AN EXAMINATION OF HEALTH-SPENDING GROWTH IN THE UNITED STATES: PAST TRENDS AND FUTURE PROSPECTS

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1 Introduction

Long-run projections of the U.S. federal budget have played a prominent role in discussions about fiscal policy and the design of major transfer programs for several decades. The projections typically show large fiscal imbalances owing to ramping up of retirement and health care costs relative to GDP. Health care costs are the key factor in these projections for two reasons. First, in current projections they are the prime source of growth of spending as a share of GDP. Second, they are the most uncertain part of the forecast. For example, the Congressional Budget Office's most recent long run outlook shows spending on Medicare and Medicaid, the governments health programs for the old and poor, respectively, rising from 4.1 per cent of GDP in 2007 to 19.1 per cent of GDP in 2082.¹ By contrast, Social Security benefits (the government's main old-age pension program) increase only 2 percentage points, from 4.3 per cent of GDP in 2007 to 6.4 per cent in 2082. Another analysis by CBO suggests that an 80 per cent confidence band around the Social Security projection would be from 5¹/₂ to 9¹/₂ per cent of GDP.² CBO did not present similar calculations for health spending; instead, they projected health spending under three different assumptions about the rate of growth of age-adjusted health care spending in excess of per capita income. Their projections show health spending ranging from 7 to nearly 40 per cent of GDP by 2082.

The state of the art in health care projections is still very rudimentary. While short-run projections are often infused with analysis of supply and demand by consumers and providers, the long run analysis is typically focuses on the age-composition of the population and an assumed excess growth rate of per capita spending above per capita income. For example, the Medicare Trustees used a sophisticated short-run analysis for the first ten years, a long run assumption of age-adjusted health costs rising 1 per cent faster than income from years twenty-five to seventy five, and an intermediate period where excess growth slows to the long-run assumption. The Congressional Budget Office and the Administration use similar approaches where short run projections ease into long-run assumptions. The assumptions about excess growth are based on historical growth rates for health care relative to income.

The standard approach of extrapolating historical excess growth is problematic for constructing a useful benchmark that facilitates policy analysis. First, this approach tends to ignore that Medicare and Medicaid reflect the larger health care market. Assumptions about the future evolution of these programs should reflect similar assumptions regarding the rest of the health care market. Historically, Medicare and Medicaid payments have been similar to those in the private

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¹ CBO (2007), The Long-term Budget Outlook.

² CBO (2006), Updated Long-Term Projections for Social Security.

insurance market.³ Failure to tie Medicare and Medicaid to the overall health care market may lead to implausible "baseline" assumptions about either total health care or the relation between payments for these programs and for private insurance markets.

Second, the current strategy does not provide much information about the adequacy of the government insurance programs in the baseline. For example, without an understanding of the amount and distribution of total health care spending, it is difficult to evaluate whether the amount of government spending in the baseline provides more or less insurance relative to private markets. Moreover, the current strategy provides little information about the pressures on household finances from rising health care costs. These pressures may have important implications about potential responses by policy makers.

Third, the current strategy does not provide a useful framework to analyze the effects of new policies. Importantly, the use of exogenous excess growth assumptions for federal health care spending implies that analysts will have very limited ability to evaluate policy changes because the baseline values of the parameters that are being changed are not known.

In this paper, we examine the macro and micro factors that are likely to be important in projecting both public and private long-run health spending. First, we examine the rate of excess health-spending growth historically at the macro and micro levels as well as domestic and international perspectives. From this analysis we conclude that excess growth has averaged about 2 per cent per year over the past forty years. In addition, we present evidence that the roles of population aging and income growth have been larger while that of technology has been smaller than has been estimated previously. More importantly, there is evidence that excess growth has slowed over time and that some of the factors that have boosted it historically may not be factors going forward. This calls into question the use of long historical averages for baseline forecasts.

Next, we simulate the evolution of the level of aggregate consumption, health consumption, and consumption of non-health goods and services over the next seventy-five years based on several different constant rates of excess growth of health spending. This analysis leads to a conclusion that 1 per cent excess growth is a good *upper* bound for long run growth because faster rates of growth would lead to declining levels of non-health consumption despite rising real incomes.

Third, we turn to the micro data sets to develop a set of stylized facts about the distribution and financing of health care in the United States. We find health care spending is flat across income and rises rapidly with age. The flat distribution implies that health care spending as a share of income increases rapidly as income falls. But private health care spending as a share of income does not increase as rapidly as overall health spending because government payments finance the lion's share of spending in the lowest income quintiles.

Fourth, we examine health spending by income quintile and age group over next 75 years by projecting current spending and financing patterns forward assuming excess growth is 1 per cent. We find that private health-spending share of income does not rise so precipitously that non-health consumption must be reduced, even among low income quintiles because the private share is held down by government financing. We also examine the implications of two policies to limit the projected increase of private health-spending burden for it effects on public spending. We find that a narrow expansion of assistance to the lowest quintile would have only minor consequences to government finances but more broad-based programs would have materially deleterious effects. In

³ Boccuti and Moon (2003) report that Medicare reimbursement rates have been similar to those of private insurers. Deviations in overall per capita spending between Medicare and private insurance have tended to reflect coverage differences and Medicare program expansion.

addition, we examine two policies to reduce future public health care spending and find that they must be targeted to upper quintiles if equality of health access is to be maintained.

Finally, we review the Congressional Budget Office's latest government health-spending projection. Our chief concern with their projection is their assumption that per capita spending by Medicare grows much more rapidly than that of the private sector. The projected divergence seems inconsistent with the underlying assumption that policies are unchanged because Medicare and private sector insurance plans have had similar payment rates historically.

