Hutchins Center
on Fiscal & Monetary Policy
at BROOKINGS

Working Paper #4 August 2014

PERSPECTIVES ON HEALTH CARE SPENDING GROWTH[1]

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The evolution of health care spending has important implications for many aspects of our economy. The trajectory of health spending growth is a central determinant of the outlook for federal and state budgets and for workers' take-home pay. Health spending also affects other key economic variables, including measured productivity and prices. Further, the coming demographic change has important implications for both the level and financing of health spending. For these reasons, the question of what drives health spending growth is a subject that has received much attention from researchers and policymakers, although much remains to be learned.

The basic questions driving all this attention are simple: Why has the share of health spending in GDP been rising for decades? And when and how will this trend stop? Recently, there has been much debate about the slowdown in health spending growth observed over the past few years. Analysts have been trying to determine whether this slowdown is simply the result of the recent recession, or whether it reflects something new.[2] In this paper, I first step back from the question of the recent slowdown and attempt to provide some background on the key determinants of health spending growth and how these have evolved over time. I then address the recent slowdown.

I find that changes in GDP do translate into changes in health spending, but the effect takes place over a number of years. Given this time lag, it seems likely that the slowdown in health spending growth observed since 2002 is largely the result of the two recessions that occurred in the last decade, rather than representing a new innovation that needs to be explained. But the paper shows that, while national health spending does appear to move with GDP, the pieces of spending—Medicare, Medicaid, and privately-financed health care—do not move together. The dramatic deceleration in Medicare spending observed over the past decade, for example, cannot be explained econometrically by either economic factors or changes in the level of Medicare payments.

Furthermore, the recent slowdown in health spending occurred during unusual times: a decade of very slow economic growth *and* very low inflation (which made it harder for firms to pass on health insurance costs to their employees), a major health reform that was accompanied by much confusion and fear, and a huge runup in budgets deficits that intensified attention on the need for future spending

[1] A prior version of this paper was presented at the Engelberg Center for Health Care Reform's April 2014 conference on the Future of U.S. Health Care Spending.
[2] See, for example, Cutler and Sahni (2013), Chandra, Holmes, and Skinner (2013), Holahan and McMorrow (2013), Roehrig (2013), and Ryu, Gibson, McKellar and Chernew (2013).

cuts. These factors might have had significant effects on health spending. Thus, it seems premature to either declare a turning point or to decide that nothing has changed. There remains much uncertainty about the likely trajectory of future health spending.

ACCOUNTING FOR HEALTH COST GROWTH

The share of health spending in GDP has increased sharply over time, from 5 percent of GDP in 1960 to over 17 percent today (Appendix Figure A1). Many researchers have attempted to link the rapid rise in health spending over time to such factors as income growth, the relative price of health care, demographics, and changes in insurance coverage. The earliest work (Newhouse 1992, 1993), using household-level estimates of the responsiveness of the demand for health care to income and prices, found that these factors could explain very little of the rise in health spending, and concluded that technology—the residual—must be responsible for most of the growth.

However, more recent work, including Smith, Newhouse, and Freeland (2009) and Follette and Sheiner (2005), recognized that household-level estimates may not be appropriate for predicting the macroeconomic impact of changes in income or insurance coverage. Cross-country and time-series estimates of the income elasticity, for example, suggest much larger estimates than can be found by comparing health consumption by households of different incomes at a single point in time (Getzen 2000.) Similarly, Amy Finkelstein's work (Finkelstein 2005) showed that the introduction of Medicare had much larger effects on spending than would be estimated using the household-level estimates of the effects of price elasticities derived from the Rand Health Insurance Experiment.

Studies that account for the larger aggregate elasticities tend to assign a smaller role for technology as an exogenous factor in explaining health spending growth.[3] And yet they are not inconsistent with the view that technology is a major driver of spending; instead, they argue that it is the growth in income or the increase in insurance coverage that *allows* for the adoption of new technologies. Furthermore, as I show below, the changes in health insurance coverage over time and even in the relative price of medical services are themselves not exogenous, and are likely also a function of income. So, in some sense, the accounting framework either does not explain health spending growth (when using cross-sectional elasticities), or explains it almost solely as a function of income growth, neither of which helps to predict when health spending will slow. But the accounting framework is helpful in clarifying the *channels* through which health spending growth could slow, and examining each of these in turn can help provide a way of discussing the likely trajectory of future health spending.

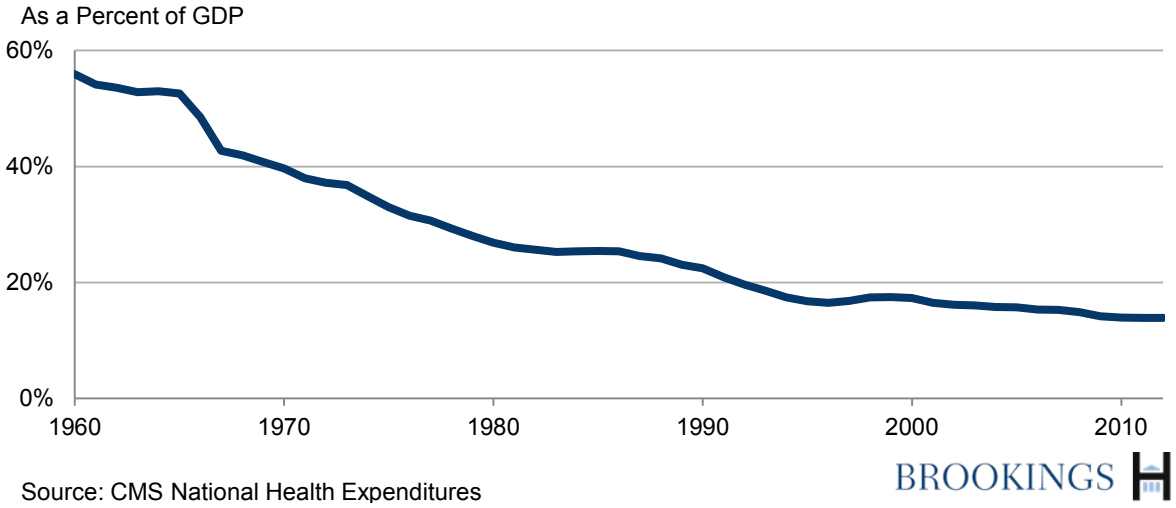
Out-of-Pocket Health Spending

The price of health insurance faced by the consumer when deciding whether to consume a particular health service is the out-of-pocket cost, the direct and uninsured payment from a patient to a health care provider. As shown in Figure 1, this price has declined dramatically over the past 50 years, falling from 56 percent of health service consumption in 1960 to 14 percent in 2012.[4]

[3] For example, Smith et al, using larger income elasticities, but not larger price elasticities, find that technology was responsible for 27 percent to 48 percent of health spending growth since 1960. Finkelstein (2005) argues that spread of insurance might explain up to ½ of the increase in spending from 1950 to 1990.

[4] The figure uses data on personal health consumption from the National Health Expenditure Accounts (CMS 2011). Personal health consumption expenditures are expenditures on actual health care services; they differ from national health expenditures (NHE) in that they exclude investment in research, equipment, and structures, and also exclude administrative costs and insurance .

Figure 1: Out-of-Pocket Share of Health Spending



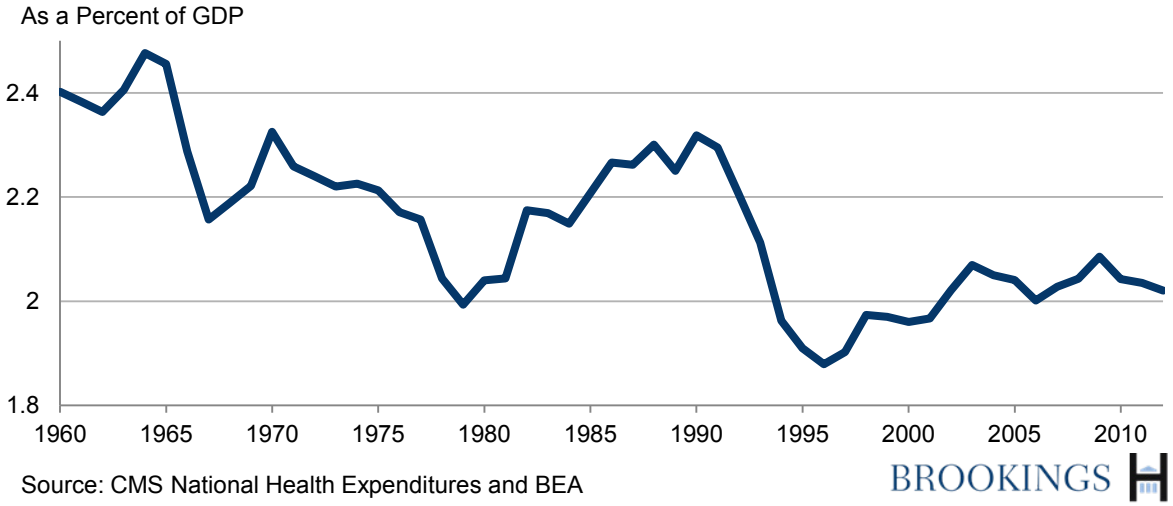
Source: CMS National Health Expenditures

The decline in the out-of-pocket share of health spending can be traced to two main factors. First, the introduction and subsequent expansions of Medicare and Medicaid reduced the share of Americans without insurance, from about 25 percent in 1960 to roughly 15 percent by the mid-1980s, as shown in Appendix Figure A2. Second, both public and private health insurance have become more comprehensive over time: deductibles, coinsurance, and catastrophic limits have not kept pace with health spending, and insurance has covered a greater share of services.

