Hutchins Center
on Fiscal & Monetary Policy
at BROOKINGS

Working Paper #4 July 2014

Perspectives on Health Care Spending Growth

By Louise Sheiner, Senior Fellow, Brookings Institution

The evolution of health care spending has important implications for many aspects of our economy. As highlighted by this conference, 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, as I hope to show in this background paper, 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.[1] 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.

Accounting for Health Cost Growth

As shown in Figure 1, the share of health spending in GDP has increased sharply over time, from 5 percent of GDP in 1960 to over 17 percent today. 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 Rank Health Insurance Experiment.

[1] 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).

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.[2] 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 2, 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.[3]

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 Figure 3. Second, both public and private health insurance have become more comprehensive over time: deductibles, coinsurance, and catastrophic limits have not keep 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 figures 4A and 4B. Figure 4A shows out-of-pocket spending over time as a share of GDP, rather than 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 as shown in figure 4B, the public share of health financing has also increased

[2] 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.

[3] 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 .

sharply. That figure shows that 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.

Thus, there appears to be a fairly large endogenous response to changes in health care spending. As spending rise 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 plan (see Ryu et al (2013)) in recent years, suggesting that the long decline in cost sharing may be abating. But the implementation of the 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[4]

A second factor that some analysts point to in explaining the rise in health spending is relative medical price inflation. As shown in Figure 5, 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.

Labor services are by far the largest input to the production of health care. Figure 6 shows the share of total compensation in the economy accounted for by the health care industry, using data on employment and compensation by industry from the National Income Product Accounts.[5] Not surprisingly, the share of total compensation accounted for by the health care industry has risen about in line with the share of health in GDP; 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.

But what has caused this rise? A rise in employment or a rise in compensation per employee? Figure 7 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.[6] 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

[4] This section draws heavily from Sabelhaus (2009).
[5] 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.
[6] 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.

net, with mean compensation per hour in health rising 3.4 percent per year on average, relative to 3.6 percent overall.

The rise in relative compensation in the 20 years following the introduction of Medicare and Medicaid **could** potentially account for some of health's care 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.[7]

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 it, 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. [8]

To examine this question, I use pooled cross-sections of the March Current Population Surveys, 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.[9] 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.

Figure 8 shows the relative compensation of nurses and technicians.[10] Compensation of technicians changed little over time, but nurse compensation rose markedly between 1970 and 1990, from about 80 percent of average earnings to over 120 percent. Why did nurse compensation rise so much? One likely reason is changes in the quality of nurses. As shown in Figure 9, the education of nurses increased sharply over that time period, both in absolute terms (top panel) and relative to the workforce as a whole(bottom panel). In 1970, for example, 45 percent of nurses had only a high school degree; by 1992, only about 5 percent of nurses had. In contrast, the education of technicians (Figure 10) changed little over this period.

Finally, Figures 11 and 12 examine the relative earnings of physicians. The top panel shows 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

[7] The effect of an increase in relative prices depends on the price elasticity of demand.

[8]. 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.

[9] The remaining occupations are therapists (including mental health professionals, occupational and speech therapists, etc.) and managers.

[10] In 1971, nurses accounted for 35 percent of employment, technicians for 40 percent, physicians 10 percent, and the remainder split equally between management and therapists.

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.

The large increase in the compensation and education of nurses in the 25 year 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 improving 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 are 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 13 plots the annual growth in real health spending per capita, defined as the growth rate of per capita 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, as shown in figure 14, 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. Indeed, the negative correlation between GDP growth and excess cost growth has consistently been very strong and predictable (Figure 15).

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 post91 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.

Figure 16 shows the actual (the blue line) and predicted (the red 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]

[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 counterfactual used , and part reflects a different specification of the

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 1999, and then use those coefficients to predict health growth from 2000 to 2012. The green line shows these out-of-sample predictions. Again, the fit is quite good, but shows a bit less of a deceleration in growth from 2009 to 2012. Figure 17 shows the same exercise for the regression in column (5), the one that adds a measure of relative medical price inflation. With these regressions, the out-of-sample predictions are virtually identical to the in-sample predictions, suggesting that the recent period has been characterized by low medical prices that are not wholly explained by GDP growth, and, once this is taken into account, the relationship between GDP growth and health spending during the past 12 years is virtually identical to that observed over the previous 30 years.

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.

Decomposing health spending growth into its major components (hospital, physician and other professionals, prescription drugs, and long-term care, including both nursing home 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

---

timing of the effects of GDP growth on spending. More importantly, as can be seen in Figure 16, 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.))

[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).

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.

