

What do we mean by the New Economy?

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Economic Growth in the Information Age

Introduction:

- Prices of Information Technology

The Information Age:

- Faster, Better, Cheaper!

Role of Information Technology:

- IT Prices and the Cost of Capital

American Growth Resurgence:

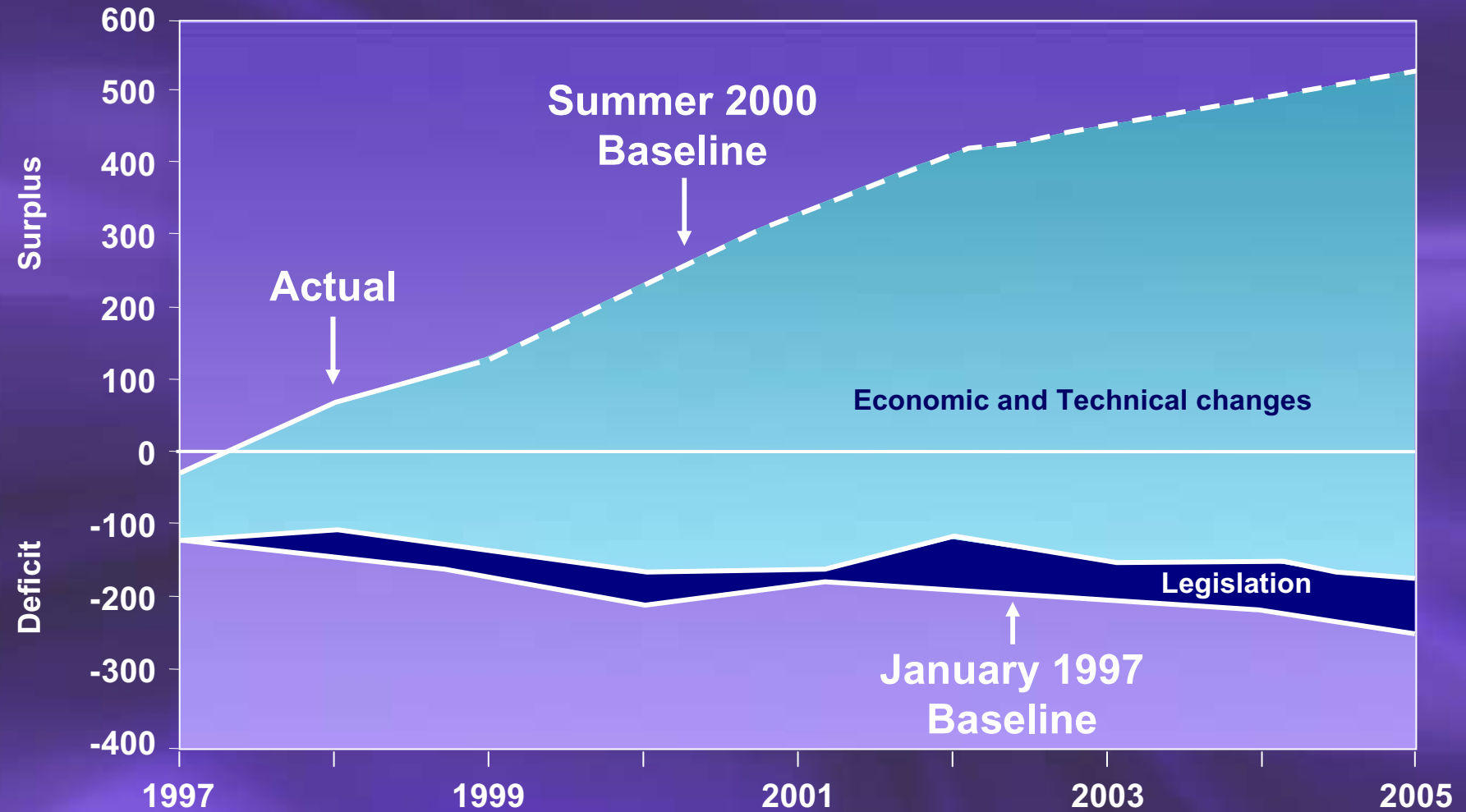
- IT Investment and Productivity Growth

Economics on Internet Time:

- The New Research Agenda

Changes in CBO's Baseline Projections since 1997

(in billions of \$)



The Information Age: Faster, Better, Cheaper!

MOORE (1998): “If the automobile industry advanced as rapidly as the semiconductor industry, a Rolls Royce would get half a million miles per gallon, and it would be cheaper to throw it away than to park it.”

Invention of the Transistor:

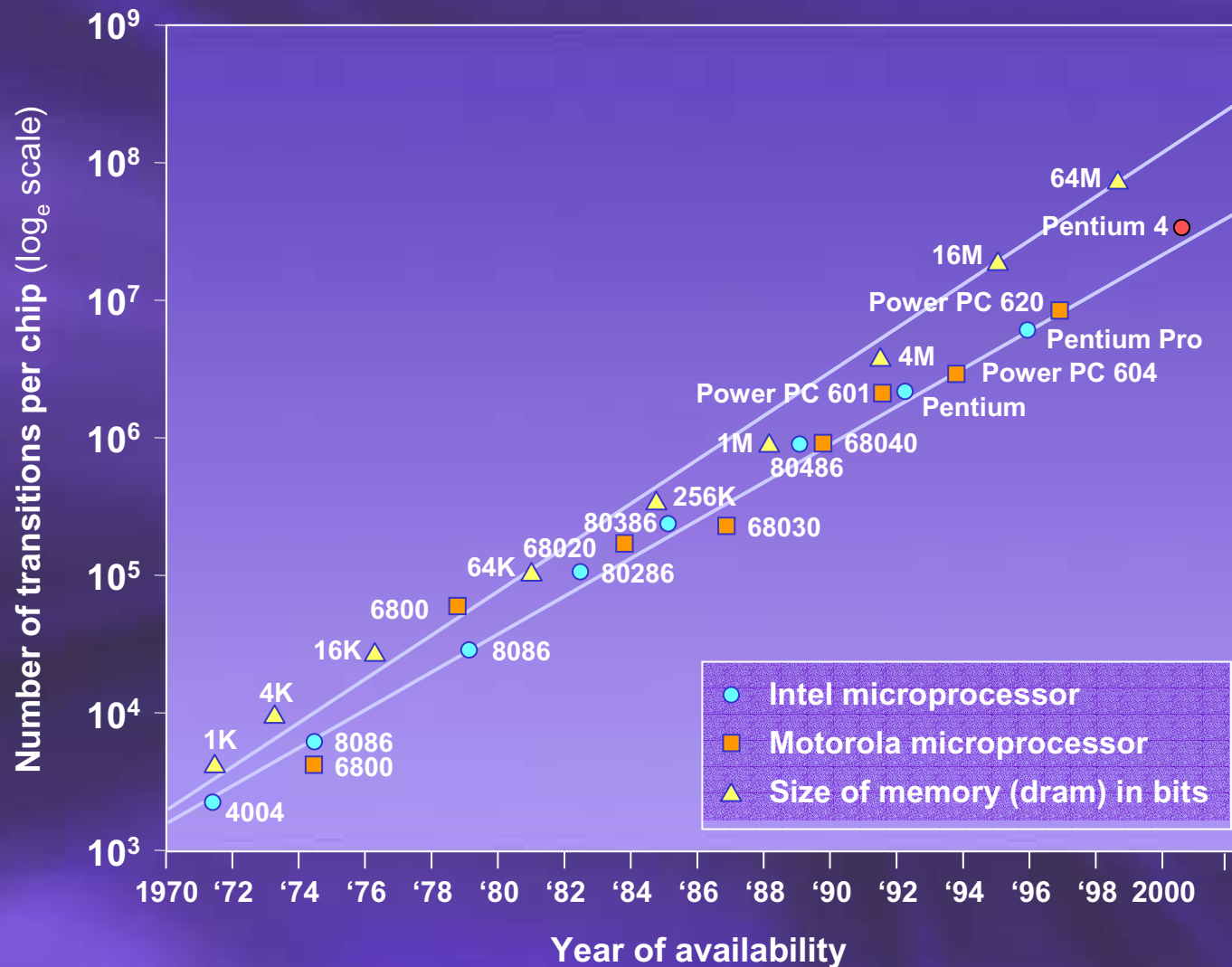
- Development of Semiconductor Technology

The Integrated Circuit:

- Memory Chips; Logic Chips

MOORE'S LAW: The number of transistors on a chip doubles every 18-24 months (Pentium 4, released November 20,2000, has 42 million transistors).

