

The Supply Side of Health Care

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September 4, 2014



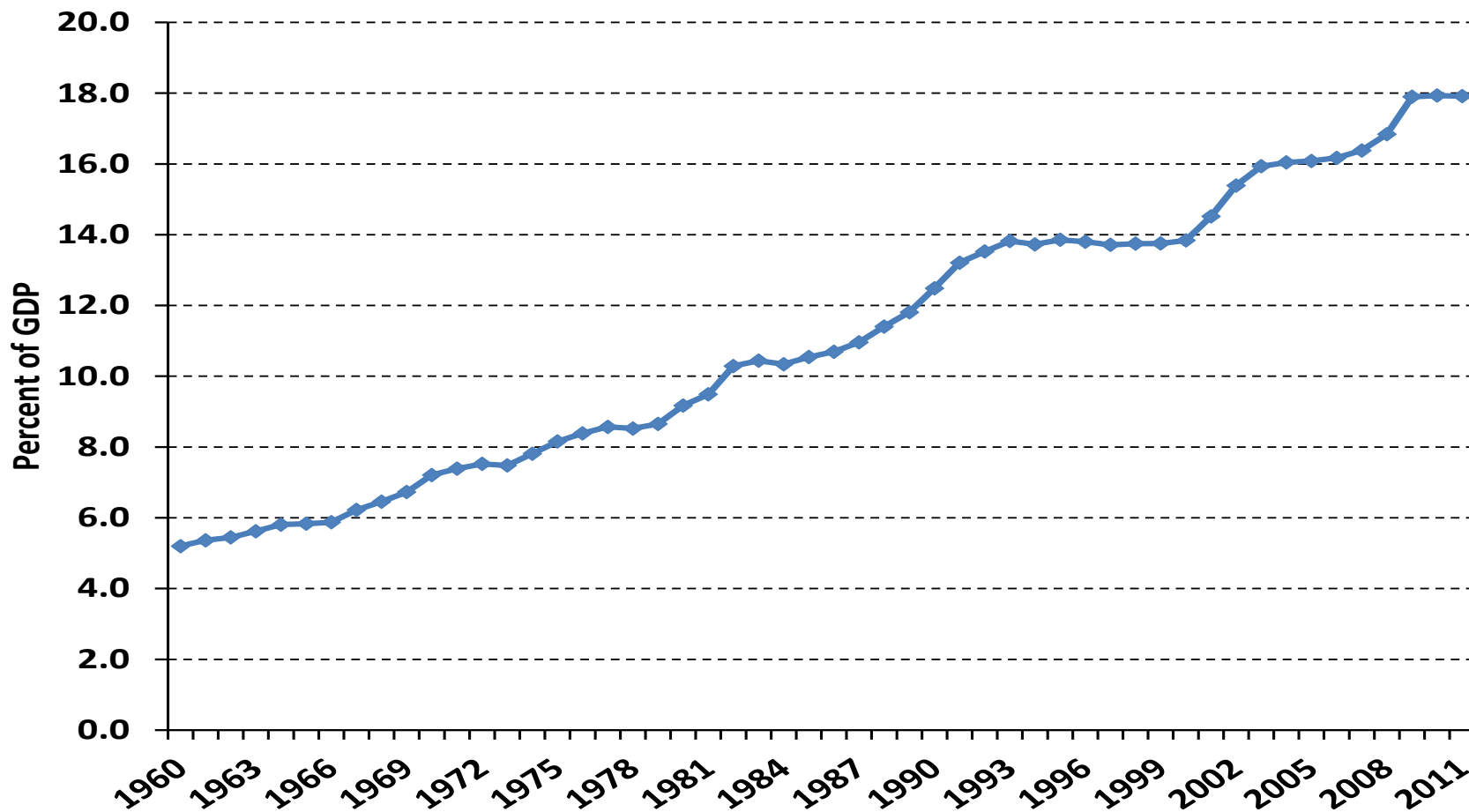
Paper

This work has been published by the Bureau of Economic Research (BEA) in April 2014. The link is below.

