Measuring the relationship between income and NHEs

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This article uses recently published time series data for the Organization for Economic Cooperation and Development countries to estimate income elasticities for health care expenditures. Several different models and alternative specifications are examined to determine the sensitivity and robustness of the estimated relationships. Income is the dominant-determinant of health care spending and longrun income elasticity for health care is significantly greater than unity. This implies that health care is a luxury good, and expenditures will tend to rise with the level of national income. There is little evidence that the degree of public finance reduces the level of health care expenditures.

Introduction

The Organization for Economic Cooperation and Development recently published a new data set for the 24 member countries for the period 1960 through 1987. Standardized data are presented for expenditures on health, social protection, utilization of medical services, available personnel resources, and demographic and general economic background characteristics. The data provide a rich source for exploring the relationship between aggregate expenditures on health care and national income. Because an attempt has been made to make the data between countries as comparable as possible, this data set is the best possible source for making international comparisons of health care spending.[1]

This article provides new estimates of per capita income with respect to per capita health care expenditures based on data for the period 1972 through 1987. First, three different models are estimated to determine the sensitivity of the elasticities to the specification of the relationship. The pooled cross-country data for the period 1972 through 1987 allow us to conduct a number of new statistical tests. While virtually all of the existing studies of income elasticities have used a single or few year cross-country data set, the new pooled cross-country data set enables us to test the stability of the relationship over time. In addition, we are able to provide new estimates on shortrun income and public finance elasticities by examining the relationship between annual changes in the relevant variables.

Parkin, McGuire, and Yale (1987) argued that estimated income elasticities are sensitive both to the functional form of the model and to the method by which national currencies have been converted into some standardized unit of account. The OECD data set was used to test the sensitivity of the elasticities to the choice of functional form and the basis of currency conversion. Finally, the influence of several other non-income determinants of health spending suggested by Leu (1986) and the OECD (1987) is examined.

Health, medical care, and income

We assume that demand for medical care derives from the more fundamental demand for health itself, which provides utility. This view treats health as the ultimate object of choice, with medical care as one input in its production. Health can be produced by a combination of two inputs, time and purchased goods (medical care). So long as medical care helps to augment health, utility-maximizing behavior will yield systematic demand curves for medical care by individuals. Derived demand for medical care will depend on incidence of illness, cultural-demographic characteristics of individuals, and economic factors.

The economic factors that determine the demand for medical care are income, prices, and the value of the patients' time. Although it may be important to understand how other non-economic factors affect demand, such factors are not subject to sudden changes, and they are usually not the subject of public policy (e.g., age structure). Economic factors, on the other hand, have more immediate impacts on demand and are generally the instrument of public policy.

Our primary concern is on the relationship between the purchase of medical care and income. So long as medical care is a normal input in the individual's production of health, an increase in demand for health will cause demand for medical care to rise. Assuming health is a normal good, an increase in real income will result in an increase in the demand for health. Producing health can be either time-intensive or goods-intensive. Individuals with higher earned incomes, and thus an increased command over goods and services, yet with no more time available to spend their incomes, will attempt to conserve on the use of time-intensive inputs. Production of health, therefore, may involve the use of more market purchased inputs. With other things being constant, the elasticity of demand for medical care will be directly related to the elasticity of demand for health. It seems plausible to assume that health is a normal good (a positive income elasticity of demand). The empirical question, however, is whether health is a necessity or a luxury good.

[1] A brief discussion of the efforts to standardize the data set are found in Poullier (1989).

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Empirical evidence reveals that within virtually every developed country the share of the gross national product (GNP) devoted to medical care has tended to rise over time (Newhouse, 1977). Despite this evidence at the aggregate level, there is disagreement about whether medical care is a luxury good. A number of studies have attempted to estimate income elasticities of demand for medical care. Estimates derived from cross-sectional within-country survey data typically find that while families with higher incomes have greater expenditures on medical care, the percentage of income spent on medical care declines as income increases (Feldstein, 1988). This implies that the income elasticity of medical care is less than one.

