Health expenditures in major industrialized countries, 1960-87

by George J. Schieber

In this article, levels and changes in health care expenditures for Canada, France, the Federal Republic of Germany, Italy, Japan, the United Kingdom, and the United States are analyzed. First, the levels and changes in the share of gross domestic product (GDP) devoted to health are reviewed in terms of the health-to-GDP ratio, nominal health expenditure and GDP growth, and changes in population and prices. Second, absolute levels of health spending denominated in U.S. dollars are compared over time. Finally, some concluding observations are made.

Introduction

The current debates in this country over assuring access to the 31 million uninsured and the continued escalation of health care expenditures have led to an intensive examination of the merits of the health care systems in other countries. Numerous articles on Japan and Canada as well as national media focus on the health care systems in other industrialized nations have placed international comparisons of health care systems at the center of the current policy debate (Evans, 1989; Iglehart, 1986, 1988, and 1989; Health Care Financing Administration, 1989). Much of the debate has been driven by comparisons of gross outcomes and aggregate health spending. For example, of the 24 western industrialized member countries of the Organization for Economic Cooperation and Development (OECD), the United States ranks 21st in infant mortality, 16th in male life expectancy at birth, and 13th in female life expectancy. Yet, the United States spends almost twice as much per person and devotes 50 percent more of its gross domestic product (GDP) than the other major industrialized countries (Organization for Economic Cooperation and Development, 1989b).

Unfortunately, these gross outcome and expenditure comparisons shed little light on the underlying performance of different health systems and cannot be used to attribute differences in performance to specific aspects or policies. Although the goal of all countries' health care systems is to provide access to medically appropriate and medically effective services in a cost-effective manner to their populations, it is almost impossible to evaluate the performance of individual health care systems because of our inability to measure health care outcomes in other than gross terms. Although definitive causal comparisons cannot currently be made, a better understanding of the expenditure performance of different health systems can be obtained through a careful examination of expenditure trends both within and across countries. In examining these trends, it is important to keep in mind that health expenditures in various countries were differentially impacted by the phase-ins of their public programs and the growth in private insurance during the period 1960-75 and the rather traumatic effects of the oil crisis between the mid-1970s and early 1980s.

Reprint requests: George J. Schieber, Ph.D., Health Care Financing Administration, Room 2F8, Oak Meadows Building, 6325 Security Boulevard, Baltimore, Maryland 21207.

Health spending in national currencies

Health-to-gross-domestic-product ratio

The most common measure used to compare health care expenditures among countries is the percent of a country's total output devoted to the health sector. This is generally measured by the share of GDP devoted to health. The health-to-GDP ratios for 1960-87 for the seven OECD countries selected for this analysis are shown in Figure 1. In 1960, the percentage shares were 5.5 in Canada, 4.2 in France, 4.7 in Germany, 3.3 in Italy, 2.9 in Japan, 3.9 in the United Kingdom, and 5.2 in the United States. By 1987, the percentage shares had increased to 8.8 in Canada, 8.5 in France, 8.1 in Germany, 7.2 in Italy, 6.8 in Japan, 6.0 in the United Kingdom, and 11.2 in the United States. From a U.S. health policy perspective, two aspects of these figures are of interest. First, although the U.S. ratio was below Canada's in 1960 and close to Germany's in 1975, it has grown substantially faster since. Second, while the other six countries have more or less stabilized their shares since the early 1980s, the U.S. share has continued to grow and the gap between the United States and other countries has widened.

These statistics provide an overview of the total amount of each country's production that is devoted to health, but they provide no information about whether the ratios are changing because of changes in nominal health spending or changes in nominal GDP. Furthermore, they provide no information about the amount of resources devoted to each country's health sector after adjusting for inflation and population growth. These factors are analyzed in turn.

Nominal health expenditures

Growth in nominal health spending and nominal GDP, respectively, are presented for the seven countries in Figures 2 and 3. In each case, an index is constructed where 1960 is the base year and each succeeding year's index is simply that year's spending figure divided by spending in 1960. Thus, the value for 1960 is 100 and the value for each succeeding year is simply 100 plus the percentage above the base-year value. For example, if expenditures in the 1960 base year were $50 and expenditures in 1961 were $75, the index for 1961 would

be 150. By plotting these values on a semi-logarithmic scale, the slope from year to year represents the compound annual rate of growth (Organization for Economic Cooperation and Development, 1989a). This type of visual display provides the basis for comparisons of rates of growth for all sub-periods within the time period 1960–87.

