Will the Slowdown in U.S.

Health Cost Growth Continue?

A Factor Market Perspective

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Abstract

Between 1970 and 1992 growth in spending on health care services in the U.S. outpaced total consumption growth by 3.5 percent per year, and the share of spending devoted to health services doubled from 7.3 percent to 14.6 percent. Since 1992 the growth rate of spending on health care services has averaged only 0.5 percentage points faster than growth in total consumption, and thus the share devoted to health services rose much more modestly, to 15.6 percent as of 2006. This break in trend cost growth can be traced directly back to quantities and relative prices of factor inputs. Between 1970 and 1992 the share of the labor force working in health services and the relative earnings of health workers both rose dramatically, causing total health spending to surge. After 1992, the share of the labor force working in health services grew more slowly while the relative price of labor in health services stabilized at the new higher level.

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I. Introduction

There is a widely held expectation that the share of total U.S spending devoted to health care is poised to rise dramatically—some might say traumatically—in the coming decades. This belief is so engrained that the focus of long-term government budget analysis is increasingly shifting towards pursuing policies that will help restrain expected growth in public health spending (Congressional Budget Office, 2007b; General Accountability Office, 2007). The attention being paid to health costs is underscored by the following calculation: if the growth rate differential between health spending and overall economic output remains at the average value observed since 1970—a gap of just over two percentage points—health spending will account for 100 percent of GDP by 2080 (Congressional Budget Office, 2007a).[1]

Simply extrapolating average historical health cost growth differentials forward through time obviously becomes nonsensical at some point, but at the same time there is no convincing reason to expect that the growth of health spending will slow of its own accord. Studies that have attempted to explain why health costs grew so rapidly in the past have been inconclusive; the consensus seems to be that medical technology is the primary driver of costs. Given that—and barring a reduction in the rate of technological improvement—it is reasonable to assume that health spending will continue to grow as a share of total spending. The historical average of the health cost growth differential is arguably the best guess to use for the near to medium-term, even if the long-run implications don't make sense.

Recent trends have added an important wrinkle to this way of thinking about future health cost growth. Between 1970 and 1992 growth in U.S. spending on health care services (doctors, hospitals, and nursing homes) outpaced total consumption growth by 3.5 percent per year, and the share of spending devoted to health doubled from 7.3 percent to14.6 percent. Since 1992 the growth rate of health services has averaged only 0.5 percentage points faster than the total, and thus the share of consumption in health

[1] The Congressional Budget Office projections also incorporate the effects of population aging, but those are small when viewed in the context of extrapolating the residual growth differential (Sabelhaus, Simpson, and Topoleski, 2004). Chernew, Hirth, and Cutler (2003) also provide calculations based on extrapolating health cost growth differentials, and they show how non-health consumption will grow over time under various assumptions about health costs.

rose much more modestly, to 15.6 percent as of 2006. Choosing to extrapolate the average growth gap over the whole period since 1970 (2.3 percentage points) instead of just the last fifteen years (0.5 percentage points) leads to wildly different implications for government budgets, employer-provided health benefits, the structure of health insurance markets, and other issues. Even a 0.5 percentage point gap will eventually become nonsensical, but the share of output devoted to health does not approach the absurd levels in the foreseeable future that one obtains by assuming a gap of 2.3 percentage points.

The goal of this paper is to shed some light on these observed differences in health cost growth over time. The approach here is referred to as a "factor market perspective," which means analyzing health cost growth in terms of the quantities and prices of factor inputs. Rather than trying to understand how possible determinants like technological change, demographics, insurance coverage, or income affect people's willingness to pay for health care, the focus here is on what happened to those health care dollars after they were spent. Measuring factor payments does not provide any direct answers about spending determinants, but the approach does shed light on the differential growth rates during the periods before and after 1992, and thus indirectly improves our understanding of factors that drive health cost growth.

The factor market perspective starts with a simple set of identities that apply to any sector of the economy. The value of health sector output equals total spending on health services, which means we can look at the same transaction from the perspective of what is purchased or in terms of how the receipts were distributed. On the receipts side, health sector output is the sum of factor payments (which is value added) and the cost of intermediate inputs (like medical supplies and machines) used to produce health services. In the health sector, about two-thirds of output is value added, and value added itself is almost entirely accounted for by payments to labor (the sum of compensation and proprietor's income).

The factor payment side of the output identity implies that the growth of health costs can be traced directly back to labor earnings in the health sector. That logic can be taken one step further, which is the basis for the analysis in this paper. Total payments to labor are average earnings multiplied by the

number of workers, so increases in either factor prices (earnings of health workers) or quantities (number of health workers) will cause health spending to rise. More to the point of this paper, increases in relative factor prices (average earnings of health workers divided by overall average earnings) or quantities (the share of the labor force working in health) will cause the health share of spending in health to increase.

The first contribution of the factor market perspective is the way in which differences in health cost growth before and after 1992 can be traced directly back to differential trends in prices and quantities of labor inputs. Between 1970 and 1992 the share of the labor force working in health service industries and the relative earnings of health service workers both rose dramatically. The combined effect of growth in both employment and relative earnings was very rapid growth in the overall share of earnings in the health sector during this period, leading to the 3.5 percentage point gap between health spending and total consumption. After 1992, growth in the share of the labor force in health service industries slowed noticeably, while relative earnings in the health sector stopped rising and stabilized at the new higher levels. That led to the much smaller 0.5 percentage point cost growth differential after 1992.

The second contribution of the factor market perspective is to provide a better way of thinking about future health cost growth. In particular, it is straight-forward to compute combinations of employment shares and relative earnings that would be consistent with any given health spending differential. For example, if we assume that salaries of health workers will rise in line with the rest of the labor force—which has been the case for the last fifteen years—then the share of the labor force working in health services would have to rise much faster than it did even during the boom period (before 1992) to achieve the sort of average growth that would be consistent with using a two-plus percentage point growth differential. In any event, the growth differential should be the outcome of interest; assumptions about the future should focus on labor force shares and relative earnings of health workers.

The third contribution of the factor market perspective gets back to the underlying problem with predicting health cost growth—we don't know why health costs rose so fast historically. The patterns of

labor force shares and relative earnings in health are consistent with some of the explanations that have been put forth, but not others. A steady increase in real demand for health services over the entire time period—that which could be attributable to determinants like technology or income—seems unable to account for differential cost growth over time. Rather, the evidence suggests that something important changed around 1992, which could be consistent with the evolution of insurance coverage, payment methods, or other institutional factors. The data also draw our attention to the relative price of labor in health services, which might have been affected by the same skill-biased technological change often suggested as an explanation for changes in earnings distributions.[2]

Health services are still the dominant component of overall health spending, but the other main types of spending—pharmaceuticals and durable medical supplies plus net health insurance premiums—have been growing faster in recent years. The available data do not permit the same factor income decomposition for these health spending categories as for health services, but logic suggests that simply extrapolating historical growth rates forward for those components is probably also unwarranted. For example, the growth in spending on pharmaceuticals will ultimately depend on drug company profits and compensation of medical researchers.

Technological innovation is something that health economists sometimes have mixed feelings about, as reflected in the literature on whether or not increased health spending is, on net, worth what we are paying (Newhouse, 1992; Cutler and McClellan, 2001; Skinner, Staiger, and Fisher, 2006). There is some concern that insurance coverage leads to consumers (or physicians) facing incentives which lead them to demand (or supply) too much health care. The bottom line message of this paper is that technological advancement in the health sector is not the primary factor that will actually determine total spending in the long run. What we spend on health care will equal factor incomes in the health sector, and factor incomes depend on quantities of factor inputs and relative prices.

[2] For a recent contribution to the earnings-inequality literature, see Autor, Katz, and Kearney (2005).

II. The Slowdown in U.S. Health Cost Growth

The empirical starting point for the factor market perspective explored here is the observation that health cost growth has been far from uniform over the last four decades. The gap between growth of health costs and overall consumption spending (the growth rate differential) has varied significantly both over time and across types of health spending.[3] In particular, even though spending on both health services (doctors, hospitals, and nursing homes) and overall health care (which also adds pharmaceuticals, durable medical goods, and net health insurance premiums) have both more than doubled since 1970, most of that relative growth occurred before 1992.

