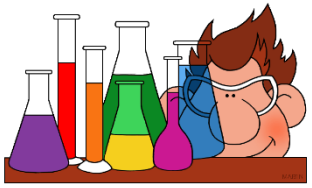
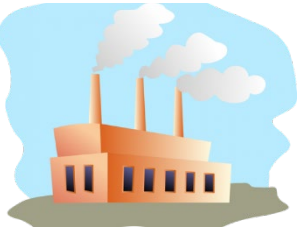
Health Care in the U.S.
The Supply Side





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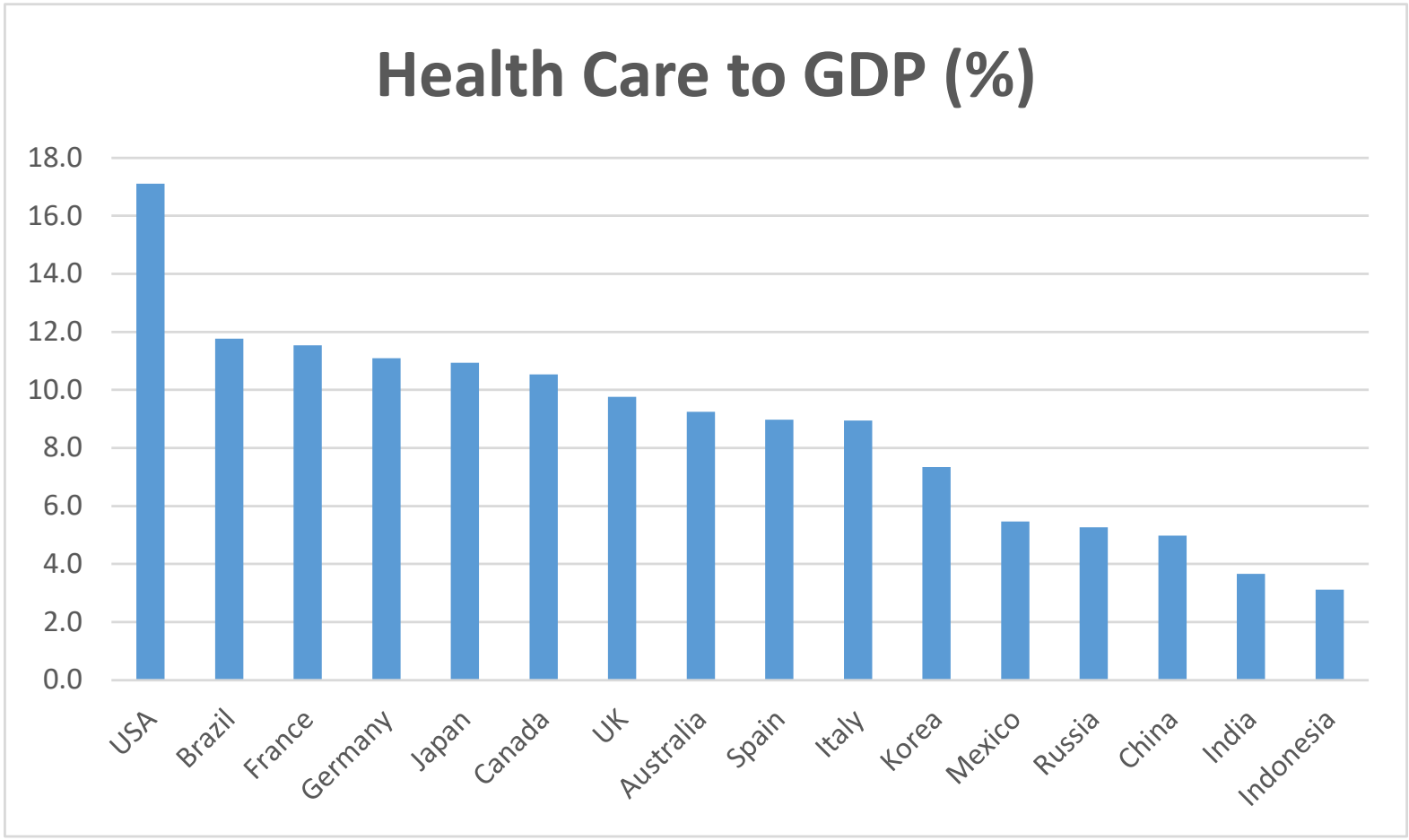
Overview

- Review of National Health Accounts (NHE)
- US Health Care Spending
- Motivation for This Study
- Calculation of the Supply Side Requirements of Health Care
- Review of Results
- Implications and Future Directions

