

Pauly, Mark V.; Saxena, Anand

**Working Paper**

## Health employment, medical spending, and long term health reform

CESifo Working Paper, No. 3481

**Provided in Cooperation with:**

Ifo Institute – Leibniz Institute for Economic Research at the University of Munich

*Suggested Citation:* Pauly, Mark V.; Saxena, Anand (2011) : Health employment, medical spending, and long term health reform, CESifo Working Paper, No. 3481, Center for Economic Studies and ifo Institute (CESifo), Munich

This Version is available at:

<https://hdl.handle.net/10419/46305>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

Health Employment, Medical Spending,  
and Long Term Health Reform

Mark V. Pauly  
Anand Saxena

CESIFO WORKING PAPER NO. 3481

CATEGORY 1: PUBLIC FINANCE

MAY 2011

PRESENTED AT CESIFO AREA CONFERENCE ON PUBLIC SECTOR ECONOMICS, APRIL 2011

*An electronic version of the paper may be downloaded*

- *from the SSRN website:* [www.SSRN.com](http://www.SSRN.com)
- *from the RePEc website:* [www.RePEc.org](http://www.RePEc.org)
- *from the CESifo website:* [www.CESifo-group.org/wp](http://www.CESifo-group.org/wp)

# Health Employment, Medical Spending, and Long Term Health Reform

## Abstract

This paper explores the relationships between the growth in the medical workforce in an aging society and employment in other sectors of the economy, based on data from the United States since 1985. Employment in medical services grew, but did not displace employment in other sectors uniformly. Instead, regression analysis shows that medical workforce growth produced contemporaneous reductions in relative employment in the manufacturing, construction, and information sectors, while being associated with growth in other services and public administration. Import penetration and productivity growth mattered, but much of the displacement remains even after controlling for these factors.

JEL-Code: I100.

*Mark V. Pauly*  
*Health Care Management Department*  
*The Wharton School*  
*University of Pennsylvania*  
*3641 Locust Walk, Room 208*  
*USA – Philadelphia, PA 19104*  
*pauly@wharton.upenn.edu*

*Anand Saxena*  
*Health Care Management Department*  
*The Wharton School*  
*University of Pennsylvania*  
*3641 Locust Walk*  
*USA – Philadelphia, PA 19104*  
*anand040564@yahoo.com*

This draft: May 20, 2011

Paper Presented at April, 2011, CESifo Area Conference on Public Sector Economics  
Munich, Germany.

## **Introduction.**

Rapidly growing medical care spending in the U.S. is a challenge to the success of health reform; the feasibility of providing health insurance to much more of the population seems to require slowing the growth of spending, and has led to the apparently obvious conclusion that slowing the growth of that spending is highly desirable if not politically necessary. Similar sentiments about the desirability of “bending the cost curve” are common in other countries as well. But why is growth in spending in one sector of the economy relative to others necessarily a problem?

One answer, as stated by the Council of Economic Advisors, is: “If we do not slow the growth rate of health care spending, we will have to devote a larger and larger share of our labor force and capital stock to health care” (Executive Office of the President, 2009, p. 21), something they find as cause for serious concern. At the same time, with the economy mired in joblessness, sites offering advice on how to get a good and steady job emphasize the desirability of training in the medical area, where jobs exist now and are expected to grow in the future. But if health care jobs grow, so will spending (and, more or less, vice versa). Only very small amounts of the medical goods and services Americans consume are produced in other countries (even when a drug company may have its headquarters overseas), and health care is a moderately labor intensive industry. So what is the correct story: does medical spending growth divert real labor resources away from other more valuable uses into health care, or is health care employment growth, necessarily linked to medical spending growth, the shining exemplar of high tech job creation? Or could both be true?

Other countries face the same issues. In the current depressed global economy, providing good well-paying jobs is a way for economies to recover (and public finances to be improved). But when and if those jobs are in health care rather than in other industries, the appeal seems to be diminished. Why is this so, and should it be this way?

One of the influences on use of medical care and spending growth is the aging of population. Here again this is usually regarded as a problem: medical services for the elderly, and services of other types associated with increased frailty with age, divert resources away from other uses. But they create jobs, especially jobs available to the lower skill workers who represent the most serious structural problem in labor force policy. And the whole point of medical care is to extend life and improve the quality of life—so why is it a problem when it succeeds?

In this paper we will explore how growth in medical spending and employment has affected employment elsewhere in the economy, concentrating on the U.S. economy. We look at the question first at a conceptual level, but then provide some evidence from the U.S. on the relationships between the growth in medical employment, aging of the population, and the rest of the economy—and draw from that some inferences about overall desirability.

This paper therefore investigates the growth of medical employment in the United States since 1985, relative both to employment in other parts of the American economy and to growth in total employment. A key first question is: what other kinds of labor were displaced? Did medical employment growth cut into employment uniformly across all industries, or did it have much different effects on some industries than others? And if the latter, how are we to understand and evaluate this “differential displacement”? Most importantly, what caused what: did employment fall relatively more in industry sector X when medical employment grew *because* medical employment grew, or did other things cause the decline in sector X and health care picked up the slack? That is, were workers pulled in by the health care sector, or were they pushed out of other sectors? We focus on three (not mutually exclusive) explanations: (1) an increase in demand for medical goods and services pulled workers from elsewhere; (2) an increase in productivity elsewhere in the economy pushed workers into medical care;

and (3) an increase in import penetration elsewhere in the economy (primarily in manufacturing) pushed workers out and into health care.