Transistor Density on Micro Processors and Memory Chips



Holding Quality Constant

Matched Models and Hedonics

Semiconductor Price Indexes:

- Memory and Logic Chips

Computer Price Indexes:

- The BEA-IBM Collaboration

Communications Equipment:

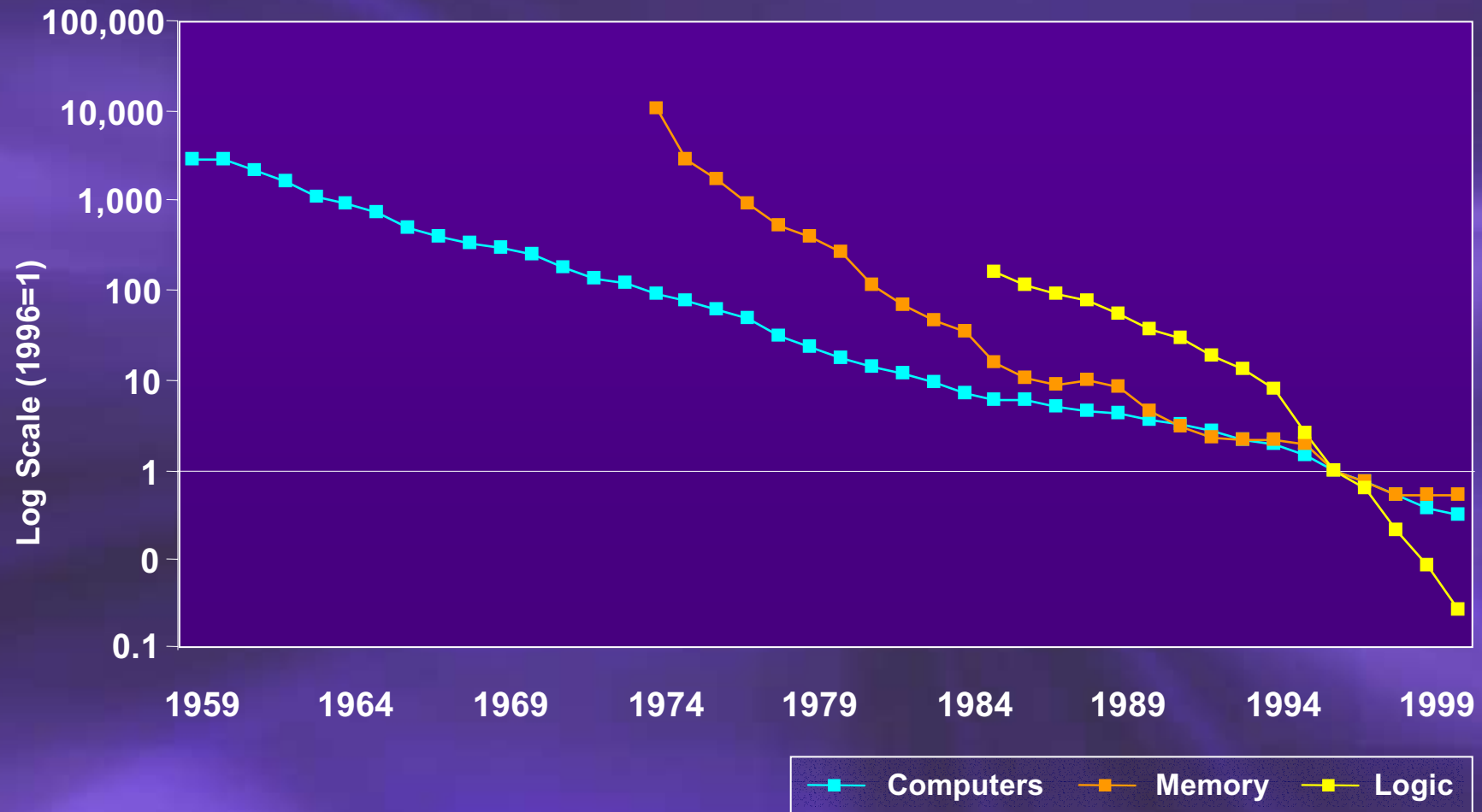
- Terminal, Switching, and Transmission

Software:

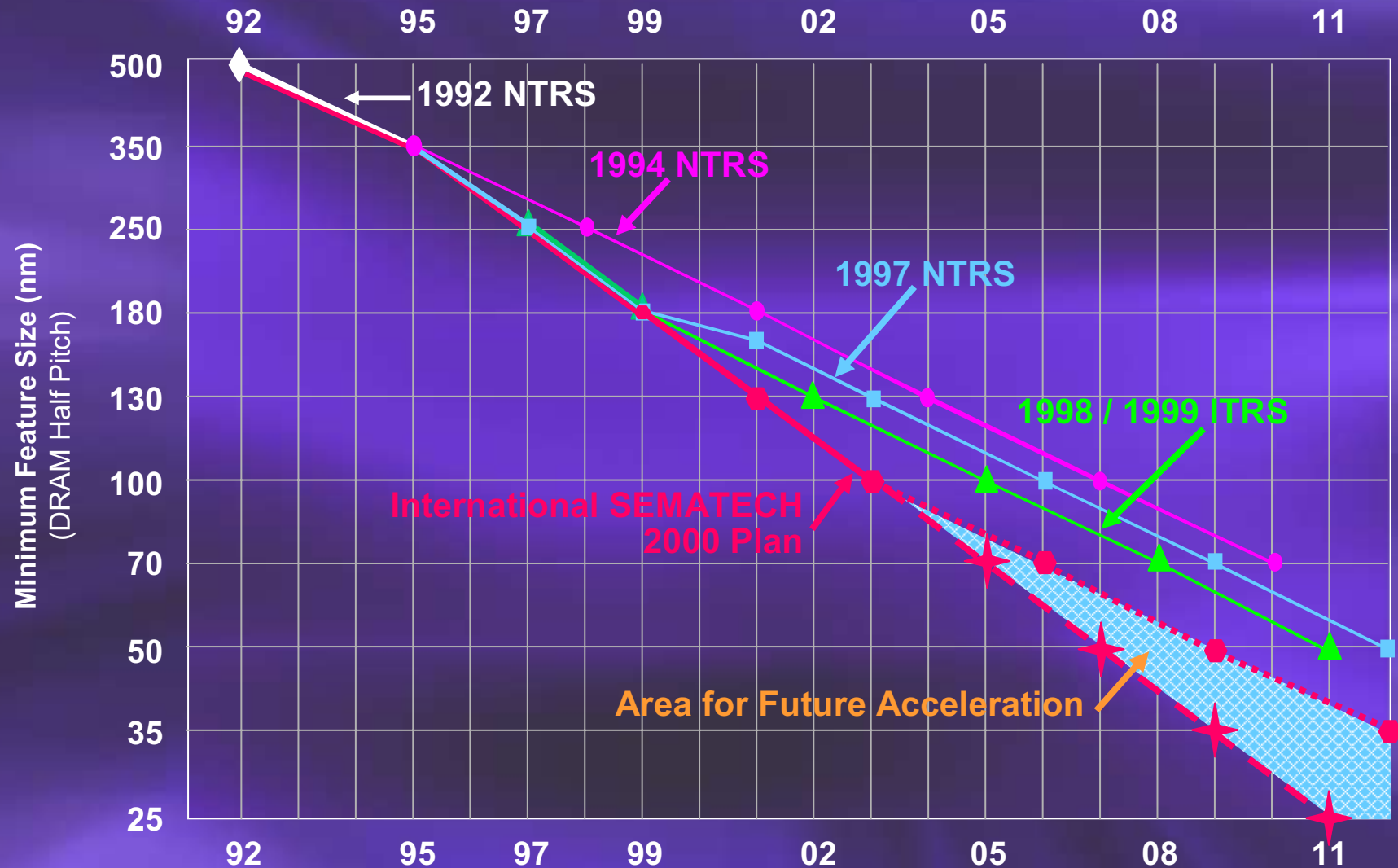
- Prepackaged, Custom, and Own-Account

Relative Prices of Computers and Semiconductors, 1959-2000

All price indexes are divided by the output price index

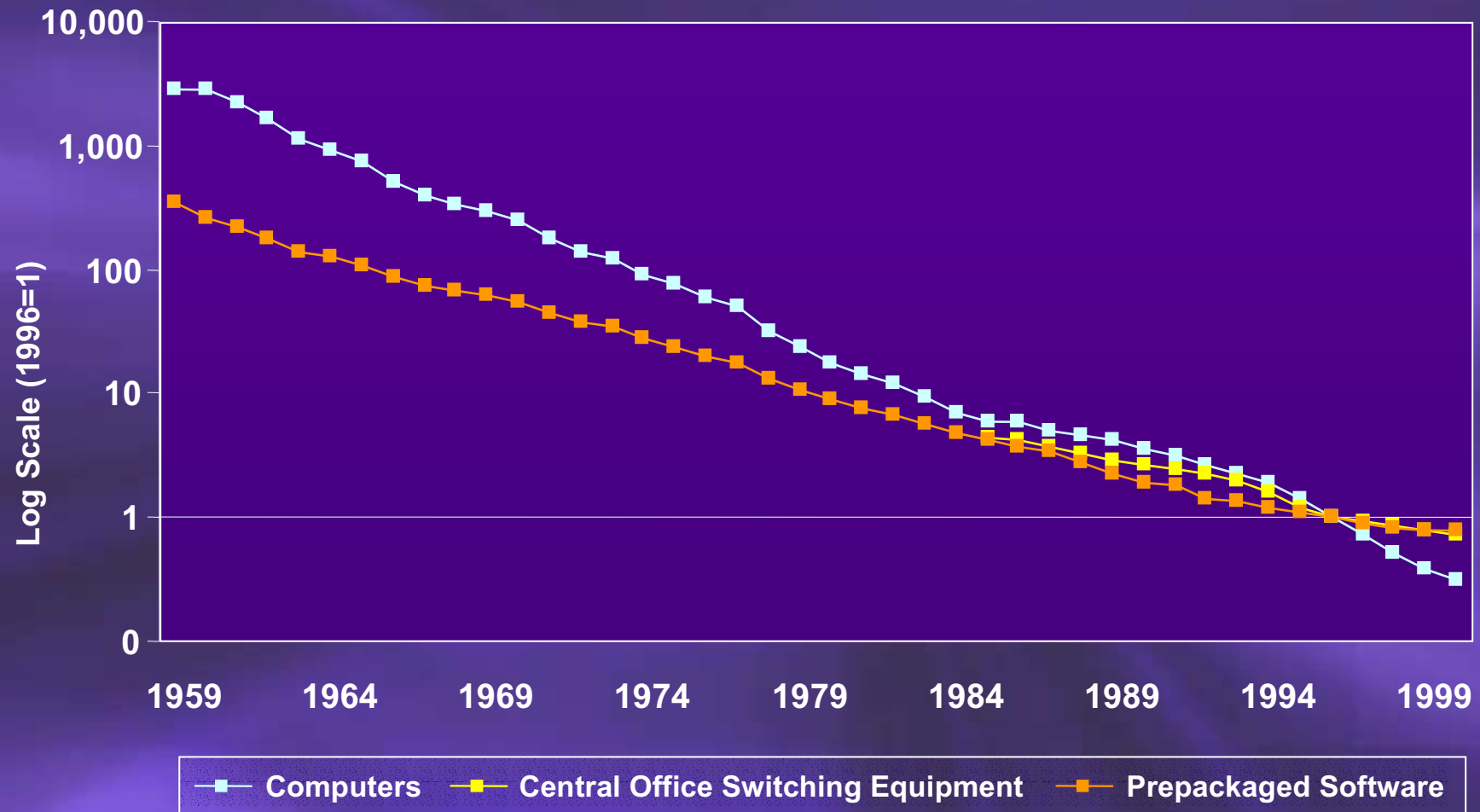


Semiconductor Roadmap Acceleration



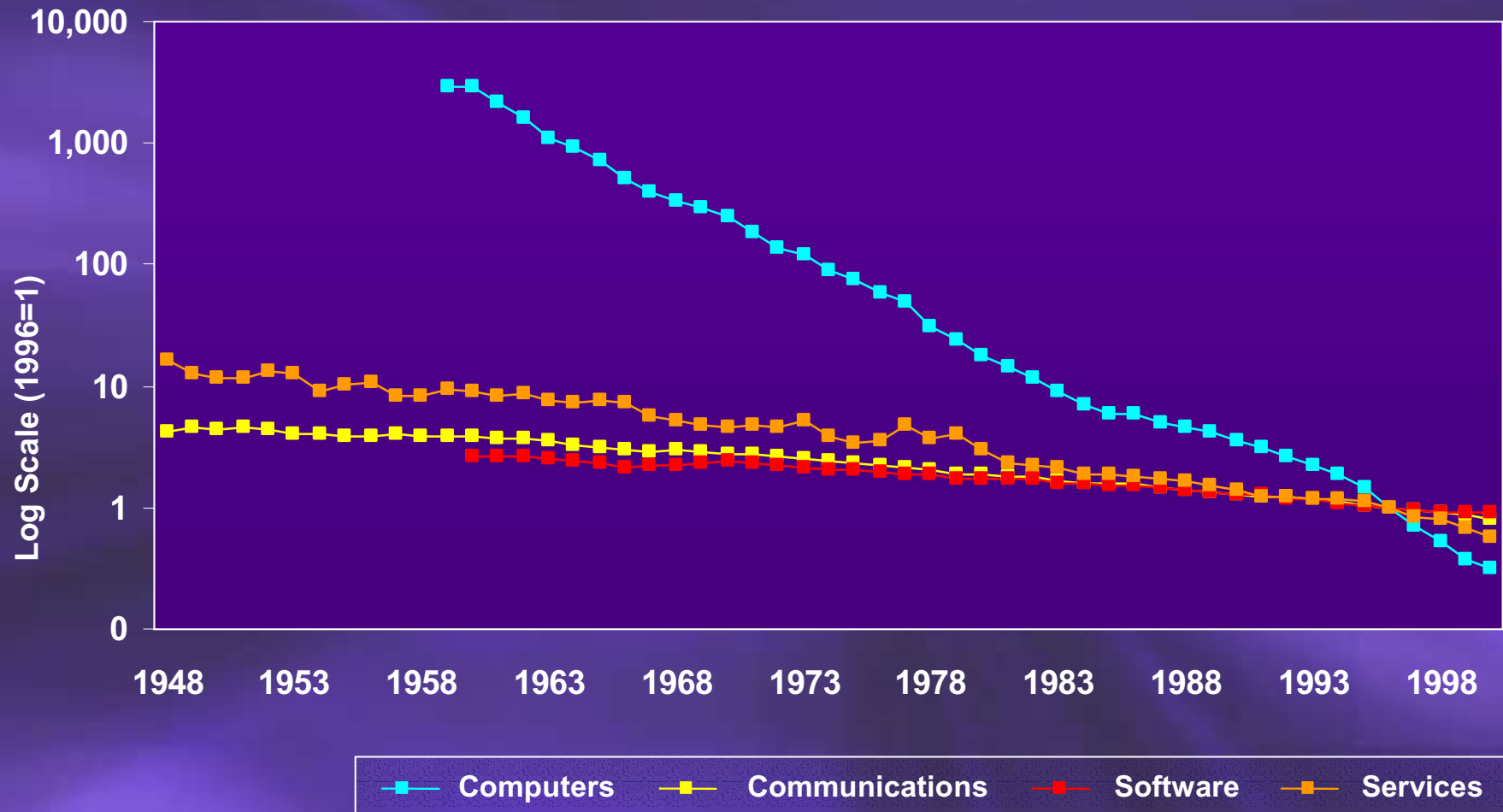
Relative Prices of Computers, Communications, and Software, 1959-2000

All price indexes are divided by the output price index



Relative Prices of Computers, Communications, Software and Services, 1948-2000

All price indexes are divided by the output price index



Role of Information Technology: IT Prices and the Growth of Output

Output Shares of IT:

- Computers, Communications Equipment, Software, and IT Services

Output Contribution of IT:

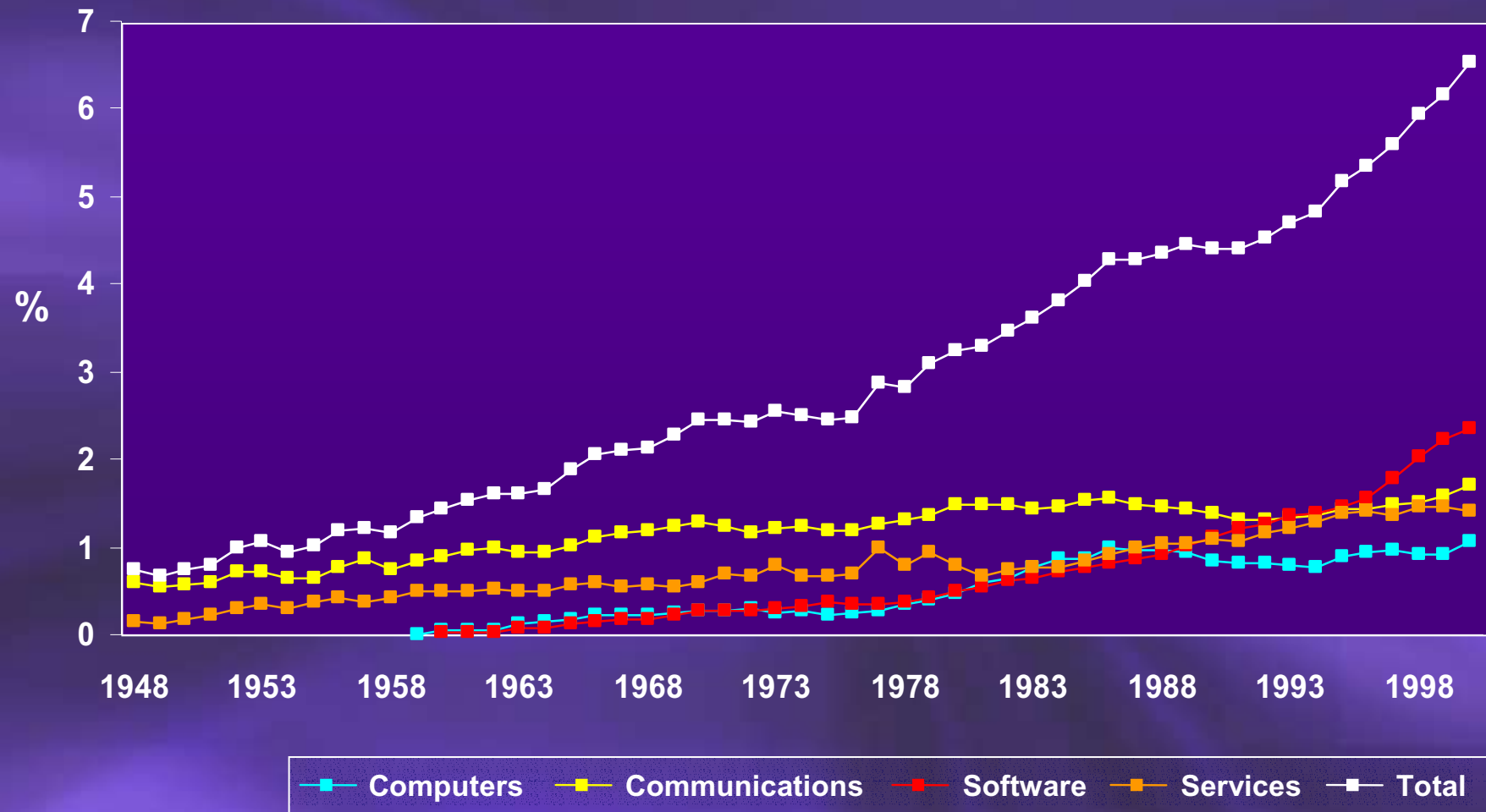
- Investment and Consumption Goods Output

Output Contribution by Type:

- Computers, Communications Equipment, Software, and IT Services

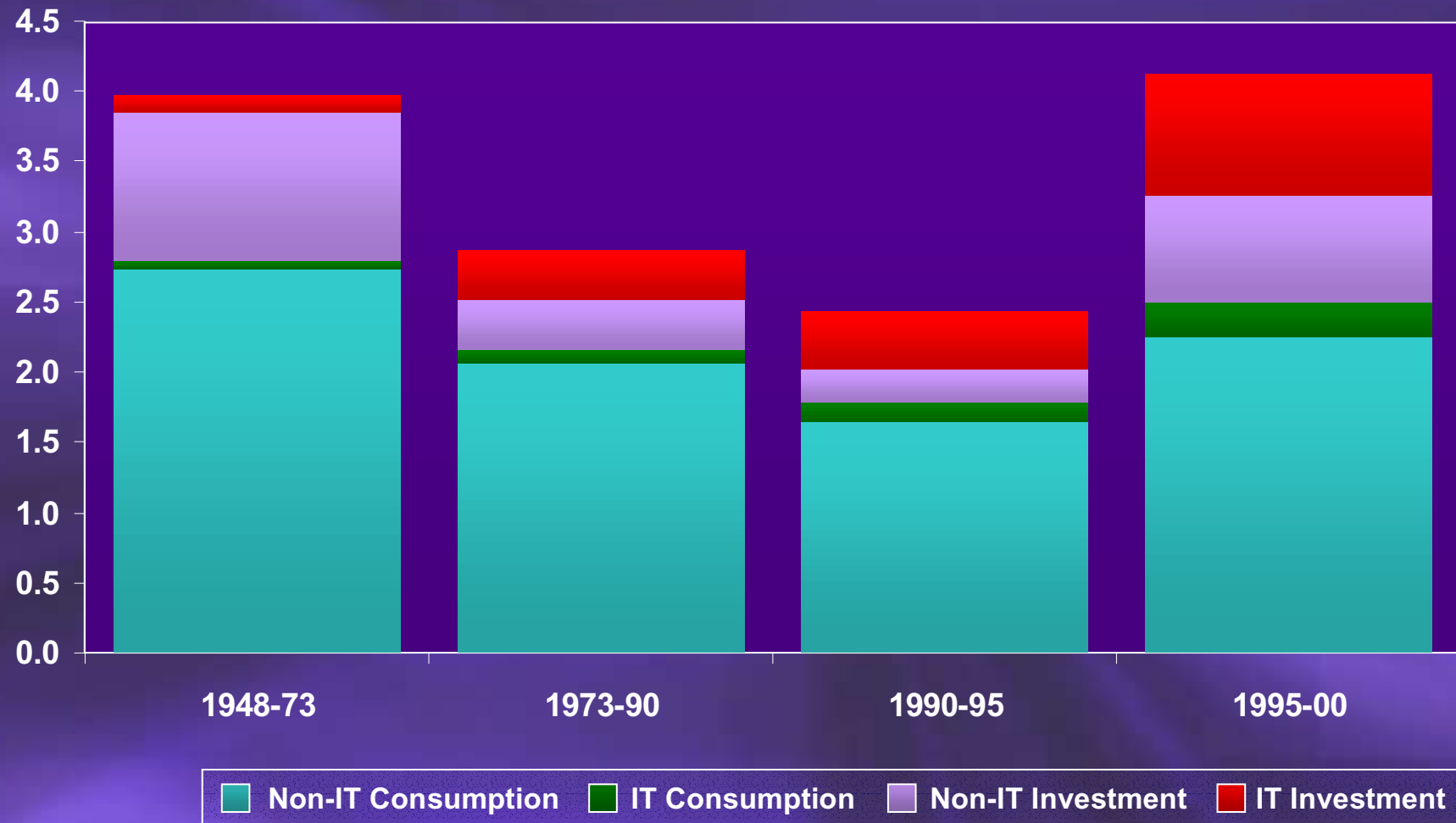
Output Shares of Information Technology by Type, 1948-2000