As noted by Follette and Sheiner (2005), a reduction in the share of out-of-pocket is not surprising if one considers that one of the prime purposes of health insurance is to insure against idiosyncratic swings in non-health consumption. As health costs increase relative to income, a constant out-of-pocket share would provide too little insurance. In addition, a constant out-of-pocket share would make health services unaffordable for those with low income who get subsidized public insurance. As discussed in Follette and Sheiner (2005), government policy appears to react strongly to changes in health affordability: when private health spending as a share of income rises significantly for those with low income, public financing expands. The introduction of Medicare Part D, for example, was preceded by a few years where drug spending was consuming a rapidly rising portion of the budgets of low-income elderly.

The net result of the changes in public and private insurance can be seen in figure 2, which shows out-of-pocket spending over time as a share of GDP, rather than as a share of total health services. It shows that the net effect of all the changes in public and private insurance has been to lower out-of-pocket spending relative to income, even while the share of total services expenditures in GDP has more than tripled. And the public share of health financing has also increased sharply (Appendix figure A3). Public spending, comprised of Medicare expenditures net of beneficiary premiums, Medicaid, CHIP, and other federal and state program, has increased over time from about 20 percent of total spending in 1960 to 40 percent in 2012.

Figure 2: Out of Pocket Spending



Thus, there appears to be a fairly large endogenous response to changes in health care spending. As spending rises as a share of income, two things happen: insurance contracts change to insulate people from the risk of large expenses if they become ill, and public programs expand to help maintain access to health services for lower income. Both of these changes fuel increased adoption of health technology.

It is hard to predict how these forces will evolve over time. Some observers have noted the increasing popularity of catastrophic health plans in recent years (Ryu et al 2013), suggesting that the long decline in cost sharing may be abating. But the implementation of the Affordable Care Act (ACA) will likely cause the share to decline once again: the ACA expands Medicaid and private insurance, provides new subsidies for out-of-pocket payments for those with low income, and closes the donut hole in Medicare Part D, all measures which will substantially lower out-of-pocket costs once again. Beyond the ACA, it is hard to predict how government policy will evolve. On the one hand, if health spending continues to rise faster than incomes, health care will become increasingly unaffordable and there will be powerful pressures for the government to address the problem. On the other hand, government budgets will be under increasing pressure in coming decades, and continued expansions of public health care financing may prove infeasible.

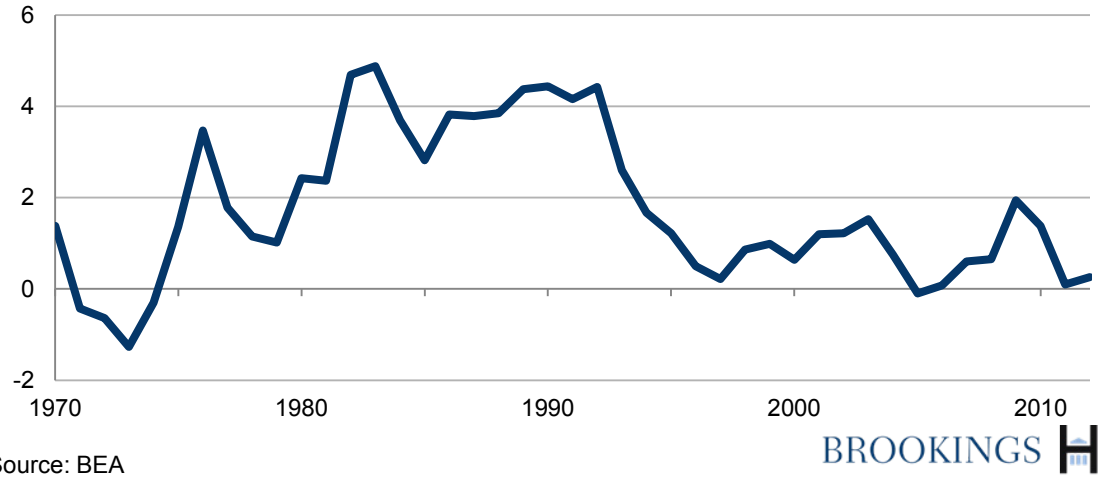
The Supply-Side Perspective[5]

A second factor that some analysts point to in explaining the rise in health spending is relative medical price inflation. As shown in Figure 3, measured medical prices, like the BEA's health price index for consumption of health goods and services, have generally increased at a faster pace than inflation, likely contributing to the rise in health spending as a share of GDP. One possible source of this rise is increasing payments for input costs.

[5] This section draws heavily from Sabelhaus (2009).

Figure 3: Relative Medical Price Inflation

PCE Health Inflation less GDP Inflation



Source: BEA

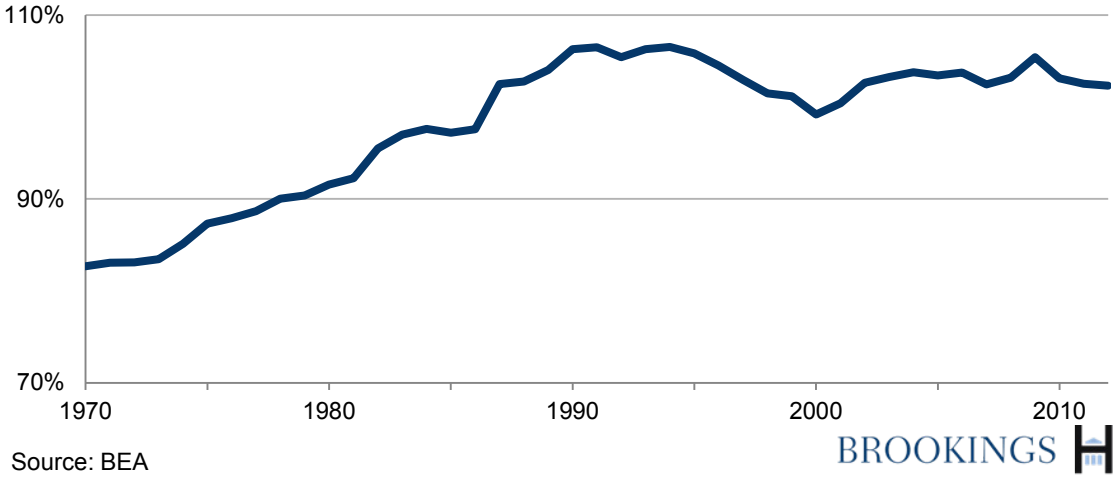
Labor services are by far the largest input to the production of health care. Using data on employment and compensation by industry from the National Income Product Accounts (NIPA), I find that the share of total compensation accounted for by the health care industry has risen about in line with the share of health in GDP. [6] It has increased from about 3 percent of total compensation in 1970 to almost 10 percent in 2012, and the periods of slow growth in health spending—including the one in the mid-1990s as well as the current episode—show up clearly in the compensation data as well (Appendix Figure A4).

But what has caused this rise? A rise in employment or a rise in compensation per employee? Figure 4 plots the mean compensation per hour of workers in the health care industry relative to that of workers in all industries, again using NIPA data.[7] The data show a striking pattern: the compensation of health industry workers rose sharply relative to that of other workers between 1970 and 1990. Over this time period, mean compensation per hour rose 8 percent per year in the health sector, compared with 6.7 percent per year overall. Since 1990, relative compensation has declined a bit, on net, with mean compensation per hour in health rising 3.4 percent per year on average, relative to 3.6 percent overall.