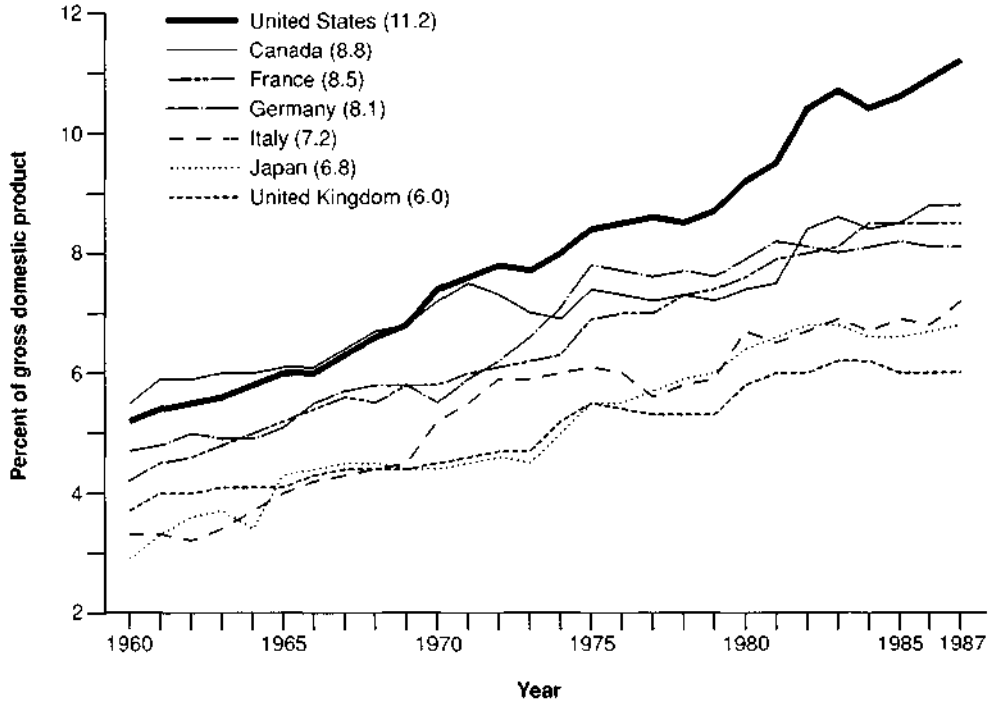
In analyzing the trends in the growth of nominal health expenditures, a rather different picture emerges in Figure 2. In 1987, nominal health expenditures in Canada were 22.32 times the level in the 1960 base year, indicating a compound annual rate of growth of 12.2 percent; in France 35.34 times for a compound annual growth rate of 14.1; in Germany 11.37 times for a growth rate of 9.4 percent; in Italy 79.21 times for a growth rate of 17.6 percent; in Japan 49.69 times for a growth rate of 15.6 percent; in the United Kingdom 24.58 times for a growth rate of 12.6 percent, and in the United States 18.6 times for a growth rate of 11.4 percent. Thus, the United States had the second lowest nominal rate of increase after Germany, with Canada third. The data in Figure 2 also indicate that, although the growth trends in Canada, Germany, and the United States were rather similar prior to 1975, Germany has experienced far lower rates of growth since 1975.

Nominal gross domestic product

In terms of nominal GDP growth, GDP in 1987 in Canada was 14.07 times the 1960 level for a compound annual rate of growth of 10.3 percent; in France 17.53 times for a growth rate of 11.2 percent; in Germany 6.64 times for a growth rate of 7.3 percent; in Italy 36.62 times for a growth rate of 14.3 percent; in Japan 20.92 times for a growth rate of 11.9 percent; in the United Kingdom 15.92 times for a growth rate of 10.8 percent; and in the United States 8.71 times for a growth rate of 8.3 percent. As in the case of health expenditures, the United States had the second lowest rate of increase in nominal GDP after Germany. From the mid-1970s onward, Canada's nominal GDP grew at higher rates than in either the United States or Germany, thus contributing to greater stability in its health-to-GDP ratio, at least when compared with the United States. The stability in the German ratio resulted from low nominal health expenditure growth. The data also indicate that,

Figure 1

Total health expenditures as a percent of gross domestic product: Selected countries, 1960-87



NOTE: Countries are listed in descending order based on the share of gross domestic product devoted to health for 1987 (in parentheses).

SOURCE: Organization for Economic Cooperation and Development: Health care expenditure and other data: An international compendium. *Health Care Financing Review*. 1989 Annual Supplement. HCFA Pub. No. 03291. Office of Research and Demonstrations, Health Care Financing Administration. Washington. U.S. Government Printing Office. Dec. 1989.

although both nominal health expenditures and nominal GDP were growing at relatively low rates when compared with other countries, the rising U.S. health-to-GDP ratio resulted from its relatively lower rate of growth in GDP compared with its growth in health spending.

Nominal elasticities

In Table 1, the compound annual rates of growth in nominal health spending and nominal GDP displayed in Figures 2 and 3 are directly compared for the time period 1960-87 as well as various sub-periods. These 'nominal elasticities' provide a direct measure of the relationship between compound annual increases in health spending and compound annual increases in GDP. Thus, the elasticity of 1.34 for the United States for 1960-87 indicates that, on an annualized basis, U.S. nominal health spending increased 34 percent faster than nominal U.S. GDP; in other words, each 10-percent increase in nominal GDP was associated with a 13.4-percent increase in nominal health spending.

