

Disease Based Price Indexes

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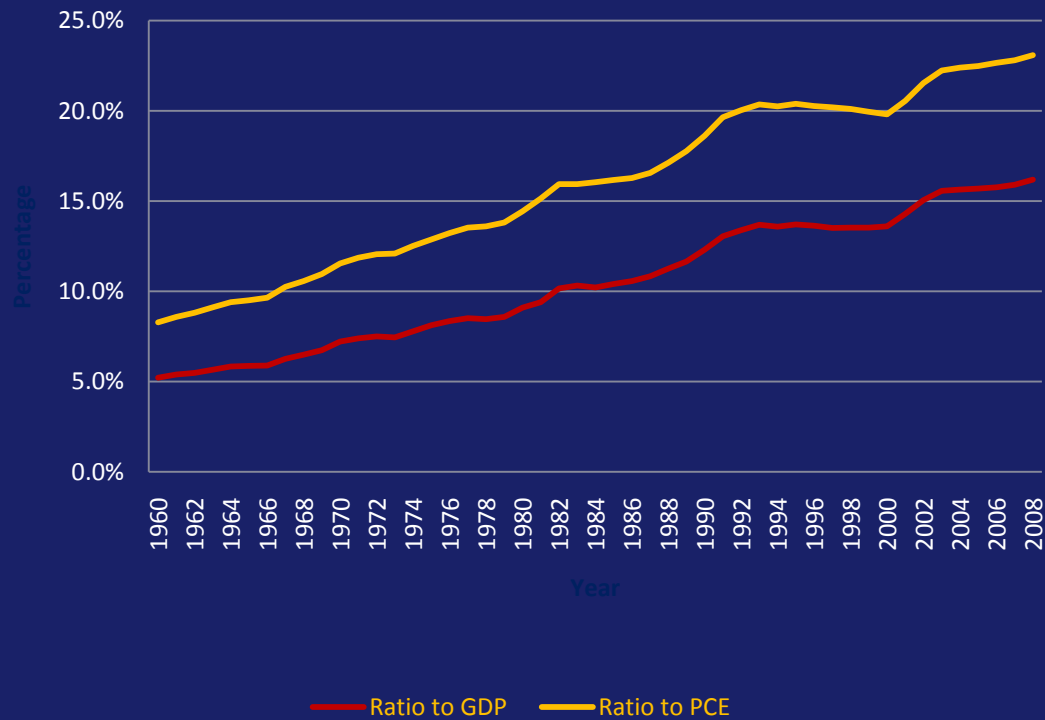
Presentation Outline

- History
- CNSTAT 2002 Recommendation*
- BEA/BLS Research
- Conclusions

* Shultze and Mackie, *At What Price?*, Recommendation 6-1.