Behind the scenes are two different broad scenarios economists have discussed as ways to understand and evaluate medical spending growth. One is the so-called “cost disease,” attributed to William Baumol (1966). This is a two sector model of the economy, one sector “progressive” with positive productivity growth, the other “non-progressive” with zero growth. Medical care is usually placed in the latter although, as we shall see, the case is not so clear-cut. An implication of Baumol’s model is that those parts of the non-progressive sector which also display low (relative) price elasticity will grow in both spending shares and employment shares, as workers are pushed out of the productive sector into the rest of the economy. In a worst-case scenario, the economy gradually becomes dominated by this sector and measured overall economic growth eventually ceases. The other model recently put forward by Robert Hall and Charles Jones (2007) imagines that rising real income appropriately stimulates the demand for medical care relative to the demand for other industries; improvements in the quality of care further stimulate demand. The growth in demand then presumably pulls workers into the medical care sector (although their model does not disaggregate health care resources). Here the final state is one in which the medical share of spending and employment also rises (though not forever), but in which the high and growing share is not cause for concern but perhaps even a source of pride and improvement as people achieve greater quantity and quality of life. Hall and Jones estimate that the optimal demand-driven share of health spending in the U.S. in 2050 will range from 23 to 45% of GDP, hardly consistent with an obsessive need to bend the health care cost curve.

Both of these explanations need to be filtered through the prism of technological change. Growth in medical employment did not primarily involve using more workers to do more of the same old thing, but

rather new uses of workers to do new things or to do old things in a different way, with the jury still out on whether these uses were all worth it.

Moreover, it is not technological change in health care alone that is at issue. If real incomes per household or worker are to grow, the most likely explanation is a growth in labor productivity. Since medical care is still a relatively small share of the total economy, that means labor productivity had to grow elsewhere in the economy (whether or not it also grew in medical care) for average real income to grow. Such productivity grows as more capital is made available, but historically the major source of growth in real income per worker has been because of technological progress, often linked to human capital growth. In this sense, if spending on medical care (or any other luxury good) is going to rise as real income grows, setting aside international trade and remittances from abroad, it is growing productivity elsewhere in the economy that both increases income and frees up workers to move to these sectors of higher relative growth. In this sense, it is growth in productivity in the rest of the economy that both causes real income growth that stimulates demand and releases resources so that supply can increase to satisfy that demand. Empirical evidence on the income growth explanation for demand growth is the strongest (Hall and Jones, 2007), but with accompanying evidence that faster growth in spending (at least for Medicare) was not coincident with improvements in outcomes (Skinner et al., 2009).

Absent from both of these strands of analysis is any disaggregation of where the resources increasingly consumed in the medical care sector came from. Consideration of their origins may shed light on the question of the value of other outputs (or areas of labor) that were displaced, along with potentially illuminating the more fundamental question of what caused what. This paper provides that disaggregation and analysis.

We will conclude that some measures of both “pull” and “push” appear to matter. This means that, even if any part of the increase in medical employment and the additional services it generated was wasteful, the actual shift is not all health care’s fault; people were pushed out, and health care (along with other services) was the next best place to go. Since we want full employment with a growing workforce, that implies that we want workers to be employed at producing something (and pushing up the “cost” of spending in that industry); the macroeconomic policy question is not one of aggregate “cost containment,” but rather one of which kind of cost and employment we want to grow. Moreover, we will argue that growth in productivity in other parts of the American economy, especially manufacturing and agriculture, both accommodated and necessitated growth in employment in other sectors of the economy, one of which is health care (but which also includes other services and government). This leads to an even more difficult issue: should the employment pushed out of other industries best go into health care, or is there some more socially valuable destination which unfortunately does not have the same kind of pull? What about population aging? Hard to avoid the aging, but can we (or should we) do anything about the demand? We will only be able to offer a few comments on this.

### **Some basic facts: Faster than what?**

The medical services and products sector has been a major contributor to the growth in employment opportunities in the American economy. Table 1 shows the annual growth rates for employment in health services, in overall employment, and in the labor force for five year intervals for the period 1985-2010. The category “health services” does not include employment in the drug and device industries (they are included in nondurable goods manufacturing), or in the health insurance industry (included in



finance, insurance, and real estate), but the total amount of employment in those subcategories was less than 10% of health services employment in 2008, so will not be included in our main analysis.

**Table 1**  
Growth Rates for Health Services, Overall Employment, and Labor Force, 1985-2010

	1985-1990	1990-1995	1995-2000	2000-2005	2005-2010
Health Services Employment	19.13%	15.48%	7.76%	15.07%	11.42%
Overall Employment	10.87%	5.14%	9.60%	3.53%	-1.88%
Labor Force	8.99%	5.14%	7.77%	4.72%	3.06%

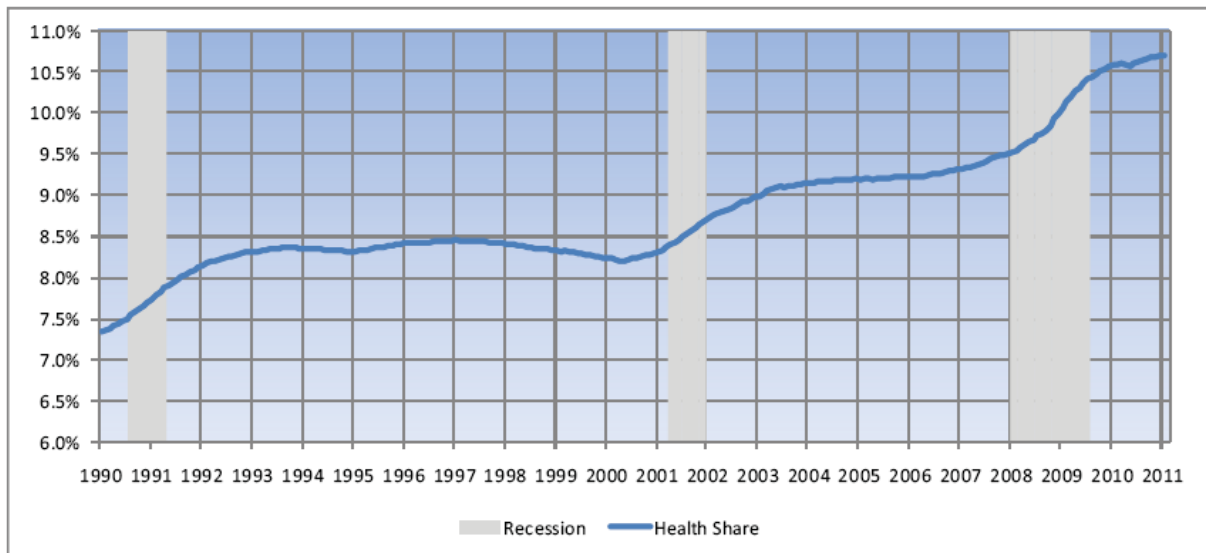
**Data source:** Current Population Survey, Bureau of Labor Statistics.

