WHAT DRIVES HEALTH CARE SPENDING? CAN WE KNOW WHETHER POPULATION AGING IS A 'RED HERRING'?

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Abstract

Several empirical studies have presented evidence that per-person health care spending does not rise with calendar age but with proximity to death. Hence, it is alleged that increases in longevity will not, by themselves, boost health care spending. Unfortunately, available data provide no basis for assuming that the curve relating average health care spending to age will, or will not, flatten with increases in longevity. For this reason, budget projections based on the assumption that increases in longevity will not boost health care spending may understate projected growth of health care spending.

Introduction

Per-person health care spending has risen far faster than income in the United States for more than forty years. The same has been true in most other developed nations. This gap results primarily from the separate and interacting effects of an ever-lengthening menu of diagnoses and treatments, deepening health insurance coverage, and rising health care prices.[1] Without fundamental changes in policy, the gap between growth of per-person income and growth of age-specific health care spending is expected to continue as medical science advances. In addition, the average age of the population in most nations is increasing, and the old use more health care than the young. For this reason, health care spending would increase even if age-specific health care spending were unchanged.

For more than a decade, analysts have debated just why health care spending rises with age. At first blush, the answer is obvious—illness becomes more frequent with age and health care spending increases accordingly. A newer view holds that health care spending depends not on age since birth but on proximity to death. On this view, health care spending increases little, or not at all, with calendar age once remaining life expectancy is taken into account.

This analytic distinction is of more than academic significance. As the U.S. population ages, health care spending in general and public spending on Medicare and Medicaid in particular are expected to increase. Increases in health care spending, in turn, are expected to boost total government spending, producing large and problematic deficits unless taxes are raised or other spending is slashed. Most of the anticipated increase in total health care spending is attributed to growth of age-specific health care spending. Some will be caused by population aging. How much depends, in part, on whether the years-since-birth or the years-until-death view is correct. If the first view is correct, population aging will push up health care spending considerably more than if the second view is correct. Whether the effect of population aging is seen as large or small influences how serious the long-term budget problems are expected to be.

Of course, both calendar age and imminence of death could be at work. To further complicate matters, the impact of calendar age or proximity to death on health care spending may not be the same for all services. Crude data indicate that the relationships between calendar age, on the one hand, and per-person expenditures on long-term care services (custodial nursing care and home care) or acute care services (hospitalization and physicians care), on the other hand, are quite different. The former rises far more steeply with calendar age than does the latter, suggesting that the relative impact on various types of health care spending of calendar age and imminence of death may differ.

Using data on actual health care spending to settle matters is not straightforward for several reasons.

• Age-specific health care spending has risen because of scientific advance, increased insurance coverage, and other factors. But the impact of each of these factors across age groups need not be uniform. A large jump in health care spending by the elderly followed the enactment of Medicare and Medicaid.[2] The advent of coronary artery bypass surgery and angioplasty, for example, boosted per-person health care spending for people 40 to 70 years of age, because coronary artery disease most frequently manifests itself among these age groups. The addition of coverage under Medicare for out-patient prescription drugs resulted in increased drug outlays by those over age 65 and the disabled. Future changes in policy could have similarly dramatic effects on relative spending by people of different ages.

• The age-specific incidence of various diseases depends on environmental conditions, which change over time. A reduction in smoking, for example, helped to lower the incidence of coronary disease, lung cancer, and emphysema among middle-aged men. The increase in obesity has raised the incidence of diabetes and associated health problems and is expected to continue to do so in the future.[3]

• More subtly, the evolving ability of health care to forestall death influences the likelihood that people of various ages will sicken and hence changes relative age-specific health care spending. The genetic and other characteristics of those who survive because of a new cure or treatment is not necessarily the same as those who would have survived anyway.

• The norms for what constitutes satisfactory treatment vary with the age of the patient, and these norms can change over time. In particular, physicians and others reportedly are less likely to do "everything possible" for the very old than for younger patients. The fact that per-person Medicare spending on those in the last year of life declines after the age of about 75 is consistent with this speculation.[4] But it is also consistent with a view that comorbidities effectively contra-indicate care to a progressively greater extent as patients age.

• The prices of various health care services change in different ways. Since the mix of health care varies by age, the age profile of health care spending can change even when the age profile of real consumption does not.