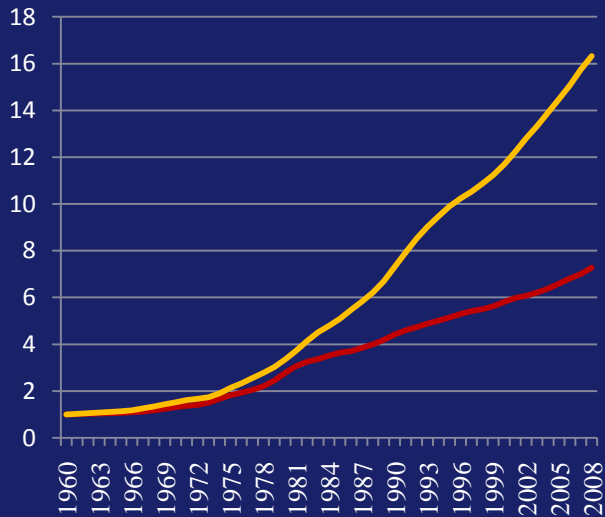
National Health Concern

National Health Expenditures As a Percent of GDP and PCE

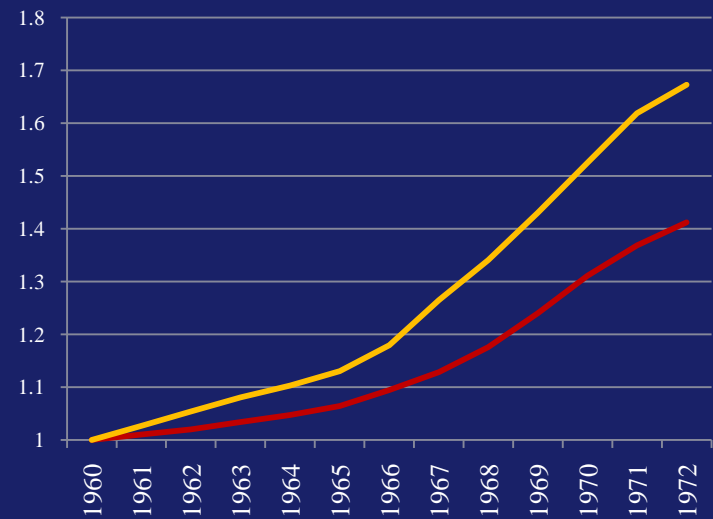


Health Inflation Compared to Overall Inflation

All Items CPI v. Medical CPI
1960-2008



All Items CPI v. Medical CPI
1960-1972



— All Items CPI — Medical CPI

— All Items CPI — Medical CPI

Is this price growth overstated?

- For over forty years, many claim that the CPI Indexes are upwardly biased.
- Many believe that bias occurs because we use the wrong concept.
- We price health care services and goods, and not the treatment of the disease.

Concepts for Medical Expenditure

- (Triplett, 1999)
Comparison between “human repair” and auto repair.
- For a car repair, the consumer pays one price for the entire repair. We do not treat human repair the same way.
- Newhouse (1992)
- CPI actually prices the inputs, and not the output.
- Should focus on the price/cost of treating a disease and not the service used to treat the disease.

The Disease Approach

- First disease based indexes computed by Scitovsky, 1967.
- Used medical records from a single medical practice group in Palo Alto.
- Results published in AER, 1967.
- She concludes that accounting for the changes in the quantity of goods and services used to treat a disease is important.
- Physician services, Rx, etc. are not final output. They are inputs.

Other Studies

- Shapiro and Wilcox (2001)
 - ▶ Substitution from inpatient hospital to outpatient for cataracts.
 - ▶ This has reduced the “price” of a cataract treatment.
- Berndt et. al (1996, 2002)
 - ▶ Substitution from office visits to medication for mental illness.
 - ▶ This has reduced the “price” of treating mental illness.
- Cutler et. al (1998)
 - ▶ Defined the concept of a Service Price Index.
 - ▶ Although service prices were increasing the total price of heart treatment was falling.
- From these studies, many infer that current medical price indexes from the CPI, PPI, and PCE are upwardly biased.
- Medical inflation is not as alarming as the published numbers would imply.
- When nominal health expenditure growth is decomposed into price and quantity growth, currently published indexes overstates the price growth and understates the quantity growth.

Major Medical Innovations Affecting Input Use

| Innovation | Service/Product | Disease Treated |
|--------------------------|-------------------------|-------------------------|
| MRI and CT | Diagnostic/Phys. Visits | various |
| ACE inhibitors | Rx/Hospitals | hypertension |
| Balloon angioplasty | Surgery/Hospitals | coronary artery disease |
| Statins | Rx/Hospitals | high blood cholesterol |
| Mammography | Diagnostic | breast cancer |
| Coronary Bypass | Surgery | coronary artery disease |
| H2 blockers | Rx | stomach |
| SSRI anti-depressants | Rx/Therapy Visits | depression |
| Cataract extraction | Inpatient/Outpatient | cataracts |
| Hip and knee replacement | Inpatient/Outpatient | orthopedic |
| Biopharmaceuticals | Rx/Hospitals/Phys. | mostly cancer |
| Da Vinci Surgical Robot | Operating Room | various |

CNSTAT 2002 Method for CPI

- Use “claims database to identify and *quantify* the inputs used in” the treatment of a disease.
- “On a monthly basis, the BLS should reprice” current medical inputs keeping the *quantities* fixed.
- “every year or two” update the *quantities* of inputs used to treat a disease.
- When updated, “the index will jump at the linkage points.”