As shown in Table 1, the growth in health services employment of all types outpaced the growth in total employment or in the labor force for all but one of the five intervals shown; the only exception was the period of high growth in private managed care insurance in the late 1990s, which reduced use of hospital care across all types of insurance for a brief period of time. The extent of differential growth varied over time, however. The relative growth rate was slightly lower for the labor force as a whole than for total employment, hinting at the moderate increase in unemployment over the entire period, but the two benchmarks are very similar.

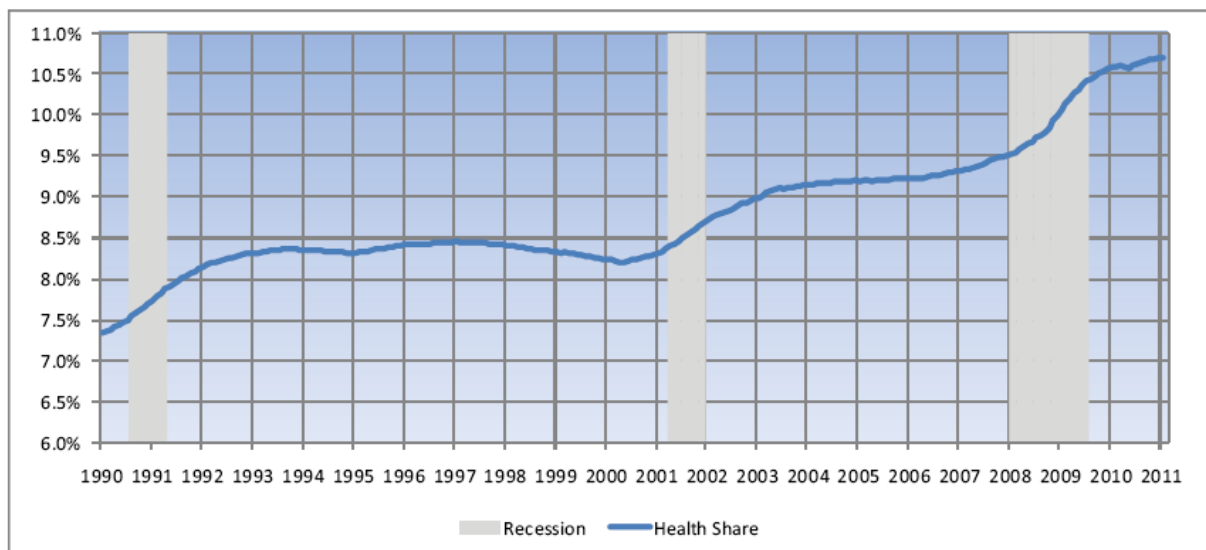
Figure 1 plots the growth in medical employment and Figure 2 shows that growth relative to total employment. One striking result from Figure 2 is that upward shifts in the medical employment share largely coincided with periods of economy-wide recession. In one sense, this is obvious since other employment tends to fall during recession. But apparently the share is permanently ratcheted upward

since the share does not fall when the economy recovers. This suggests, as noted above, that medical care plays an especially crucial role as a source of employment when the overall labor market is weaker.

**Figure 1**  
Twelve-month Percent Change in Health Employment



**Figure 2**  
Health Sector Share of Total Employment



**Source for Figures 1 and 2:** Center for Studying Health Spending, *Health Sector Economic Indicators: Health Market Insights* from the BLS January 2011 Employment Data. ALTARUM INSTITUTE Labor Brief #11-01, p. 4 (Exhibits 7 and 8). [www.altarum.org](http://www.altarum.org), February 9, 2011.

Table 2 contrasts the overall health services growth rate with the two major subcategories of health services employment, hospital and non-hospital. Both medical categories showed positive growth over all time intervals, with the hospital category showing much less rapid growth in the period of high managed care growth in the early 1990s, but there has been a return to a somewhat more comparable rate in recent years as outpatient care and scanning and testing services provided by hospitals have grown more rapidly than services in doctors' offices and clinics.

**Table 2**  
Growth Rates for Health Services, by Hospital and Non-Hospital Employment, 1985-2009

	1985-1990	1990-1995	1995-2000	2000-2005	2005-2009
Hospital Employment	10.56%	6.03%	4.88%	9.94%	9.27%
Non-Hospital Employment	28.18%	24.09%	10.00%	18.88%	12.89%
All Health Services	19.13%	15.48%	7.76%	15.07%	11.42%

**Note:** Hospital employment includes nursing and residential care facilities; non-hospital employment consists entirely of ambulatory health care services.

**Data source:** Current Population Survey, Bureau of Labor Statistics.

Table 3 shows descriptive data on the growth rate of employment in specific selected industries elsewhere in the economy relative to the growth rate of employment in health services. (This is not an exhaustive list of all other sectors; we have selected ones that are either relatively large or which turn

out to be more strongly related to medical employment than those omitted.) We will describe a more precise regression-based analysis below, but, for the present, we note that while other industries vary substantially in their growth rates, there is little obvious correlation between variation in their growth rates and variation in the growth rates of medical employment.

