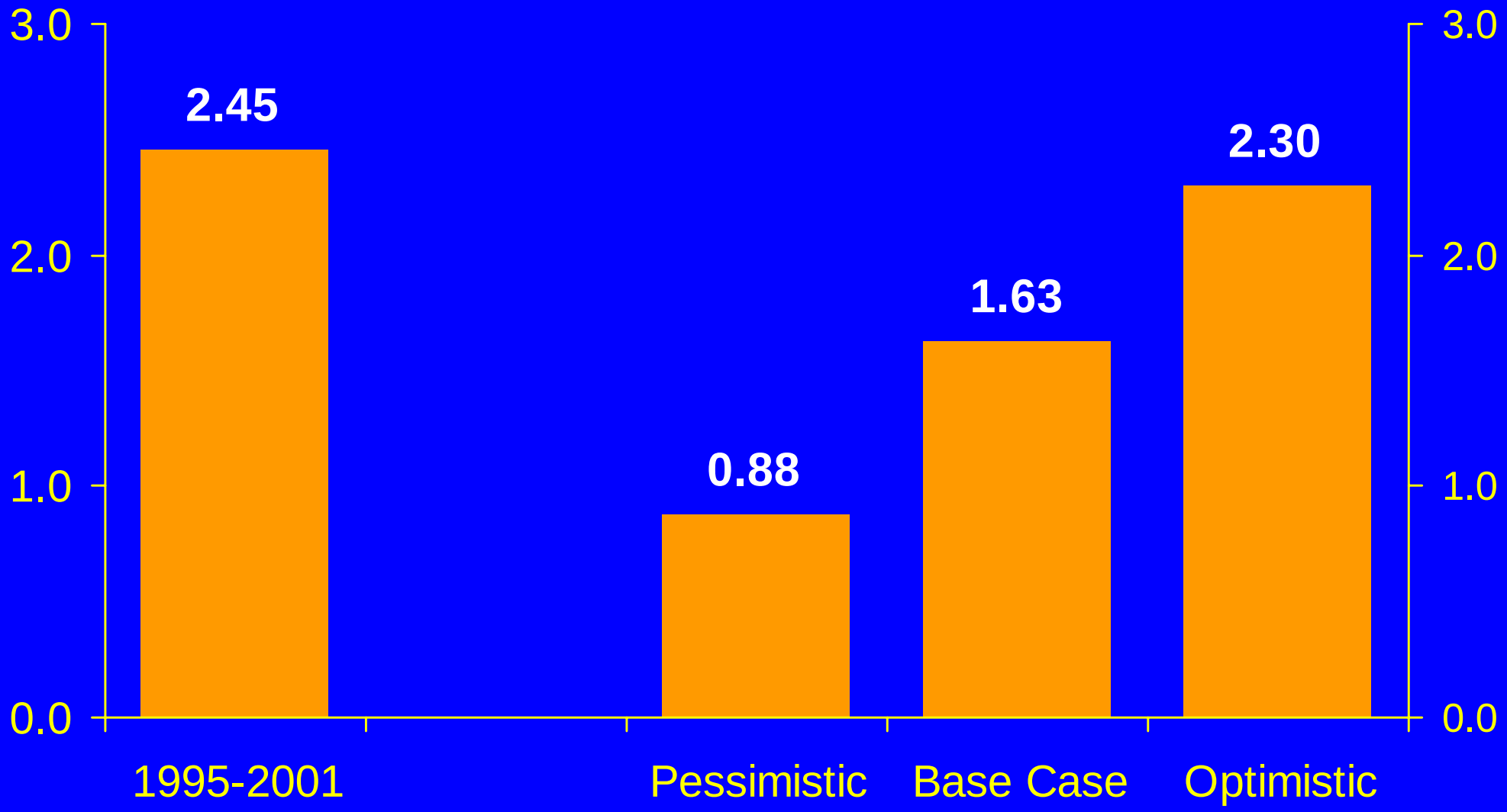
Average annual percentage.

Other TFP Contribution



Average annual percentage.