Simplified CNSTAT Formulae

P_{dit} = Price of input service i used to treat disease d in period t .

Q_{dir} = Quantity of input i for a patient with d in period $r < t-1$.

When quantities are not updated:
(Lowe Index)

$$I_{dt} = \frac{\sum_i P_{dit} Q_{dir}}{\sum_i P_{dit-1} Q_{dir}}$$

When quantities are updated:

$$\begin{aligned} I_{dt} &= \frac{\sum_i P_{dit} Q_{dir+1}}{\sum_i P_{dit-1} Q_{dir}} \\ &= \frac{\sum_i P_{dit-1} Q_{dir+1}}{\sum_i P_{dit-1} Q_{dir}} \times \frac{\sum_i P_{dit} Q_{dir+1}}{\sum_i P_{dit-1} Q_{dir+1}} \\ &= \text{Jump from Q change} \quad \text{Price change only} \end{aligned}$$

Example 1

A Mental Illness Patient

Price of Office Visit = \$200 in period 1; = \$220 in period 2.

Price of Rx = \$30 in period 1; = \$33 in period 2.

The price of all inputs increase 10%.

Quantity of Office Visits = 4 in period 1 ; = 1 in period 2.

Quantity of Rx = 0 in period 1 ; = 4 in period 2.

Disease Based Index drops 66%:

$$\frac{P_{doc,2}Q_{doc,2} + P_{RX,2}Q_{RX,2}}{P_{doc,1}Q_{doc,1} + P_{RX,1}Q_{RX,1}} = \frac{P_{doc,1}Q_{doc,2} + P_{RX,1}Q_{RX,2}}{P_{doc,1}Q_{doc,1} + P_{RX,1}Q_{RX,1}} \times \frac{P_{doc,2}Q_{doc,2} + P_{RX,2}Q_{RX,2}}{P_{doc,1}Q_{doc,2} + P_{RX,1}Q_{RX,2}}$$

$$\frac{220*1 + 33*4}{200*4 + 30*0} = \frac{200*1 + 30*4}{200*4 + 30*0} \times \frac{220*1 + 33*4}{200*1 + 30*4}$$

$$.44 = .4 \times 1.10$$

$$\text{Index} = \text{Input Effect} \times \text{Price Effect}$$

Recent Research by BEA/BLS

| Study | Data Source | Episode Grouped | Time Period | Allocation of spending to diseases | Other |
|--|------------------------|-----------------|---|---------------------------------------|---|
| Song et. al (2009) | Thomson Claims Data | Yes | Jan 1999-December 2002 | ETG | Only 3 cities, Only 40 randomly selected ICD-9. |
| Aizcorbe and Nestoriak (2010) | Pharmetric Claims Data | Yes | 1 st Qtr 2003-4 th Qtr 2005 | ETG | Quarterly indexes for all diseases, national representation. |
| Bradley et. al. (2010) | MEPS and CPI | No | Jan 1999-December 2004 | Proration | Monthly indexes for all diseases, national representation |
| Dunn, Liebman, Pack, Shapiro (2010) | Marketscan (weighted) | Yes | 1 st Qtr 2003-4 th Qtr 2007 | ETG | Quarterly indexes for all diseases with robustness checks |
| Contract with Analysis Group (2010-2011) | Ingenix | Yes | 1 st Qtr 2001-4 th Qtr 2004 | ETG | Quarterly indexes with claims data from private health insurers |
| Aizcorbe et. al. (2011) | MEPS | Yes | 2001-2005 | MEG, Primary diagnosis, and proration | Annual indexes for all diseases, national representation |

Conclusion from BLS/BEA Studies

- With *different data, different time periods, and different methods*, all find bias from current service based methods.
- A biased medical price indexes leads to a biased real GDP growth estimate.
- For a few diseases, the service base method produces a lower index.
- We have the capacity to generate timely disease based price indexes.
- This is a feasible program that can be easily integrated into existing programs.

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