

Deflators for GDP Services: PPIs and Other Tools

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Measuring the Nation's Economy.



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

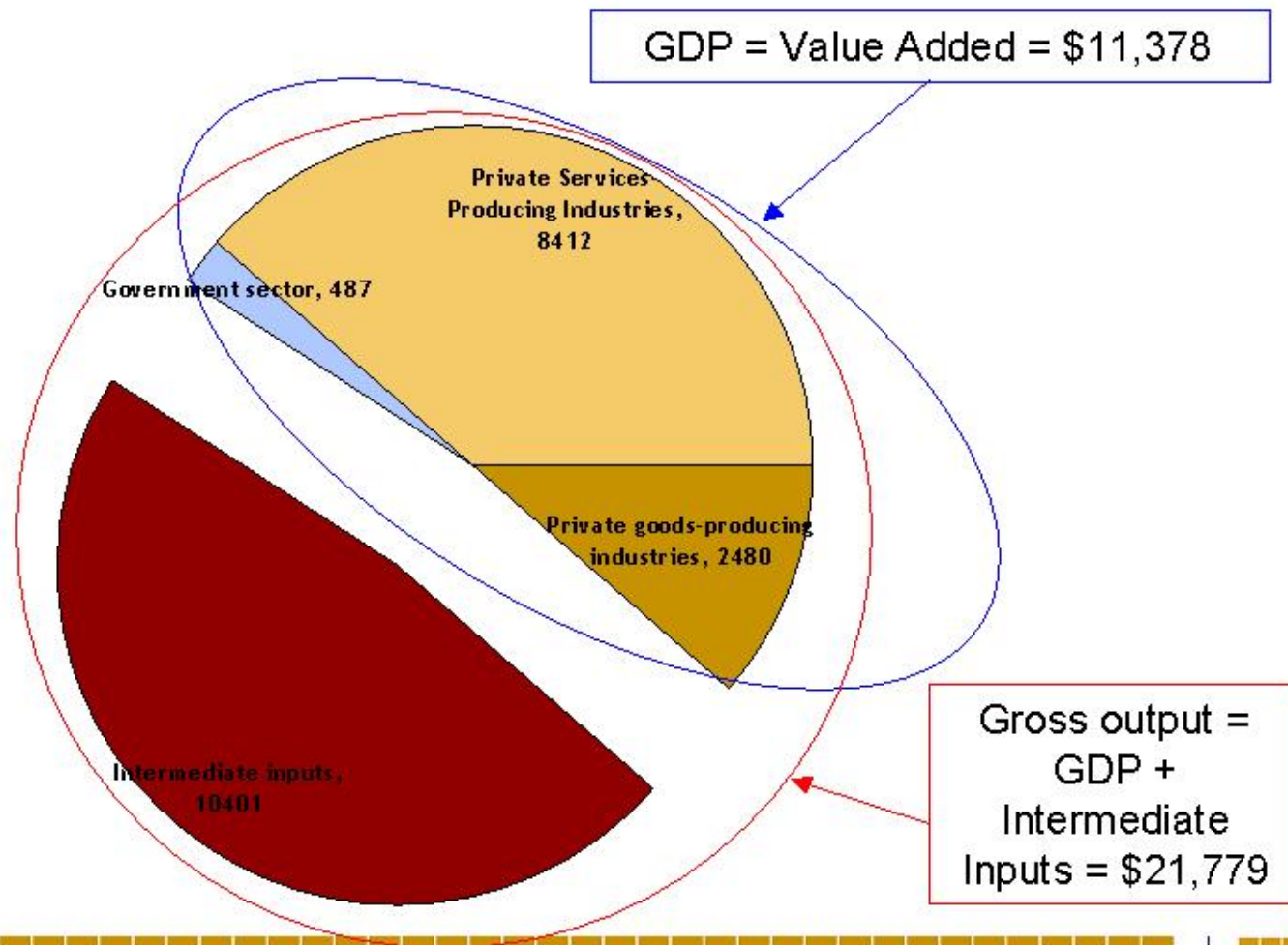
Measures of U.S. Real GDP*

- 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