[6] Sabelhaus (2009) shows that compensation for labor services constitutes, by far, the largest value added in the health care sector, accounting for about 77 percent of value added in 2010.

[7] As noted by Sabelhaus, there is a small definitional change between 1998 and 2000, in terms of which subindustries are classified as "health," and part of the apparent decline in relative compensation during that period is attributable to that change.

Figure 4: Relative Compensation in Health Industry



The rise in relative compensation in the 20 years following the introduction of Medicare and Medicaid could potentially account for some of health care's excess cost growth. In particular, if the increase in compensation represented pure rents—that is, if the productivity of the workers over this period did not increase faster than that of workers overall—then the rise in relative compensation would translate one-for-one into an increase in relative medical costs, which would likely boost excess health cost growth.[8]

The story is a bit more complicated if the increase in relative compensation reflected an increase in the productivity of workers in the health sector. If the workers were more productive in a traditional sense—that is, if the more highly paid workers were more productive in the sense that you needed fewer of them to produce the same product—then total industry compensation costs would not rise. Instead, there would be fewer more productive and more highly paid workers. But, if the workers were more productive in the sense that they were able to produce a better product, perhaps because they could take advantage of new technologies in health care, then total spending would increase. Excess cost growth would rise, but relative medical price inflation, properly measured, would not increase.[9]

To examine this question, I use pooled cross-sections of the March Current Population Surveys (CPS), which allow me to look at compensation and education by occupation over a long time span. I focus on three health occupations: physicians, nurses, and technicians (orderlies and aides); these occupations accounted for about 90 percent of health workers in 1970.[10] Because many physicians are sole practitioners reporting business income instead of wage income, I use the sum of wage income and business income as a measure of compensation for them. In addition, in the early years, top coding in the CPS had a significant effect on mean physician income—for that reason, I focus on medians when looking at physicians or at the health sector as a whole.

I find that the relative compensation of technicians has been fairly stable over time, but nurse compensation rose markedly between 1970 and 1990, from about 80 percent of average earnings to

[8] The effect of an increase in relative prices on spending depends on the price elasticity of demand.
[9] The topic of whether additional health spending has been associated with improved quality and, if so, whether the benefits we have received could have been obtained at lower cost, remains a controversial one that is beyond the scope of this paper.
[10] The remaining occupations are therapists (including mental health professionals, occupational and speech therapists, etc.) and managers.

over 120 percent. Why did nurse compensation rise so much? One likely reason is changes in the quality of nurses, which appears to have increased sharply over that time period. In 1970, for example, 45 percent of nurses had only a high school degree; by 1992, the proportion had dropped to only about 5 percent. In contrast, the education of technicians changed little over this period (Appendix Figures A5-A7).

How about physician compensation? I find that, relative to the median worker, physician compensation has drifted up somewhat over time. As noted by Cutler and Ly (2011), however, changes in physician compensation likely reflect overall increase in income inequality. Relative to the 90th percentile of all workers, physician compensation has been quite steady, on net, over time, although it bounces around substantially from year to year (Appendix Figures 8 and 9).

The large increase in the compensation and education of nurses in the 25 years or so following the introduction of Medicare and Medicaid likely contributed to the increase in health spending over that time period, while at the same time probably improved the quality of health care. There is some evidence that the increase in inequality over time has also contributed to an increase in spending, although, again, whether this represents a true price increase or simply higher-quality spending depends on whether the productivity of physicians has increased as well.

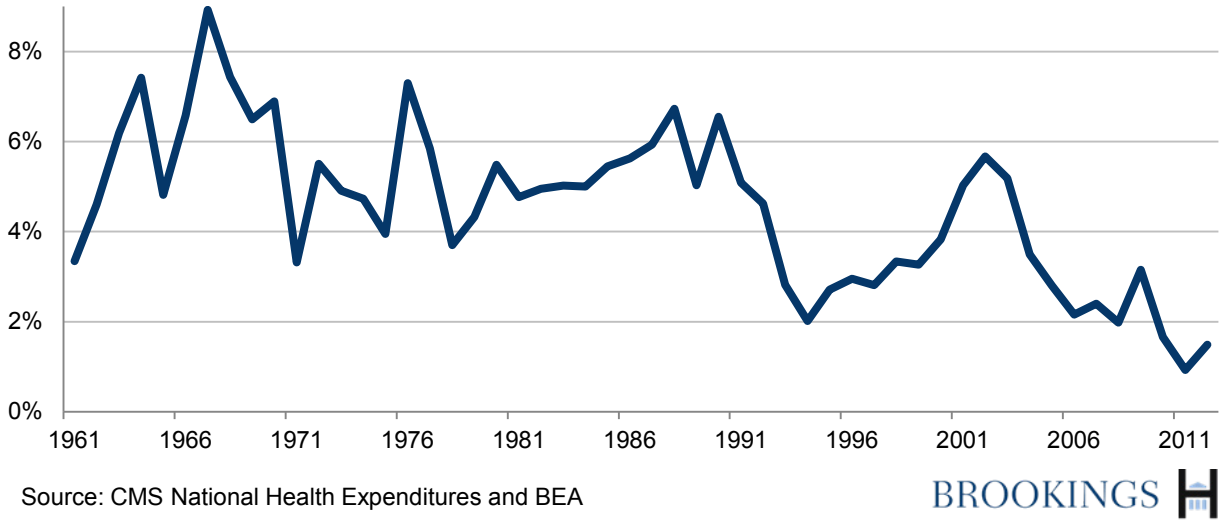
EXPLAINING SHORT-TERM HEALTH SPENDING GROWTH

The accounting framework has typically been used to examine health spending growth over long periods of time. And discussions of long-term projections of health spending generally center on pinning down the trajectory for "excess cost growth"—that is, health spending growth in excess of GDP growth, because it is assumed that health spending will rise at least as fast as GDP over the long run. But the recent slowdown in health spending growth has led to renewed interest in the determinants of the short-run movements in health spending growth.

Aggregate Health Spending Growth

Figure 5 plots the annual growth in real health spending per capita, defined as the growth rate of per capita National Health Expenditure Accounts (NHEA) personal health consumption deflated by the GDP deflator. It shows a notable slowdown in health spending growth beginning in 2002, before the beginning of the great recession. When excess cost growth is plotted, however a different story emerges: the recession years of 2001, 2008, and 2009 are associated with very high excess cost growth, followed by more subdued growth in the subsequent years (Appendix Figure A10). Indeed, the negative correlation between GDP growth and excess cost growth has consistently been very strong and predictable (Figure 6).

Figure 5: Growth of Real Per Capita Health Spending



Source: CMS National Health Expenditures and BEA

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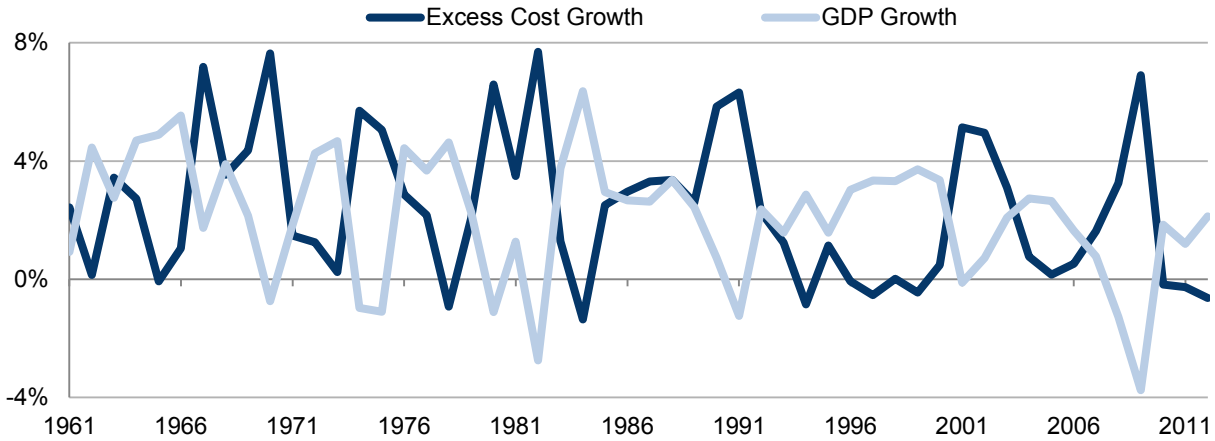
Figure 6: Excess Cost Growth and GDP Growth



Source: CMS National Health Expenditures and BEA

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Recent work by the Altarum Institute in conjunction with the Kaiser Family Foundation (Roehrig 2013) has shown that changes in annual GDP growth are powerful predictors of health spending growth. Table 1 presents the results from simple regressions of real per capita health spending growth on real per capita GDP growth, using data from 1970 to 2012. The first column includes just current and five years of lagged GDP growth, the second column adds a time trend, the third column adds a dummy for the years 1992 to 2012, and the fourth column, my preferred specification, drops the time trend, which is insignificant once the post-91 dummy is included. The final column adds a measure of relative medical prices—defined here as the BEA's household health consumption deflator less the GDP deflator.