The Supply Side of Health Care

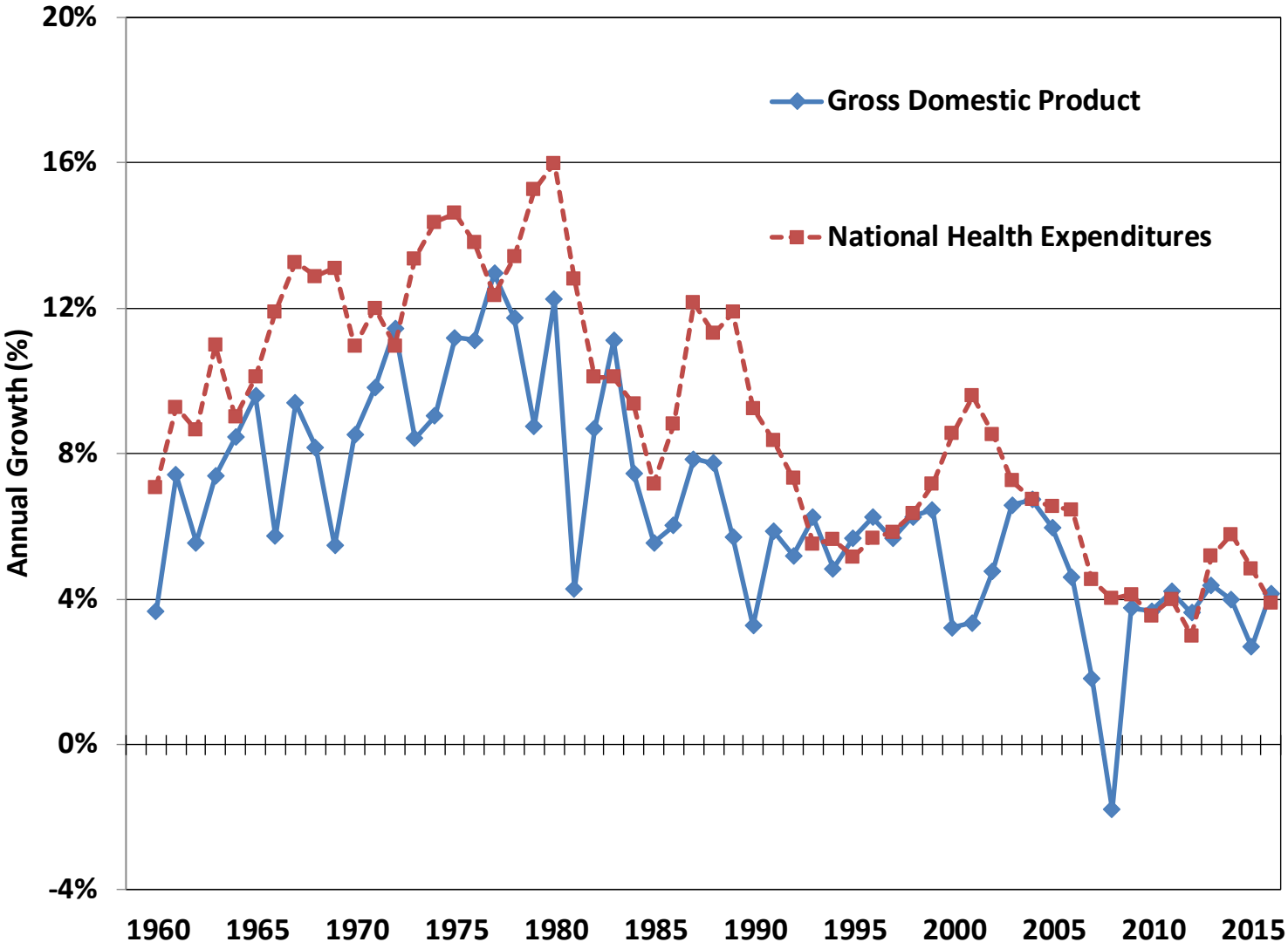
- Health care spending is a large component of US GDP (17.9% in 2017).
- *Demand:* Reported in detail and studied extensively.
- *Supply:* Only major health care industries are widely recognized and studied (6.3% of GDP as measured by VA in 2017).
- Difference includes: Direct supply of pharmaceuticals, machinery, retail and other services. Indirect supply chain, and trade and transportation margins.
- Input-Output techniques identify the indirect supply to health care.