Share of current dollar gross domestic product



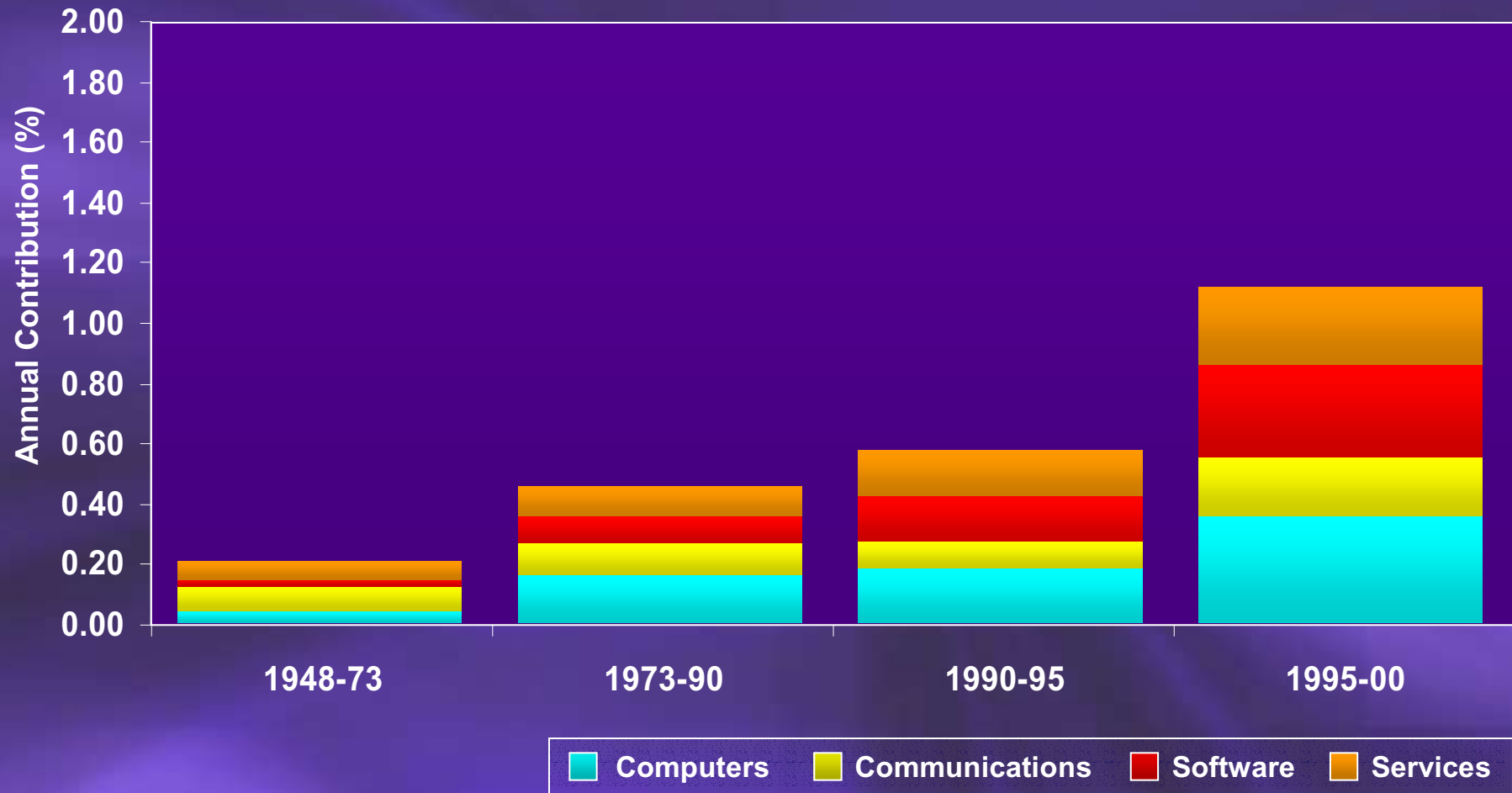
Output Contribution of Information Technology

Average annual percentage growth rates, weighted by the output shares



Output Contribution of Information Technology by Type

Average annual percentage growth rates, weighted by the output shares



Role of Information Technology: IT Prices, Investment and Productivity

Input Shares of IT:

- Computers, Communications Equipment, and Software

Capital Contribution:

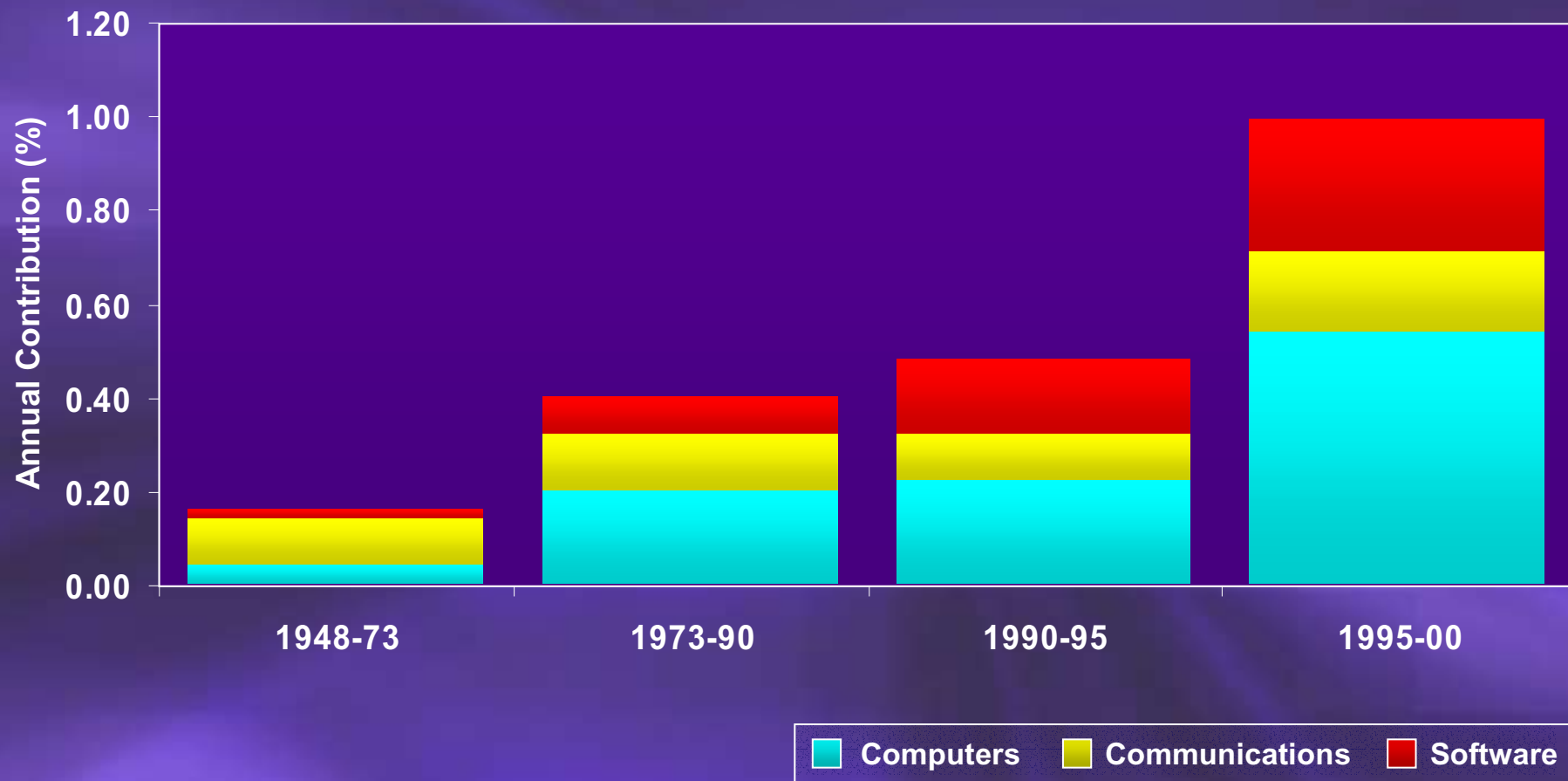
- IT versus Non-IT Capital Services

Capital Contribution By Type:

- Computers, Communications Equipment, and Software

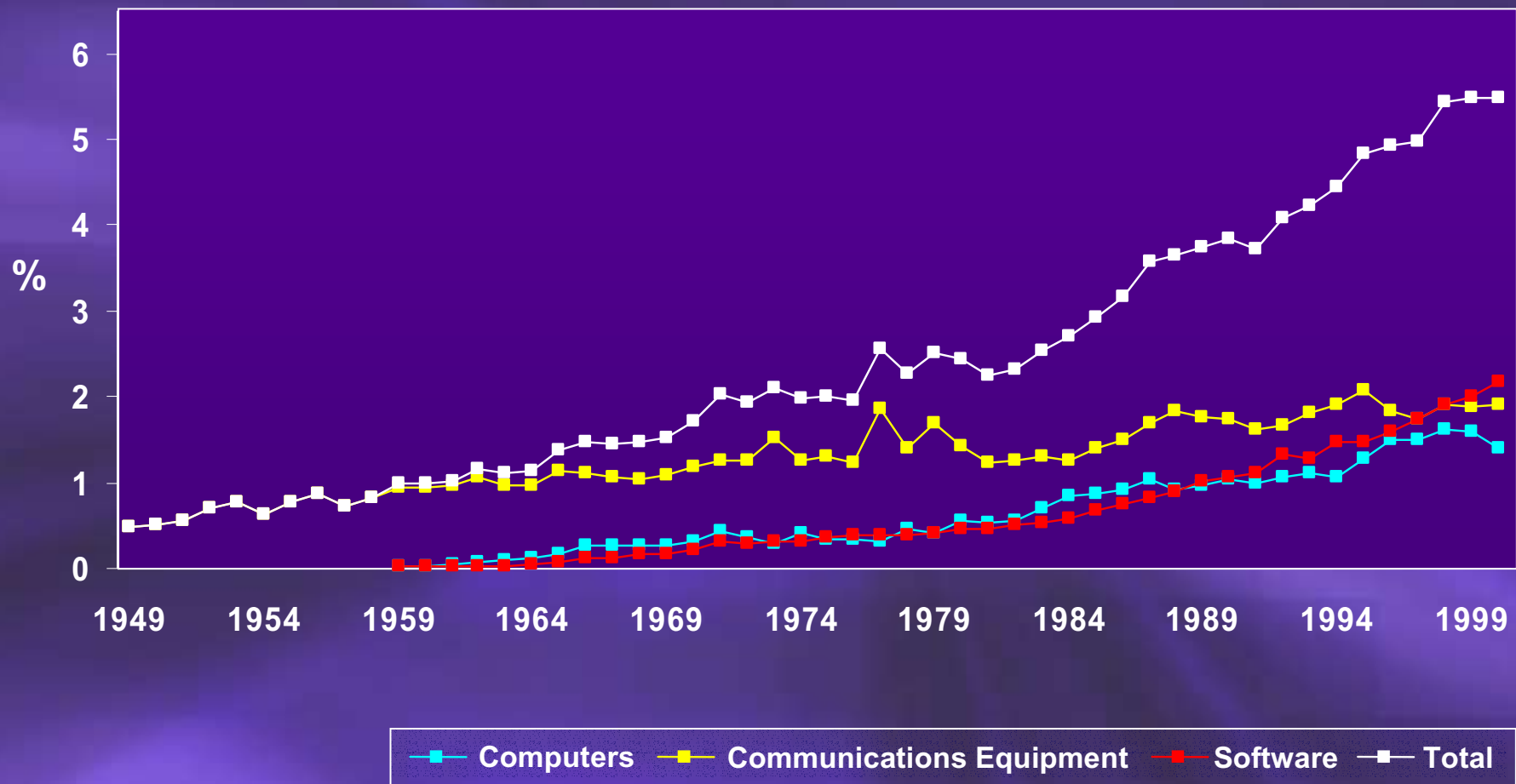
Capital Input Contribution of Information Technology by Type

