



Information Technology and the World Growth Resurgence

By

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July 19, 2007**

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Productivity

V O L U M E 3

*Information Technology
and the American Growth
Resurgence*

Dale W. Jorgenson, Mun S. Ho,
and Kevin J. Stiroh

Economic Growth in the Information Age

INTRODUCTION:

Prices of Information Technology

ROLE OF INFORMATION TECHNOLOGY:

IT Prices and the Cost of Capital

WORLD GROWTH RESURGENCE:

IT Investment and Productivity Growth

ECONOMICS ON INTERNET TIME:

The New Research Agenda

THE INFORMATION AGE: Faster, Better, Cheaper!

MOORE'S LAW: The number of transistors on a chip doubles every 12-24 months. (Itanium 2 Processor, released November 8, 2004, has 592 million transistors.)

INVENTION OF THE TRANSISTOR:

Development of Semiconductor Technology.

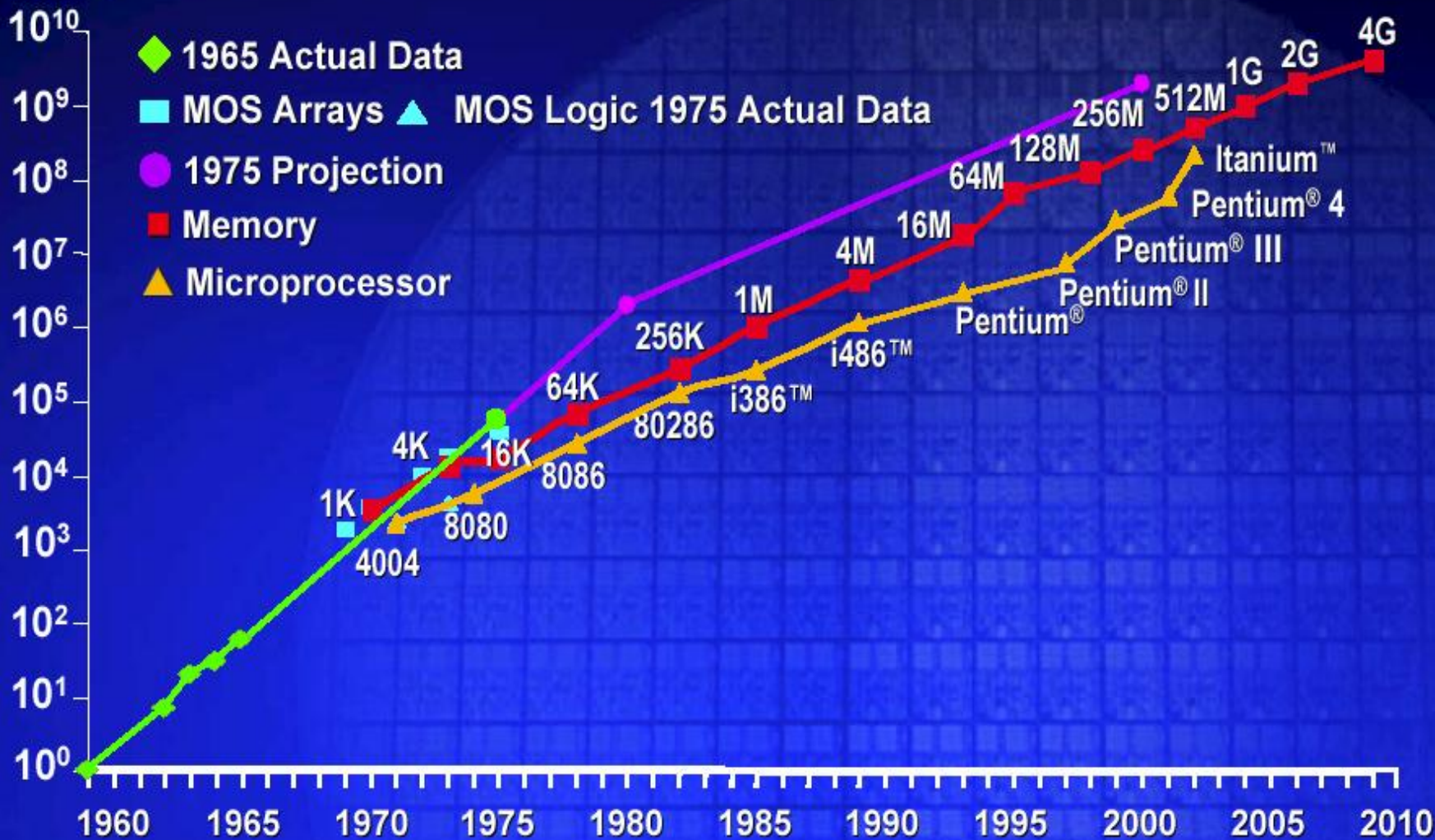
THE INTEGRATED CIRCUIT:

Memory Chips; Logic Chips.

SIA Annual Report 2005: In 1978, a commercial flight between New York and Paris cost \$900 and took seven hours. If the principles of Moore's Law were applied to the airline industry, that flight would now cost about a penny and take less than one second.

Integrated Circuit Complexity

Transistors
Per Die



HOLDING QUALITY CONSTANT

Matched Models and Hedonics

SEMICONDUCTOR PRICE INDEXES:

Memory and Logic Chips.

COMPUTER PRICE INDEXES:

The BEA-IBM Collaboration.

COMMUNICATIONS EQUIPMENT:

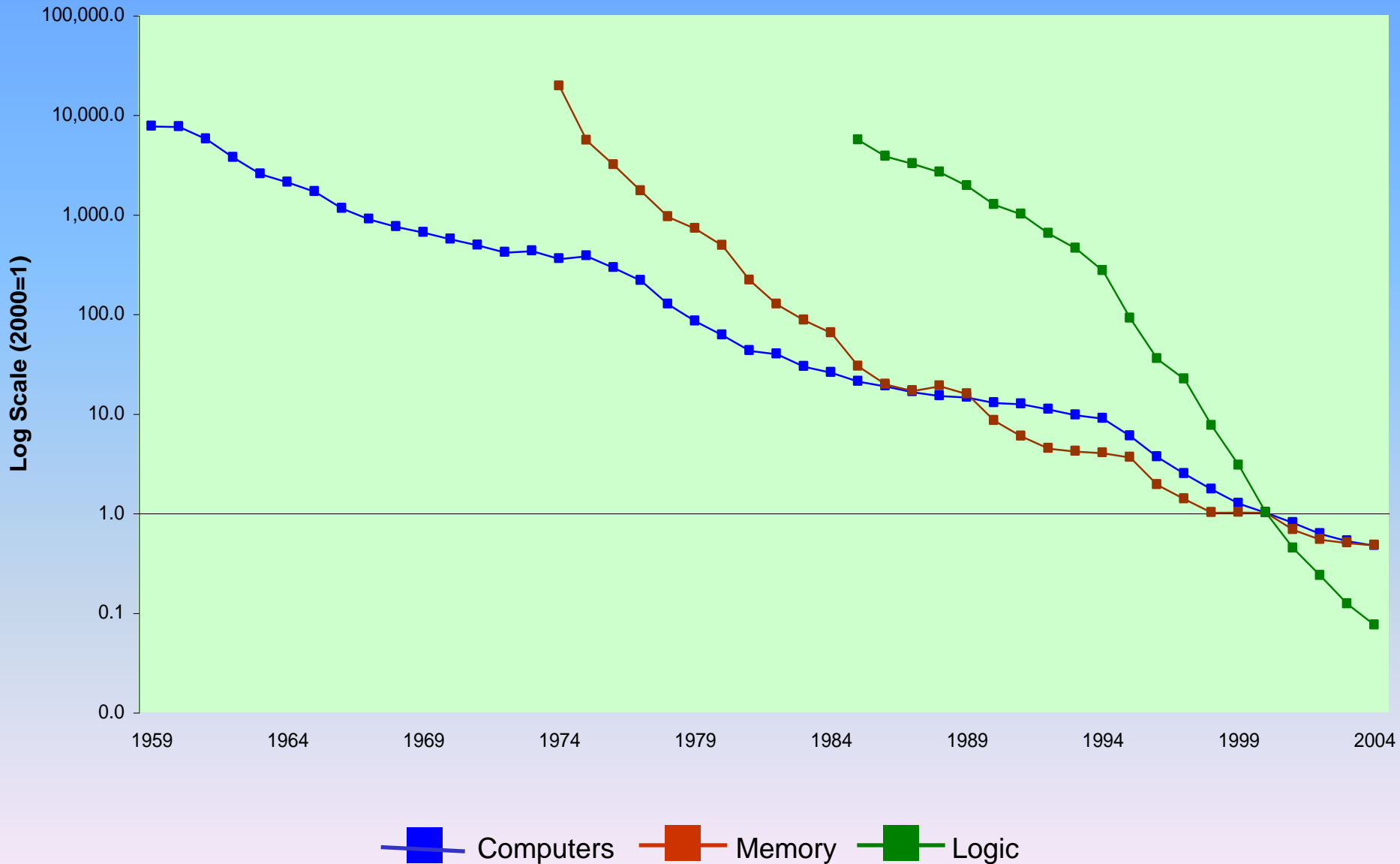
Terminal, Switching, and Transmission.

SOFTWARE:

Prepackaged, Custom, and Own-Account.

Relative Prices of Computers and Semiconductors, 1959-2004

All price indexes are divided by the output price index



ROLE OF INFORMATION TECHNOLOGY: IT Prices, Investment, and Productivity.

INPUT SHARES OF IT:

Computers, Communications Equipment, and Software.

CAPITAL CONTRIBUTION:

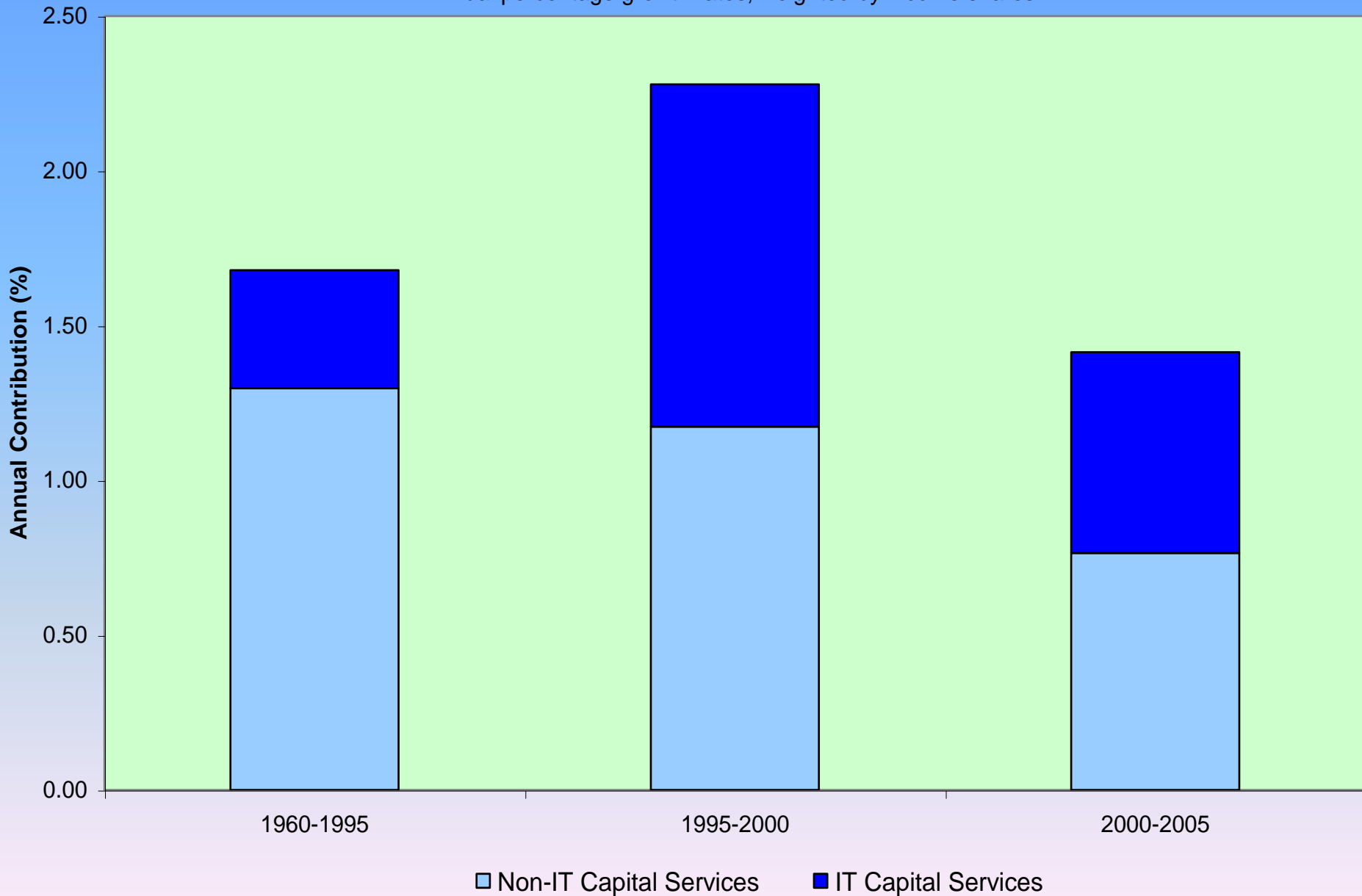
IT versus Non-IT Capital Services.