The US Devotes the Largest Share of GDP to Health Care

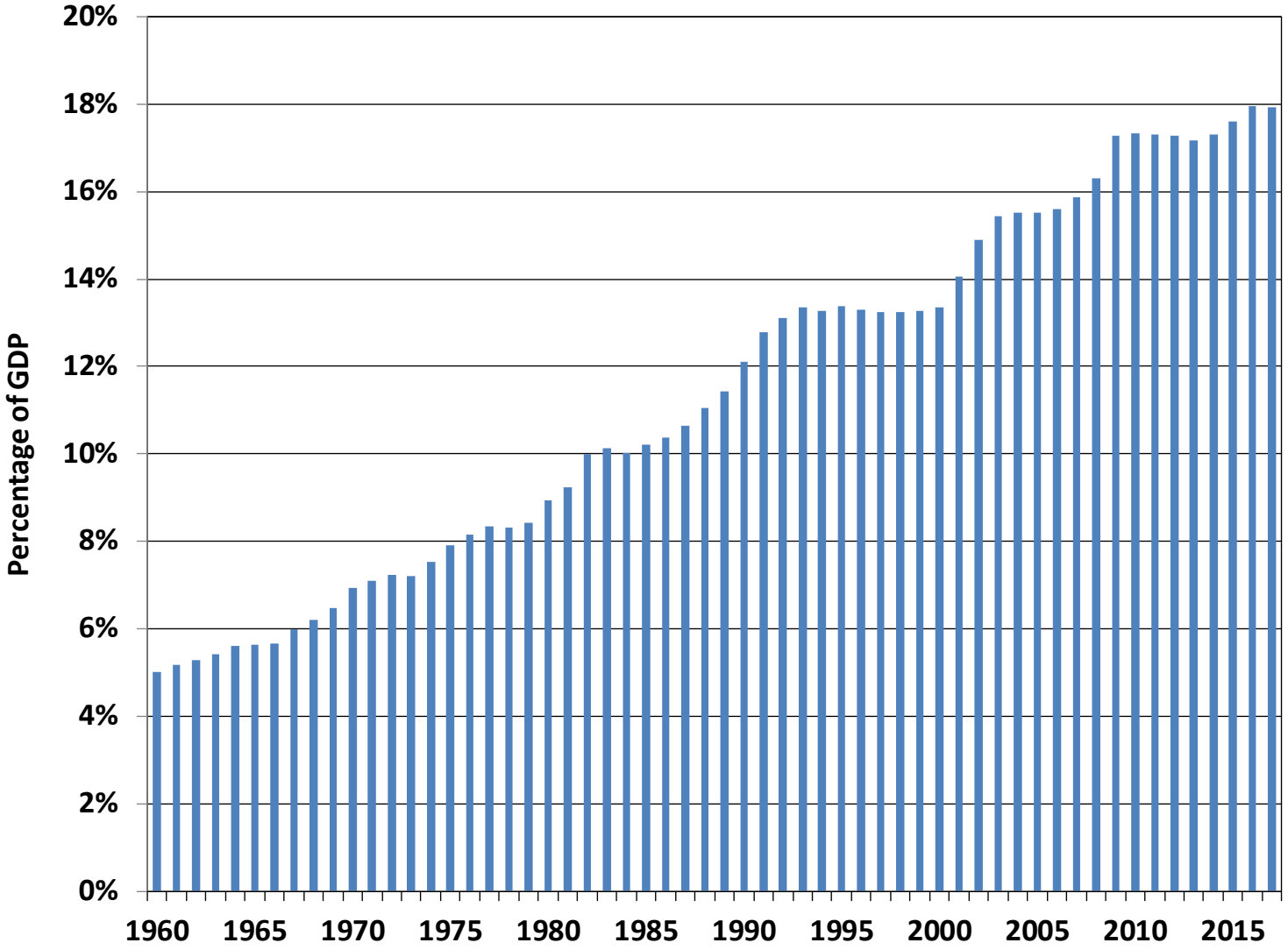


Source: World Development Indicators, Data for 2016

U.S. Health Expenditures Have Grown Faster than GDP



Resulting in a Steadily Increasing Share of GDP

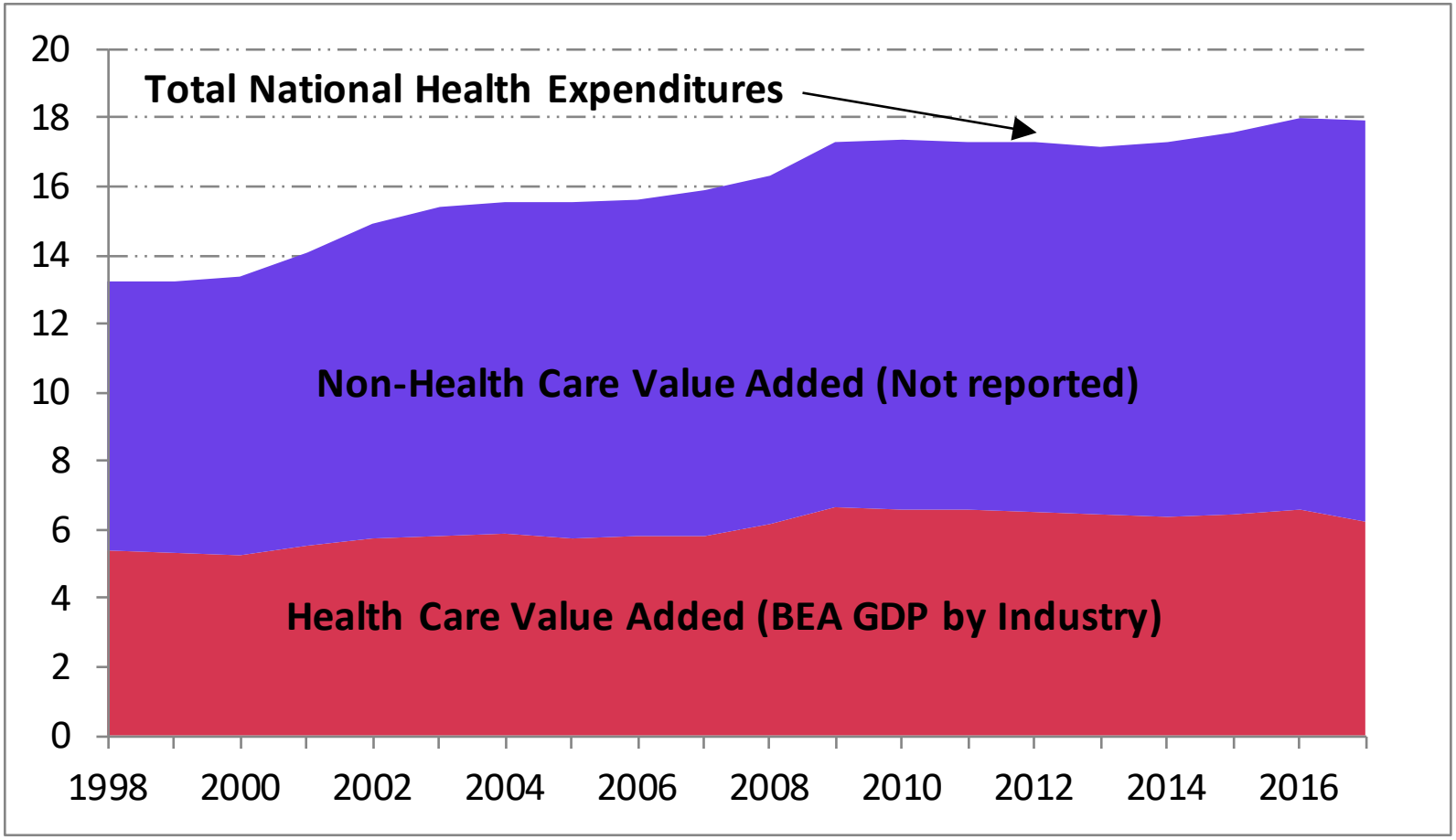


National Health Expenditures: 1960-2017

	Billions of U.S. dollars				Growth
	1960	1980	1998	2017	60-17
Gross domestic product (GDP)	**542.4**	**2,857.3**	**9,062.8**	**19,485.4**	**6.5**
National health expenditures (NHE)	**27.2**	**255.3**	**1,201.5**	**3,492.1**	**8.9**
NHE as percent of GDP	5.0	8.9	13.3	17.9	2.3
Personal health care	23.3	217.0	1,025.6	2,961.0	8.9
Hospital care	9.0	100.5	374.9	1,142.6	8.9
Physician and clinical	5.6	47.7	256.5	694.3	8.8
Dental services	2.0	13.3	53.6	129.1	7.6
Other professional services	0.4	3.5	33.4	96.6	10.1
Home health care	0.1	2.4	34.1	97.0	13.9
Nursing home care	0.8	15.3	79.1	166.3	9.8
Other health services	0.4	8.4	55.6	183.1	11.2
Prescription drugs	2.7	12.0	88.5	333.4	8.8
Other nondurables	1.6	9.8	28.6	64.1	6.7
Durable medical products	0.7	4.1	21.4	54.4	7.8
Net cost of private health insurance	1.0	9.3	49.9	229.5	10.0
Government administration	0.1	2.8	13.3	45.0	12.5
Public health activities	0.4	6.4	37.5	88.9	10.1