Capital Quality Growth

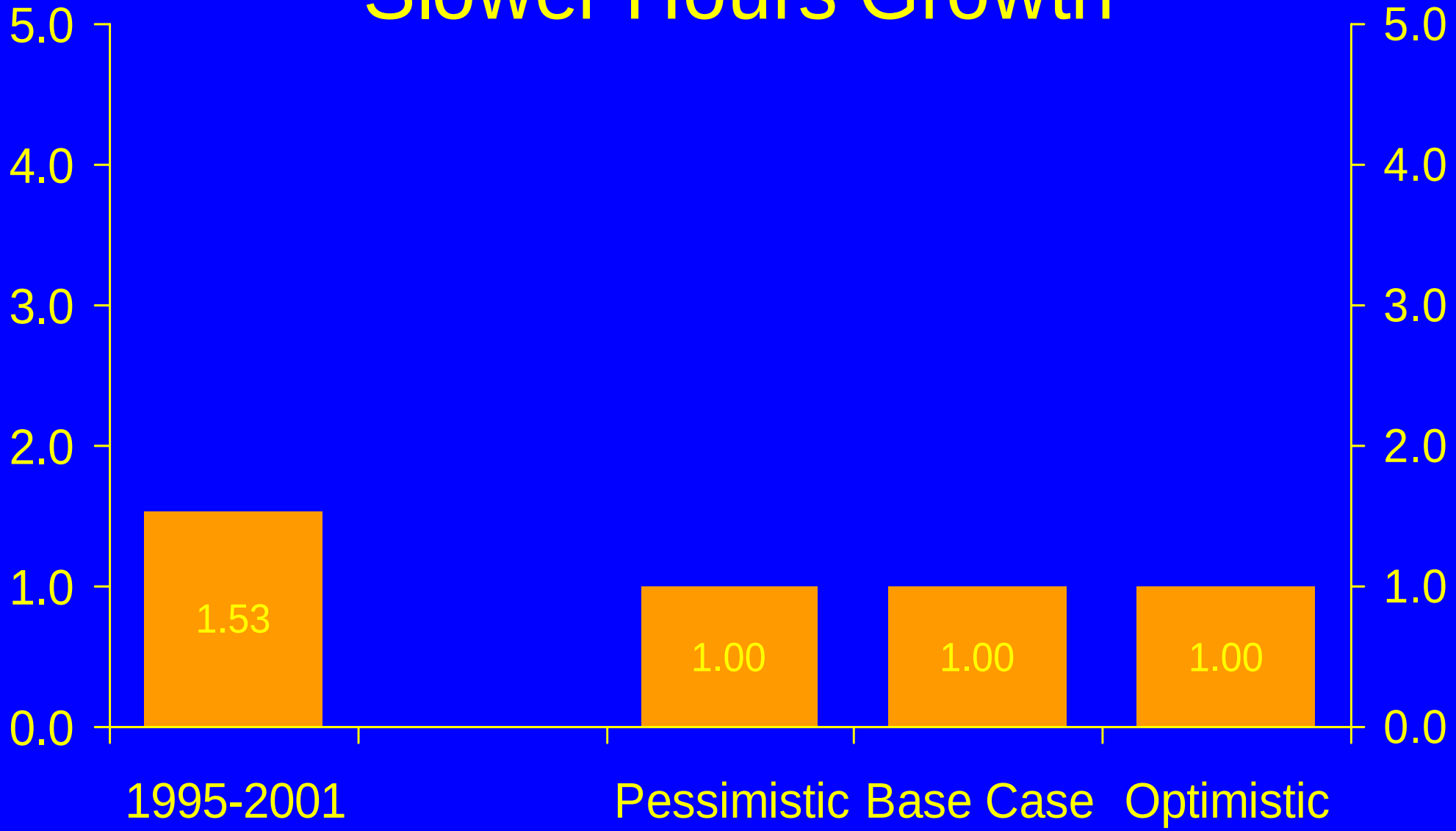


Average annual percentage.