Average annual percentage growth rates, weighted by the income shares



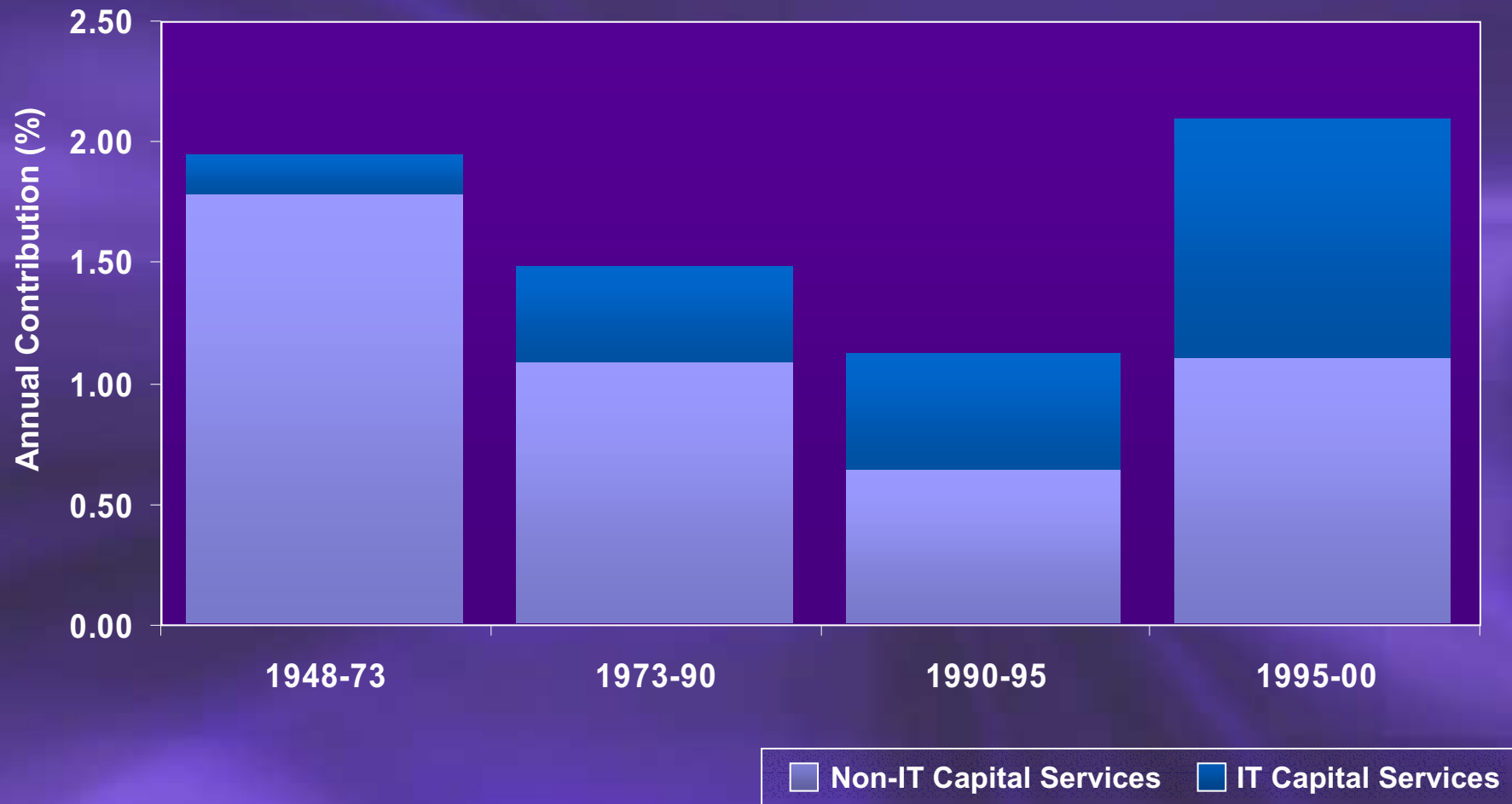
Input Shares of Information Technology by Type, 1948-2000

Percent share of current dollar gross domestic income



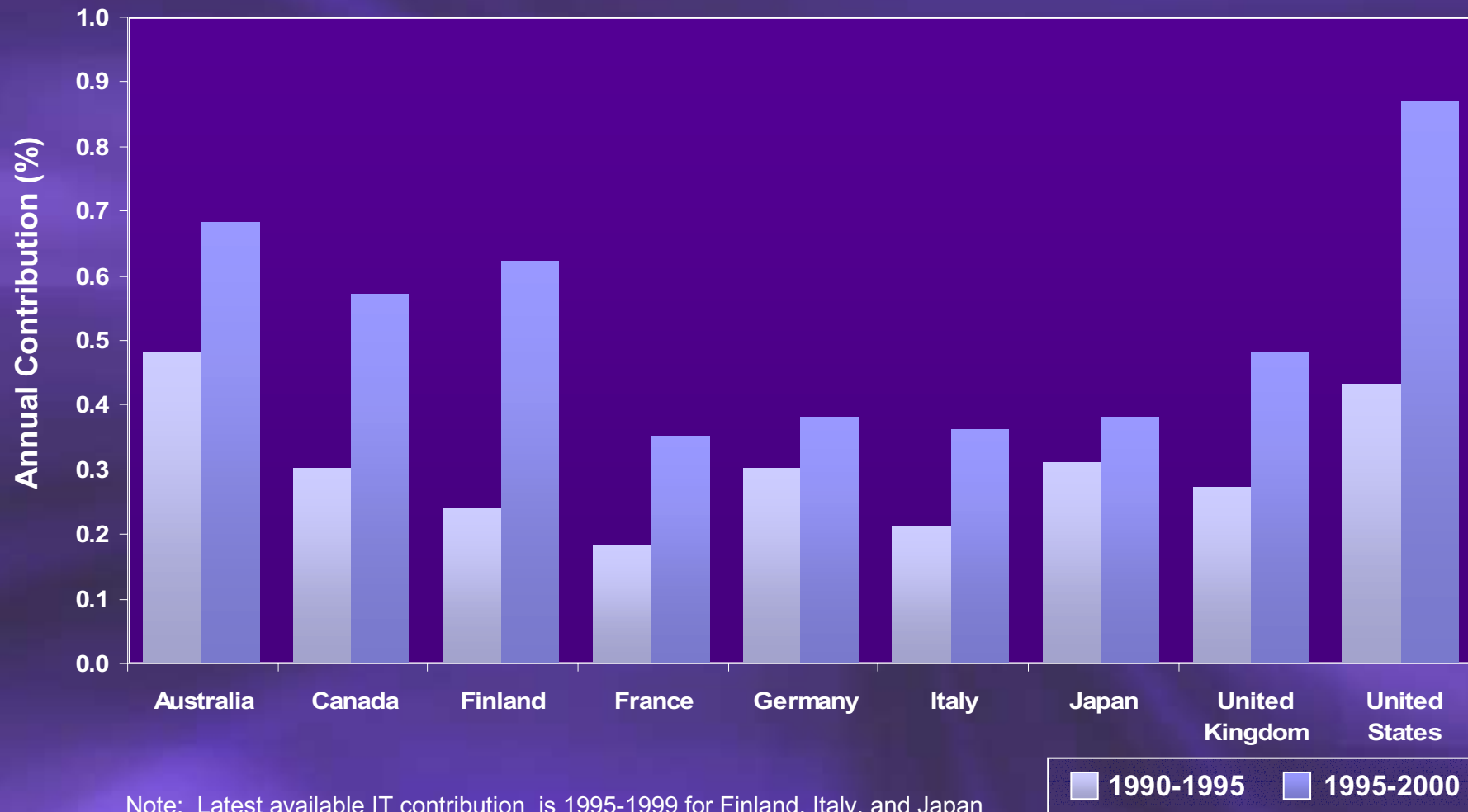
Capital Input Contribution of Information Technology