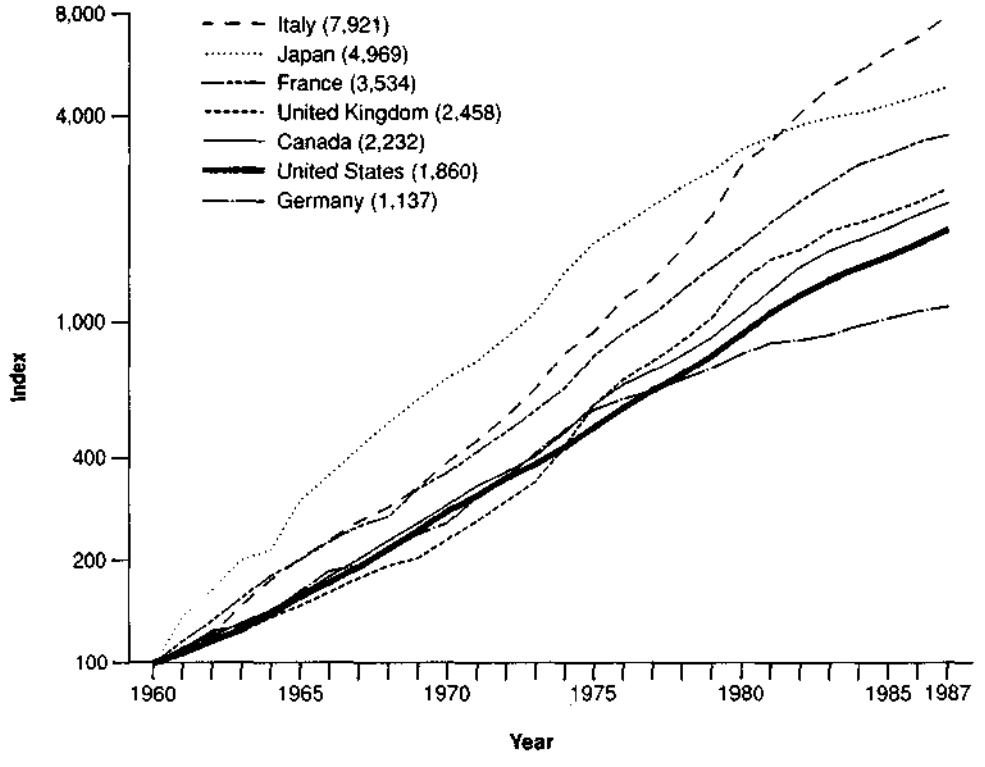
During 1960-87, the United States and Germany had the highest annual rates of increase, with health spending increasing more than 30 percent faster than GDP. Canada had the lowest rate of increase at 14 percent. Similar analyses can be performed for other time periods. In general, U.S. and German nominal elasticities were among the highest and Canadian among the lowest, except for the most recent time periods. The low nominal elasticities for Germany since 1975 may reflect the 1977 German cost-containment legislation. Canada, on the other hand, experienced far more rapid growth after 1980, both compared with its prior experiences and the 1980-87 experiences of other countries, with health spending increasing 31 percent faster than GDP, giving Canada the second highest growth after the United States. Interestingly, on average, nominal health expenditure growth relative to GDP was the lowest during the 1980-87 time period. This simply may reflect saturation of public program coverage. On the other hand, it may reflect more effective cost containment on the part of individual countries.

Although these data provide some disaggregate information on the factors underlying health-to-GDP ratios, they do not provide any information on the real volumes of health services provided per person, because

Figure 2

Relative growth index in health expenditures: Selected countries, 1960-87

(Semi-logarithmic scale, 1960=100)



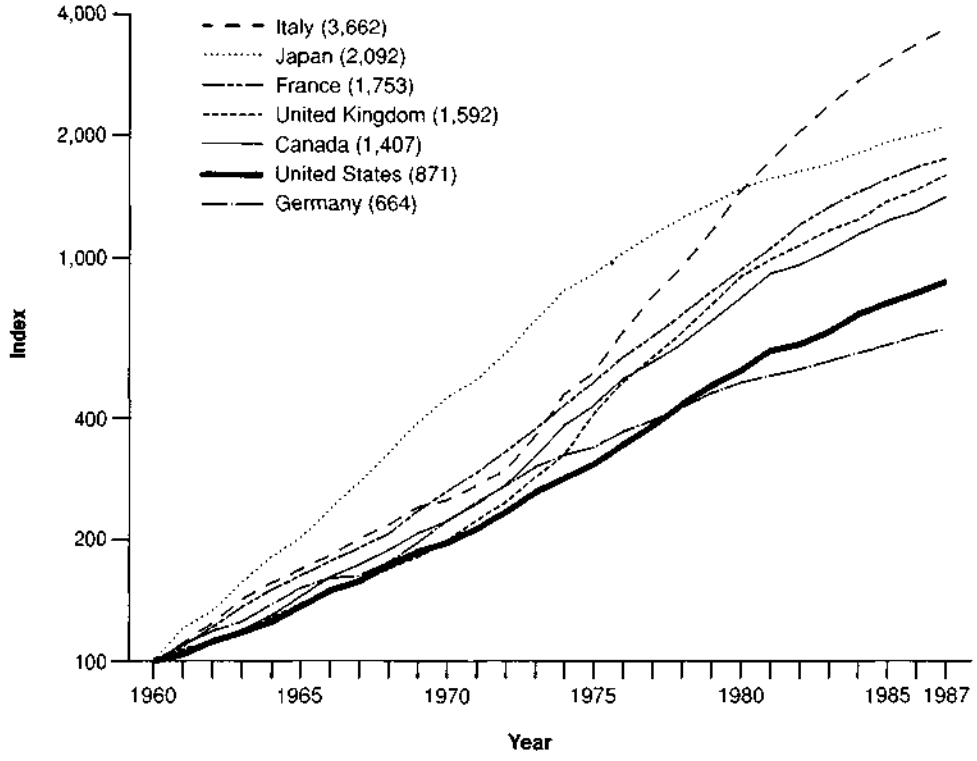
NOTE: Countries are listed in descending order based on the value of the index for 1987 (in parentheses).

