Trends in total hospital financial performance under the prospective payment system

by Charles R. Fisher

In this article, the author examines trends in determinants of total hospital facility revenues, expenses, and net profits during the period 1977-89. Measures of change in transaction prices are developed, which enable an analysis of trends in real hospital outputs and total factor productivity. The main source of hospital spending growth in excess of the gross national product is identified as growth in hospital employee compensation.

Introduction

In order to focus on the overall performance of hospitals under the prospective payment system (PPS), I chose to study those hospitals that were under PPS since the inception of that program in October 1983. Thus, data for hospitals in States that had their own cost-control programs during some portion of the PPS period (Maryland, Massachusetts, New Jersey, and New York) are excluded from the study because their specific payment systems could confound the numbers.

Two basic data sources are used for this analysis:

- American Hospital Association (AHA) annual surveys for 1977 through 1989 as reported in the annual publication *Hospital Statistics* (American Hospital Association, 1977-89).
- Medicare Cost Reports for report years 1985-89. Data and analysis based on Medicare Cost Reports are shown in the Technical note.

This article first examines the "average" hospital's financial performance and total hospital activity in the context of the general economy, using AHA data for report years 1977-89. The study period was divided into four periods:

- From 1977 through 1979, the effective period of the industry's Voluntary Effort (VE) cost-containment program.
- From 1979 through 1983, the pre-PPS period when VE was no longer effective.
- From 1983 through 1985, the initial period of PPS.
- From 1986 through 1989, the later period of PPS.

Each of the four periods displays unique aspects of trends in hospital expenditures.

Key determinants of financial performance are examined:

- A measure of hospital output transaction prices that enables an estimate of hospital real output trends.
- Expense trends as a function of outputs, total factor productivity rates, and input resource prices.
- Net profit and net revenue trends.
- Trends in nominal and real expenditures and in transaction prices for the hospital industry compared

with nominal and real output and prices in the general economy.

The same trend analysis is then applied to Medicare Cost Reports for report years 1985-89.

Key findings of this article are:

- Hospital spending grew less than economywide spending (gross national product, or GNP) in the initial PSS period but resumed historical excess growth in the later PPS period.
- Rising hospital input prices, particularly hospital worker compensation increases in excess of general economy compensation changes, are a primary source for hospital spending rates in excess of general economy spending.
- Hospital inpatient outputs, which declined in the initial PPS period, resumed historical growth patterns in the later PPS period.
- Rapid growth in outpatient outputs characterized the entire PPS period.
- Hospital net profit rates, although declining in the recent PPS period following unprecedented high rates in the initial PPS period, were higher at the end of the study period than at the beginning of the study period.

Trends in revenues and profits

From 1977 through 1989, the average PPS hospital's net revenues quadrupled, reaching nearly $32 million by 1989 (Table 1). Most of these revenues, about 93 percent, were derived from revenues provided by patients or their third-party payers (government or private health insurers) for patient care goods and services provided by the hospital. The remainder represents revenues received by hospitals from sources other than patient care, for example, investments and proceeds from parking lots, gift shops, etc.

During the period 1977-89, the average hospital's net profits fluctuated from a low of $258,000 in 1977 to a high of $1.6 million in 1985, the first full year of PPS implementation. Overall, from 1977 through 1989, the average hospital's net profits increased fivefold, ending with nearly $1.3 million in profits in 1989.

Net profits as a percent of net revenues increased 25 percent during the period, rising from 3.2 percent in 1977 to more than 6 percent in the initial PPS period

Table 1

Per hospital gross patient revenues, net patient and non-patient revenues, expenses, and net profits: Fiscal years 1977-89

Fiscal year	Gross patient revenues			Net revenues			Expenses	Net profits	Net revenues	Number of hospitals
	Total	Inpatient	Outpatient	Total	Patient	Non-patient				
				Dollar amounts per hospital, in thousands						
1989	$44,301	$34,901	$9,400	$31,972	$29,695	$2,277	$30,704	$1,268	4.0	4,968
1988	38,077	30,375	7,702	28,866	26,761	2,105	27,732	1,134	3.9	5,034
1987	32,935	26,706	6,229	26,026	24,178	1,848	24,793	1,233	4.7	5,104
1986	29,102	24,012	5,090	24,053	22,378	1,675	22,545	1,508	6.3	5,166
1985	26,286	22,116	4,170	22,322	20,893	1,429	20,694	1,628	7.3	5,210
1984	24,990	21,519	3,470	20,773	19,425	1,348	19,499	1,274	6.1	5,232
1983	23,193	20,243	2,950	19,431	18,175	1,256	18,463	968	5.0	5,250
1982	19,999	17,466	2,534	17,408	16,229	1,179	16,558	850	4.9	5,264
1981	16,676	14,569	2,107	14,821	13,784	1,037	14,167	654	4.4	5,273
1980	13,852	12,110	1,742	12,462	11,571	891	11,914	548	4.4	5,282
1979	11,647	10,197	1,450	10,546	9,841	705	10,152	394	3.7	5,289
1978	10,057	8,808	1,248	9,209	8,593	616	8,896	313	3.4	5,289
1977	8,706	7,655	1,052	8,044	7,543	501	7,786	258	3.2	5,308
				Annual percent change						
1989	16.3	14.9	22.0	10.8	11.0	8.2	10.7	11.8	—	-1.3
1988	15.6	13.7	23.6	10.9	10.7	13.9	11.9	-8.0	—	-1.4
1987	13.2	11.2	22.4	8.2	8.0	10.3	10.0	-18.2	—	-1.2
1986	10.7	8.6	22.1	7.8	7.1	17.2	8.9	-7.4	—	-0.8
1985	5.2	2.8	20.2	7.5	7.6	6.0	6.1	27.8	—	-0.4
1984	7.7	6.3	17.6	6.9	6.9	7.3	5.6	31.6	—	-0.3
1983	16.0	15.9	16.4	11.6	12.0	6.5	11.5	13.9	—	-0.3
1982	19.9	19.9	20.3	17.5	17.7	13.7	16.9	30.0	—	-0.2
1981	20.4	20.3	20.9	18.9	19.1	16.4	18.9	19.3	—	-0.2
1980	18.9	18.8	20.1	18.2	17.6	26.4	17.4	39.1	—	-0.1
1979	15.8	15.8	16.2	14.5	14.5	14.4	14.1	25.9	—	0.0
1978	15.5	15.1	18.7	14.5	13.9	23.0	14.3	21.3	—	-0.4
Period				Average annual percent change						
1977-89	14.5	13.5	20.0	12.2	12.1	13.4	12.1	14.2	—	-0.4
1985-89	13.9	12.1	22.5	9.4	9.2	12.4	10.4	-6.1	—	-1.2
1983-85	6.5	4.5	18.9	7.2	7.2	6.7	5.9	29.7	—	-0.4
1979-83	18.8	18.7	19.4	16.5	16.6	15.5	16.1	25.2	—	-0.2
1977-79	15.7	15.4	17.4	14.5	14.2	18.6	14.2	23.6	—	-0.2
				Percent distribution						
1989	100.0	78.8	21.2	100.0	92.9	7.1	—	—	—	—
1988	100.0	79.8	20.2	100.0	92.7	7.3	—	—	—	—
1987	100.0	81.1	18.9	100.0	92.9	7.1	—	—	—	—
1986	100.0	82.5	17.5	100.0	93.0	7.0	—	—	—	—
1985	100.0	84.1	15.9	100.0	93.6	6.4	—	—	—	—
1984	100.0	86.1	13.9	100.0	93.5	6.5	—	—	—	—
1983	100.0	87.3	12.7	100.0	93.5	6.5	—	—	—	—
1982	100.0	87.3	12.7	100.0	93.2	6.8	—	—	—	—
1981	100.0	87.4	12.6	100.0	93.0	7.0	—	—	—	—
1980	100.0	87.4	12.6	100.0	92.9	7.1	—	—	—	—
1979	100.0	87.5	12.5	100.0	93.3	6.7	—	—	—	—
1978	100.0	87.6	12.4	100.0	93.3	6.7	—	—	—	—
1977	100.0	87.9	12.1	100.0	93.8	6.2	—	—	—	—

NOTE: Data for Maryland, Massachusetts, New Jersey, and New York are excluded.

SOURCE: (American Hospital Association, 1977-89).

and subsequently stabilizing at about 4 percent in the late 1980s. During the same time, the number of community hospitals declined steadily from 5,308 to 4,968.

Net revenues and expenses, while decelerating rapidly in the initial period of PPS following rapid growth in pre-PPS periods, began to accelerate again in the later PPS period (Table 1). Net revenues, which had been increasing at double-digit rates prior to PPS, dropped to single-digit increases from 1984 through 1987, but subsequently resumed double-digit growth in 1988.

Outputs and output prices

Hospital outputs are defined here as any good or service appearing on a hospital bill in the form of a billable charge. Specific outputs do not have to be detailed but must be measurable by being included in an aggregate charge. I define a charge for an output as the output "list price" and the cash value of an output as the output "transaction price." The output transaction price represents the list price after discounts are applied.