CAPITAL CONTRIBUTION BY TYPE:

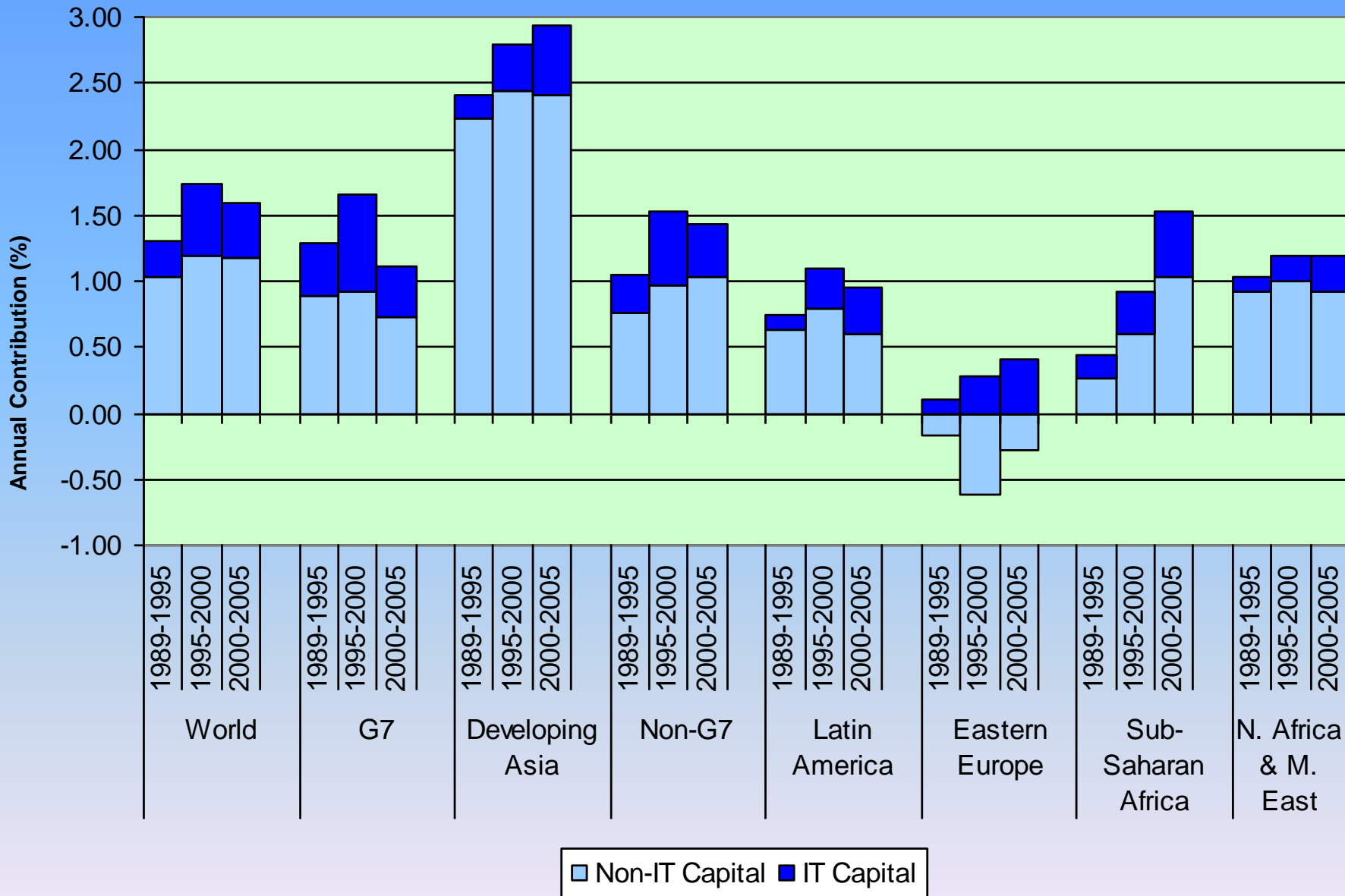
Computers, Communications Equipment, and Software.

Capital Input Contribution of Information Technology

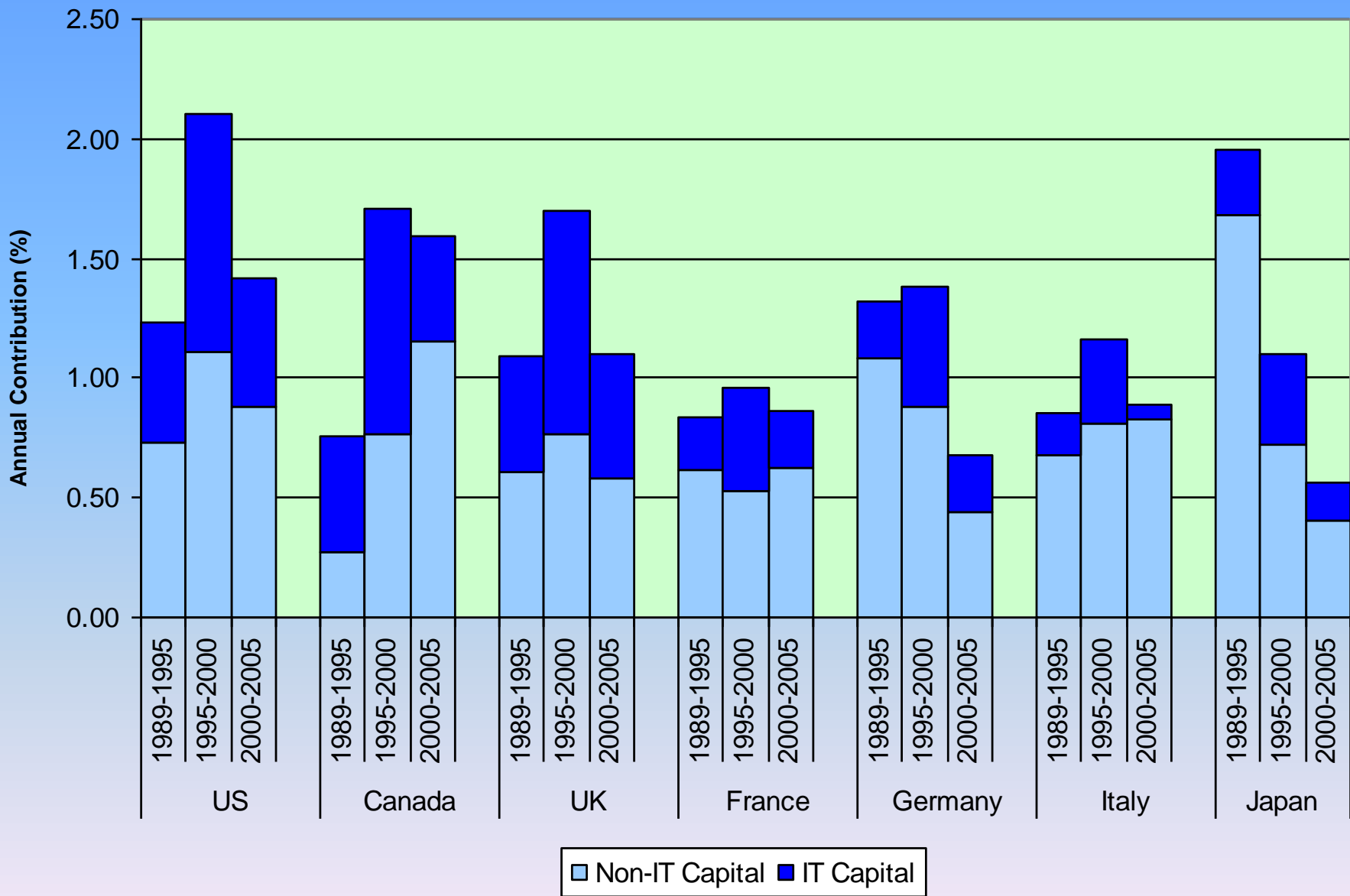
Annual percentage growth rates, weighted by income shares.



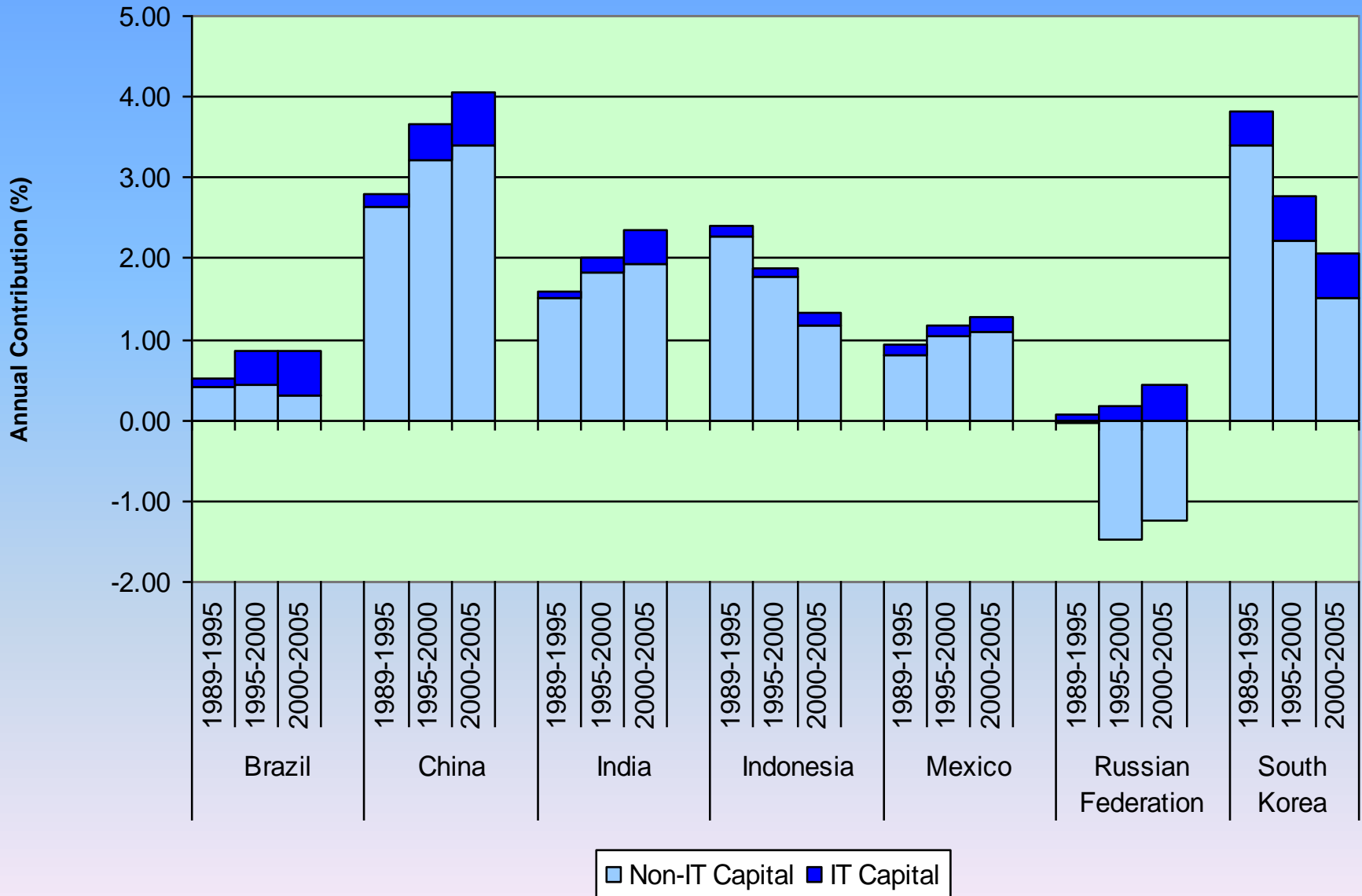
Capital Input Contribution by Country: World and Regions



Capital Input Contribution by Country: G7



Capital Input Contribution by Country: Developing and Transition Economies



WORLD GROWTH RESURGENCE: IT Investment and Productivity Growth.

TOTAL FACTOR PRODUCTIVITY:

IT-Production versus Non-IT Production.