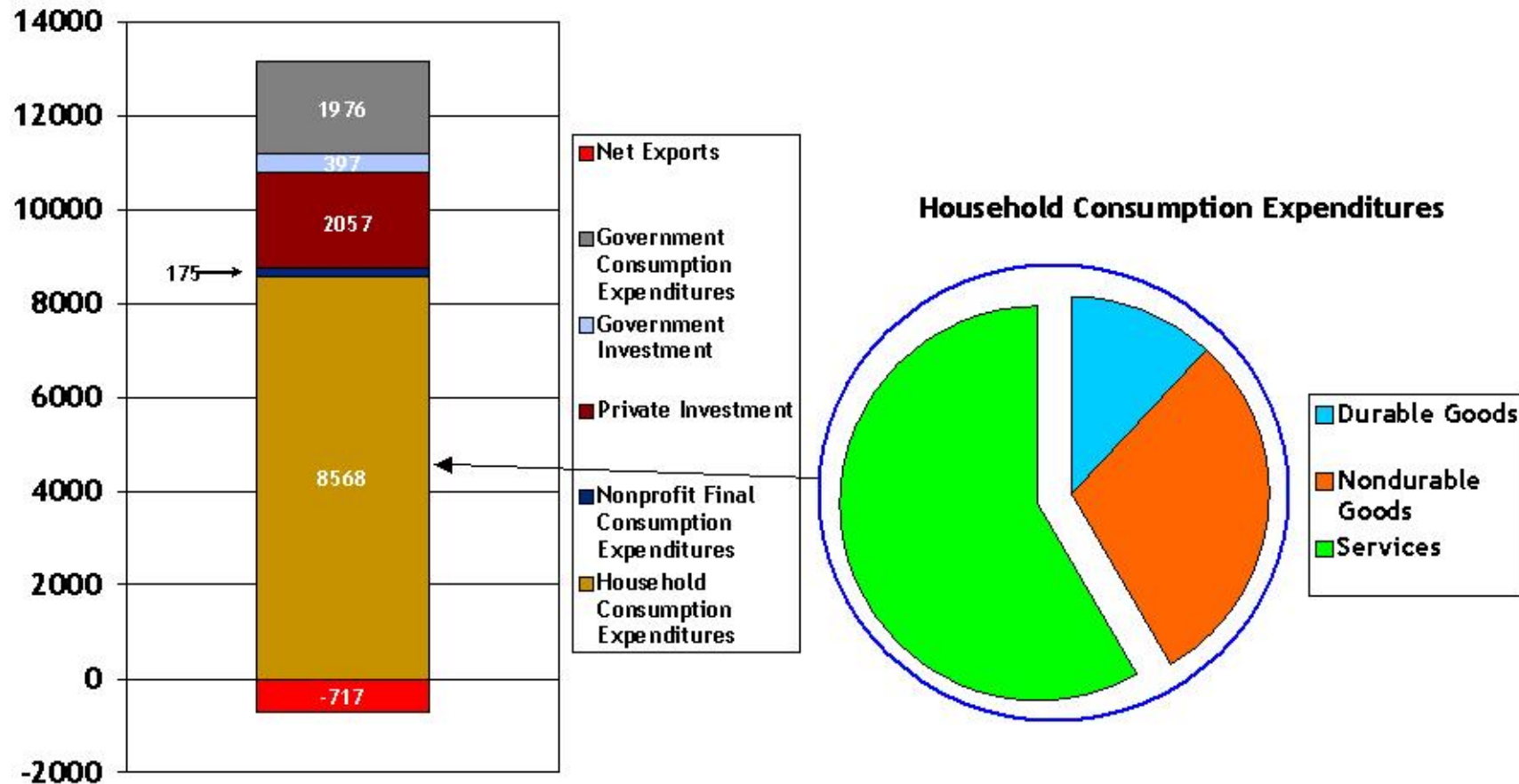
U.S. Gross Output and GDP by Industry

2005, Billions of Dollars



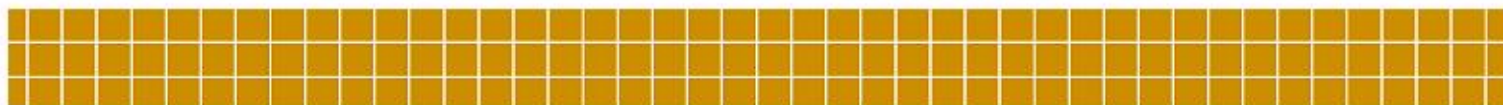
U.S. GDP: Final Demand Approach

Billions of dollars, 2005



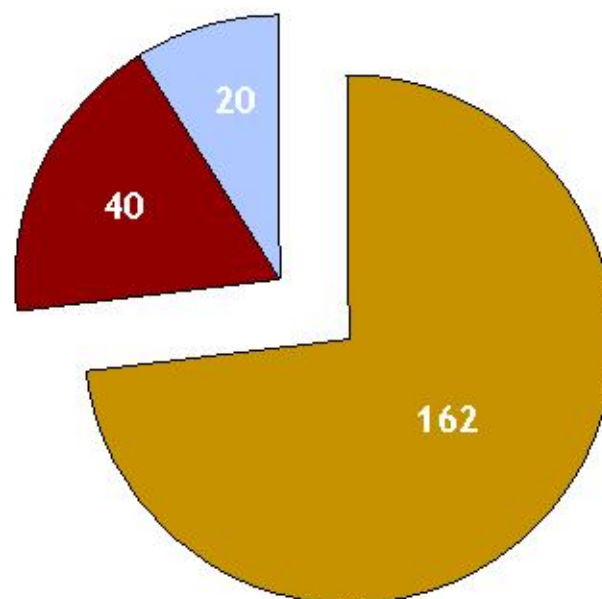
