



# INTRODUCTION TO THE WORLD KLEMS CONSORTIUM

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Research Institute of Economy, Trade & Industry, IAA

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# Productivity

V O L U M E 3

*Information Technology  
and the American Growth  
Resurgence*

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# INTRODUCTION TO THE WORLD KLEMS CONFERENCE

World KLEMS Consortium

Formed August 19-20, 2010

What's New?

70 NAICS Industries Covering 1960-2007

Before the Crisis

The IT Boom, the Dot-Com Crash, and the Jobless Recovery

The New Agenda

Retire The Aggregate Production Function?

# EU KLEMS PROJECT

Initial Release:

March 15, 2007

25 EU Economies:

U.S., Canada, Japan, and Korea

U.S. Data Sources:

Labor, Capital, and Intermediate Input

Completion Date:

June 30, 2008

# IT-RELATED INDUSTRIES

## IT-Producing Industries

Computer and peripheral equipment manufacturing  
Communications equipment manufacturing  
Semiconductor and other electronic component manufacturing  
Software publishing  
Information and data processing services  
Computer systems design and related services

## IT-Using Industries

Construction  
Machinery  
Motor vehicles bodies and trailers and parts  
Other transportation equipment  
Miscellaneous manufacturing  
Printing and related support activities  
Wholesale Trade  
Retail Trade  
Air transportation  
Water transportation  
Truck transportation  
Transit and ground passenger transportation  
Pipeline transportation  
Other transportation and support activities  
Broadcasting and telecommunications

Federal Reserve banks credit intermediation and related activities  
Securities commodity contracts and investments  
Insurance carriers and related activities  
Rental and leasing services and lessors of intangible assets  
Legal services  
Miscellaneous professional scientific and technical services  
Management of companies and enterprises  
Administrative and support services  
Waste management and remediation services  
Educational services  
Hospitals Nursing and residential care facilities  
Social assistance  
Performing arts spectator sports museums and related activities  
Other electronic products  
Newspaper; periodical; book publishers

# NON-IT INDUSTRIES

Farms  
Forestry fishing and related activities  
Oil and gas extraction  
Mining except oil and gas  
Support activities for mining  
Utilities  
Wood products  
Nonmetallic mineral products  
Primary metals  
Fabricated metal products  
Electrical equipment appliances and components  
Furniture and related products  
Food and beverage and tobacco products  
Textile mills and textile product mills  
Apparel and leather and allied products  
Paper products  
Petroleum and coal products

Chemical products  
Plastics and rubber products  
Rail transportation  
Warehousing and storage  
Motion picture and sound recording industries  
Funds trusts and other financial vehicles  
Ambulatory health care services  
Amusements gambling and recreation industries  
Accommodation  
Food services and drinking places  
Other services except government  
Federal General government  
Federal Government enterprises  
S&L General Government  
S&L Government enterprises  
Real estate  
Household

# **ROLE OF INFORMATION TECHNOLOGY: Growth of Output**

## OUTPUT SHARES OF IT:

Computers, Communications Equipment, Semiconductors, Software, Information and data processing services, Computer systems design and related services

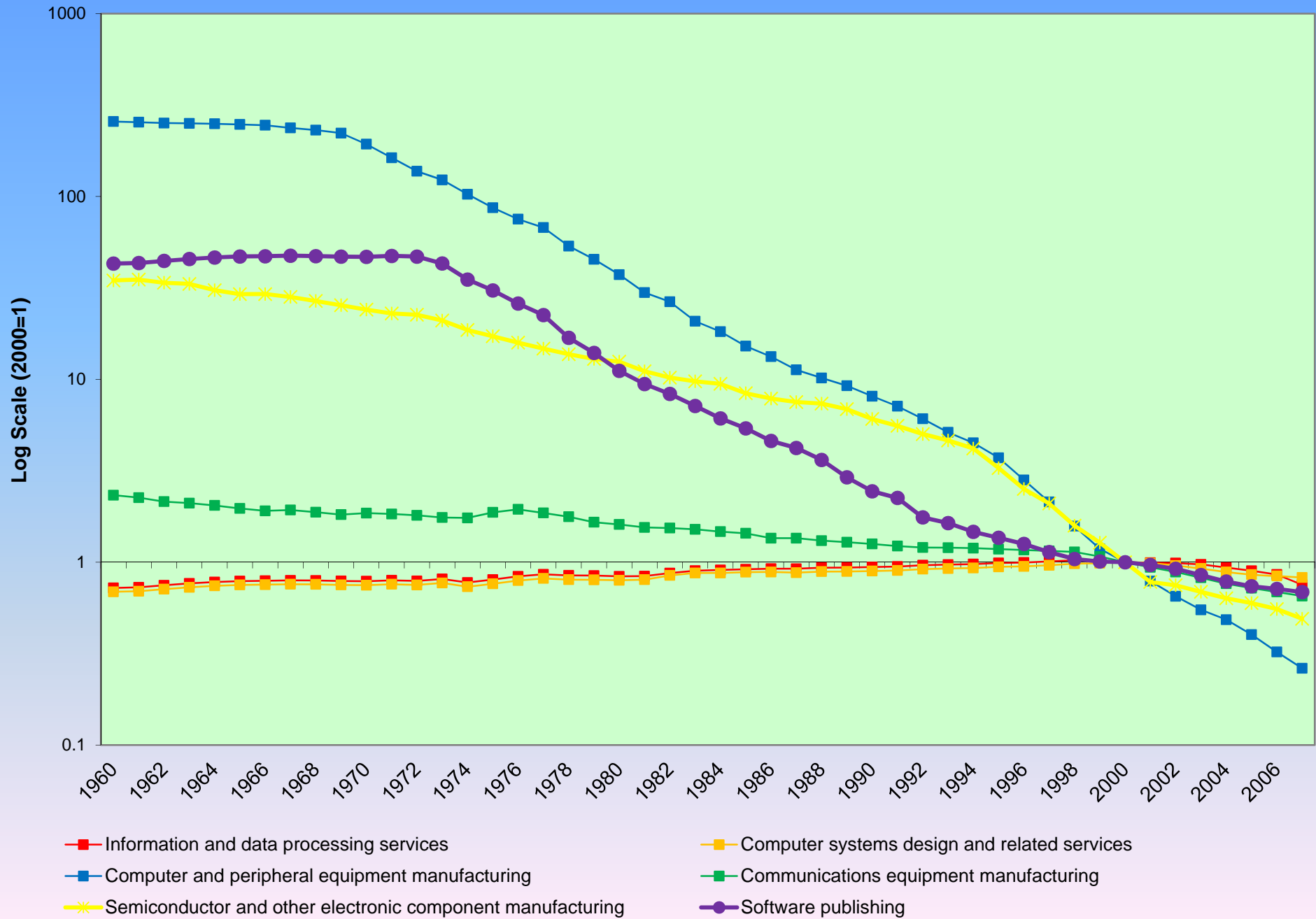
## OUTPUT CONTRIBUTION BY TYPE:

Computers, Communications Equipment, Semiconductors, Software, Information and data processing services, Computer systems design and related services

## OUTPUT CONTRIBUTION OF IT:

IT-Producing, IT-Using, and Non-IT Value Added

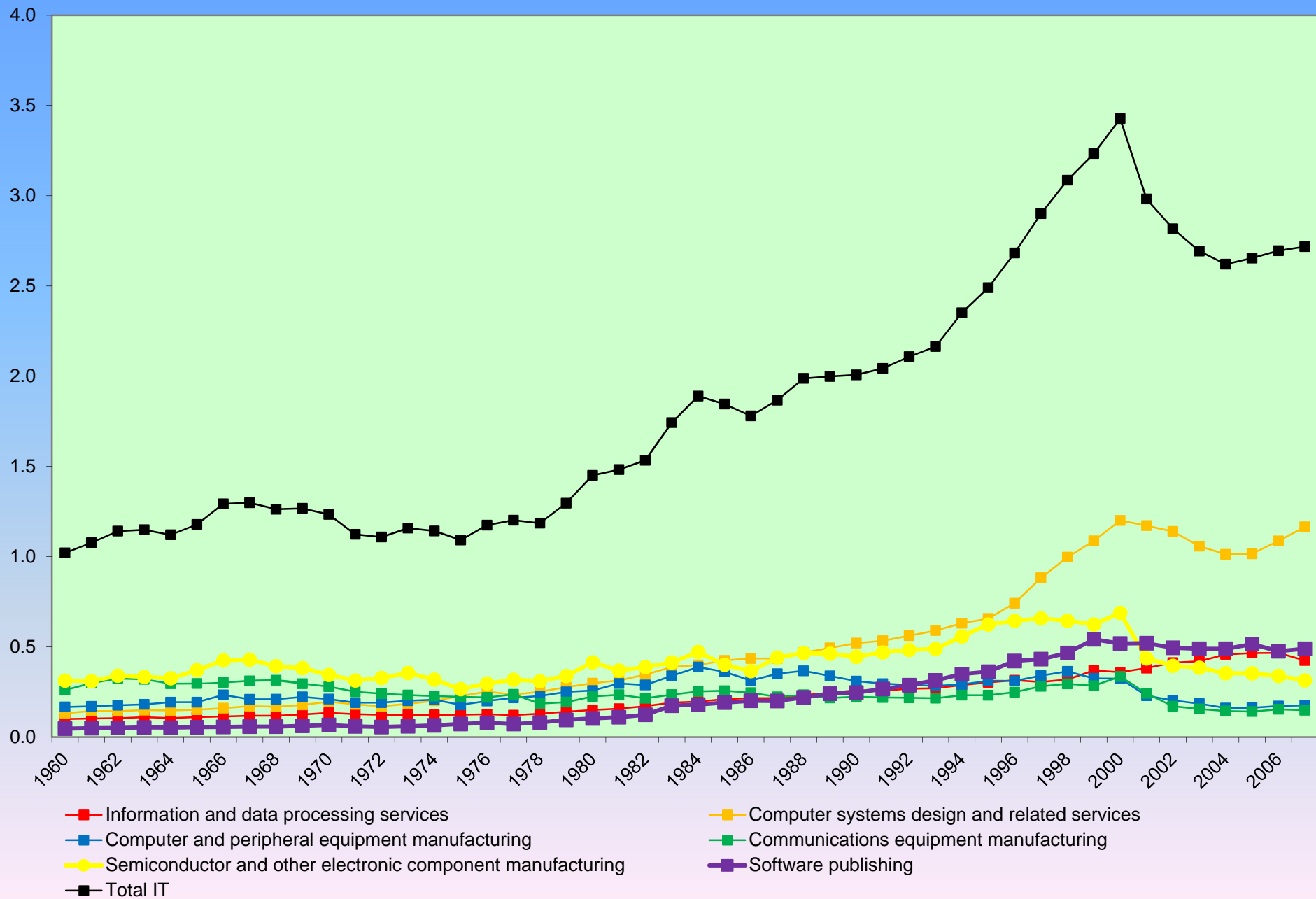
# Relative Prices of IT Industry Output, 1960-2007