Despite these confounding influences, several researchers have tried to distinguish the relative importance of calendar age and remaining life expectancy in explaining the age gradient of health care spending. The authors of most of these studies claim that the data support the view that remaining life expectancy is the principal factor. That is, average health care spending rises with calendar age because a growing share of each cohort is near death. As life expectancy increases over time, the curve relating health care spending to age will therefore flatten. In popular parlance, "80 will be the new 60." Or as one of the earlier studies puts matters, the belief that health care spending will rise with calendar age at the same rate as in the past is a "red herring."[5]

Part I of this paper will briefly describe some of the studies that support the "red herring" hypothesis. Part II will use a simple numerical example to explain why reported statistics relating health care spending to calendar age, life expectancy, and other factors cannot be used validly to infer whether the "red herring" hypothesis is or is not correct. Part III will present estimates of the time trend in the relationship between health care spending and age in the United States. Part IV summarizes the results.

I

Over the past decade, numerous analysts have examined data on individual health care spending in an attempt to determine whether calendar age or life-expectancy better explains the increase of health care spending with age.

The first major empirical study advancing the years-until-death hypothesis was published in 1999.[6] It examined health expenditure data from one Swiss insurance fund for the years 1983-

92. Regression coefficients relating health care spending by people age 65 or older to their calendar ages were insignificant once one had controlled for the number of quarters until the person died and other variables, including sex and insurance status. This study included only people who died within either the succeeding two or five years. The primary determinant of health care spending—aside from calendar year dummy variables to capture the secular increase in health care spending—were additional dummy variables indicating whether people were six quarters or less from dying. Because of these results, the authors characterized the view that population aging would raise age-specific health care spending as a "red herring."

This study did not, however, include survivors. Thus, it was impossible to tell whether health care spending was related to age among those who did not die within the specified period. A separate study based on a much smaller sample of Swiss decedents and simpler statistical procedures reached similar conclusions.[7] A new team of three authors (including two of the three co-authors of the original "red herring" article) later found that calendar age is related to health care spending for survivors. Nonetheless, they concluded that "a naive estimation that does not control for proximity to death will grossly overestimate the effects of population ageing on aggregate health care expenditure."[8]

Another study, also based on data from Switzerland, examined data on health expenditures during the final two years of life by 415 Swiss decedents.[9] The study showed that after controlling for the number of quarters until death, health expenditures declined with age among those age 65 or older. Yet another study, based on data from British Columbia, found that health care spending on people alive at the end of a period rose with age; expenditures on people who died during the period were much higher than on those who survived, but declined with age.[10] It is not clear whether the positive relationship among survivors between spending and age reflected age or proximity to death. A study based on aggregate data from Taiwan spanning 1960 to 2006 concluded that health expenditures depend negatively on remaining life expectancy and positively on age; of the two forces, life expectancy was found to be stronger than age.[11]

A study of U.S. data produced results different in important ways from the studies based on Swiss data.[12] In particular, health care spending on those very near death was much higher than that on those further from death. But spending near death was negatively related to age. Among those near death, health outlays were lower on 65-74 year olds than on those age 85 or older. In contrast, spending increased with age among those two years or more from death. Furthermore, Medicare outlays (largely for acute care) fell with age for those within one year of dying and varied little for those more than one year from dying, while Medicaid outlays (largely for long-term care) rose for both groups.[13]

An additional issue concerns which types of health care spending are sensitive to calendar age or proximity of death. The raw data indicate that both acute and long-term care spending increase with age, but that spending on long-term care rises much faster than does spending on acute care.[14]

A study of U.S. Medicare data published in 2001 indicated that recognizing the impact on age-specific health care spending of increases in time-until-death (that is, increasing longevity) would significantly lower projected growth of Medicare spending.[15] The larger the increase of longevity, the greater the difference. Later studies reached the same conclusion.[16] [17]

Another study of U.S. Medicare data attempted to sort out the separate impact on health care spending of calendar age, predicted life expectancy, and health status.[18] If only age was included, health care spending was strongly related to age. If variables indicating predicted life expectancy (which depends on various factors, including current health status) were added, the impact of age declined by roughly 90 percent.