SOURCES OF ECONOMIC GROWTH:

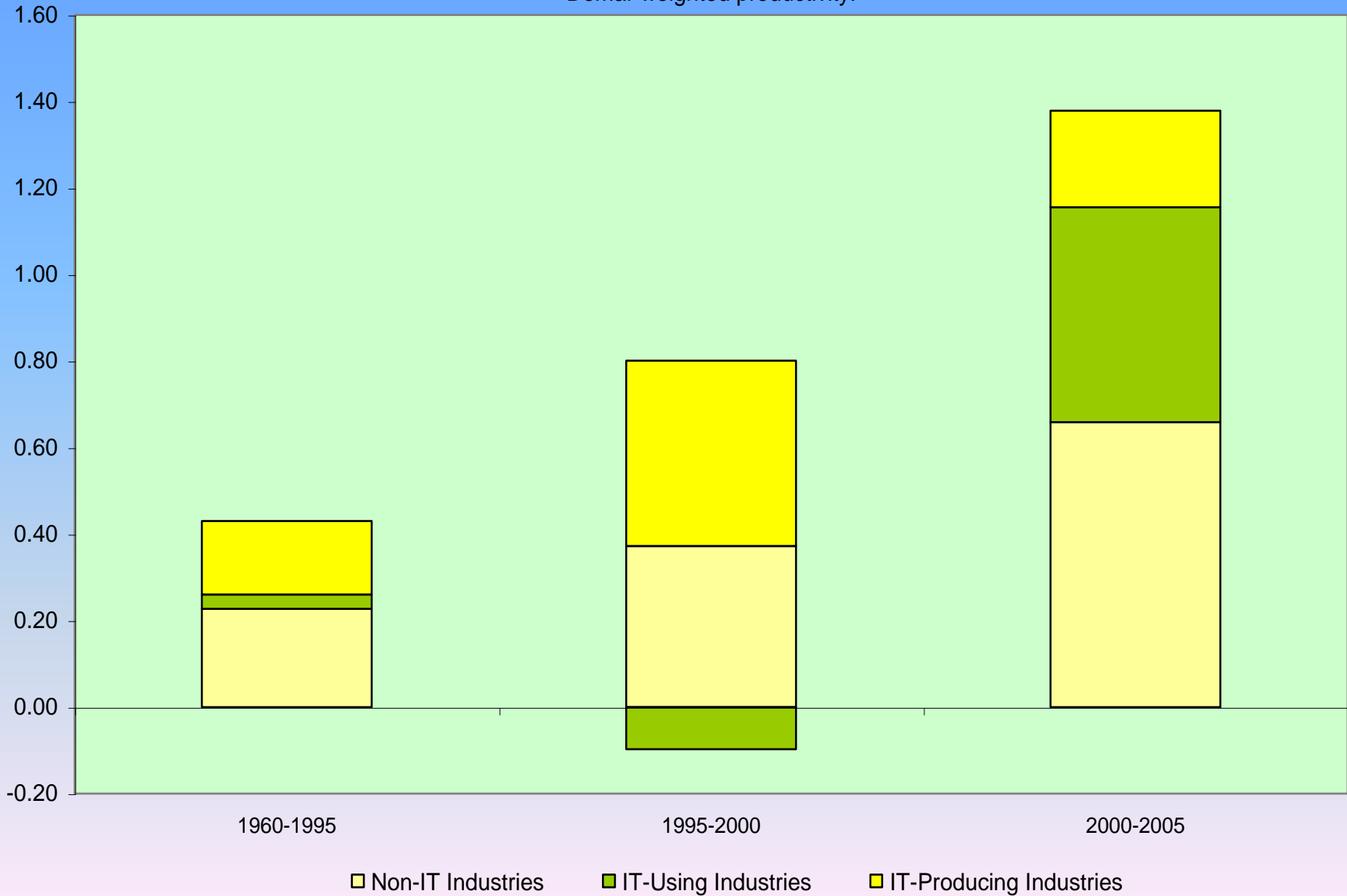
Capital Input, Labor Input, and TFP.

LABOR INPUT GROWTH:

Hours Worked and Labor Quality.

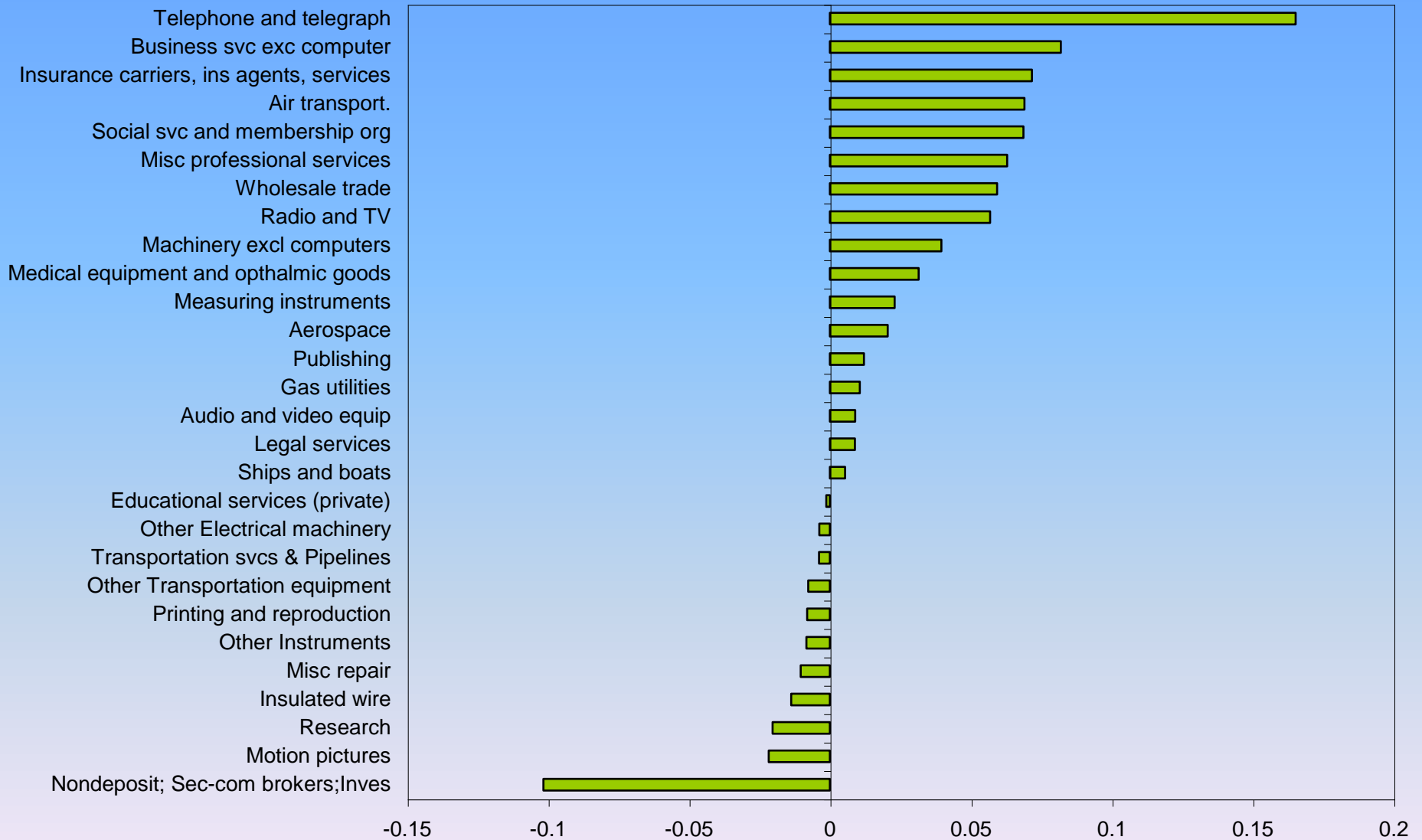
Industry Contributions to Productivity Growth

Domar weighted productivity.