Two output transaction prices are estimated: a patient care transaction output price, which represents

net patient revenues divided by patient care outputs, and a total output transaction price, which represents total net revenues divided by patient care outputs. (Total net revenues are the sum of net patient revenues and non-patient revenues derived from sources other than patient care.)

The method to derive patient care output transaction prices is described in the "Data sources and limitations" section of this article. The results of the method are shown in Table 2.

Patient care transaction prices increased at double-digit rates in the pre-PPS period and at near double-digit rates in the initial PPS period (Table 2). After 1985, however, third-party insurers, particularly Medicare, sharply limited increases in the transaction prices they were willing to pay hospitals. In this later PPS period, transaction price increases decelerated. Starting in 1988, however, patient care transaction price changes, although well below pre-PPS period rates, began once again to accelerate.

Changes in patient care real outputs are derived by dividing changes in net patient revenues by changes in patient care transaction prices. Patient care real outputs per hospital, which had been increasing substantially in the immediate pre-PPS period over the prior VE period, decreased nearly 2 percent annually in the initial 2 years of PPS (Table 2). Beginning in 1986, however, real outputs per hospital sharply accelerated and continued to increase at rapid rates thereafter. By 1989, real outputs were increasing at about the same rate as the average annual pre-PPS rate, about 4.6 percent annually (Table 2).

I converted rates of change in real outputs per hospital in Table 2 into constant dollar levels in Table 3, where fiscal year (FY) 1987 was arbitrarily chosen as a base year for the constant-dollar values. I distributed the total hospital constant-dollar values to the inpatient facility and outpatient facility sectors by dividing inpatient gross revenues and outpatient gross revenues, respectively, by the total Consumer Price Index (CPI) hospital component and by the total CPI hospital component less the CPI hospital room component.

This procedure is equivalent to the derivation of transaction prices shown in the "Data sources and limitations" section of this article, because a change in gross patient revenues deflated by a change in list prices provides a measure of growth in total real outputs. Because gross patient revenues for inpatient care represent the product of real inpatient outputs and list prices for real inpatient outputs, gross inpatient revenues deflated by list prices for real inpatient outputs provide a measure of inpatient real outputs. Real outpatient facility outputs were derived similarly.

I found that real outputs of inpatient facilities declined rapidly in the initial period of PPS (about 3 percent annually in 1984 and 1985), as real outputs of outpatient facilities increased sharply (at double-digit rates after 1984). This was particularly true in 1985, when new Medicare payment policies were implemented that encouraged outpatient surgery as an alternative to inpatient surgery (Table 3).

As inpatient admission rates and average lengths of stay began to stabilize, after declining rapidly in the initial PPS period (Table 4), inpatient real outputs resumed their historical rates of increase in the later PPS period (Table 5). Outputs per hospital day, which had been accelerating continuously since a low point observed in 1979 (the effective period of the VE program), decelerated in 1984, when PPS was introduced. Subsequently, outputs per patient day appeared to accelerate through 1986 and then tended to rise more slowly thereafter (Table 5).

Table 2
Trends in patient care hospital output prices and outputs: Fiscal years 1977-89

Fiscal year	CPI for hospitals (list price proxy)		Ratio of gross to net patient revenues		Percent change in		
	Level	Percent change	Level	Percent change	Patient care output transaction price	Patient care net revenue per hospital	Patient care real output per hospital
1989	156.1	11.3	1.492	4.9	6.1	11.0	4.6
1988	140.3	8.4	1.423	4.5	3.8	10.7	6.6
1987	129.4	6.9	1.362	4.7	2.1	8.0	5.8
1986	121.0	5.5	1.300	3.4	2.1	7.1	5.0
1985	114.7	7.0	1.258	-2.2	9.4	7.6	-1.7
1984	107.2	9.3	1.286	0.6	8.6	6.9	-1.6
1983	98.1	12.0	1.276	3.7	8.0	12.0	3.7
1982	87.6	14.7	1.232	1.9	12.6	17.7	4.6
1981	76.4	14.2	1.210	1.1	13.0	19.1	5.4
1980	66.9	12.6	1.197	1.1	11.4	17.6	5.6
1979	59.4	13.4	1.184	1.1	12.1	14.5	2.2
1978	52.4	10.5	1.170	1.4	9.0	13.9	4.5
1977	47.4	—	1.154	—	—	—	—
Period			Average annual percent change				
1977-89	—	10.4	—	2.2	8.1	12.1	3.7
1985-89	—	8.0	—	4.4	3.5	9.2	5.5
1983-85	—	8.1	—	-0.8	9.0	7.2	-1.6
1979-83	—	13.4	—	1.9	11.2	18.6	4.8
1977-79	—	11.9	—	1.3	10.5	14.2	3.3

NOTES: CPI is Consumer Price Index. Hospital data excluded for providers in Maryland, Massachusetts, New Jersey, and New York.

SOURCES: CPI statistics from (U.S. Department of Labor, Bureau of Labor Statistics, 1977-89); hospital revenue data from (American Hospital Association, 1977-89).

Table 3

Constant-dollar value of patient care real outputs, by type of output: 1977-89[1]

Fiscal year	Total	Inpatient care	Outpatient care
	Dollar amounts per hospital in thousands[2]		
1989	$36,724	$28,869	$7,855
1988	35,109	28,004	7,105
1987	32,935	26,706	6,229
1986	31,129	25,698	5,432
1985	29,647	24,948	4,699
1984	30,160	25,970	4,190
1983	30,588	26,685	3,903
1982	29,525	25,778	3,747
1981	28,227	24,685	3,542
1980	26,781	23,434	3,347
1979	25,360	22,221	3,139
1978	24,814	21,791	3,023
1977	23,746	20,834	2,912
	Percent distribution		
1989	100.0	78.6	21.4
1988	100.0	79.8	20.2
1987	100.0	81.1	18.9
1986	100.0	82.6	17.4
1985	100.0	84.2	15.8
1984	100.0	86.1	13.9
1983	100.0	87.2	12.8
1982	100.0	87.3	12.7
1981	100.0	87.5	12.5
1980	100.0	87.5	12.5
1979	100.0	87.6	12.4
1978	100.0	87.8	12.2
1977	100.0	87.7	12.3
	Annual percent change		
1989	4.6	3.1	10.5
1988	6.6	4.9	14.1
1987	5.8	3.9	14.7
1986	5.0	3.0	15.6
1985	-1.7	-3.9	12.1
1984	-1.4	-2.7	7.4
1983	3.6	3.5	4.2
1982	4.6	4.4	5.8
1981	5.4	5.3	5.8
1980	5.6	5.5	6.6
1979	2.2	2.0	3.8
1978	4.5	4.6	3.8
Period	Average annual percent change		
1977-89	3.7	2.8	8.6
1985-89	5.5	3.7	13.7
1983-85	-1.6	-3.3	9.7
1979-83	4.8	4.7	5.6
1977-79	3.3	3.3	3.8

[1]1987 base year.
[2]Real output equals nominal output divided by the Consumer Price Index (CPI) for hospitals.

NOTE: Data for Maryland, Massachusetts, New Jersey, and New York were excluded.

SOURCES: CPI data from (U.S. Department of Labor, Bureau of Labor Statistics, 1977-89); hospital revenue data from (American Hospital Association, 1977-89).

Total output transaction prices, as contrasted with patient care output transaction prices, are defined as total net revenues divided by patient care outputs. Total output transaction prices recognize that hospitals receive revenues from sources other than patients or their third-party payers. Total output transaction price changes are derived by dividing changes in total net revenues by changes in patient care real outputs. Total output transaction prices (Table 6) generally change at the same rate as patient care output transaction prices (Table 2) because the proportion of total net revenues represented by non-patient revenues remains relatively constant, and it is a small proportion.

In every year except 1985, total hospital output transaction prices rose more slowly than the CPI hospital component (Table 6 and Figure 1). In the early period of the study, total output transaction prices rose at slightly less than the CPI hospital component (list prices). In the initial 2 years of PPS, 1984 and 1985, combined output transaction price changes increased as a proportion of the CPI for hospital changes, actually exceeding the CPI list price increases in 1985, only to resume a relatively slower rate in later years of PPS. Part of these trends appears to be related to the rapid increase in Medicare PPS net revenues per Medicare real output in the first 2 years of PPS, followed by sharp constraints on Medicare PPS net revenues per Medicare real outputs in the following years.

Expenses

Hospital expenses can be defined as the product of three factors: the number of real outputs produced, the inverse of total factor productivity rates (where total factor productivity consists of labor productivity, capital productivity, and other factor productivity), and the average price of input resources. These relationships are represented in the identity:

Expenses = (Outputs)
× (Inputs/Outputs) × (Expenses/Inputs)

Because changes in expenses, real outputs, and unit prices per resource input (sometimes called an input price index or market basket, adjusted for skill-mix changes) have been estimated, the identity implies a measure of total factor productivity change for the hospital sector (or more precisely, a measure of the inverse of total factor productivity). This is because total factor productivity is defined as real outputs divided by real inputs.