**Table 3**  
Growth Rates of Employment in Other Industry Sectors Relative to Health Services, 1985-2010

	1985-1990	1990-1995	1995-2000	2000-2005	2005-2010	Growth Rate
Health Services	19.13%	15.48%	7.76%	15.07%	11.42%	90%
Other Services	14.49%	9.36%	12.04%	7.17%	5.05%	58%
Public Admin.	12.73%	6.12%	2.77%	6.82%	6.94%	40%
Financial Activities	14.96%	-0.02%	11.91%	8.84%	-8.36%	28%
Transport./Utilities	11.39%	6.47%	11.25%	-0.27%	-3.07%	28%
Trade	10.02%	5.69%	8.25%	7.14%	-7.78%	24%
Construction	10.64%	-0.93%	22.48%	12.75%	-18.93%	23%
Information	3.15%	4.95%	18.27%	-16.19%	-7.44%	-1%
Non-durable Goods Manufacturing	5.37%	-2.23%	-3.81%	-16.93%	-10.58%	-26%
Durable Goods Manufacturing	1.19%	-3.64%	5.26%	-17.46%	-14.94%	-28%

**Data source:** Current Population Survey, Bureau of Labor Statistics.

Finally, Table 4 shows the change in industry-specific employment shares over the cost part of the period. The health services share grew by about a quarter, but it was by no means the only growing sector. Its growth was paralleled by growth in other services and public administration, while there was pronounced shrinkage in the employment shares of manufacturing and “information” (publishing and journalism) sectors.

**Table 4**  
Shares of Total Employment in Selected Industry Sectors, 1995 and 2010

	1995	2010
Services less Health Services	32.35%	36.64%
Wholesale and Retail Trade	14.78%	14.19%
Health Services	9.07%	11.26%
Financial Activities	6.71%	6.72%
Construction	6.49%	6.53%
Durable Goods Manufacturing	9.52%	6.32%
Transportation and Utilities	5.31%	5.13%
Public Administration	4.76%	5.02%
Non-durable Goods Manufacturing	5.93%	3.81%
Information	2.75%	2.26%

**Data source:** Current Population Survey, Bureau of Labor Statistics.

It is worth noting that, even though medical spending outpaced real GDP in almost all of these years, it rarely grew so rapidly as to force other spending to decline in real terms. By extension, it would have been possible for employment everywhere to grow, and just to have medical care absorb much of the

growth in the labor force (largely driven by population growth). Although we will comment below on effects on employment *shares* (the object of CEA concern), we will argue that it is effect on the actual levels of employment that should matter the most.

### Some simple statistical analysis.

To get further insight into what is displaced by growth in health services employment, we used regression analysis to relate the percentage change in employment in each of nine broad sectors in the economy to the percentage change in health services employment and the percentage change in total employment (or, alternatively, change in the total workforce). (The other sectors not analyzed were ones that were small.) We explored the use of lags but found the most parsimonious specification to be one that used current period changes in these measures. The benchmark hypothesis here is that changes in health services employment would be distributed evenly over all the other sectors of the economy. In our specification which calculates the elasticity of employment in each sector with respect to health services employment, that hypothesis would be supported if all elasticities were negative and uniform, equal to the reciprocal of one minus the medical care share. The health care share was about 10% of total employment in most of this period, which means that under a “uniform drawdown” benchmark the elasticities for all other sectors would be (10/9), or about -0.11.

The regression equation takes the form:

$$\ln E_{it} = \alpha + b \ln M_t + c \ln TE_t$$

where  $\ln E_{it}$  is the natural logarithm of employment in industry  $i$  in year  $t$ ,  $\ln M_t$  is the log of medical employment in year  $t$ , and  $\ln TE_t$  is the log of total employment in year  $t$ . The coefficients  $b$  and  $c$  are thus elasticities.

The striking results in Table 5 are quite inconsistent with this benchmark equal-proportions model. While changes in employment in most of the subsectors are closely coupled to changes in health services employment, with statistically significant elasticities of employment in that sector relative to medical employment, the patterns vary substantially. Over the period from 1995 to 2010, growth in health employment significantly displaces employment in the same year in durable goods manufacturing, non-durable goods manufacturing, information, and construction. In contrast, growth in health services employment is significantly and *positively* associated with employment changes in public administration and services employment. It is unrelated to changes in employment in trade, finance, and transportation and utilities.

**Table 5**  
Regression Coefficients, 1987-2008

Industry	Health Services	t	Total Employment	t
Durable Manufacturing	-1.28	-6.0	1.72	4.1
Non-durable Manufacturing	-0.82	-3.2	0.44	0.9
Trade	-0.07	-0.8	1.07	6.5
Transportation/Utilities	-0.10	-1.0	1.1	5.9
Finance	-0.15	-1.4	1.35	6.3
Construction	-0.63	-2.1	2.90	6.9
Public administration	0.41	5.4	0.08	0.5
Other Services	0.34	8.2	0.90	10.9
Information	-0.77	-3.4	1.93	4.4

Note that these coefficients tell us more than whether employment in the sector tends to rise or fall over time as health services employment has grown; they tell us that the size of the change in employment in that sector in a given time period is strongly related to the size of the change in health care employment *in that time period*. Since the growth of health employment though usually positive was far from uniform over time, this relationship is of considerable interest. For example, we know that employment in the rest of the services sector also grew over this time period, but the positive and significant elasticity tells us that the periods of most rapid growth in that sector coincided with periods of rapid growth in medical employment, and periods of slower growth in that sector matched periods of slow growth in health. Similarly, manufacturing employment did not just decline over the period; it declined most rapidly when medical employment grew. One implication is that general economic conditions which enhance consumer demand, like low unemployment and growth in real income, did not have similar effects on health care and manufacturing or information-industry employment.

Employment growth in most sectors is also related to the size of overall employment growth; here the elasticities indicate that employment growth overall, controlling for health services employment offsets, tends to be evenly distributed across most sectors (with the exception of public administration and non-durable goods manufacturing).

#### **Teasing out some causes: A first cut.**

To get a partial understanding of whether the changes in employment in some of the sectors might be caused by something other than “pull” from health care, we added variables to characterize import substitution and productivity change in those sectors where either or both were potentially relevant. We find that sometimes these variables were significant predictors of employment changes.



A direct way to look at the sectoral decomposition of employment changes would be to base it on evidence about differential income and price elasticities across sectors. A given exogenous increase in real income will (relative prices held constant) increase output and therefore employment more in those sectors where the income elasticity of demand is high than in those where it is low. If these shifts then also produce changes in relative prices, price elasticity will come into play. Unfortunately, however, while we have numerous (though conflicting) estimates of the income elasticity of demand for health care, we do not have a similar full set of elasticity estimates for the other components, beyond the intuitive notions that most goods are normal goods but the income elasticity of demand for food and other necessities is likely to be relatively small. So this approach cannot be pursued.