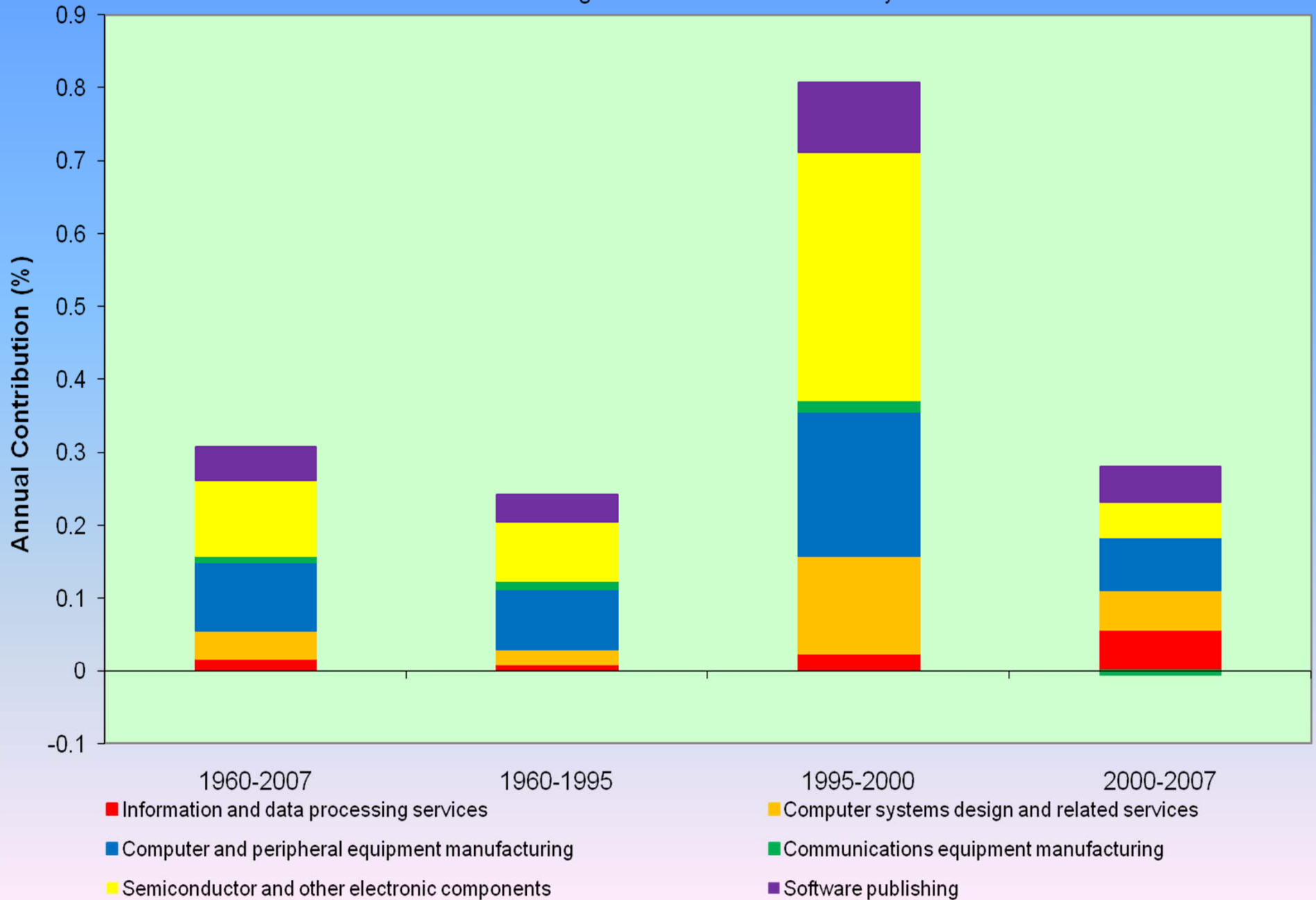
# Value Added Shares of Information Technology by Type, 1960-2007

Share of Current Dollar Value Added.



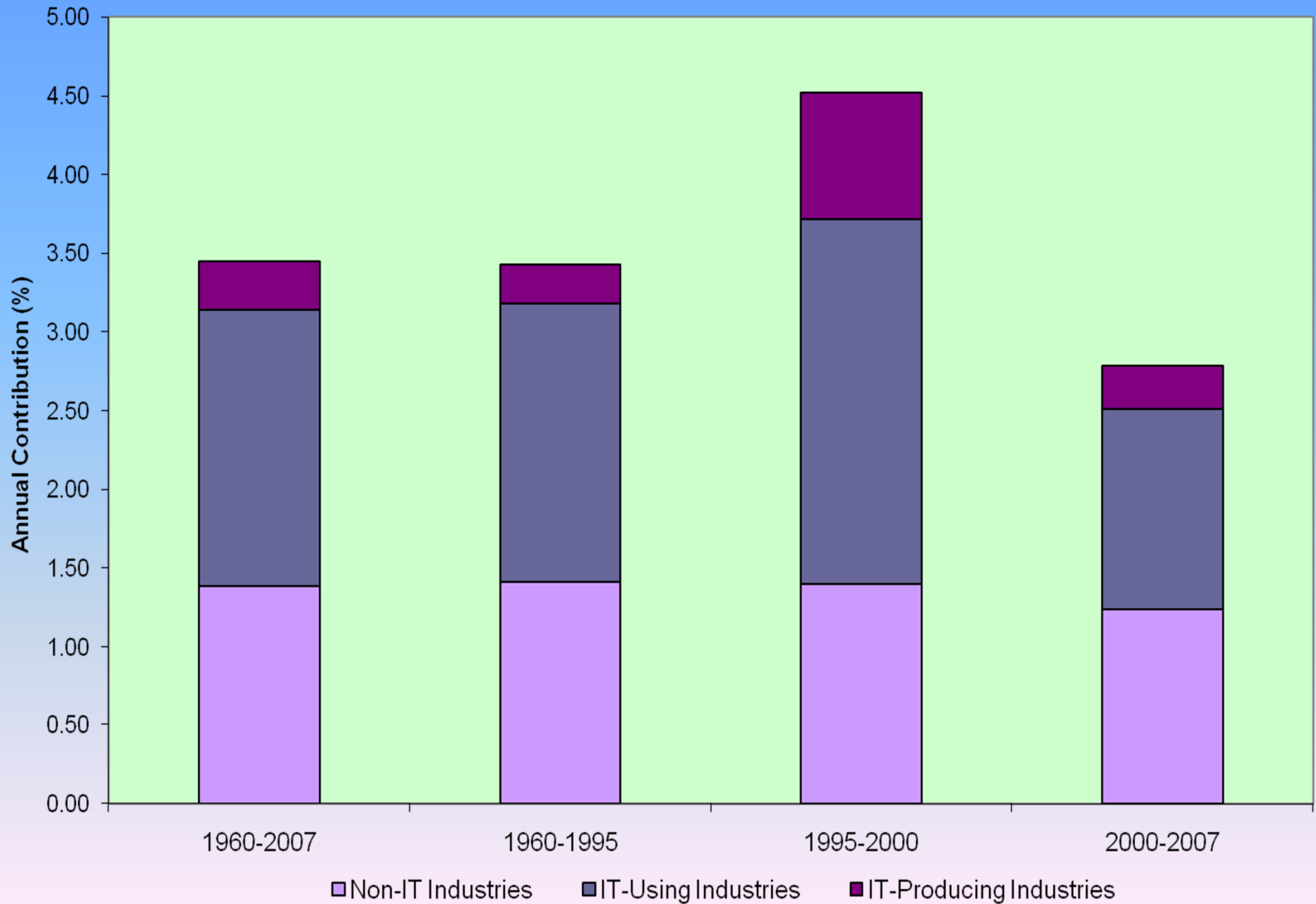
# Industry Contributions to Value Added

Value added weighted contributions of industry value added.