There are several categories of health spending one can work with in the National Income and Product Accounts (NIPA), but looking ahead to the focus on factor payments in the next section, the analysis of spending here begins with health services versus other types of spending.[4] Figure 1 shows the major components of U.S. health spending as a share of total personal consumption from 1970 to 2006. Notice first that the health services category dominates all health spending, but health insurance and drugs/durables are growing faster in recent years and thus the share of services in the total is falling. Second, note that the doubling of the share of consumption devoted to the health services component occurred almost entirely prior to 1992. Third, although total health care spending has outpaced total consumption growth since 1992, much of that recent relative increase occurred in only three years: 2001, 2002, and 2003. Thus the jump coincided with a recession and aftermath in which the growth rate of total consumer spending slowed considerably, so some of the increase in the ratio is attributable to the slowdown in the growth rate of the denominator.[5]

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[3] The term "growth differential" is used here instead of the more familiar "excess cost growth" because there is no attempt to subtract out how much of the historical growth in health costs can be explained by underlying demographics. In practice the fraction of historical health cost growth explained by demographics is quite small, though the effects going forward are expected to be larger. See Congressional Budget Office (2007a).

[4] The decision here to use NIPA data instead of the National Health Expenditure (NHE) tables prepared by the Center for Medicare and Medicaid Studies (CMS) is based on the one to one correspondence with underlying industry compensation and employment data. The NHE aggregates show the same trends as the NIPA.

[5] The jump is very distinct because some components of the numerator—especially health insurance—also accelerated temporarily for those three years. See Catlin, et al, (2007) for a discussion of very recent spending trends. Baicker and Chandra (2006) also note that malpractice premiums rose significantly during this period.

Table 1 shows the cost growth rates for the three components of spending relative to overall consumption for the entire period and two sub-periods (1970-1992, and 1992-2006). The table confirms the visual impressions in Figure 1. The overall health spending differential fell from 3.3 percent before 1992 to 1.1 percent after 1992, and that is dominated by the slowdown in health services, where the differential fell from 3.5 percent to 0.5 percent. The health insurance premiums and drugs/durables components are still rising at a strong pace relative to total consumption. Indeed, the growth rate of the drugs and durables category actually accelerated relative to the total after 1992.

The shift away from growth in health services towards drugs, durables, and health insurance after 1992 should not come as a surprise to most health care observers—though the dramatic slowdown in health services and total health spending might. It can be argued that the slowdown in health services cost growth after 1992 was a levels effect; as more patients were shifted into lower cost managed care plans, there was a series of one-time savings that showed up as a lower growth rate when viewed over time, but that does not necessarily imply a permanent slowdown in cost growth (see Chernew, et al, 1998). However, most of the shift towards managed care had occurred before the mid 1990s, so the one-time level shift argument does not seem to explain the persistence of slowdown in cost differentials.

There is no real consensus in the literature on health spending determinants about why costs have grown so rapidly in the last several decades, much less an explanation for why the growth rate may have slowed. Some previous efforts at understanding rapid historical health cost growth have focused on how spending has risen across different types of medical procedures (Thorpe, et al, 2004), but there is no smoking gun in terms of cost drivers. Other research has looked directly at the patterns of growth over different time periods—comparing the U.S. to other OECD countries (White, 2007) and conducting time-series analysis of the relationship between health costs and underlying economic growth (Jewell, et al, 2003; Carrion-i-Silvestre, 2005; Narayan, 2006)—but again nothing stands out that might help predict

why cost growth slowed or where cost growth is headed. It is fair to say that there is no consensus about past growth differentials that is useful for projecting future trends.[6]

The default explanation for cost growth differentials is advancements in medical technology. Hall and Jones (2007) show that increases in health spending over the last several decades can be explained using a model in which individuals can choose to purchase extended lifespan. The implication is that further relative health cost growth can be expected so long as real incomes continue to rise, and we continue to invest in producing the life-extending technology that consumers want. As more complicated (and thus expensive) procedures become feasible, health spending will increase. This explanation for health cost growth makes a lot of sense, but any particular rate of cost growth predicted by the model will depend on the underlying parameters. Also, the predictions of a technology-based approach do not seem to be consistent with the observed slowdown in health cost growth since 1992.

The timing of the 1992 trend break in health spending growth suggests that changes health insurance rules—within public programs and the shift to managed care on the private side—could be at least part of the story. Some research on public health insurance (Finkelstein, 2005; White, 2006) has shown that changes in coverage and reimbursement policy might have had first-order effects on health spending. In particular, the introduction of Medicare created an initial (some might say "blank check") surge in demand for medical services, but subsequent changes in reimbursement rules tempered that demand. On the private side, coverage type shifted from fee for service to capitation, which may have slowed growth.

The idea that type of insurance coverage and government reimbursement rules might have had something to do with the slowdown in health costs seems promising. One way to think about the possibility is to consider what changes in factor demands—affecting both quantities and prices—may have resulted from the changes in insurance markets. Thus, the focus in the next section shifts to the factor market perspective: how employment and relative earnings evolved in the health sector in the periods before and after 1992.

[6] See the U.S. Department of Health and Human Services, Centers for Medicare and Medicaid Services (2004) Technical Panel Report for a discussion about competing explanations for historical health cost growth rates.

III. Employment and Compensation in Health Service Industries

By far the largest component of value added in the health services sector is labor compensation, and the other components (mostly incomes of self-employed doctors or other health workers) are also effectively payments for labor services.[7] This section uses data from two sources to explore the trends in employment and earnings in health service industries since 1970. The first data source is NIPA employment and compensation by detailed industry, which has the nice feature of being internally consistent with the health spending data presented in the last section. The second data source is pooled March Current Population Survey (CPS) cross-sections, which has individual earnings (both wages and self-employment) and the detailed industry codes that make it possible to discern workers in the health sector over time.[8]

Figure 2 shows compensation in health service industries from the NIPA and total earnings of workers in health service industries in the CPS, both as a share of their respective totals. The NIPA data is represented by two lines between 1998 and 2000, because of a change in the composition of the health sector that added a few new categories when BEA switched from the Standard Industrial Classification (SIC) to the North American Industrial Classification System (NAICS) during that period (see the Appendix for details). The most prominent feature of Figure 2—especially when focusing on NIPA compensation—is the extent to which the differential growth before and after 1992 correspond to the observations about health service spending in Figure 1. The share of NIPA compensation in the health sector rose from just under 3.0 percent in 1970 to 8.1 percent by 1992; since then, the share of

[7] The NIPA only shows the compensation share of factor payments, but a complete breakdown can be found in the BEA industry tables associated with their detailed input-output calculations. In 2005 value added in health services was about 62 percent of health sector output, so intermediate goods (like medical supplies and machines) accounted for 38 percent. Within value added, the lion's share is direct compensation, which accounted for 77 percent. The other main type of payment to labor is proprietor's income of self-employed doctors, which accounted for another 12.3 percent of value added. The remaining ten percent of value added is accounted for corporate gross operating surplus, indirect taxes, and business transfers to persons (mostly legal settlements).

[8] The March CPS data used in this paper was downloaded from the CPS-IPUMS site at the Minnesota Population Center (see King, Ruggles, Alexander, Leicach, and Sobek (2004). The health sector industry codes in the NIPA changed when the Bureau of Economic Analysis switched from the Standard Industrial Classification (SIC) to North American Industrial Classification System (NAICS) after 1998; see the appendix for a detailed reconciliation. Also, the industry and occupation codes in the March CPS changed three times during the time period being analyzed; the appendix shows how health categories were mapped in each of the four sub-periods.

compensation in health services fell before rising (as with spending, in the 2001 through 2003 period) to 8.6 percent as of 2006.

Total health sector earnings in the pooled March CPS files (Figure 2) also exhibits the same differential growth rates as health spending (Figure 1) before and after the early 1990s. The share of total earnings in the CPS is a couple of percentage points higher in the CPS, which reflects the fact that many doctors are still self-employed, so their earnings do not show up in NIPA compensation (but their earnings are part of NIPA value added). That conceptual difference has evolved, which explains why the slope of the compensation line is somewhat steeper in the early period. Based on the CPS earnings by health sector occupation (next section) the share of total doctors' earnings accounted for by wages rose from less than 40 percent in 1970 to about 85 percent by the mid 1990s, where it has remained since. Thus, at least part of the reason that CPS health sector earnings grew faster that NIPA health industry compensation is because of changes in the way that doctors are getting paid.