http://bea.gov/scb/pdf/2014/04%20April/0414_supply_side_of_health_care.pdf



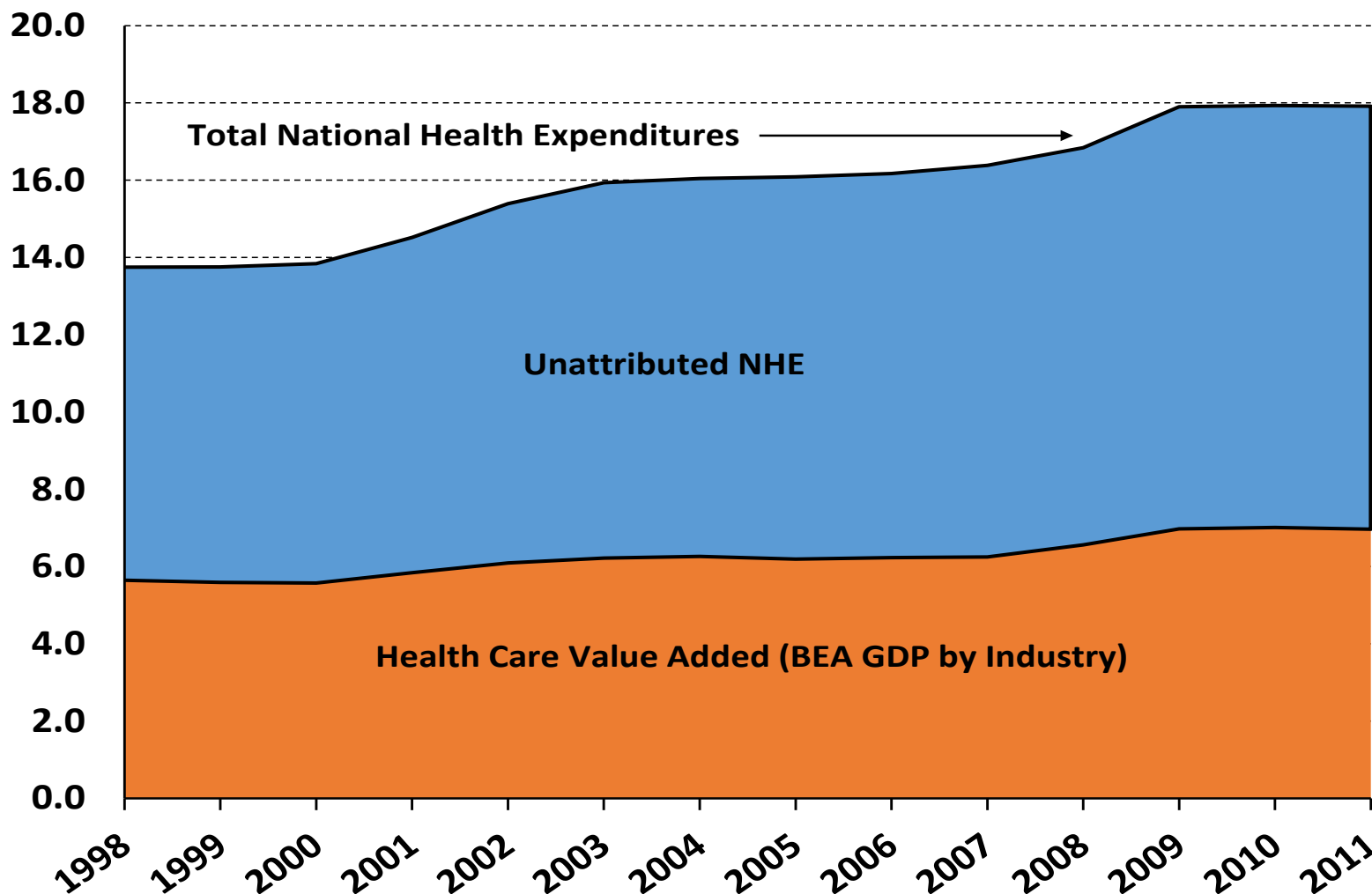
Nominal NHE as a Percent of GDP



Health Care Demand: NHEA

	Billions of U.S. Dollars						Annual Percent Change		
	1960	1970	1980	1990	2000	2011	1960-2011	2000-2011	2008-2011
Gross Domestic Product (GDP)	526.4	1038.3	2788.1	5800.5	9951.5	15075.7	6.8	3.8	1.8
National Health Expenditures	27.4	74.9	255.8	724.3	1377.2	2700.7	9.4	6.3	3.9
NHE as percent of GDP	5.2	7.2	9.2	12.5	13.8	17.9	2.5	2.4	2.1
Personal Health Care	23.4	63.1	217.2	616.8	1165.4	2279.3	9.4	6.3	4.3
Hospital Care	9.0	27.2	100.5	250.4	415.5	850.6	9.3	6.7	5.3
Physician & Clinical	5.6	14.3	47.7	158.9	290.9	541.4	9.4	5.8	3.6
Dental Services	2.0	4.7	13.4	31.7	62.3	108.4	8.2	5.2	1.9
Other Professional Services	0.4	0.7	3.5	17.4	37.0	73.2	10.8	6.4	4.6