Research	0.7	5.4	21.5	50.7	7.8
Equipment	0.3	5.8	29.9	61.3	9.6
Structures	1.5	8.6	23.7	55.6	6.6

CMS National Health Expenditures Data: 1960 - 2017, and BEA NIPA.

The Health Care Value Added Share is Much Smaller



Gross Domestic Product (GDP): Demand and Supply

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

$$GDP = C + I + G + X - M$$

"Health Care is 18% of the economy!"

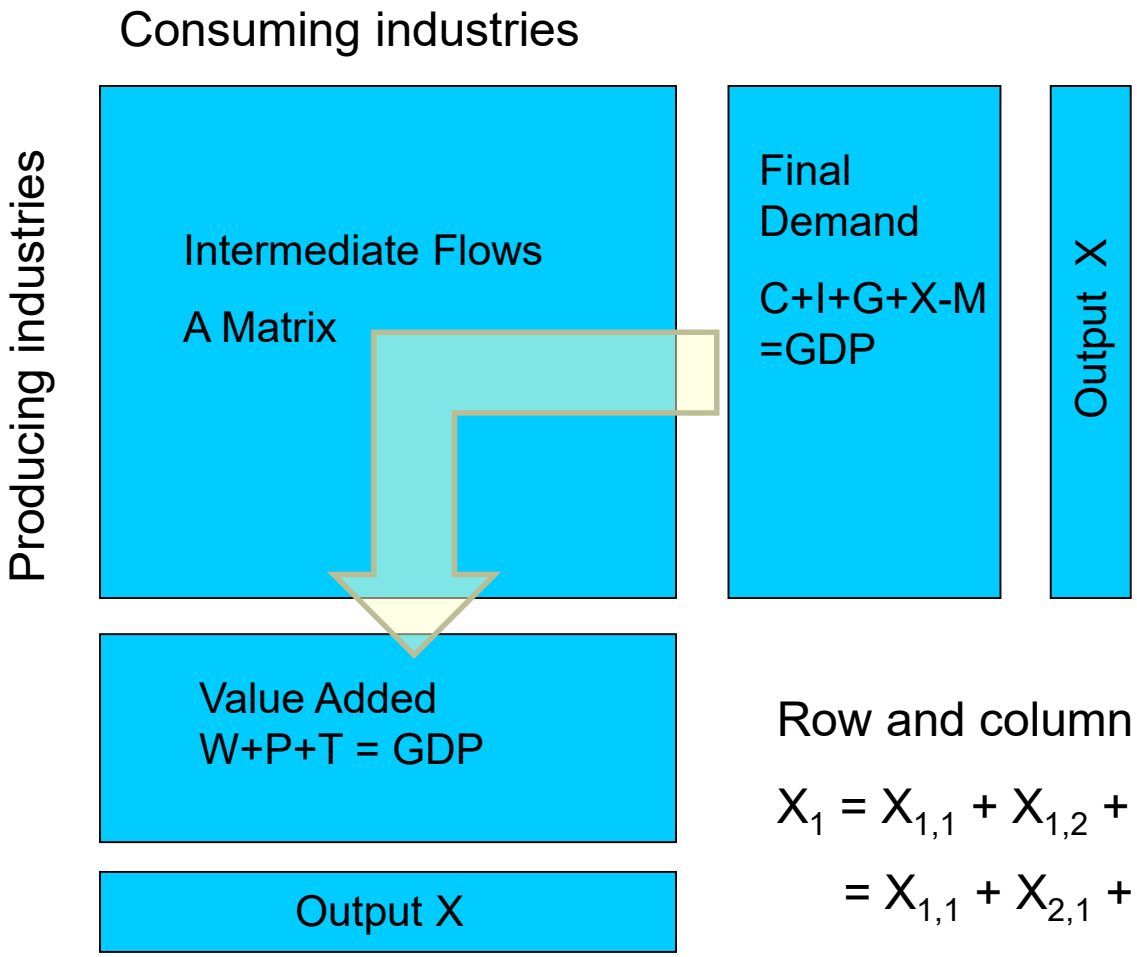
- **Supply** (NIPA Table 6.1): Value Added (labor income, return to capital and net indirect taxes), by industry - agriculture, manufacturing, services, etc.

$$GDP = \Sigma\, VA_i \text{ across sectors}$$

"Manufacturing is only 10% of the economy."

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

IO Equivalence of Final Demand and Value Added



Row and column sums are consistent

$$X_1 = X_{1,1} + X_{1,2} + X_{1,3} \ldots + C_1 + I_1 + \ldots$$

$$= X_{1,1} + X_{2,1} + X_{3,1} \ldots + W_1 + P_2 \ldots$$

Supply Side Calculations

- The next several slides provide an overview of the calculations of the supply side.
- We'll trace where health spending shows up in total requirements, value added and employment.
- Every dollar spent on health care final demand should appear as domestic value added or imports.