Over time, demographic changes—whether in age, mortality, or simple population count—account for only a small part of the shift in the age profile of health care spending. A study of the shift in use of various health care services in France found that demographic factors accounted for only a bit over 10 percent of the shift in spending for drugs and hospital services and about one-third of the shift in use of physician services.[19]

With a large sample of 5,075 deceased and 57,085 survivors, the authors of the "red herring" hypothesis were able to examine the relative impacts of calendar age and life expectancy on distinct categories of health care spending and identified what they called "a school of red herrings"—outlays on all types of health care spending other than long-term care were related to life expectancy, but little, or not at all, to calendar age.[20]

II

The attempt to identify the separate roles of aging and of life expectancy on health care spending has relied on regressions of health care spending among decedents or both decedents and survivors. As this literature has developed, the authors have applied increasingly elaborate econometric techniques. Authors have recognized that not all health care spending is driven by age-related infirmities or by illnesses that culminate in death. Causation runs both ways: illness or imminent death trigger health care spending, but much health care spending is undertaken to extend life and actually does so. Currently available studies have not recognized that reverse causality—the fact that health care spending defers death—means that coefficients in regressions relating health care spending to “time-to-death” and age are therefore biased and that it is impossible in practice to determine the size of the bias. Furthermore, the relative importance of health care undertaken explicitly to extend life rather than in response to illnesses leading to death likely varies across age groups and over time. Sorting out ‘life-extending’ from ‘mortality-provoked’ health care spending is virtually impossible.

Three simple, entirely artificial numerical examples illustrate the problem (see Table 1). In each example, I assume that the population consists of 14 people of three ages: 1, 2, and 3. No one in the population survives to year four. Each person has a “natural” life expectancy and a “natural” “number of years-to-death.” In each example, health care spending rises with age and “natural” proximity to death. Additional health spending can extend life. Actual proximity to death is the sum of “natural” proximity to death and the life-extending properties of some health care spending.

Regression coefficients for age and total observed years-to-death (which I assume is known precisely) are shown at the bottom of each example. In each case, the coefficient on years-to-death is negative, indicating that health care spending rises as death approaches. That “result” corresponds to all of the published literature on the subject. The coefficient on age is variously, positive, zero, or negative. Because the examples are artificial, there is little unexplained variance in any of the examples. This feature contrasts sharply with regressions using actual health expenditure data where unmeasured factors dominate health care spending. If random numbers were added to the three examples, the proportion of variance in health care spending that is explained would fall, as would t values, without necessarily changing regression coefficients.

None of the raw “data” used to construct the examples is meant to be realistic in detail, but each example obeys the standard “stylized” facts. 1) Average spending rises with age for each age group. 2) Spending rises independently as death approaches. 3) For people with given “natural” life expectancy, more is spent on the young than on the old. 4) Average health care spending by “age cohort” rises with age. Numerical values differ across the three examples. The pattern by age of spending undertaken expressly to boost life expectancy varies across the three examples.

In fact, much if not most health care spending has some impact on life expectancy. It is hard to know how such life-extending outlays are distributed by age or how such spending varies over time in amount or in its age distribution.

The central point of these examples is simple: health care spending influences life expectancy. It does so in ways that no one fully understands or is likely to understand. The existing pattern, whatever it is, will evolve in unpredictable ways. It is therefore not fruitful to try to identify how health care spending is related to calendar age and life expectancy. One can, of course, run regressions and apply sophisticated econometric methods to data on health care spending, age, and actual or predicted life expectancy. Regression coefficients and t values will emerge. But they will not reveal the underlying structure of the relations among age, life expectancy, and health care spending. Nor will they provide any basis for predicting how health care spending will be related to changes in the age distribution or longevity. The literature that has tried to find a structural relationship has displayed enormous ingenuity. The objective, alas, is just not achievable.

More pointedly, there is no basis for assuming that the curve relating average health care spending to age will, or will not, flatten with increases in longevity. Even if health care spending at a point in time is influenced or even dominated by remaining life expectancy, the observed relationship provides no basis for projecting how the curve will evolve as life expectancy increases. It could be stationary or move either to the right or to the left, depending on discoveries of life-extending health care, personal "tastes" for such care, and public policy.

III

Given the inescapable uncertainties regarding the structural relationships among age, longevity, and health care spending, a reduced form relationship is all that policymakers are, or will be, vouchsafed. What has been the pattern in the United States? The Medical Expenditure Panel Survey (MEPS) provides the best available data on total health care spending for a representative sample of U.S. residents of all ages. MEPS excludes certain groups, notably people in institutions or the military. A new panel has been enrolled in each year since 1996. Data for each surveyed household span two years. In any given calendar year, a new panel begins and an old panel ends. Thus, two panels are ongoing at each moment. The survey devotes considerable effort to identifying the dollar amounts spent on all health care spending, but coverage is not complete.[21] The largest omissions are of spending for nursing home care and acute care for the institutionalized. The most recent panel currently available covers the years 2005-2006. Thus, 10 two-year panels are available.