Home Health Care	0.1	0.2	2.4	12.6	32.4	74.3	15.1	7.8	6.1
Nursing Home Care	0.8	4.0	15.3	44.9	85.1	149.3	10.8	5.2	4.0
Other Health Services	0.5	1.3	8.5	24.3	64.5	133.1	11.8	6.8	5.4
Prescription Drugs	2.7	5.5	12.0	40.3	120.9	263.0	9.4	7.3	2.7
Other Non-Durables	1.6	3.3	9.8	22.4	31.6	47.0	6.8	3.7	3.4
Durable Medical Products	0.7	1.7	4.1	13.8	25.2	38.9	8.1	4.0	3.6
Net Cost of Private Insurance	1.0	1.9	9.3	31.6	64.1	156.4	10.4	8.4	3.9
Government Administration	0.1	0.7	2.8	7.2	17.1	32.5	13.4	6.0	2.4
Public Health Activities	0.4	1.4	6.4	20.0	43.0	79.0	11.1	5.7	2.8
Research	0.7	2.0	5.4	12.7	25.5	49.8	8.7	6.3	4.7
Equipment	0.4	1.3	6.1	19.0	36.7	58.4	10.3	4.3	-0.2
Structures	1.5	4.5	8.6	17.0	25.4	45.3	6.9	5.4	-4.3

GDP by Industry: Where is the Health Care?



Gross Domestic Product (GDP): Demand and Supply

- Demand (NIPA Table 1): Expenditure on final demand of goods & services:

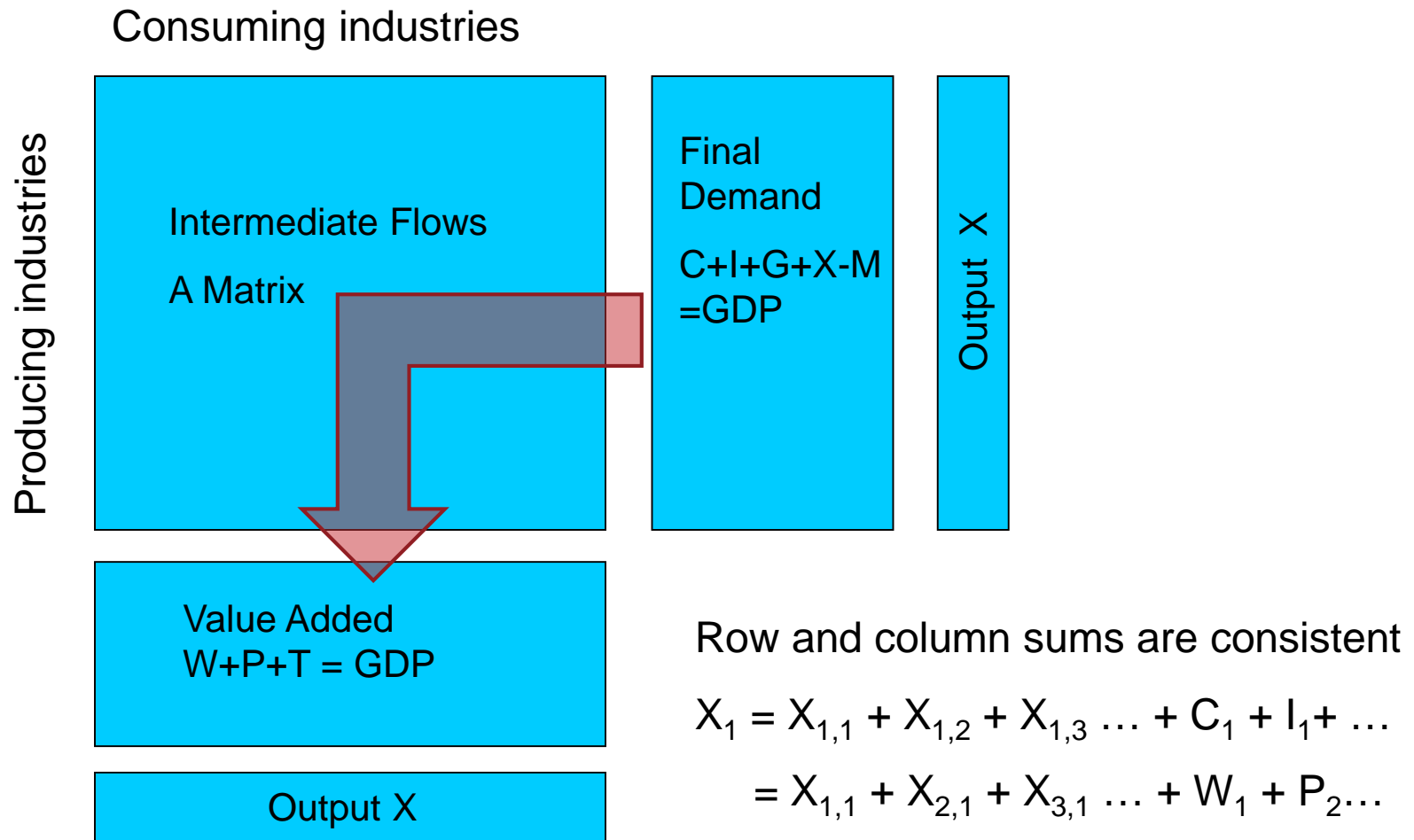
$$\text{GDP} = C + I + G + X - M$$

- Supply (NIPA Table 6.1): Value Added by industry - agriculture, manufacturing, services, etc.

$$\text{GDP} = \sum VA_i \text{ across sectors}$$

- Remember that GDP does not include the sales of *intermediate demand of goods and services* (inputs such as coal in steel, steel in auto).

Input-output table traces transactions



The Recipe: Ingredients

- CMS NHEA by function (Demand)
- BEA Industry and Input-Output Accounts
- Cross walk from NHE to NIPA final demand categories
- Key LIFT components (110 commodities, 65 industries):
 - **Bridge matrices** for consumption and investment
 - **Input-output** flow table, incl. output, imports, exports
 - **Make** table to convert commodities to industries
 - **Value added** to output ratios
 - **Employment** to output ratios
- Over history, LIFT components are roughly consistent with published BEA Industry GDP and IO data

Input-Output (IO) and GDP by Industry Accounts

U.S. Bureau of Economic Analysis / x
www.bea.gov

U.S. Department of Commerce
Bureau of Economic Analysis

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U.S. Economic Accounts

Please Note: *Survey of Current Business* to be published online only beginning February 2014.

