

Redefining the output of medical care industries: implications for productivity measurement

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Measured productivity growth for medical care services is thought to be understated (Bosworth and Triplett)

- In large part because real output growth is likely understated
 - Current measures do not account for the marginal improvements to health that accrue from new technologies and methods (quality change)
 - The “commodity” provided by the sector should be defined in terms of the purpose of the spending (preventive care, screening, diagnosis services, and the treatment of disease) not by provider (offices of physicians, hospitals, etc.).
- Fixing these problems will likely increase measured real GDP growth, and measured productivity growth.
- Question: who should get the credit for these productivity gains?

Background: Proposed changes to nominal spending in the NIPAs

Growth in Nominal Spending (2001-2005)			
Old Method		New Method	
<i>Revenues by Industry</i>		<i>Medical Care Spending for the Treatment of:</i>	
Prescription Drugs	12.10%	1 Infectious and Parasitic Diseases	15.00%
Physician Services	10.00%	2 Neoplasms	11.80%
Hospital Services		3 Endocrine, Nutritional and Metabolic Diseases, and Immunity Disorders	11.60%
Inpatient	8.40%	4 Diseases of the Blood and Blood-Forming Organs	28.30%
Outpatient	9.10%	5 Mental Disorders	10.70%
Emergency Room	7.30%	6 Diseases of the Nervous System and Sense Organs	11.80%
		7 Diseases of the Circulatory System	5.30%
		8 Diseases of the Respiratory System	4.50%
		9 Diseases of the Digestive System	11.10%
		10 Diseases of the Genitourinary System	15.80%
		11 Complications of Pregnancy, Childbirth, and the Puerperium	7.60%
		12 Diseases of the Skin and Subcutaneous Tissue	9.30%
		13 Diseases of the Musculoskeletal System and Connective Tissue	9.80%
		14 Congenital Anomalies and Certain Conditions Originating in the Perinatal Period	22.70%
		15 Certain Conditions Originating in the Perinatal Period	18.90%
		16 Symptoms, Signs, and Ill-Defined Conditions	10.80%
		17 Injury and Poisoning I	8.60%
		18 Supplementary Classifications--E Codes	5.70%
	9.70%		9.70%

Background: Proposed changes to price index and real spending in the NIPAs

Effect of redefining the output of the medical care sector, 2001-2005 (compound annual growth rates)

Output Definition		
	<i>Old Method</i>	<i>New Method</i>
Medical Care Sector		
Nominal spending	9.70%	9.70%
Price Deflator	7.80%	6.80%
Real spending	1.80%	2.70%
Contribution to real GDP	.36pp	.47pp

Question: How do we reflect the increase in real output growth in the industry accounts?

Spending side of the accounts

Production Side of the accounts

Growth in Real Spending, 2001-2005

Medical Care Spending for the Treatment of:

1 Infectious and Parasitic Diseases	-0.2%
2 Neoplasms	0.4%
3 Endocrine, Nutritional and Metabolic Diseases, and Immunity Disorders	5.3%
4 Diseases of the Blood and Blood-Forming Organs	-1.8%
5 Mental Disorders	6.5%
6 Diseases of the Nervous System and Sense Organs	-0.1%
7 Diseases of the Circulatory System	4.9%
8 Diseases of the Respiratory System	0.2%
9 Diseases of the Digestive System	3.5%
10 Diseases of the Genitourinary System	0.2%
11 Complications of Pregnancy, Childbirth, and the Puerperium	0.2%
12 Diseases of the Skin and Subcutaneous Tissue	-1.3%
13 Diseases of the Musculoskeletal System and Connective Tissue	2.6%
14 Congenital Anomalies and Certain Conditions Originating in the Perinatal Period	3.2%
15 Certain Conditions Originating in the Perinatal Period	0.9%
16 Symptoms, Signs, and Ill-Defined Conditions	0.2%
17 Injury and Poisoning I	0.6%
18 Other	0.7%

2.7%

Revenues by Industry

Prescription Drugs	3.6%
Physician Services	3.9%
Hospital Services	
Inpatient	-0.1%
Outpatient	-1.8%
Emergency Room	1.1%

1.8%

What do we usually do to the industry accounts when we change deflators in the NIPAs?

- There is usually an obvious industry whose deflator also needs to be changed.
- For example, when BEA changed the deflator used for computers in the NIPAs, it was clear what to do in the industry account:

National Income and Product Accounts		Industry Account	
.		.	
.		.	
.		Manufacturing	
<i>Personal Computers</i>	(Final goods)	<i>Personal computers</i>	(Final goods)
.		Semiconductor chips	(intermediate good)
.		Disk Drives	(intermediate good)
.		.	
Prescription drugs	(Final goods)	Pharmaceuticals	(Final goods)
.		.	
.		Services	
.		.	
Hospital Services	(Final goods)	Hospitals	(Final goods)
Offices of Physicians	(Final goods)	Offices of Physicians	(Final goods)

For medical care spending, one possibility is to treat doctors as outsourcers.

Treats “prescribing doctors” as the orchestrators of care, like a “contractor.”

National Income and Product Accounts

Medical Care (Final good)
 Infectious diseases
 Neoplasms
 etc.