The NIPA and March CPS employment counts (Figure 3) affirm the trends observed in health care spending and compensation/earnings. The break in the NIPA employment line at the point of the shift from SIC to NAICS industry codes is much more pronounced than in the compensation graph, which is because the additional industries included in health services under NAICS (see the Appendix) have generally lower-paid health workers, so their share of employment is much larger than their share of compensation (though of course both employment and compensation went up). The line break in Figure 3 does lead to a bit of an optical illusion--suggesting that growth was steady over the entire post-1970 period—but the numbers add some clarity. Between 1970 and 1992 the share of employment in health more than doubled from 3.5 percent of the labor force to 7.5 percent, but since then (assuming the industries added after 1998 did not grow disproportionally before 1992) the cumulative growth has increased the health share of the labor force by only about 0.9 percentage points.

The fact that employment growth slowed down less than earnings/compensation growth after the early 1990s suggests (mathematically) that trends in payments per worker (relative earnings) must have changed, which is indeed the case (Figure 4). The three lines in Figure 4 are all measures of relative

compensation per health worker. The NIPA relative compensation measure and CPS mean value both come directly from the data underlying Figure 2 (total earnings/compensation) and Figure 3 (total employment). The median value from the CPS is the ratio of health industry median earnings divided by overall median earnings. The median is presented as an alternative to the mean because it does not suffer from changes in CPS top-coding procedures that might be differentially affecting CPS mean earnings across industries.

The three measures in Figure 4 all agree that there was a significant increase in relative earnings of health industry workers in the period 1970 through the early 1990s. Between 1970 and the early 1990s the earnings of workers in health industries rose 20 to 25 percent relative to overall earnings in the economy. The two data sets disagree to some extent about whether relative health sector earnings fell somewhat before stabilizing or simply stopped growing after the early 1990s. The NIPA data indicate that relative health sector compensation actually fell in the 1990s, reversing almost half of the increase that occurred in the previous two decades. The CPS relative earnings data—both medians and means—are more volatile, but there is a clear break in the strong upward trend for those as well. In any case, both data sets agree that health service worker earnings have been stable relative to all other workers for over a decade.

The slowdown in trend employment growth and distinct break (with or without some reversal) in relative earnings are clearly consistent with the patterns of health care spending identified in the last section. One possible source of differentials in trend growth—especially in terms of relative earnings—is a shift in the occupational composition of health workers. That is, the distinct break in the relative earnings graph may simply reflect a shift towards more expensive health workers during the earlier period, and a shift towards less expensive workers since then. The distinction between within- and across-group changes is important, because occupational composition may change again going forward, and that should be built into the projections. The next section looks directly at employment and earnings within and across health occupations.

IV. Employment and Compensation in Health Service Occupations

The NIPA and CPS industry data generally agree about trends in employment and earnings in the health sector since 1970—including the divergent patterns before and after 1992—which is reassuring. It would be nice to have both aggregate and micro data with which to investigate employment and earnings across health versus non-health occupation groups as well, but unfortunately the aggregate data by occupation that would allow the same sort of side-by-side comparison only go back about a decade.[9] However, the CPS earnings and employment data can be tabulated by occupation, and the results both confirm and enhance the impressions from the industry data.

Figure 5 shows shares of employment across three broad types of health occupations in the CPS—doctors, nurses/therapists, and technicians/administration. As with the industry assignments, the detailed occupation codes evolved several times since 1970s, but there is sufficient detail in every period to generate a consistent mapping into the three categories (see the Appendix). The break in employment trends by occupation in Figure 5 is similar to the patterns by industry in Figure 3. In particular, the share of the labor force reporting one of the three identified health occupations rose from about 4% to 6.4% by 1993. Since then, health sector employment growth has been much more modest, and the overall share of the labor force working in one of the three health occupations had increased to just over 7% as of 2006.

Physicians are the smallest of the three broad health occupation categories, accounting for 0.62 percent of the labor force in 1970, and rising to 0.84 percent by the early 1990s. Growth in the physician share has moderated to some extent—but remained positive—and the fraction reached 0.96 percent in 2006. The nursing and therapist group is much larger and growing faster, accounting for only 1.1 percent of the labor force in 1970, before rising to 1.7 percent by the early 1990s and 2.1 percent as of 2006. Technicians and health administration is the largest group of health workers, representing 2.3 percent of the labor force in 1970, 3.4 percent by the early 1990s, and 4.1 percent in 2006.

[9] The Bureau of Labor Statistics Occupational Employment Statistics (OES) program has extensive information about occupational employment and earnings, but the data only goes back to 1999. See the BLS website (www.bls.gov) for details.

The composition of growth in employment across the three health occupation subgroups could help explain some of what is happening to earnings at the industry level (Figure 4). The three occupation groups have very different relative earnings at any given point in time, so changes in the distribution across the three groups will affect overall relative earnings in the health sector. Using either medians (Figure 6) or means (Figure 7), nurses and therapists earn 30 to 40 percent more than technicians and administrators, and physicians (based on medians) earn something like 300 percent of what nurses and therapists earn.[10] Therefore, to the extent that the physician or nursing group increases relative to technicians and administration, the overall relative earnings of health workers should increase.

However, the occupational data suggest that changes—at least across these three broad occupation groups—have been negligible. In 1970, 15 out of every 100 health workers were doctors, 27 were nurses or therapists, and the remaining 58 were technicians or administration. By 2006, the fraction of health workers accounted for by doctors was barely changed, at 14 out of every 100. The share accounted for by nurses rose slightly to 29 out of every 100, and the share accounted for by technicians and administration fell even more slightly to 57 out of 100. The implication is that broad movements across occupation groups are probably not driving overall relative earnings in health—the only other possibility is within group changes in relative earnings.

The two measures of relative health worker earnings in Figure 6 (medians) and Figure 7 (means) confirm the overall differential trends before and after the early 1990s observed at the industry level, but the noisy survey data makes it difficult to completely disentangle the effects of across and within group changes. Overall, relative earnings of workers in health occupations rose 25 to 30 percent between 1970 and the early 1990s. There has been no further growth (and maybe some decline) since then. Although composition across the three health occupations may be part of the story, it is clear that significant within-group changes have occurred.

[10] The concerns about top-coding mentioned in the last section are particularly relevant when describing patterns of physician earnings in the CPS, so the means are not shown in Figure 7. One strategy would be to impute above the top-coded values, as in the literature on earnings inequality. The change in CPS top-coding levels and procedures (the appendix to Autor, Katz, and Kearney (2005) provides an excellent description) suggests that the usual approach of assigning a single mean above the top-code value would effectively dictate the conclusion.

The most striking occupation-level relative earnings change is for nurses and therapists. Both the mean and median suggest that relative earnings of nurses and therapists rose more than 40 percent between 1970 and the early 1990s. After that, both the mean and median agree that relative earnings fell, but the size of the relative decrease ranges from about 10 percent (median) to about 15 percent (mean). It is easy to speculate about why the relative earnings of nurses increased so dramatically in the early period; there was strong demand for health services, and at the same time nurses were increasingly being called upon to perform duties that had previously been done by doctors. The subsequent decline could be composition within the nursing and therapist group, or perhaps a drop in demand for nurses due to (for example) the reduction in numbers of hospital beds over this period.

The relative earnings of workers in health technician and administration occupations also rose during the earlier period, from something like 70 percent of earnings economy-wide to 85 or even 90 percent, depending on the measure. The data is unclear about whether the relative earnings of health technicians and administrators actually fell back after the early 1990s, but it is clear that there was a break in the trend relative increase that had been occurring. Again, the data are not able to support further investigation—in particular, looking to see whether changes within the group (between certain types of technicians and/or administrators) or true shifts in relative earnings are driving the aggregates.

The timing of the rapid period in health cost growth is, as noted above, consistent with the shift in health insurance coverage from traditional fee for service to managed care. Thus, the time patterns of relative earnings identified here could just be part of an overall insurance-driven demand shift story, but it is worth noting that it could also just be part of a bigger story about earnings distribution more generally. In particular, the literature on skill-biased technological change identifies the 1970s and 1980s as the period in which returns to education rose dramatically, and the relative earnings changes at least in the bottom half of the distribution seem to have stopped (Autor, Katz, and Kearney, 2005). In any case, it is not clear why the relative earnings shifts for health workers that occurred through 1992 are bound to resume; it seems more likely that we reached a new level of relative earnings fifteen years ago, and that's as good a guess as any for the future.