In this study, I used an input price market basket prepared by the Health Care Financing Administration for the Bureau of Economic Analysis, U.S. Department of Commerce, altered to reflect employee compensation (wages per full-time equivalent [FTE] employee and employee benefits per FTE obtained from AHA) specific to the subset of hospitals that were included in this study. Hospital employee labor compensation per FTE generally rose faster than private non-agricultural employee compensation throughout the period (Table 7 and Figure 2). The hospital input price (or market basket) incorporating these employee compensation changes is shown in Table 8. The market basket implicitly incorporates any skill-mix changes that may be occurring in the hospital industry because the compensation variables from AHA are for a changing mix of employees. (Although hospitals shifted to a more expensive mix of employee hours in the study period, the magnitude of the shift was small—less than 2 percent cumulatively from 1980 to 1989 [Donham, Maple, and Lemieux, 1990].)

Table 4
Number of hospitals, admissions per hospital, average length of stay, and total days per hospital: 1977-89

Report year	Number of hospitals	Admissions per hospital		Average length of stay		Total days per hospital	
		Number	Percent change	Days	Percent change	Number	Percent change
1989	4,968	5,295.4	0.2	7.0	0.8	37,012	1.0
1988	5,034	5,284.2	1.0	6.9	-0.5	36,644	0.5
1987	5,104	5,233.6	-1.4	7.0	1.5	36,476	0.0
1986	5,166	5,309.4	-2.6	6.9	0.9	36,471	-1.8
1985	5,209	5,453.1	-4.8	6.8	-3.0	37,141	-7.7
1984	5,232	5,727.9	-2.9	7.0	-4.1	40,232	-6.8
1983	5,250	5,895.9	-0.7	7.3	-1.0	43,162	-1.7
1982	5,264	5,938.5	-0.1	7.4	0.2	43,915	0.2
1981	5,273	5,941.8	1.0	7.4	1.2	43,842	2.3
1980	5,284	5,880.4	3.3	7.3	0.1	42,875	3.4
1979	5,287	5,690.7	1.9	7.3	-0.6	41,457	1.3
1978	5,289	5,584.3	1.3	7.3	-0.1	40,933	1.2
1977	5,308	5,512.1	—	7.3	—	40,444	—
Period			Average annual percent change				
1977-89	—	—	-0.3	—	-0.4	—	-0.7
1985-89	—	—	-0.7	—	0.6	—	-0.1
1983-85	—	—	-3.8	—	-3.5	—	-7.2
1979-83	—	—	0.9	—	0.1	—	1.0
1977-79	—	—	1.6	—	-0.4	—	1.2

NOTE: Data for Maryland, Massachusetts, New Jersey, and New York are excluded.

SOURCE: (American Hospital Association, 1977-89).

Table 5
Percent changes in admissions per hospital, total inpatient days per hospital, inpatient outputs per hospital, and percent changes in inpatient outputs per admission and per day: 1977-89

Report year	Admissions	Total inpatient		Inpatient outputs per	
		Days	Outputs	Admission	Day
		Percent change			
1989	0.2	1.0	3.1	2.9	2.1
1988	1.0	0.5	4.8	3.8	4.3
1987	-1.4	0.0	3.9	5.4	3.9
1986	-2.5	-1.8	3.0	5.6	4.9
1985	-4.8	-7.7	-3.9	0.9	4.1
1984	-2.9	-5.8	-2.7	0.2	3.3
1983	-0.7	-1.7	3.5	4.2	5.3
1982	-0.1	0.2	4.4	4.5	4.2
1981	1.0	2.3	5.3	4.3	2.9
1980	3.3	3.4	5.5	2.1	2.0
1979	1.9	1.3	2.0	0.1	0.7
1978	1.3	1.2	4.6	3.3	3.4
Period		Average annual percent change			
1977-89	-0.3	-0.6	2.7	3.1	3.4
1985-89	-0.7	-0.1	3.7	4.4	3.8
1983-85	-3.9	-6.8	-3.3	0.6	3.7
1979-83	0.9	1.0	4.7	3.8	3.6
1977-79	1.6	1.2	3.3	1.7	2.0

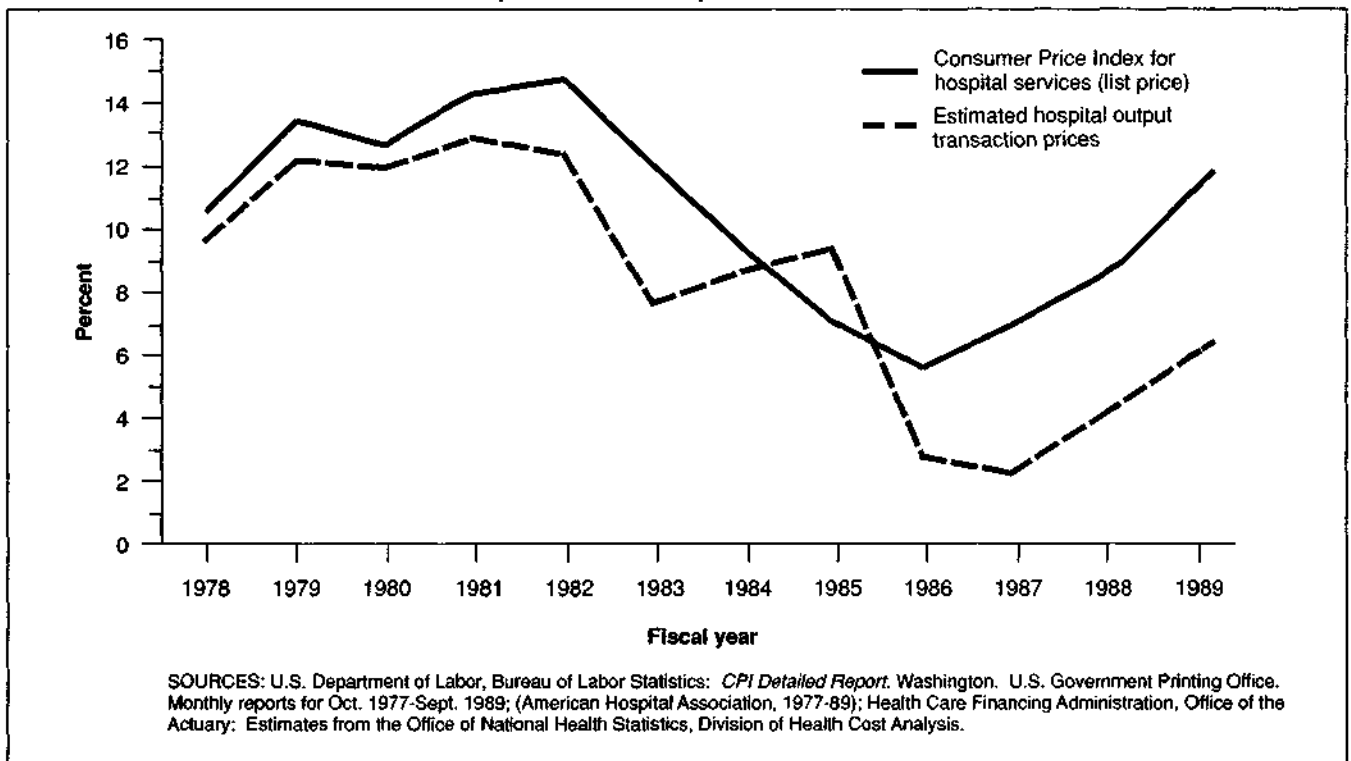NOTE: Data for Maryland, Massachusetts, New Jersey, and New York are excluded.

SOURCE: (American Hospital Association, 1977-89).

Table 6
Total hospital output price changes: 1978-89

Fiscal year	Percent change in				Ratio of transaction output price change to CPI for hospitals change
	Net total revenues per hospital	Patient care outputs	Total output transaction price	CPI for hospitals (list price)	
1989	10.8	4.6	5.9	11.3	-4.8
1988	10.9	6.6	4.0	8.4	-4.1
1987	8.2	5.8	2.2	6.9	-4.4
1986	7.8	5.0	2.7	5.5	-2.7
1985	7.5	-1.7	9.3	7.0	2.2
1984	6.9	-1.6	8.6	9.3	-0.6
1983	11.6	3.7	7.6	12.0	-3.9
1982	17.5	4.6	12.3	14.7	-2.1
1981	18.9	5.4	12.8	14.2	-1.2
1980	18.2	5.6	11.9	12.6	-0.6
1979	14.5	2.2	12.1	13.4	-1.1
1978	14.5	4.5	9.6	10.5	-0.9
Period			Average annual percent change		
1977-89	12.2	3.7	8.2	10.4	-2.0
1985-89	9.4	5.5	3.7	8.0	-4.0
1983-85	7.2	-1.6	9.0	8.1	0.8
1979-83	16.5	4.8	11.1	13.4	-2.0
1977-79	14.5	3.3	10.8	11.9	-1.0

NOTES: CPI is Consumer Price Index. Data for Maryland, Massachusetts, New Jersey, and New York were excluded.

SOURCE: (American Hospital Association, 1977-89).