Change in Contribution to Productivity: 2000-2005 less 1960-1995

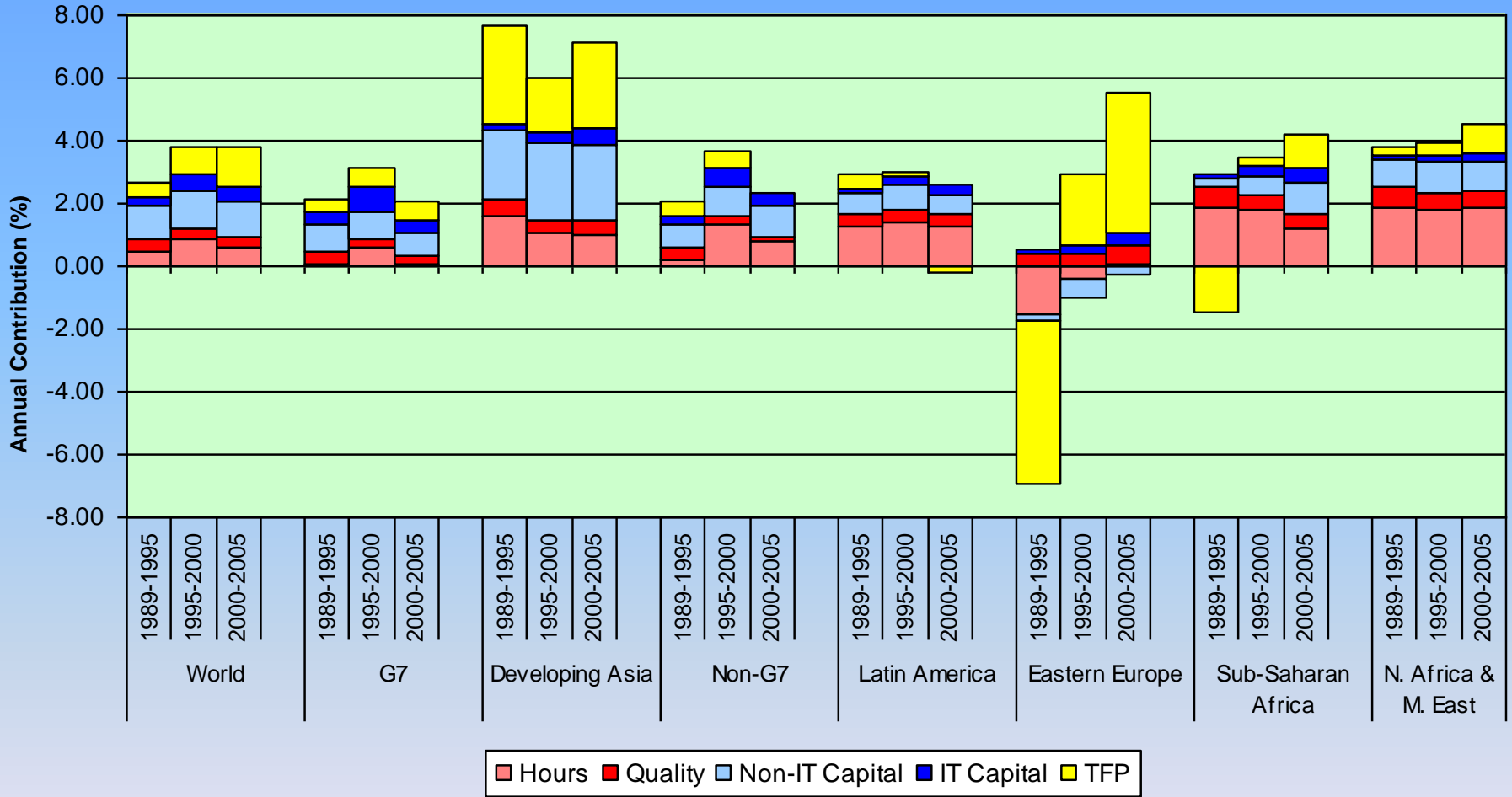
IT-Users



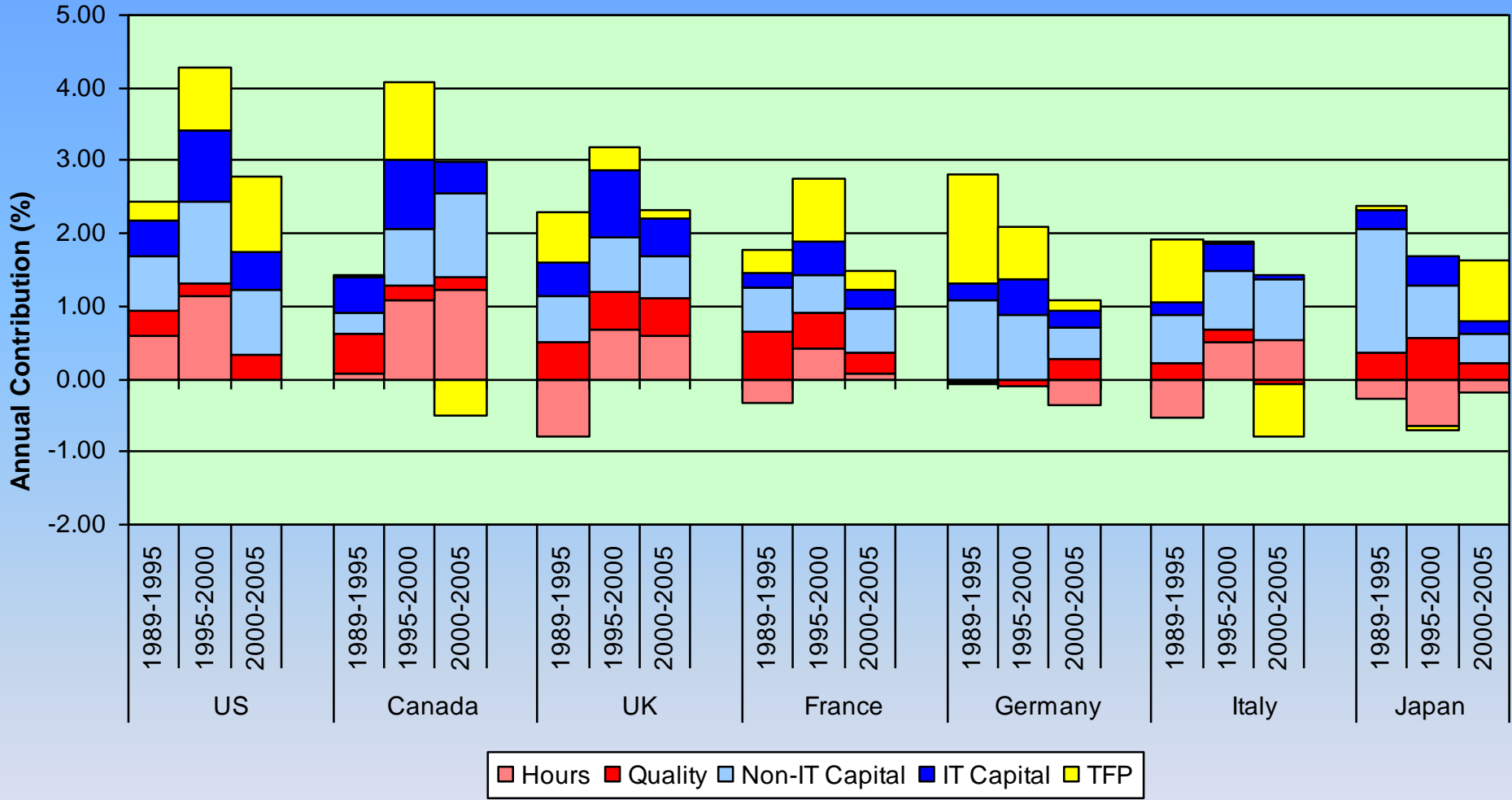
Sources of U.S. Economic Growth



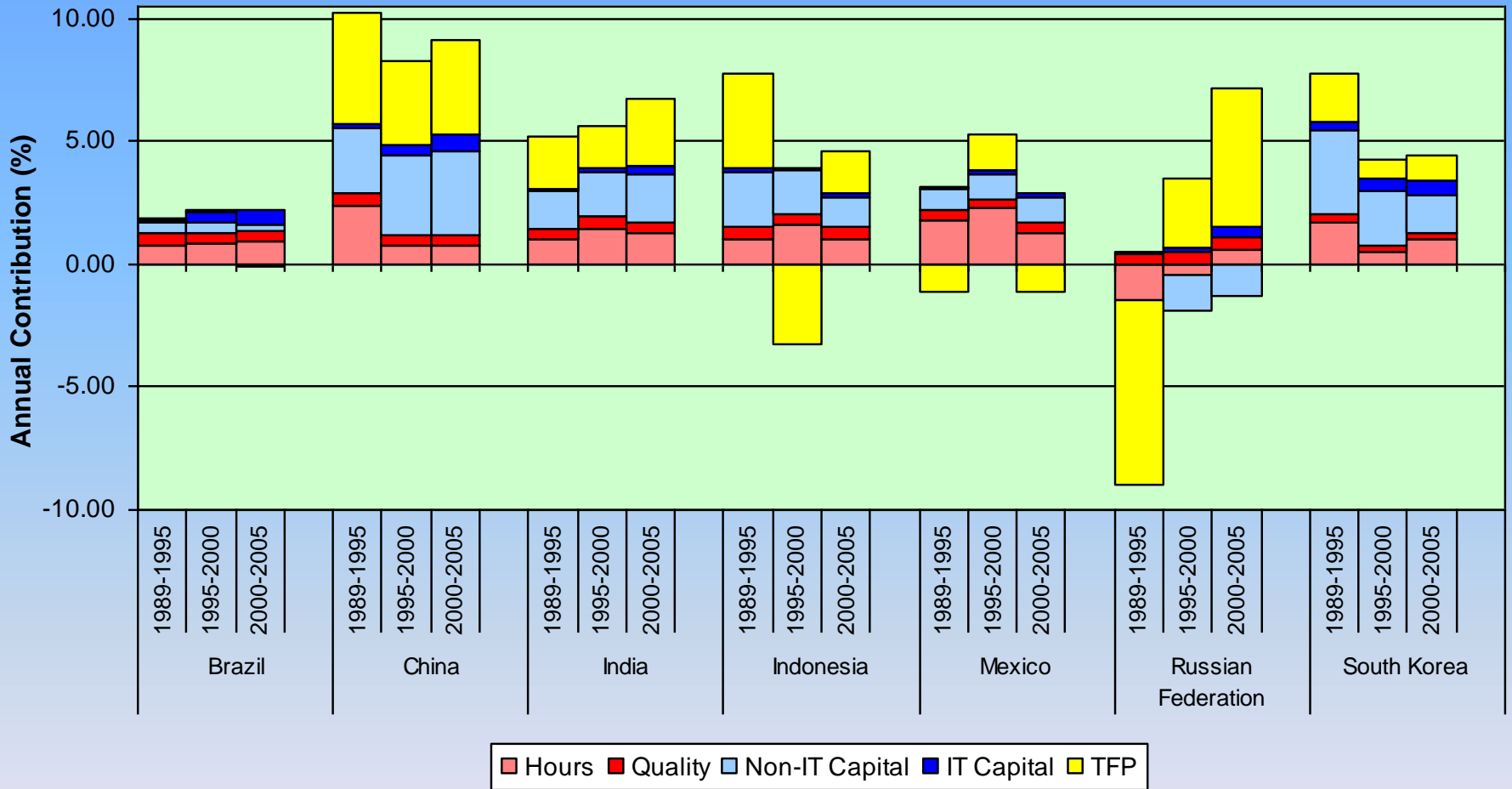
Sources of Growth by Country: World and Regions



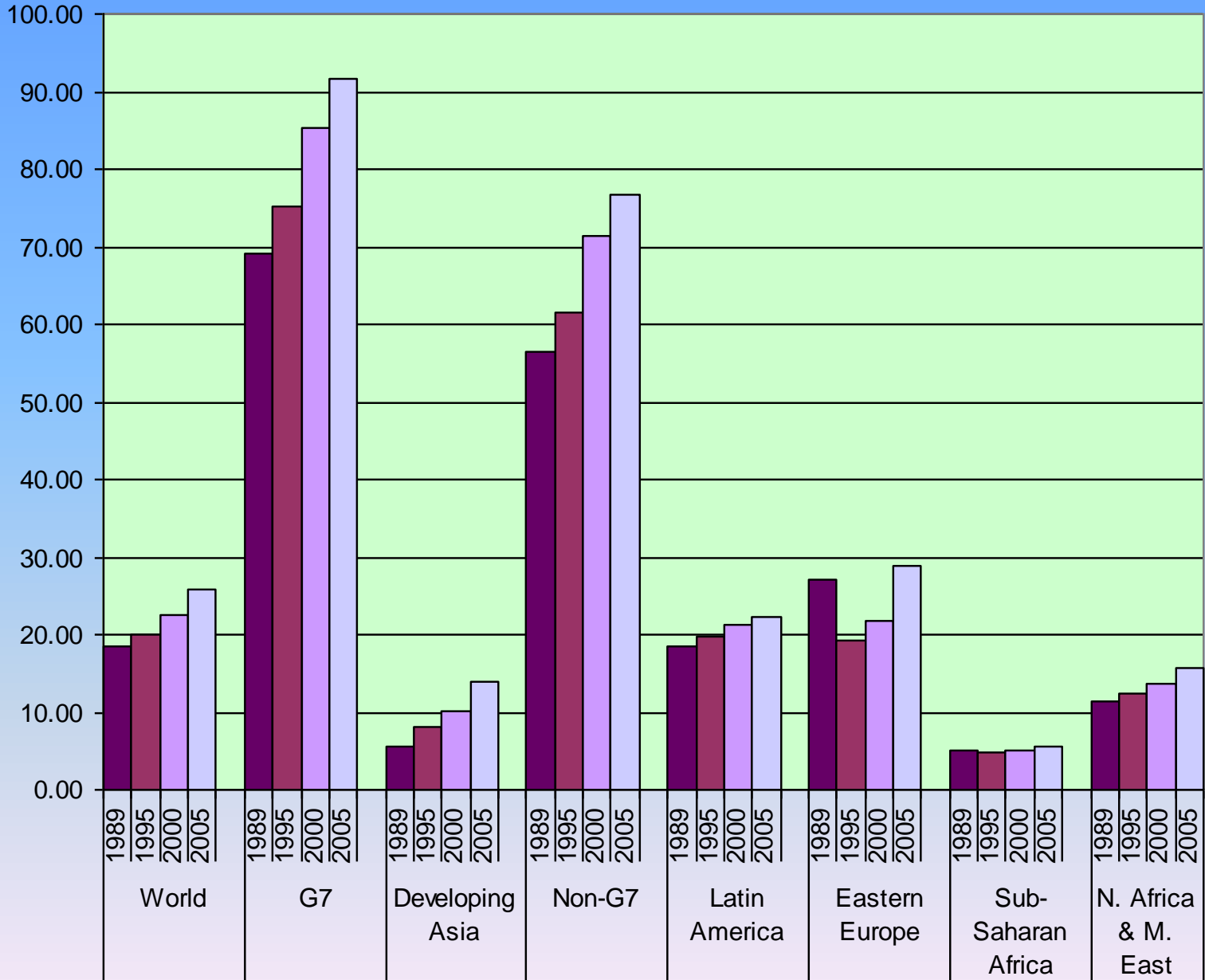
Sources of Growth by Country: G7



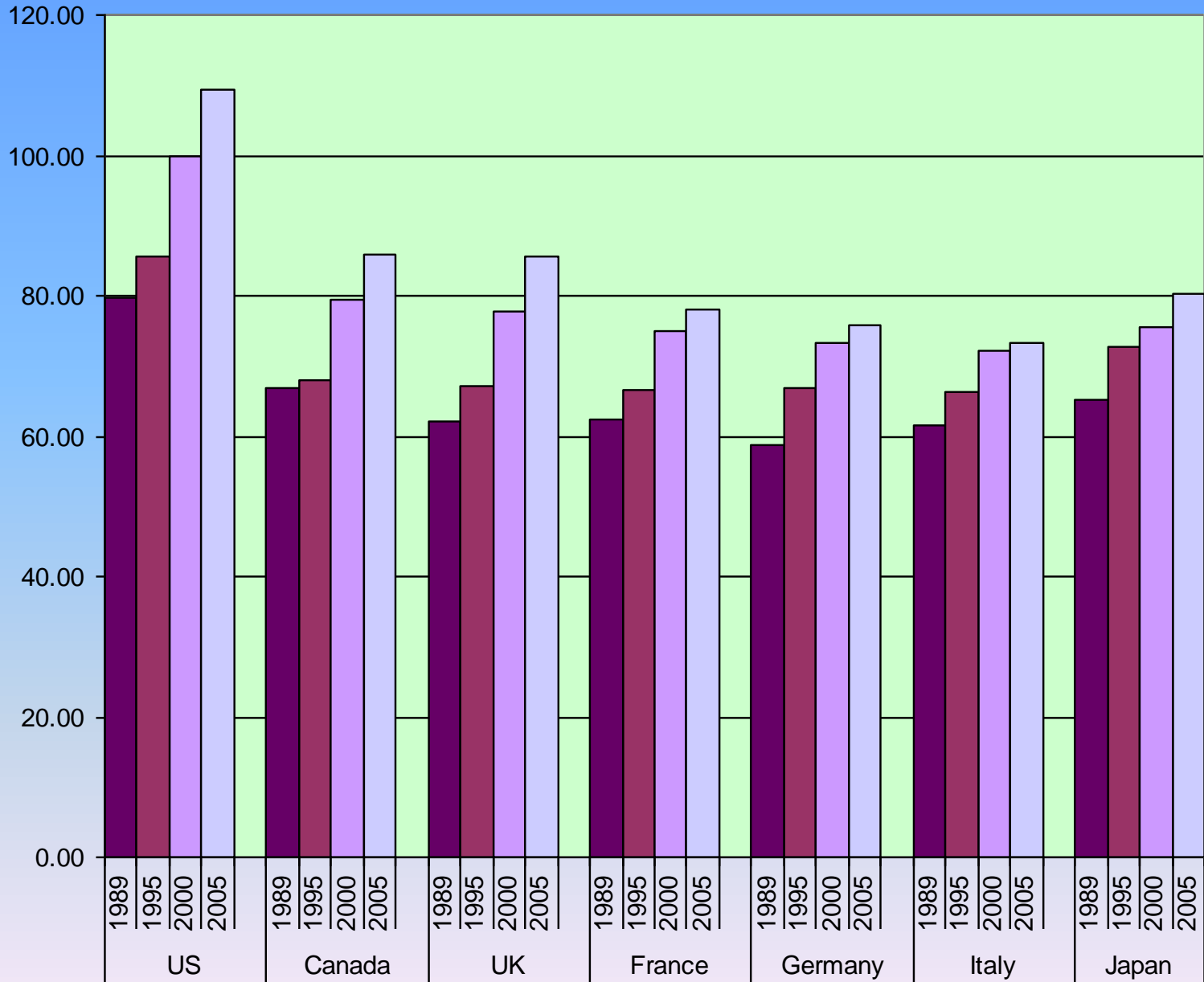
Sources of Growth by Country: Developing and Transition Economies