2 Macroeconomic evidence on health-spending growth and its determinants

Health-spending growth has exceeded income growth by 2.5 percentage points, on average since 1960. As a result, health care spending as a share of GDP has risen from $5\frac{1}{4}$ per cent in 1960 to 16 per cent in 2005. A key question is whether excess growth has shown any discernable trend over the period. One method is to examine the trend in health spending as a share of GDP. It is easy to show that the log of the ratio of aggregate health care, *H*, to aggregate income, *Y*, increases linearly when excess growth, *h*, is constant:

$Ln[H(t)/Y(t)] = Ln [H_0/Y_0] + h^*t$

A regressions on the log of the ratio of heath to GDP shown in Table 1 indicates that the heath share has not increased at a rate consistent with constant excess growth; rather excess growth has tended to decline over time.

The slowdown evident in this regression may reflect a falling income elasticity of demand. One property of the income elasticity is that it cannot be globally greater than one (nor can the price elasticity be globally less than one) because when the share of income devoted to the good becomes high the elasticity must fall to allow the budget constraint to hold. While the slowdown may reflect changing elasticities, it may also reflect other factors. Some candidates include population aging, rising consumption share of GDP, increased insurance coverage, and cyclical swings in GDP.



Table 1

									Predicte	ed Values
Constant	Т	T^2	Gap	Elderly share	PCE	Price	Adj. R^2	D.W.	Excess	Growth
									1970	2006
1.59	0.035	-0.00020					0.991	0.454	3.1	1.7
	(0.001)	(0.00003)								
1.91	0.030	-0.00017	0.0039				0.995	0.226	2.6	1.4
	(0.001)	(0.00002)	(0.00002)							
1.53	0.025	-0.00011	0.0036	0.039			0.995	0.275	2.3	1.5
	(0.002)	(0.00003)	(0.0007)	(0.015)						
-2.95	0.027	-0.00023	0.0026	0.018	1.134		0.996	0.328	2.2	0.5
	(0.002)	(0.00006)	(0.0008)	(0.016)	(0.439)					
-5.19	0.024	-0.00023	0.0016	0.012	1.593	-0.202	0.996	0.441	2.0	0.7
	(0.004)	(0.00005)	(0.0008)	(0.015)	(0.439)	(0.079)				

Excess Spending Growth Regressions

Range: 1960 to 2006.

Dependent variable is: Ln[NHE/GDP*100].

NHE = National Health Expenditures, T = Time, Gap = GDP gap *(fitted value from baseline regression), Elderly share = (population aged 65 and over)/(total population), PCE = Ln(personal consumption expenditures/GDP), Price = Ln(ratio of out-of-pocket expenditures to total expenditures).

Standard errors in parentheses.

- The portion of the population that is 65 or older has grown from 9 to 12 per cent and per capita spending by the elderly is about 4.5 times that of the non-elderly. Accordingly, the rise in the elderly share would boost health spending by about 8 per cent or 1.2 percentage point of GDP when total health spending reaches 15 per cent of GDP.
- The rising share of consumption in GDP may have increased health spending as a share of GDP. The share of consumption in GDP rose from 63 to 70 per cent from 1960 to 2006. If consumption were to fall back to 63 per cent of GDP and the spending on health services were reduced proportionally, then health expenditures as a share of GDP in 2006 would fall from 16 to 14.5 per cent.⁴
- The out-of-pocket share of expenditures fell from 52 per cent of spending in 1960 to only 13 per cent in 2006 and this may have spurred demand.
- Health spending appears to reflect permanent income, rather than temporary income, to a greater extent than consumption overall, perhaps reflecting the dominance of third-party payments. Some of the low spending share in the late 1990s may reflect GDP higher than potential, while the jump in 2001 may reflect the recession.

The bottom portion of Table 1 provides regression results accounting for these factors. The regressions control for deviations of actual GDP from potential GDP by a GDP gap variable to allow for a different marginal propensity to consume health out of cyclical income than out of permanent income.⁵ The coefficient suggests that the cyclical MPC is close to zero. That is, health

⁴ This counterfactual assumes that the rise in the wealth-income ratio, financial liberalization and other factors that increased consumption relative to income boosted health and non-health consumption equally.

⁵ If the MPC out of cyclical income is zero then the coefficient on the gap variable should be equal to the health share and thus rise over time as the share rises. Consequently, we used the product of the gap and the fitted value of the health share from the regression on time as our gap variable.

care spending does not respond to temporary deviations in income and is driven by permanent income. The second regression examines whether the changing share of the elderly in the population helps to explain the health-spending share. The coefficient on the aged-share of the population is significant with the correct sign and magnitude.⁶ The third regression controls for the rising share of consumption in GDP. The coefficient on the consumption term indicates that the estimated contribution from the rise in consumption is 1.1 percentage points of GDP, a bit smaller than our back of the envelope calculation. The aged-share is no longer significant, but this may reflect the multi-colinearity of the time, consumption, and age variables. The final regression controls for the ratio of out-of-pocket payments to total payments and the coefficient indicates that the demand elasticity is -0.2, consistent with the microeconomic evidence.

Across all of the regressions, excess growth falls over time. In the basic regression it falls from around 3 per cent in 1970 to $1\frac{3}{4}$ per cent by 2006. With the augmented regressions the reduction is smaller, from $2\frac{1}{4}$ per cent to a range of $\frac{1}{2}$ to $1\frac{1}{2}$ per cent. Importantly, the additional explanatory variables do not account for the slowing of excess growth over time. The smaller increases in excess growth do not necessarily imply that technological change is occurring at a slower pace with the passage of time. The amount of excess growth depends, in part, on whether technological change is boosts or reduces health care spending. In addition, excess growth depends upon the endogenous private and public response to rising health costs.