Figure 1
Percent change in the Consumer Price Index for hospital services (list prices) and estimated hospital output transaction prices: 1978-89

SOURCES: U.S. Department of Labor, Bureau of Labor Statistics: CPI Detailed Report. Washington. U.S. Government Printing Office. Monthly reports for Oct. 1977-Sept. 1989; (American Hospital Association, 1977-89); Health Care Financing Administration, Office of the Actuary: Estimates from the Office of National Health Statistics, Division of Health Cost Analysis.

The major source of increase in hospital input prices in almost all years of the study period was labor compensation (i.e., employee wages and salaries and employee benefits per FTE worker), which generally rose much faster than the price of non-labor inputs over the period (Table 8).

In the later PPS period, rising resource input prices (i.e., expenses/inputs) accounted for most of the increases in hospital expenses, with rising outputs as a major secondary source (Table 9). Total factor productivity rates generally decreased in the VE period, as outputs decelerated relative to input resources, but increased in the immediate pre-PPS period. In the initial PPS period, total factor productivity rates declined, as the reduction in input resources lagged behind rapidly decreasing outputs. However, as input resource adjustments were made in later periods, productivity rates stopped decreasing throughout the later PPS period.

In Table 10, I disaggregate changes in total factor productivity rates into a direct-labor component and a non-direct-labor component (which includes productivity factor components for capital and other non-labor inputs). Changes in direct-labor productivity were computed by dividing changes in real outputs by changes in FTE employees. Direct-labor productivity increased at a declining rate in the first year of PPS, 1984, decreased in 1985, and subsequently increased. Changes in non-direct-labor productivity were computed by subtracting expenditure-weighted direct-labor productivity changes from expenditure-weighted total-factor productivity changes. Changes in non-direct-labor productivity were negative for almost all the pre-PPS periods through 1986.

Two warnings about productivity estimates in Table 10 should be noted. First, anecdotal data suggest that the rate of change in industry use of contract labor is increasing. Because the number of contracted labor units is excluded from the FTE data in Table 10, computations of hospital labor productivity are inaccurate to the extent that they exclude contract labor. Second, the flow of capital services provided by a given stock of existing real hospital capital has not been determined.

Net profits

Net profits as a percent of total net revenues gradually increased during the VE and pre-PPS periods, rapidly increased in the initial PPS period, and subsequently slowed to pre-PPS period rates in later years (Table 1). By the end of the study period in 1989, the average PPS hospital was accumulating about $1.3 million in net profits annually.

The ratio of total net revenues to expenses changes because total revenues per unit of output change and because expenses per output change. Generally, hospital revenues per output kept pace with expenses

Table 7

Amounts and annual percent change in hospital labor compensation per full-time equivalent employee; percent change in general economy labor compensation; and real wage changes: 1977-89

| Fiscal year | Wages and salaries | | Benefits | | Total compensation | | Percent change in private non-agricultural sector | | CPI All Items | | Percent change in real wages | |
	Amount per FTE	Percent change	Amount per FTE	Percent change	Amount per FTE	Percent change	Hourly wages[1]	Benefit per FTE[2]	Level	Percent change	Hospital sector	General economy
1989	$24,253	5.2	$4,776	10.1	$29,029	6.0	4.0	4.5	122.6	4.8	0.4	−0.8
1988	23,056	6.5	4,338	7.9	27,394	6.8	3.2	4.5	117.0	4.1	2.4	−0.9
1987	21,640	4.3	4,020	3.4	25,660	4.2	2.2	3.7	112.4	2.8	1.4	−0.6
1986	20,748	4.2	3,888	1.4	24,636	3.8	2.5	3.2	109.3	2.5	1.7	0.0
1985	19,903	4.1	3,834	6.0	23,737	4.4	3.1	1.7	106.6	3.7	0.4	−0.6
1984	19,113	7.5	3,616	11.3	22,729	8.1	4.0	4.2	102.8	4.0	3.4	0.0
1983	17,773	8.5	3,250	15.5	21,023	9.6	4.6	8.1	98.8	3.6	4.8	1.0
1982	16,377	14.7	2,813	21.1	19,190	15.6	6.7	9.7	95.4	7.3	6.9	−0.6
1981	14,278	12.1	2,322	17.8	16,600	12.9	9.1	11.0	88.9	11.1	0.9	−1.8
1980	12,733	10.9	1,971	14.0	14,704	11.3	7.9	10.6	80.0	13.6	−2.4	−5.0
1979	11,481	8.7	1,729	11.9	13,210	9.1	8.5	9.7	70.4	10.3	−1.5	−1.7
1978	10,562	9.0	1,545	11.8	12,107	9.3	8.2	9.5	63.8	7.0	1.8	1.1
1977	9,690	—	1,382	—	11,072	—	—	—	59.6	—	—	—
Period					Average annual percent change							
1977-89	—	7.9	—	10.9	—	8.4	5.3	6.7	—	6.2	1.6	−0.8
1985-89	—	5.1	—	5.6	—	5.2	3.0	4.0	—	3.6	1.5	−0.6
1983-85	—	5.8	—	8.6	—	6.3	3.5	2.9	—	3.9	1.9	−0.3
1979-83	—	11.5	—	17.1	—	12.3	7.1	9.8	—	8.8	2.5	−1.6
1977-79	—	8.9	—	11.9	—	9.2	8.3	9.6	—	8.7	0.2	−0.3

[1]From (U.S. Department of Labor, Bureau of Labor Statistics, 1977-89).
[2]From Federal Register, Vol. 51, No. 170, 31583, Sept. 3, 1986.

NOTES: CPI is Consumer Price Index. FTE is full-time equivalent. Data for providers in Maryland, Massachusetts, New Jersey, and New York are excluded.

SOURCE: (American Hospital Association, 1977-89).

Figure 2
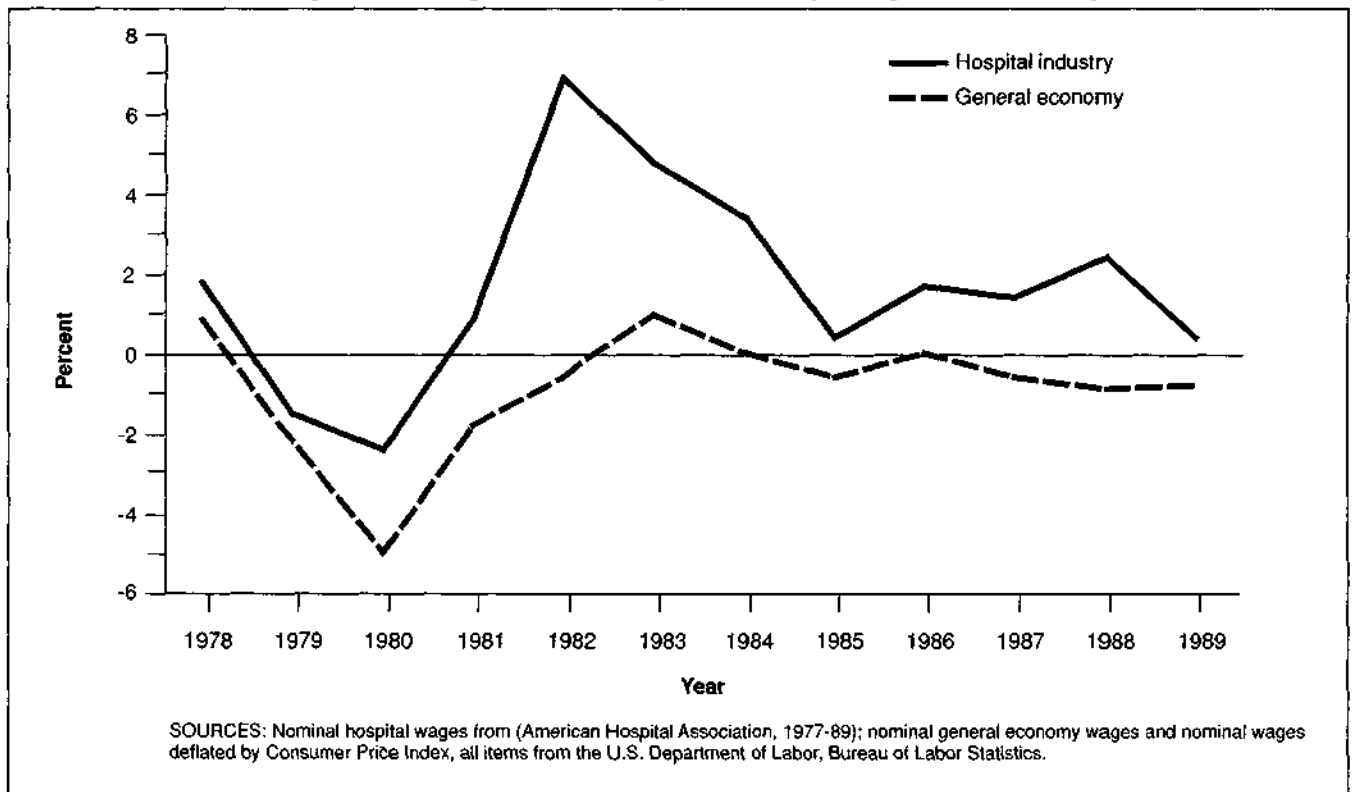## Percent change in real wages for the hospital industry and general economy: 1978-89

SOURCES: Nominal hospital wages from (American Hospital Association, 1977-89); nominal general economy wages and nominal wages deflated by Consumer Price Index, all items from the U.S. Department of Labor, Bureau of Labor Statistics.