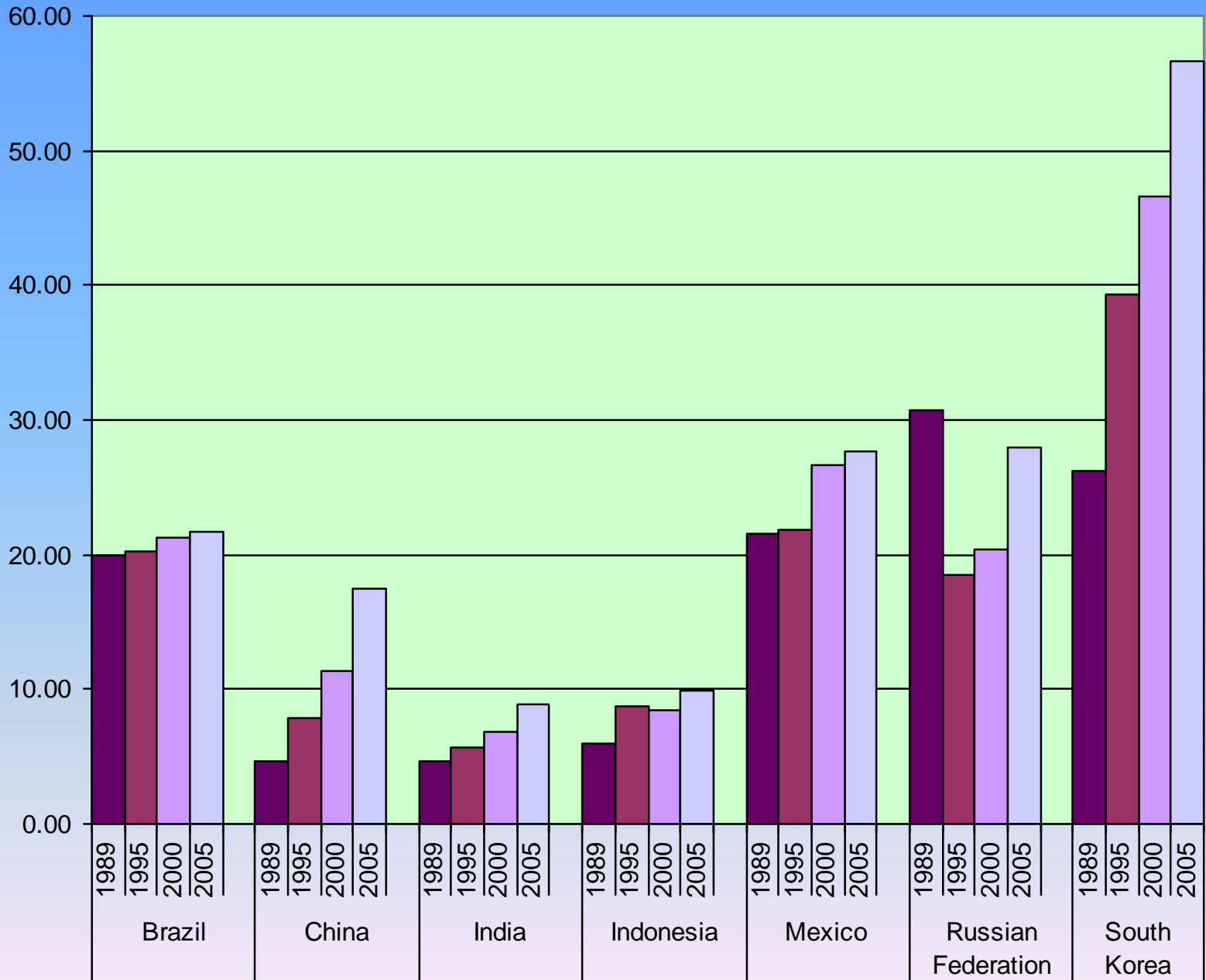
Output Per Capita by Country: World and Regions



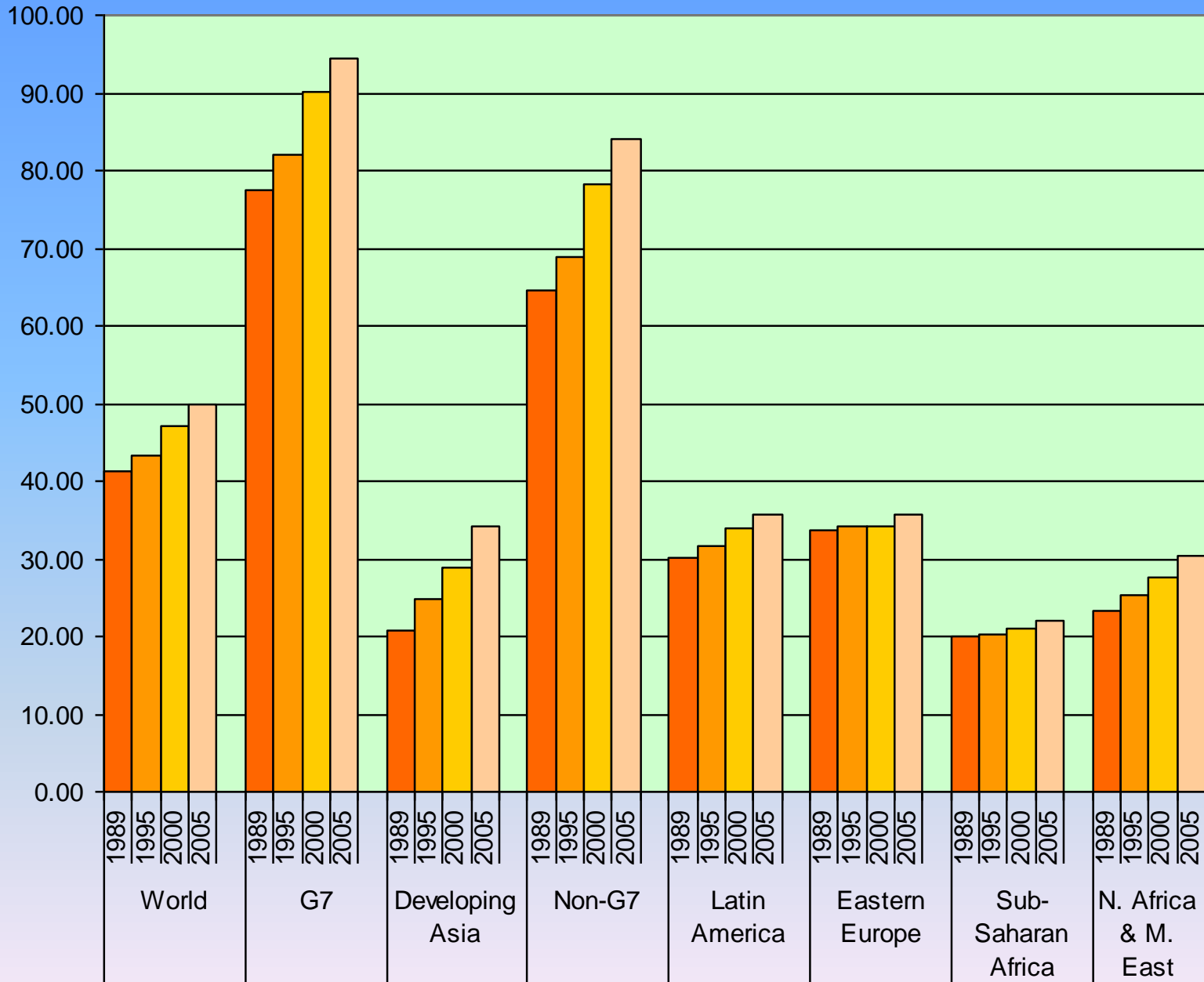
Output Per Capita by Country: G7



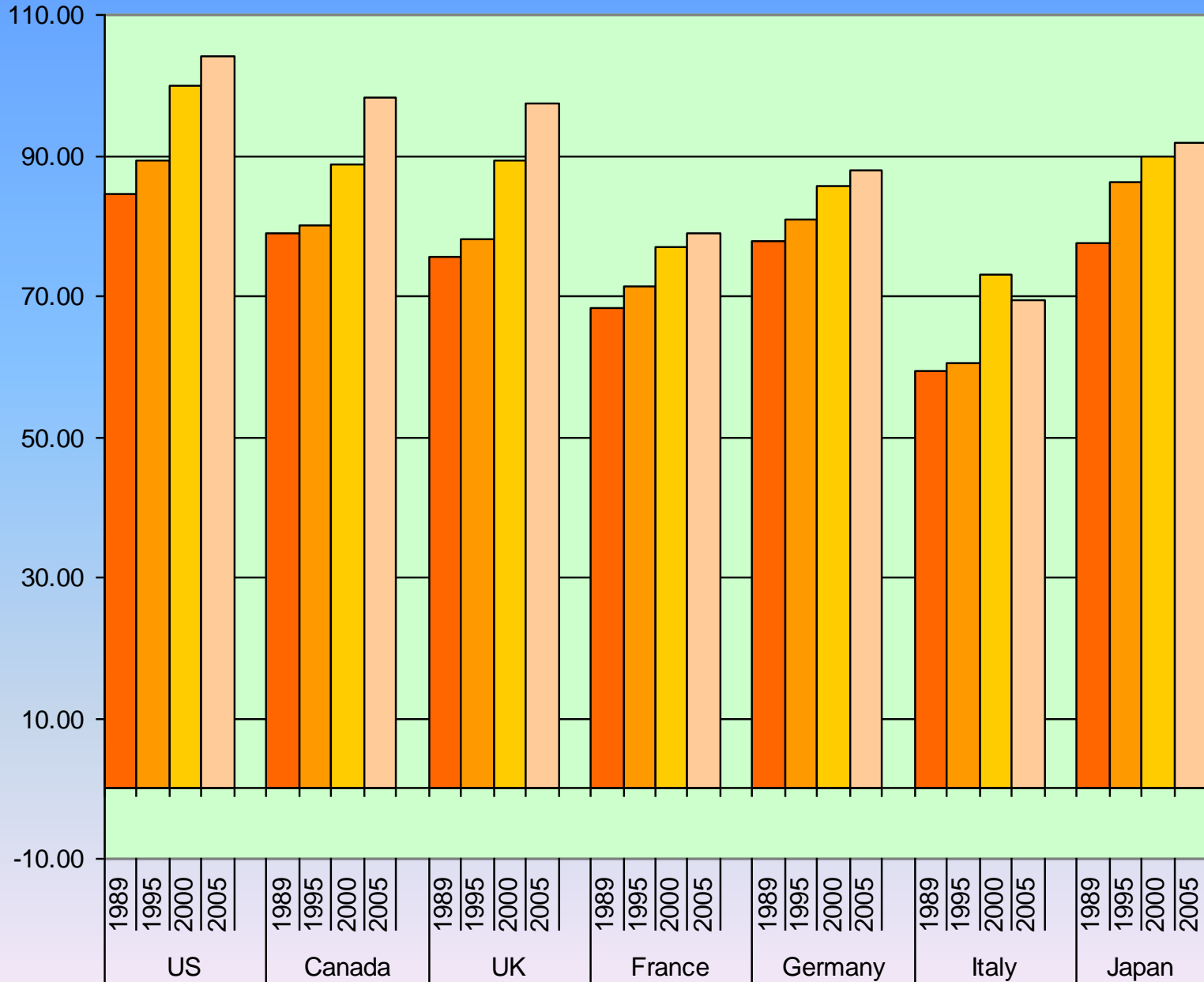
Output Per Capita by Country: Developing and Transition Economies