V. Health Insurance and Prescription Drugs

Health services are the dominant component of overall health spending, but the other main types of spending—pharmaceuticals and durable medical supplies plus net health insurance premiums—are growing faster in recent years (Table 1). Still, the slowdown in comprehensive health spending growth has been dramatic, from 3.3 percent faster than total consumption between 1970 and 1992 to only 1.1 percent faster since 1992. The overall health cost growth differential of 1.1 percent should still be considered alarming, however, because extrapolating divergent growth of 1.1 percent per year into the future for even a few decades implies significant problems for the federal budget and probably overall economic growth.[11]

Although the available data do not allow a direct factor market investigation of spending on consumer health products or net health insurance premiums, logic does suggest that simply extrapolating recent growth in those categories is also probably unwarranted. For example, recent growth in the health insurance component of comprehensive health costs can be explained by the shift towards more intensive management of treatment and costs—the slowdown in outlays for health services suggests that the goal has at least in part been achieved since 1992. The factor market perspective on health insurance costs is very clear about the difference between level and growth rate implications of the shift towards more monitoring by insurance companies. In particular, unless health insurers increase profit margins, hire more employees per insured person, increase the relative pay of their existing employees, or the fraction of the population with private insurance rises, there is no reason to expect that health insurance spending will continue to outpace overall economic growth.

Indeed, the patterns of spending on net health insurance (premiums less payments for services, which is basically value added in the health insurance sector) suggests that the shift towards managed care and more monitoring may have actually had competing effects on total health spending during the transition.

[11] Both CMS and CBO have differential growth of overall health expenditures falling below one percent after several decades, although the rates start out much higher at the beginning of the projections.

Managed care almost certainly slowed health care usage/outlays during the transition, and maybe going forward, but that's because health insurers were investing in resources to monitor treatments and costs more intensively. Those investments in labor and capital show up as an increase in value added (relative to gross health sector output) that will almost certainly persist (as a share) going forward, unless insurers find a more efficient way to monitor and the net premium share actually decreases. In any case, there is no obvious reason to believe that health insurers will continue to expand the relative size of their workforce going forward—the increased labor input per patient associated with more managed care is probably largely complete. If so, the relative growth in health insurance premiums will be limited to the relative growth of compensation and profits in the health insurance sector; what happens to underlying expenditures on health services is beside the point.

The implications of the factor market perspective for spending on pharmaceuticals also seems clear—perhaps even more so—because production costs are such a small part of value added in the drug sector. In the case of pharmaceuticals one can argue that unless there is a significant increase in drug industry profit margins, the medical researcher share of the labor force, or researcher relative salaries, there is no reason to expect that drug costs will continue to grow as rapidly (relative to total output) as they have in the past. This is not to say that many valuable drug breakthroughs won't occur; it just means that when we add up all of the factor payments made to people and firms working in the pharmaceutical sector, the limits on cost growth are apparent. Drugs are probably the area where it is easiest to confuse value and cost; for example, the cure for cancer we all hope to see in our lifetimes will be very valuable, but whether or not the cure is costly will depend on the underlying technology. If it is a pill then total health costs will immediately drop, and budget analysts will be shifting their focus back to Social Security and other long-run programs where annuity payments for the duration of increased lifespans are the primary policy concern.

VI. Conclusion

It would be a mistake to interpret the evidence presented here as suggesting that future growth of spending on health care in the U.S. is not a serious concern, and that policy makers can safely turn a blind eye. The evidence does suggest that simple extrapolation of historical growth differentials over the last four decades is probably misguided because there is a distinct break in trend growth that can be traced directly back to patterns of health sector employment and relative earnings before and after 1992. One can interpret that to mean the trend growth differential since 1992 is at least a better estimate for projecting ahead, but even that conclusion does not reflect the true spirit of the factor market approach. The bottom line message is that projections of future health cost growth should not be based on extrapolating past spending trends; those forecasts should be built up from projections of employment and relative earnings (and ultimately other components of value added) in the health sector.

There is also an important corollary to the main message of this paper—any projections of health care spending should be considered very uncertain. Some could interpret this unwillingness to make precise estimates as detrimental to the policy making process. How can policy makers be expected to respond to the budgetary implications of rapid health cost growth if they don't have a precise baseline against which policy changes can be measured? The same problem exists in Social Security policy analysis as well, but, as Sabelhaus and Topoleski (2007) discuss, the fact that significant uncertainty exists should not be ignored—it should become part of the policy making and evaluation process. The same is true in health care and probably other policy areas as well. Given uncertainty about how the underlying determinants of some potential budgetary problem are going to evolve, the first step should be to admit what we don't know, and the second step should be to deal with that uncertainty directly by developing a flexible policy or a set of contingency plans to implement as needed.

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VIII. Appendix: March CPS and NIPA Data Issues

This appendix provides details about the March Current Population Survey (CPS) and National Income and Product Account (NIPA) data used in the paper. The first section describes the NIPA health spending data. The second section reconciles the differences between Standard Industrial Classification (SIC) and North American Industrial Classification System (NAICS) health industry definitions, and in particular, why the NIPA compensation and employment series diverge in the 1998 through 1990 overlap period. The third section presents March CPS health industry and detailed health occupation codes, which changed several times during the time-period studied.

NIPA Health Consumption Categories

The health spending data in Figure 1 and Table 1 is taken from NIPA Table 2.5.5. The health services category include physicians (line 47), dentists (line 48), other professional services (line 49), and hospitals and nursing homes (line 50). The "other professional services" category footnote lists chiropractors, optometrists, mental health practitioners (except physicians), physical, occupational, and speech therapists, and audiologists, podiatrists, all other miscellaneous health practitioners, ambulance services, kidney dialysis centers, family planning services, outpatient mental health and substance abuse centers, all other outpatient care centers, blood and organ banks, all other miscellaneous ambulatory health care services, home health furniture and equipment rental, medical and diagnostic laboratories, and home health care. The second health spending category is consumer purchases of health care products, which is drug preparations and sundries (line 45) and ophthalmic products and orthopedic appliances (line 46). The final category is medical care and hospitalization insurance, which is premiums less benefits for health, hospitalizations, and accidental death and dismemberment insurance.

Reconciling SIC and NAICS Differences in the NIPA

The difference in the NIPA health services employment and compensation data evident in the transition from the Standard Industrial Classification (SIC) system to the North American Industry Classification System (NAICS) between 1998 and 2000 is attributable to changes in a handful of detailed industries. NIPA data from the Bureau of Economic Analysis indicates that in 1998 there were 10,129,000 full- and part-time employees in the Health Services sector under the SIC system (Table 6.2C. line 68) while the NAICS shows 10,617,000 in Health Services (Table 6.2D, lines 75, 76, and 77). The employment differential is resolved by examining NAICS categories 621 and 623. Each of these categories has industries contained in it that were not present in the Health Services (80) category under SIC. NAICS 621910 Ambulance Services was classified under SIC 41 Local and interurban passenger transportation and SIC 45 Transportation by air. By bringing these industries under health care, an additional 112,000 jobs are added to NAICS 621. Other categories that experienced similar transformations within NAICS 623 include NAICS 623220: Residential Mental Health and Substance Abuse Facilities, which was SIC 8361 Residential Care (added 98,000 employees), NAICS 623312: Homes for the Elderly, which was SIC 8361 Residential Care. Employment (added 180,000 employees), and NAICS 623990: Other Residential Care Facilities, which was SIC 8361 Residential Care. Employment (added 135,000 employees). The total employment change explained by these changes is

525,000. There were also a few changes in the other direction. SIC categories 8072 Dental Laboratories and 8099 Health and Allied Services not elsewhere classified were mapped into NAICS categories 339116, 541430, and 541922, leaving the Health Services industry entirely, which subtracted 42,000 jobs from the health sector. Summing employment changes from category shifts brings a change of +483,000 employees that is accounted for by addition and subtraction of the aforementioned categories. This number is very close to the calculated difference of 488,000 shown for 1998, and further differences can be accounted for by rounding errors, survey errors, or the year change. Data used in employment calculation was obtained from the 1997 Economic Census and compared to 1998 employment figures.