International data also suggest that excess growth may have fallen over time in many countries. White (2007) finds that OECD countries, excluding the United States experienced a decline in excess growth from 2 per cent over the 1970-1985 period to ³/₄ per cent over the 1985-2002 period. For example, Table 2 reports regressions on real health spending and real GDP across OECD countries reported by White.⁷ The first two regressions examine the relation between real per capita GDP and real per capita health spending across countries two points in time, 1970 and 2002; there is no control for the age distribution of the population. The regressions indicate that the income elasticity fell from 1.5 in 1970 to 0.9 in 2002, consistent with slowing excess growth. The third regression looks at growth rates of health spending. The dependent variable is the average annual growth rate of age-adjusted per capita real health spending over the 1970 to 2002 period. The regression using only real per capita GDP growth yields an elasticity of 1.2. We added a term that measures the ratio between a country's real health spending in 1970 and that of the highest spending country in that year (Switzerland) to capture convergence to high spending countries. That specification leads to a coefficient on real GDP growth of 0.65 and a coefficient of 0.5 on the initial spending ratio term. In both regressions, the constant term picks up the average excess growth across countries and is about 1. Of course these regressions do not control for many factors. But, long range projections prepared by the European Commission, that are based on their more detailed analysis and include factors such as falling mortality and morbidity rates, yield projections where excess growth is zero, or even negative.⁸ In summary, the international data and analysis suggest that excess growth has been 1 per cent or less and that expectations going forward are that it will slow substantially further.

⁶ The coefficient indicates that the three percentage point increase in the elderly share increased the health share by 1.2 percentage points.

⁷ Throughout this paper real health care spending is nominal spending deflated by the GDP deflator. Quality changes are very difficult to measure and thus real quantities of care are difficult to gauge.

⁸ For example, Bartosz Przywara and Declan Costello ("Health Care Expenditure Projections: Results, Policy Conclusions and Recommendations for Future Work", this volume) show that improved health and lower death-related costs are likely to hold down spending relative to the pure-ageing baseline with no excess growth.

3 Microeconomic evidence for factors behind the rise in health spending

Numerous studies have tried to allocate health-spending growth various factors. to The best known are Newhouse (1992), Cutler (1995), and Smith, Heffler, and Freeland (2000) which produce similar findings. These studies find that aging and real income growth account for a relatively small fraction of the increase in real spending over the 1940 to 1990 period, while increased insurance coverage, changes in relative prices, and increased administrative costs have

Log levels Adj. R^2 **Real GDP Date Range** Constant 1970 0.701 -5.77 1.50 (1.85)(0.23)2002 -1.08 0.87 0.428 (2.38)(0.23)Growth rates Initial Date Range Constant Real GDP Spending Adj. R^2 Ratio 0.94 1970-2002 1.15 0.557 (0.57)(0.24)1970-2002 1 25 0.65 2.08 0.652 (0.51)(0.29)(0.87)

Dependent variable is real per capita health spending using PPP dollars. Data are from White (2007).

Initial spending ratio is defined as 1 minus the ratio of real health spending in the country to that of the highest spending country (Switzerland). Standard errors in parentheses.

Countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Japan, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States.

been important contributors to growth. The reminder, about 50 to 60 per cent, is assigned to technology-related changes in medical practice.

Our estimates, by contrast, suggest a larger role for income and aging. The elasticity of demand with respect to real income growth is subject to debate. As explained in Getzen (2000), studies of individual demand for health services that are largely covered by insurance indicate small income elasticities, while studies of consumption of health care products that are less well covered by insurance, and studies at the macro level – time series or cross country – indicate much larger elasticities. Studies across individuals which control for health and other variables show an income elasticities closer to 1 and cross-country analyses report elasticities of about 1.2. As argued by Getzen, the national and cross-country data are more appropriate for our analysis and using an elasticity of 1.0 generates a 24 per cent contribution from real income growth since 1960.

The role of aging has been small, but probably larger than that estimated in previous studies. Figure 2 shows the age-profile of spending for various years using the MEPS data. These data, which exclude institutional care, indicate that spending by those aged 65 and old is about 3.5 times that of those aged 20 to 64 and has not changed over the past decade, though it rose quite rapidly after the introduction of Medicare in 1966 through the mid-1980s.

448

Table 2

Cross-country Regressions on Health and GDP

⁹ Marquis and Long (1995) review studies using micro data which includes a range from 0 to 0.2. Newhouse (1992) reports a range of 0.2 to 0.4 for studies based on the Rand experiment.

Factoring in institutional care raises the figure to 4.5.¹⁰ Using the 4.5 ratio, an index of the spending-weighted population grew 8 per cent more rapidly than the overall population, and when the population is disaggregated further to account for the decline in the low-cost youth share of the population, the spending weighted population rose 18 per cent faster. Accordingly, we estimate that health care spending in 2005 would have been 15 per cent lower with the 1960 demographics, implying that aging contributed 17 per cent of the real increase in spending.¹¹ By contrast, Newhouse calculates that the 14 per cent increase represents only 2 per cent of the 840 per cent increase in real per capita health spending over the 1940 to 1990 period. His calculation evaluates the change in demographics at the 1940 spending level for health, while our calculation uses the 2005 level of health spending; the difference between the two calculations is the treatment the interaction effects of aging with

Contributions of Selected Factors in Growth of Real Per Capita Health-care Spending

(percent)	
(percent)	

		Study						
Factor	Newhouse (1992)	Cutler (1995)	Smith, Heffler and Freeland (2000)	Follette & Sheiner				
Period	1940-90	1940-90	1940-90	1960-2005				
Demand-side factors								
Personal income growth	Less than 23	5	11 to 18	24				
Aging of the population	2	2	2	17				
Insurance	10	13	10	15				
Supply-side factors								
Administration	No estimate	13	3 to 10	2				
Health sector prices	No estimate	19	11 to 22	No estimate				
Residual								
Technology, other	More than 65	49	38 to 62	42				

Source: CBO (2008), *Technological Change and the Growth of Health Care Spending*, January, and authors' calculations.

Figure 2





Source: Calculations based on Medical Expenditure Panel Survey (MEPS), various years.

Table 3

¹⁰ Meara *et al.* (2004) estimates the ratio of spending by those 65 and older relative to those under age 65 rose from 2.4 in 1963 to 4.4 in 2000. Lubitz *et al.* (2001) estimates the ratio rose from 2.9 in 1966 to 4.6 in 1996. Sheiner (2004) examines the trends in spending by age among the elderly population, and finds that health spending by age has remained constant over time.