- National**
 - Gross Domestic Product (GDP)
 - Personal Income and Outlays
 - Consumer Spending
 - Corporate Profits
 - Fixed Assets
 - Research and Development Satellite Account
- International**
 - Balance of Payments
 - Trade in Goods and Services
 - International Services
 - International Investment Position
 - Direct Investment and Multinational Companies
 - Survey Forms and Related Materials
- Regional**
 - GDP by State and Metropolitan Area
 - State and Local Area Personal Income
 - RIMS II Regional Input-Output Multipliers
 - Economic Information for Coastal Areas
- Industry**
 - Annual Industry Accounts (GDP by Industry & Input-Output Accounts)
 - Benchmark Input-Output Accounts
 - Research and Development Satellite Accounts
 - Travel and Tourism Satellite Accounts
 - Supplemental Statistics
- Integrated Accounts**
 - Integrated Income, Product, and Federal Reserve Financial Accounts
 - Integrated BEA GDP-BLS Productivity Accounts
 - Integrated BEA/BLS Industry-Level Production Account

Latest Release 12/6/2013
Personal Income

Real GDP 12/5/2013
+3.6% in Q3 2013

Personal Income 12/6/2013
-0.1% in October 2013

Int'l Trade in Goods and Services 12/4/2013
Deficit decreased to \$40.6 billion in October 2013(p) from \$43.0 billion in September 2013(r).

U.S. Int'l Transactions 9/19/2013
Current-account deficit decreased \$6.0 billion to \$98.9 billion in Q2 2013(p).

2013 Release Schedule Revision
2014 News Release Schedule

Video

- What is the origin of GDP?
- Arts and entertainment now part of GDP
- GDP: Numbers Behind the Numbers

BEA Blog

The Recipe: Process

1. Convert NHEA to **NIPA-based final demand to LIFT goods and service categories** (PCE, GOV, INV, CST) of LIFT. (Ex: spread other health care services to PCE for physicians, etc.).
2. Multiply health care final demand in purchaser prices by **bridge matrices** to obtain final demand by production commodity. (Allocate spending across manufacturers' shipments, transport and trade margins, services, etc.)
3. Compute **domestic health care commodity demand** by removing health care imports implied by LIFT commodity import share (pharmaceuticals is most affected sector, health sectors hardly impacted).

The Recipe: Process

4. Use **I-O identity** -- $q^d = (I - A^d)^{-1} f^d$ -- to compute **total domestic commodity gross output requirements** (direct + indirect). Indirect demand includes utilities, building materials, services, etc. purchased by health care providers.
5. Convert commodity output to total industry gross output requirements with LIFT **Make** matrix.
6. Compute health care **value added by industry** by multiplying total requirements by BEA **value added to output ratios**.
7. Compute **employment by industry** with LIFT **output to employment** ratios.

Direct NHE Final Demand by LIFT Commodity

LIFT Commodity	Billions of Dollars						Annual Percent Growth		
	1998			2011			1998-2011		
	Health Care Direct Demand	Direct Imports	Domestic Direct Demand	Health Care Direct Demand	Direct Imports	Domestic Direct Demand	Health Care Direct Demand	Direct Imports	Domestic Direct Demand
Total National Health Expenditures	1,208.9	24.4	1,184.5	2,700.7	103.2	2,597.6	6.4	11.7	6.2
94 Hospitals	360.3	0.1	360.2	794.1	0.4	793.7	6.3	13.1	6.3
92 Offices of physicians, dentists, other practitioners	285.3	-	285.3	577.0	-	577.0	5.6	-	5.6
95 Nursing and residential care facilities	104.7	-	104.7	203.5	-	203.5	5.2	-	5.2
62 Retail trade	64.1	-	64.1	185.8	-	185.8	8.5	-	8.5
93 Other ambulatory health care services	73.6	-	73.6	163.4	-	163.4	6.3	-	6.3
79 Insurance	49.7	1.2	48.4	156.4	15.8	140.6	9.2	21.7	8.5
27 Pharmaceuticals	63.3	15.4	47.9	145.7	67.2	78.5	6.6	12.0	3.9
61 Wholesale trade	22.2	-0.6	22.9	99.2	-1.9	101.1	12.2	8.6	12.1
91 Home health care services	47.5	-	47.5	85.0	-	85.0	4.6	-	4.6
107 General government industry	28.4	-	28.4	65.4	-	65.4	6.6	-	6.6
13 New construction	21.8	-	21.8	42.5	-	42.5	5.3	-	5.3
85 Professional, scientific and technical services	15.2	0.1	15.1	34.6	0.5	34.1	6.5	13.6	6.4
90 Educational services	15.9	0.0	15.9	33.3	0.1	33.2	5.8	14.8	5.8
58 Medical equipment and supplies, dental labs	12.0	1.6	10.5	29.2	7.6	21.6	7.1	13.0	5.7
106 State and local government enterprises	10.2	-	10.2	22.1	-	22.1	6.1	-	6.1
45 Electromedical, electrotherapeutic apparatus	7.4	2.0	5.4	13.7	4.7	9.0	4.8	6.9	3.9
59 Ophthalmic goods	4.2	1.8	2.4	8.1	3.5	4.6	5.2	5.4	5.1
86 Computer systems design and related services	3.6	0.0	3.6	7.2	0.1	7.1	5.5	15.4	5.4
66 Truck transportation	2.2	0.0	2.2	6.6	0.1	6.5	8.7	9.6	8.7
All Other Commodities	17.4	2.9	14.4	28.1	5.1	23.0	3.8	4.3	3.6