March CPS Industry and Occupation Codes

The March CPS data used in this paper was extracted from the CPS-IPUMS site at the Minnesota Population Center (see King, Ruggles, Alexander, Leicach, and Sobek (2004); website is www.cps-ipums.org/cps). The mapping of codes into health sectors is based on the detailed industry and occupation codes made available through CPS-IPUMS. The detailed industry and occupation codes changed three times during the period covered in this study, but the concepts remained consistent over time. The industry codes used to identify the health industries are shown in Appendix Table 1, and the occupation codes used to identify the three types of health occupations in each period are shown in Appendix Table 2.

Appendix Table 1: March CPS Health Service Industry Codes			
1970-1982	**1983-1991**	**1992-2002**	**2003-2007**
828 Office of physicians **829 Office of dentists** **837 Office of chiropractors** **838 Hospitals** **839 Convalescent services** **847 Office of health practitioners** **848 Health services**	**812 Office of physicians** **820 Office of dentists** **821 Office of chiropractors** **822 Office of optometrists** **830 Office of health practitioners** **831 Hospitals** **832 Nursing/personal care facilities** **840 Health services**	**812 Office of clinic of physicians** **820 Office and clinic of dentists** **821 Office and clinic of chiropractors** **822 Office and clinic of optometrists** **830 Office and clinic of health practitioners** **831 Hospitals** **832 Nursing and personal care facilities** **840 Health services**	**7970 Office of physicians** **7980 Office of dentists** **7990 Office of chiropractors** **8070 Office of optometrists** **8080 Office of other health practitioners** **8090 Outpatient care centers** **8170 Home health care services** **8180 Other health care services** **8190 Hospitals** **8270 Nursing care facilities**

	Appendix Table 2: March CPS Health Service Occupation Codes			
	1970-1982	1983-1991	1992-2002	2003-2007
Doctors	061 Chiropractors 062 Dentists 063 Optometrists 064 Pharmacists 065 Physicians and Surgeons 071 Podiatrists 072 Veterinarians 073 Health practitioners, NEC	084 Physicians and surgeons 085 Dentists 086 Veterinarians 087 Optometrists 088 Podiatrists 089 Health diagnosing practitioners n.e.c. 096 Pharmacists 106 Physicians assistants	084 Physicians and surgeons 085 Dentists 086 Veterinarians 087 Optometrists 088 Podiatrists 089 Health diagnosing practitioners n.e.c. 096 Pharmacists 106 Physicians assistants	300 Chiropractors 301 Dentists 304 Optometrists 305 Pharmacists 306 Physicians and surgeons 311 Physicians assistants 312 Podiatrists 325 Veterinarians 326 Health diagnosing/treating n.e.c.
Nurses and Therapists	074 Dieticians and nutritionists 075 Registered nurses 076 Therapists	095 Registered nurses 097 Dieticians and nutritionists 098 Inhalation therapists 099 Occupational therapists 103 Physical therapists 104 Speech therapists 105 Therapists, n.e.c.	095 Registered nurses 097 Dieticians and nutritionists 098 Inhalation therapists 099 Occupational therapists 103 Physical therapists 104 Speech therapists 105 Therapists, n.e.c.	303 Dieticians and nutritionists 313 Registered nurses 314 Audiologists 315 Occupational therapists 316 Physical therapists 320 Radiation therapists 321 Recreational therapists 322 Respiratory therapists 323 Speech-language pathologists 324 Therapists, all other
Technicians and Administration	080 Clinical laboratory technologists 081 Dental hygienists 082 Health record technicians 083 Radiologist technicians 084 Therapy assistants 085 Health technologists, technicians n.e.c. 426 Dental lab technicians 506 Opticians and lens grinders/polishers 212 Health administrators 921 Dental assistants 922 Health aides 923 Nurses, student professional 924 Midwives 925 Nursing aides 926 Practical nurses	015 Managers, medicine and health 203 Clinical laboratory technologists 204 Dental hygienists 205 Health record technicians 206 Radiologist technicians 207 Licensed practical nurses 208 Health technologists 445 Dental assistants 446 Health aides, except nursing 447 Nursing aides, orderlies 677 Optical goods workers 678 Dental lab technicians	015 Managers, medicine and health 203 Clinical laboratory technologists 204 Dental hygienists 205 Health record technicians 206 Radiologist technicians 207 Licensed practical nurses 208 Health technologists 445 Dental assistants 446 Health aides, except nursing 447 Nursing aides, orderlies 677 Optical goods workers 678 Dental lab technicians	035 Medical/health service managers 330 Lab technicians/technologists 331 Dental hygienists 332 Diagnostic technologists 340 Emergency tech/paramedics 341 Diagnosing support technicians 350 Practical/vocational nurses 351 Medical record technicians 352 Opticians, dispensing 353 Misc health technologists 354 Other healthcare practitioner 360 Nursing, psychiatric/home hlth 361 Occupational therapists 362 Physical therapist assistants 363 Massage therapists 364 Dental assistants 365 Medical assistants, other

Figure 1: Shares of Health Spending in Total Consumption

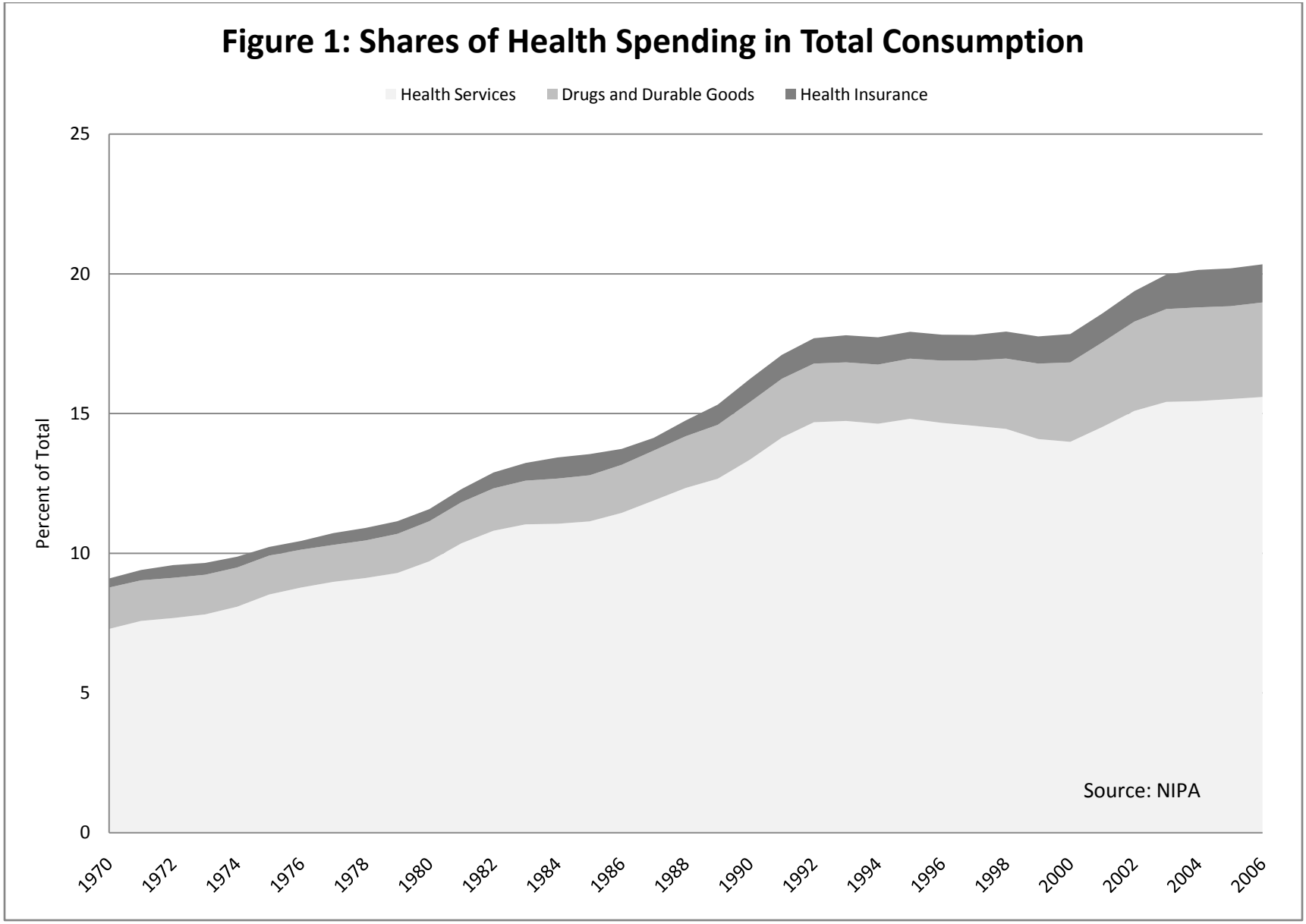


Table 1: Growth Rates and Growth Differentials

	1970-2006	1970-1992	1992-2006
Average Annual Growth Rates (Percent)			
Total Consumption	7.7	8.9	5.7
Total Medical	10.1	12.2	6.8
Health Services	10.0	12.4	6.2
Drugs and Durable Medical Goods	10.2	10.6	9.4
Health Insurance	12.0	14.1	8.9
Derived Growth Rate Differentials (Percent)			
Total Medical	2.4	3.3	1.1
Health Services	2.3	3.5	0.5
Drugs and Durable Medical Goods	2.5	1.7	3.7
Health Insurance	4.4	5.2	3.1