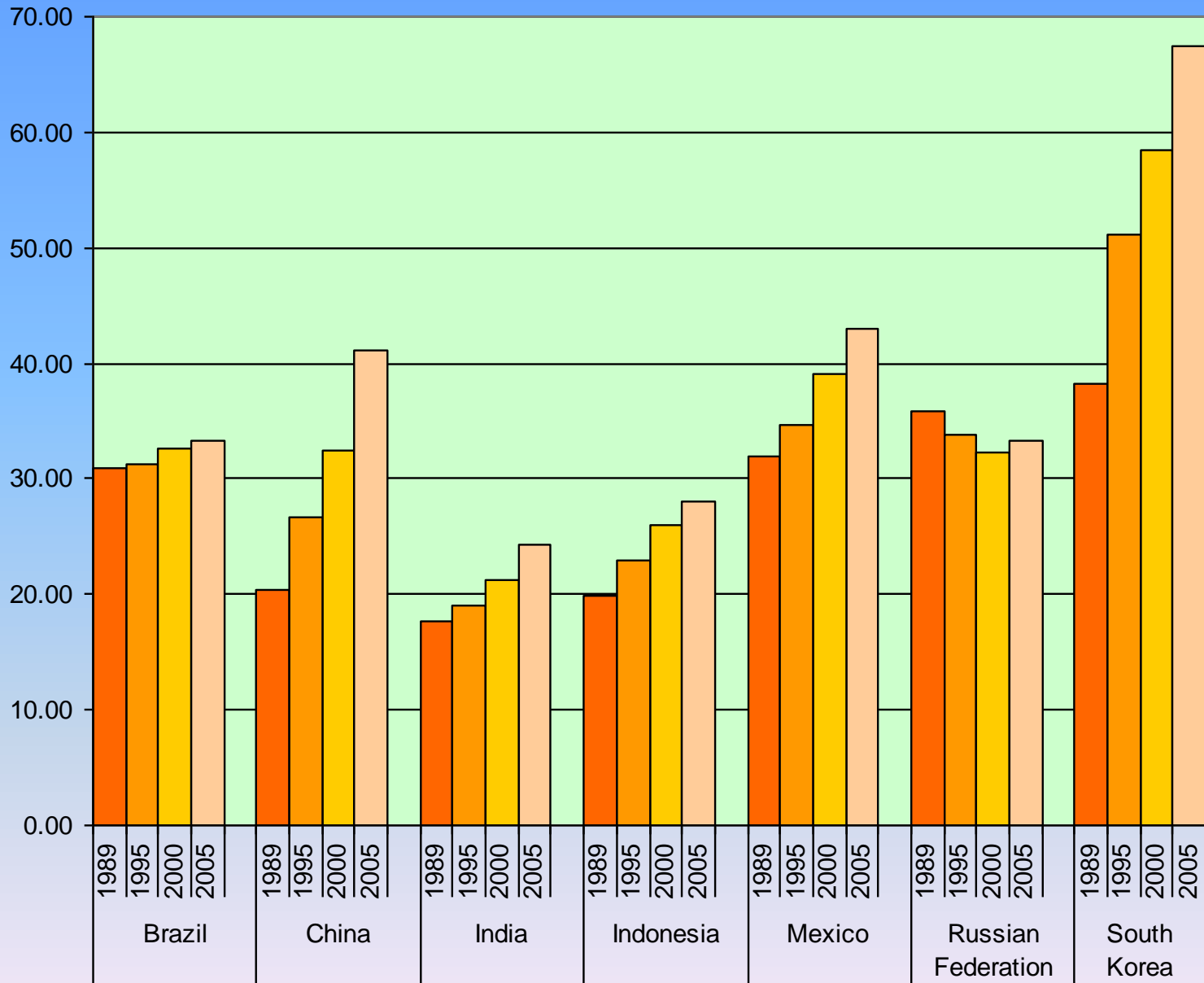
Input Per Capita by Country: World and Regions



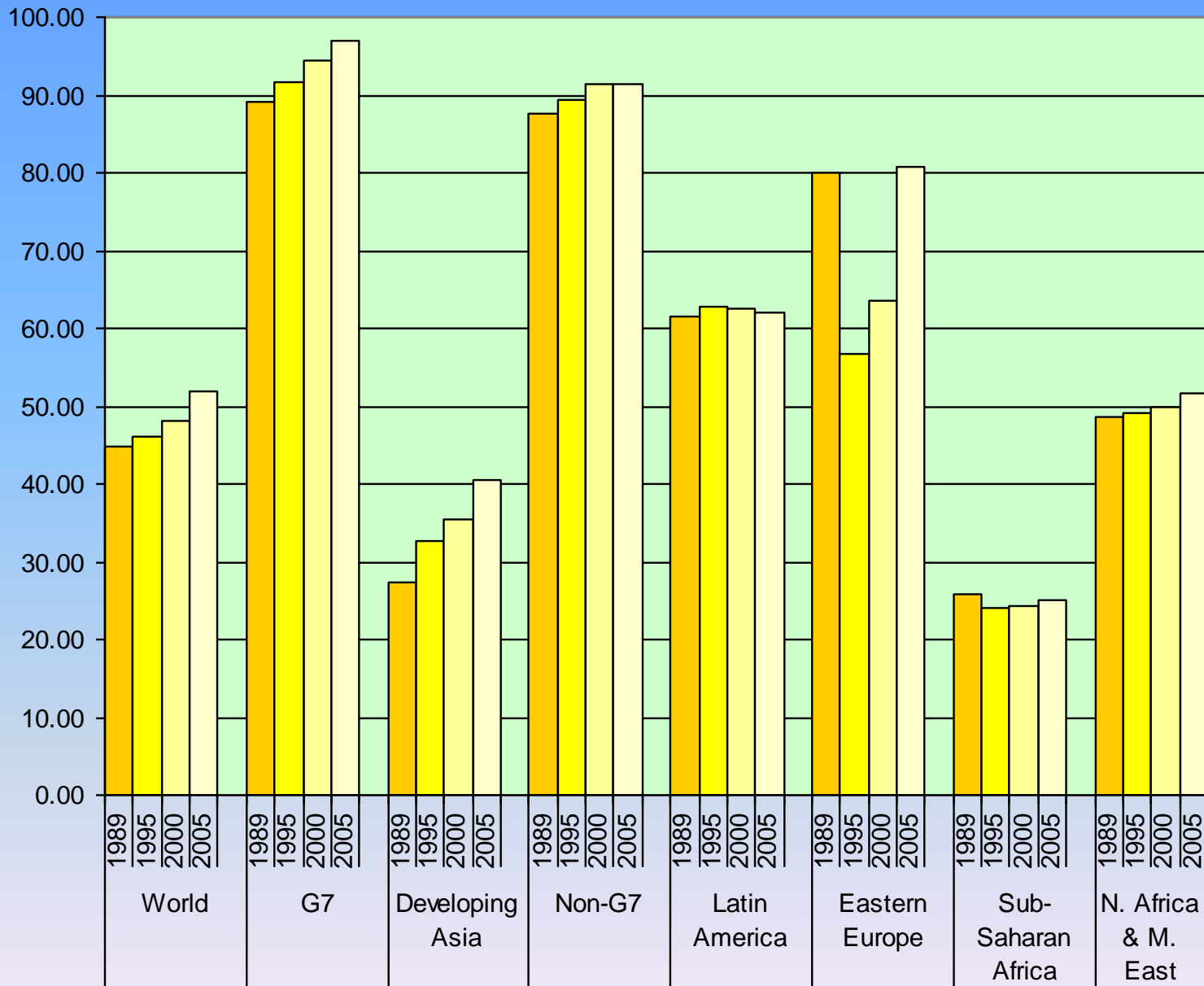
Input Per Capita by Country: G7



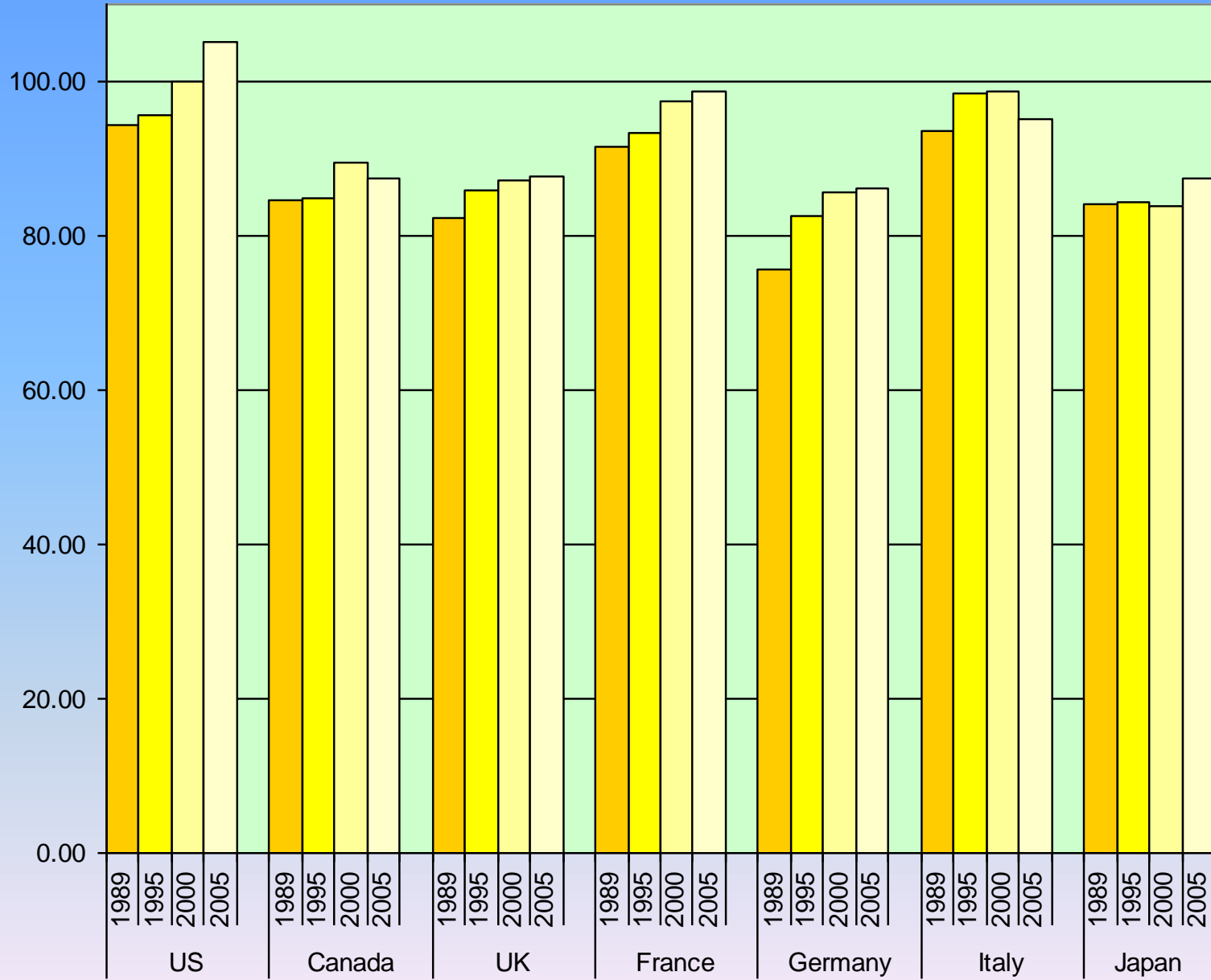
Input Per Capita by Country: Developing and Transition Economies