SOURCE: Organization for Economic Cooperation and Development: Health care expenditure and other data: An international compendium. *Health Care Financing Review.* 1989 Annual Supplement. HCFA Pub. No. 03291. Office of Research and Demonstrations, Health Care Financing Administration. Washington. U.S. Government Printing Office, Dec. 1989.

Figure 3

Relative growth index in gross domestic product: Selected countries, 1960-87

(Semi-logarithmic scale, 1960=100)



NOTE: Countries are listed in descending order based on the value of the index for 1987 (in parentheses).

SOURCE: Organization for Economic Cooperation and Development: Health care expenditure and other data: An international compendium. *Health Care Financing Review.* 1989 Annual Supplement. HCFA Pub. No. 03291. Office of Research and Demonstrations, Health Care Financing Administration. Washington. U.S. Government Printing Office, Dec. 1989.

Table 1

Compound annual rates of growth in nominal health spending relative to nominal gross domestic product: Selected countries, 1960-87

Country	1960-1987	1960-1975	1975-1987	1960-1970	1970-1980	1980-1987
Canada	1.14	1.19	1.19	1.26	1.00	1.31
France	1.23	1.27	1.19	1.34	1.22	1.20
Germany	1.33	1.35	1.09	1.28	1.47	1.03
Italy	1.20	1.46	1.11	1.47	1.06	1.07
Japan	1.25	1.21	1.31	1.28	1.31	1.10
United Kingdom	1.17	1.22	1.12	1.22	1.14	1.05
United States	1.34	1.43	1.30	1.45	1.20	1.33
Average	1.24	1.30	1.19	1.33	1.20	1.16

SOURCE: Organization for Economic Cooperation and Development: Health care expenditure and other data: An international compendium. *Health Care Financing Review.* 1989 Annual Supplement. HCFA Pub. No. 03291. Office of Research and Demonstrations, Health Care Financing Administration. Washington. U.S. Government Printing Office, Dec. 1989.

no adjustments were made for differences in inflation, population levels, or their rates of increase. Real (health inflation-adjusted) per capita growth in health spending relative to real (GDP-deflator adjusted) per capita growth in GDP can be analyzed in the same way as the nominal increases.