Health Care Supply Side Calculations

Step 1
- Reconcile NHE and NIPA health care expenditures
- Translate final demand from NHE to I-O commodities

Step 2
- Calculate domestic health care final demand by commodity
- Using 121 LIFT commodities

Step 3
- Calculate domestic gross output requirements by commodity
- I-O identity: $q^d = \left(I - A^d\right)^{-1} f^d$

Step 4
- Calculate indirect requirements & indirect imports

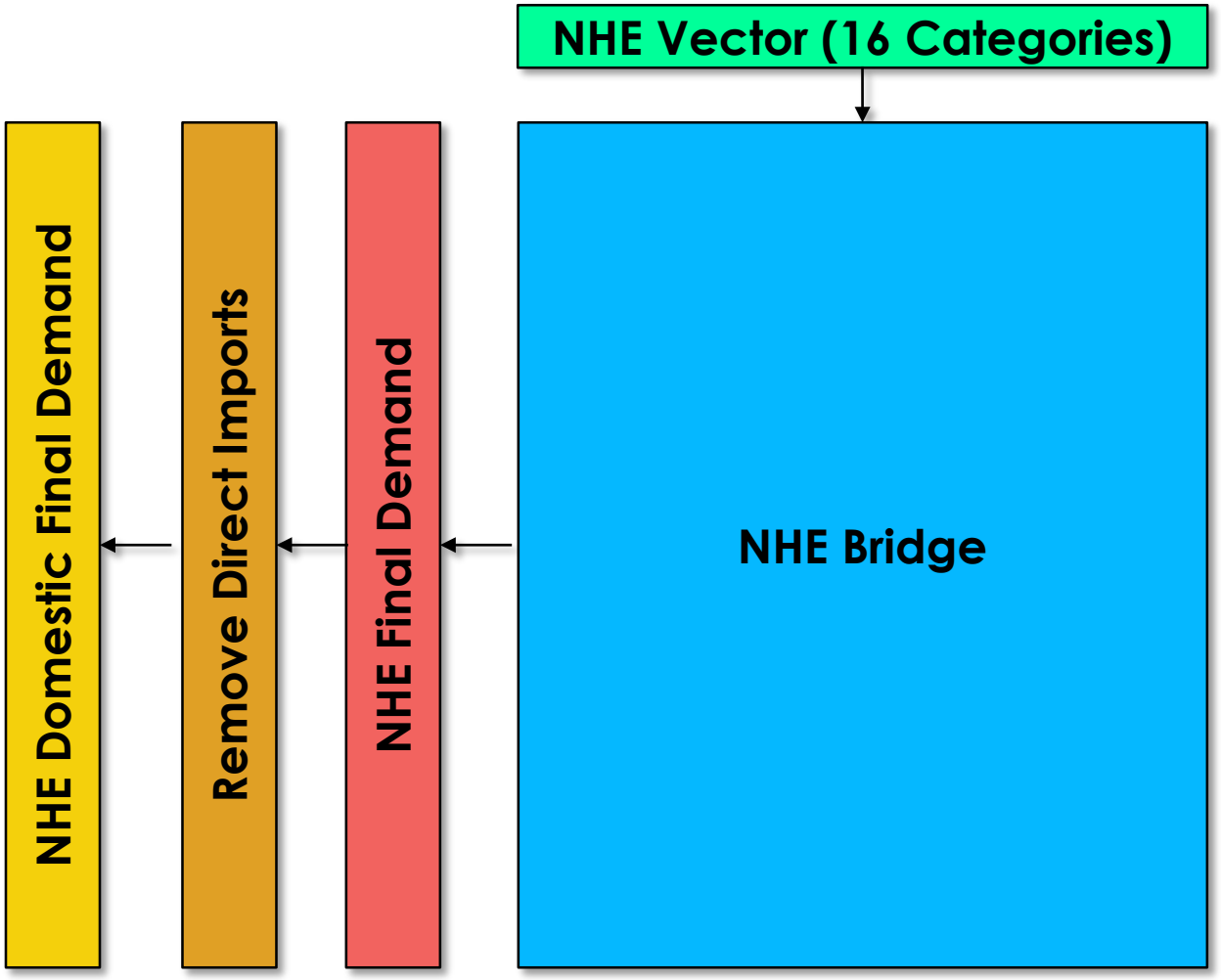
Step 5
- Convert requirements from commodity-basis to industry-basis

Step 6
- Calculate healthcare-related value added
- Calculate healthcare-related employment