¹¹ Real per capita health expenditures rose \$4,151 from \$576 in 1960 to \$4,726 in 2005. We estimated that spending would have been 15 per cent lower, with 1960 demographics (or that 2005 demographics boosts spending by 18 per cent). That results in \$707 in extra spending in 2005, 17 per cent of the total increase in real spending.

income, technology, and other factors.

The increase in health insurance coverage in the United Sates probably had a dramatic effect on spending for health care for the elderly. The ratio of per capita spending on those over 65 to those under 65 rose from roughly 2.5 before Medicare was enacted and when about 50 per cent of the elderly had health insurance coverage to 3.5 with universal coverage five years later.¹² Health insurance for those aged 25 to 65 also is now more widespread, rising from 75 per cent in 1963 to 82 per cent in 2006, and insurance coverage for children has risen from 65 to 90 per cent. The uninsured receive less health care than the insured, by an estimated 20 to 50 per cent depending upon treatment needs.¹³ 2005 spending would have been 9 per cent lower assuming insurance coverage had not increased since 1960 and that the uninsured spend 60 per cent of the amount spent by the insured. In addition, those with coverage face lower effective prices because the share of expenditures covered by co-payments and deductibles has fallen. Combining these two features, third party payments now account for vast majority of outlays: consumer out-of-pocket payments fell from 51 per cent of health service expenditures in 1960 to 37 in 1970 to 13 per cent of health services in 2005. If the price elasticity of demand is -0.2, then the 75 per cent decline in the effective price leads to a 15 per cent increase in demand by 2005.^{14, 15}

Several supply-side factors have been highlighted in the literature, including rising administrative costs, increased relative prices for health care, and increased technology. According to the national health accounts data, administrative costs (including insurance company profits) have risen from 4.4 to 6.9 per cent of expenditures and from 0.2 of GDP to 1 per cent of GDP. The rise in administrative costs also increases the effective price of health care and therefore reduces demand. Using a price elasticity of demand -0.2, the net effect of the rise in administrative costs is to boost spending by about 2 per cent. We did not attempt to estimate a role for changes in relative prices of the health sector in boosting health spending as a share of income because we do not believe that existing measures of quality change, and therefore prices exist.

Putting these factors together, perhaps 60 per cent of the increase in real health spending over the past fifty years can be attributed to aging, income, insurance, and administrative costs, with the rest reflecting increases in technology. An alternative decomposition is that half of the excess growth above income is not accounted for by aging, insurance or administrative costs. Accordingly, 1.1 percentage points of the 2.2 percentage points of age-adjusted excess growth over the period resulted from technological change and other factors and 1.1 percentage points reflected the effects increased insurance coverage and administrative costs.¹⁶ The historical data therefore support excess growth of 1.1 per cent per year if we assume that out-of-pocket costs do not decline further and that administrative costs (as a share of expenditures) do not rise further. However, demand should fall short of this as consumers respond to rising health bills. As health care spending increases in its share of total household spending, each additional 1 per cent increase in health care implies ever increasing percentage reductions in spending on other goods. This "price"

¹² Finkelstein (2005). CMS data point to 54 per cent hospital insurance coverage and 45 per cent for surgery for those 65 or older, while Finkelstein reports 25 per cent "meaningful" insurance coverage.

¹³ Doyle (2003) finds the uninsured spend 20 per cent less than the privately insured after automobile accidents. Thorpe and Howard (2005) find that uninsured cancer patients spend 43 per cent less.

¹⁴ The reduction in price combines changes in insurance status as well as deductibles and co-payments. Chandra, Gruber, and McKnight (2007) report that the researchers using the Rand health experiment find an elasticity around -0.2 and they conclude that their data is consistent with a more elastic response.

¹⁵ Finkelstein (2005) argues that this type of calculation underestimates the effect of insurance because it excludes the role that health insurance may play in inducing cost increasing medical innovation and its diffusion.

¹⁶ Real per capita health rose 2.5 percentage points faster than real per capita consumption, and 0.3 percentage points owed to the change in the age structure.

effect is particularly important with large assumed increases in excess growth, which we now turn to explore.

4 Health and non-health consumption over the next seventy five years

This section examines the implications of ever-increasing health care spending on consumption of non-health goods and services. We begin with the macroeconomic assumptions assumed in the 2007 Social Security and Medicare Trustees Reports. We follow the methodology laid out in Follette and Sheiner (2005) where we constructed total personal consumption expenditures to be GDP less the sum of gross investment, government purchases, and net exports. Our projection of gross investment assumes that the real per-worker capital stock continues to rise at the historical rate, consistent with the Trustees' assumption that labor productivity will increase at near its historical trend and that depreciation rates would remain at current values. We assume that government purchases are maintained at their 2004 share of GDP. We also assume that net exports rise over the coming fifteen years to post a small surplus that stabilizes the current account deficit at 2 per cent of GDP, which in turn allows the ratio of net foreign debt to GDP to stabilize at about 50 per cent.¹⁷

Table 4

	Composition of GDP (percent)							
Year	Consumption	Investment	Government	Net Exports	Memo: Net Foreign Assets			
2005	70.2	16.5	19.0	-5.8	-18			
2010	70.5	14.2	19.1	-3.8	-36			
2020	68.3	12.8	19.1	-0.2	-53			
2030	68.4	12.1	19.1	0.4	-52			
2060	70.1	10.5	19.1	0.2	-49			
2090	71.6	9.1	19.1	0.2	-48			

Table 4 shows the results. The projected slowdown in labor force growth leads to a smaller share of GDP devoted to investment over time. The decline in investment about offsets the swing of the trade account; accordingly the share of GDP going to consumption is relatively constant. Nonetheless, consumption declines over the next fifteen years from 70 per cent of GDP in 2005 to 68 per cent of GDP by 2020 because the swing in the trade account is assumed

to be completed by that time. It then climbs, reflecting further declines in the investment share of GDP.