Table 1
Regression of Growth in Real Per Capita Health Spending
1970-2012

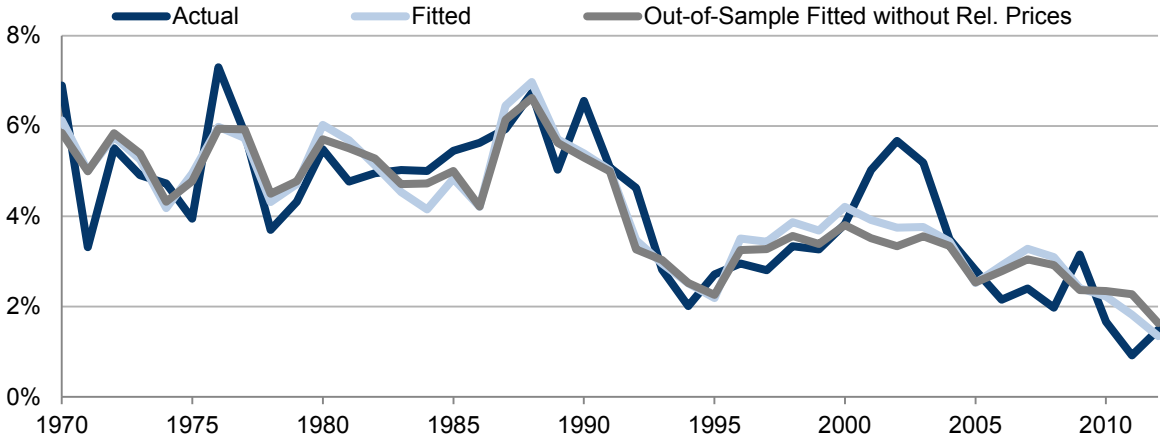
	(1)	(2)	(3)	(4)	(5)
GDP Growth	.16	.09	.12	.11	.12*
	(.10)	(.09)	(.08)	(.07)	(.07)
GDP Growth$_{t-1}$	.16	.10	.09	.09	.12*
	(.11)	(.09)	(.08)	(.08)	(.07)
GDP Growth$_{t-2}$	.16	.09	.09	.09	.10
	(.11)	(.09)	(.08)	(.08)	(.07)
GDP Growth$_{t-3}$	.21**	.14	.14*	.14*	.13**
	(.11)	(.09)	(.08)	(.08)	(.07)
GDP Growth$_{t-4}$	.39**	.33**	.33**	.33**	.31**
	(.11)	(.09)	(.08)	(.08)	(.07)
GDP Growth$_{t-5}$	.12	.05	.05	.05	.05
	(.11)	(.09)	(.08)	(.08)	(.07)
Post-1991			-.019**	-.018**	-.014**
			(.006)	(.003)	(.003)
Year		-.0006**	0.00006		
		(.0001)	(.0002)		
Rel. Med. Prices					0.24**
					(.09)
Constant	.018**	1.2**	-0.09	.034**	.028**
	(.005)	(.28)	(.46)	(.005)	(.005)
Rsq adj	.36	.57	.67	.68	.73
Sum GDP Coeff	1.2	.8	.82	.81	.83

Figure 7 shows the actual (the dark blue line) and predicted (the light blue line) values from the regression in column 4—the most parsimonious regression that includes just GDP and a post-1991 dummy. The regression fits quite well and explains much of the decline in health spending growth in recent years. Although health spending growth since 2006 is, on average, slightly below the regression's prediction, spending growth in the preceding five years, from about 2000 to 2005, was a bit above the model's prediction.[11] Chandra, Holmes, and Skinner (2013) question the validity of this reduced-form macroeconomic model of health spending, because it misses all the complexities discussed above and aggregates spending by different payers with very different likely responses to changes in GDP. I test the robustness of this regression in two ways. First, I run the regression from 1970 to 2000, and then use those coefficients to predict health growth from 2001 to 2012. As shown by the gray line in Figure 7, the out-of-sample predictions look very similar to the in-sample

[11] Cutler and Sahni (2013) find that the recession accounted for only about 1/3 of the slowdown in health spending since 2002, whereas I find that the pattern of GDP growth can explain about 2/3 of the slowdown. Part of this difference may reflect the choice of counterfactual, and part reflects a different specification of the timing of the effects of GDP growth on spending. More importantly, as can be seen in Figure 7 the rapid spending growth from 2000 to 2003 appears to the anomaly, and may reflect, at least in part, some loosening of the tight restrictions on federal provider payments enacted in the BBA of 1997 (Hartman et al 2006).

predictions. The relationship between GDP growth and health spending during the past 12 years is almost identical to that observed over the previous 30 years.

Figure 7: Predicted and Actual Health Spending Growth



Source: Author's calculations

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My second robustness check uses the CMS data on health spending by state from 1991 to 2009. By including state and year dummies, I ensure that all the variation in these regressions is coming from income shocks that are uncorrelated with national trends. The results of this regression are presented in column 4 of Table 2. (Columns 1 through 3 show the results without the full set of fixed effects.) It shows the same basic pattern as the regressions using national data—income does matter for health spending, but the response occurs only gradually over a few years. The coefficients on state personal income are smaller than those from the national regressions, and the effect is complete in three years, but this is not surprising. Some of the channels through which income shocks will affect spending are likely to be more national in nature—for example, multi-state firms may not adjust their health insurance policies on a state-by-state basis, but may respond to aggregate economic conditions. Similarly, part of the health spending response to national economic shocks may reflect endogenous responses in federal Medicare and Medicaid policies, and this channel will not be operational for state-level income shocks.

These regressions provide some insight into the dynamics and causes of health spending growth. First, they show that the slowdown in health spending growth observed since 2002 is largely the result of the two recessions that occurred in the last decade, rather than representing a new innovation that needs to be explained. Second, they show that changes in GDP do translate into changes in health spending, but the effect takes place over a number of years. In my parsimonious regression, I find an income elasticity of about .8 over 5 years. On the one hand, the timing is surprisingly slow—it does not seem likely that consumers would decide to cut back on health spending four years after they experienced a decline in income. On the other hand, the timing is surprisingly fast. As I noted above, estimates of the income elasticity of demand for health care from cross-sectional studies are much lower than those gleaned from cross-country or time-series studies and many researchers have attributed the difference to the responsiveness to income changes of both technology adoption and the structure of insurance.[12] One might have thought that such responses would be quite sluggish—taking decades, not years.

[12] Estimates of cross-sectional income elasticities range from 0 to .4, whereas national time-series estimates are around 1 and cross-country estimates around 1.2 (Follette and Sheiner 2005).

Table 2
State-level Regressions of Per Capita Health Spending on Personal Income
1991-2009

	(1)	(2)	(3)	(4)
Income Growth	.07**	.08**	.09**	.08**
	(.03)	(.03)	(.03)	(.03)
Income Growth$_{t-1}$	.10**	.13**	.07**	.07**
	(.03)	(.03)	(.03)	(.03)
Income Growth$_{t-2}$	.18**	.20**	.08**	.09**
	(.03)	(.03)	(.04)	(.03)
Income Growth$_{t-3}$	.23**	.25**	.06	.06*
	(.03)	(.03)	(.03)	(.03)
Income Growth$_{t-4}$	.18**	.20**	-.05	-.06
	(.03)	(.03)	(.04)	(.04)
Income Growth$_{t-5}$	.14**	.16**	.03	.02
	(.03)	(.03)	(.04)	(.04)
Constant	.14**	.04**	.044**	.07**
	(.03)	(.005)	(.003)	(.004)
State Dummies	No	Yes	No	Yes
Year Dummies	No	No	Yes	Yes
Rsq adj	.2	.26	.4	.46

Decomposing health spending growth into its major components (hospitals, physicians and other professionals, prescription drugs, and long-term care, including both nursing homes and home health) sheds a bit of light on the question of timing. As shown in Table 3, changes in GDP growth don't translate into increased consumption of hospital services until three to five years later. Spending on physicians and prescription drugs, which have larger out-of-pocket components, responds to both current and lagged GDP, whereas long-term care is completely unaffected by near-term economic conditions. The fifth column of the table explores the effects of GDP growth on employer-provided insurance premiums.[13] Changes in the growth rate of insurance premiums may reflect a number of different factors, including adjustments to out-of-pocket payments that alter the share of health services that are insured, changes in service utilization that show up in insurance premiums with a lag, changes in negotiated payment rates to providers, or changes in the characteristics of the workers who are covered. Regardless of the source of the responsiveness, the regression shows that private insurance premiums respond strongly to changes in GDP, but with quite a long lag.