The panel nature of the survey makes it possible, to a limited extent, to identify people who are near death. The survey identifies people surveyed in the first year who die in the second year. It also identifies people who enter an institution and are not surveyed in the second year or who have limitations on activities of daily living. Mortality rates among these two groups are higher than among the general population. Because the panel runs for just two years, it is not possible to pick out those who die more than one year after the initial survey year.

With MEPS data, it is possible to answer two questions:

1) Has the age gradient of health care spending changed over the decade for which data are available? During that decade, mortality rates declined slightly (see Table 2). If the curve relating health care spending to calendar age is driven by the fraction of people within each age cohort who are near death, then the curve should shift gradually to the right and the shift should be largest in those age cohorts with the largest drops in mortality rates.

2) Does health care spending rise with age if one controls for proximity to death?

To answer these questions, I regressed total health care spending and each of three components of total health care spending—hospital spending, physician spending, and all other health care spending—on race, sex, education, insurance status, and age. The independent variables, all dummies, are listed in Table 3.

Figures 1 and 2 answer the first question. Each figure shows the ratio of per-person health care spending for each age group to mean per-person health care spending across all age groups during the first survey year for each indicated period. All survey units are included for which data are available for the first year, including those for whom data are not available for the second year because they died or were institutionalized. Figure 1 shows the curves for the first year from four of the 10 MEPS surveys, 1996-97, 1998-99, 2003-2004, and 2005-2006. To reduce sampling variation, Figure 2 averages relative spending by age for each of the first five surveys and for each of the second five surveys. In neither case is there any clear or consistent shift in the curves over time. The same lack of pattern holds for hospital expenditures, physician expenditures, and all other health care spending (see appendix figures).

Any of a number of factors could explain the lack of any clear direction of movement, including sampling variability, shifts in medical technology, changes in private or public payment policies, or changes in the share of outlays going for life-extending rather than mortality-provoked health care spending. The absolute reductions in mortality rates within the 10-year period were small. However, if outlays of those near death were responsible disproportionately for the rise of health care spending, some shift might be visible given the sizeable relative reductions for some age groups.

Figure 3 provides information relevant to the second question. It shows the ratio of per-person health care spending by each age group to mean health care spending during the first year of each survey. Values for the first five surveys are averaged and values for the second five surveys are averaged. The bold lines (solid and dashed) report relative spending for the entire sample. The lighter lines (solid and dashed) show spending for people other than those who a) died before completion of the second year, b) entered an institution and therefore were not surveyed in the second year, or c) had any limitations on activities of daily living. The latter two groups were excluded because they are presumed likely to die sooner than average after the end of the second year. Excluding these three groups significantly lowers the slope of the curves relating health care spending to age, but the slope remains strongly positive. The slope reduction is not smooth or continuous, but the gap widens with age. The fact that the gap widens with age shows that proximity to death boosts health care spending, but the remaining positive slope suggests that age, as well as proximity to death, influences health care.

The shift in the curves between the earlier period (dashed lines) and the later period (solid lines) is variable and small, except for people over age 75. (The curves based on data from single surveys move erratically and are less smooth.) Among the very old, relative health care spending is much lower in the later than in the earlier surveys. However, the shift is too large to be explained by the rather small reductions in mortality rates from an average over the period 1996 to 2001 to an average over the period from 2001 through 2006. Once again, this shift is probably attributable to some combination of sampling error, medical technology, policy changes, and shifts in the proportions of what I have called 'life-extending' and 'mortality-provoked' health care spending. Once again, charts showing the separate patterns for hospital, physician, and all other health care spending analogous to those shown in Figure 3 are in the appendix.

IV

The idea that reductions in mortality rates might reduce age-specific health care spending and do so increasingly as age increases is plausible. Drops in age-specific disability rates also seem to support this idea. The several studies cited purport to support this inference. Several studies, based on data from various countries, claim to support the hypothesis that age-specific health care spending will rise little, if at all, as life expectancy increases because the events that trigger high health care spending and that are clustered among the old are associated with oncoming death, not simple age. All of these studies recognize that the bulk of projected increases in health care spending come from other sources: advancing medical technology and increases in the proportion of the population that is elderly and, therefore, near death. These studies have dwelt on the econometric difficulties in identifying the separate effects of age and time-until-death and have used quite sophisticated methods. They have uniformly suggested that projections of health care spending should be based on the assumption that age-specific relative health care spending should be assumed to decline because of reductions in age-specific mortality rates.