Total Output Requirements by Commodity

LIFT Commodity	Billions of Dollars						Annual Percent Growth		
	1998			2011			1998-2011		
	Direct Domestic Output	Indirect Output	Health Care Total Domestic Output	Direct Domestic Output	Indirect Output	Health Care Total Domestic Output	Direct Domestic Output	Indirect Output	Health Care Total Domestic Output
Gross Commodity Output	1184.5	710.8	1,895.3	2597.6	1,488.4	4086.0	6.2	5.8	6.1
Multiplier			1.6			1.6			
94 Hospitals	360.2	0.5	360.7	793.7	1.0	794.7	6.3	6.4	6.3
92 Offices of physicians, dentists, and other practitioners	285.3	0.1	285.4	577.0	0.1	577.1	5.6	5.4	5.6
79 Insurance	48.4	43.8	92.3	140.6	107.4	248.0	8.5	7.1	7.9
95 Nursing and residential care facilities	104.7	0.0	104.7	203.5	0.1	203.5	5.2	5.5	5.2
93 Other ambulatory health care services	73.6	15.8	89.4	163.4	34.5	197.9	6.3	6.2	6.3
62 Retail trade	64.1	5.8	69.9	185.8	5.5	191.3	8.5	-0.3	8.1
85 Professional, scientific and technical services	15.1	67.1	82.2	34.1	148.1	182.2	6.4	6.3	6.3
80 Real estate	1.9	69.3	71.1	3.4	156.9	160.4	4.8	6.5	6.5
61 Wholesale trade	22.9	41.0	63.8	101.1	57.3	158.5	12.1	2.6	7.2
88 Administrative and support services	1.6	50.9	52.5	4.0	128.0	132.0	7.1	7.4	7.4
27 Pharmaceuticals	47.9	29.1	77.0	78.5	31.7	110.2	3.9	0.7	2.8
87 Management of companies and enterprises	0.0	25.3	25.3	0.0	107.1	107.1	-	11.8	11.8
91 Home health care services	47.5	0.0	47.5	85.0	0.0	85.0	4.6	4.5	4.6
107 General government industry	28.4	0.0	28.4	65.4	0.0	65.4	6.6	-	6.6
77 Banks, credit cards and finance	0.0	18.7	18.7	0.0	52.2	52.2	-	8.2	8.2
58 Medical equipment and supplies, dental labs	10.5	14.2	24.6	21.6	23.5	45.1	5.7	4.0	4.8
Other Commodities	72.5	329.3	401.9	140.6	634.8	775.4	5.2	5.2	5.2

Health Care Value Added by Industry INFORUM

(Levels in Billions of Dollars)