Source: NIPA

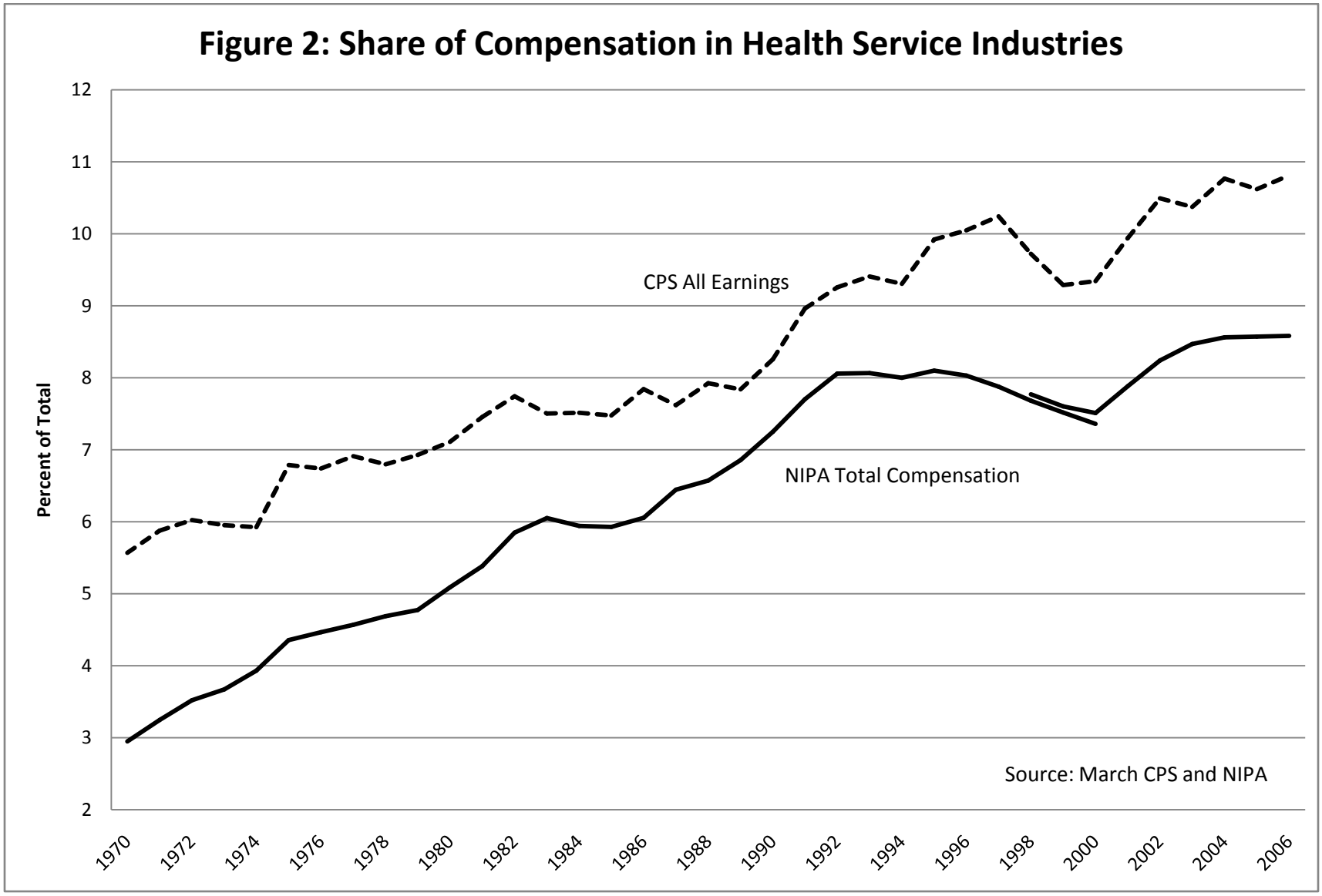


Figure 2: Share of Compensation in Health Service Industries
Percent of Total
12
11
10
9
8
7
6
5
4
3
2
CPS All Earnings
NIPA Total Compensation
Source: March CPS and NIPA
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006