[13]I use the CMS estimate of private insurance premium per enrollee from the NHEA tables.

Table 3
Regressions of Health Spending by Service, 1970-2012

	Hospitals	Physicians and Other Professionals	Prescription Drugs	Long-Term Care	Private Insurance Premiums
GDP Growth	-.20*	.29*	.81**	-0.03	0.12
	(0.11)	(0.15)	(0.34)	(0.21)	(0.22)
GDP Growth$_{t-1}$	-0.09	0.19	0.51	-0.04	-0.23
	(0.12)	(0.16)	(0.35)	(0.22)	(0.24)
GDP Growth$_{t-2}$	0.05	-0.04	0.54	-0.03	0.34
	(0.12)	(0.16)	(0.35)	(0.22)	(0.24)
GDP Growth$_{t-3}$	0.12	0.07	.73**	-0.14	0.16
	(0.12)	(0.16)	(0.35)	(0.22)	(0.26)
GDP Growth$_{t-4}$	.29**	.43**	0.44	0.02	.86**
	(0.12)	(0.17)	(0.37)	(0.22)	(0.29)
GDP Growth$_{t-5}$	0.19	-0.25	0.26	0.21	.79**
	(0.12)	(0.16)	(0.36)	(0.22)	(0.28)
Post-1991	-.02**	-.03**	.04**	-.039**	-.03**
	(0.005)	(0.006)	(0.01)	(0.008)	(0.01)
Constant	.042**	0.047	-.04*	.070**	.03*
	(0.005)	(0.01)	(0.02)	(0.01)	(0.016)
Rsq adj	0.55	0.5	0.24	0.32	0.78

Medicare, Medicaid, and Private Health Spending

An important question for projections of future health spending growth is whether national health spending is best viewed in the aggregate, or whether Medicare and other health care should be considered separately.[14] Table 4 decomposes spending by payer, where Medicare spending is Medicare financed spending from the NHEA plus an estimate of out-of-pocket payments by Medicare beneficiaries, divided by the number of Medicare enrollees; non-Medicare is all other spending, divided by the population not enrolled in Medicare.[15] I restrict the analysis to hospital, physician, and other professional services. These are services that are used by both the nonelderly and the elderly, for which Medicare has always paid (unlike prescription drugs) and for which I have good data on out-of-pocket payments for fee-for-service Medicare beneficiaries. I also include a measure of relative medical price inflation. For Medicare, I use a weighted average of the payment updates to hospitals

[14] I don't separate out Medicaid expenditures because the age distribution of Medicaid enrollment changes over time, making it hard to think about growth rates per beneficiary.

[15] I use the following method to decompose NHEA spending into spending by type of insurance coverage. For Medicare, I add Medicare expenditures from the NHEA to CMS estimates of out-of-pocket payments by fee-for-service Medicare beneficiaries for physician and hospital services, assuming that Medicare managed care beneficiaries have no out of pocket liabilities. (This assumption matters little as the results are unchanged if I instead assume that managed care enrollees have the same out of pocket costs as fee-for-service beneficiaries.) I assume that Medicaid and CHIP enrollees have no out of pocket costs. I subtract the assumed Medicare out of pocket expenditures from total private spending to get an estimate of private spending on behalf of uninsured and privately insured beneficiaries. Finally, I divide Medicare spending by the number of enrollees.

and physicians, with the weights based on the share of spending; for non-Medicare, I use the BEA's deflator for personal health consumption.[16]

The health spending of Medicare and Medicaid beneficiaries responds quite differently to changes in GDP than the spending of those without coverage from either program. As shown in the first two lines of Table 4, which run regressions over the entire 1970-2012 period, Medicare spending growth appears to be negatively correlated with GDP growth. Spending growth for those without Medicare (who include both the privately insured, those on Medicaid, and the uninsured) is positively correlated to GDP growth.

Table 4
Regressions of Hospital, Physicians and Other Professionals by Payer[a]

	Current GDP	Sum of Coefficients on Lag 1-Lag 5 of GDP[a]	Post-1991	Relative Price*	R-squared	Time Period
Medicare	-.31**	0.07	-.034**	.008**	0.32	1970-2012
Non-Medicare	0.11	.87**	-.019**	0.0008	0.48	1970-2012
Medicare	-.70**	-1.7**	-.027	.003	0.36	1970-2000
Non-Medicare	.3**	1.4**	-.025**	0.002	0.67	1970-2000

[a] Medicare Beneficiary Out of Pocket Payments included in Medicare and Excluded from Private

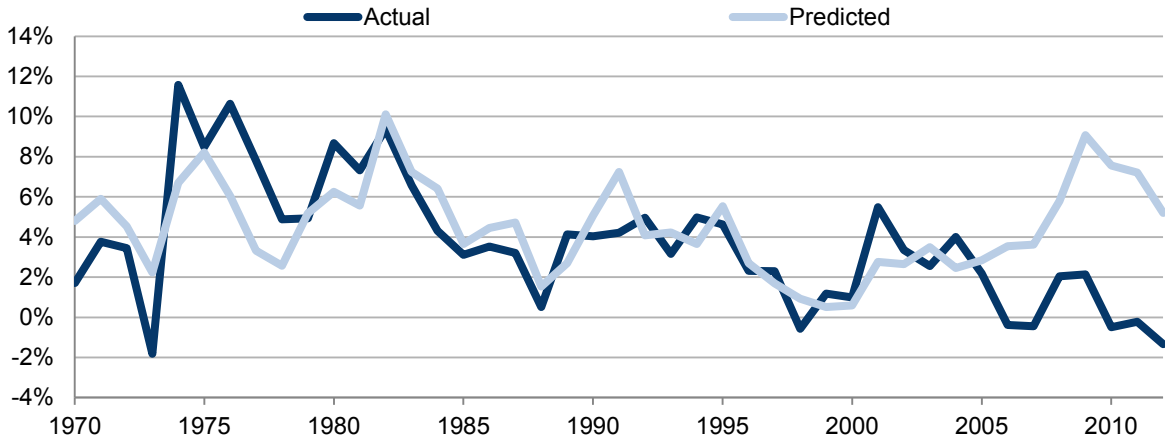
[b] Stars on coefficient cums indicate whether sums are significantly different from zero.

Unlike the NHE regressions, however, the coefficients from regressions that exclude data from 2001 on, shown in the bottom two rows, look quite different. GDP growth has much larger positive effects for non-Medicare, and much larger negative effects for Medicare. The implication, which is seen clearly in Figures 8 and 9, is that the regressions do not do a good job of explaining the recent slowdowns in Medicare and non-Medicare spending—non-Medicare spending is higher than predicted, and Medicare spending is lower.[17]

[16] CMS's "Expanded and Supplementary Tables" which are published on the web alongside the Trustees Report, include this information for1984 on. I gathered information for earlier years from various Trustee Reports. Before 1977, most Medicare providers were paid on the basis of usual and customary payments, and so I just use the BEA health price index for this time period.

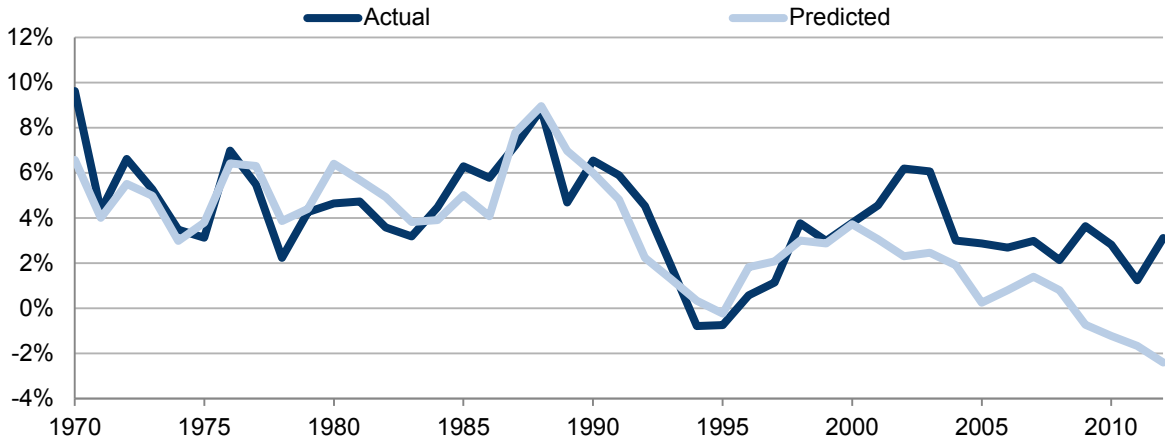
[17] When restricted to just hospital and physician spending, the national regressions still do a good job at predicting the recent slowdown.