There are at least two reasons why elasticity estimates derived from survey data may be understated. First, economic theory strongly suggests that a family's level of consumption is determined primarily by its permanent income (Friedman, 1957). To the extent that families that are sick are below their normal income levels, the estimated income elasticity will include the effects of both permanent and transitory income. Removing the effects of transitory income would cause the income elasticity of medical expenditures to rise.

Second, estimates of income elasticity of demand derived from survey data will be biased downward because the reported taxable income of families in the sample does not include employer contributions to health insurance premiums. Higher income families have a greater incentive to opt for employer-paid health insurance. Thus, for higher income families, a greater proportion of medical expenditures are covered by third-party payers. The resulting survey data will understate the true income elasticity because the observed relationship is between measured income and out-of-pocket expenditures.

As Feldstein (1988) points out, once survey data are corrected for transitory income and employer-paid health insurance premiums, the estimates of income elasticity tend to be approximately one. Even these estimates may be biased downward for another reason. The responsiveness of demand to a change in income may depend on the money price consumers face within a country. It can be shown that income elasticity will fall as the money price to consumers goes toward zero (Phelps and Newhouse, 1974). Within many countries, medical care may be provided at a zero money price to individual consumers. Each country, however, faces the full price of medical care, which means that while the individual as a consumer faces a zero (or low) price, the individual as a taxpayer faces the true resource cost (Buchanan, 1965). Consequently, we expect that income would play a greater role in explaining medical care consumption across nations (particularly across countries over time) than for cross-sections of individuals within nations. The benefit of estimating income elasticities from an international cross-section time series data set is that we can more nearly control for the zero-price effect, which can cause problems for a within-country cross-section analysis.

Alternative models of health care spending

We have chosen to report the results from estimating the following three models of health care spending:

Model 1: PCHCE = f(PCY, TIME, COUNTRY)

Model 2: PCHCE = g(PCY, TIME, COUNTRY, PUBFIN)

Model 3: PCHCE = i(PCY, TIME, COUNTRY, PUBFIN, PCBEDS, PCPHYS, PCNURSES)

The definition of the variables and the reason for their inclusion is discussed in order of their presentation. Throughout the analysis, the dependent variable PCHE is defined as per capita health care expenditures in a given country for a given year.

For reasons emphasized by Kleinman (1974) and Newhouse (1977), we assume that health care expenditures are primarily a function of income (PCY), which is defined as per capita gross domestic income. In fact, the success of income as a variable in explaining the level of health spending has raised the issue of whether there are any other empirically important determinants of national health care expenditures. For example, Newhouse (1977) contends that the organizational form and financing of health care are endogenous and do not exert an independent effect on health care spending. He believes that centralized control of, or influence over, budgets is itself a response to low income and a desire to control costs. That is, low per capita income leads to both controls and low per capita expenditures on health.

The other variables included in Model 1 are basically control variables, which are necessary for using the pooled cross country data set. TIME is a trend variable, which has the value of zero in the first year and is incremented by one in each of the following years. This variable captures the influence of trend forces that are not otherwise accounted for in the model. COUNTRY is a vector of zero-one dummy variables that are included to capture the impact of country-specific time invariant forces that may not be captured by observable data. For example, country dummy variables will capture those important demand determinants that differ across countries, but do not change suddenly, such as cultural-demographic characteristics. In the empirical analysis, at least one country dummy variable has to be omitted in order for the model to be estimated. In general, Model 1 is a simple income-health expenditures model with the TIME and COUNTRY variables included to control for omitted secular and country-specific factors that could influence both the level of income and the level of health expenditures.