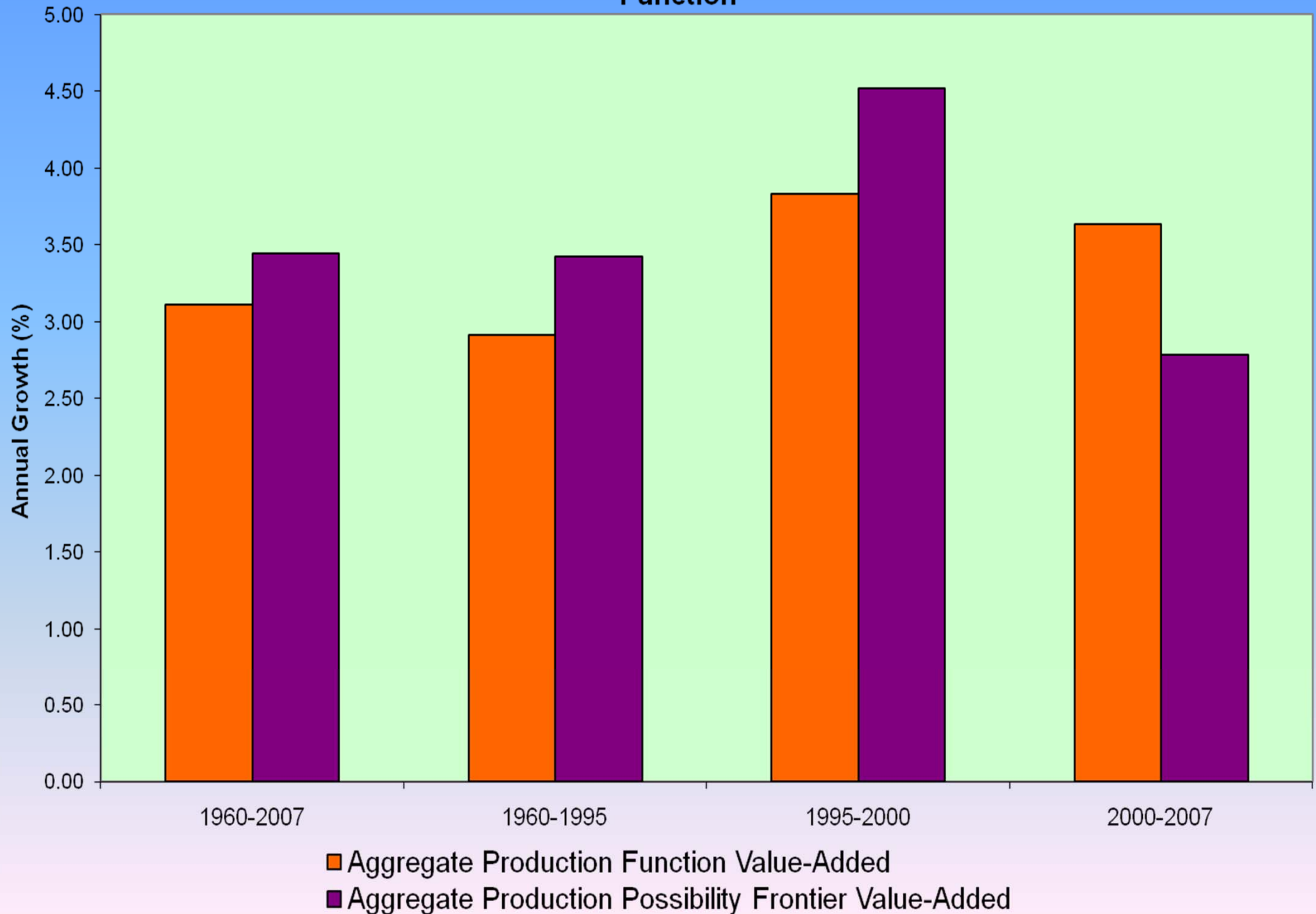


# Industry Contributions to Value Added Growth

Value added weighted contributions of industry value added.



