

INNOVATION AND PRODUCTIVITY GROWTH

by

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Samuel W. Morris University Professor
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Theodore W. Schultz Lecture

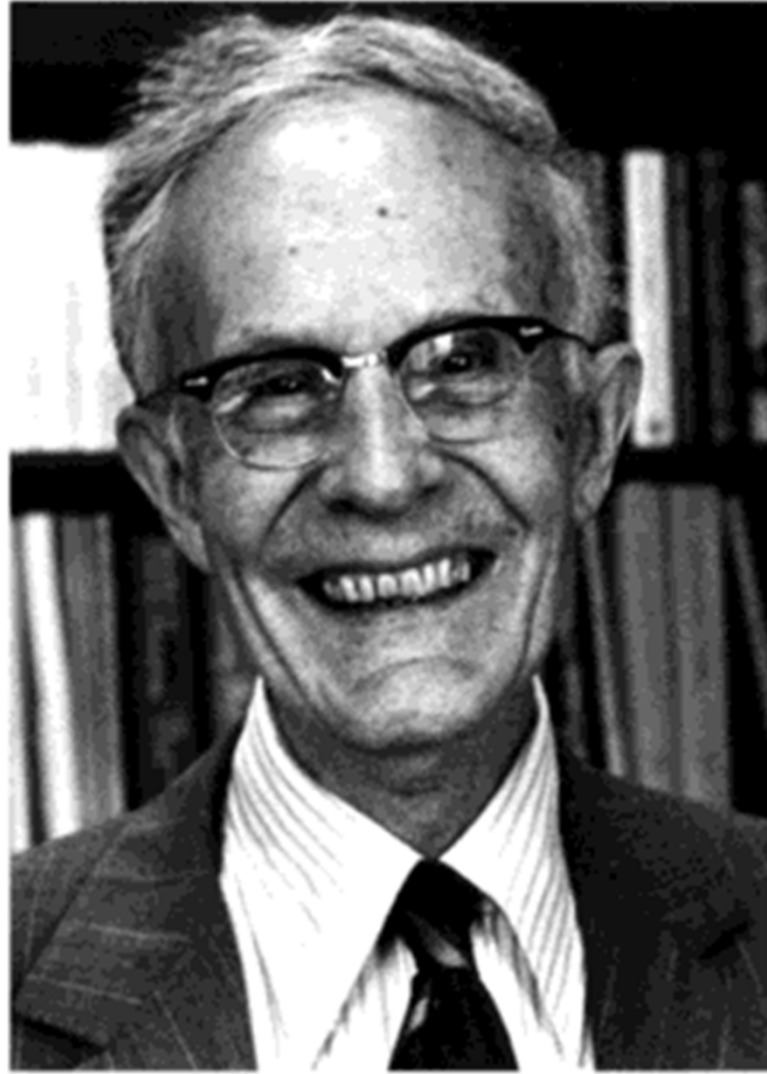
Agricultural and Applied Economics Association

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<http://www.economics.harvard.edu/faculty/jorgenson>





Photograph by Patricia Evans

T. W. Schultz

SCHULTZ ON PRODUCTIVITY GROWTH

The puzzle confronting economists has been that the rate of growth of output that was being observed has been much larger than the rate of increase in the principal resources that were being measured. It is now clear that this puzzle is of our own making because we have been using measures of capital and labor which had been refined and narrowed in ways that excluded many of the improvements that have been made in the quality of these resources.