Figure 8: Predicted and Actual Medicare Spending Growth



Source: Author's calculations

Figure 9: Predicted and Actual Non-Medicare Spending Growth

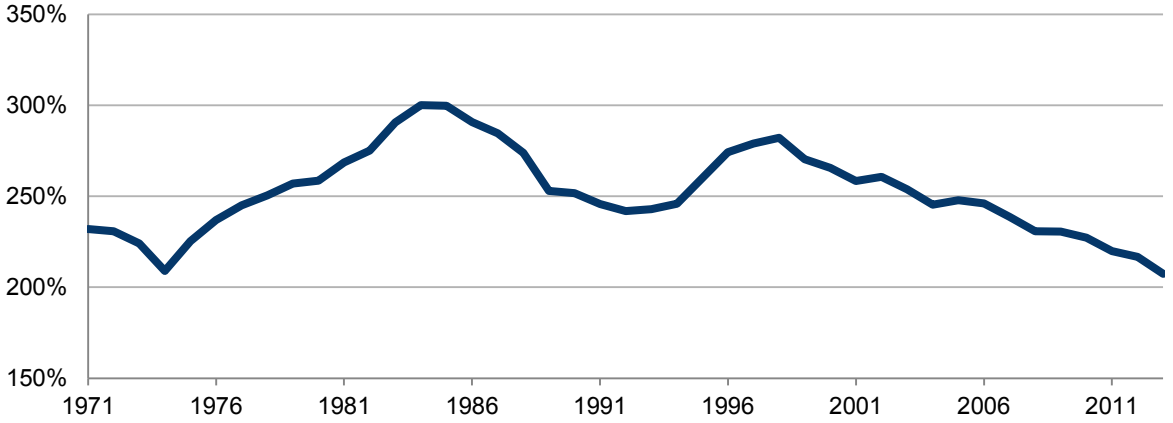


Source: Author's calculations

It may be that the "right" way to think about health spending is in the aggregate, with the split between Medicare and non-Medicare varying over time depending on factors such as changes in provider and insurer negotiating power. In the past, spending on Medicare and non-Medicare has tended to move together over long time periods. Spending may move together over the long run because of technology spillovers between private and public spending, or because Medicare (or private) payment policies adjust whenever Medicare spending moves too far out-of-line with private spending. As shown in Figure 10, the ratio of Medicare to private (hospital and physician) spending per beneficiary has experienced periods of both widening and narrowing, and these have tended to be reversed over time. However, the figure also shows that the trend has been on a downward trajectory since 1997, a finding that is consistent with the time trend noted above (which found a negative trend even after controlling for Medicare's hospital and physician updates).[18] It is important to remember, however, that these data exclude spending on everything but hospitals, physicians, and other professionals. In particular, the introduction of Medicare Part D had the opposite effect: it boosted Medicare spending per beneficiary relative to spending on non-Medicare beneficiaries.

[18] A recent paper by Levine and Buntin (2013) argues that the recent slowdown in Medicare spending is hard to explain by economic or payment policy factors, a finding consistent with a time trend.

Figure 10: Ratio of Medicare per Beneficiary Spending to Private per Beneficiary Spending



Source: Author's calculations based on CMS National Health Expenditures

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CONCLUSION

The relationship between GDP growth and national health spending appears to be relatively robust. It suggests that the recent decline in health spending is the result of the poor economy experienced in the 2000s, rather than to any permanent change in health spending growth. But the econometrics cannot explain the decline in Medicare spending growth, which has been even larger than the decline in national health spending overall. This suggests that we still don't fully understand why spending growth has declined so much.

One fact to keep in mind is that the slowdown occurred during a decade of very slow economic growth *and* very low inflation (which made it harder for firms to pass on health insurance costs to their employees and may have required larger adjustments than usual), a major health reform that was accompanied by much confusion and fear, and a huge run-up in budget deficits that intensified attention on the need for future spending cuts. Given these unusual times it is premature to either declare a turning point in health spending growth or to decide that nothing has changed. There remains much uncertainty about the likely trajectory of future health spending.

Thus, we are left with the same set of unanswered questions that have been plaguing forecasters for decades: when and how will excess cost growth slow? It is clear that it is the *combination* of technological innovation and a continued willingness to pay for that technology that has allowed health spending to rise faster than income for so long. For example, without the dramatic decline in the share of health expenditures paid out-of-pocket, many Americans would simply not have been able to afford the new technologies when they became ill. It is inevitable that this willingness to pay will diminish at some point, but we have very little ability to predict when that will be.

This uncertainty presents a dilemma for budget forecasters. The current convention is to assume that health spending slows gradually over time. For example, CBO assumes that excess cost growth in private health insurance is eliminated gradually over 75 years. This seems to be a reasonable convention, but it is just that—a convention, not a projection. The 75-year time frame was adopted because this is the time period over which the Social Security and Medicare Trustees do their projections. One can imagine numerous scenarios in which spending slows much faster—for example, if the recent attention to budget deficits persists and leads to continued legislative measures to restrain spending—as well as scenarios in which it rises much more quickly, at least for a while—

for example, if the ACA's insurance expansions spur more technological innovation than expected. A key question for both economic researchers and policymakers is how best to deal with the inescapable uncertainty of long-run budget projections.

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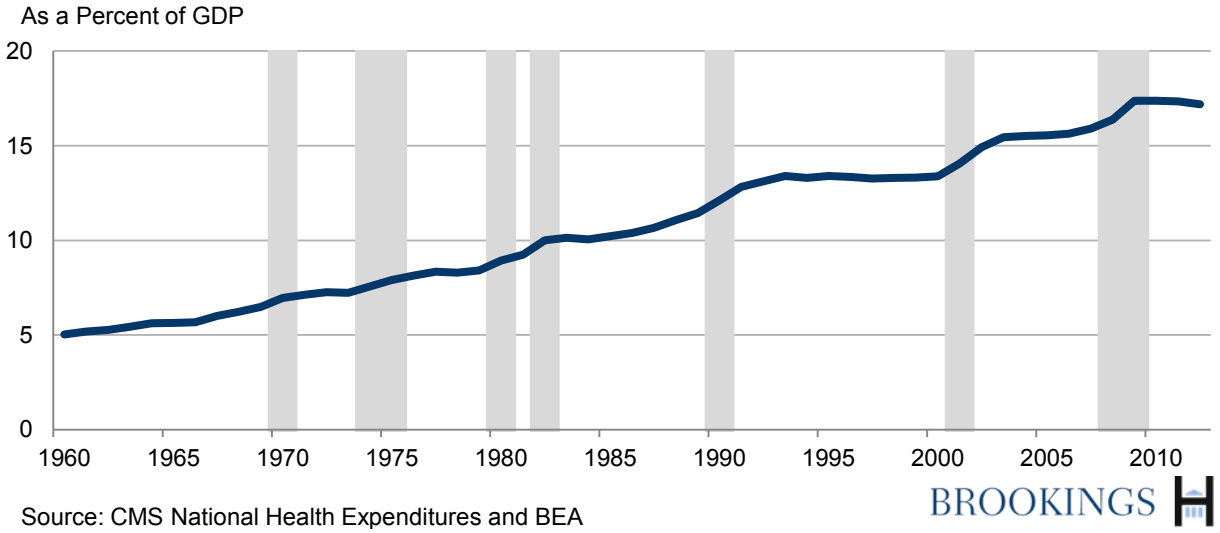
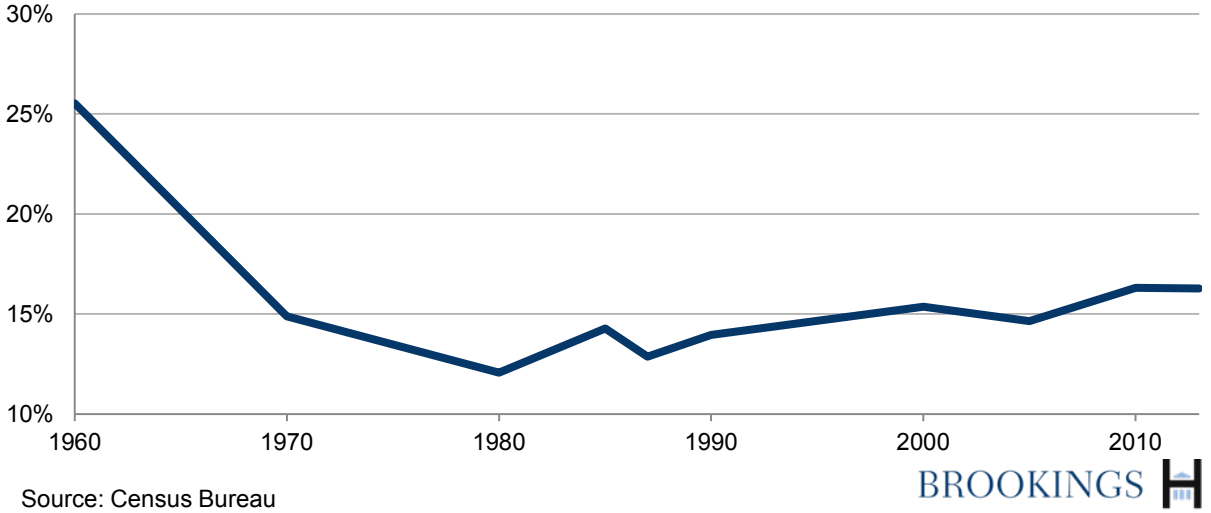
APPENDIX