I believe that this latter suggestion is not justified because no one currently has any well-supported reason for predicting whether age-specific relative health care spending will rise, fall, or remain unchanged. The fact is that declining mortality in some measure reflects factors other than health care (which may well reduce health care spending) and in some measure reflects the results of increasing health care spending (which will cause a declining mortality to be associated with increased health care spending).

This observation has practical significance for projections of U.S. health care spending. Long-term budget projections of the Congressional Budget Office (CBO) indicate large and growing budget deficits. These deficits arise largely because of projected increases in health care spending. CBO health care spending projections are reported to be based on the assumption that time-until-death will influence future health care spending, although the details of the methodology that CBO uses in making these projections are not in the public domain.[22] Current projections stretch 75 years into the future. Even small annual percentage changes in assumed rates of growth can cumulate into large differences five, six, or seven decades into the future. Thus, it might appear that CBO projections, although dire, understate the problem, as they are based on what I have argued is the unjustified assumption that increasing longevity will help to hold down health care spending.

The proper inference, in my view, is rather different. There is no good reason for assuming any change in age-specific relative health care spending. In addition, little weight should be attached to projections stretching many decades into the future. Which age groups will be the principal beneficiaries of new medical technology, the principal driver of health care spending, is unknown and unknowable. Furthermore, both age-specific relative health care spending and overall average growth of health care spending depend with considerable sensitivity on health care payment policies. It is not possible to predict reliably the impact of advancing technology on either average total health care spending or on age-specific relative spending. To be sure, advances in medical technology have in recent decades been the major contributor to increases in average health care spending. The vibrancy of biomedical science strongly suggests that this impetus to higher spending will persist and could even strengthen. It is prudent, therefore, to assume that continuing scientific advances will boost overall health care spending. But this growth depends sensitively on payment policies. But there is no good reason, based on historical trends, to assume that age-specific relative health care spending will decline with increasing longevity. The best projection approach, until better evidence is available, would be to assume that average age-specific health care spending will rise at the historic average.

It is impossible to accurately predict how scientific advance will affect either overall health care spending in the distant future or relative spending by various age groups at any time. Furthermore, projections are intended to reflect spending under current policy, which is likely to change. For both reasons, projections stretching as much as 75 years into the future are no better than guesswork and should not materially influence current policy. Deciding how far into the future to project health care spending is a matter of judgment, but the decision first by the Medicare actuaries to make projections of Medicare spending beyond 25 years and then by the Congressional Budget Office to project total health care spending and its components for 75 years were mistakes. Each shifted emphasis from near-term projections, which are enormously useful to the public and to policymakers, to distant extrapolations that have virtually no informational content.

TABLE 1
NUMERICAL EXAMPLES

Panel A

(1) Age	(2) Age-related health outlay	(3) Natural "Years to Death"	(4) Years-to-death related health outlays	(5) Discretionary health outlays	(6) Impact of discretionary health outlays on years to death	(7) Total years to death (3) + (6)	(8) Total health outlays (2)+(4)+(5)	(9) Average health outlays for age group
1	1	3	0	0	0	3	1	3.2
1	1	3	0	0	0	3	1	
1	1	3	0	0	0	3	1	
1	1	1	3	1	1	2	5	
1	1	2	3	0	0	2	4	
1	1	1	6	0	0	1	7	
2	2	2	2	1	1	3	5	6
2	2	2	2	1	1	3	5	
2	2	2	2	1	1	3	5	
2	2	0.5	5	0.5	0.5	1	7.5	
2	2	0.5	5	0.5	0.5	1	7.5	
3	3	1	4	0	0	1	7	7
3	3	1	4	0	0	1	7	
3	3	1	4	0	0	1	7	

	Age	Total years to death	
Coefficient	1.05	-1.65	$R^2 = 0.76$
Standard error	.52	.43	

Panel B

1	1	2	0	2	1	3	3	5
1	1	2	0	2	1	3	3	
1	1	2	0	2	1	3	3	
1	1	1	3	2	1	2	6	
1	1	1	3	2	1	2	6	
1	1	0	6	2	1	1	9	
2	3	1.5	2	1	0.5	2	6	7.2
2	3	1.5	2	1	0.5	2	6	
2	3	1.5	2	1	0.5	2	6	
2	3	0.5	5	1	0.5	1	9	
2	3	0.5	5	1	0.5	1	9	
3	5	1	4	0	0	1	9	9
3	5	1	4	0	0	1	9	
3	5	1	4	0	0	1	9	