**Theodore W. Schultz (1962),
“Reflections on Investment in Man”**

INNOVATION AND PRODUCTIVITY GROWTH: OUTLINE

New Framework for Measuring Productivity

**New Architecture for the U.S. National
Accounts**

Economic Impact of Innovation

Investment versus Innovation

STATISTICS

AVAILABLE ON LINE
www.SourceOECD.org
DISPONIBLE EN LIGNE



Measuring Productivity

OECD Manual

MEASUREMENT OF AGGREGATE
AND INDUSTRY-LEVEL
PRODUCTIVITY GROWTH



3

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

NEW FRAMEWORK FOR MEASURING PRODUCTIVITY

Constant Quality Labor Input

Constant Quality Capital Input

Production Possibility Frontier

**EU KLEMS: 25 of 27 EU Members;
Australia, Canada, Japan,
Korea, and the U.S.**



National
Bureau of
Economic
Research

Studies in
Income
and
Wealth
Volume 66

A New Architecture for the U.S. National Accounts

Edited by
Dale W. Jorgenson,
J. Steven Landefeld, and
William D. Nordhaus

MEASURING INNOVATION IN THE 21ST CENTURY ECONOMY

The proposed new 'architecture' for the NIPAs would consist of a set of income statements, balance sheets, flow of funds statements, and productivity estimates for the entire economy and by sector that are more accurate and internally consistent. The new architecture will make the NIPAs much more relevant to today's technology-driven and globalizing economy and will facilitate the publication of much more detailed and reliable estimates of innovation's contribution to productivity growth.

**Advisory Committee on Measuring Innovation
in the 21st Century Economy to the U.S.
Secretary of Commerce (2008)**

MEASURING CAPITAL SERVICES 2008

By associating these estimates with the standard breakdown of value added, the contribution of labor and capital to production can be portrayed in a form ready for use in the analysis of productivity in a way entirely consistent with the accounts of the System.

United Nations (2009), *System of National Accounts 2008*, Volume 2, Chapter 20

MEASURING CAPITAL SERVICES 1993

The net operating surplus is an accounting residual which does not possess quantity and price dimensions of its own. It may also be negative, of course.

It is not possible, therefore, to decompose the net operating surplus into its own price and volume components.

United Nations (1993), *System of National Accounts 1993*, Chapter 16



Measuring Capital OECD Manual

SECOND EDITION



2009

BLS/BEA TIMELINE

1979: Rees Report

1983: BLS TRENDS IN MULTIFACTOR PRODUCTIVITY

1994: BLS Constant Quality Labor Index

2006: Jorgenson, Landefeld, and Nordhaus, *A NEW ARCHITECTURE FOR THE U.S. NATIONAL ACCOUNTS*

2008: Advisory Committee on Measuring Innovation in the 21st Century Economy

2008: Completion of EU KLEMS Project: International Comparisons of 25 of 27 EU Member Countries, Australia, Canada, Japan, Korea, and the U.S.

2009: BEA/BLS Aggregate Production Account

THE INTERNATIONAL LIBRARY OF
CRITICAL WRITINGS IN ECONOMICS 236

THE
ECONOMICS
OF PRODUCTIVITY

Dale W. Jorgenson

MEASURING PRODUCTIVITY AT THE INDUSTRY LEVEL

Develop annual, industry-level measures of total factor productivity by restructuring the NIPAs to create a more complete and consistent set of accounts integrated with data from other statistical agencies to allow for the consistent estimation of the contribution of innovation to economic growth.