An alternative approach focuses on changes in productivity. The most important one (consistent with our earlier discussion of real income growth) was above-average increases in worker productivity. When we added a measure of productivity growth for the sectors where such a measure was available, we found that it was statistically significant as indicated in Table 5a. The elasticities of changes in employment with regard to medical employment were generally reduced by controlling for productivity growth, especially in manufacturing (where the elasticity for non-durable goods manufacturing went to zero). Since it seems reasonable to assume that productivity growth in manufacturing and construction is unrelated to anything having to do with medical care, it is likely that this “push” out of these jobs is exogenous. What is more puzzling is why medical employment seems targeted to respond by adding contemporaneous jobs, and disproportionately so.

Growth in the share of imports reduced growth in employment in both manufacturing sectors. Some of the offset attributed to health services was thus due to factors other than health care. However, there remained a sizeable and varying pattern of significant employment effects, some reflecting substitution and others complementarity. There is also still a significant offset in the construction sector where

there is almost no import competition. Thus effects on employment running through international trade are part, but only part, of the overall impact of medical employment on employment elsewhere—and the positive relationships to other services and public administration further make this point.

**Table 5a**  
1987-2008

Industry	Health Services	t	Total Employment	t	Product	t	Imports	t
Durable Manufacturing	-.90	-8.5	3.13	13.7	-.004	-3.5	-.94	-2.8
Non-durable Manufacturing	-.29	-1.6	1.55	4.8	-.006	-2.2	-2.04	-1.8
Trade	-.06	-0.6	1.07	5.3	-.0002	-0.0	N/A	N/A

**What does this all mean for mature economies with aging populations?**

With these empirical observations as background, we now consider in more detail possible implications of medical labor offsets for efficient and equitable public policy. Our goal here is exploratory: to identify questions which sharpened empirical methods might in the future address.

The trend of rising relative health care employment is not new, and the trend of rising relative services sector employment is not new. There has been a shift toward higher *spending* shares of health care and services since the mid-1960s; before that time growth in services and health care, employment was offset by low wages (even controlling for worker characteristics) that grew less rapidly than those in the economy as a whole, fewer hours per worker, and higher relative productivity growth for the rest of the

economy. Since then wages have grown more rapidly in services and health care; relative productivity and hours per worker have been less of a factor.

As spending and employment in the U.S. economy shift toward services in general and medical services in particular, can we say anything about the relative value of what is gained and what is lost? As already suggested, there obviously is no convincing evidence that outputs of some industries are intrinsically more valuable than others: a knee replacement relative to a big screen TV, a fast food hamburger relative to a washing machine. It is clear that if, compared to some feasible alternative, there was inefficiency in these growing sectors—either outputs of little value, or production processes of low efficiency—it would improve economic welfare to eliminate such waste. Much of that improvement would not show up in measured GDP, of course, since it values outputs by what they sell for, not by what they are worth. Agnosticism seems called for here as a first approximation.

### **Income effects on demand and productivity growth.**

How might the well known Hall-Jones model of the growth of medical spending (and by implication employment, assuming negligible international trade in health care) be reconciled with a full model of labor force allocation? In the simplest version of this model individuals maximize lifetime utility in “non-health” consumption subject to a resource (income) constraint which is assumed to grow continuously at a given exogenous rate. Health enters because the number of time periods over which an individual can enjoy consumption is limited by mortality; it is entered as a discount factor for lifetime utility.

With growing real income, resource allocation to medical care grows relative to resource allocation to consumption if marginal utility of consumption per se declines relatively rapidly and if the elasticity of the health production function “does not decline too rapidly.” People devote more of their growing real

income to medical care if its marginal effect on their lifetime utility is falling less rapidly than the marginal utility of consumption of other goods. A more elaborate version of the model allows for increasing productivity in the health (survival) production function and for people to get “quality of life” utility from consumption of health care. It also allows for the greater longevity produced by high medical demand to feed back into yet higher demand as a large fraction of the population becomes aged. The result is that the share of spending optimally going to health care can and should increase as income increases over a long period of time. It must eventually stop growing, presumably because the productivity of medical care in increasing survival must eventually be limited by biological limits that constrain people from surviving for more than 100 years or so—but it can grow significantly, and the efficient share in the U.S. according to Hall and Jones may well be much above the current share, given reasonable assumptions about real income growth and the form and growth in health production function.

What consideration of the cross-industry distribution of employment and productivity growth adds to this model is the observation that real income growth is almost surely not exogenous (as Hall and Jones assume) and instead may be affected by the changes in spending and corresponding changes in the allocation of labor to different sectors. Specifically, as medical employment displaces other employment, real income growth will be affected even if there is constant exogenous growth in productivity elsewhere in the economy, precisely because the share of employment in that part of the economy will be shrinking. The question is whether growth in productivity of medical employment can offset this shrinkage—precisely what the Baumol model professes to doubt.

**Aging and medical employment.**

It seems somewhat inconsistent to argue at the same time that the medical care sector is stagnant and that we have an increasing problem of an aging population. While increased life expectancy comes from many causes, surely one of them has been the combination of more effective medical care and more spending on it. David Cutler (2004) and others calculate that overall medical spending growth in the U.S. has yielded improvements in health which, if valued in the usual (conservative) way, are several multiples of the spending. So how does population aging affect medical care spending, and vice versa?

We begin with the first half of this question and initially assume that the “medical care” we are talking about is palliative or quality-of-life improving, but does not affect longevity. Much of the “care” specifically targeted to people once they become elderly (and the more so the older they get) has this property, and it seems obvious a priori that the prospects for improved productivity in custodial and palliative care are intrinsically limited. So let us begin with a simple static life cycle model.