In Model 2, we expand the analysis to include the method of financing health care. Buchanan (1965), Culyer (1990), and other researchers argue that the political process and the way in which health care is

financed may have important implications for the amount of health spending. Therefore, in Model 2, we include a proxy for the influence of the public sector in the provision of health care. This variable is defined as the ratio of public expenditures to total health care expenditures (PUBFIN). There exists some disagreement whether the extent of public finance will increase or decrease the level of health expenditures. Leu (1986) contends public finance will raise the level of spending so long as the user price to the consumer falls (but fees to providers do not) and providers have an incentive to respond to the increase in demand by increasing quantity supplied. He provides empirical evidence suggesting that "the more governments are involved in providing or financing medical care in decentralized health care systems, the higher are health expenditures" (Leu, 1986).

The ambiguity concerning the impact of public finance on health spending was also recognized by OECD (1987):

> "To the extent that higher public shares are associated with higher eligibility ratios, fuller benefits and less cost-sharing, a higher public share would be expected to be associated with higher per capita spending and GDP shares. On the other hand, if most individuals have access to public programs or subsidized private coverage, higher public penetration may be associated with better control over the health system and, hence, lower absolute and relative spending."

Earlier studies by Buchanan (1965) and Bird (1970) also suggested that the degree of public finance in health care expenditures may serve as a restraint on such expenditures. Our empirical estimates of Models 1, 2, and 3, along with the associated sensitivity tests, are designed to improve the understanding of the relationship between public finance and health care spending.

In Model 3, several supply variables are added to the analysis. The theoretical justification for their inclusion is provided by Newhouse and Phelps (1974). They explain, leaving supply constraints out of the model implicitly assumes "there is no variation in market supply opportunities faced by individuals, either because all individuals are in the same market or all markets are identical." Clearly, this assumption is untenable when analyzing international health care expenditures. The supply of health care services varies markedly across countries, and variation in excess demand may lead to certain kinds of non-price rationing. For these reasons, it is desirable to include measures of the supply of services in our analysis.

Model 3 includes the following controls for supply across countries: the number of hospital beds per capita (PCBEDS), the number of practicing physicians per capita (PCPHYS), and the number of nurses per capita (PCNURSES). The OECD (1987) study hypothesizes the greater the availability of hospitals, doctors, and nurses, the larger would be expenditures on health care. The study stresses an interest in the influence of availability rather than utilization of these resources since utilization rates would be mechanically related to the level of health spending. A lower level of availability of these resources, however, could lead to rationing of health care and, therefore, a decline in health care spending. For these reasons, the study predicts a positive relationship between the three input variables and the level of health care expenditures. The OECD empirical results provide only weak support for their hypothesis.

Methodological issues

Before presenting the results of the analysis, it may be useful to discuss three important methodological issues that arise when making international comparisons of health care spending. First, because we are ultimately interested in the importance of income as a determinant of the level of health care expenditures, specification of the empirical model may be a critical consideration. Obviously, there are other factors that help explain health care spending. What effect does the exclusion of these other variables in the model have on the estimated income elasticity of demand? Estimates from Model 3 should enable us to determine whether there exists a serious omitted-variable bias in Model 1. Many previous studies relied on estimates derived from similar models.

Second, are the estimates of income elasticity sensitive to the method by which national currencies are converted into some standardized unit of account? As a general rule, in most previous work, health care expenditures were converted into a common currency through the use of market exchange rates (ERs) with all other currencies being expressed in U.S. dollars. The resulting values reflected not only differences in the quantities of goods and services produced among countries but also differences in price levels as well. Consequently, they do not accurately reflect the relative purchasing power of national currencies within each country. In fact, when applied, there was a tendency for exchange rate conversions to exaggerate the true differences in real per capita health care expenditures between countries.

This weakness has led to the development of purchasing power parities (PPPs). These price indexes represent the average prices in specific countries relative to the average international prices for an entire group of countries for purchasing the same market basket of goods and services (Ward, 1985). Consequently, using PPPs will more nearly reflect actual differences in the quantities of goods and services purchased. Although PPPs have been developed specifically for health care services, they are still in preliminary stages of development and are available for only a few years. Also, as Schieber and Poullier (1989) point out, health care PPPs are considered to be less reliable than PPPs developed for gross domestic product (GDP) PPPs. Thus, in the following analysis we use GDP PPPs.