Measuring Production: Industry vs. Product Data

- U.S. GDP by Industry
 - Industry Revenue \neq 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

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

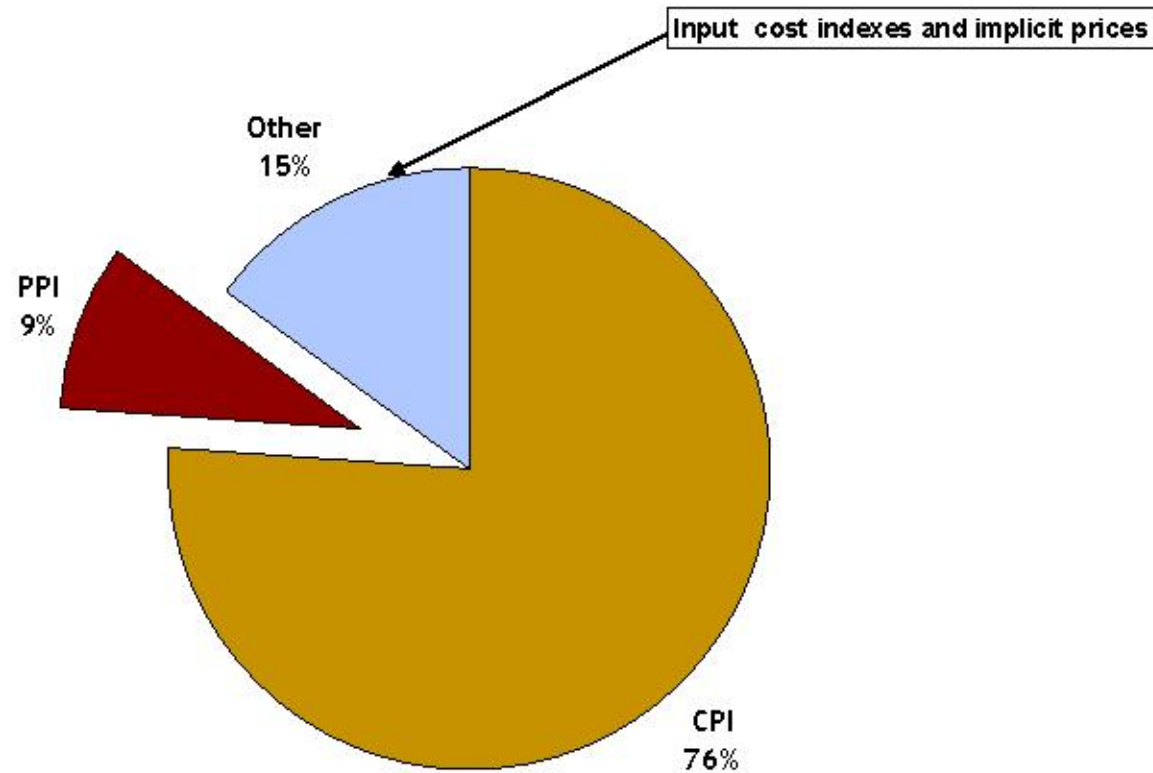
- 1,900 PPIs used in deriving real value added
- Only 75 PPIs used for services-producing industries—use CPIs or PCE price indexes where services PPIs not available
- Current issue:
 - For wholesale trade, use PPIs for goods themselves because detailed margin prices not yet available
 - U.S. Bureau of 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