Table 8
Percent change in Hospital Input Price Index, by major component: Fiscal years 1978-89

| Fiscal year | Total | Hospital Input Price Index | | | Non-compensation input prices |
| | | Labor-related compensation | | | |
		Total per FTE	Wages and salaries per FTE	Benefits per FTE	
			Percent change		
1989	5.7	6.0	5.2	10.1	5.4
1988	6.0	6.8	6.5	7.9	4.9
1987	3.9	4.2	4.3	3.4	3.5
1986	3.5	3.8	4.2	1.4	3.1
1985	4.2	4.4	4.1	6.0	3.9
1984	6.7	8.1	7.5	11.3	4.7
1983	7.6	9.6	8.5	15.5	4.8
1982	12.2	15.6	14.7	21.1	7.2
1981	12.0	12.9	12.1	17.8	10.6
1980	12.0	11.3	10.9	14.0	12.9
1979	8.8	9.1	8.7	11.9	8.4
1978	7.9	9.3	9.0	11.8	5.9
Period			Average annual percent change		
1977-89	7.5	8.4	7.9	10.9	6.2
1986-89	4.8	5.2	5.1	5.6	4.2
1984-85	5.5	6.3	5.8	8.6	4.3
1980-83	10.9	12.3	11.5	17.1	8.8
1978-79	8.4	9.2	8.9	11.9	7.1

NOTES: FTE is full-time equivalent (employee). Data for providers in Maryland, Massachusetts, New Jersey, and New York are excluded.

SOURCES: Compensation data per FTE from (American Hospital Association, 1977-89); non-compensation expense rates obtained from an index prepared by the Health Care Financing Administration for the Bureau of Economic Analysis, U.S. Department of Commerce.

Table 9
Expenses per hospital and ratio changes in determinants of hospital expenses per hospital: 1977-89

Fiscal year	Expenses Levels[1]	Ratio change	Real outputs	Inputs/outputs	Expenses/inputs	Total factor productivity
1989	$30,704	1.107	1.046	1.001	1.057	0.999
1988	27,732	1.119	1.066	0.990	1.060	1.010
1987	24,793	1.100	1.058	1.000	1.039	1.000
1986	22,545	1.089	1.050	1.003	1.035	0.997
1985	20,694	1.061	0.983	1.036	1.042	0.965
1984	19,499	1.056	0.986	1.004	1.067	0.996
1983	18,463	1.115	1.036	1.001	1.076	0.999
1982	16,558	1.169	1.046	0.996	1.122	1.004
1981	14,167	1.189	1.054	1.008	1.120	0.993
1980	11,914	1.174	1.056	0.993	1.120	1.007
1979	10,152	1.141	1.022	1.026	1.088	0.974
1978	8,896	1.143	1.045	1.013	1.079	0.987
1977	7,786	—	—	—	—	—
			Annual percent change			
1989	—	10.7	4.6	0.1	5.7	-0.1
1988	—	11.9	6.6	-1.0	6.0	1.0
1987	—	10.0	5.8	0.0	3.9	-0.0
1986	—	8.9	5.0	0.3	3.5	-0.3
1985	—	6.1	-1.7	3.6	4.2	-3.5
1984	—	5.6	-1.4	0.4	6.7	-0.4
1983	—	11.5	3.6	0.1	7.6	-0.1
1982	—	16.9	4.6	-0.4	12.2	0.4
1981	—	18.9	5.4	0.8	12.0	-0.7
1980	—	17.4	5.6	-0.7	12.0	0.7
1979	—	14.1	2.2	2.6	8.8	-2.6
1978	—	14.3	4.5	1.3	7.9	-1.3
Period			Average annual percent change			
1977-89	—	12.1	3.7	0.6	7.5	-0.6
1985-89	—	10.4	5.5	-0.1	4.8	0.1
1983-85	—	5.9	-1.5	2.0	5.5	-1.9
1979-83	—	16.1	4.8	-0.1	10.9	0.1
1977-79	—	14.2	3.3	2.0	8.4	-1.9

[1]Dollar amounts per hospital in thousands.

NOTE: Data for Maryland, Massachusetts, New Jersey, and New York are excluded.

SOURCE: (American Hospital Association, 1977-89).

Table 10
Number of full-time equivalents (FTEs) and productivity rate changes: Fiscal years 1977-89

Fiscal year	FTEs per hospital Number	Percent change	Real output	Direct-labor productivity	Non-direct-labor productivity	Total factor productivity
			Percent change			
1989	550.7	4.5	4.6	0.1	-0.5	-0.1
1988	527.2	4.4	6.6	2.1	-0.4	1.0
1987	504.8	4.0	5.8	1.8	-2.6	-0.0
1986	485.6	1.7	5.0	3.2	-5.1	-0.3
1985	477.6	0.2	-1.7	-1.9	-5.7	-3.5
1984	476.7	-2.8	-1.6	1.3	-3.1	-0.5
1983	490.5	1.2	3.7	2.5	-3.2	0.1
1982	484.6	1.3	4.6	3.3	-3.7	0.4
1981	478.6	6.1	5.4	-0.7	-0.9	-0.7
1980	451.0	4.5	5.6	1.0	0.4	0.7
1979	431.4	4.3	2.2	-2.1	-3.3	-2.6
1978	413.5	3.9	4.5	0.6	-3.9	-1.3
1977	398.0	—	—	—	—	—
Period			Average annual percent change			
1977-89	—	2.7	3.7	0.9	-2.7	-0.6
1985-89	—	3.6	5.5	1.8	-2.2	0.1
1983-85	—	-1.3	-1.6	-0.3	-4.4	-2.0
1979-83	—	3.3	4.8	1.5	-1.9	0.1
1977-79	—	4.1	3.3	-0.8	-3.6	-1.9

NOTE: Data for Maryland, Massachusetts, New Jersey, and New York are excluded.

SOURCE: FTEs from (American Hospital Association, 1977-89).

per output throughout the study period (Table 11). However, in the initial PPS period, revenues per unit of output accelerated relatively faster than expenses per output. Since 1986 and 1987, expenses per unit of output tended to drift above revenues per unit of output and, therefore, profits have tended to decline. Since 1987, revenues and expenses have resumed their historical trends.

Trends in net revenues

Although expenses per PPS hospital rose rapidly in recent years as a result of rising outputs and input resource prices, the average PPS hospital was able to maintain its pre-PPS profit rates by rapidly increasing its net revenues. Some erosion of profit margins is observed in recent periods, beginning from the relatively high profit rate observed in the early PPS period. These trends are summarized in Table 12, which shows specific amounts for the identity:

Net revenues = (Expenses) × (Net Revenues/Expenses)

Table 12 shows that hospital net revenues have kept pace with increasing costs in recent years. The table also indicates that rising input prices have been a consistent contributor throughout the study period, accounting for more than one-half of growth in net revenues in recent years. Rising outputs were another major source of increase in all other years except 1984 and 1985, when net profits replaced them.

Hospital expenditures and economic growth

Total expenditures for hospital care (i.e., net revenues) are the product of average net revenues per

Table 11

Trends in net revenues and expenses per unit of hospital output, 1978-89

Fiscal year	Percent change per unit of output		Difference (revenues less expenses)
	Net revenues	Expenses	
1989	5.9	5.9	0.0
1988	4.0	4.9	-0.9
1987	2.2	3.9	-1.7
1986	2.7	3.8	-1.1
1985	9.3	8.0	1.4
1984	8.6	7.3	1.3
1983	7.6	7.5	0.1
1982	12.3	11.7	0.6
1981	12.8	12.8	0.0
1980	11.9	11.1	0.8
1979	12.1	11.7	0.4
1978	9.6	9.4	0.2
Period	Average annual percent change		
1977-89	8.2	8.1	0.1
1985-89	3.7	4.6	-0.9
1983-85	9.0	7.6	1.3
1979-83	11.1	10.8	0.4
1977-79	10.8	10.5	0.3

NOTE: Data from Maryland, Massachusetts, New Jersey, and New York are excluded.

SOURCE: (American Hospital Association, 1977-89).

hospital and the number of hospitals. Although average net revenues per hospital increased steadily over the study period, the number of hospitals steadily decreased. Therefore, in order to estimate changes in total hospital expenditures, the rates of change in average revenues per hospital and in outputs per hospital obtained in prior sections must be adjusted by changes in the number of hospitals. These adjustments to hospital revenues and outputs are shown in Table 13.

Net hospital revenues consistently grew more rapidly than the GNP before PPS was implemented in FY 1984, grew less than the GNP in the initial PPS period, and resumed faster growth in the later PPS period. By 1989, hospital revenues grew nearly 2 percentage points faster than the GNP (Table 13). The major eras of changing growth patterns were:

- 1977 through 1979, the industry's effective VE cost-control period, when hospital revenues exceeded GNP growth by 1.6 percent annually.
- 1979 through 1983, an era with no effective cost-control program, when hospital revenues exceeded GNP growth by 7.8 percent annually.
- 1983 through 1985, the PPS implementation period, when hospital revenues grew 2.1 percent less annually than the GNP.
- 1985 through 1989, the later PPS implementation period, when hospital revenues grew 1.3 percentage points faster than the GNP.