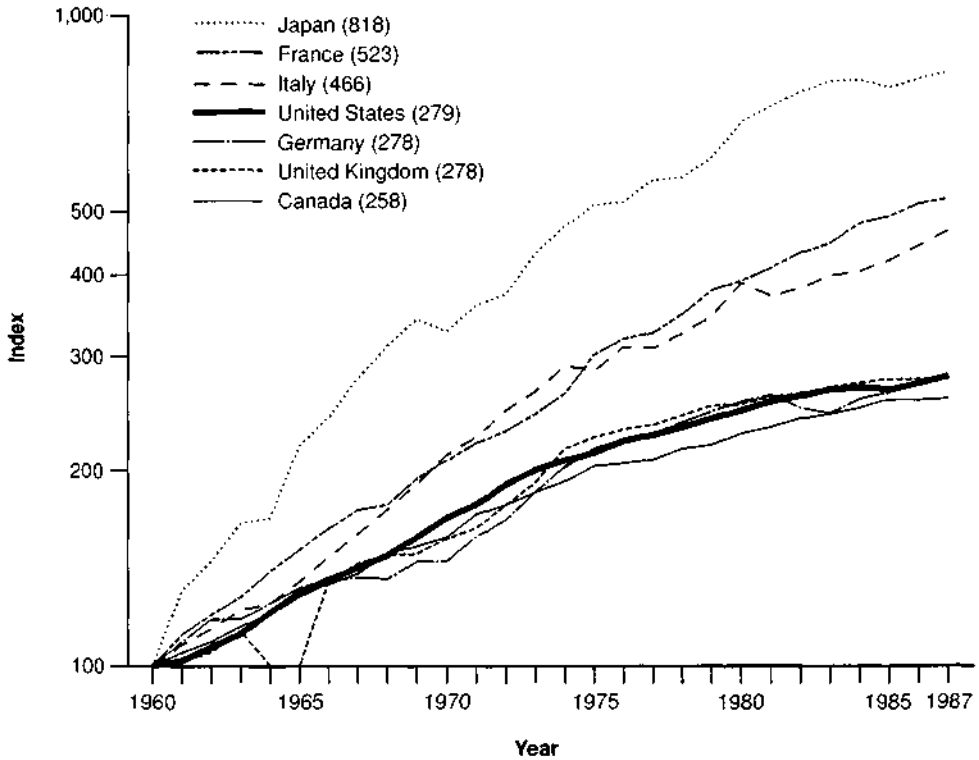
Real per capita health expenditures

Figure 4 is the same as Figure 2 except health expenditures are adjusted for health care inflation and population growth for each of the seven countries. These data provide information on per capita increases in the

Figure 4

Relative growth index in real per capita health expenditures: Selected countries, 1960-87

(Semi-logarithmic scale, 1960=100)



NOTE: Countries are listed in descending order based on the value of the index for 1987 (in parentheses).

SOURCE: Organization for Economic Cooperation and Development: Health care expenditure and other data: An international compendium. *Health Care Financing Review.* 1989 Annual Supplement. HCFA Pub. No. 03291. Office of Research and Demonstrations, Health Care Financing Administration. Washington. U.S. Government Printing Office, Dec. 1989.

volume and intensity of health services. There is far less disparity in increases in health spending after accounting for inflation and population growth. Canada had the lowest increase, with 1987 real per capita health spending that was 2.58 times the 1960 level for a compound annual rate of real growth of 3.6 percent, followed by Germany and the United Kingdom (2.78 times, 3.9 percent), the United States (2.79 times, 3.9 percent), Italy (4.66 times, 5.9 percent), France (5.23 times, 6.3 percent), and Japan (8.18 times, 8.1 percent). The high rates of growth in France, Japan, and Italy may be attributable to their relatively low 1960 health expenditure base and their relatively higher GDP growth.

Real per capita gross domestic product

Given the well-established relationship between health spending and GDP, both in terms of levels and rates of growth, it is useful to examine increases in real GDP growth. Higher increases in real output create more real resources that can be devoted to the health sector. The growth patterns in real GDP per capita for the seven OECD countries are displayed in Figure 5. Japan had the highest growth in real output (GDP) per person, with a 1987 level that was 4.1 times the 1960 level for a compound annual rate of growth in real per capita GDP of 5.4 percent. Japan was followed by Italy (2.36 times, 3.2 percent), Canada (2.26 times, 3.1 percent), France (2.19 times, 2.9 percent), Germany (2.04 times, 2.7 percent), the United States (1.74 times, 2.1 percent), and the United Kingdom (1.73 times, 2.1 percent). Despite its rather poor growth performance, the U.S. per capita GDP was still well above the levels in the other six countries (Schieber and Poullier, 1989b).