#### **A simple lifetime planning model.**

Consider a population of workers beginning working life. Given their skills and productivity, they can estimate how much they will earn over their working lifetime. Conventional planning models will advise them to borrow so they can consume more than they can earn when young, then build up accumulation by consuming less than earning in middle income years, both to pay off earlier debt and to accumulate capital for the post retirement period, and then finally to retire and again consume more than earnings. In the market-based model of the latter period, people who retire exchange assets with the next generation (at positive interest rates); the next generation (which is in its accumulation phase) voluntarily consumes less than it produces in order to enhance the consumption of whatever goods and services the older population desires.

We can translate this fable into a story about the workforce. The general workforce (in the accumulation phase) will produce products desired by young workers who are borrowing and older workers who are lending. The young workers will seek things like housing, consumer durables, and child education. The retired workers will seek retirement products (golf clubs?) but primarily services, both explicit medical services and long term care custodial or servant-type services. The people who provide both of these sets of products are rewarded in large part by the products produced by the bulk of the workforce, which it is willing to transfer rather than consume because it is lending to younger workers and obtaining the assets of older workers. If overall productivity of work is increasing because of neutral technical change, this story can be accommodated by a flexible market economy. Moreover, even if there are demographic shifts so that the proportions young or old change, those shifts will induce some reallocation of workers (toward production of goods and services desired by the growing demographic), compensated by the larger amount of assets or higher levels of borrowing.

In this story, does it matter if one set of goods is subject to significant productivity improvement while another set, which includes medical services, is not—what is known as Baumol’s “cost disease”? The answer appears to be negative. Relative prices will rise for the service not experiencing technical change because wages will increase overall, and that will lead to changes in demand and employment that will be different than if productivity improvement was neutral, the same across all products. The substitution away from medical services will be tempered by the higher real income, and in a world with flexible labor markets employment may well rise in medical services if the demand elasticity for the products with rising productivity is relatively low. But there will in no sense be a problem, even if services for the elderly, whether medical or custodial, are least likely to experience higher productivity. There is really no disease here, only wistful hope that productivity gains could occur across the board. But compared to no productivity increase in any product, this scenario is obviously welfare superior—though relatively less of the gain in wellbeing will go to seniors if they tend to disproportionately

consume the goods and services with small gains in productivity (i.e., tend to consume more services relative to consumer durables).

The most obvious impediment to this smooth adjustment is if some of the source of income or purchasing power for either group comes not from their private efforts but from tax financed programs. Taxes to pay for elementary and secondary schools, and the associated wage and retirement burdens for public sector workers, are one potential issue. Another issue is that public financing may be less able to cope with rises in prices and spending for the services it finances compared to what would happen if those services were bought privately. The fact that higher taxation generates high (and increasing) excess burden combines with the natural sluggishness of political choice to mean that there is a “disease” affecting politicians who would prefer not to raise taxes (because of higher input prices and employment) and yet provide the same real benefits.

Another impediment is associated with employment-based group insurance, the predominant form of private insurance in the U.S. Increases in premiums here are supposed to be offset by reductions in money wages, and generally are. But when insurance premiums rise so rapidly that money raises would be negative, employers appear to respond by cutting employment. This phenomenon does not, however, differentially affect lifetime health insurance or health care allocation.

For our purposes here, however, the most serious difference is that social insurance benefits may well be counted as assets in retirement even if they are not backed by private assets that can be exchanged voluntarily, but instead are paid by contemporaneous taxes on a pay-as-you-go basis. The consequence is a low saving rate, with attendant adverse effects on sustainable long term economic growth. Of course, if prospective retirees view the accumulating public debt in a Buchanan-Barro framework as a future liability, they should also take this into account—but both the timing and the credibility of the promise to pay social insurance benefits will affect matters.

So what does happen if demographic change shifts spending toward medical services? It is easy to overemphasize the broad effects of demographic change; as a contributing factor to total U.S. medical spending growth, aging of the U.S. population has a far smaller share than technological change or higher relative wages. Our earlier results showed that similarly the effect of aging on medical employment growth is small. And even if aging of the population shifts demands across categories of spending—from buying groceries to put on a meal for spouse and children to empty-nesters dining out—that has no normative implication per se. We get the same kind of nihilistic conclusion as earlier in the case of the economy as a whole: there is no reason to be either concerned or elated by the sectoral shifts that accompany changes in an economy's demographic structure. Markets make adjustments, people do as well as they can, and that is that.

What potentially causes a problem is the source of the resources for elderly demand—either social income insurance or social medical insurance. To elaborate: drawing on these sources is not the same as selling assets accumulated earlier in life (the source of financing of consumption in excess of income at older ages in economic life cycle models). Instead, the resources have to be financed by tax collections from others in the economy, largely workers, and the burden of the tax leads to disincentive effects that may reduce overall welfare. In the U.S. at least this future tax burden looks enormous not so much relative to the economy as a whole but rather relative to the tax burden the population is used to paying, and recent federal commission recommendations to reduce that burden by reducing the sizes of transfers have mostly met polite silence.

Can the workers paying the taxes to pay for medical care for seniors be largely working at providing that medical care themselves? The answer in a full model of the economy is clearly affirmative, but the trick is to get workers to use their time in this way voluntarily, and raise the financing that pays for their time gracefully and with neither distortion to incentives nor gross inequity. Technically, excess burden as



applied to the labor force shows up as too few people willing to work, at least in the formal sector, as higher taxes make working for pay less remunerative.

At present an excessively small labor force—a small number of people looking for work that they are able and willing to do—does not seem to be the problem in the United States. Indeed, the major reason for people to stay out of the workforce is discouragement in failure to get an attractive job. There is a stark contrast between the static models of labor force reallocation and the reality of unemployment and macroeconomic turmoil. Clearly something is preventing the labor market from equilibrating in a way envisioned by the simple theory. We do not know what it is, but we do know that appeals to the static theory will fall on deaf ears until macroeconomic stability returns.

But suppose we do turn to the long run model. Eventually drawing enough people into the workforce to provide for the needs of seniors *and* furnish inputs for other outputs of economic importance may prove a challenge. But rather than lamenting the diversion of resources into medical care per se, it seems more appropriate to focus, on the one hand, on the value of and productivity in those services and, on the other hand, in raising the financing for those services in a good way.