We project the share of consumption devoted to health spending by a two-step procedure. First, we allocate BEA's estimate of personal consumption expenditures on health in 2004 among three age groups (under 20, aged 20 to 64, and 65 and over) using the population shares and the relative health-spending intensities. Then, health spending was projected forward using the Social Security Trustees' population projection, GDP per capita, and selected assumptions about excess

¹⁷ Alternative assumptions about the steady-state level of the current account deficit would have only a small effect on the trade account surplus and therefore on consumption.

Table 5

Veen		Excess Growth							
Year	0	0.5	1	1.5	2	2.5			
2005	20.2	20.2	20.2	20.2	20.2	20.2			
2020	22.6	24.2	25.8	27.6	29.5	31.5			
2030	24.4	27.3	30.7	34.4	38.5	43.1			
2055	24.7	31.3	39.6	49.9	63.0	79.3			
2080	25.1	35.8	51.0	72.5	102.9	145.7			
Crowd-out year	n.a.	n.a.	n.a.	2056	2022	2014			

Health Share of Consumption (percent of consumption)

Table 6

Real Per Capita Non-health Consumption

Voor	Excess Growth							
rear		0.5	1	1.5	2	2.5		
2005	20.5	20.5	20.5	20.5	20.5	20.5		
2010	22.7	22.5	22.4	22.3	22.2	22.1		
2020	24.6	24.1	23.6	23.0	22.4	21.8		
2030	27.5	26.4	25.2	23.9	22.4	20.7		
2055	41.6	38.0	33.4	27.7	20.5	11.4		
2080	62.8	53.8	41.1	23.1	-2.4	-38.3		

(thousands of year 2000 dollars)

health care growth beginning in 2007. Real health spending was calculated using the PCE deflator which was assumed to grow at the same rate as the GDP deflator.

Our projections are summarized in Tables 5 and 6 and Figure 3. Persistent excess growth of 1.0 per cent or less does not lead to crowd-out of non-health consumption, while higher levels of excess growth lead to crowd-out within the seventy-five year projection window used by the Trustees. Crowding out begins when the share of consumption devoted to health is greater than the ratio of the growth rate of consumption to the growth rate of health care.¹⁸ Our projections indicate stress on non-health consumption as soon as the next decade with excess growth of as little as 2 per cent. As noted earlier, consumption grows more slowly than GDP over the next fifteen years

¹⁸ With per capita consumption growth of 1.5 per cent and 2 per cent excess growth of health care, crowd-out begins when health care is 43 per cent of consumption. For 1 per cent excess growth, crowd-out begins when health care reaches 60 per cent of consumption.



Per capita Real Non-health Consumption (constant 2000 dollars)



owing to the assumed current account correction. The slow growth of overall consumption leads to declines in non-health consumption as soon as 2015 with 2 per cent excess growth. Over the next seventyfive years, excess growth of 2.0 per cent leaves no resources for non-health consumption and excess growth of 1.5 per cent yields significant declines in per capita non-health consumption. With these results, 1 per cent excess growth looks to be an upper bound for seventy-five year projections, while 2 per cent could be maintained for only a relatively short period of time. Balanced projections that leave room for errors on both sides should probably assume rates of excess growth lower than 1 per cent.

5 Projections of the distribution of spending

The assumption of 1 per cent excess cost growth is feasible if the appropriate criterion to use for feasibility is that the average consumption of non-health goods and services will not decline over the next century. However, it is important to also examine whether such growth of non-health consumption will be feasible for different groups. The question of whether health spending will crowd out non-health spending depends on the initial share of health spending in consumption. If some groups have higher shares today, then, assuming that health-spending growth constant across is population, the these will groups face absolute crowd-out sooner than the average.

To examine some of the microeconomic issues associated with the excess cost growth

Household Health Spending by Equivalent Income Quintile
(2000 dollars)

Table 7

Income			Year		
quintile	1970	1977	1987	1997	2004
			Non-elderly		
1	2,520	3,205	4,321	4,180	6,475
2	2,754	3,364	4,094	4,381	5,771
3	2,631	3,361	3,772	4,374	6,371
4	3,525	2,883	3,958	4,237	6,081
5	2,135	3,114	3,717	4,545	6,583
			Elderly		
1	1,836	4,667	5,977	8,019	11,475
2	1,893	4,233	7,856	8,320	10,941
3	2,041	5,904	7,210	8,485	12,179
4	2,709	4,246	7,787	9,626	15,112
5	1,926	4,758	7,500	8,195	11,837

assumption, we use the various national medical expenditure surveys that have been conducted over the years. Specifically, we examine data from 1970, 1977, 1987, 1997, and 2004.¹⁹ We examine total medical spending and private medical spending for the non-institutionalized by family-size equivalent income level.²⁰ We measure total medical spending financed by private insurance (thus zero for those who do not experience any illness, even though they may have private insurance), assuming that the distribution of privately-financed medical expenditures will roughly equal the distribution of private insurance premiums.²¹ Similarly, we do not have measures of consumption, only income. Thus, we evaluate crowd-out relative to income rather than consumption.

Table 7 shows the distribution of health spending per household member over time across income quintiles for elderly and non-elderly households, where an elderly household is defined as one in which the household head is 65 or older. Health spending does not vary substantially with income. For the non-elderly, health spending does not vary with income quintile. For the elderly, those in the top two quintiles do spend a bit more on average, but spending is quite flat across the bottom three quintiles. Note that this does not mean that lower-income people have equal access to health care. Indeed, those with lower-income tend to have a greater need for health care, as they tend to be in poorer health, but they tend to have less insurance coverage and it has been well documented that those without insurance receive less care than the insured.