**Advisory Committee on Measuring Innovation
in the 21st Century Economy to the U.S.
Secretary of Commerce (2008)**

U.S.D.A. TIMELINE

1960: First Official Measure of Total Factor Productivity

1980: Gardner Report

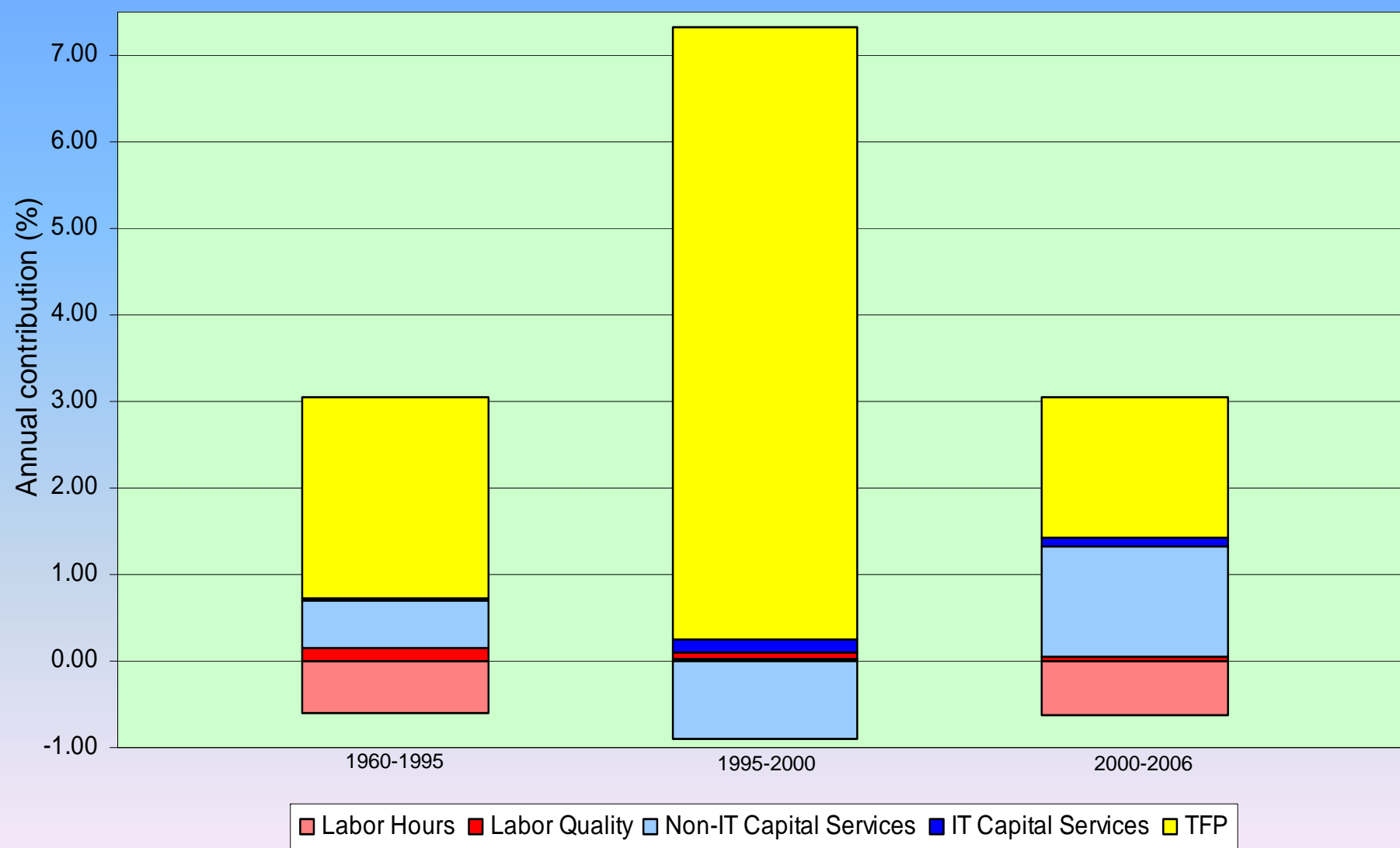
1991: Revised Official Measure of Total Factor Productivity