#### **Adding technical change and productivity growth.**

Now we return to the Baumol model and its implications for a world experiencing demographic change. Our empirical results indicate that there is something to the story, as Hartwig (2008) found for Switzerland: adding a measure of manufacturing productivity reduces the displacement effect of medical employment, implying that some of that displacement was associated with productivity change. But the results also show that changes in relative productivity are not the whole story, or even the main part of the story, at least not for durable goods manufacturing, since large displacement effects remain even after controlling for productivity changes.

However, it is interesting to consider the Baumol model in the context of demographic change, which has the direct effect of shifting demand to the non-progressive sector, thus increasing still further the increase in employment there. One question is what this implies for the overall growth in productivity—and therefore real income per capita—in the economy as a whole. It seems to imply a continuous decline unless something else (like acceleration of productivity gains in the progressive sector or some avenue for productivity gains in the traditionally non-progressive sector) intervenes. Of course falling real income growth, even given demographic change, should reduce the size of the shift of demand to the non-progressive sector. Moreover, we should surely be grateful for the increases in productivity in the progressive sector despite the eventual attenuation of prospects for continuity of the trend for the economy as a whole.

### **Productivity change in health care.**

As already noted, there is considerable evidence that there have been important productivity improvements in the health care sector if the output is taken to be “health” rather than medical services. So why should there then be a Baumol disease? One obvious point is that we measure national welfare by GDP per capita, and improvements in health which do not themselves augment GDP are just not measured. (There have been some rather silly studies that looked at whether enhanced human capital would increase GDP enough to make medical services productivity increase and so offset the Baumol disease. They found little contribution of improved health in developed countries to GDP, not surprising if improved health largely increases life years after retirement.) If we measured welfare correctly, this argument would go, we need not be afraid. But that misses a crucial point: will increases in health productivity allow for increases in real income per worker? The answer seems to be not in

money real income; rather, workers will have fewer aches and pains and live longer, even if their capacity to obtain purchased goods is fairly stagnant.

### **Import substitution, savings, and the macroeconomy.\***

While the relationship between medical employment growth and reductions in employment in manufacturing persists even after controlling for growth in manufacturing imports, it is clear that growth in purchases of imported manufactured goods relative to U.S. domestic production did account for part of the substitution of medical jobs for manufacturing jobs. Why did this happen, and is it the result of some kind of market or policy failure? As in other parts of this analysis, such changes may have multiple causes. Here we explore and comment on some obvious and less obvious possibilities.

The most obvious story is to postulate an increase in the quantity demanded of imported manufactured goods, in response to exogenous changes in exchange rates (or the terms of trade more broadly) and perhaps some exogenous change in tastes. The relative price of imported goods appears to have fallen relative to the price of American-manufactured counterparts. Improvements in productivity in China and other emerging economies relative to the U.S., country-specific trends in relative wages, and possibly undervaluation of currencies relative to the dollar may have all played a part. As manufacturing employment shrinks, workers, especially those new to the labor force, may then have gravitated toward industries with less foreign competition—services in general, public administration, and medical care.

---

\* I am indebted to Hans-Werner Sinn for suggesting this discussion. The point that rising medical spending may reduce saving is also made in the Council of Economic Advisors report (Executive Office of the President, 2009) but they assume that all savings changes would be translated into domestic direct investment.

But there is an alternative less obvious explanation for this part of medical job displacement. The GDP identity combined with the definition of national income predicts (in a world of government budget balance and no net foreign remissions):

$$TB = S - I$$

where  $TB$  is the current-account trade balance (exports less imports),  $I$  is gross domestic investment, and  $S$  is gross domestic savings. When  $TB$  is negative (imports exceed exports), then domestic investment exceeds domestic savings, as excess imports are paid for with claims on the ownership of domestic capital.

One possible story then traces a causal path from a hypothesized exogenous decline in the U.S. savings rate (with the investment rate roughly constant) to increased imports. If the associated decrease in domestic manufacturing employment was then offset by increases in consumption of products of non-import competing industries, we would have another reason to find a relationship between growth in medical employment and shrinkage in manufacturing employment.

Both changes in exchange rates and declines in the domestic savings rate did characterize the U.S. during this period. The savings rate fell from about 9% of GDP in 1985 to less than 2% in the mid-2000s, to recover to about 6% by 2010. Some of this shift is due to the fact that the savings rate tends to be low in periods of prosperity (in the mid-2000s) and high in recessions (in 1985 and after 2008), but it does appear that there was a secular decline as well. It is also speculated that there was a wealth effect arising from exogenous increases in the value of household assets, especially real estate, during this period (Garner, 2006). Intuitively, as the value of homes grew, people increasingly planned to use this increase to fund their other expenses later in the life cycle, including long term care expenses and other medical expenses not covered by Medicare, and saw less need to add to savings. While it is early to

judge, the collapse of the real estate market may be another reason, in addition to greater precautionary savings in a recession, for the recent rebound in the savings rate.

It is more challenging to determine if there was also a shift in tastes for savings, less demand for thrift and frugality and more willingness to engage in present consumption at the expense of the future.

Whatever happened to private preferences, we do know that the U.S. government budget shifted into deficit after 2000. When public spending exceeds taxes, either domestic savings or foreign purchases of government debt must step in. We already noted that domestic savings was weak over this period. But then to produce the opportunity for foreign investment in public debt, as long as government spending remains largely domestic, imports must exceed exports. Especially since much of the deficit funded public spending was medical spending associated with medical employment, we have an additional reason for the connection with manufacturing employment.

Specifically, if the Chinese are going to be able to buy U.S. government debt, and if they are not going to sell capital in China to the U.S., they must expand their exports to the U.S. and displace U.S. employment in at least some import-competing industries. In this sense, the U.S. is financing Medicare- and Medicaid-induced growth in employment by selling debt to foreigners, which does not seem ideal (whatever its political attraction), from a normative perspective. The private medical growth funded by lower savings is more ambiguous normatively; it may have just been a mistake about future asset values, erroneous in hindsight but not necessarily at the time. Still, in both cases there is a price to be paid in terms of transfer of ownership of assets, and the need to make changes in the growth of medical employment and spending which can no longer be sustained.