Figure A1: Share of National Health Expenditures



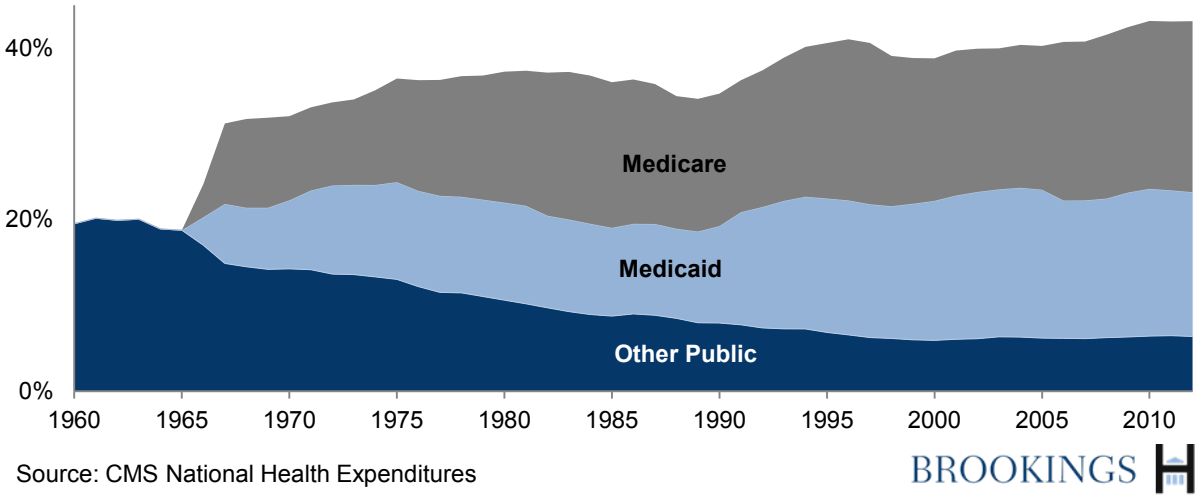
Source: CMS National Health Expenditures and BEA

Figure A2: Share of Population Uninsured



Source: Census Bureau

Figure A3: Public Share of Health Spending



Source: CMS National Health Expenditures

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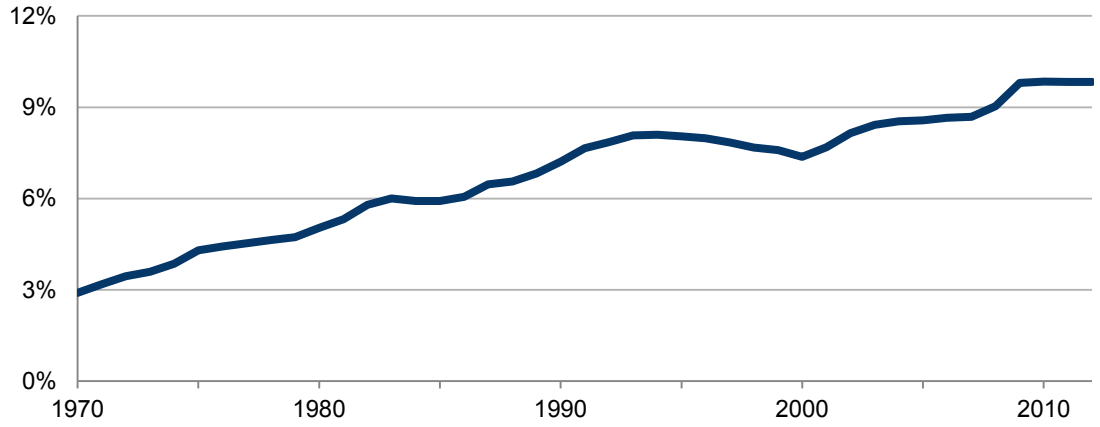
Figure A4: Health Industry Share of Compensation



Source: BEA

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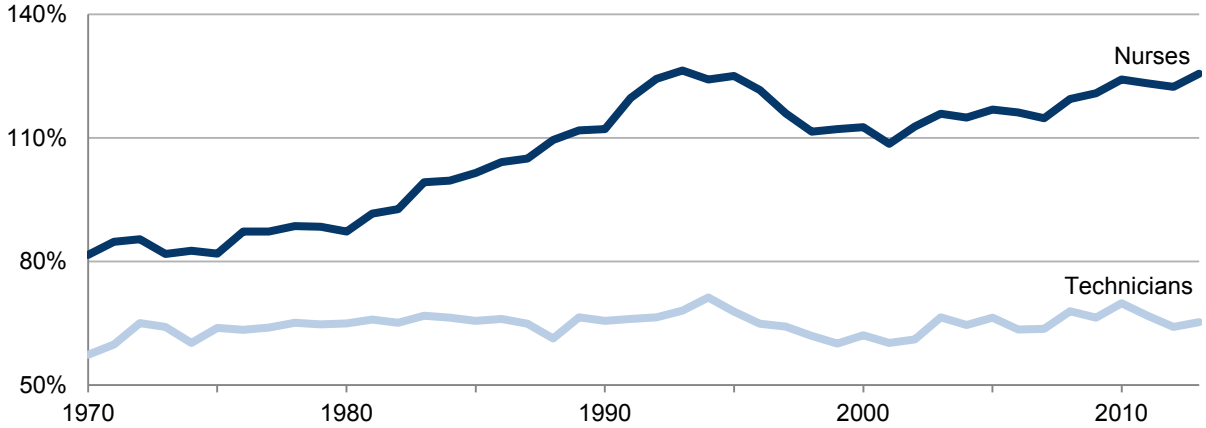
Figure A5: Mean Compensation of Health Workers Relative to All Workers



Source: BLS

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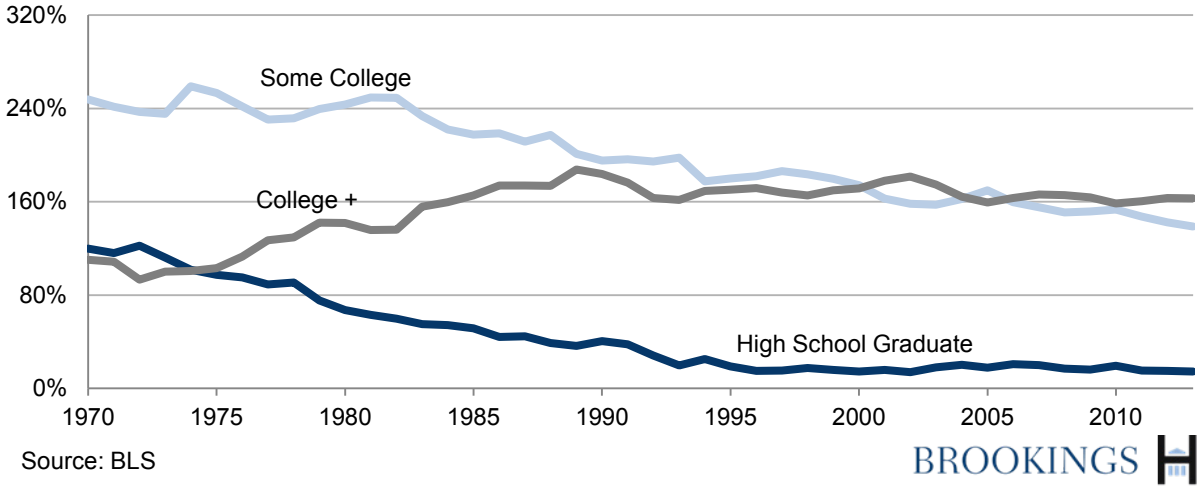
Figure A6: Education of Nurses