	Age	Total years to death

Coefficient	0	-3	R^2= 1.0
Standard error	0	0	

Panel C

(1) Age	(2) Age-related health outlay	(3) Natural "Years to Death"	(4) Years-to-death related health outlays	(5) Discretionary health outlays	(6) Impact of discretionary health outlays on years to death	(7) Total years to death (3) + (6)	(8) Total health outlays (2)+(4)+(5)	(9) Average health outlays for age group
1	1	2	0	2	1	3	3	5
1	1	2	0	2	1	3	3	
1	1	2	0	2	1	3	3	
1	1	1	3	2	1	2	6	
1	1	1	3	2	1	2	6	
1	1	0	6	2	1	1	9	
2	2	1.5	2	1	0.5	2	5	6.2
2	2	1.5	2	1	0.5	2	5	
2	2	1.5	2	1	0.5	2	5	
2	2	0.5	5	1	0.5	1	8	
2	2	0.5	5	1	0.5	1	8	
3	3	1	4	0	0	1	7	7.3
3	3	1	4	0	0	1	8	
3	4	1	4	0	0	1	8	
		Age	Total years to death					
Coefficient		-0.85	-2.99	R^2= 0.99				
Standard error		0.12	0.12					

TABLE 2

CHANGES IN MORTALITY RATES, BY AGE

	Change in One-year Mortality Rate			
	1995[a]	2005[b]	Change	Percentage Change
0-20	0.08%	0.07%	-0.01%	-16.5%
21-25	0.10%	0.10%	0.00%	-3.8%
26-30	0.11%	0.10%	-0.01%	-11.4%
31-35	0.14%	0.12%	-0.02%	-16.7%
36-40	0.19%	0.16%	-0.03%	-14.0%
41-45	0.27%	0.25%	-0.01%	-4.1%
46-50	0.40%	0.39%	-0.01%	-2.8%
51-55	0.60%	0.56%	-0.04%	-6.6%
56-60	0.95%	0.81%	-0.14%	-14.9%
61-65	1.48%	1.25%	-0.23%	-15.8%
66-70	2.28%	1.90%	-0.38%	-16.5%
71-75	3.52%	3.03%	-0.50%	-14.1%
76-80	5.50%	4.83%	-0.67%	-12.2%
81-88	10.22%	9.51%	-0.70%	-6.9%

Source: SSA, 1990, 2000, and 2005 Life Tables

a. Male and female values were averaged together, as were ages to create age group values for 1990 and 2000. These were then averaged to create the values for 1995.

b. Male and female values given in the 2005 SSA Life Table were averaged together, as were ages to create these age group values.

TABLE 3

REGRESSION VARIABLES

INDEPENDENT VARIABLE	CATEGORIES (DUMMY VARIABLES)
Race	White (omitted category) Black Asian Other
Sex	Male (omitted category) Female
Education	Less than high-school diploma (omitted category) High-school diploma Some college or bachelor's degree More than bachelor's degree
Insurance status	Never insured during survey period (omitted category) Ever insured during survey period
Age	0-20 51-55 21-25 56-60 26-30 61-65 31-35 66-70 36-40 71-75 41-45 (omitted category) 76-80 46-50 81-85