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

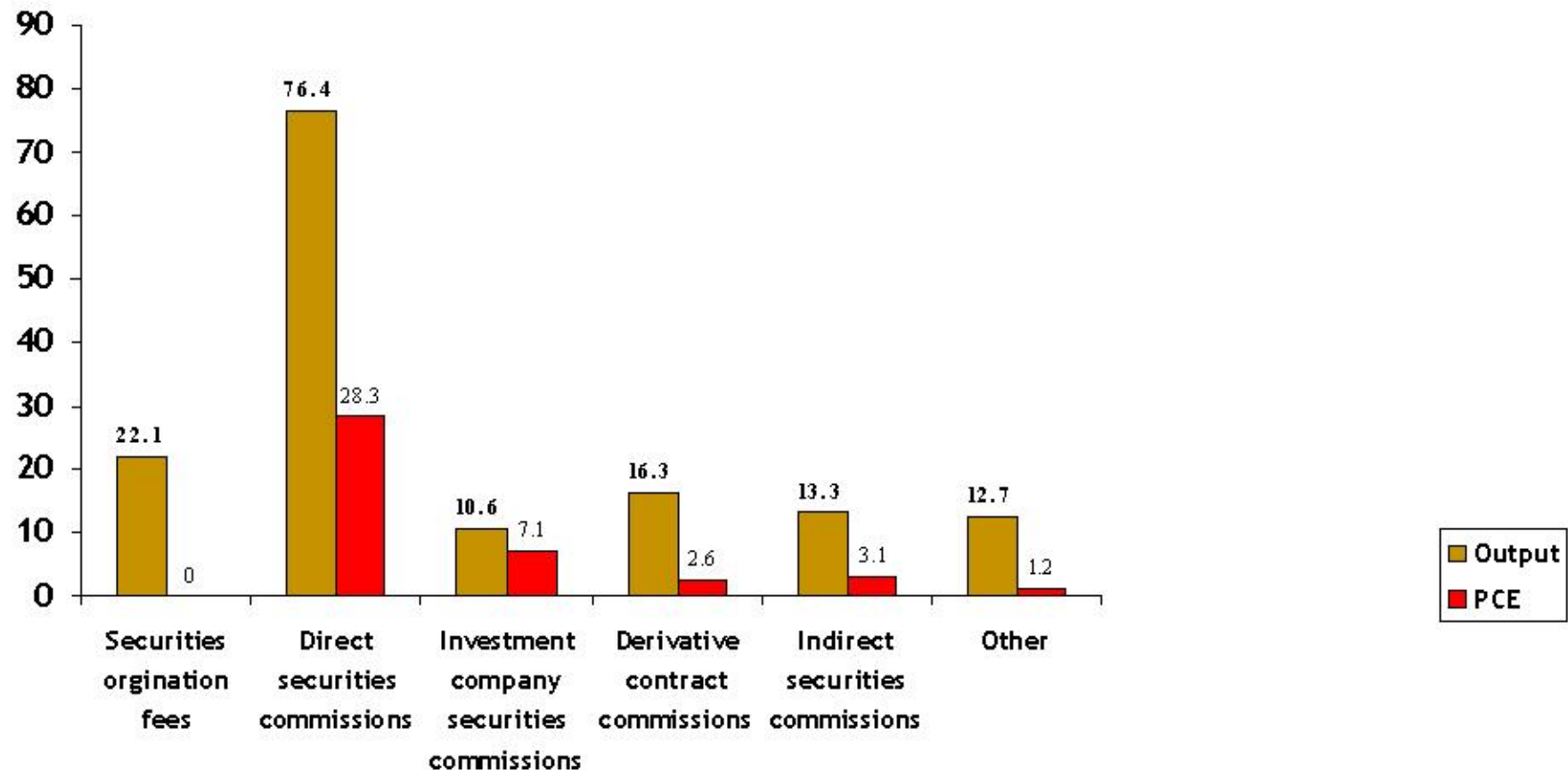
Use of Securities Industry PPIs in PCE

- 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

Output and PCE from Securities Industry

Billions of U.S. dollars, 2002

Reflects redefinitions



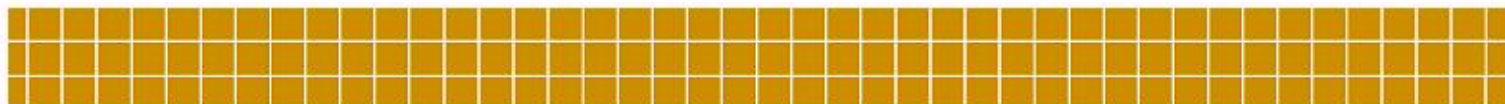
PCE Securities Deflation

- 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)