1999: First Official Measure of Total Factor Productivity by State

2007: International Comparisons of the US and the EU

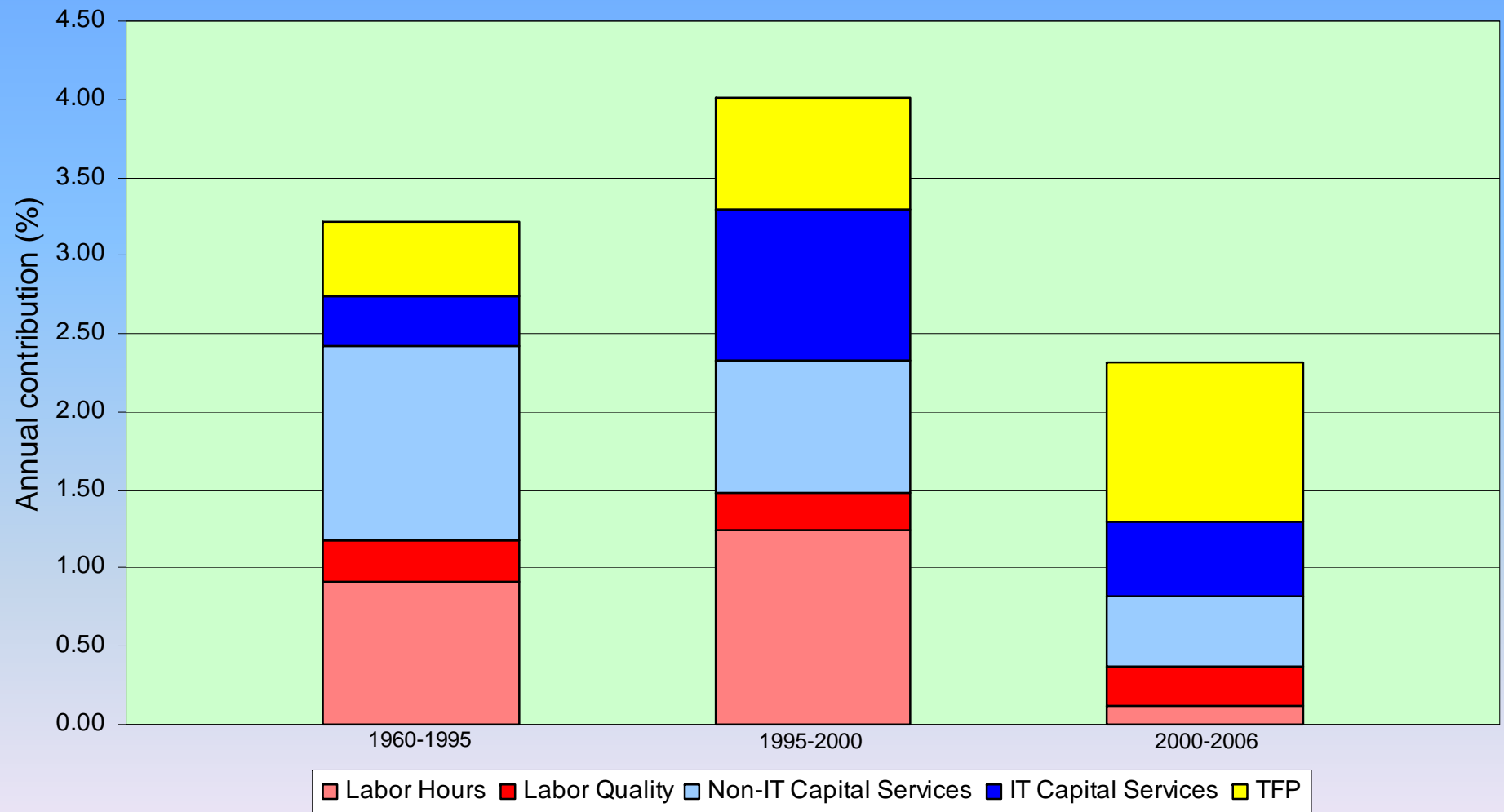
SOURCES OF U.S. AGRICULTURAL GROWTH

Average annual growth rates, weighted by the income share



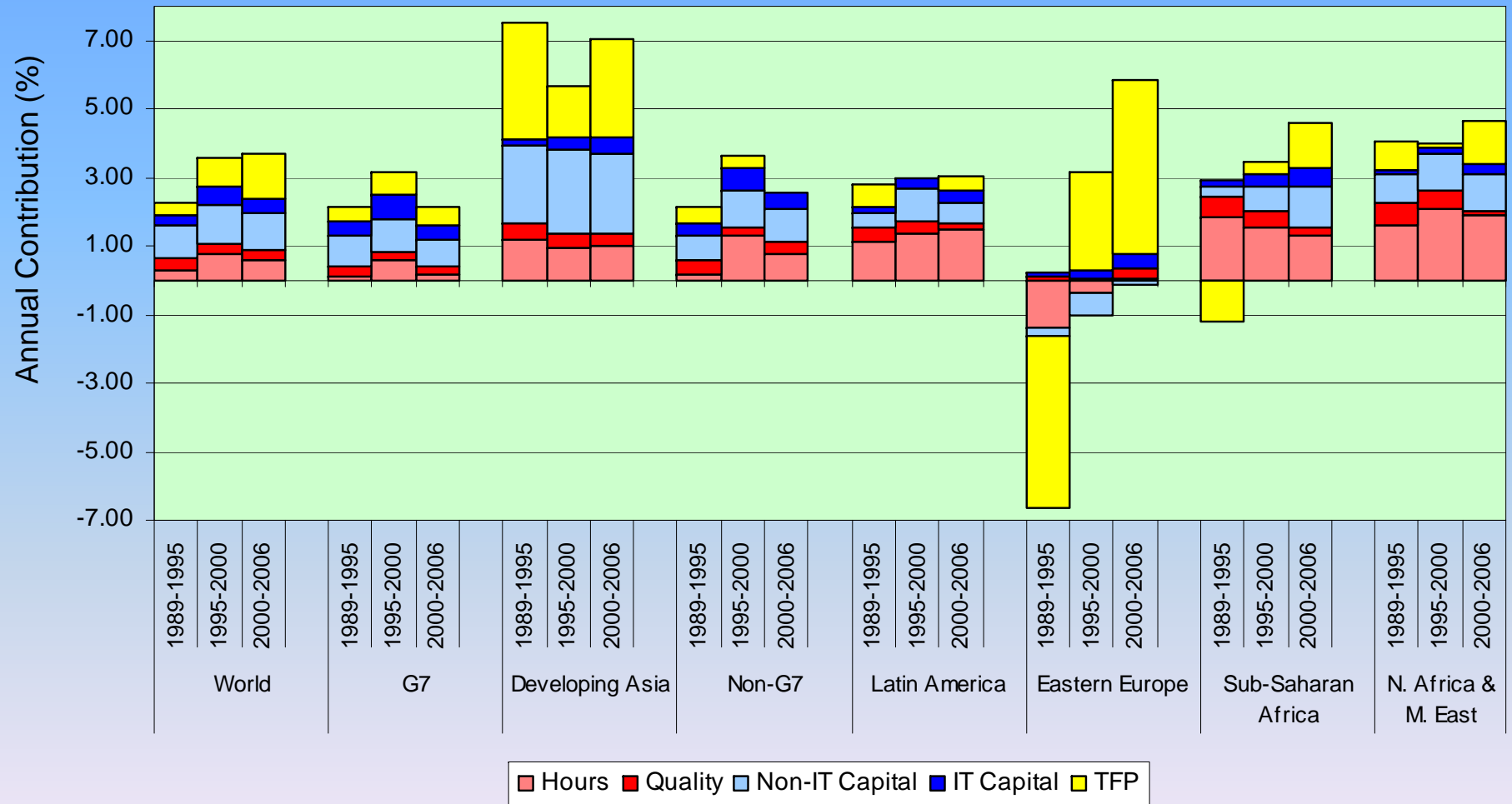
SOURCES OF U.S. ECONOMIC GROWTH

Average annual growth rates, weighted by the income share



SOURCES OF WORLD ECONOMIC GROWTH

Average annual growth rates, weighted by the income share



INNOVATION AND PRODUCTIVITY GROWTH

**Implementation of the New Framework
for Productivity Measurement**

**Implementation of the New Architecture
for the U.S. National Accounts**

**Economic Impact of Innovation: A New
Perspective on Policy**

**Investment versus Innovation: A New View of
Growth Economics**