Figure 3: Share of Employment in Health Service Industries

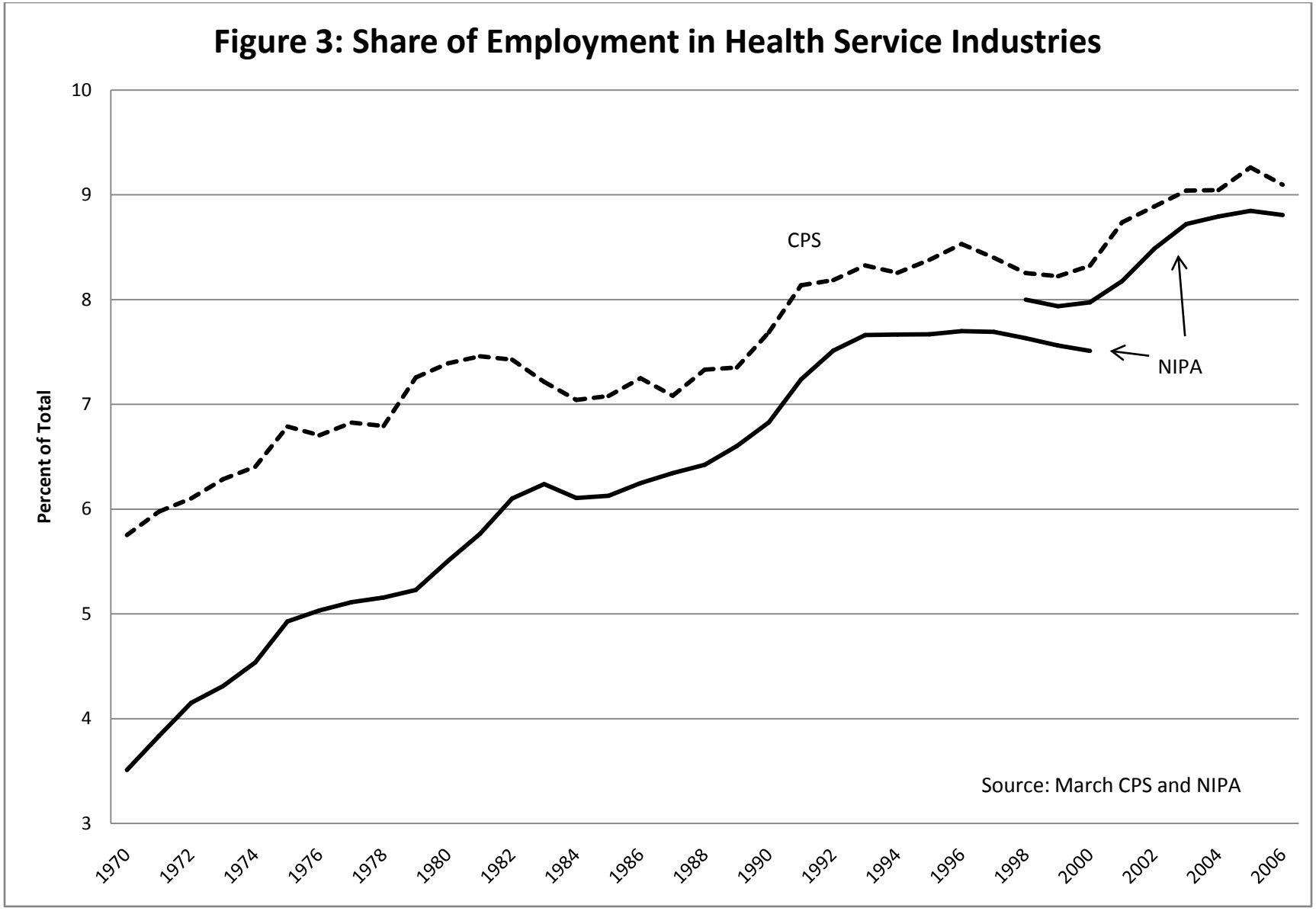


Figure 4: Relative Earnings in Health Service Industries

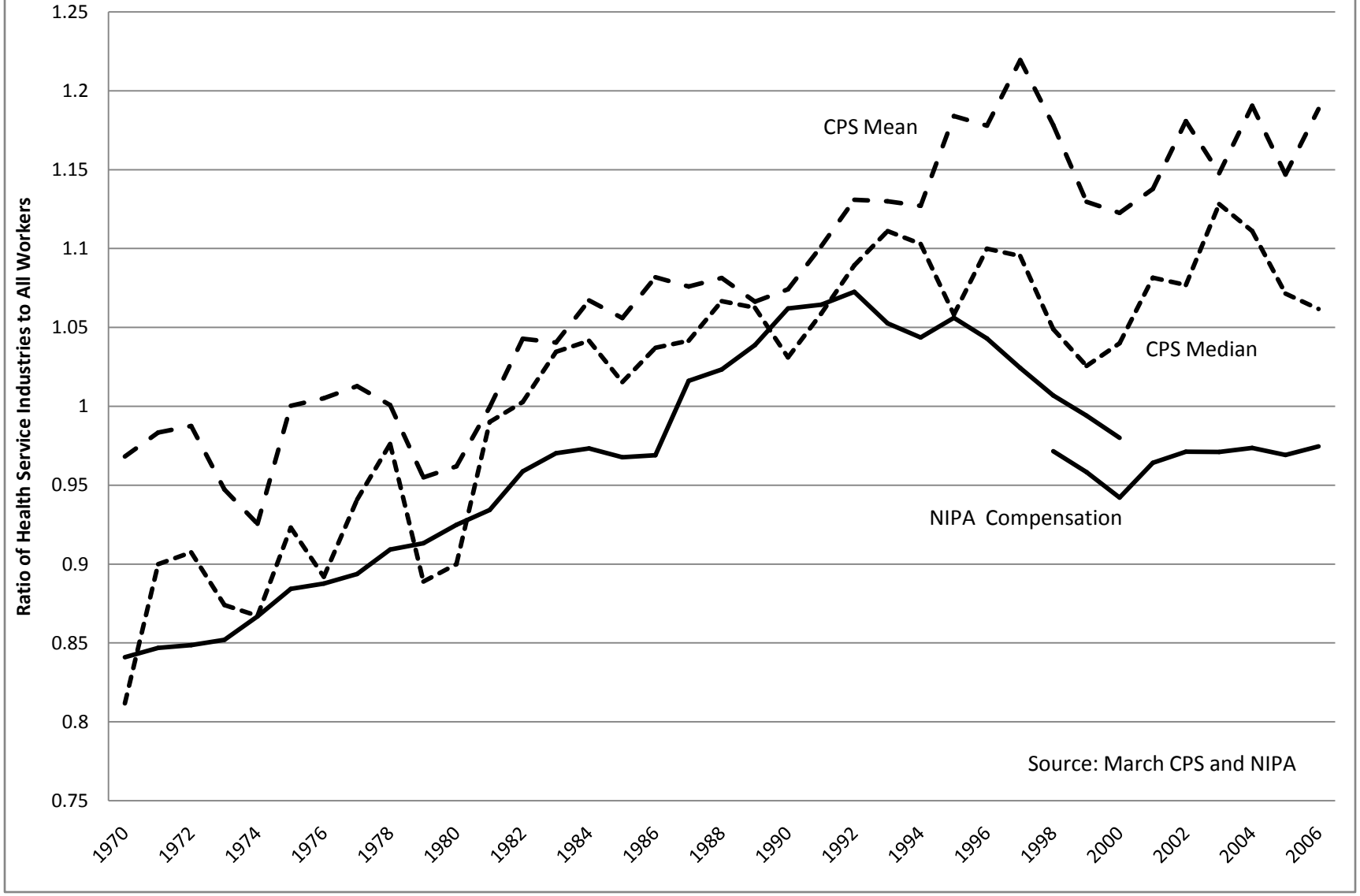
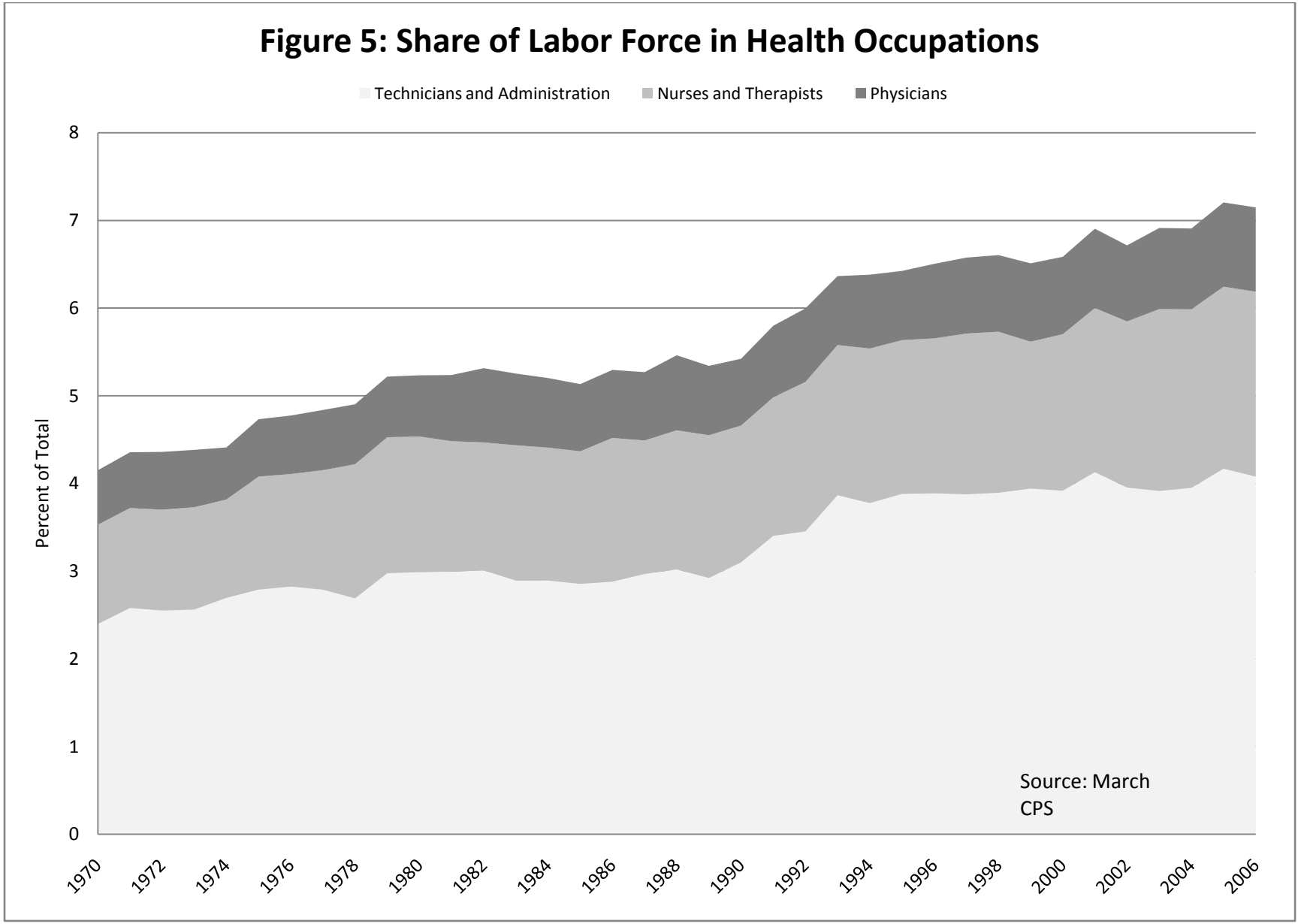