## Comparison of Production Possibility Frontier and Aggregate Production Function



# **GROWTH IN THE NEW MILLENNIUM: IT Investment and Productivity Growth**

## TOTAL FACTOR PRODUCTIVITY:

IT-Producing, IT-Using, and Non-IT Production

## SOURCES OF U.S. ECONOMIC GROWTH:

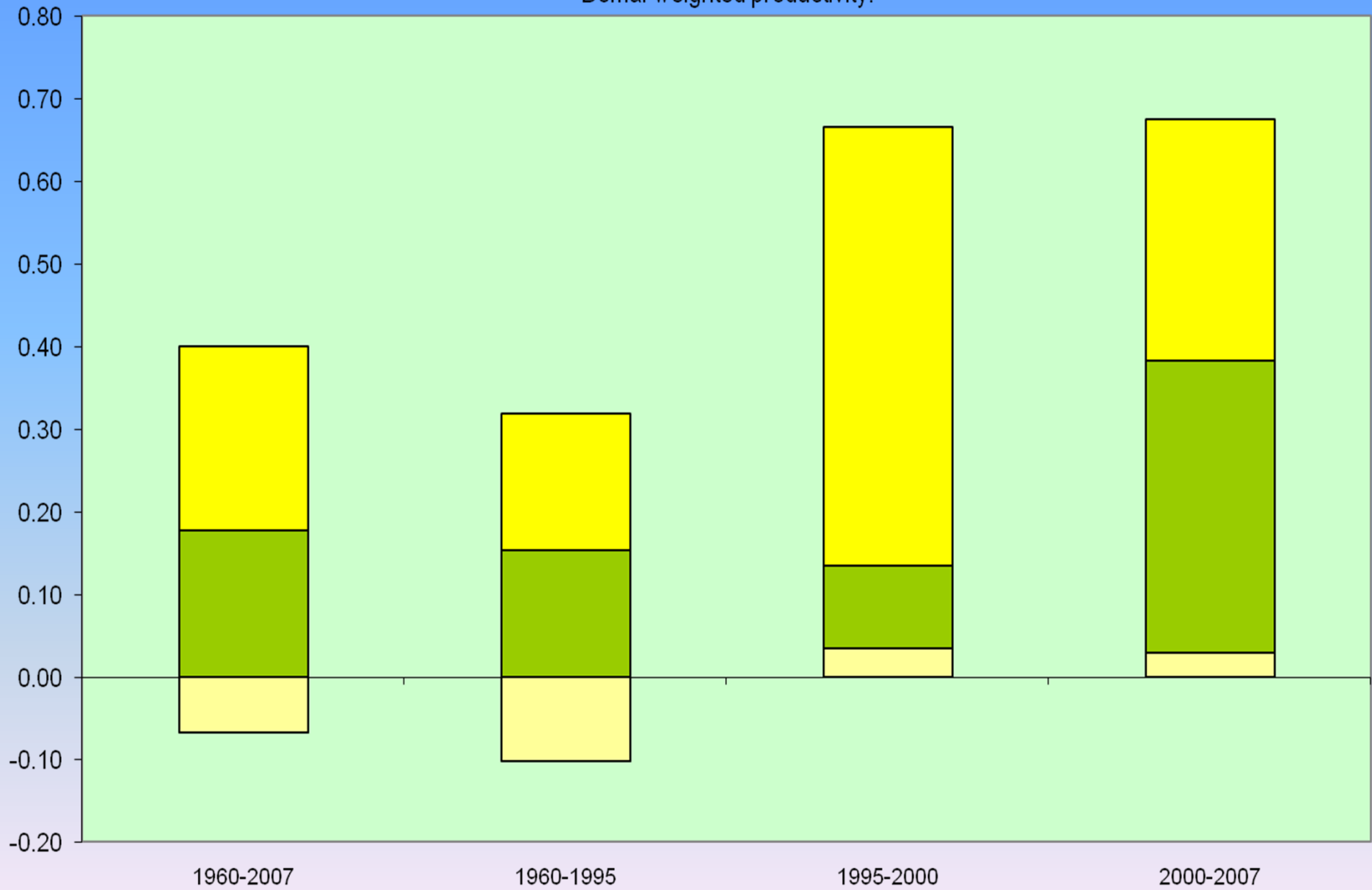
Capital Input, Labor Input, and TFP

## AVERAGE LABOR PRODUCTIVITY GROWTH:

Capital Deepening, Labor Quality, TFP

# Industry Contributions to Productivity Growth

Domar weighted productivity.