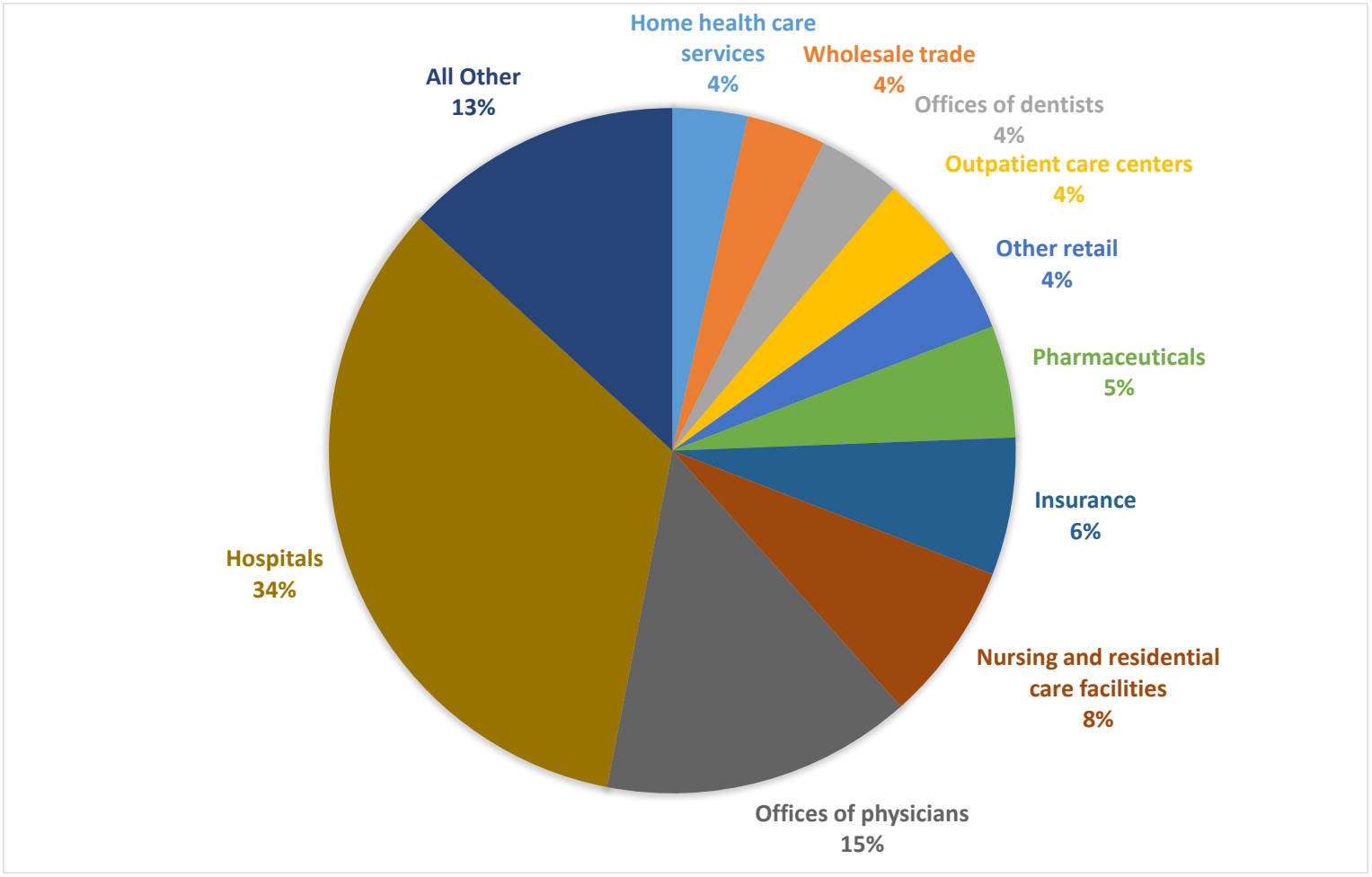
Reconciliation

NHE Title	*NHE*	*NIPA*	*NIPA Title (Lift Correspondences)*	Difference (NHE-BEA)
NHE Total	**3,492.1**			
Personal health care	2,961.0	2,846.8		114.2
Hospital care	**1,142.6**	**1,050.3**	Hospitals (PCE 51)	92.3
Physician and clinical	**694.3**	529.5	Physicians (PCE 46)	-12.4
		36.8	Medical laboratories (PCE 49)	
		140.4	Specialty Outpatient care facilities (PCE 50 part)	
		706.7		
Dental services	**129.1**	**131.1**	Dentists (PCE 47)	-2.0
Other professional services	**96.6**	78.0	Other professional medical services (less specialty centers)(PCE 50 part)	0.0
		18.6	Therapeutic appliances, eyeglasses, contacts (PART PCE 16)	
		96.6		
Home health care	**97.0**	105.0	Home health care (PCE 48)	0.0
		-8.0	Move some PCE 48 to Other health, residential and personal care	
		97.0		
Nursing home care	**166.3**			3.6
		55.9	Nonprofit nursing homes' services to households (part PCE 52)	
		124.6	Proprietary and government nursing homes (part PCE 52)	
		-17.8	(PCE 52 in Other health, residential and personal care)	
		162.7		
Other health, residential and personal care	**183.1**	8.0	Home health care (PCE 48)	37.3
Nursing homes		17.8	Moved from Nursing homes (PCE 52)	
Drugs		120.0	Moved from Prescription drugs (part PCE 31)	
		145.8		
Prescription drugs	333.4	452.0	Prescription drugs (part PCE 31)	1.4
		-120.0	(PCE 31 in Other Health, residential and personal care)	
		332.0		