¹⁹ We use the *Survey of Health Services Utilization and Expenditures* (1970), the *National Medical Care Expenditure Survey* (1977), the *National Medical Expenditure Survey* (1987) and the *Medical Expenditures Survey* for 1997 and 2004.

 $^{^{20}}$ The income measure we use to sort households into income quintiles divides income by the weighted number of family members, where the first adult has a weight of 1, each subsequent adult has a weight of 0.7 and each subsequent child has a weight of 0.4.

²¹ This procedure will understate private health spending because it does not account for the insurer's markup of insurance premium over reimbursements. In addition, for the elderly it scores all of Medicare Part B expenditures as government spending because it does not count as private spending the Part B spending that is financed by the elderly's premium payments.

Income	Year						
quintile	1970	1977	1987	1997	2004		
		1	Non-elderly				
1	16.1	28.8	36.2	37.1	58.0		
2	8.7	10.9	13.5	14.2	18.3		
3	6.6	7.6	8.2	9.0	12.9		
4	6.7	5.0	6.3	6.5	8.6		
5	2.6	2.9	3.5	4.2	5.4		
			Elderly				
1	33.8	78.4	82.0	110.0	152.0		
2	23.3	40.9	63.1	60.3	75.8		
3	18.4	38.3	38.4	40.8	54.9		
4	14.9	18.2	28.0	29.3	41.5		
5	4.1	7.5	10.7	11.3	17.1		

Mean Household Health Spending by Quintile (share of mean household income by quintile)

Table 9

Table 8

Mean Private Household Health Spending by Quintile (share of mean household income by quintile)

Income			Year		
quintile	1970	1977	1987	1997	2004
]	Non-elderly		
1	9.6	13.6	14.0	13.2	18.0
2	7.8	8.2	9.6	10.0	12.8
3	6.3	6.3	7.0	7.2	11.0
4	6.1	4.4	5.6	5.6	7.6
5	2.5	2.5	3.1	3.4	4.7
			Elderly		
1	10.0	18.4	18.6	21.6	38.4
2	8.9	13.2	18.2	17.5	21.2
3	8.5	11.9	17.7	15.4	18.2
4	6.7	6.6	12.0	11.7	12.9
5	2.5	2.8	5.4	5.0	6.7

²² These are mean spending by quintile divided by mean income by quintile.

The implications of these findings on health spending as a of income are share shown in Table 8. The relative constancy of health spending across income quintiles translates into large differences in the ratio of health spending to and large income increases over time.²² By 2004, health spending by low-income elderly households represented 152 per cent of income, up from 34 per cent 1970; for in the lowest-income non-elderly households, health spending represented 58 per cent of income, up from 16 per cent in 1970. These numbers suggest that excess health care cost growth will tend to cause crowd-out of non-health consumption much earlier for older lower-income and groups. But to determine crowd-out, it is important to concentrate on private health spending rather than total health spending.

Table 9 reports the shares of income represented by private health spending – that is, health spending financed by private insurance or out-of-pocket payments. Two important facts stand out: First, private health spending is a much smaller share of income for most groups than total health spending. For example, mean private health spending represents 18 per cent of mean income for the lowest nonelderly income quintile in 2004, as opposed to 58 per cent for total health spending. Second, there is much less variation across income quintiles in the share of income represented by private health spending than public health spending. For example, in 2004, the share of spending for the lowest non-elderly income quintile was more than 10 times larger than the share for the highest non-elderly quintile; for private health spending, the share was only 4 times larger for the lowest quintile. The rising private health-spending share in recent years for the low-income elderly reflects increased spending on drugs which were poorly covered by Medicare and Medicaid. With the prescription drug benefit now in effect, we estimate that this share has dropped down to near its 1997 level.

Table 10 shows that the public share of health spending for the lower income quintiles of the non-elderly has expanded rapidly. Among the non-elderly, the share of health care paid by Medicare and Medicaid rose from 34 per cent in 1970 to 56 per cent in 2004 and a similar increase among the second quintile, while among the middle quintile the Medicaid and Medicare share rose only 5 percentage points. Among the elderly, the story was quite a bit different and more complicated. Among the poorest quintile, the share was virtually unchanged, edging up from 70 per cent to 71, while among the highest income quintile the public share rose from 39 per cent to 52 per cent. The rise at the top probably reflects greater coverage of home health, the failure of co-payments to keep up with rising charges, and other changes to Medicare. The results among the poorest reflect changes to Medicaid as well as Medicare. In addition, the relative increase in pharmaceutical use in health care had an important effect on the public share because drugs were not covered by Medicare. Thus, although the public share of total health costs among the lowest quintile was stagnant, the public share of health costs excluding drugs rose significantly.

We use these facts to explore whether health care cost growth is sustainable across income quintiles from the perspective of crowding out non-health consumption and whether there will be increased demand for the public sector to further enlarge its role in health care financing to ameliorate crowd-out.

6 Simulations of health care spending by quintile

We simulated the evolution of income and health spending over the next seventy-five years to determine whether 1 per cent excess growth in health care spending would lead to declines in non-health spending for groups with relatively high health costs. We began with the 2004 income and health-spending data described above. We projected the income of

Share of Health-care Spending Provided by Medicare and Medicaid

Table 10

Income	Non-e	elderly	Elderly		
quintile	1970	2004	1970	2004	
1	34	56	70	71	
2	6	23	62	67	
3	2	7	45	59	
4	3	4	54	61	
5	0	2	39	52	



Figure 4

each quintile of elderly and non-elderly by increasing their income by the amount that real per capita GDP is projected to grow over the same period. This assumes that the distribution of income does not change going forward, either across quintiles or between non-elderly and elderly and that per capita factor income grows at the same pace as overall GDP.²³ Our income measure also includes transfers, but excludes taxes, and our methodology implicitly assumes per capita transfers to the elderly rise in line with GDP, while under current law they are projected to rise more slowly owing to the increase in the normal retirement age to 67 for Social Security benefits.24

Health care spending is projected forward after making two adjustments to the 2004 data. First, we increase proportionately 2004 health spending across all income groups (maintaining the shares financed by public and private sectors) to bring the overall level up to the share in spending observed in the national

Total Health Spending: Non-elderly (percent of income, by household income quintile)



²³ Over the projection, factor income will likely grow more slowly than GDP reflecting the rising foreign indebtedness. The distribution of factor income between non-elderly and elderly may change if the relative returns to capital and labor change.