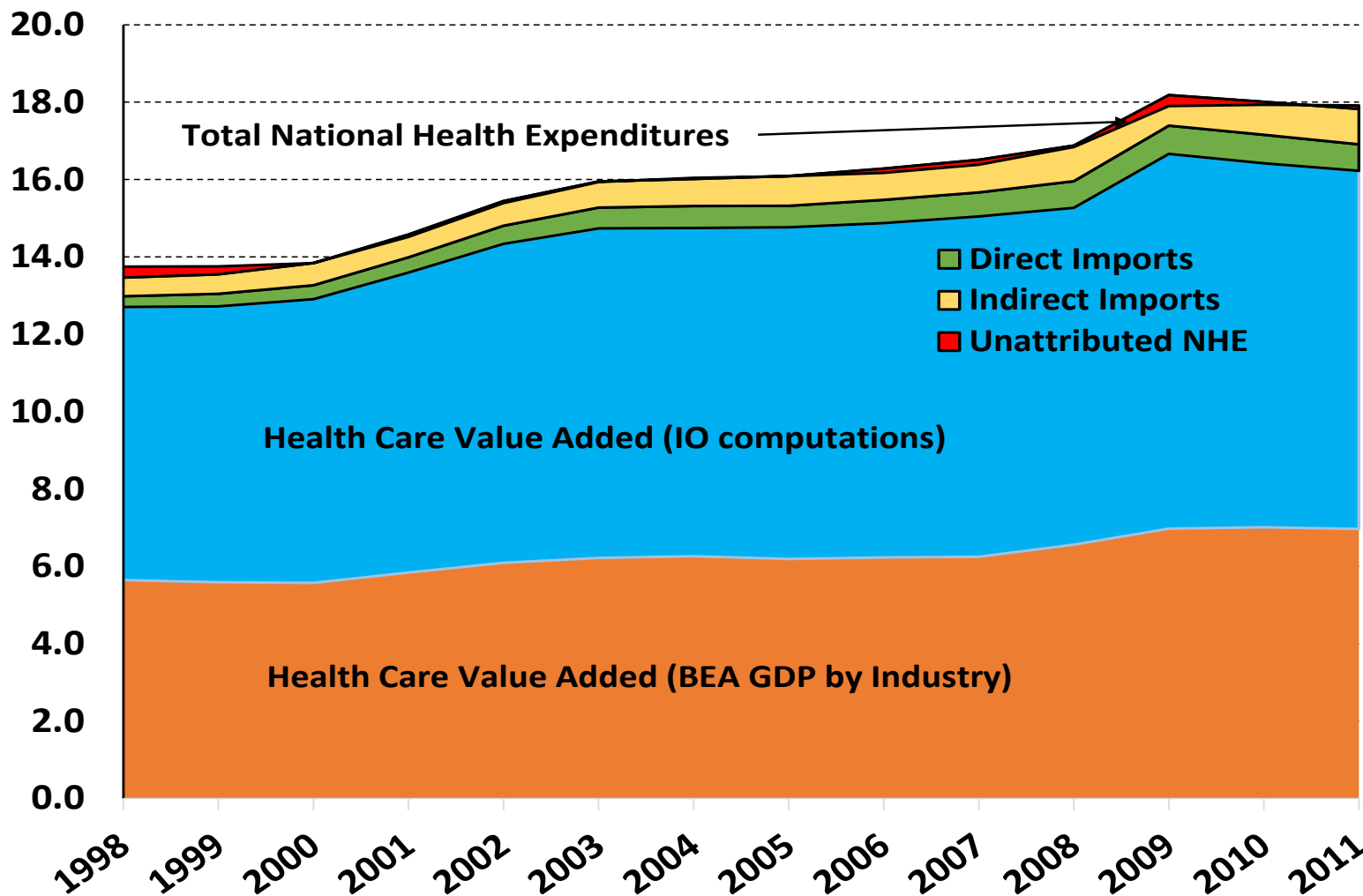
	<u>1998</u>		<u>2011</u>		<u>1998-11</u>
	Bill \$	% of GDP	Bill \$	% of GDP	Growth
GDP	8,793.5	100.0	15,075.7	100.0	4.2
National Health Expenditures	1,208.9	13.7	2,700.7	17.9	6.4
Total Domestic Value Added by Industry	1,117.1	12.7	2,446.0	16.2	6.2
Construction	14.5	0.2	34.0	0.2	6.8
Manufacturing	91.6	1.0	141.5	0.9	3.4
Durable manufacturing	33.1	0.4	57.3	0.4	4.3
Nondurable manufacturing	58.5	0.7	84.2	0.6	2.8
Chemical products	35.7	0.4	51.5	0.3	2.9
Wholesale trade	46.1	0.5	103.3	0.7	6.4
Retail trade	49.6	0.6	127.4	0.8	7.5
Transportation	15.6	0.2	34.4	0.2	6.3
Information	24.6	0.3	45.6	0.3	4.9
Finance, insurance, real estate, rental & leasing	130.9	1.5	330.2	2.2	7.4
Professional & business services	110.0	1.3	308.3	2.0	8.2
Education, health care & social assistance	494.0	5.6	1,057.9	7.0	6.0
Ambulatory health care services	258.6	2.9	559.5	3.7	6.1
Hospitals & nursing & residential care facilities	227.2	2.6	480.4	3.2	5.9
Government Administration & Enterprises	98.7	1.1	181.4	1.2	4.8
State & local general government	79.1	0.9	147.0	1.0	4.9