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, Medicaid, and privately-financed health care should be considered separately. 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, Medicaid is NHEA Medicaid per Medicaid enrollee, and private is NHEA services financed by private insurance plus an estimate of out of pocket payments by non-Medicare/Medicaid beneficiaries, divided by an estimate of the non-Medicare nonMedicaid population.[14] I restrict the analysis to hospital, physician, and other professional services. These are services that are used by both the nonelderly and the elderly, 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 and physicians, with the weights based on the share of spending; for Medicaid and non-Medicaid/non-Medicare, I use the BEA's deflator for personal health consumption.[15]

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 Table 4, Medicaid spending per beneficiary rises with GDP, but only with long lags. Medicare spending growth is negatively correlated with GDP in the short run, but positively related over the long run. Spending growth for those without either Medicare or Medicaid (who include both the privately insured and the uninsured) is strongly positively related to both current GDP and GDP lagged up to 4 years, but lags beyond four years are not significant Furthermore, when the data are decomposed into

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

[14] These adjustments are necessary if one is to view the resulting spending per person as reflecting aspects of Medicare, Medicaid, or private payer policies. 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 NHEA Medicaid+CHIP and Medicare spending by the number of enrollees in each respective program. To determine the population that has neither Medicare nor Medicaid, I assume that all aged Medicaid beneficiaries have Medicare and that ½ of the disabled Medicaid beneficiaries are also covered by Medicare.

[15] 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.

these categories and divided by estimates of beneficiaries (rather than total population), there are significant and opposing time trends, with Medicare growth declining over time, and non-Medicare growth increasing.[16]

These disparate responses to changes in GDP are consistent with the view that Medicare spending and non-Medicare spending may not move together in the short run (indeed, they sometimes appear to move in opposite directions), but tend to swing back together over longer periods of time. 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 18, 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.[17]) 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.

Conclusion

The debate about the reliability of the reduced form macroeconomic regressions is really a debate about the timing of the response of health spending to changes in income. Most analysts believe that health spending will rise at least as fast as GDP over the long run, so the question of whether that response takes place over 5 years, 10 years, or longer, is not that important in thinking about the long run trajectory of health spending. Even if one rejects these regressions, it would be hard to argue that a few years of slower growth should be viewed as a turning point, particularly given that the recent slowdown 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 and may have required larger adjustments than usual), 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 cuts.

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

[16] The time trend for non-Medicare is only significant if the post-1991dummy is included but the Medicare time-trend is significant either way.

[17] 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.

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.

References

Cutler, David and Nikhil Sahni, "If Slow Rate of Health Care Spending Growth Persists, Projections may be Off by $770 Billion." Health Affairs, 32, no.5 (2013): 841-850.

Chandra, Amitabh, Jonathan Holmes, and Jonathan Skinner, "Is This Time Different? The Slowdown in Healthcare Spending", Fall 2013 Brookings Panel on Economic Activity.

Conover, Christopher J. "How private health insurance slashed the uninsured rate of Americans", September 16, 2011. http://www.aei.org/article/health/healthcare-reform/private-insurance/how-private-health-insurance-slashed-the-uninsured-rate-for-americans/

Cutler, David, and Dan Ly, "The (Paper)Work of Medicine: Understanding International Medical Costs" The Journal of Economic Perspectives, Volume 25, Number 2, Spring 2011.

Finkelstein, Amy, "The Aggregate Effects of Health Insurance: Evidence from the Introduction of Medicare", Quarterly Journal of Economics, 2007, Volume 122, Issue 1.

Follette, Glenn and Louise Sheiner. An Examination of Health Spending Growth in the United States: Past Trends and Future Prospects, Fiscal Sustainability: Analytical Developments and Emerging Policy Issues vol. Apr. Perugia: Banca d'Italia. 2008.

Getzen, TE. Forecasting health expenditures: short, medium, and long (long) term. J. Health Care Financ. 2000;26(3):56-72.

Hartman Micah, Cynthia Smith, M.A., Stephen Heffler, M.B.A., and Mark Freeland, , "Monitoring Health Spending Increases: Incremental Budget Analyses Reveal Challenging Tradeoffs" Health Care Financing Reivew/Fall 2006/Volume 28, Number 1.

Holohan, John and Stacey McMorrow, "Is the Recent Health Care Spending Growth Slowdown Sustainable Over the Long Term?"Health Affairs Blog. May 7th 2013. http://healthaffairs.org/blog/2013/05/07/is-the-recent-health-care-spending-growth-slowdown-sustainable-over-the-long-term/

Roehrig, Charles, "Further Thoughts on the Recession and Health Spending," Health Affairs Blog, May 7th 2013, http://healthaffairs.org/blog/2013/05/07/further-thoughts-on-the-recession-and-health-spending/.

Ryu, Alexander, Teresa B. Givson, M. Richard McKellar and Michael E. Chernew, "The Slowdown in Health Care Spending in 2009-11 Reflected Factors Other Than the Weak Economy and Thus May Persist." Health Affairs, 32, no.5 (2013): 835-840.

Levine, Michael, and Melinda Buntin, 2013. "Why Has Growth in Spending for Fee-for-Service

Medicare Slowed?" Congressional Budget Office Working Paper 2013-16, August.

Newhouse, Joseph. 1992. "Medical Care Costs: How Much Welfare Loss? Jounal of Economic Perspectives, 6(3) Summer.

Newhouse, Joseph. 1993. Free for All? Lessons from the Rand Health Insurance Experiment. Cambridge, MA: Harvard University Press.

Sabelhaus, John, "Accounting for U.S. Health Cost Growth", unpublished working paper, University of Maryland Department of Economics, April 2009.

Smith, Sheila, Joseph Newhouse and Mark Freeland, "Income, Insurance, and Technology: Why Does Health Spending Outpace Economic Growth", Health Affairs, September/October 2009.