²⁴ The "normal retirement age" is the age at which workers can retire and receive full benefit.

accounts data. The micro data understate health spending because they do not include private or public administrative costs and profits and spending on institutionalized patients. Second, we altered the public/private spending shares for the elderly to capture the Medicare drug benefit.²⁵

Our results, displayed in Table 11 and Figures 4 and 5, indicate that while private health care spending will rise to a very large share of income among the lower quintiles, real non-health consumption will not be crowded out - for the quintile on average - over the projection period. Low-income groups now only spend a small portion of their income on health because a large share of health spending is financed by the public sector. In 2080, when health care costs are projected to be 124 per cent of income on average for the lowest non elderly quintile, only 38 per cent of income will be spent on private insurance and out-of-pocket health expenditures. Thus non-health consumption



Private Health Spending: Non-elderly

(percent of income, by household income quintile)



²⁵ Lacking good estimates on the overall impact (increased Medicare less decreased Medicaid) of the drug benefit by quintile we apportioned the drug benefit by observed drug spending. This resulted in a fairly even distribution of the benefit across quintiles with the lower two quintiles receiving 30 per cent higher per capita benefit than the top two quintiles. With 90 per cent take-up rates the basic benefit will be broadly distributed, we assume, in effect, that the low income subsidies will largely offset by reduced Medicaid payments.

Figure 5

Table 11

Income			Year		
quintile	2004	2020	2040	2060	2080
			Non-elderly		
1	18.0	21.1	25.8	31.5	38.4
2	12.8	15.0	18.4	22.4	27.4
3	11.0	13.0	15.8	19.3	23.6
4	7.6	8.9	10.9	13.3	16.3
5	4.7	5.6	6.8	8.3	10.1
			Elderly		
1	38.4	28.4	34.7	42.3	51.7
2	21.2	21.1	25.8	31.5	38.5
3	18.2	19.9	24.3	29.7	36.3
4	12.9	15.0	18.3	22.4	27.3
5	6.7	7.8	9.5	11.7	14.2

Mean Private Household Health Spending by Quintile (share of mean household income by quintile) can continue to grow, on average, for this quintile.²⁶ Among the elderly, we project the lowest quintile's private health spending will reach 52 per cent of income by 2080.²⁷ the Although public sector finances 82 per cent of health care, the other 18 per cent uses up over half of the quintile's income because health care costs are 325 per cent of income for this group.²⁸

While none of our ten quintiles will have declining non-health resources, subgroups among the quintiles may see declines relative to earlier generations, particularly families with persistent high health expenditures.

Furthermore, our analysis does not account for the taxes that will be needed to finance the increased transfers for Social Security and health care. If these increased taxes are broadly based, then some of the lower quintiles may also see declines in the resources available to finance non-health spending.

7 Endogenous responses by government

Historically, political pressure has mounted when groups have faced increasing health costs. The creation of Medicare and Medicaid in the 1960s is one example of increased government support during a period of generally expanding government involvement. More recently, despite budget pressures and a general trend toward reducing government involvement, the government's role has been increased further. Medicare coverage was expanded in the 1980s to cover home health when its spending pressures were formidable, Medicare drug coverage was enacted in 2003, and child health insurance was expanded in the mid-1990s. In addition, state governments have

²⁶ As noted earlier, with 1 per cent excess growth and 1.5 per cent income growth, crowing out begins when health reaches 60 per cent, which none of the age-income cells reach during our simulation.

²⁷ With health care consuming 52 per cent of income, some household will be experiencing reduced consumption of other goods, especially since health care costs rise annually because of the general increase in health as well as costs rising with age, but, for many real incomes are stagnant or falling.

²⁸ These results are similar to Johnson and Penner (2004) who project income, taxes and, medical costs through 2030.

continued to expand child health insurance this decade and several states, notably Massachusetts, have created programs to expand insurance coverage through subsidies.

Our simulations show unprecedented levels of private health spending by the lowest quintiles. If government were to expand insurance to mitigate these increases then spending would rise more than in the baseline case. To assess the implications on the federal budget of an increased public role we simulated two alternatives that may capture the endogenous response by government in the past. In addition, we examine two scenarios where government support is reduced; while these two scenarios are inconsistent with the historical record on health care policy, they are consistent with proposals to scale back entitlement growth in the face of budget pressures.

First, we examined the case where government raises the public share of health spending of the lowest young and old quintiles to prevent private spending as a share of income from rising above its current level. As noted above, one reading of the history of health care policy is that government has stepped in to provide relief when the health-spending burden has expanded. Our calculation suggest that such a policy response would have only a moderate impact on the budget, boosting spending by ¹/₄ per cent of GDP after twenty five years and ¹/₂ percentage point after seventy five years. This is a relatively small amount because the government is already picking up 85 per cent of the elderly poor's health care and 70 per cent on the non-elderly poor's care.

By contrast, if the government pursues policies that are more broad-based then the budget effect could be substantial. In the second scenario, we increase the public financing of health care so that the private share of income devoted to health care spending remains at its 2004 value through 2030. After 2030, we hold constant the new higher public portion of health spending and allow the private share of income devoted to health to rise. We increase the role of the government only through 2030 because at some point the private share of income devoted to health continues to exceed that of income. We estimate such a policy would boost combined federal and state and local spending by 5 percentage points of GDP by 2030.²⁹

Lastly, we examine two scenarios where the government's share of health care spending is scaled back by 25 per cent. If this were done on an across the board basis, then private spending by the lowest two quintiles of the elderly would rise to implausible levels, 120 per cent and 70 per cent of income in 2080, and the middle quintile elderly household would spend over 50 per cent of income. Alternatively, the same sized total cut could be implemented on a sliding scale that would lead to a leveling out of spending burdens as measured by share of income. For example, with no cut for the lowest quintile, a 10 per cent cut for the second quintile, 15 per cent for the middle, 25 per cent of income on health care in 2080. In both cases, total government spending would be reduced by $2-\frac{1}{2}$ per cent of GDP in 2030 and by over 4 per cent of GDP in 2080.