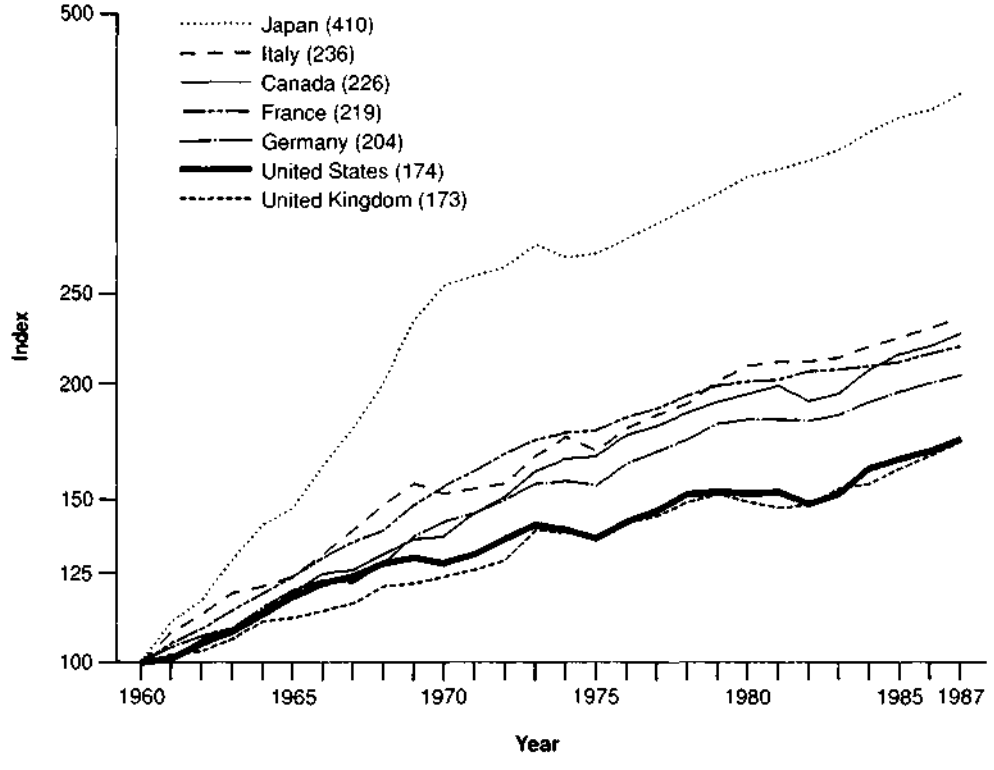
Real elasticities

Table 2 contains the compound annual rates of growth in real per capita health spending relative to the compound annual rates of growth in real per capita GDP that are depicted graphically in Figures 4 and 5 for 1960-87 and various sub-periods. These "real elasticities" show the relationship between growth in the volume and intensity of health services (health inflation-adjusted spending) per person relative to growth in real (GDP deflator-adjusted) output per person. These data

Figure 5

Relative growth index in real per capita gross domestic product: Selected countries, 1960-87

(Semi-logarithmic scale, 1960=100)



NOTE: Countries are listed in descending order based on the value of the index for 1987 (in parentheses).

SOURCE: Organization for Economic Cooperation and Development: Health care expenditure and other data: An international compendium. *Health Care Financing Review.* 1989 Annual Supplement. HCFA Pub. No. 03291. Office of Research and Demonstrations, Health Care Financing Administration. Washington. U.S. Government Printing Office, Dec. 1989.

must be interpreted with caution because the health care price deflators are not strictly comparable (Poullier, 1989).

In terms of the relationship between growth in real resources devoted to the health sector and growth in real output per person, a slightly different picture emerges, especially for Germany and the United Kingdom. During the 1960-87 period, the United Kingdom had the highest growth of real health output relative to real GDP per person, with each 10-percent increase in real per capita GDP associated with a 24-percent increase in real per capita health spending. The United States was second, with each 10-percent increase in real per capita GDP associated with a 21.3-percent increase in real per capita health spending. As in the case of the nominal elasticities, Canada had the lowest increase, with each 10-percent increase in per capita GDP associated with only an 11.9-percent increase in health spending. However, contrary to its high nominal elasticity, Germany had the third lowest real elasticity, with each 10-percent increase in real per capita output associated with a 14.7-percent increase in real per capita health spending.

Given the various time periods for the phase-in of public health programs and the differential impacts of the oil shocks as well as other major structural changes (e.g., Italy adopting a national health service in 1980, or Germany enacting cost-containment legislation in 1977), it is difficult to make definitive judgments about the elasticities for many of the sub-periods. However, the 1980-87 elasticities for many countries are different than those for earlier periods. Putting aside Italy which was implementing its national health service and France where the health price deflators might be suspect, the remaining five countries all had real per capita health spending increases well below the rates of increase in real output. Whether this reflects relatively higher real output growth following the oil shocks, saturation of public coverage, better control over the implementation and diffusion of health care technologies, reduced morbidity from healthier life styles, or simply relatively higher health care inflation is difficult to say. However, other analyses have shown that, during this time period, the United States and Canada had substantially higher rates of health care inflation relative to overall inflation, compared with the other five countries (Schieber and Poullier, 1989a).

Table 2

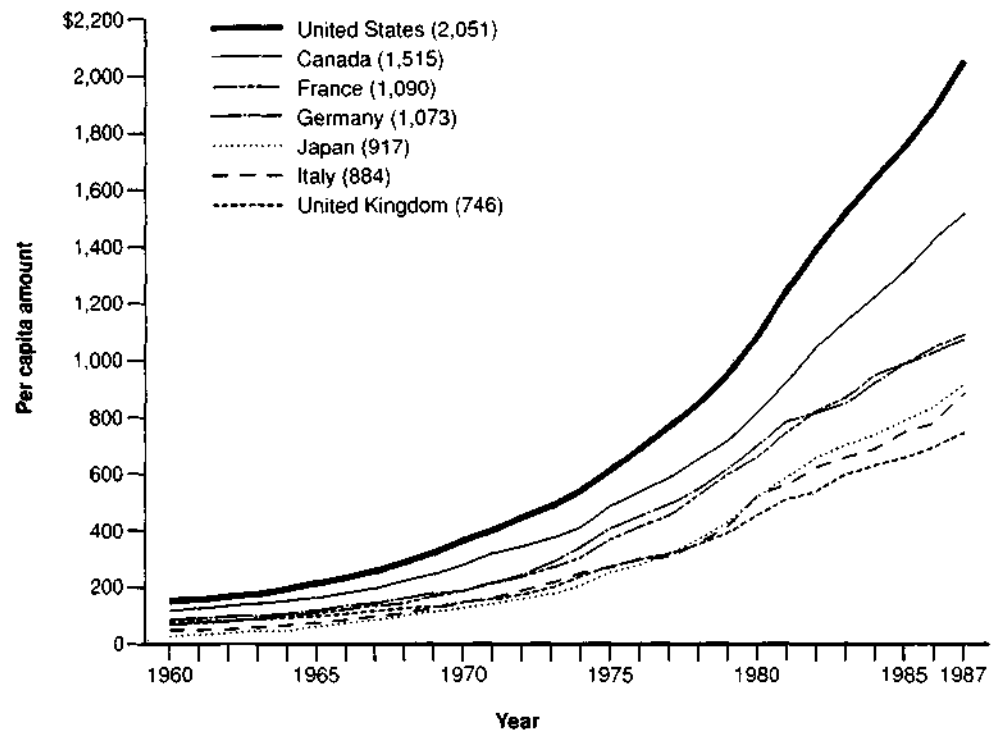
Compound annual rates of growth in real per capita health spending relative to real per capita gross domestic product: Selected countries, 1960-87