FIGURE 1

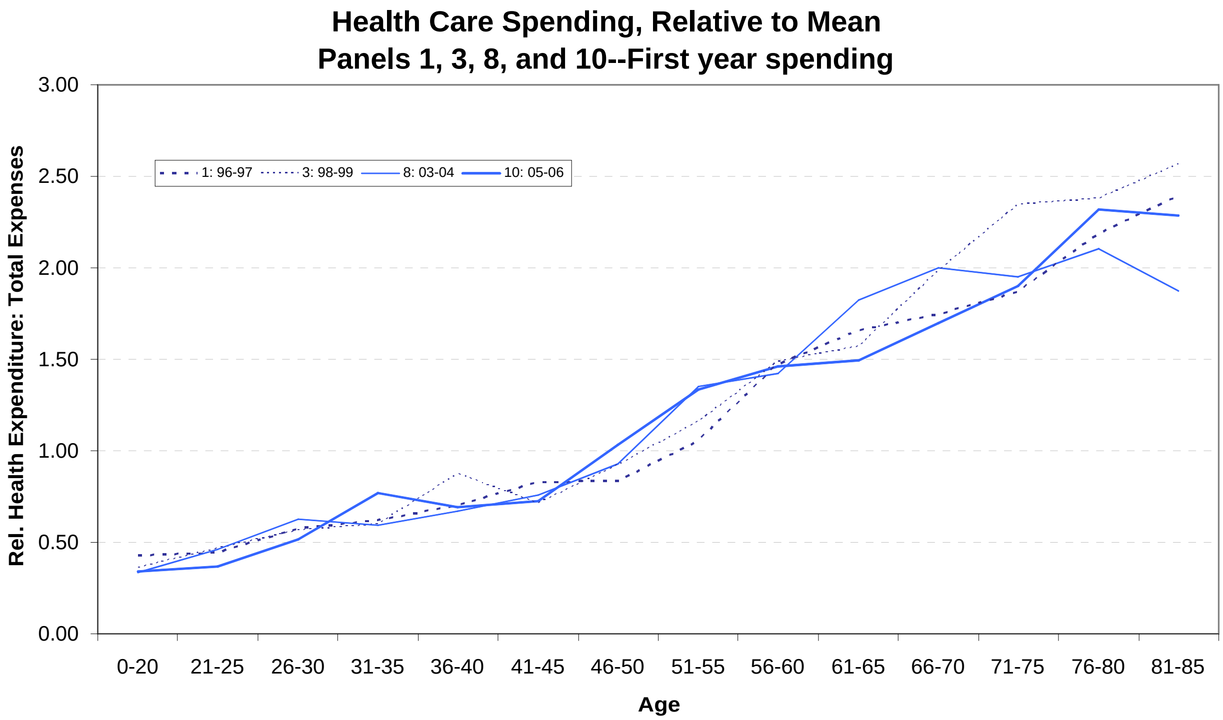

Health Care Spending, Relative to Mean
Panels 1, 3, 8, and 10--First year spending
Rel. Health Expenditure: Total Expenses
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1: 96-97
3: 98-99
8: 03-04
10: 05-06
0-20
21-25
26-30
31-35
36-40
41-45
46-50
51-55
56-60
61-65
66-70
71-75
76-80
81-85
Age