We report income elasticity estimates derived from both ER and PPP conversions. Currently, there is disagreement over whether these estimates are sensitive to method of conversion. Parkin et al. (1987) report a marked difference in the estimates using PPP and ER

conversions. Using a PPP conversion, they obtain an income elasticity of less than 1.0 for the linear and log-linear models. With the same models, they find an income elasticity greater than 1.0 with an ER conversion. In contrast, Gerdtham and Jönsson (1991) use more recent data with a larger cross-sectional sample of OECD countries to address the same issue. They find that Parkin's results concerning the conversion factor instability of the income elasticity of demand for 1980 do not hold when 1985 data are used.[2] Furthermore, the aggregate income elasticity is significantly greater than 1.0, no matter which conversion factor is used. Unfortunately, both studies are based on data for a single cross-section and, thus, it is difficult to assess how robust their findings are. Our pooled cross-section time series data will provide additional evidence on the conversion factor sensitivity of income elasticity of demand.

Finally, Parkin et al. (1987) also report that the choice of functional form influences the estimates of aggregate income elasticities. They reject both the semi-log specification because it must yield income elasticities less than 1.0, and the exponential form because it necessarily implies an income elasticity greater than 1.0. They prefer to use a linear or double-log functional form, which leaves the elasticity estimate unconstrained. We have followed their suggestion by estimating our three models using both the linear and double-log functional form.

In summary, three alternative specifications of the health care expenditure model are estimated using both exchange rates and purchasing power parities as the basis for currency conversion. The models are estimated in both linear and double-log functional form with data from 20 OECD countries for the period 1972 through 1987.[3] Our pooled cross-section time series data also permit us to distinguish between shortrun and longrun elasticities.

Estimation model

Suppose that the desired level of health care spending (PCHCE*) at time t is a function of income and other explanatory variables denoted by vector X_{it}, so that

$$PCHCE^*_t = \alpha + \Sigma\beta_i X_{it}.$$

Due to a variety of reasons, including technological constraints, institutional rigidities, and habit persistence, the actual level of spending may not be equal to the desired level. This means that the actual change in health care spending that results from a change in income is only a fraction of the desired change; that is:

$$PCHCE_t - PCHCE_{t-1} = \delta(PCHCE^*_t - PCHCE_{t-1}).$$

The coefficient δ is called the adjustment coefficient because it indicates the rate of adjustment of PCHCE to PCHCE*. We assume δ is a fraction between zero and one. Upon manipulation, this process can be conveniently summarized by the following partial adjustment model (Maddala, 1977 and Kmenta, 1971):

$$PCHCE_t = \alpha\delta + \Sigma\delta_i\beta_1 X_{it} + (1-\delta)PCHCE_{t-1} + \epsilon_t.$$

The advantage of this specification is that it allows us to distinguish between longrun and shortrun effects of changes in income on health care spending. In particular, our estimates of $\delta\beta$ give the shortrun effect on PCHCE of a change in X_i. The longrun effect is given by β.

Empirical estimates

Determinants of spending

Parameter estimates from the partial adjustment models are reported in Table 1. A few interesting patterns emerge. First, per capita income is clearly the most important determinant of national health care spending. In fact, separate regressions (not reported) revealed that well over 90 percent of the variation in national health care expenditures could be explained by per capita income alone. Second, for any given functional form and currency conversion, the measured effect of income on health care spending does not appear to be sensitive to the inclusion or exclusion of other controls. For example, using the linear model with an ER conversion, the coefficient on PCY ranges from .0579 to .0597. An examination of the other combinations reveals the same pattern—the PCY coefficient is insensitive to inclusion of other factors. Thus, we conclude that our estimates are not subject to any serious omitted-variable bias.