Putting it All Together

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

Slower Hours Growth

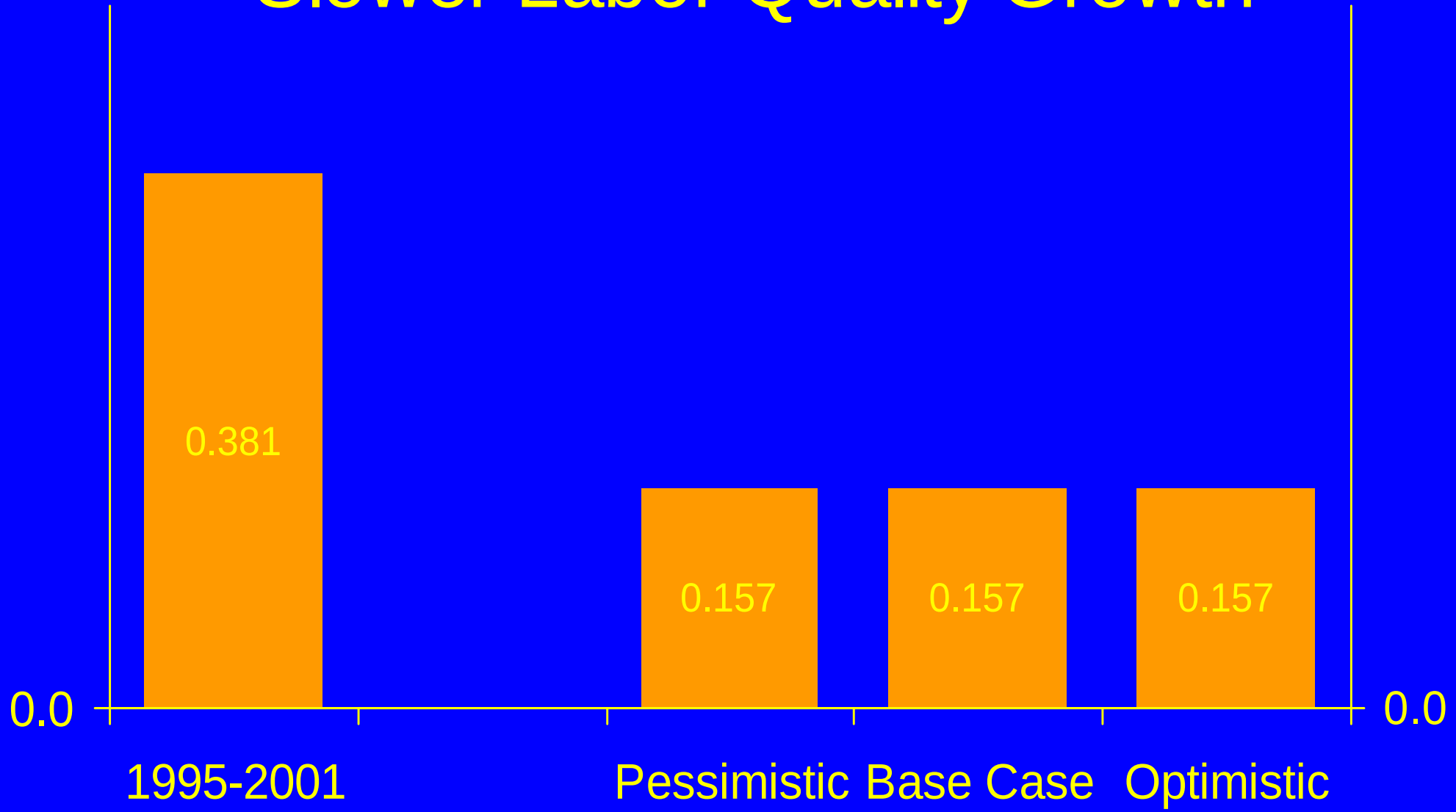


Average annual growth rate.

