Deflators for GDP Services: PPIs and Other Tools

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Ways of Measuring GDP

- Output
  - Measures the contribution or value added of each industry to GDP

- Final demand
  - Final consumption expenditure
    - Plus: Gross capital formation
    - Exports
    - Minus: Imports

- Income
  - Compensation of employees
    - Plus: Taxes on production and imports, less subsidies
      - Gross operating surplus/mixed income
Measures of U.S. Real GDP*

- **Final demand**
  - Deflation of component commodities (Volume = Expenditure/Price)
  - Aggregation using Fisher Ideal formula

- **Output**
  - Double-deflation
    - Deflated gross output less deflated intermediate inputs
    - Aggregation using Fisher Ideal formula

- **Income components are not deflated**

*Also referred to as GDP volume or GDP at constant prices*
U.S. Gross Output and GDP by Industry

2005, Billions of Dollars

GDP = Value Added = $11,378

Private Services Producing Industries, 8412
Government sector, 487
Private goods-producing Industries, 2480
Intermediate inputs, 10401

Gross output = GDP + Intermediate Inputs = $21,779

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Measuring Production: Industry vs. Product Data

- U.S. GDP by Industry
  - Industry Revenue ≠ Gross output
    - Particularly true in many services industries
      - Example: Financial services
    - Creates need for data on sources of revenue
      - Many sources of revenue are not defined as output
      - Output as defined in NIPAs does not match North American Product Classification System product lists
Revenue vs. Output: U.S. Securities Intermediation and Brokerage

2002 Revenue
Billions of dollars

- Output
- Own-Account Trading Gains
- Interest

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Why Commodities Matter

- Industry data **not** sufficient to measure real GDP
  - Commodity-specific data needed for both value added and final demand
  - Commodities must be matched to price indexes for deflation
- For value added
  - Double-deflation requires commodity and price information for both gross output and intermediate inputs
- For final demand
  - Organized into commodity categories, which may include sales from different industries
Why Commodity Prices Matter for U.S. GDP by Industry

- Real (inflation-adjusted) value added for each industry:
  - Gross output price index:
    - Calculated by weighting together the commodity price indexes that comprise the industry’s output
  - Intermediate inputs price index:
    - Calculated by weighting together the commodity price indexes that comprise the industry’s purchases of goods and services
  - Commodity composition of both gross output and intermediate inputs change annually
Use of Services PPIs in U.S. Value Added Deflation

- 1,900 PPIs used in deriving real value added
- Only 75 PPIs used for services-producing industries—use CPIs or PCE price indexes where services PPIs not available

Current issue:
- For wholesale trade, use PPIs for goods themselves because detailed margin prices not yet available
- U.S. Bureau of Labor Statistics (BLS) is working to prepare margin price indexes for detailed industries
Use of Services PPIs in U.S. Final Demand Deflation

- Personal consumption expenditures (PCE) for services
  - Medical care
  - Securities brokerage
- Private Investment
  - Brokers’ commissions
  - Prepackaged software
- Government consumption expenditures and gross investment
  - Utilities
  - Communications
  - Most professional services
- Net exports
  - Selected other transportation
Composition of the PCE Price Index

- CPI: 76%
- PPI: 9%
- Other: 15%
- Input cost indexes and implicit prices
Medical Care PPIs in PCE

- PPI scope close match to PCE:
  - Expenditures made by or on behalf of households
    - Out-of-pocket expenditures
    - Employer-sponsored health insurance
    - Government programs (e.g. Medicare, Medicaid)

- CPI medical care prices only cover out-of-pocket expenditures

- PCE medical care also includes operating expenses of nonprofit providers
  - Deflated with input cost indexes
Medical Care Prices and Quality Change

- Issue of quality change generic to all price indexes
  - Want to “filter out” quality improvements, i.e. not have these show as price changes
  - Problem may be especially acute in medical care
    - Measured labor productivity very small over time
    - Have been improvements over time in price measures
    - Measuring quality change a difficult problem with no consensus on solution
Medical Care Prices and Substitution

- Medical care PPIs are for commodities by provider (industry)
- Cost of treating certain diseases/disorders may be reduced by substitution across providers
  - Example: Certain types of surgery switching from inpatient hospital setting to outpatient setting
- Effects cannot be captured in provider-based indexes
- Disease-based indexes required to account for reductions in cost arising from substitution
  - Indexes require data on nominal expenditures broken down by disease
  - Disease-based expenditures available in medical insurance records
  - BEA researchers are developing indexes from these records
  - Preliminary results show smaller increases in medical care prices than provider-based indexes
Use of Securities Industry PPIs in PCE

- Brokerage services are out of scope of U.S. CPI
- PPIs for securities industry include commodities purchased by households (e.g. equities commissions) and services sold only to business (e.g. underwriting services)
- Commodity-level PPIs needed for deflation
- Matching of nominal expenditures and price indexes especially important
  - Securities and commodity contracts intermediation and brokerage are excellent examples of "multi-commodity" industries
  - Nominal expenditures estimates require detailed commodity data
Billions of U.S. dollars, 2002
Reflects redefinitions

- Securities origination fees: 22.1
- Direct securities commissions: 76.4
- Investment company securities commissions: 7.1
- Derivative contract commissions: 16.3
- Indirect securities commissions: 3.1
- Other: 12.7

Output and PCE from Securities Industry

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PCE Securities Deflation

- Distribution of PCE very different from industry output
- Weights for PPI for Securities and Commodity Contracts Intermediation and Brokerage based on industry revenues
  - Weights are fixed
- Some PPI securities items not defined as output in NIPAs (e.g. margin lending)
- Nominal PCE for securities matched to PPI commodity indexes
- Some securities PPIs not used (e.g. investment banking services)
Potential Services PPIs in PCE: Airlines

- PPI airlines—Uses transactions prices, including Internet prices
  - Present methodology adopted in 2005
  - Separate indexes for domestic & international service

- A better measure than CPI, which uses “list” prices

- Issue: Taxes—would have to be tracked separately
Potential Services PPIs in PCE: Insurance

- PPIs for insurance reflects premium prices & rate of return on reserves
- PCE measure of insurance (property-casualty) =
  - Premiums earned
    - Plus: Premium supplements (rate of return)
    - Less: Expected losses
- Rate of return
  - PPI--Actual rate
  - PCE--Expected rate
- Real PCE by double deflation
  - \( \frac{(\text{Premiums} + \text{Premium supplements})}{\text{PPI}} \)
  - Less: (Expected losses/Benefits deflator)
Motor Vehicle Insurance Claims Distribution
Services PPIs Not Used in PCE Deflation

- CPI counterpart available
  - Most of services: Housing, household operation, transportation, recreation, personal care
- Sales are primarily intermediate
  - Example: Freight transportation
- Conceptual differences
  - Example: Casino gaming receipts
- Price measured does not reflect what is measured in nominal PCE
  - Example: Nonprofits such as hospitals, measured by operating expenses