Industry Account

Offices of Physicians	(Final commodity)
Hospitals	(intermediate good)
Pharmaceuticals	(intermediate good)

Example of production function for outsourcing doctors:

$$Q^{DOC} = A \cdot f(\text{treatment of infectious diseases, neoplasms,.....}; L^{DOC}, K^{DOC}, Q^{HOSPITALS}, Q^{PHARMACEUTICALS})$$

Treating doctors as outsourcers requires rerouting transactions

Table 2: Nominal Gross Output, Intermediate Inputs, and Value Added by Industry, 2002
Selected Health Industries, Current vs. New Structure (\$millions)

Industry Code	Industry Description	Gross Output			Intermediate Inputs			Value Added		
		Current	Alternate	Difference	Current	Alternate	Difference	Current	Alternate	Difference
62	Health care and social assistance	1,140,378	1,927,367	786,989	449,435	1,236,424	786,989	690,943	690,943	0
621	Ambulatory health care services	524,779	1,311,768	786,989	189,508	976,497	786,989	335,271	335,271	0
621110	Offices of Physicians	263,588	1,050,577	786,989	85,648	872,636	786,989	177,940	177,940	0
621Other	Ambulator health care services excluding offices of physicians	261,191	261,191	0	103,860	103,860	0	157,330	157,330	0
622HO	Hospitals and nursing and residential care facilities	516,099	516,099	0	220,031	220,031	0	296,068	296,068	0
624	Social assistance	99,501	99,501	0	39,896	39,896	0	59,605	59,605	0

- Some definitions:
 - Gross output = dollar value of PCs produced by original equipment manufacturers (OEMs). Adding up gross output over all industries leads to double counting.
 - Value added is used to avoid double counting. It is measured as gross output less value of materials and services purchased by OEMs (intermediate inputs like MPU chips, disk drives, etc.)

Treating doctors as outsourcers also requires a new price index for gross output.

Alternative Measures of Growth in Gross Output, Intermediate Inputs, and Value Added for Offices of Physicians

(compound annual growth rates)

	Gross output		Intermediate inputs		Value added	
	new structure	Bradley (2013)	new structure	Bradley (2013)	new structure	Bradley (2013)
Growth in deflators	3.1	2.1	3.7	3.7	--	--
Growth in reals	3.5	4.5	3.2	3.2	5.3	10.9

- Some definitions:
 - Real gross output = gross output deflated by a price index.
 - Real value added is obtained using double deflation
 - Real value added = real gross output less real intermediate inputs.

MFP measures based on Gross Output also show faster growth

- The table below uses the data underlying the MFP measure developed by Fisher (2008) to illustrate how changing the structure and applying the Bradley index would change measured MFP growth.

Table 8. MFP calculations for Offices of Physicians, alternative scenarios
2001-2004, compound annual growth rates

		Fisher (2008)	New Structure	
			old price indexes	new price indexes
Output	growth	6.74%	5.21%	6.25%
Labor	share	62.4%	16.5%	16.5%
	growth	2.50%	2.50%	2.50%
Capital	share	7.0%	1.9%	1.9%
	growth	3.80%	3.80%	3.80%
Intermediates	share	30.6%	81.6%	81.6%
	growth	10.55%	3.80%	3.80%
	MFP	1.68%	1.63%	2.66%

Are there any alternatives?

We could leave the productivity gains “unallocated”

Table 6. Growth in Real Value Added (compound annual growth rates)

	Current Deflator	New Measured Productivity Gains Allocated to:		
		All Industries	Health Care and Social Assistance	Offices of Physicians
All industries	2.6%	2.7%	2.7%	2.7%
Private industries	2.9%	2.9%	3.0%	3.0%
Educational services, health care, and social assistance	2.8%	2.8%	4.0%	4.0%
Health care and social assistance	3.2%	3.2%	4.6%	4.6%
Ambulatory health care services	4.2%	4.2%	4.2%	7.1%
Offices of Physicians	5.4%	5.4%	5.4%	10.9%
Other ambulatory health care services	2.8%	2.8%	2.8%	2.8%
Hospitals and nursing and residential care facilities	2.0%	2.0%	2.0%	2.0%
Social assistance	3.1%	3.1%	3.1%	3.1%
Not allocated to Health Care and Social Assistance Industry	--	--	1.4%	--
Government	0.7%	0.7%	0.7%	0.7%
Not allocated by industry	--	0.1%	--	--

$Q_{HealthCareSector} =$

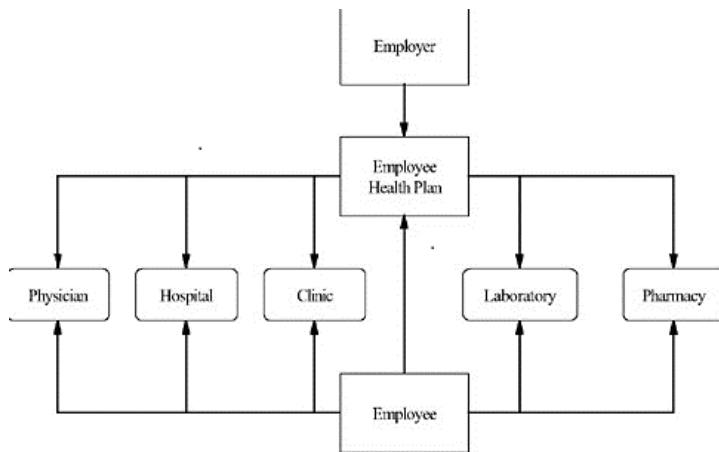
$A \cdot g(\text{treatment of infectious diseases, neoplasms,.....}; L^{DOC}, K^{DOC}, L^{HOSP}, K^{HOSP}, L^{PHARMA}, K^{PHARMA})$

Background:

Medical care expenditures are already rerouted.

Example: patients with commercial insurance

Actual transactions



Rerouted Transactions