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

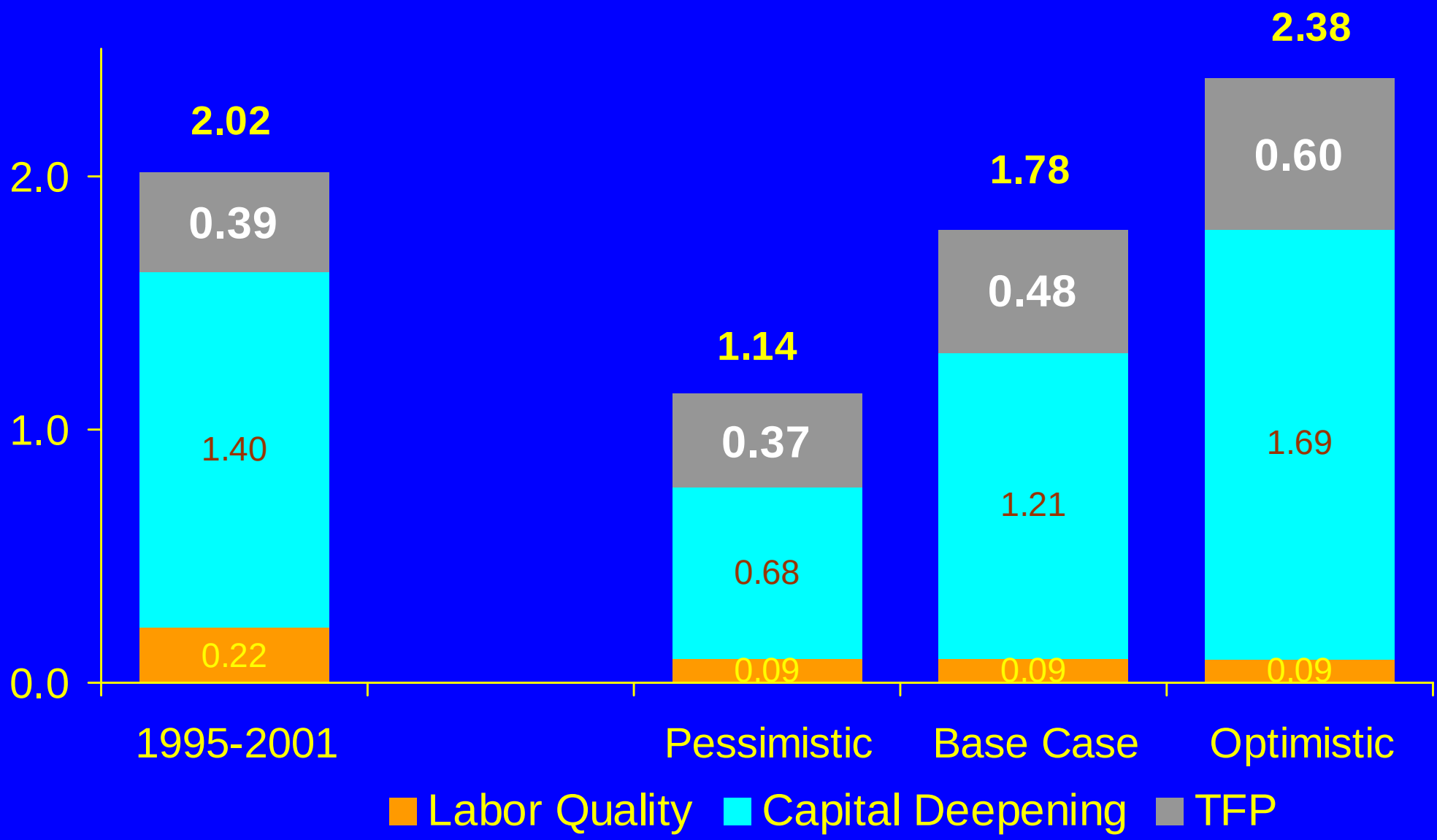


Average annual growth rate.