Hospital total output transaction prices grew substantially faster than general prices (as measured by the GNP implicit price deflator) in all years of the study except 1986 and 1987, when third-party payers, particularly Medicare, sharply limited rates of increase in payment rates.

Hospital real outputs generally grew less than real outputs in the general economy during the initial periods of the two hospital cost-containment programs implemented in the study period. Thus, real hospital outputs grew less than general real economic growth in the VE period and again in the initial PPS period. Changes in hospital real outputs tended to exceed changes in general economy real outputs in all other periods (Table 13 and Figure 3).

Over the entire study period, 1977 through 1989, hospital revenues rose at an average annual rate of 2.9 percent faster than the GNP (Table 13 and Figure 3). Hospital spending trends in Table 13 include personal health care consumption spending but exclude hospital investments in construction and equipment (not shown in this article). To the extent that hospital investment rate changes differ from hospital consumption rate changes, the ratio of change in hospital spending to changes in the GNP will vary. The preliminary estimate is that changes in hospital investment spending rates do not differ markedly from changes in hospital consumption rates shown in Table 13.

I previously showed how hospital output prices could be derived directly from list prices. Total hospital output prices can also be considered as the product of input prices, productivity rates, and profit rates. This relationship is shown in the identity:

10

Table 12
Trends in determinants of hospital net revenues, ratio changes, and percent distribution: 1978-89[1]

Fiscal year	Net revenue	Patient real outputs	Inputs/ outputs[2]	Expenses/ inputs[3]	Net revenues/ expenses
		Annual ratio change per hospital			
1989	1.108	1.046	1.001	1.057	1.000
1988	1.109	1.066	0.990	1.060	0.992
1987	1.082	1.058	1.000	1.039	0.984
1986	1.078	1.050	1.003	1.035	0.989
1985	1.075	0.983	1.036	1.042	1.013
1984	1.069	0.984	1.005	1.067	1.012
1983	1.116	1.037	0.999	1.076	1.001
1982	1.175	1.046	0.996	1.122	1.005
1981	1.189	1.054	1.008	1.120	1.000
1980	1.182	1.056	0.993	1.120	1.007
1979	1.145	1.022	1.026	1.088	1.004
1978	1.145	1.045	1.013	1.079	1.002
		Annual percent change			
1989	10.8	4.6	0.1	5.7	0.0
1988	10.9	6.6	-1.0	6.0	-0.8
1987	8.2	5.8	0.0	3.9	-1.6
1986	7.8	5.0	0.3	3.5	-1.1
1985	7.5	-1.7	3.6	4.2	1.3
1984	6.9	-1.6	0.5	6.7	1.2
1983	11.6	3.7	-0.1	7.6	0.1
1982	17.5	4.6	-0.4	12.2	0.5
1981	18.9	5.4	0.8	12.0	0.0
1980	18.2	5.6	-0.7	12.0	0.7
1979	14.5	2.2	2.6	8.8	0.4
1978	14.5	4.5	1.3	7.9	0.2
Period		Average annual percent change			
1977-89	12.2	3.7	0.6	7.5	0.1
1985-89	9.4	5.5	-0.1	4.8	-0.9
1983-85	7.2	-1.6	2.1	5.5	1.2
1979-83	16.5	4.8	-0.1	10.9	0.3
1977-79	14.5	3.3	2.0	8.4	0.3

[1]Determinants of hospital net revenues are related by the identity: Net revenues = (Real outputs) × (Inputs/Real outputs) × (Expenses/Real inputs) × (Net revenues/Expenses).
[2]Inverse of total factor productivity.
[3]Input price index.

NOTE: Data for Maryland, Massachusetts, New Jersey, and New York are excluded.

SOURCE: (American Hospital Association, 1977-89).

Hospital output prices =
    Total net revenues/Outputs = (Inputs/Outputs)
    × (Expenses/Inputs) × (Total net revenues/Expenses)

The identity shows that a 1-percent increase in input prices translates directly into a 1-percent increase in output prices, unless changes in productivity rates or profit rates offset or supplement the input price increase. During the study period, the major determinant of rising output prices was rising input prices (Table 14). The major determinant of rising input prices in the period was hospital labor compensation (Table 8).

The impact of rising hospital compensation rates can be observed in the growing differences in real wage rate changes in the hospital sector compared with the general economy. Over the 12-year study period, 1977 through 1989, real hospital wages (i.e., nominal hospital wages divided by the CPI for all items) rose more than 20 percent, while real private non-agricultural wages declined nearly 10 percent (Table 7 and Figure 2). Victor Fuchs reports that "From 1977 to 1987, wages in most industries failed to keep pace with inflation, but rank-and-file health workers did better,

outpacing employees in the rest of the economy by 1.3% per annum," and that "In 1949, rank-and-file health care workers (16 years of schooling or less) earned 15% less than their counterparts in the rest of the economy. In 1985 they earned 7% more than other workers [which] implies that relative wages rose at the rate of 0.6% per annum" (Fuchs, 1990).

Data sources and limitations

Hospital data for Tables 1 through 14 were obtained from *Hospital Statistics*, an annual publication of the American Hospital Association. Data are shown for all community hospitals in the United States from this source except for hospitals in the States of Maryland, Massachusetts, New Jersey, and New York.

Data for Tables 15 through 19 were obtained from a linked file of Medicare Cost Reports for 5,161 providers for cost report years 1985 through 1989.

Data from Medicare Cost Reports and AHA annual surveys are reported for provider reporting periods, which generally do not coincide with Federal FY periods. Thus, the characterization of hospital-related

Table 13

Comparison of percent growth in hospital net revenues and gross national product (GNP), by nominal, price, and real growth: 1978-89

Fiscal year	Growth in GNP			Growth in hospital net revenues			Ratio of hospital growth component to GNP growth component		
	Nominal	Price	Real	Nominal	Price[1]	Real[2]	Nominal	Price	Real
				Annual percent change					
1989	7.3	4.2	2.9	9.4	5.9	3.2	1.9	1.6	0.3
1988	8.0	3.0	4.9	9.3	4.0	5.1	1.2	1.0	0.2
1987	5.8	3.1	2.6	6.9	2.2	4.5	1.0	-0.8	1.8
1986	5.9	2.6	3.2	6.9	2.7	4.2	1.0	0.0	0.9
1985	6.9	3.1	3.7	7.0	9.3	-2.1	0.1	6.0	-5.6
1984	11.2	3.9	7.1	6.6	8.4	-1.7	-4.2	4.4	-8.2
1983	5.8	4.1	1.5	11.3	7.8	3.3	5.3	3.5	1.7
1982	5.2	7.4	-2.0	17.2	12.3	4.4	11.4	4.6	6.6
1981	11.9	9.9	1.8	18.7	12.8	5.2	6.0	2.6	3.3
1980	8.8	8.8	-0.1	18.1	11.9	5.5	8.5	2.8	5.5
1979	12.8	8.6	3.9	14.6	12.1	2.2	1.5	3.2	-1.6
1978	12.3	6.9	5.0	14.0	9.6	4.1	1.6	2.4	-0.9
Period				Average annual percent change					
1977-89	8.5	5.5	2.9	11.6	8.2	3.1	2.9	2.6	0.3
1985-89	6.8	3.2	3.4	8.1	3.7	4.3	1.3	0.4	0.8
1983-85	9.0	3.5	5.4	6.8	8.9	-1.9	-2.1	5.2	-6.9
1979-83	7.9	7.6	0.3	16.3	11.2	4.6	7.8	3.4	4.3
1977-79	12.6	7.8	4.4	14.3	10.8	3.1	1.6	2.8	-1.2

[1]Total output transaction price (Table 6).

[2]Real output changes per hospital (Table 12) multiplied by changes in the number of hospitals (Table 1).

NOTES: Percent changes for output prices and outputs do not add because of rounding and because the percent changes were derived from ratio changes. Hospital data excluded for providers in Maryland, Massachusetts, New Jersey, and New York.

SOURCES: GNP data from the Bureau of Economic Analysis, U.S. Department of Commerce, Summary of Current Business monthly reports for 1978-89. Hospital data from (American Hospital Association, 1977-89).