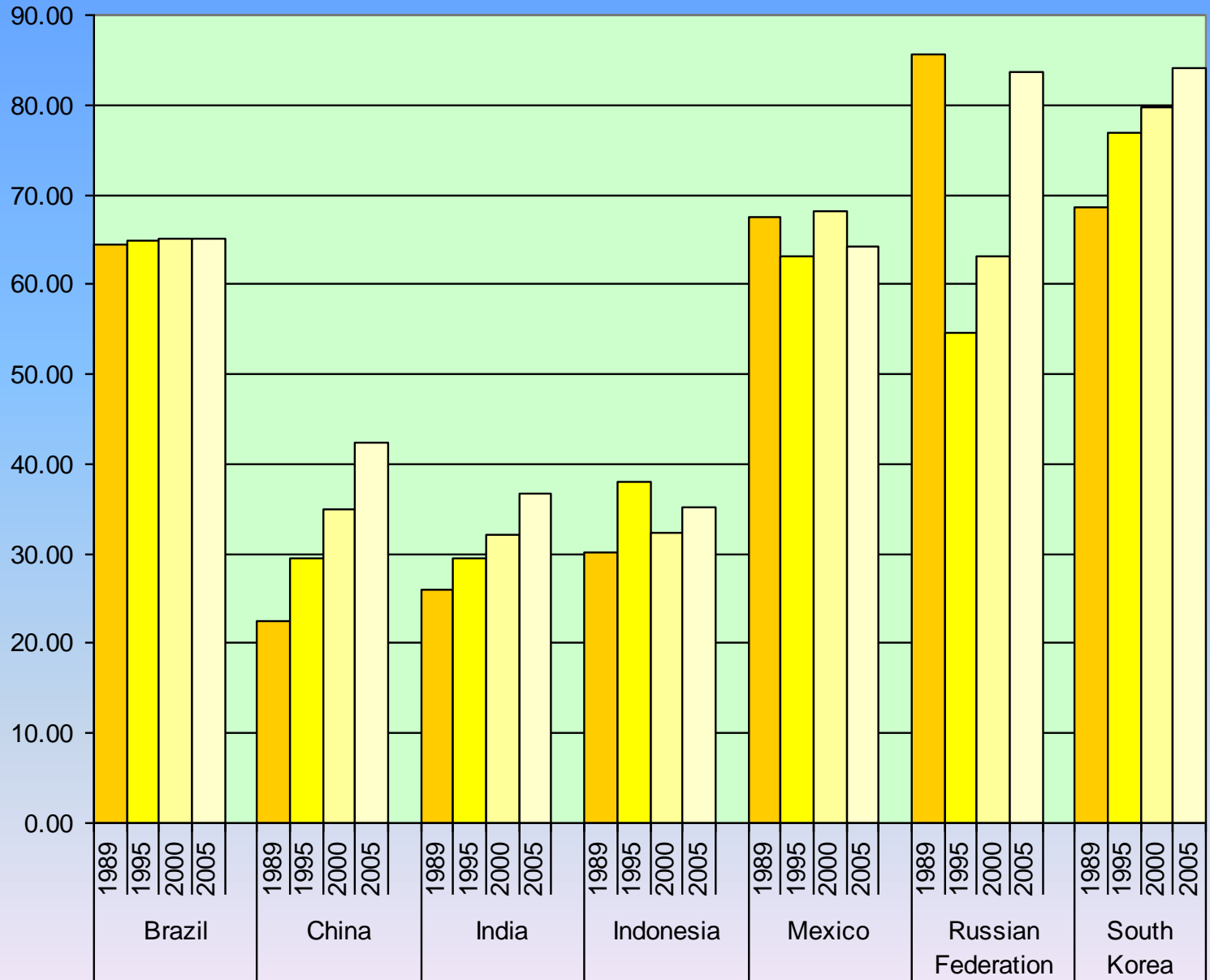
Productivity by Country: World and Regions



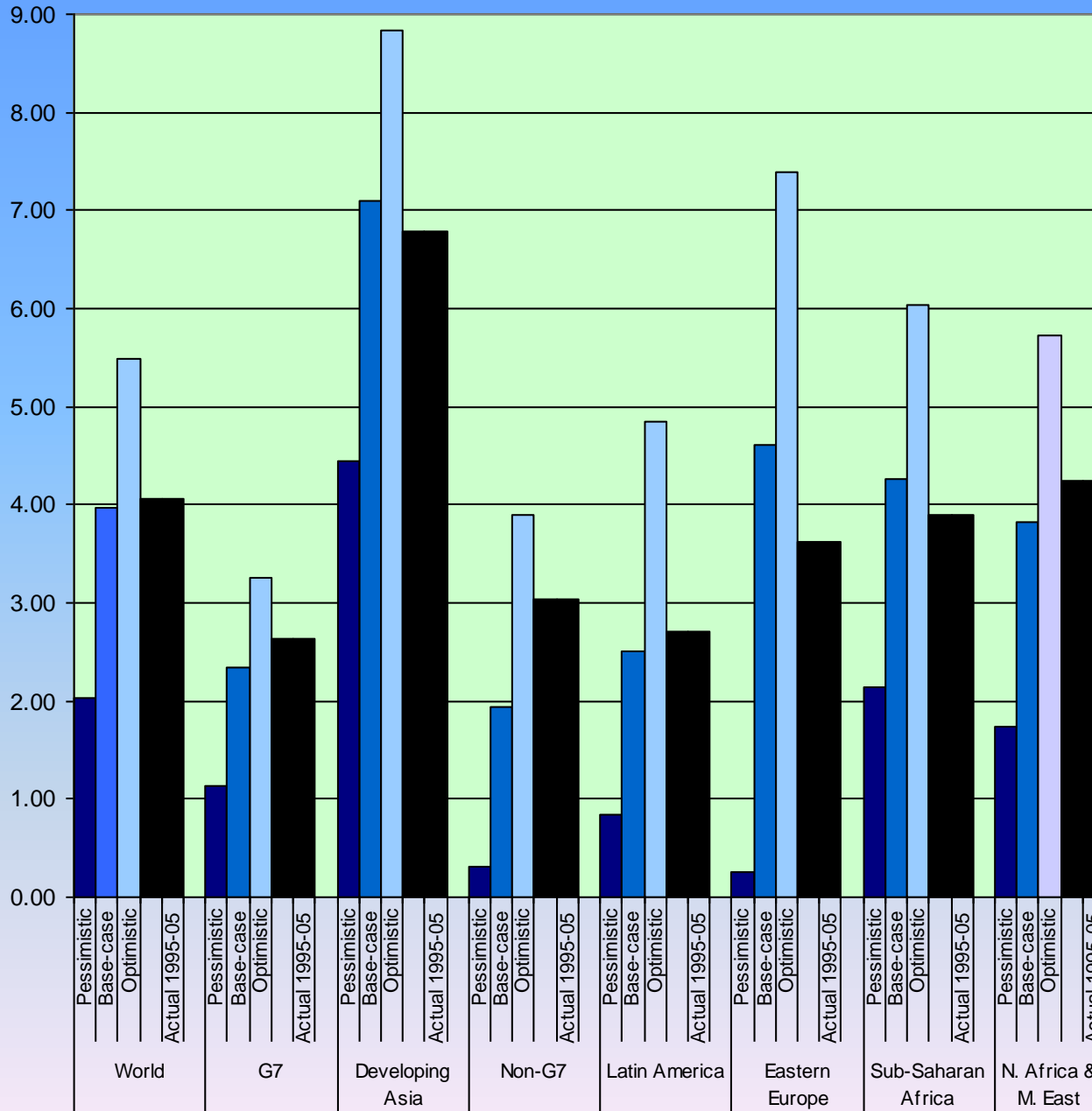
Productivity by Country: G7



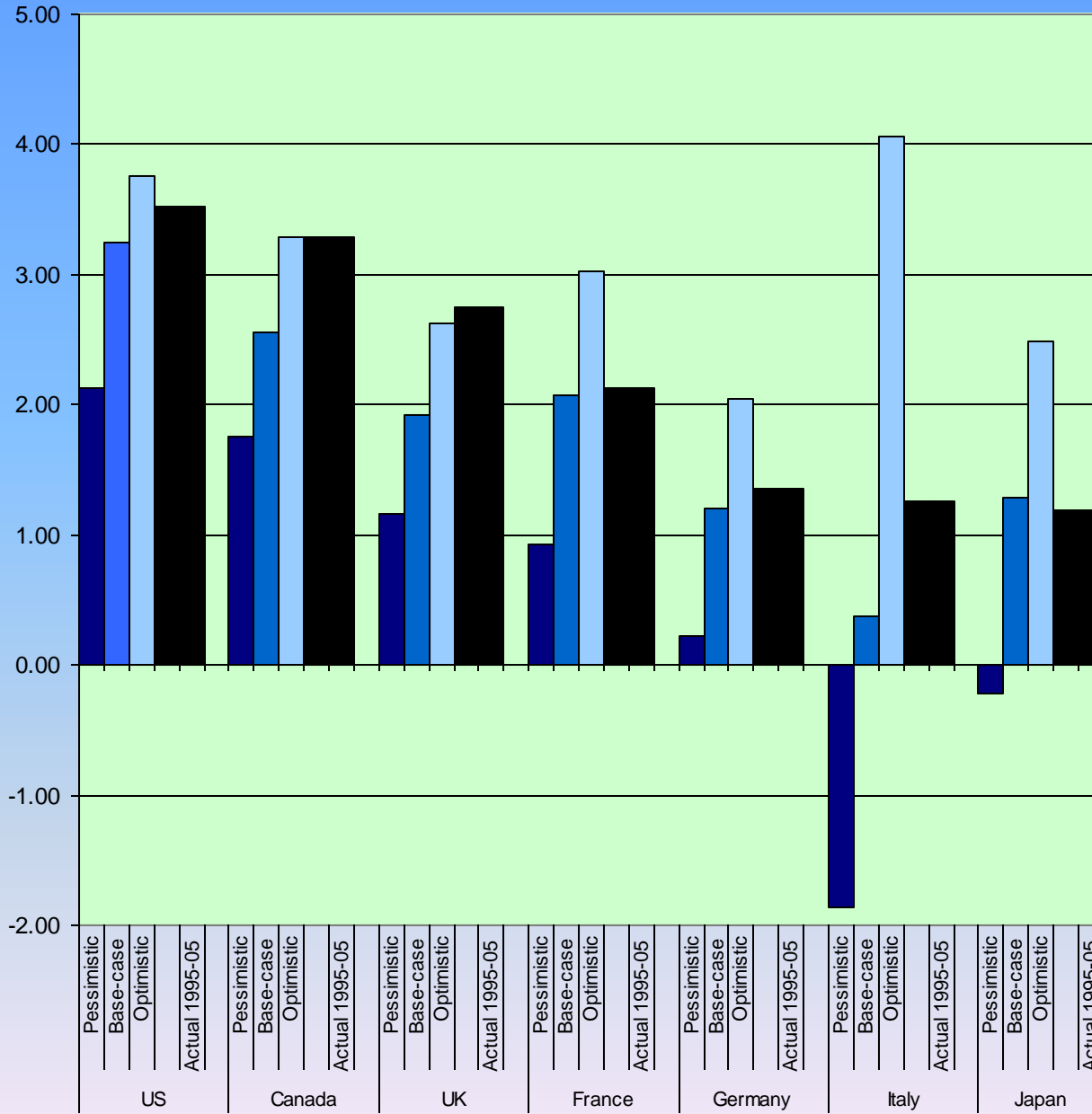
Productivity by Country: Developing and Transition Economies



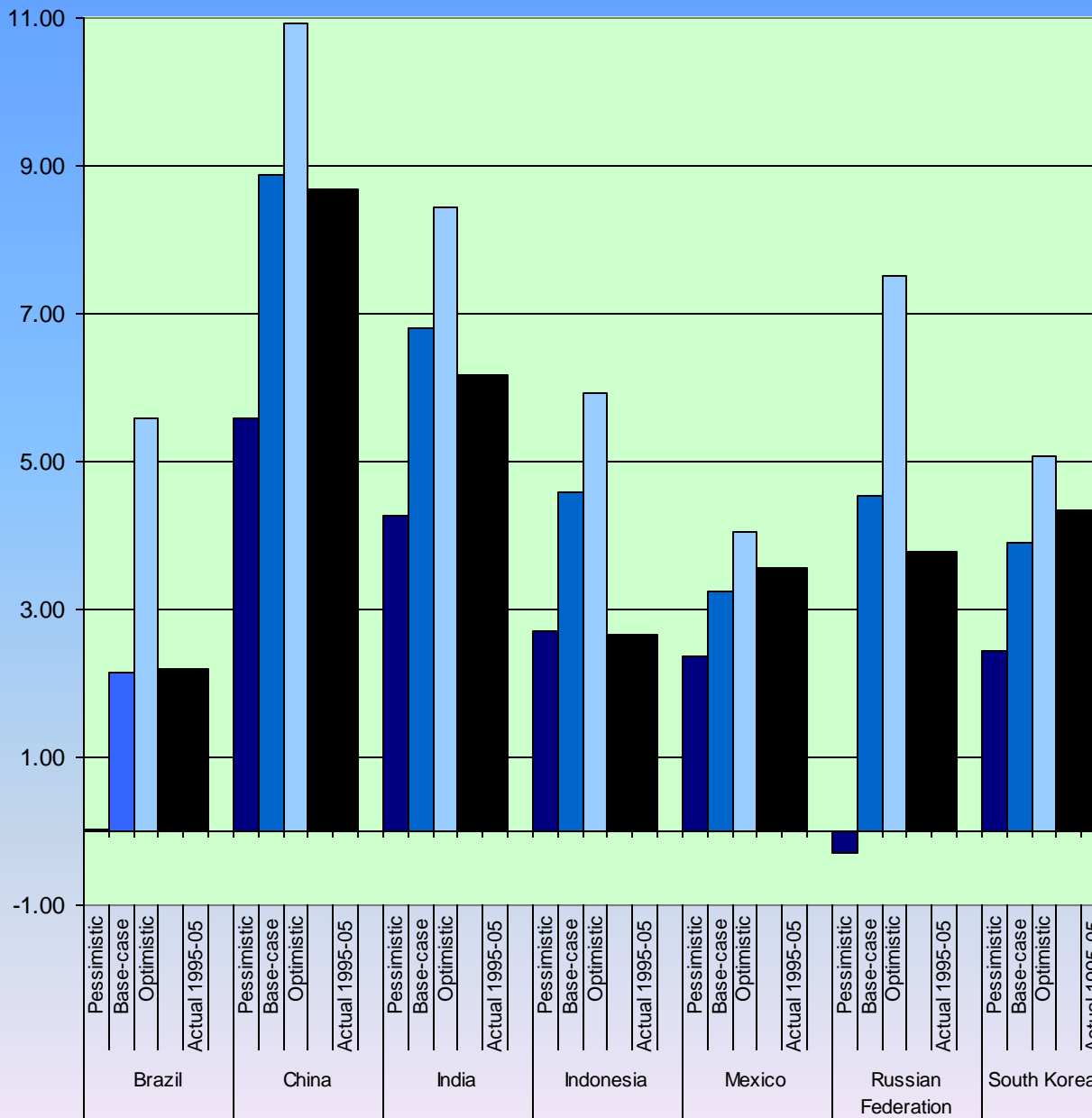
GDP Growth by Country: World and Regions