Putting it All Together

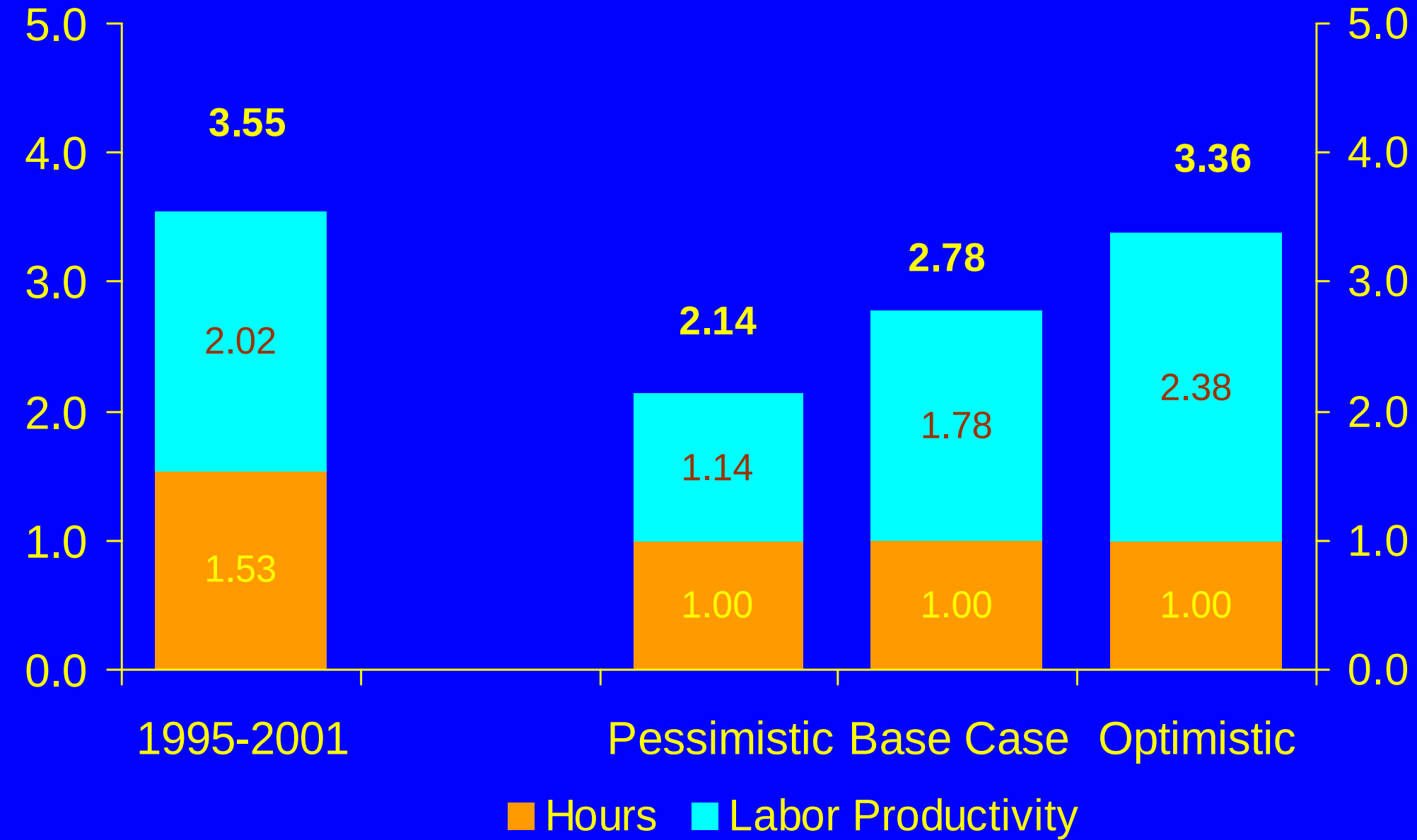
- Demographic assumptions put hours growth at 1.0% per year in all scenarios
- Labor quality growth continues to slow – 0.157% in all scenarios
- Alternative assumptions about capital quality and TFP growth – Pessimistic, Base Case, and Optimistic