Translation of NHE to IO Final Demand

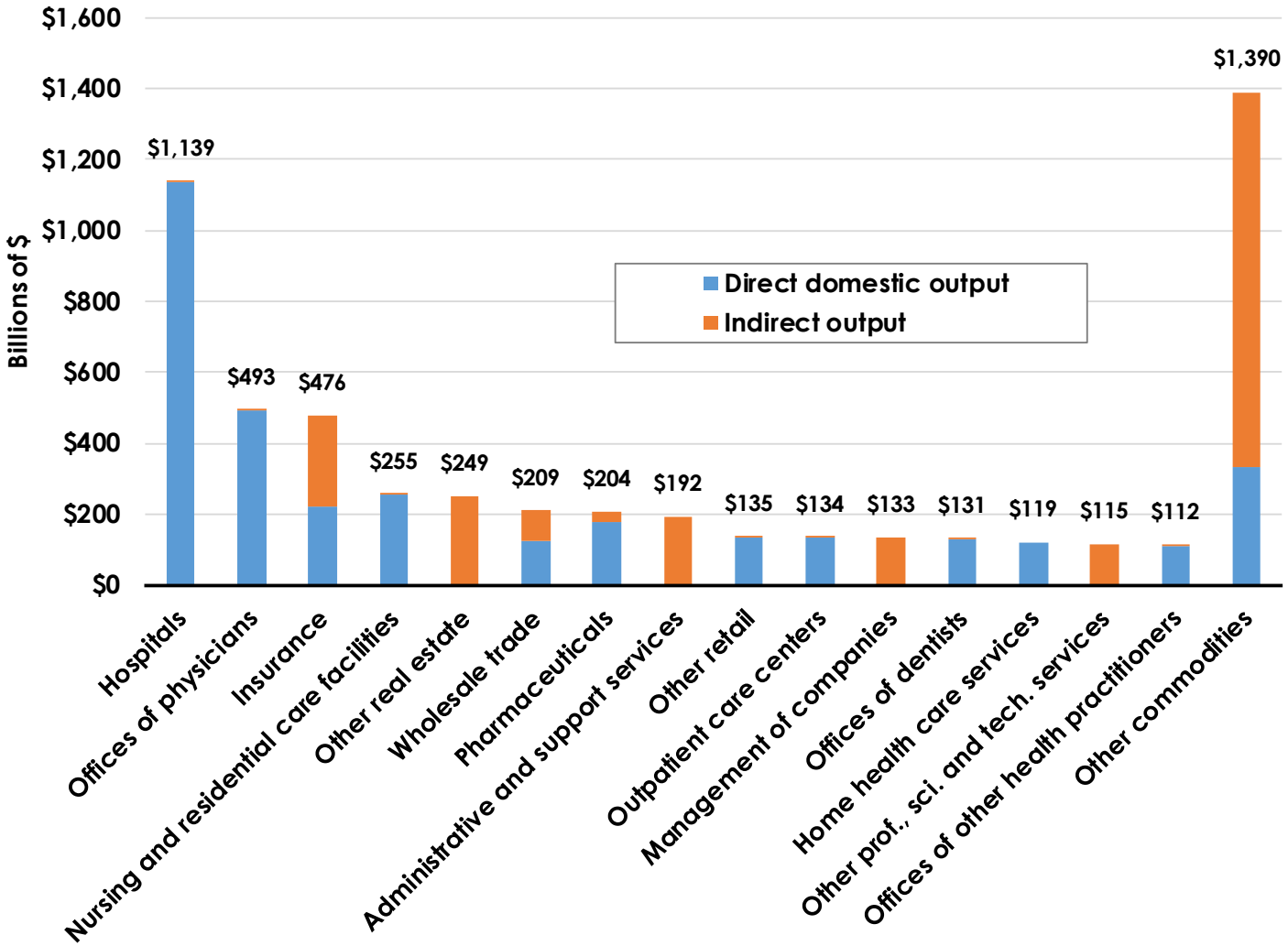


Direct Domestic NHE Demand by LIFT Commodity (2017)



Source: National Health Accounts and LIFT Model Calculations

Direct, Indirect and Total NHE Requirements by Commodity (2017)



Health Care Value Added (GDP) by Industry

Health Care Value Added by Industry			
	2017		1998 - 2017
	Billions of dollars	Percent of GDP	Growth Rate
Gross domestic product	**19,390.6**	**100.0**	**4.1**
National health expenditures	**3,492.1**	**18.0**	**5.8**
Total domestic health care value added	**3,155.9**	**16.3**	**5.5**
Agriculture, forestry and fishing	7.7	0.0	4.7
Mining	12.2	0.1	7.9
Utilities	25.0	0.1	4.1
Construction	43.3	0.2	5.6
Manufacturing	248.6	1.3	4.3
Durable manufacturing	84.2	0.4	4.1
Nondurable manufacturing	164.5	0.8	4.5
Wholesale trade	152.7	0.8	6.1
Retail trade	135.0	0.7	5.3
Transportation	48.0	0.2	5.8
Information	70.6	0.4	5.6
Finance, insurance, real estate, rental and leasing	479.4	2.5	7.5
Insurance carriers and related activities	297.0	1.5	8.5
Professional and business services	373.4	1.9	6.9
Education, health care and social assistance	1,242.5	6.4	5.0
Ambulatory health services	**631.2**	**3.3**	**4.9**
Hospitals and nursing and residential care facilities	**607.6**	**3.1**	**5.1**
Arts and recreation	7.7	0.0	6.1
Accommodation and food services	26.6	0.1	6.4
Other services, except govt	27.2	0.1	4.0
Government administration and enterprises	256.1	1.3	4.7

Source: Inforum LIFT Model Calculations with BEA IO Data

Health Care Employment by Industry

Health Care Employment by Industry			
	2017		1998-2017
	Jobs (thousands)	Percent of employment	Average Annual Growth Rate
Total U.S. civilian & military employment	**160,774**	**100.0**	**0.7**
Total domestic health care employment	**31,583**	**19.6**	**2.1**
Agriculture, forestry and fishing	93	0.1	1.0
Mining	19	0.0	0.1
Utilities	46	0.0	0.4
Construction	466	0.3	2.0
Manufacturing	1,103	0.7	-0.2
Durable manufacturing	561	0.3	0.2
Nondurable manufacturing	542	0.3	-0.6
Wholesale trade	794	0.5	2.4
Retail trade	1,953	1.2	2.1
Transportation	499	0.3	3.0
Information	215	0.1	0.4
Finance, insurance, real estate, rental and leasing	2,083	1.3	3.2
Insurance carriers and related activities	1,364	0.8	4.1
Professional and business services	3,785	2.4	2.9
Education, health care and social assistance	16,605	10.3	2.0
Ambulatory health services	**7,511**	**4.7**	**2.6**
Hospitals and nursing and residential care facilities	**8,995**	**5.6**	**1.6**
Arts and recreation	94	0.1	2.8
Accommodation and food services	700	0.4	3.9
Other services, except govt	512	0.3	1.4
Government administration and enterprises	2,617	1.6	1.3