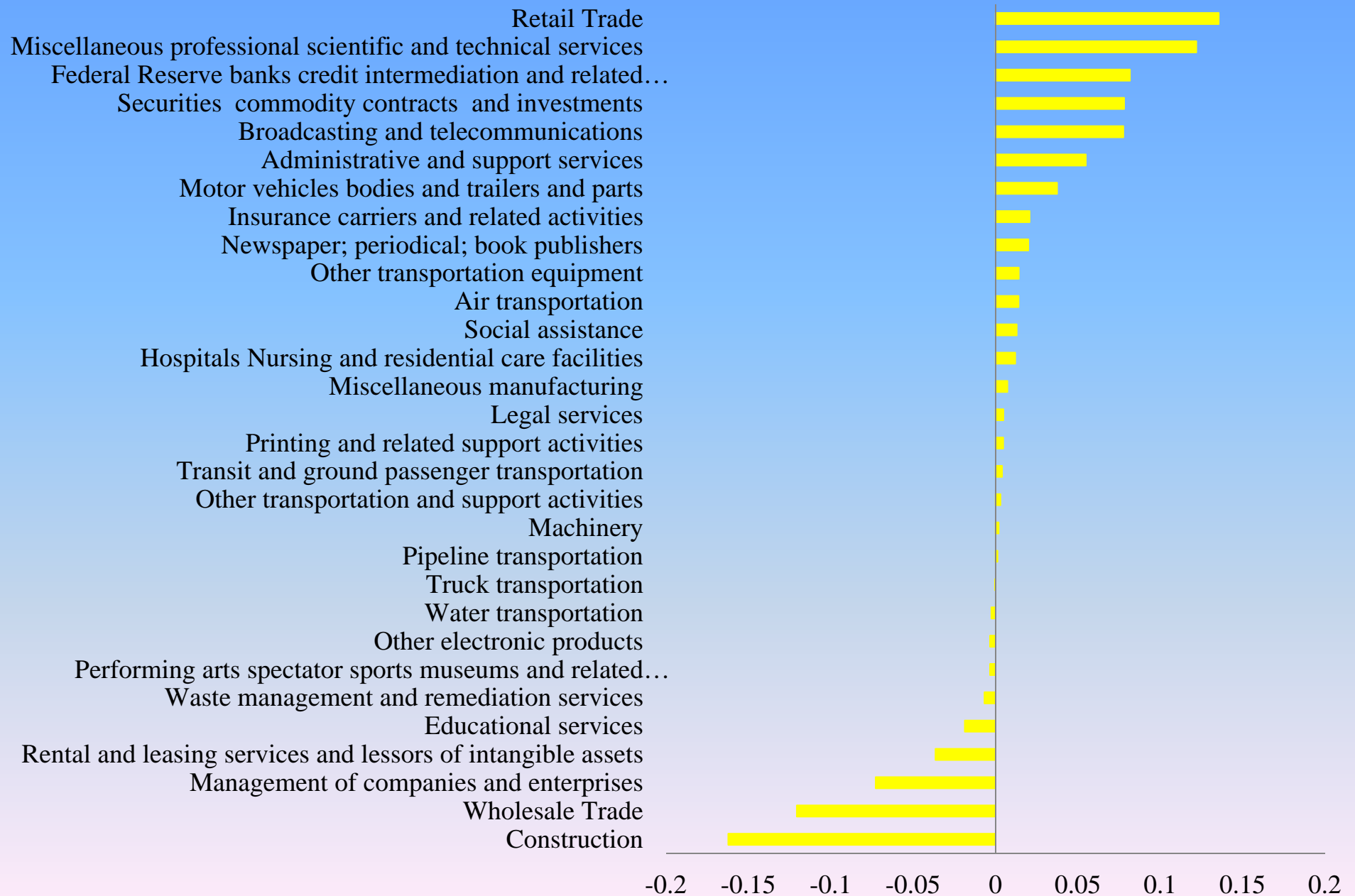


Non-IT Industries

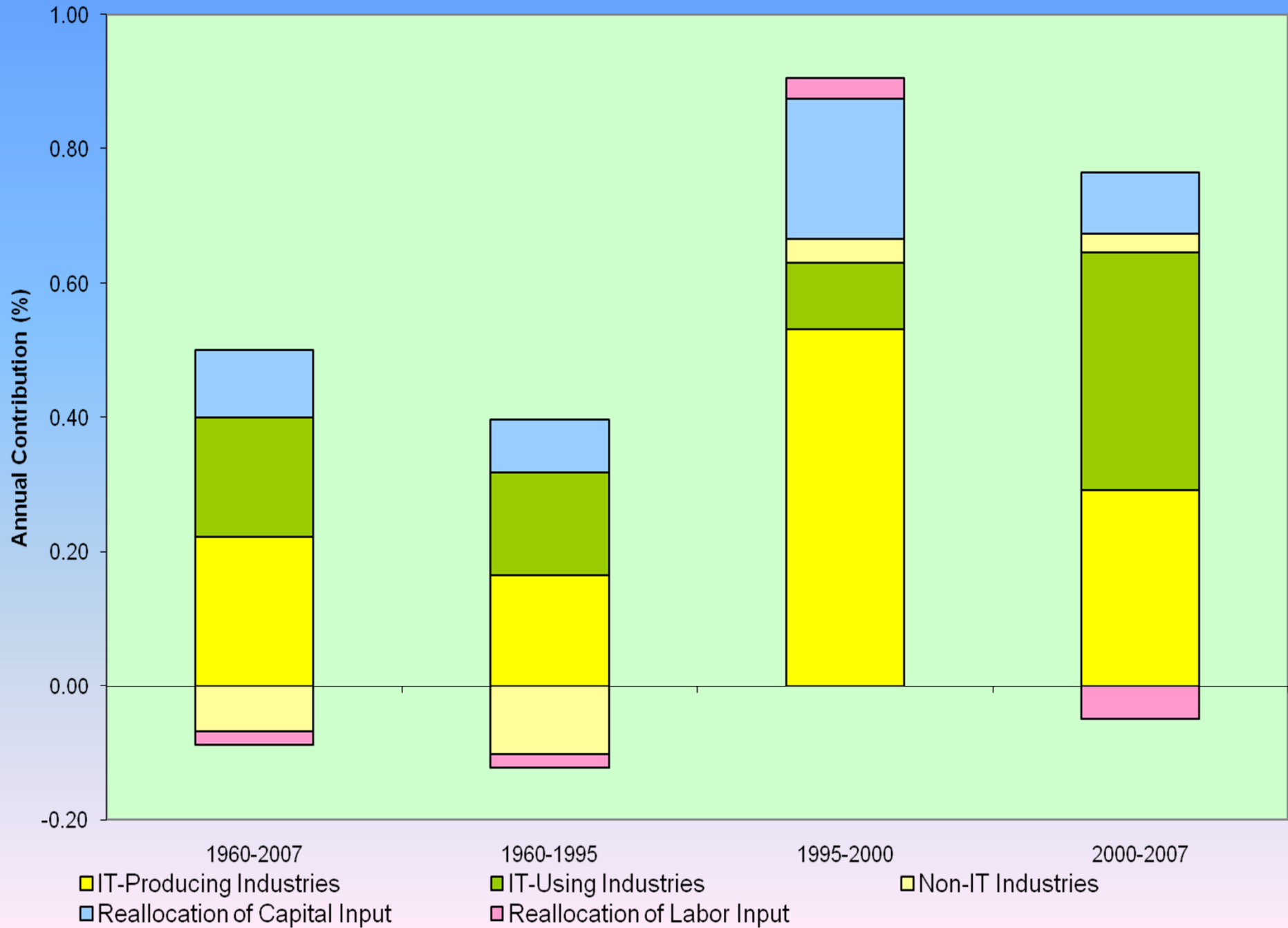
IT-Using Industries

IT-Producing Industries

## Change in Contribution to Productivity: 2000-2007 less 1960-1995: IT Users

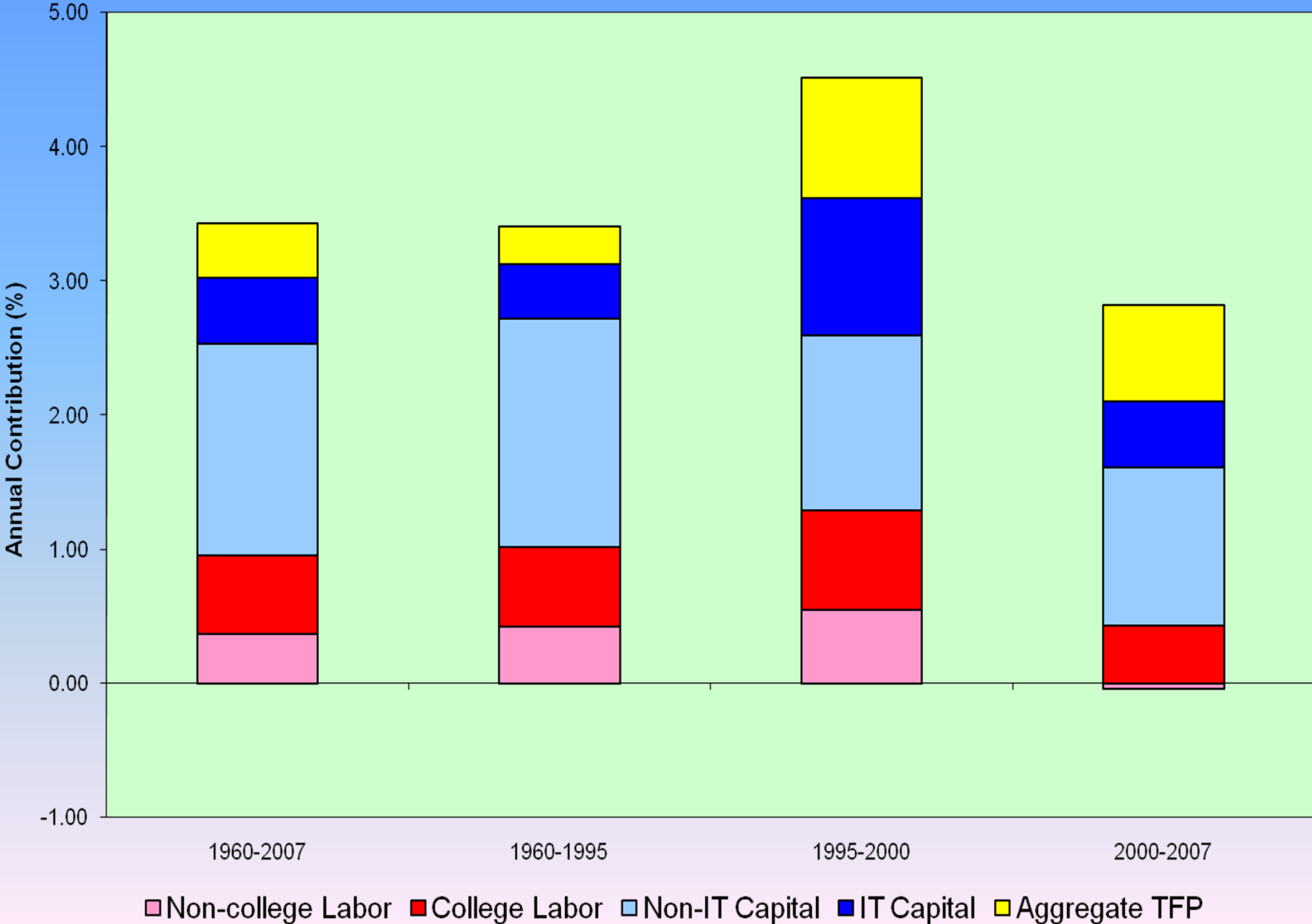


# Sources of Aggregate TFP Growth

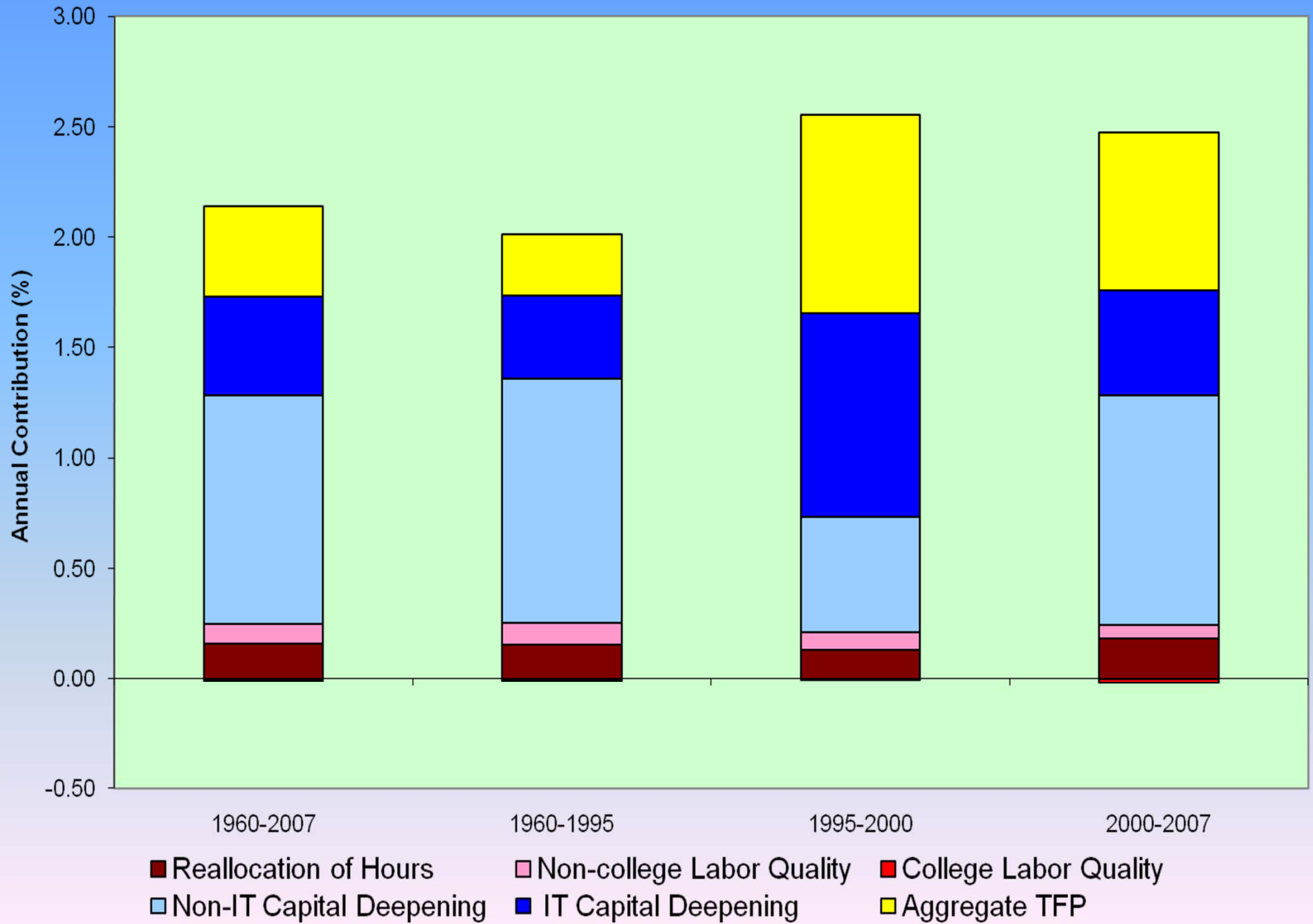