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

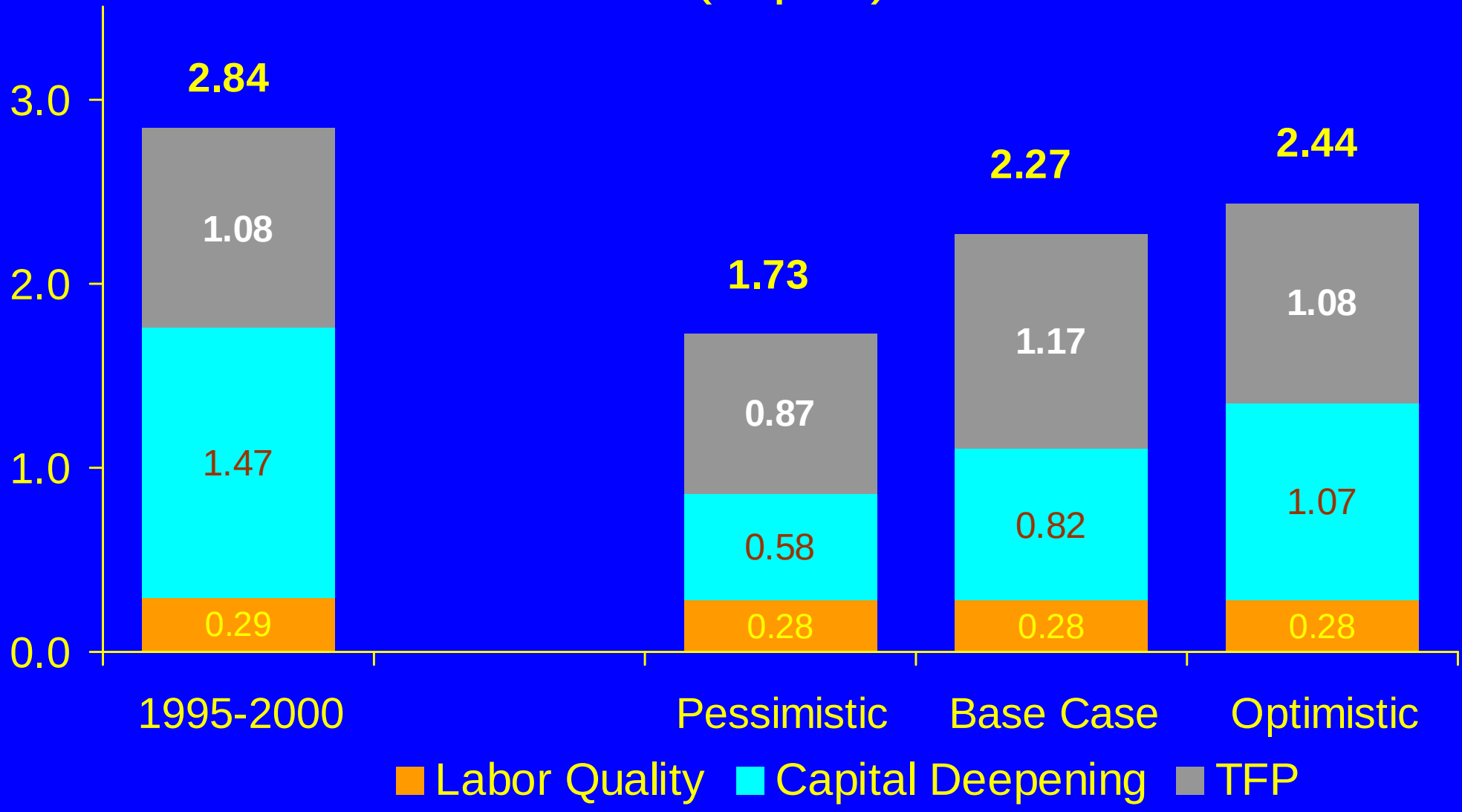
Lessons For Japan

- 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

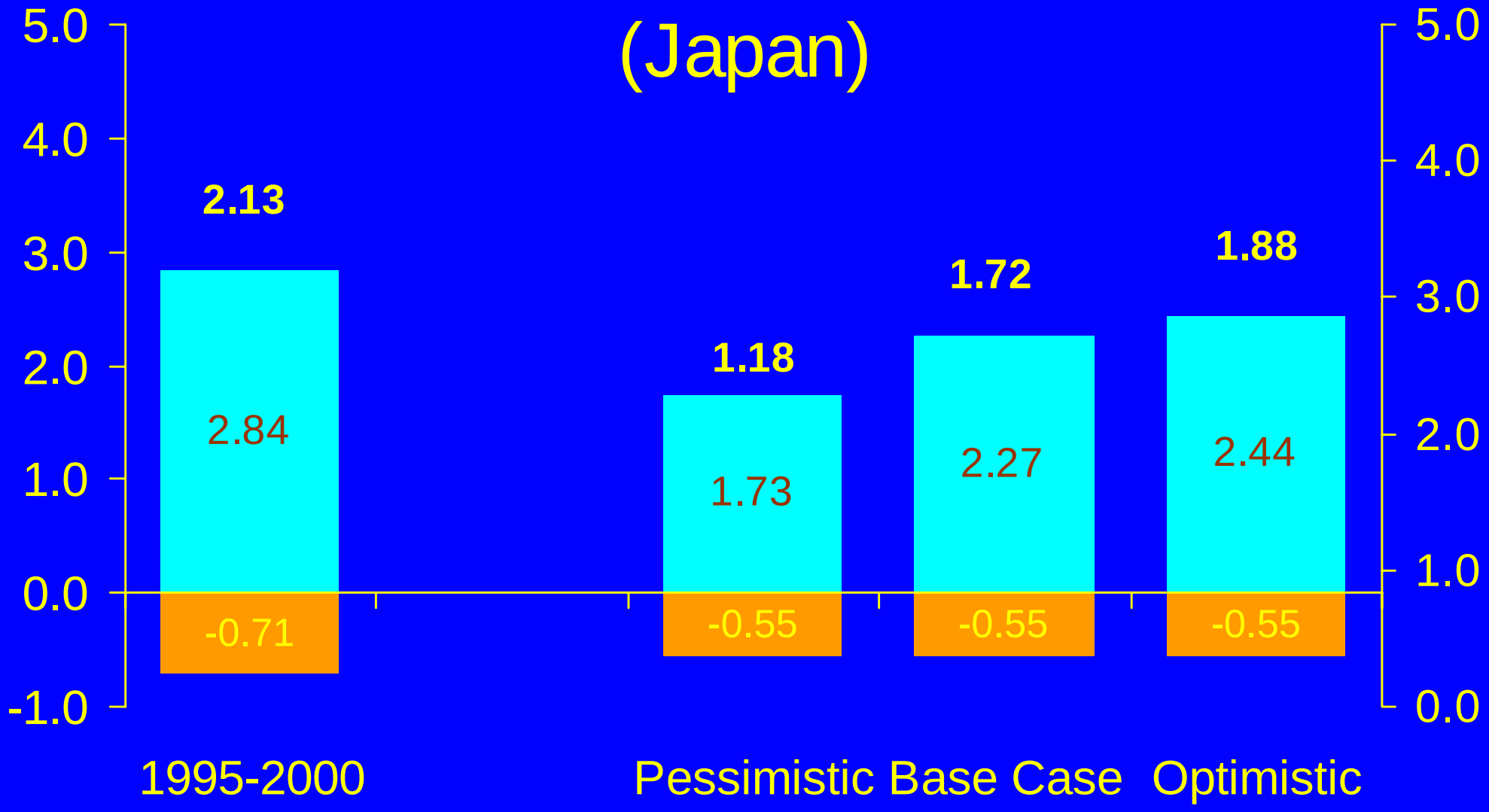
- **Base Case scenario**
  - Use 1980-1995 averages
- **Optimistic scenario**
  - Revert to 1995-2000 averages
- **Pessimistic scenario**
  - 1990-2000 averages continue

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.**