Country	1960-1987	1960-1975	1975-1987	1960-1970	1970-1980	1980-1987
Canada	1.19	1.31	0.94	1.36	0.99	0.63
France	2.05	1.65	2.94	1.64	2.56	3.61
Germany	1.47	1.33	0.94	1.00	2.08	0.84
Italy	1.93	2.04	1.50	1.64	1.66	1.73
Japan	1.46	1.30	1.36	1.30	2.55	0.65
United Kingdom	2.40	2.59	0.98	2.18	2.41	0.52
United States	2.13	2.18	1.06	1.78	1.94	0.50
Average	1.80	1.77	1.39	1.56	2.03	1.21

SOURCE: Organization for Economic Cooperation and Development: Health care expenditure and other data: An international compendium. *Health Care Financing Review*. 1989 Annual Supplement. HCFA Pub. No. 03291. Office of Research and Demonstrations, Health Care Financing Administration. Washington. U.S. Government Printing Office, Dec. 1989.

Figure 6

Per capita health spending in U.S. dollars: Selected countries, 1960-87



NOTE: Countries are listed in descending order based on the per capita amount of spending for 1987 (in parentheses).

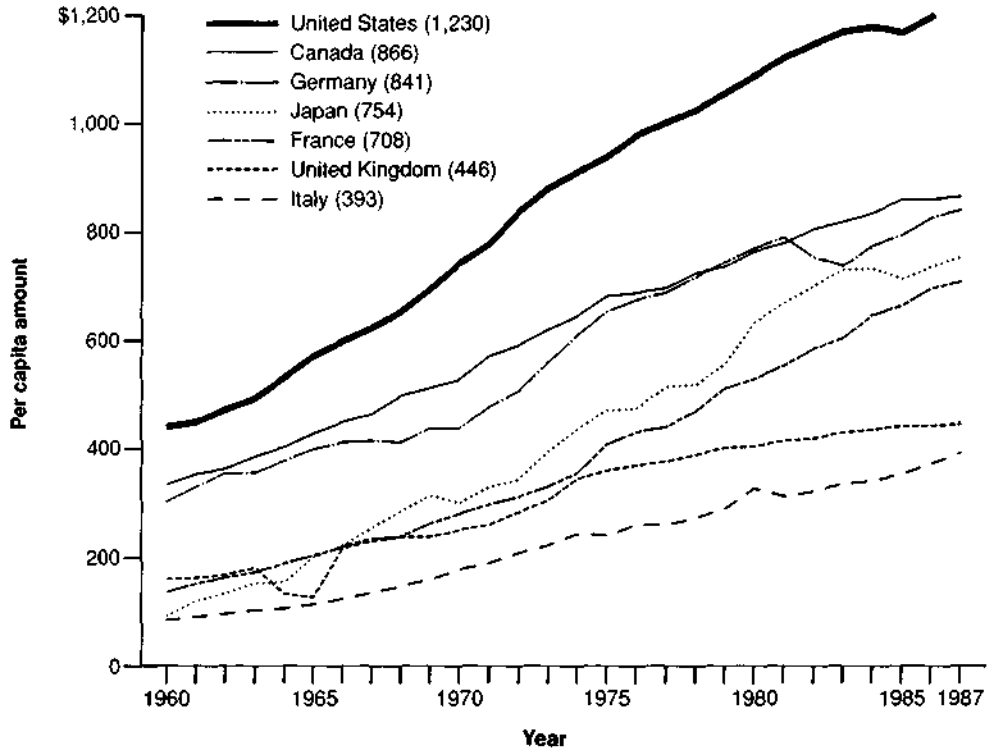
SOURCE: Organization for Economic Cooperation and Development: Health care expenditure and other data: An international compendium. *Health Care Financing Review*. 1989 Annual Supplement. HCFA Pub. No. 03291. Office of Research and Demonstrations, Health Care Financing Administration. Washington. U.S. Government Printing Office, Dec. 1989.