# Sources of U.S. Economic Growth



# Sources of U.S. Labor Productivity Growth



# **GROWTH AT THE INDUSTRY LEVEL: Value Added and Productivity Growth**

## VALUE ADDED GROWTH:

IT-Producing Industries

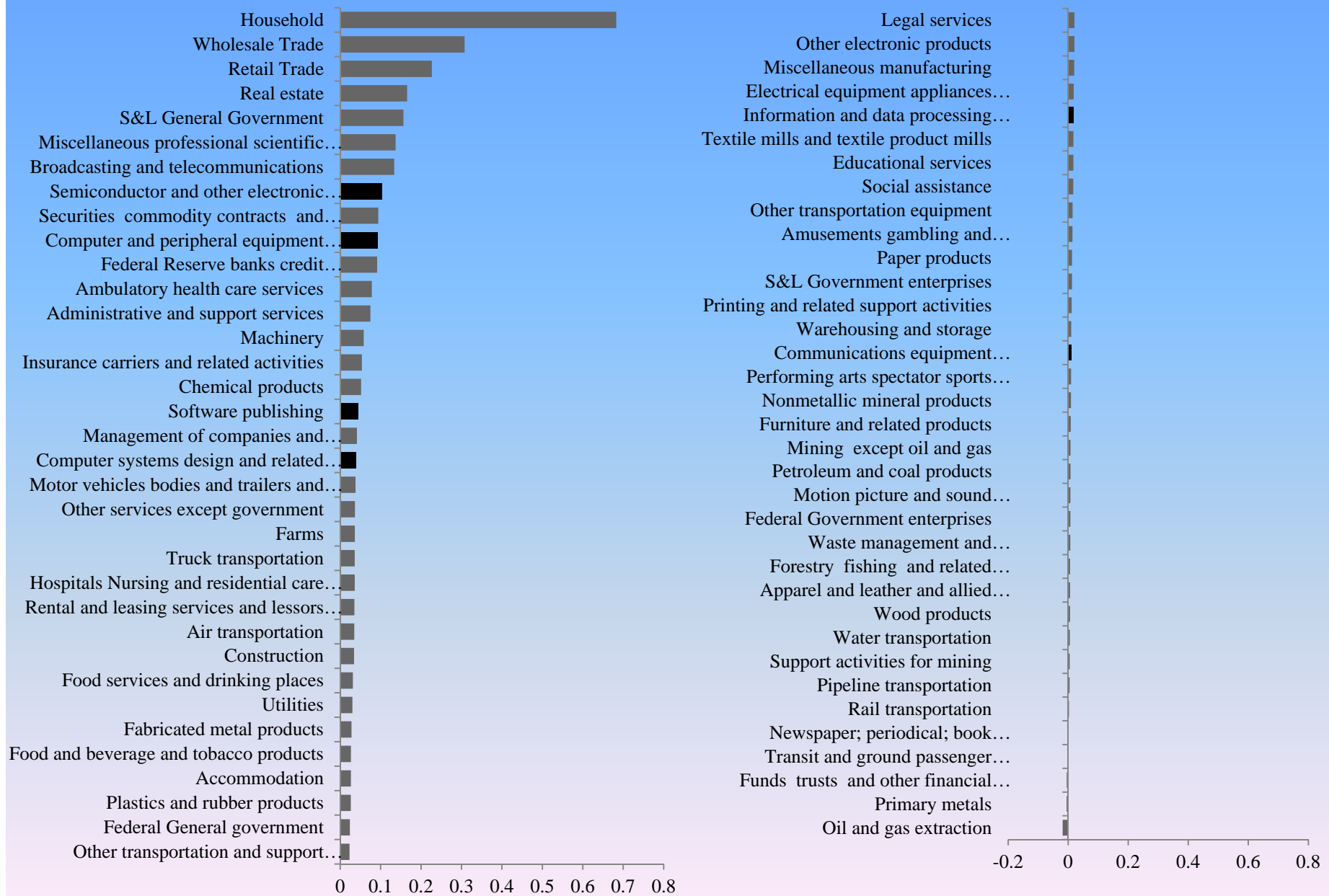
## PRODUCTIVITY GROWTH:

IT-Producing Industries

## CHANGE IN PRODUCTIVITY GROWTH:

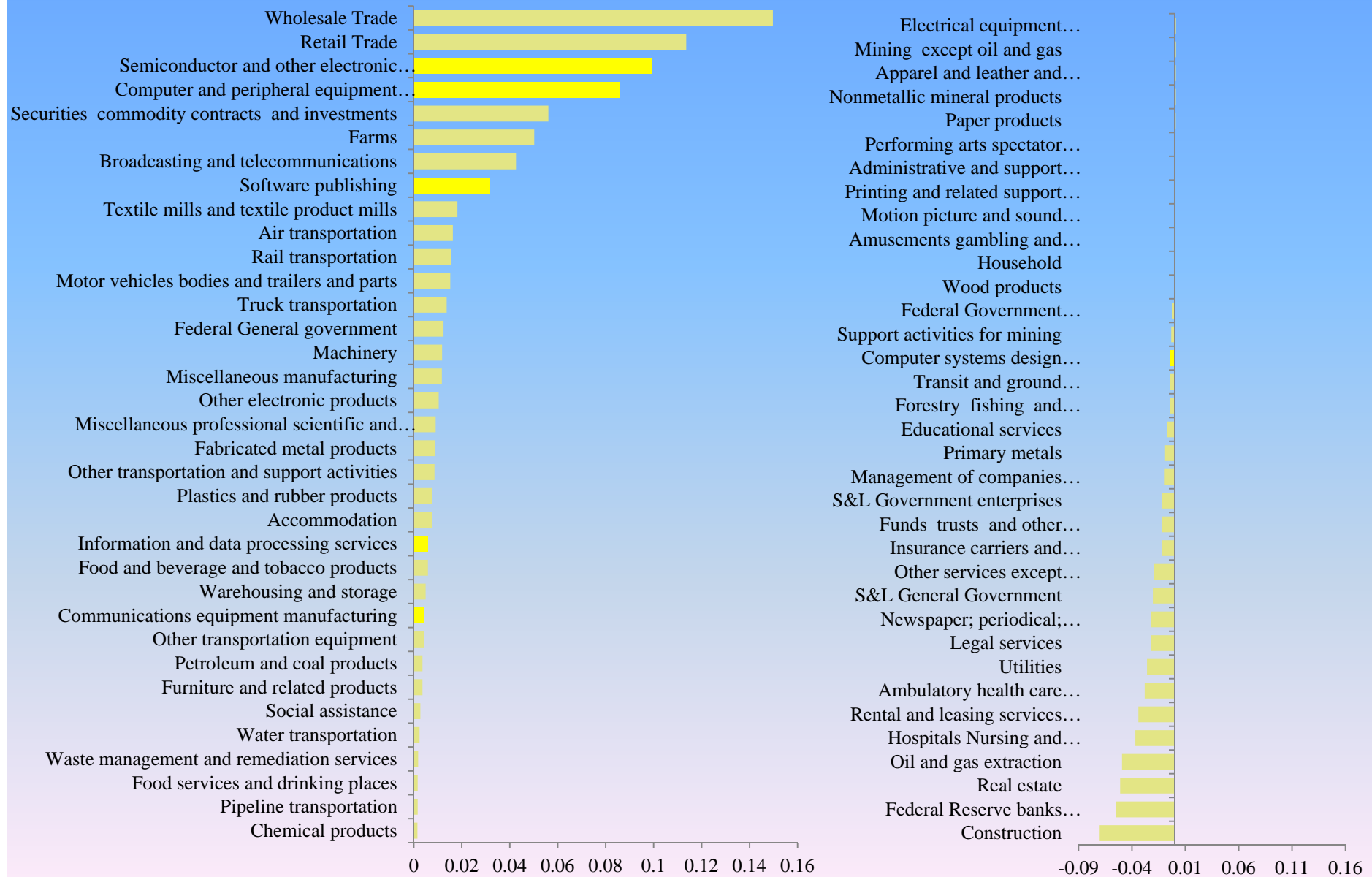
IT-Using Industries

# Industry Contributions to Value Added Growth, 1960-2007



# Industry Contributions to Productivity Growth, 1960-2007

Domar weighted contribution



# **THE NEW RESEARCH AGENDA: Economics on Internet Time**

## IT PRODUCTION:

Permanent vs. Transitory Changes

## IT UTILIZATION:

Trade and Services to the Forefront

## TANGIBLE AND INTANGIBLE ASSETS:

Beyond Software and R&D

## IMPLICATIONS FOR MACROECONOMICS:

Retire the Aggregate Production Function?