Figure 3
Growth of hospital spending less growth in gross national product, by total and major component: 1978-89

SOURCES: Hospital spending growth from (American Hospital Association, 1977-89); gross national product growth from U.S. Department of Commerce, Bureau of Economic Analysis.
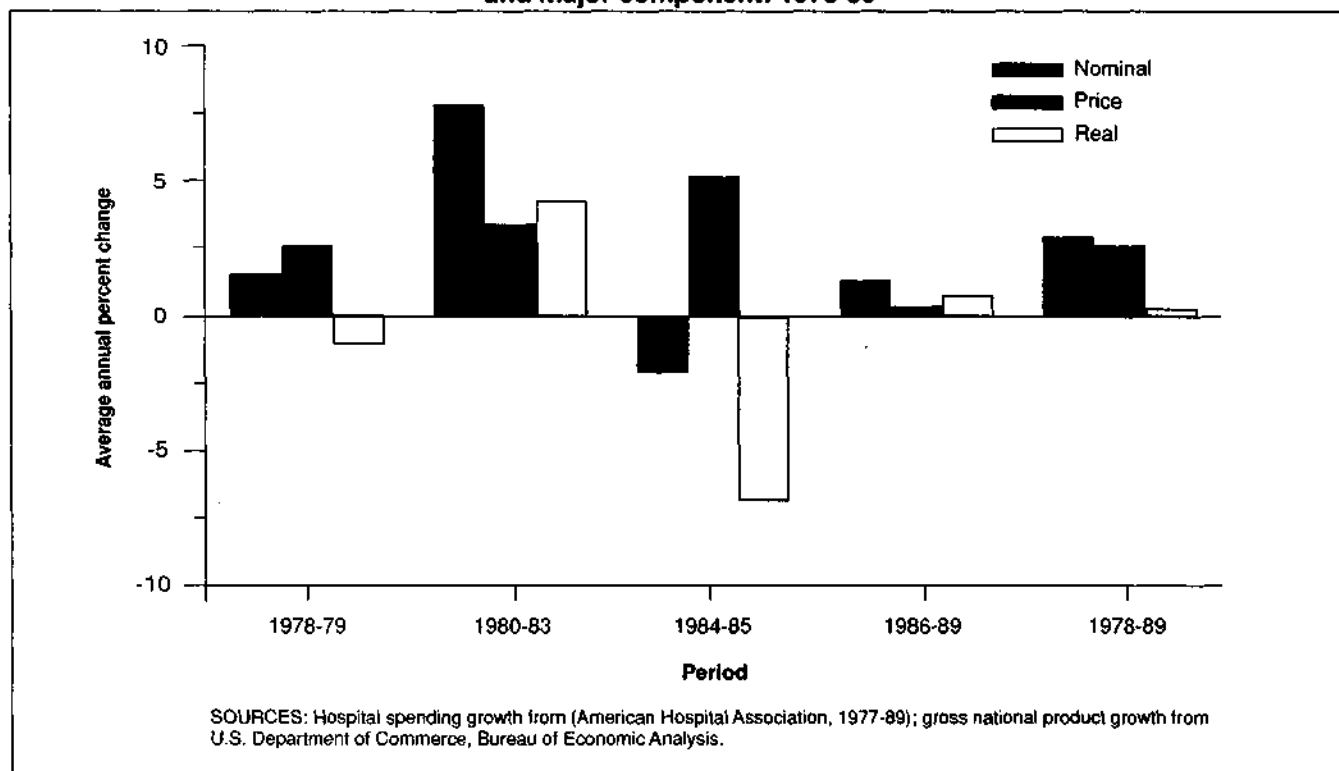
Table 14

Trends in determinants of hospital total transaction prices, annual ratio and percent changes, and percent distribution: 1978-89

Fiscal year	(Expenses/ inputs)[1] ×	(Inputs/ outputs)[2] ×	(Net revenues/ expenses)[3] =	Total transaction price
		Annual ratio change		
1989	1.057	1.001	1.000	1.059
1988	1.060	0.990	0.992	1.040
1987	1.039	1.000	0.984	1.022
1986	1.035	1.003	0.989	1.027
1985	1.042	1.036	1.013	1.093
1984	1.067	1.005	1.012	1.086
1983	1.076	0.999	1.001	1.076
1982	1.122	0.996	1.005	1.123
1981	1.120	1.008	1.000	1.128
1980	1.120	0.993	1.007	1.119
1979	1.088	1.026	1.004	1.121
1978	1.079	1.013	1.002	1.096

Period		Average annual percent change		
1977-89	7.5	0.6	0.1	8.2
1985-89	4.8	−0.1	−0.9	3.7
1983-85	5.5	2.1	1.2	9.0
1979-83	10.9	−0.1	0.3	11.1
1977-79	8.4	2.0	0.3	10.8

[1]Input price market basket.
[2]Inverse of total factor productivity.
[3]Relative profit ratio.

NOTE: Data for Maryland, Massachusetts, New Jersey, and New York are excluded.

SOURCE: Expenses and net revenues from (American Hospital Association, 1977-89).

financial data as "fiscal year" data in this article is not strictly accurate.

The relationship between list and transaction prices follows from definitions of these two prices:

Let:
P_L = List price
P_{PT} = Patient care output transaction price
G = Gross patient revenues
N = Net patient revenues
O = Number of patient care outputs

Then:
$P_L = G/O$
$P_{PT} = N/O$
$P_L/P_{PT} = (G/O)/(N/O) = G/N$
$P_{PT} = P_L/(G/N)$

For rates of change between period "0" and period "1,"

$$P_{PT1}/P_{PT0} = (P_{L1}/P_{L0})/((G_1/N_1)/(G_0/N_0))$$

The change in list prices, P_{L1}/P_{L0}, is proxied by the CPI hospital component. The change in the ratio of gross patient revenues to net patient revenues, $(G_1/N_1)/(G_0/N_0)$, is available from Medicare Cost Reports and AHA annual *Hospital Statistics*. The change in patient care output transaction prices is thus the quotient of the change in the CPI hospital component divided by the change in the ratio of gross patient revenues to net patient revenues.

Derivations of transaction price changes in Tables 2 and 3 are based on three assumptions about their determinants:

* That hospitals do not engage in discriminatory pricing for various products and services (i.e., they do not alter the relationship between list prices for individual outputs to maximize revenues).
* That the CPI Hospital Index captures the list price effects of all hospital outputs.
* That the consumer expenditure weights used by the Bureau of Labor Statistics for individual categories of hospital prices do not result in material differences in total CPI for hospital changes when compared with total CPI Hospital Index changes based on industry-derived expenditures weights.

To the extent that these assumptions hold true, transaction price trends shown in this article reflect actual trends.

Alternative measures for trends in hospital wages and/or benefits shown in Table 7 are sometimes used in various input price market baskets:

* Bureau of Labor Statistics wage series including Hospital Average Hourly Earnings for private hospital non-supervisory workers and Employment Cost Index (ECI) series for private and State and local hospital workers.
* American Hospital Association panel survey wage and benefit data.

Trends in these alternative measures generally parallel the measure shown in Table 7 in direction but not always in magnitude.

Balance sheet data in Table 17 were estimated from subsets of Medicare Cost Reports, which reasonably represented the universe of 5,161 hospitals whose income and expense data are shown in Table 15, because some hospitals did not report balance sheet data.

Technical note

Medicare Cost Report data trends

In order to portray characteristics of hospitals under PPS that are not available from the AHA annual surveys, I prepared a data file of 5,161 hospitals that were continuously under PPS for all cost report years 1985 through 1989. Revenue, expense, and balance sheet data in Table 15 were obtained from this file. This set of hospitals differs from the AHA set of hospitals portrayed in Tables 1 through 14 in two major respects:

* Hospitals that entered or dropped out of the industry at any time in the period 1985 through 1989 are excluded from the Medicare Cost Report File data tables but are included in the AHA survey data tables. Because more hospitals dropped out than entered, presumably associated with below-average financial performance or with mergers and acquisitions, our Medicare Cost Report tables differ from the AHA data.

Table 15

Gross revenues, net revenues, expenses and net profits, amounts, annual percent change, and percent distribution: 1985-89

Fiscal year	Gross revenues			Net revenues			Expenses	Net profits	
	Total	Inpatient	Outpatient	Total	Patient	Non-patient		Amount	Percent of net revenues
				Dollar amounts per hospital in thousands					
1989	$45,087	$35,217	$9,870	$31,844	$29,867	$1,977	$30,350	$1,494	4.7
1988	38,842	30,660	8,182	28,750	26,979	1,771	27,394	1,356	4.7
1987	33,790	27,214	6,576	26,032	24,405	1,627	24,903	1,129	4.3
1986	29,838	24,484	5,354	24,304	22,771	1,533	22,973	1,331	5.5
1985	26,744	22,247	4,497	23,050	21,641	1,409	21,365	1,685	7.3
				Annual percent change					
1989	16.1	14.9	20.6	10.8	10.7	11.6	10.8	10.2	—
1988	15.0	12.7	24.4	10.4	10.5	8.9	10.0	20.1	—
1987	13.2	11.2	22.8	7.1	7.2	6.1	8.4	-15.2	—
1986	11.6	10.1	19.1	5.4	5.2	8.8	7.5	-21.0	—
				Percent distribution					
1989	100.0	78.1	21.9	100.0	93.8	6.2	—	—	—
1988	100.0	78.9	21.1	100.0	93.8	6.2	—	—	—
1987	100.0	80.5	19.5	100.0	93.8	6.3	—	—	—
1986	100.0	82.1	17.9	100.0	93.7	6.3	—	—	—
1985	100.0	83.2	16.8	100.0	93.9	6.1	—	—	—

NOTE: Data based on Medicare Cost Reports for 5,161 hospitals that were under the prospective payment system in Federal fiscal years 1985-89.