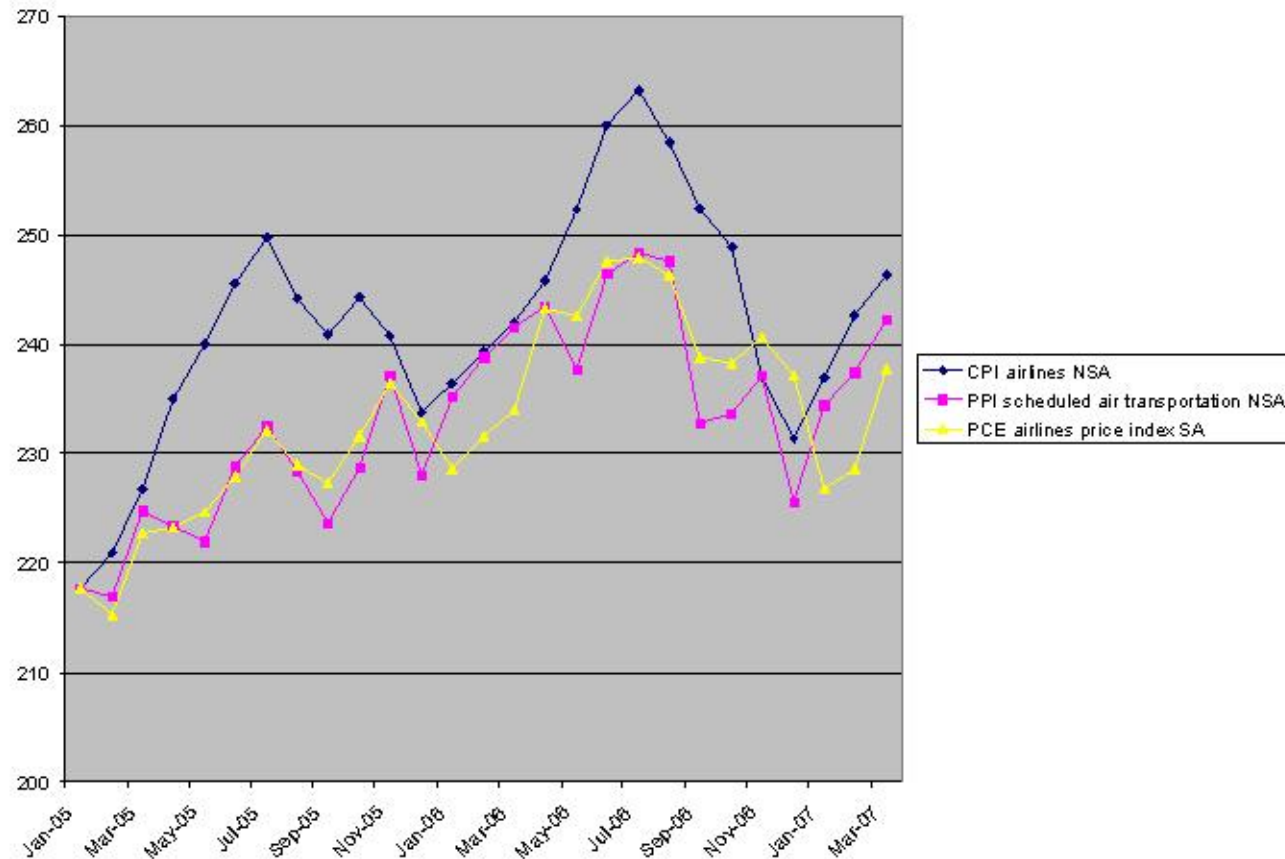


Potential Services PPIs in PCE: Airlines

- 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



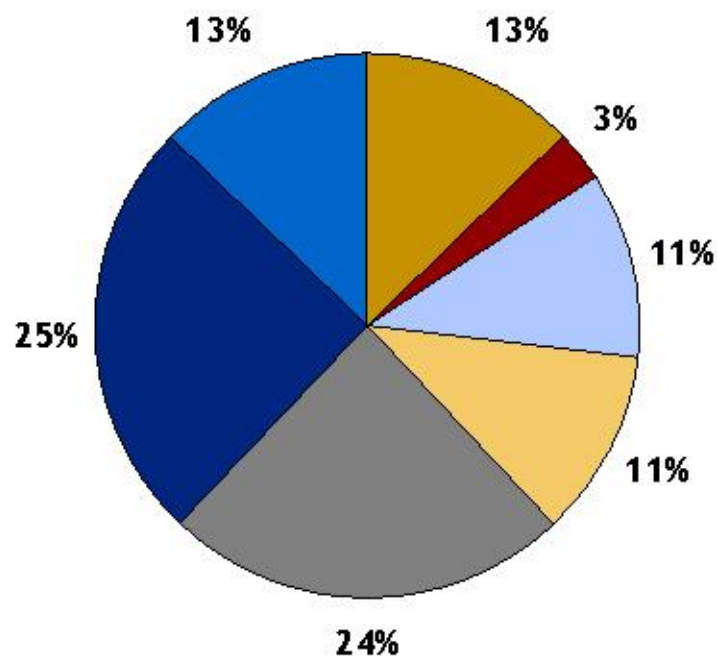
Airline Price Measures



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
 - $\{(Premiums + Premium\ supplements)/PPI\}$
 - 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