Average annual percentage growth rates, weighted by the income shares



Capital Input Contribution of Information Technology for OECD Countries

Average annual percentage growth rates, weighted by the income shares



American Growth Resurgence: IT Investment and Productivity Growth

Total Factor Productivity:

- IT-Production versus Non-IT Production

Sources Of U.S. Economic Growth:

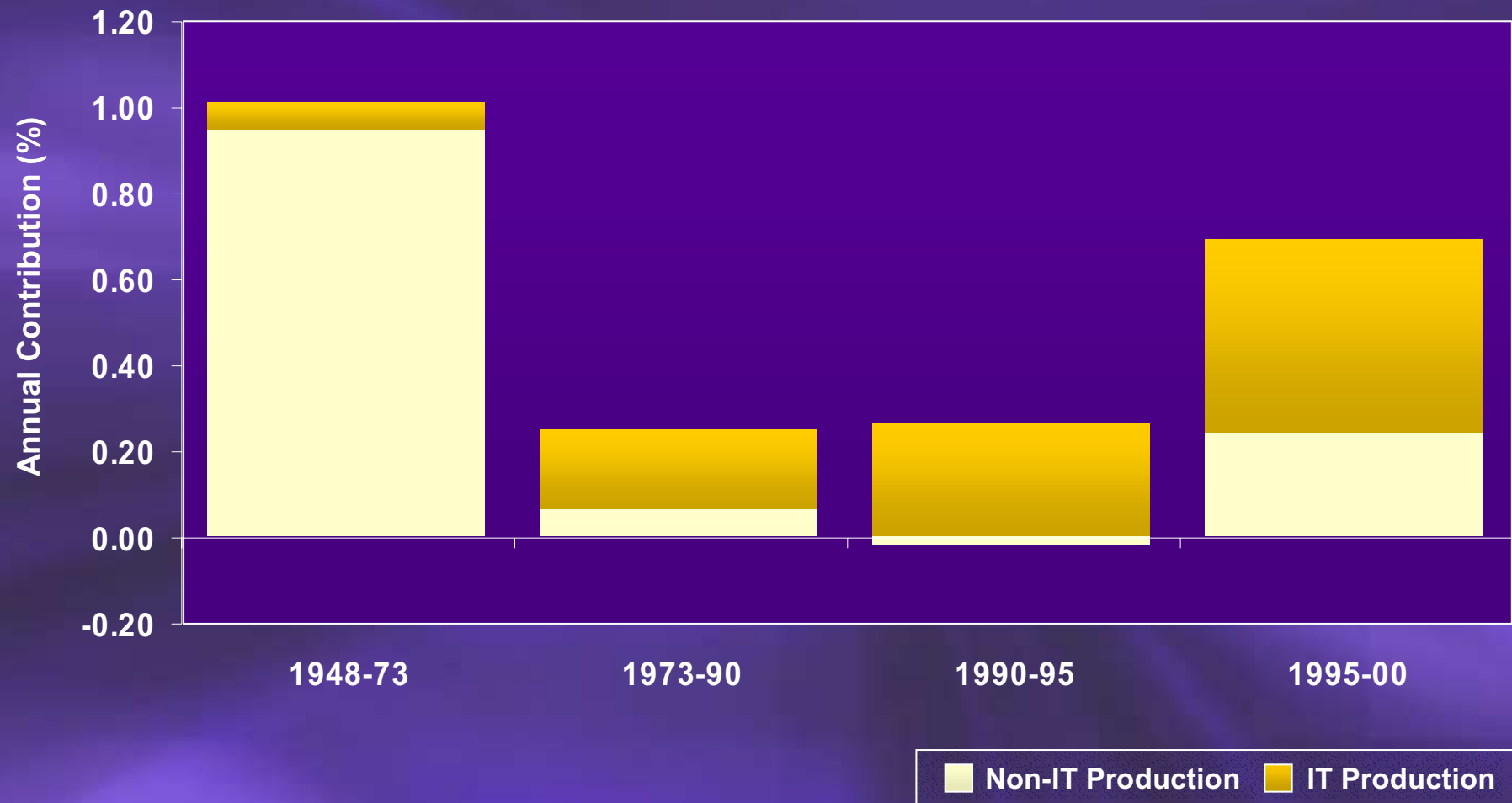
- Capital Input, Labor Input, and TFP

Average Labor Productivity Growth:

- Capital Deepening, Labor Quality, TFP

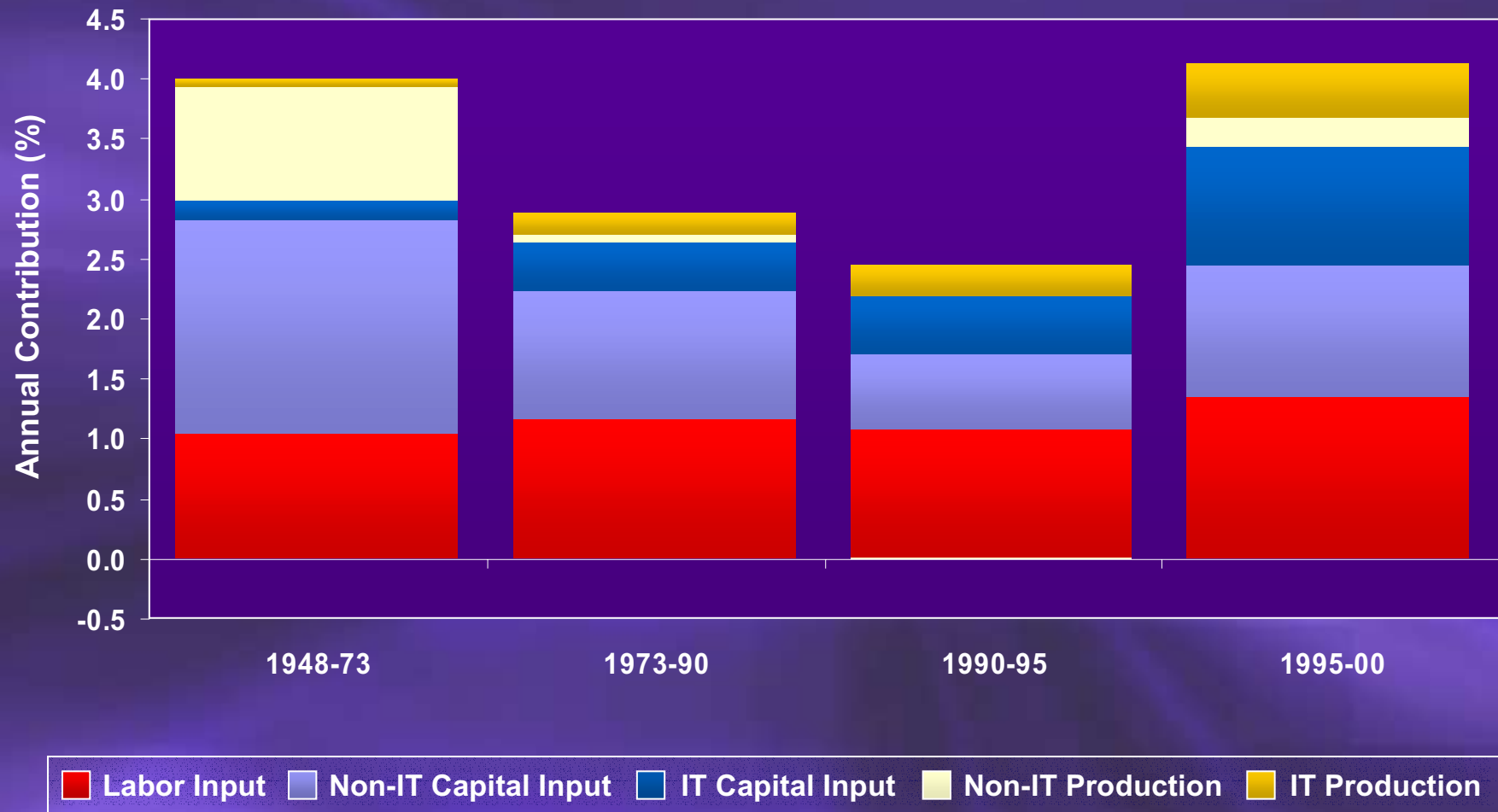
Contributions of Information Technology to Total Factor Productivity Growth