FIGURE 2

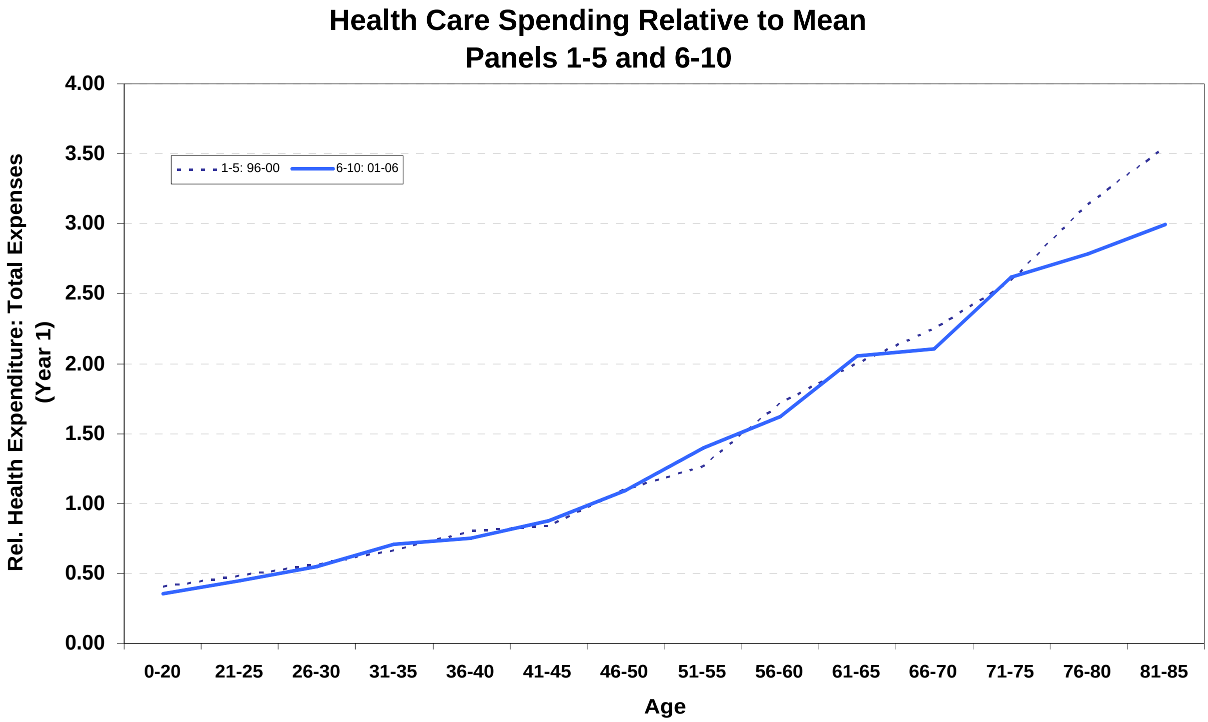
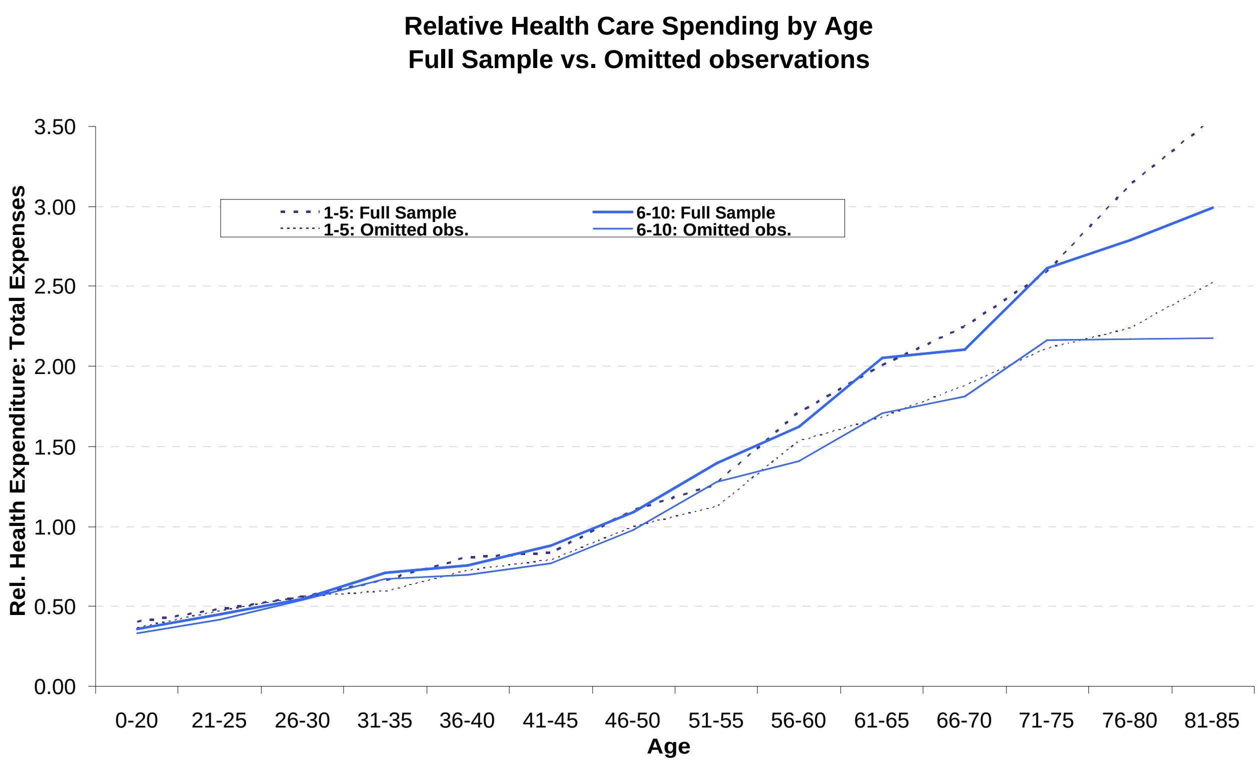

Health Care Spending Relative to Mean
Panels 1-5 and 6-10
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1-5: 96-00
6-10: 01-06
Rel. Health Expenditure: Total Expenses (Year 1)
0-20
21-25
26-30
31-35
36-40
41-45
46-50
51-55
56-60
61-65
66-70
71-75
76-80
81-85
Age

FIGURE 3



Relative Health Care Spending by Age
Full Sample vs. Omitted observations
1-5: Full Sample
1-5: Omitted obs.
6-10: Full Sample
6-10: Omitted obs.
Rel. Health Expenditure: Total Expenses
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
0-20
21-25
26-30
31-35
36-40
41-45
46-50
51-55
56-60
61-65
66-70
71-75
76-80
81-85
Age

ENDNOTES

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