Health Care Employment by Industry INFORUM

(Levels in Thousands of Jobs)

BEA Industry	1998		2011		1998-2011
	Thousand Jobs	% of Tot Employ	Thousand Jobs	% of Tot Employ	Growth Rate
Total U.S. Civilian Employment	140049	100.0	144640	100.0	0.2
Total Health Care Employment	21096	15.1	28055	19.4	2.2
Total Non-Health Employment	118953	84.9	116585	80.6	-0.2
Agriculture, forestry, & fishing	93	0.1	100	0.1	0.6
Mining	21	0.0	19	0.0	-0.7
Utilities	42	0.0	36	0.0	-1.3
Construction	302	0.2	467	0.3	3.4
Manufacturing	1055	0.8	910	0.6	-1.1
Durable manufacturing	482	0.3	423	0.3	-1.0
Miscellaneous manufacturing	196	0.1	181	0.1	-0.6
Nondurable manufacturing	573	0.4	486	0.3	-1.3
Chemical products	238	0.2	237	0.2	0.0
Wholesale trade	480	0.3	703	0.5	3.0
Retail trade	1253	0.9	2197	1.5	4.4
Transportation	285	0.2	406	0.3	2.8
Information	211	0.2	187	0.1	-0.9
Finance, insurance, real estate, rental & leasing	882	0.6	1310	0.9	3.1
Insurance carriers & related activities	587	0.4	905	0.6	3.4
Professional & business services	2206	1.6	3400	2.4	3.4
Misc. professional, scientific & tech services	608	0.4	874	0.6	2.8
Management of companies & enterprises	194	0.1	468	0.3	7.0
Administrative & support services	1161	0.8	1721	1.2	3.1
Education, health care & social assistance	11374	8.1	14878	10.3	2.1
Ambulatory health care services	4646	3.3	6549	4.5	2.7
Hospitals & nursing & residential care	6441	4.6	7953	5.5	1.6
Accommodation & food services	343	0.2	490	0.3	2.8
Other services, except government	381	0.3	428	0.3	0.9
Government: general & enterprise	2124	1.5	2455	1.7	1.1

Summary Reconciliation: NHE and Health Care Supply



Future Directions

- Adapt LIFT to the new integrated industry and IO frameworks.
- Occupational composition of health care employment.
- Health care labor productivity growth (broadly defined) relative to non-health care productivity growth – will require some use of deflators.
- Short-run projections: what are the labor force (and occupational) demands given projections.
- Long-run projections (beyond 2022): implications of projected health care spending on economy-wide potential growth.