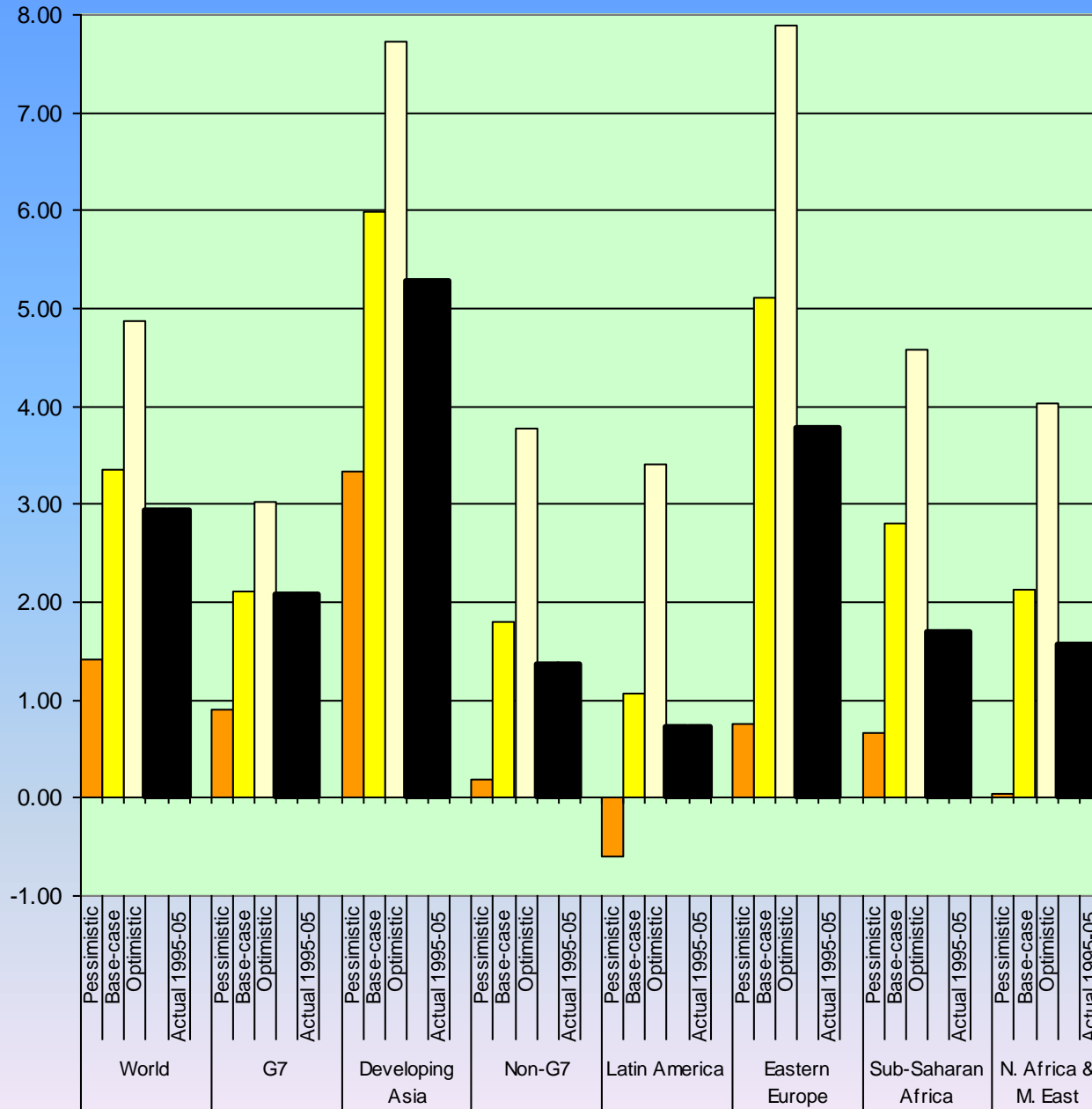
GDP Growth by Country: G7



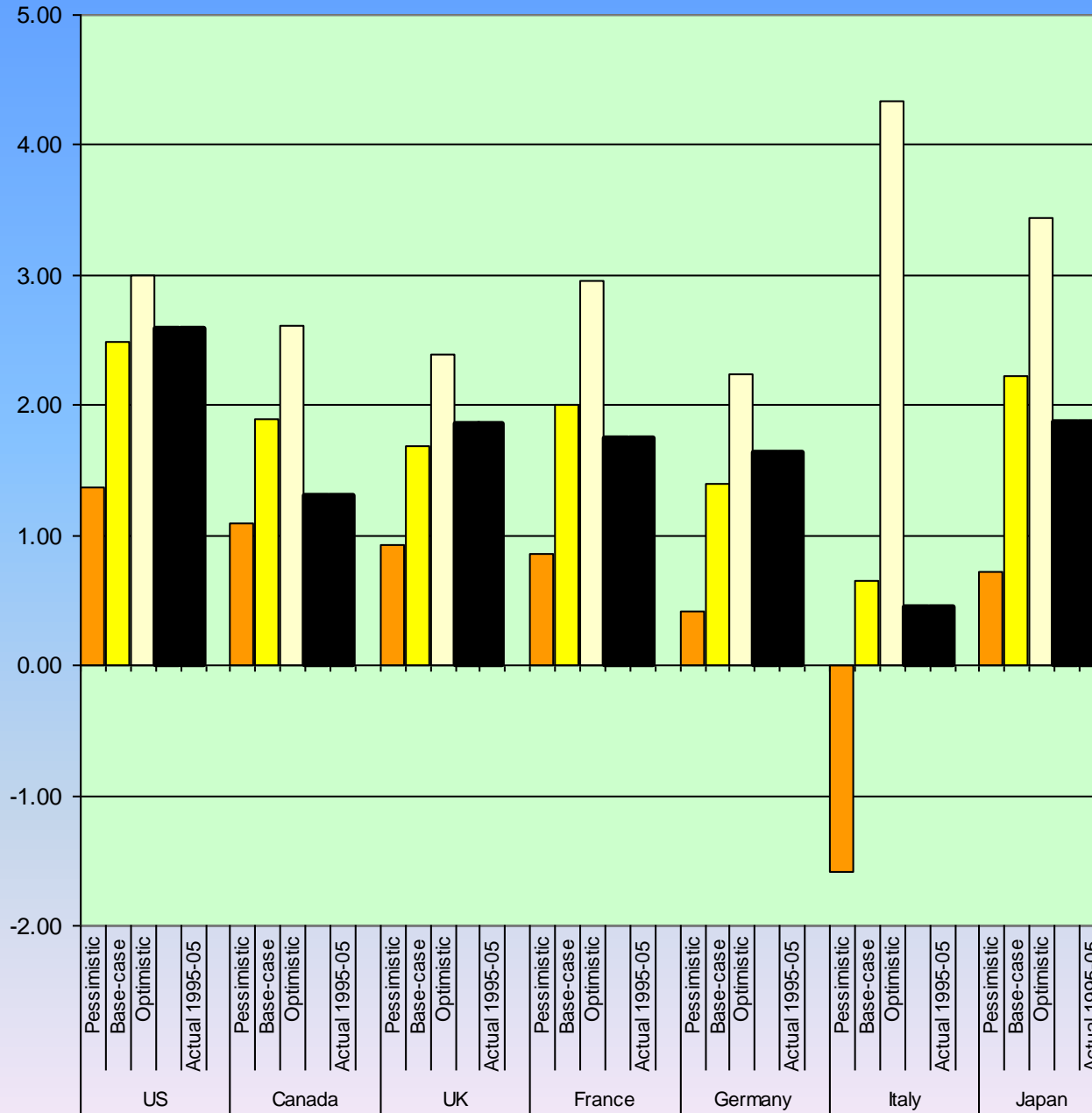
GDP Growth by Country: Developing and Transition Economies



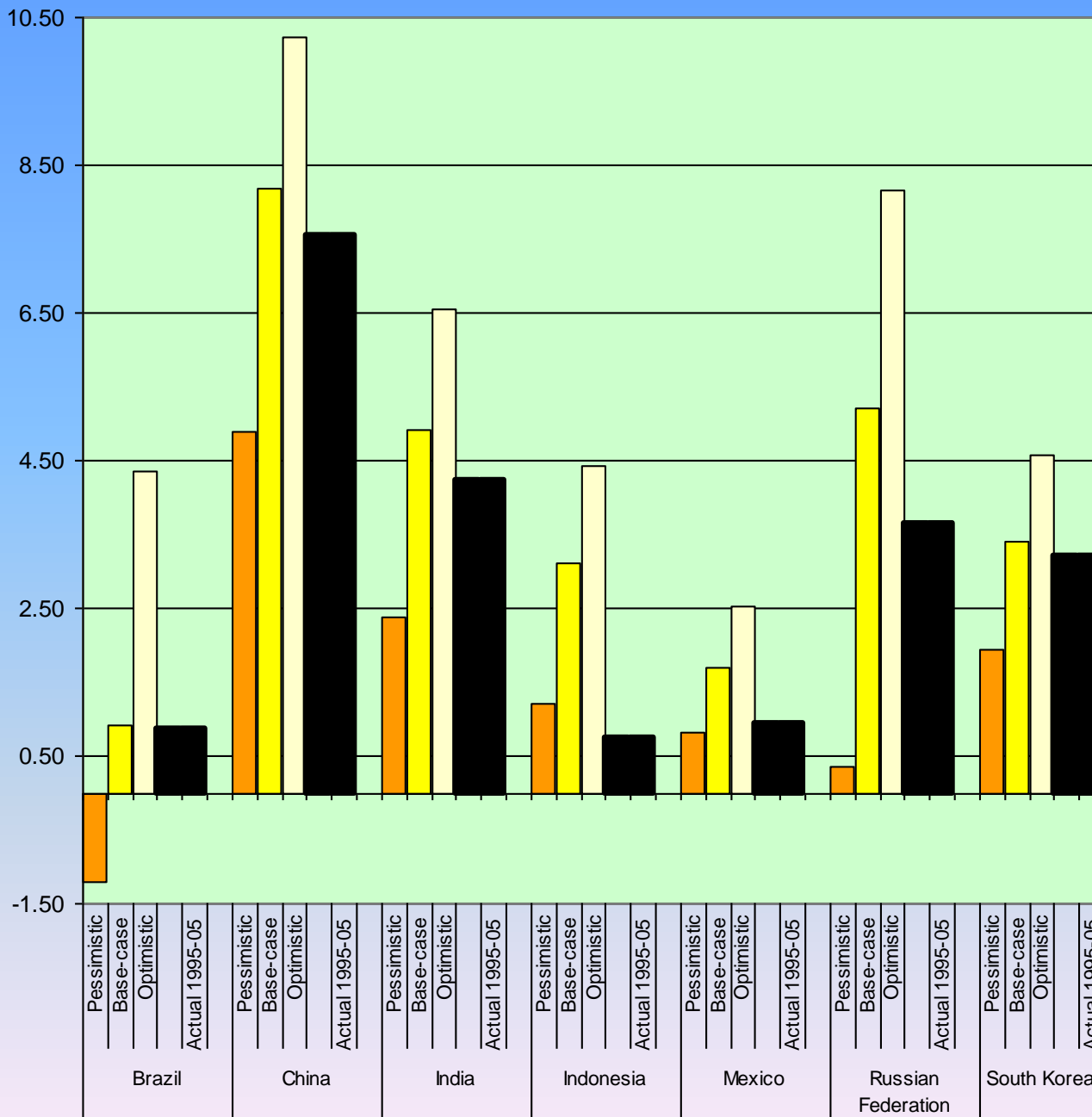
Labor Productivity Growth by Country: World and Regions



Labor Productivity Growth by Country: G7



Labor Productivity Growth by Country: Developing and Transition Economies



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

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-Producing and IT-Using Industries: investment versus TFP as sources of economic growth.