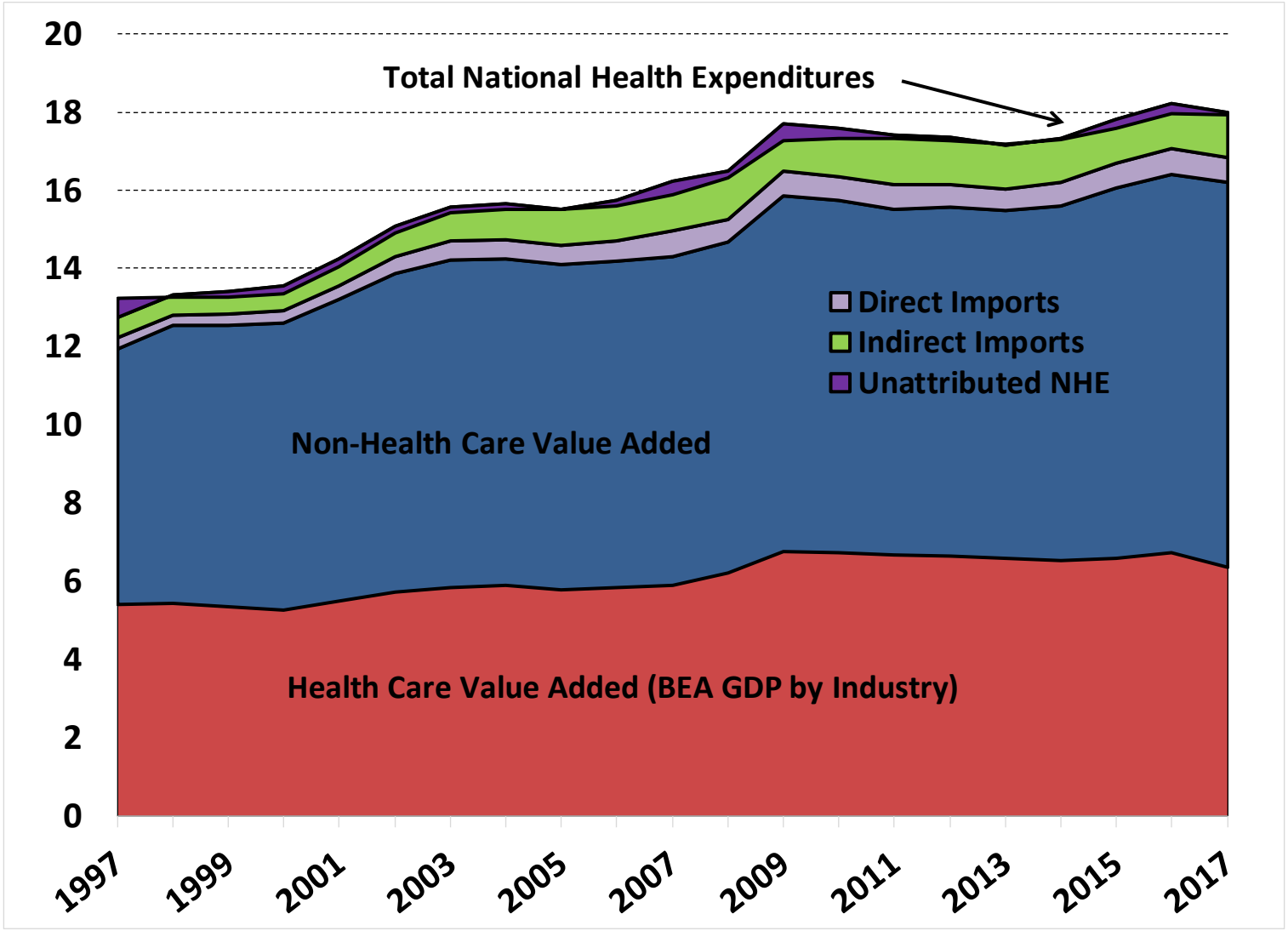
Source: Inforum LIFT Model Calculations with BEA IO and NIPA Data

Summary of Value Added Accounting

	Levels (billions of dollars)		Average Annual Growth	Share of NHE		Share of GDP	
	1998	2017	1998-2017	1998	2017	1998	2017
Gross Domestic Product	9,063	19,485	4.1				
National health expenditures (NHE)	1,201	3,492	5.8	100.0	100.0	13.3	17.9
Direct demand imports	21	123	9.7	1.8	3.5	0.2	0.6
Direct demand domestic production	1,180	3,369	5.7	98.2	96.5	13.0	17.3
Value added	1,138	3,156	5.5	94.7	90.4	12.6	16.2
Ambulatory care, hospitals, nursing homes	492	1,239	5.0	41.0	35.5	5.4	6.4
Other industries	646	1,917	5.9	53.8	54.9	7.1	9.8
Value added leaked due to imports	47	227	8.6	3.9	6.5	0.5	1.2
Unattributed value added	-5	-14		-0.4	-0.4	-0.1	-0.1

Source: Inforum LIFT Model Calculations with BEA IO and NIPA Data

Reconciliation: NHE and Health Care Supply



Future Directions

- Better understand shifts in health-related value added and employment between sectors. This may be factored as follows:
  1. Changes in labor productivity and value added/output ratios.
  2. Changes in the import share.
  3. Changes in the structure of interindustry purchases.
- Build health care supply side accounting in constant prices. Determine how the components of supply affect health care prices.
- Short-run (10 year) projections: Labor force (and occupational) demands given projections?
- Long-run projections (beyond 2028): Implications of projected health care spending on economy-wide potential growth.

Thank you!

More information available at:
www.inforum.umd.edu

Background Slides

The Inforum LIFT Model

- LIFT is an interindustry macroeconomic model of the U.S., with IO demand and price relationships at its core, but also a dynamic aggregative model.
- Econometric equations are included for all vectors of final demand, value added, employment, and hours. There are 121 commodities and 71 industries in the model.
- The model structure is useful for understanding how changes in import prices affect average prices paid in the U.S. and imports by commodity.
- Price changes affect consumers, but also industries that purchase imported good for intermediate consumption.
- Benefits and costs can be expected to be different for each industry.

The LIFT Model