Average annual percentage change in relative prices, weighted by average nominal output shares

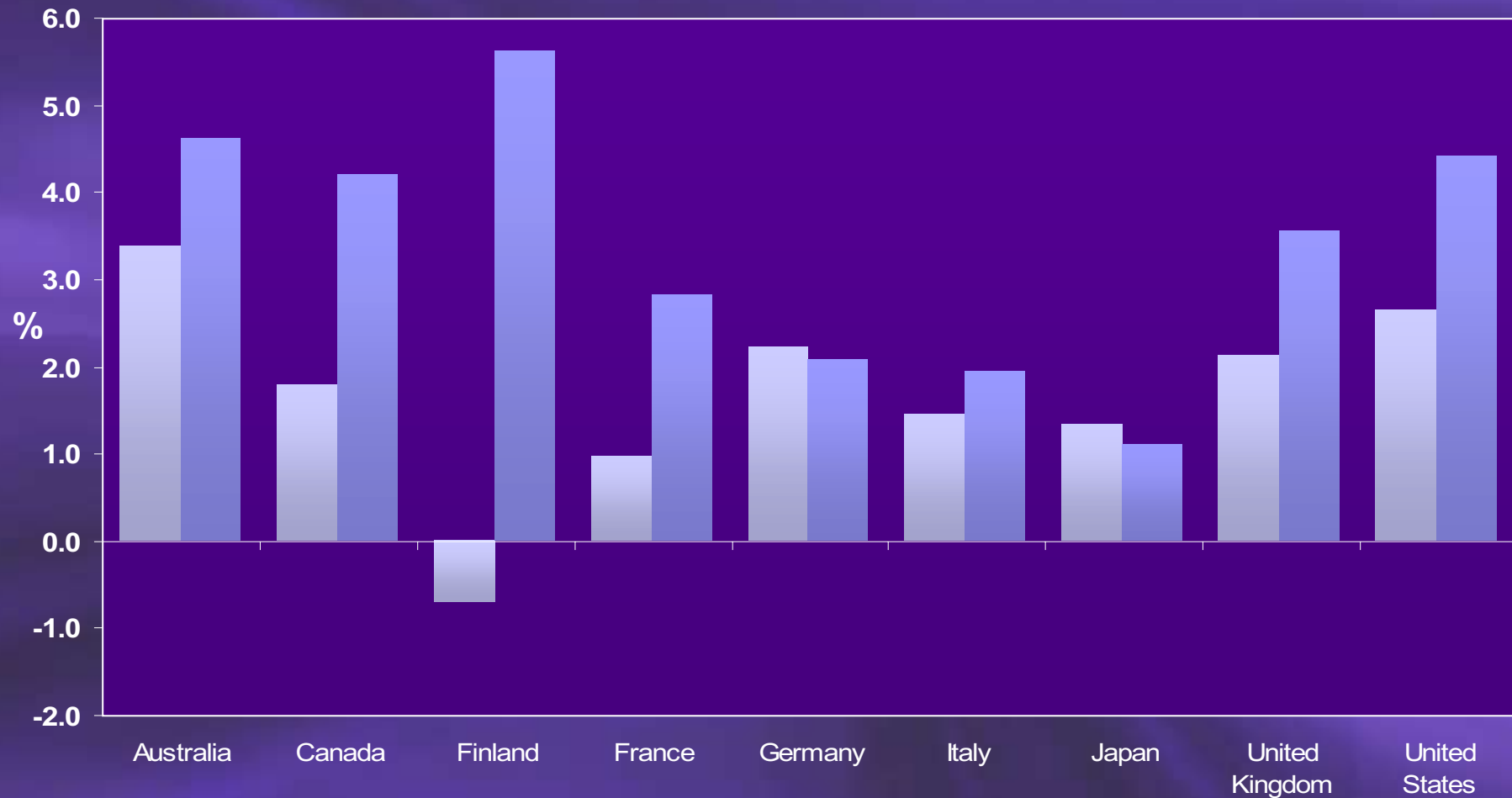


Sources of Gross Domestic Product Growth

Average annual percentage rates of growth, weighted by average nominal income shares



Output Growth, 1990-95 versus 1995-2000

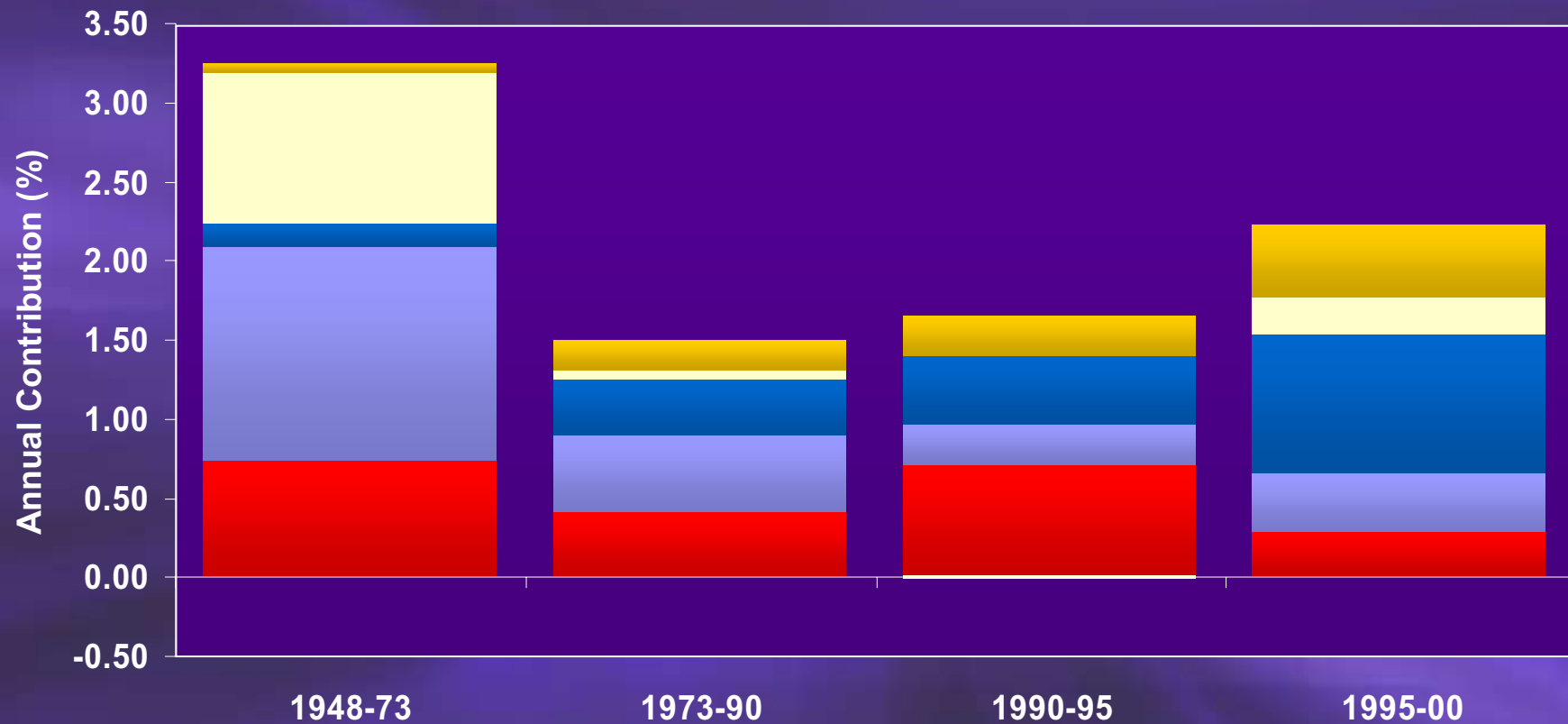


Note: Latest available output growth is 1995-1999 for Finland, Italy, and Japan

■ 1990-1995 ■ 1995-2000

Sources of Average Labor Productivity Growth

Average annual percentage rates of growth, weighted by average nominal income shares



Economics on Internet Time: The New Research Agenda

- The Solow Paradox -- we see computers everywhere but in the productivity statistics -- versus the Information Age
- Equity Valuations and Growth Prospects: accumulation of intangible assets versus irrational exuberance
- Widening Wage Inequality: capital-skill complementarity versus skill-biased technical change
- Modeling IT and the semiconductor industry: permanent versus transitory contributions to economic growth