8 The CBO long-run projection

The Congressional Budget Office released a new long-run federal health care spending projection in late 2007. The CBO baseline is constructed using several assumptions about excess growth. Over the next ten years CBO assumes that excess growth for Medicare, Medicaid and

²⁹ By contrast, we project that under current law federal and state and local spending on Medicare and Medicaid will rise from 5 per cent of GDP to 10 per cent of GDP by 2030 under the assumptions of 1 per cent excess growth in health care costs beginning in 2007.

"other" health care are at their historical rates, 2.4 per cent, 2.2 per cent, and 2.0 per cent respectively.³⁰ From 2018 to 2082 these excess growth rates are assumed to decline monotonically to reach 1.1 per cent for Medicare and close to zero for Medicaid and other health care. The resulting projection is shown in Figure 6. There are several striking features of their projection:

- Per capita real non-health consumption is only 12 per cent higher in 2082 than in 2005.
- Age-adjusted Medicaid spending rises more rapidly than does private health spending.



Source: Congressional Budget Office, "Long-term Outlook for Health Care Spending," November 2007.

Total is public and private health consumption. Medicare is net of premium and co-payments. Medicaid includes federal and state and local contributions.

Medicare spending rises much faster than private spending and thus the ratio of health care costs
of the elderly to working age individuals skyrockets.

According to CBO, a design feature of their projection was that aggregate health costs were not allowed to grow so quickly that non-health consumption would fall. By our calculations, however, health consumption rises fast enough in their projection so that non-health spending rises only 12 per cent over the first fifty years and then is roughly constant during the last twenty years of the projection. This implies that CBO's baseline projection for overall health care as a share of GDP is unbalanced as there is little reason to expect health care to crowd out other consumption and thus there may be little risk of higher overall health spending but a substantial risk of lower overall health spending. For example, a basis result of the model developed by Hall and Jones (2004) is that the health share of consumption rises only if non-health consumption increases.³¹ The relatively high share of health spending in the CBO projection owes to the high levels of excess growth assumed for various pieces of the health payment system. These in turn reflect their decision to base spending on average rates of growth over the past 35 years, without examining whether there has been a slowdown and without accounting for non-demographic factors – such as

Figure 6

³⁰ The other health care is a mixture of private insurance and out-of-pocket expenses plus state Medicaid expenditures and premium payments for Medicare. With the rapid growth of Medicare and Medicaid the private portion grows more slowly than "total other".

³¹ Their model has tradeoffs between health care which boosts life expectancy and non-health consumption. According to equation 8 of their paper, the health share con consumption is inversely related to the marginal utility of non-health consumption and thus rises only if non-health consumption increases.

the increase in third party payments – that may have elevated spending growth in the past, but may not in the future.

The lack of distinction between policy and other factors is a particular problem because CBO uses different excess cost growth assumptions for Medicare, Medicaid, and other health spending, and the CBO projection is supposed to be under the assumption of no policy changes. Past Medicare spending growth includes factors that are not assumed to continue in the future. For example, the Medicare Part B premium was not previously indexed to Medicare spending; thus Medicare spending growth grew faster than overall health spending, as Medicare picked up a higher share of spending. Similarly, Medicare policies changed to include renal dialysis, HMOs, coverage of the SSI population, and more broadened coverage of home health care. As CBO is not assuming further expansion of Medicare, it does not seem reasonable to forecast future growth based on historical growth rates that include such expansions. Similar issues arise with Medicaid.

Perhaps a more important factor is the assumed long-term wedge between CBO's excess growth assumption for Medicare and excess growth of other health care spending. By the end of the projection, the ratio of per capita Medicare health care spending on the elderly to that of the non-elderly is twice the current level, rising from 3.5 to 7. In addition, by the end of the projection the ratio of Medicare to Medicaid is 1.8 times the current level although half of Medicaid's payments will be for the elderly. It is difficult to imagine how these wedges could emerge under current law, because this wedge must reflect either prices or quantities. Medicare reimbursements are based on the prospective payment system which reimburses for treatments based on the diagnosis. The payment rate is updated every year for increases in the hospital market basket. Thus, Medicare prices should follow those of the private sector, as they have historically. It is also hard to imagine any long-term divergence between quantity of health care in the public and private sector. To the extent that the private sector undertakes measures to lower the rate of growth in the quantity of treatment, it is hard to imagine how this can occur without changes in practice styles that inevitably spill over into Medicare. Thus, it seems more reasonable to assume that age-adjusted health spending increases at similar rates for Medicare, Medicaid, and other spending over the long run.

9 Conclusions

The key determinant in long-term budget projections is the evolution of age-adjusted health care spending. Long-run projections that assume that age-adjusted health care spending rises more than 1 percentage more rapidly than per capita income are probably not balanced because faster rates of growth imply declining per capita consumption of non-health goods and services. If we assume 1 per cent excess growth, then past experience suggests that the resulting pattern of health spending across income groups will create pressures to increase government support of health care among lower income groups. However, reductions in government subsidies of health care are feasible for higher income groups. Our investigation of the effects of greater health care consumption on non-health consumption over the next seventy-five years was based on several simplifying assumptions concerning factor incomes, transfers, and taxes that should be modified in future research. In addition, as health care becomes increasingly expensive the consequent increased relative price of health insurance may have important effects on private health insurance coverage and place additional pressures to increase the scope of government insurance. This too has been ignored in our analysis.

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