Third, results regarding the impact of public finance on health care spending are mixed; however, we find no empirical support for the hypothesis that publically financed health care may serve as a restraint on such expenditures. Only two of the eight estimated coefficients are statistically significant, and they are positive.

Finally, two of the three input supply variables in Model 3, which serve primarily as controls to minimize the potential omitted variable bias on the per capita income variable, do not have statistically significant effects on PCHCE. This may be partly the result of a simultaneity bias, because rising health care spending may also elicit increased supplies of health care inputs. We do find, however, that the per capita supply of hospital beds tends to reduce health care expenditures. Our results suggest that the negative effects of the supply of beds on health care expenditures tend to dominate the positive effects of health care spending on the supply of beds.

The reasons for the weak and conflicting input supply results may have to do with the nature of our data. Auster and Oaxaca (1981) have shown that empirical tests of supplier induced demand in the health care

[2]Gerdtham and Jönsson also find the aggregate income elasticity with respect to health care expenditures is identical for both GDP, PPP, and health care PPP conversions.

[3]Luxembourg, Netherlands, Portugal, and Turkey are excluded because of incomplete data observations.

Table 1

Regression results: 1972-87

Independent variable	Model 1				Model 2				Model 3			
	Exchange rates		Purchasing power parities		Exchange rates		Purchasing power parities		Exchange rates		Purchasing power parities	
	Linear	D-Log	Linear	D-Log	Linear	D-Log	Linear	D-Log	Linear	D-Log	Linear	D-Log
Intercept	−.0692	−2.1041	−.0135	−.8335	.0180	−2.1115	−.1179	−.7913	.1346	−1.8433	−.0877	−.8132
	(4.61)	(33.55)	(1.29)	(7.21)	(0.26)	(32.94)	(3.02)	(6.74)	(1.53)	(12.70)	(1.54)	(4.64)
PCY	.0581	.8317	.0223	.4092	.0579	.8309	.0237	.3986	.0597	.8568	.0326	.5037
	(27.39)	(33.26)	(6.98)	(7.82)	(27.21)	(33.08)	(7.35)	(7.61)	(25.21)	(30.82)	(6.72)	(7.31)
$PCHCE_{t-1}$	.4223	.2676	.8931	.7232	.4223	.2703	.8985	.7284	.4044	.2344	.8363	.6517
	(15.16)	(13.25)	(35.04)	(21.09)	(15.14)	(13.11)	(35.60)	(21.20)	(12.89)	(9.69)	(25.01)	(13.76)
TIME	−.0029	.0029	−.0071	−.0110	−.0027	.0029	−.0084	−.0108	−.0056	.0024	−.0122	−.0132
	(2.38)	(1.86)	(5.30)	(3.44)	(2.13)	(1.78)	(5.96)	(3.37)	(1.96)	(0.90)	(4.56)	(2.93)
PUBFIN					−.1132	−.0442	.1292	.0702	−.0523	.0306	.1515	.0806
					(1.31)	(0.64)	(2.80)	(1.30)	(0.51)	(0.42)	(2.50)	(1.29)
PCBEDS									−.0199	−.1593	−.0079	−.1067
									(2.69)	(3.23)	(1.87)	(2.42)
PCPHYS									.0094	−.0509	.0133	.0087
									(0.42)	(0.75)	(1.00)	(0.15)
PCNURSES									.0067	.0597	.0005	.0192
									(0.75)	(1.96)	(0.10)	(0.74)
COUNTRY	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
$\bar{R}^2$	.98	.99	.99	.99	.98	.99	.99	.99	.99	.99	.99	.99

[1]Not reported.

NOTES: The absolute values of *t*-statistics are in parentheses.
PCY = Per capita gross domestic income.
$PCHCE_{t-1}$ = Per capita health care expenditures in previous year.
TIME = Trend variable.
PUBFIN = Ratio of public expenditures on health care to total expenditures on health care.
PCBEDS = Hospital beds per capita.
PCPHYS = Number of practicing physicians per capita.
PCNURSES = Number of nurses per capita.
COUNTRY = Vector of dummy variables, one for each country with one dummy variable omitted.
$\bar{R}^2$ = Adjusted multiple correlation coefficient.