### **Policy implications.**

What does this analysis say about the implications for public policy of growing medical employment and aging of the population? Is the concern about displacement of other uses of resources raised by the Council of Economic Advisors one that is well grounded in theory or in data? And what about the effects of any successful cost containment on unemployment? The answers, as usual, seem to be: "It all depends." In particular, growth in medical spending made by consumers on a voluntary basis and paid by them as private insurance premiums or private out of pocket payments does not in itself appear to raise policy concerns. That private medical spending seems to respond more to permanent than to transitory income means that it can also help serve as a kind of automatic stabilizer in periods of economic distress. Even the potential for lower long term economic growth as it is usually measured is not necessarily a problem. Of course, the markedly uneven nature of employment displacement from medical employment growth will raise problems of sectoral adjustment as always, but this is nothing new.

The more serious public policy problems arise for that part of medical spending and medical employment which is supported through the public sector and financed through taxes. (In the U.S., the heavy tax subsidy to most private insurance also raises issues of its own about excessive [low value relative to real opportunity cost] insurance and medical spending, but the solution there is to remove the distortion, a step that will be taken in a small way under health reform when a tax on expensive private group insurance is imposed in 2018.) It is the increasing excess burden and distortion from higher taxes to support public insurance that is the problem. And in the U.S. the clients of most of public insurance are the elderly, either through Medicare that pays for their acute care or through Medicaid which largely pays for their long term care.

**What do opportunity cost and aging mean for health reform in the U.S.?**

The U.S. is still intensively discussing health reform, despite passage of landmark legislation. The primary impact of reform will be to reduce the number of under-65 uninsureds through subsidies that are generous relative to premiums but small as a proportion of current national health care spending or current publicly supported health care spending. Moreover much of this explicit subsidy only replaces current private charity care, so the real resource cost impact of covering the uninsured, even taking moral hazard into account, should only represent an additional real medical resource cost of the order of about 4-5% of the current total. The intent is to hold down tax increases to cover these subsidies to the young by reducing payments for the elderly (primarily for acute care, not long term care). However, reducing public payments does not necessarily translate into fewer services and fewer people employed producing these services—the changes if they occur are more likely to impact profits, incomes, and wages. There may be some small employment reductions if the goal of restructuring payments to reduce “wasteful” services (and the wasteful employment that goes with them) is achieved. But the surprising bottom line, given the CEA statement at the beginning of this article, is that reform as currently constituted is unlikely to affect the opportunity cost of medical care in the U.S. to any appreciable extent.

What may matter much more is the next reform in the offing: reform of the Medicare entitlement in a more drastic form than the payment reductions/price cuts—reform that substantially reduces the growth of real benefits per beneficiary. (Because of relatively high population growth in the U.S. compared to other countries, paying for today’s real benefits to the elderly would be possible with little or no tax increase if growth in worker productivity returns to long term trend [Pauly, 2008].) But if spending per elderly person continues to grow at its higher long term trend—largely driven by new technology—resources needed to produce health services for seniors will increase substantially, more than doubling as a share of aggregate output by about 2035.

The labor market effects of this change may be profound. High growth in real spending means shifting much more labor into the medical sector. As noted above, that is not necessarily a problem if the value of the additional output is worth the cost, but it may not be. Equally, if not more important, the anticipated high increase in marginal tax rates to fund the subsidies may substantially distort the supply of labor, and may have other disincentive effects on innovation and investment. The resources needed for long term care per se are still a relatively small part of the problem, but their anticipated growth does not help.

To sum up: the problems with growing employment in the health care sector in the U.S., to the extent that they exist, are not caused by demographic changes per se, but rather by the choices made about the types and quality of those services, and by the decision to finance them largely through taxes which cause distortion. These potential worries may be acceptable if we believe that the value of the uses to which these additional resources are put is high enough, and if we think there are other reasons why tax finance must be used. However, some of the current discussion envisions a different approach, in which the bulk of additional costs of services for seniors who are not poor are financed by themselves through their own savings and market purchases, and the public commitment is limited to a predefined “premium support” that can guarantee that today’s real benefit levels can be covered by public financing going forward—but anything more will either have to be paid privately or given up. It remains to be seen if the politics surrounding this kind of political bargain materialize. That the opportunity cost of higher medical employment in the current depressed labor market is probably zero makes it even harder to get political consensus on the inevitably necessary steps to reduce spending and employment growth. Challenges continue to lie ahead.



## References.

- Baumol, W. J., and W. G. Bowen. 1966. *Performing Arts: The Economic Dilemma*. New York: The Twentieth Century Fund.
- Cutler, D. M. 2004. *Your Money or Your Life: Strong Medicine for America's Health Care System*. New York: Oxford University Press.
- Executive Office of the President. Council of Economic Advisors. 2009. *The Economic Case for Health Care Reform*. June 2009.
- [http://www.whitehouse.gov/assets/documents/CEA\\_Health\\_Care\\_Report.pdf](http://www.whitehouse.gov/assets/documents/CEA_Health_Care_Report.pdf) (accessed 18 May 2011).
- Garner, C.A. 2006. Should a decline in the personal saving rate be a cause for concern? Federal Reserve Bank of Kansas City, *Economic Review* (Q II): 5-28.
- Hall, R. E., and C. I. Jones. 2007. The value of life and the rise in health spending. *The Quarterly Journal of Economics* 122(1): 39-72.
- Hartwig, J. 2008. What drives health care expenditure?—Baumol's model of 'unbalanced growth' revisited. *Journal of Health Economics* 27(3): 603-623.
- Pauly, M. V. 2008. *Markets Without Magic: How Competition Might Save Medicare*. Washington, DC: AEI Press.

Skinner, J., A. Chandra, D. Goodman, and E. S. Fisher. 2009. The elusive connection between health care spending and quality. *Health Affairs* 28(1): w119-w123 (published online 4 December 2008; 10.1377/hlthaff.28.1.w119).