Relative to General Labor Force



Source: BLS

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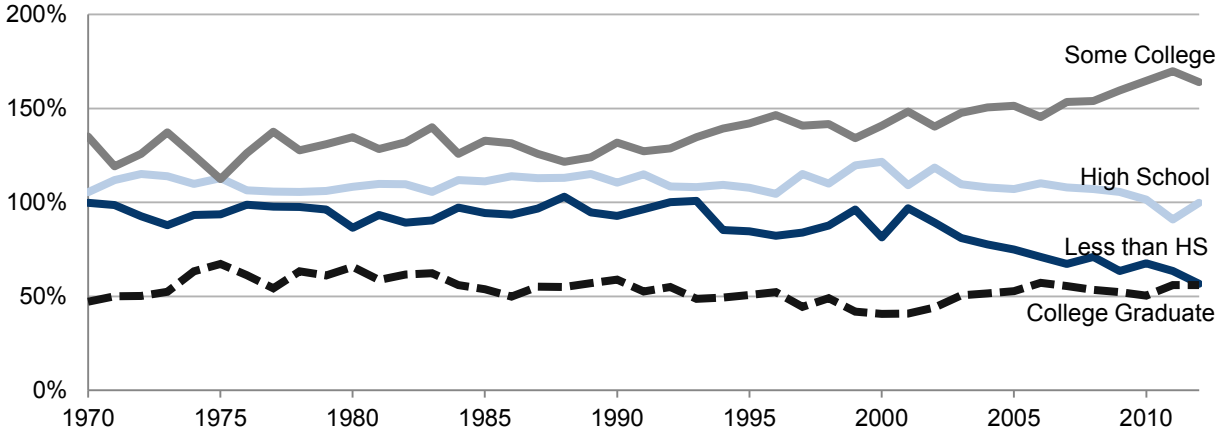
Figure A7: Relative Education of Technicians



Source: BLS

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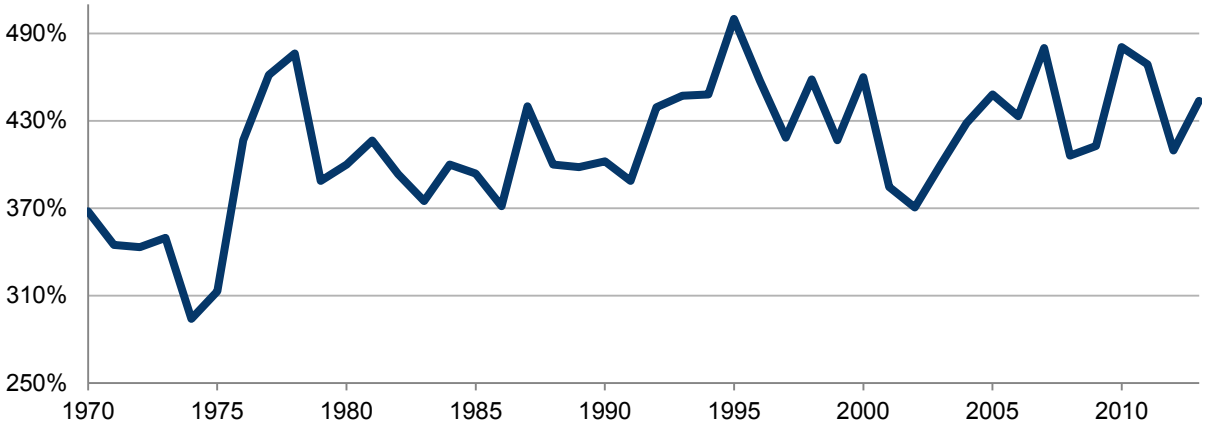
Figure A8: Median Physician Compensation

Relative to all Workers



Source: BLS

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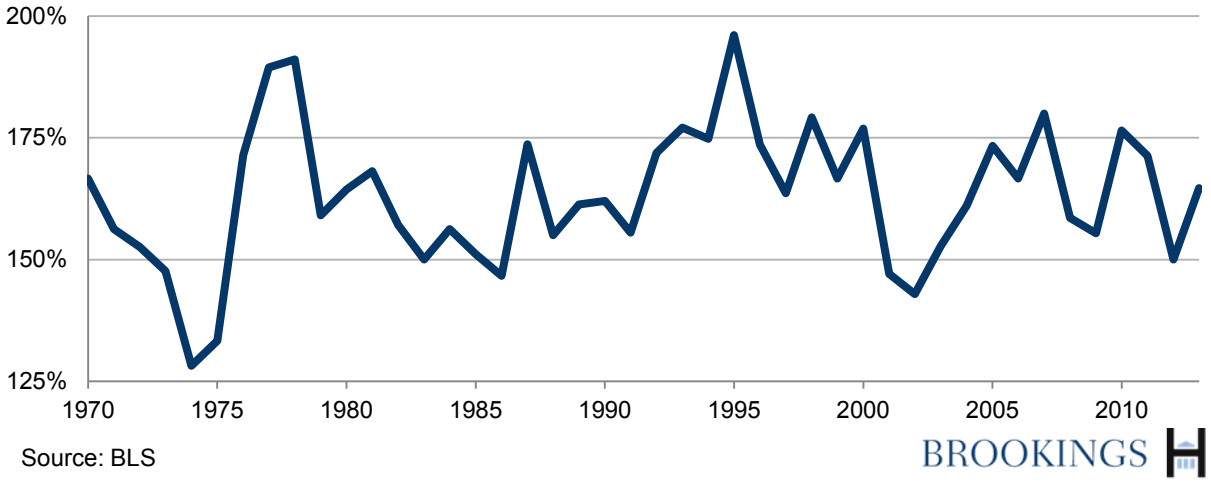
Figure A9: Median Physician Compensation

Relative to 90th percentile All Workers



Source: BLS

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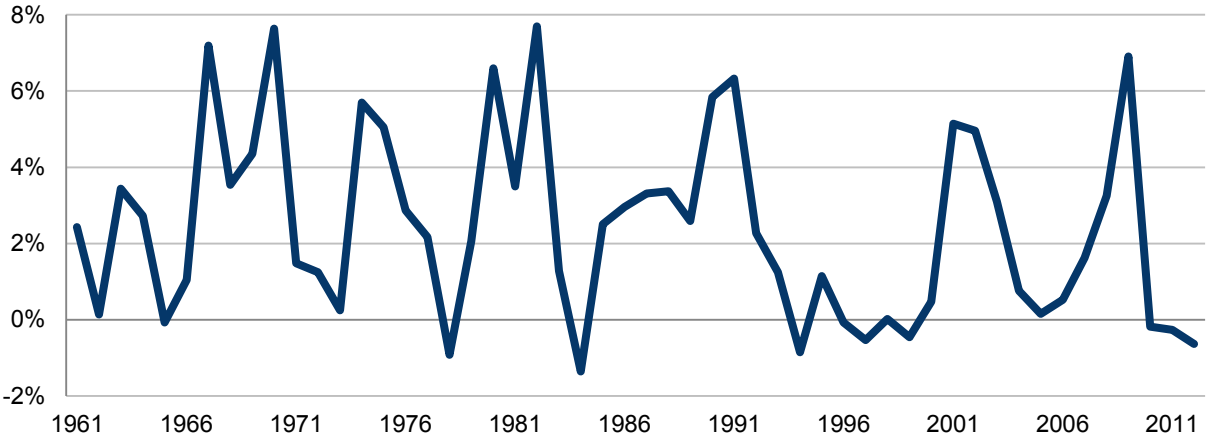
Figure A10: Excess Cost Growth



Source: CMS National Health Expenditures and BEA

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