SOURCE: Moore, Newman, and Fheili, Louisiana State University, 1992.

sector and similar questions such as those addressed, may not be feasible with the kind of cross-sectional data employed in this article. It would be very useful if future research could separate the conflicting hypotheses associated with supply-side variables. However, despite the unresolved questions concerning the exact nature of the relationship between input supply and health care spending, our results suggest that the estimated effect of per capita income on spending is invariant to the inclusion of other spending determinants.

Income elasticities

Estimates of shortrun and longrun per capita income elasticities of health care spending are reported in Table 2. A very clear and consistent pattern emerges from the data. All of the estimated shortrun elasticities are significantly less than 1.0 while all of the longrun elasticities are significantly greater than 1.0. Though the magnitude of the estimates differs, the qualitative results are not sensitive to the choice of model specification, currency conversion, or functional form. Another interesting pattern concerns differences in the income elasticity estimates produced by ER and PPP conversions. For the shortrun, ER produces uniformly higher income elasticity estimates than PPP. On the other hand, PPP produces consistently higher estimates of the longrun income elasticity.

In this regard, our findings are similar to those of Parkin, McGuire, and Yule (1987) in the sense that the method of currency and functional form do seem to have an influence on the estimated value of the income elasticity. However, we find that the longrun income elasticity for health exceeds one no matter which currency conversion method or functional form is used, which implies that health care is a luxury good. As is the case for most commodities, individuals are most responsive in the longrun, allowing them time to adjust their health care spending decisions, than they are in the shortrun.

As an additional check, we performed conventional F-tests for the homogeneity of regressions between countries. The data reject the hypothesis of homogeneity. However, for the per capita income coefficient, joint *F*-tests produce two homogeneous groups of countries. Within each group, differences in the estimated income coefficients are not statistically significantly (i.e., we cannot reject the null hypothesis

Table 2

Estimates of shortrun and longrun income elasticities: 1972-87

Estimated model	Linear		Double-log	
	Exchange rate	Purchasing power parities	Exchange rate	Purchasing power parities
Shortrun				
Model 1	0.798	0.308	0.832	0.409
Model 2	0.795	0.449	0.831	0.399
Model 3	0.811	0.446	0.857	0.504
Longrun				
Model 1	1.381	2.881	1.136	1.478
Model 2	1.376	3.224	1.139	1.468
Model 3	1.362	2.722	1.119	1.446

SOURCE: Moore, Newman, and Fheili, Louisiana State University, 1992.

of homogeneity). On the basis of these tests, we find that the effect of per capita income on health care expenditures in Denmark, Germany, Ireland, and Norway (Group 1) differs significantly from its effect on income in the remaining OECD countries in our sample (Group 2). Running our models separately for each group produces statistically different estimates of both shortrun and longrun income elasticities of demand. Nevertheless, despite the differences across the two groups of countries, the qualitative results are unchanged: The longrun income elasticity is clearly greater than 1.0. For example, using the double-log specification, our estimates of the longrun income elasticity ranges from 1.436 to 1.644 in Group 1 and 1.258 to 1.506 in Group 2. Thus, for ease of presentation, we will continue to report estimates based on pooled data from both groups.

Structural stability of income elasticity

To test the structural stability of the income-health expenditures relationship across time, we estimate Model 2 for two subperiods: 1972-79 and 1980-87.[4] Note that there is a marked disagreement over the value of the income elasticity of demand for health care. In particular, Parkin, McGuire, and Yule (1987) and Gerdtham and Jönsson (1991), both using a cross section of OECD countries, arrive at dramatically different conclusions. Parkin, McGuire, and Yule, 1987 use data from 1980 and find income elasticity to be less than unity, implying health care is a necessity. Gerdtham and Jönsson, using data from 1985, find aggregate income elasticity is significantly greater than 1.0.

