Integrated Historical Input-Output and GDP by Industry Accounts for the United States Analyses, Extensions and Future Directions

4th World KLEMS Conference

23-24 May 2016, Madrid, Spain

Lyndaker, Howells, Strassner and Wasshausen

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Outline

- Fully Integrated Accounts
- Background on existing historical statistics
- Methodology
- Results
- Extensions
- Future directions
Integration of the National and Industry Economic Accounts

- 2014 comprehensive revision marks the first time that the Industry Economic Accounts (IEAs) and National Income and Product Accounts (NIPAs) are fully consistent with one another

- Benchmark I-O accounts establish both levels and commodity composition of GDP final use categories
  - Provide critical information for estimating GDP (by extrapolation) for periods after benchmark years

- Fully integrated historical IEA statistics
Background on Previously Published Historical Statistics

- Benchmark I-O accounts available beginning with 1947

- Annual GDP by industry statistics are available on a NAICS basis beginning with 1947.

- Annual I-O accounts available beginning with 1997
Methodology

1) 1947-92 benchmark tables updated to incorporate major definitional changes
2) Benchmark tables converted to a 2002 NAICS basis
3) Annual time series interpolated between benchmark years
4) 2002 NAICS-based time series of annual I-O accounts was converted to a 2007 NAICS basis.
5) Major definitional and statistical improvements from the 2013 comprehensive revision incorporated
Historical benchmark I-O accounts made consistent in definition and statistically with the 2010 IEA comprehensive revision:

- Government treated as a producer selling services to industries and households
- Changes to the output of insurance and banking
- Capitalization of purchased and own-account software
Methodology – Steps 2 and 3

- Conversion of benchmark I-O accounts from SIC to 2002 NAICS
  - Official concordance exists for 1997 only
  - Develop dynamic concordances historically at roughly 3-digit NAICS
- Interpolate annual time series between benchmarks, 1947-1997
Methodology – Step 4

- Convert 2002 NAICS-based time series to a 2007 NAICS basis

1) Information (NAICS 51)

2) Professional, Scientific, and Technical Services (NAICS 54)

3) Administrative and Support and Waste Management and Remediation Services (NAICS 56).
Methodology – Step 5

- Update for Definitional and Statistical Revisions from the 2013 Comprehensive Revision
  - Recognition of research and development (R&D) expenditures as capital
  - Capitalization of entertainment, literary, and other artistic originals
  - Expanded capitalization of ownership transfer costs of residential fixed assets
  - Improved measure of transactions for defined benefit pension plans.
Research and Development

R&D Output - Top Private Industries, excluding 54 (millions)  
1947-2007

- Sputnik launch in 1954
- Johnson administration in the 1960s: R&D centered on space exploration and weapon systems
- Eisenhower's presidency
- Kennedy and Johnson administration in the 1980s, increased investment in 3364OT and 334 R&D
- Reagan defense build up in the late 1980s
- Dot.com boom (and bust) and Y2K build up
- Pharma R&D picks up in the late 1990s
- Post 9/11: defense-related R&D

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Real Estimates

- Double-deflation full historical period


  - Separate prices for domestically produced versus imported commodities

  - Reflect BLS PPIs, NIPA price deflators, and BLS import prices
Improvements

- Incorporation of IPP as capital
- Expanded capitalization of ownership transfer costs
- Enhanced measures of pensions
- Double-deflation throughout
Results

Shares of Current-Dollar Value Added by Major Sector

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Revisions

- Concentrated in industries affected by the definitional improvements

  - Upward revisions to gross output and to value added – especially in manufacturing sector:
    - Chemical products
    - Computer and electronic products
    - Motor vehicles
Nominal Value Added Revisions
Nominal Value Added Revisions

Motor Vehicles

Revised

Published

Millions of dollars


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I-O Ratios

- Newly available time series for I-O statistics – fully consistent with GDP by industry

- I-O ratios – potentially important indicator for a number of metrics
  - Efficiency
  - Costs of production
  - Price volatility
Nominal I-O Ratios for Finance
Real I-O Ratios for Finance
Import Shares

- Imports shares--the ratio of imports to commodity output--are another interesting metric to evaluate over time.

- Import shares for manufactured durable goods increases gradually over the historic period, rising from percent 3.1 in 1963 to 27.0 percent in 1996.

- Mining commodities also saw notable growth in the import share over the historic period, increasing from 15.4 percent in 1963 to 49.1 percent in 1996.
Imports as a Share of Output

- Durable goods manufacturing
- Computers and electronic products
- Electrical equipment and appliances
- Motor vehicles
Extensions

▪ Trade in Value Added Statistics
  ▪ “Extended Supply-Use Tables in Basic Prices with Firm Heterogeneity: A Proof of Concept for the United States,” Fetzer, Howells, Jones, Strassner, and Wang

▪ Integrated Industry-Level Production Account for the United States
  ▪ Sources of the Ongoing U.S. Recovery - Rosenthal, Russell, Samuels, Strassner, and Usher
  ▪ Carry back in time
Export Share of Domestic Output

- Goods
- Services

Data spans from 1947 to 2012.
Intermediate Imports as a Share of Total Intermediate Inputs

Graph showing the trend of intermediate imports as a share of total intermediate inputs from 1947 to 2007.
Future Directions

- ICT price index research and implementation
  - Medical equipment
  - Cell phones
  - Custom software
  - Imported personal computers
  - Communication equipment