Health expenditures in U.S. dollars

The previous analysis provides information on rates of growth in health spending and GDP within individual countries based on their own currencies. Although comparisons of these growth rates can be made among countries, the analysis provides no basis for comparing absolute levels of health spending in one numeraire currency. In making such comparisons, an exchange rate is needed that adjusts for price-level differences among countries. Purchasing power parities (PPPs) are exchange rates that reflect the relative cost of buying a standard bundle of goods in one country to the cost in the representative group of countries (Ward, 1985). By dividing per capita spending by the relevant PPP, absolute spending levels in U.S. dollars corrected for price-level differences among countries can be obtained.

Figure 7

Real per capita health expenditures in U.S. dollars: Selected countries, 1960-87



NOTE: Countries are listed in descending order based on their real per capita health spending for 1987 (in parentheses). All countries' local currencies are deflated by their medical care price deflators normalized to 1980 equaling 100. These expenditure amounts are then converted to U.S. dollars using 1987 purchasing power parities.

SOURCE: Organization for Economic Cooperation and Development: Health care expenditure and other data: An international compendium. *Health Care Financing Review.* 1989 Annual Supplement. HCFA Pub. No. 03291. Office of Research and Demonstrations, Health Care Financing Administration. Washington. U.S. Government Printing Office, Dec. 1989.

Nominal expenditures per capita

The PPP-adjusted per capita health spending denominated in U.S. dollars for the seven countries for 1960-87 is shown in Figure 6. In 1960, per capita health spending ranged from $26 in Japan to $117 in Canada to $149 in the United States, almost a six-to-one difference from high to low. By 1987, the range was from $746 in the United Kingdom to $1,515 in Canada to $2,051 in the United States, less than a three-to-one difference. Since 1975 (1980 for Japan), the percent by which per capita U.S. spending has exceeded every other country has increased. Nominal spending growth was the lowest in the United Kingdom, with a compound annual rate of growth of 8.8 percent, followed by Canada and Germany at 9.9 percent, the United States at 10.2 percent, France at 10.9 percent, Italy at 11.6 percent, and Japan at 14.1 percent.

Real expenditures per capita

Accounting for differential inflation within countries and then comparing absolute levels of real per capita health spending is problematic because of the interaction of the individual countries' price deflators and the PPPs that are based on absolute, not inflation-adjusted, price levels. One method of dealing with this problem is to calculate health inflation-adjusted per capita health spending in local currencies and then use the PPPs from one representative year to convert spending into U.S. dollars (Evans, 1988). Using 1987 as the conversion year for PPPs and with all countries' price deflators normalized to 1980 equaling 100, real per capita health spending in U.S. dollars is shown for 1960-87 in Figure 7.

A comparison of inflation-adjusted per capita spending reveals two interesting observations. First, real U.S. spending has always been the highest. Second, differential rates of increase in real per capita health spending resulted in a closing of expenditure gaps in some countries and increases in others. For example, real per capita expenditures in the United States increased at a compound annual rate of 3.9 percent per year as did spending in Germany and the United Kingdom. Thus, the ratio of U.S. health spending to U.K. and German health spending was the same in 1987 as in 1960. On the other hand, real per capita health spending grew at only 3.6 percent annually in Canada, so the gap between the United States and Canada in real per capita health spending widened. Conversely, since the rates of growth were higher in France (6.3 percent), Italy (5.9 percent),

and Japan (8.1 percent) than in the United States, the gaps between these countries and the United States narrowed during this period.

Conclusion

The previous analysis provides several interesting insights into underlying trends in health expenditures across countries. First, although the United States had the highest health-to-GDP ratio and faced the largest increases in nominal health spending relative to its nominal GDP growth, much of this phenomenon can be explained by the slower growth of U.S. GDP relative to U.S. health spending. Second, after adjusting for differential population growth and inflation within countries, the United States had the second highest rate of growth in real per capita health spending relative to real per capita GDP. Third, in absolute dollar terms, U.S. spending was the highest in the world, and the gap between the United States and other countries has widened. Fourth, even after adjusting for inflation within countries, U.S. real per capita health spending was the highest in the world and the gap between the United States and Canada, the second highest country, has widened. In other words, the volume and intensity of health services provided to Americans has been by far the highest in the world and has increased as fast or faster than in other high-expenditure countries.

Although differences in performance may be related to differences in underlying morbidity, amenities, economic efficiency, and/or quality, the current state of the art in international comparisons and health services research cannot measure these factors or attribute differences in these factors to specific features of health systems. Nevertheless, these comparisons raise difficult questions for U.S. policymakers. Has reliance on competition, freedom of choice, and entrepreneurship provided Americans with the best health care system in the world? Would the impersonality, queuing, and lack of choice inherent in some other countries' health systems be an acceptable trade-off to the American public for more economic efficiency and greater equity? As other industrialized countries with highly regulated and controlled systems turn to the use of market incentives to induce efficiency, perhaps it is time to take a closer look at some of the features of these systems that have created universal access at lower cost without any demonstrable lower level of quality.

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