In Table 3, we present the associated income elasticity estimates derived from regressions in each of the two periods. The results are consistent with those from the entire period; shortrun elasticities are less than unity, while longrun elasticities are greater than unity. This pattern does not depend on functional form or method

[4]By using Model 2, rather than Model 3, all countries except for Turkey are included in the analysis. However, even under Model 3, with fewer units of observation, the qualitative results are the same, and upon request, these results will be provided by the authors.

Table 3

Estimates of shortrun and longrun income elasticities for two sub-periods: 1972-79 and 1980-87

Estimated model	Linear		Double-log	
	Exchange rate	Purchasing power parities	Exchange rate	Purchasing power parities
Shortrun				
1972-79	0.685	0.431	0.761	0.453
1980-87	0.809	0.687	0.875	0.512
Longrun				
1972-79	1.488	2.501	1.265	1.279
1980-87	1.205	2.169	1.069	1.259

NOTE: Estimates based on Model 2 specification.

SOURCE: Moore, Newman, and Fheili, Louisiana State University, 1992.

of currency conversion. More importantly, our estimates suggest that health care is a luxury good, whether one examines the income-expenditure relationship in the 1970s or the 1980s. Thus, there does not appear to be any evidence of a structural change in their relationship. Overall, the two subperiod regression equations seem to confirm that income is the primary determinant of health care spending and the estimated income-health expenditure elasticities are stable over time and robust with respect to functional form and method of currency conversion.

Conclusions

In this article, we use standardized data released by the OECD to obtain new estimates of income elasticities for health care. These estimates are more reliable than past estimates because they are based on standardized data from a large sample of countries over an extended period of time. These estimates also are robust with respect to estimation technique, functional form, and method of currency conversion.

Our analysis clearly reveals that income is the most important determinant of health care spending, explaining well over 90 percent of the variance in expenditures across countries. As Newhouse (1982) has previously noted, an important implication of this finding is that health care spending, including public sector budgets, is more sensitive to economic than political or ideological forces. He notes that the decline in public health care spending in the United States preceded the arrival of the Reagan Administration. Finally, Newhouse hypothesizes that the choice of which health programs (e.g., Medicaid versus Medicare) to cut in response to a declining economy may be determined by political forces.

Second, we find that the longrun income elasticity of medical care exceeds unity; thus, at the margin, medical care is a luxury good. This conclusion remains firm over alternative model specifications, different bases of currency conversion, alternative functional forms, and different time periods. The implication of this finding is that over time, as the level of national income rises in a country, the share of health care expenditures to GDP

can be expected to rise as well. Evidence of this phenomenon is presented in Culyer (1990). The rising demand for medical care exerts great pressure on both public and private health care budgets. The worldwide increase in health care cost containment programs in the late 1970s and 1980s appears to be a natural response to this phenomenon. The search for the determinants of health care spending and policies for controlling such expenditures is reviewed by Culyer (1990), Enthoven (1990), and Jönsson (1990).

No empirical evidence is found to indicate that the share of total health expenditures financed publicly has a significant negative influence on health care spending. This relationship is even weaker when supply-side variables, which may serve as quality control measures, are included in the model. The analysis indicated that the availability of beds tends to have a negative effect on the level of health care spending, i.e., the larger the number of beds per capita, the lower the level of expenditures. The availability of nurses and physicians does not appear to significantly affect the level of spending.

In this study, we have focused on national health care spending and its determinants. Decisions on health care vary from country to country because of differences in incomes, prices, tastes, and many other political and socioeconomic factors. The level of national health expenditures cannot be considered as too high or too low in relation either to itself or to expenditures in other countries. An assessment of the appropriateness of national health spending requires a balancing of costs and benefits at the margin. Put simply, the efficiency question is: Does a country get as much medical benefit as possible from the expenditure it chooses to make? We have not attempted to measure the relative efficiency of health care systems; accordingly, our empirical results should not be used for this purpose.

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