Figure 5: Share of Labor Force in Health Occupations



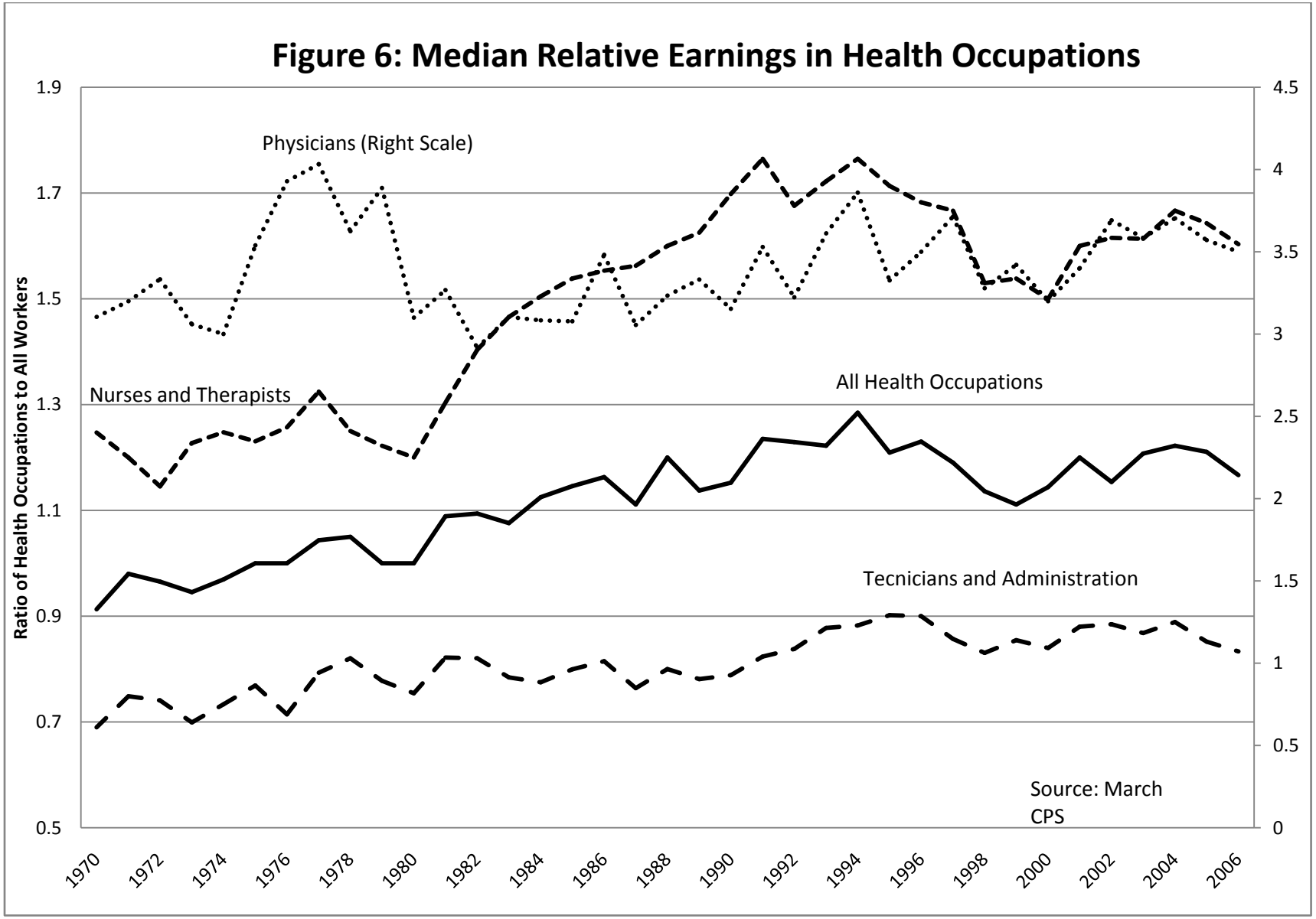


Figure 6: Median Relative Earnings in Health Occupations
Ratio of Health Occupations to All Workers
1.9
1.7
1.5
1.3
1.1
0.9
0.7
0.5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Physicians (Right Scale)
Nurses and Therapists
All Health Occupations
Tecnicians and Administration
Source: March CPS
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006

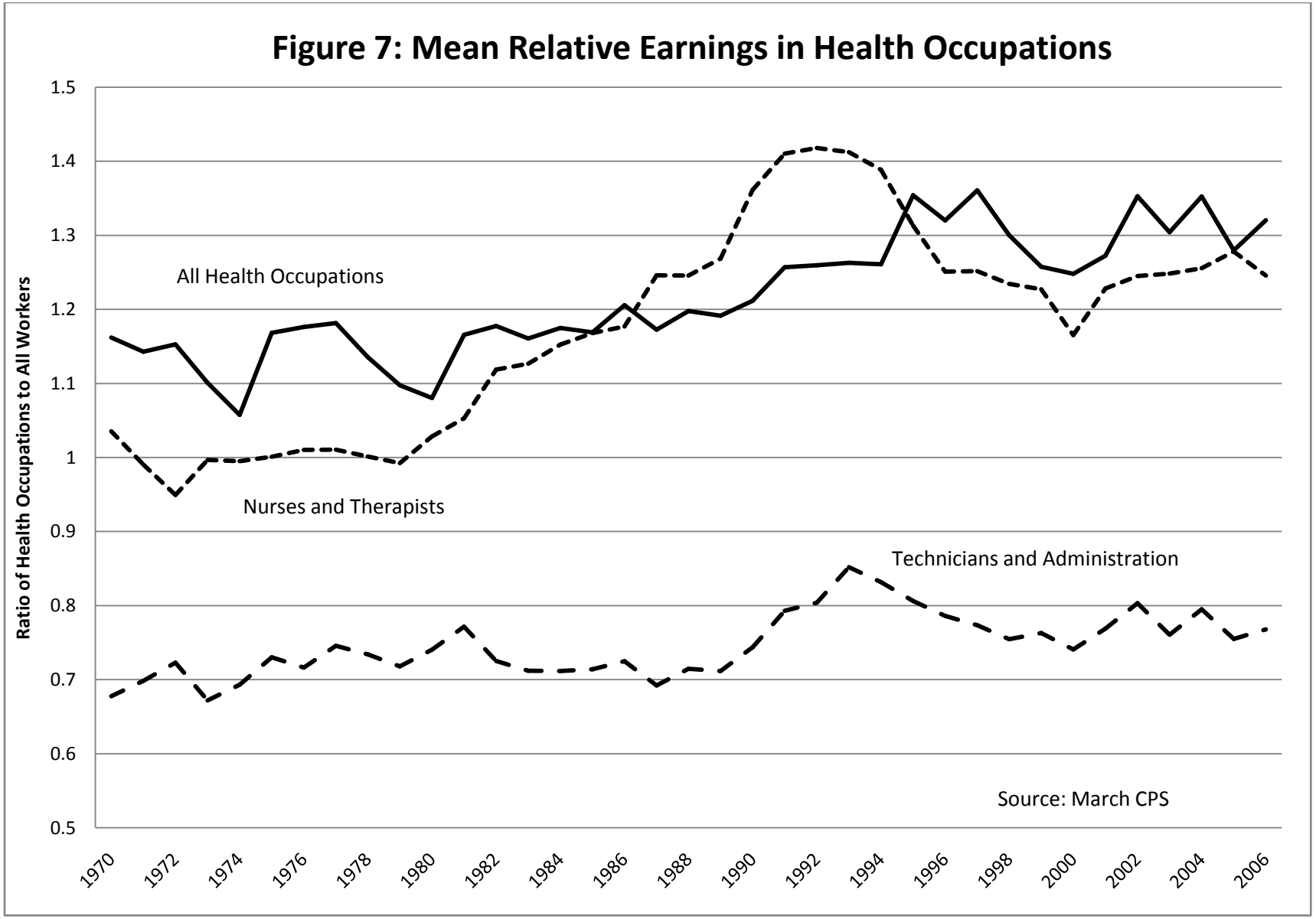


Figure 7: Mean Relative Earnings in Health Occupations
Ratio of Health Occupations to All Workers
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
All Health Occupations
Nurses and Therapists
Technicians and Administration
Source: March CPS
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006