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Cost Report File, 1985-89.

Table 16

Summary of determinants of percent changes in total revenues: Fiscal years 1986-89

Fiscal year	Total revenue	Outputs	Input prices	Inverse of productivity	Ratio of revenues to expenses	Total factor productivity
1989	10.8	4.3	5.7	0.5	0.0	-0.5
1988	10.4	6.0	6.0	-2.1	0.4	2.1
1987	7.1	5.9	3.9	-1.5	-1.2	1.5
1986	5.4	5.8	3.5	-1.9	-1.9	1.9

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Cost Report File, 1986-89.

• Some PPS providers are defined as hospitals in the Medicare Cost Report File but are not included in the AHA data because they are not community hospitals as defined by AHA.

Generally, trends shown in Table 15 for revenues and expenses parallel trends for the same data shown in Tables 1 through 14, except that expenses per hospital from the AHA survey data generally increase faster than expenses per hospital from the Medicare Cost Report data. I attribute this factor primarily to lower productivity rate changes in the AHA survey data (Table 9), compared with productivity rate changes in the Medicare Cost Report data (Table 16).

These differences in productivity rate changes appear to be related to differences in the hospitals studied in the two sources. The AHA data include all hospitals reporting in the period, while the Medicare Cost Report data include only hospitals that succeeded in remaining in business for the entire period. Thus, it is no surprise that the Medicare Cost Report data show higher profits and profit rates than the AHA data (Table 1 and Table 14).

To supplement the analysis of trends in hospital income and expenses shown in Table 15, I have provided balance sheet data showing trends in assets, liabilities, and fund balances for the "typical" hospital

in the Medicare Cost Report data (Table 17). Key relationships revealed by the balance sheets are shown in a series of ratios in Table 18. The ratio concepts and their import were obtained from *Essentials of Hospital Finance* by William O. Cleverly (1978).

• Liquidity ratios. Trends in measures of short-term liquidity indicate a relative decline in the average hospital's ability to meet its short-term obligations. The "current ratio" (i.e., the ratio of current assets to current liabilities) decreased steadily during the study period but still was above 2.00 at the end of 1989. Both the "days in accounts ratio" (net accounts receivable/operating revenues/365) and the uncollectible rate (uncollectible notes and accounts/operating revenues/365) increased during the period.

• Capital structure ratios. Trends in measures of long-term liquidity indicate a relative decline in the average hospital's ability to meet its long-term obligations. The ratio of fund balances to total assets, an indicator of the percentage of assets that has been financed with sources other than debt, declined over the period, while the ratio of long-term debt to fund balances and the ratio of long-term debt to fixed assets increased.

Table 17
Asset values for hospitals under the prospective payment system: 1985-89

Balance sheet assets	1989	1988	1987	1986	1985
	Dollar amounts per hospital in thousands				
Total assets	$35,794	$32,806	$30,640	$28,677	$26,487
Current assets					
Total current assets	10,534	9,570	8,770	8,057	7,513
Cash on hand and in banks	1,248	1,123	1,059	1,017	965
Accounts receivable	9,167	8,083	7,041	6,112	5,490
Uncollectible notes and accounts	(2,821)	(2,434)	(2,142)	(1,894)	(1,696)
Other current assets	2,940	2,798	2,812	2,822	2,754
Depreciable fixed assets					
Total fixed assets	17,649	16,496	15,609	14,608	13,610
Building and fixed equipment	18,600	17,402	16,200	14,990	13,830
Accumulated depreciation	(7,060)	(6,439)	(5,801)	(5,199)	(4,633)
Net building and fixed equipment assets	11,540	10,963	10,399	9,791	9,197
Movable equipment	9,472	8,413	7,639	6,796	5,863
Accumulated depreciation	(5,098)	(4,427)	(3,890)	(3,353)	(2,810)
Net movable equipment assets	4,374	3,986	3,749	3,443	3,053
Other fixed assets	1,735	1,547	1,461	1,374	1,360
Other assets					
Investments	4,539	3,962	3,669	3,491	3,219
Other	3,072	2,778	2,592	2,521	2,145
Total other assets	7,611	6,740	6,261	6,012	5,364
Total liabilities	18,631	16,904	15,507	14,279	13,153
Current liabilities					
Total current liabilities	5,112	4,487	4,124	3,662	3,440
Accounts payable	1,641	1,454	1,336	1,152	1,020
Notes and loans payable (short-term)	581	509	446	334	363
Other current liabilities	2,890	2,524	2,342	2,176	2,057
Long-term debt					
Total long-term debt	13,519	12,417	11,383	10,617	9,713
Mortgages	5,030	4,524	4,365	4,061	3,709
Notes payable	4,137	3,406	3,182	2,967	2,594
Other long-term debt	4,352	4,487	3,836	3,589	3,410
Fund balances	17,163	15,902	15,133	14,388	13,334
Total liabilities and fund balances	35,794	32,806	30,640	28,667	26,487

NOTE: Data based on Medicare Cost Reports for 5,161 hospitals that were under the prospective payment system 1985-89.

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Cost Report File, 1985-89.

Table 18
Selected financial analysis ratios for hospitals under the prospective payment system: 1985-89

Item	1989	1988	1987	1986	1985
Liquidity ratios					
Current ratio	2.061	2.133	2.127	2.200	2.184
Days in accounts	112	110	105	98	93
Uncollectible rate	34.5	32.9	32.0	30.4	28.6
Capital structure ratios					
Fund balances to total assets	0.479	0.485	0.494	0.502	0.503
Long-term debt to fund balances	0.788	0.781	0.752	0.738	0.728
Long-term debt to fixed assets	0.766	0.753	0.729	0.727	0.714
Activity ratios					
Total asset turnover	0.890	0.876	0.850	0.848	0.870
Fixed asset turnover	1.804	1.743	1.668	1.664	1.694
Current asset turnover	3.023	3.004	2.968	3.017	3.068
Accounts receivable turnover	3.474	3.557	3.697	3.976	4.199
Profitability ratios					
Net profit rate	0.047	0.047	0.043	0.055	0.073
Return to total assets	0.042	0.041	0.037	0.046	0.064

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Cost Report File, 1985-89.

Table 19

Capital-related expenses as a percent of total expenses: 1985-89

Fiscal year	Total expenses	Capital-related expenses						Leases and rentals
		Total	Owner-operated capital-related expenses					
			Total	Depreciation	Interest	Other[1]		
			Dollar amounts per hospital in thousands					
1989	$30,350	$3,048	$2,643	$1,690	$892	$61		$405
1988	27,394	2,689	2,369	1,502	813	54		320
1987	24,903	2,372	2,172	1,359	766	47		200
1986	22,973	2,173	2,006	1,253	710	43		167
1985	21,365	1,945	1,812	1,137	636	39		133
			Percent of total expenses					
1989	100.0	10.0	8.7	5.6	2.9	0.2		1.3
1988	100.0	9.8	8.6	5.5	3.0	0.2		1.2
1987	100.0	9.5	8.7	5.5	3.1	0.2		0.8
1986	100.0	9.5	8.7	5.5	3.1	0.2		0.7
1985	100.0	9.1	8.5	5.3	3.0	0.2		0.6

[1]Includes insurance, taxes, and licenses on capital stock.

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Cost Report File, 1985-89.

- Activity ratios. Some measures of efficiency show upward trends over the period. Both the "total asset turnover ratio" (i.e., the ratio of operating revenues to total assets) and the "fixed asset turnover ratio" (i.e., the ratio of operating revenues to fixed assets) generally increased over the period. Another measure, the "current assets ratio" (i.e., the ratio of operating revenues to current assets), is stable. A final measure, the "accounts receivable turnover ratio" (i.e., the ratio of operating revenues to accounts receivable), is declining.
- Profitability ratios. Measures of ability to meet financial requirements of the hospital generally show declines from early years of the PPS and stability in recent years. Both the "net profit rate" (i.e., the ratio of net profits to total net revenues) and the "return to total assets" (i.e., the ratio of net profits to total assets) remained relatively stable from the 1986 report year through the 1989 report year.

Any conclusion about the deterioration or improvement in the average hospital's ability to meet its future obligations that is based on the ratios obtained from balance sheets should be tempered by consideration of alternative financing procedures that hospitals have adopted in recent years. Many hospitals have shifted from purchasing capital stock to leasing capital stock in recent years. The dollar amounts of the leased capital stock do not appear in the hospital's balance sheet, which is restricted to descriptions of its own capital stock. However, leasing costs do appear as expenses and comprise an increasing proportion of capital-related and total expenses (Table 19). (Data on leasing costs are not explicitly shown in Medicare Cost Reports and, therefore, have been estimated in Table 19 from other data sources, particularly a recent U.S. Bureau of the Census survey of capital expenditures.)

No adequate national balance sheet data are available for pre-PPS periods. Therefore, it is not possible to determine whether the observed ratio trends in Table 18 represent a return to normal pre-PPS performance or whether they represent a significant departure from pre-PPS performance.

Acknowledgment

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