Health Care Spending and the Rest of the Economy: A Short Look at the Long Term

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Over the last few years, the INFORUM group at the University of Maryland has been working with the Office of the Actuary in the Health Care Financing Administration (HCFA) to develop a model to address various aspects of health care policy. We began with the INFORUM LIFT model, a macro-interindustry model, predecessors of which have been used since the late 1960s.[2] A key question we set out to answer was: how much health care can we afford?

It's not clear that we will ever answer that question. But, like all really interesting questions, attempts to find answers led to more questions and more work on the model. For example, to improve our view of the health care sector as a whole, we separated our single health care sector into nursing homes, physicians, hospitals, and other. We expanded the detail of the labor compensation package to include information on employer contributions for health insurance (as well as pensions and all other non-wage contributions). Janoska (1996) improved the modeling of the Medicare program by treating it as a subsidy for medical care (which reduces the price facing eligible consumers) rather than an income transfer (providing consumers with the income to purchase care or providing care directly). This work was incorporated in a crucial part of the model, the consumer spending equations, the general consumer demand system where relative prices across goods partially determine spending. Finally, we lengthened the simulation horizon from 2010 to 2050 and developed a separate population forecasting model. These last enhancements were done in recognition of the fact that the leading edge of the Baby Boom cohort (those born from 1946 through 1964) would begin to retire after 2010. Once the cohort begins to retire, the economy begins to experience some very interesting pressures.

We've used the model with the shorter time horizon for several policy studies. For example, in what can only be described as a case of exquisite timing, we showed in the fall of 1994 that the Clinton health care proposal was good for the overall economy. Indeed, we showed that any health care proposal that could reduce the rate of growth of health care prices was good for the overall economy. We later elaborated on the theme that rising health care prices hurt economic growth in Monaco and Phelps (1995). Since the beginning of 1996, we have focused more on the long term horizon. In the first part of this paper, we'll quickly describe some of the general relationships among the aging, medical care spending, and the rest of the economy. Then we'll describe some of our recent simulation experiments. Finally, we'll point out some places where we will do more work describing the relationship of health care spending and the rest of the economy.

Comparing the Health Care Sector and the Rest of the Economy

We began looking at the health care sector using a model that explicitly accounts for interindustry interaction because, quite simply, industries are different. They use different mixes of other goods to produce their own output; they use different amounts of labor to produce a unit of output; their prices -- and therefore their income per unit of output -- grow at different rates, *etc.* Though accounting for industries is important to people in those industries, the importance goes beyond specific industry interests. Because industries' characteristics are different, policies or events that significantly change the mix of economic activity across industries can have varied macroeconomic consequences.

Compared with the rest of the economy, the health care sector has exhibited two characteristics that set it apart: (1) measured health care inflation has been significantly higher, (2) measured health sector labor productivity has been substantially lower (see Table 1). Despite rising relative prices, real spending on medical care has risen continuously as a share of total consumer spending. Standard thinking about the health care sector traces much of the increase in real spending over the last three decades to a third characteristic that sets the health care sector apart from others: (3) much of health care spending is actually paid for by third parties. Out-of-pocket health care spending accounted for only 21 percent of total spending in 1994, down from 33 percent in 1975. About 35 percent of total personal health care spending is accounted for by Medicare and Medicaid, and another third by payments from private insurers.[3] Because Medicare and Medicaid are entitlement programs under current law, federal budget exposure for these programs is potentially unlimited.

Table 1
Medical Services and the Rest of the Economy
average annual growth, 1977-94

	Medical Services	Aggregate
Real consumer spending	3.5	2.7
Consumer spending deflator	6.9	4.8
Jobs	3.7	1.8
Labor productivity	-0.3	0.9
Source: INFORUM data files.		

Exactly why the medical care sector in the U.S. has evolved this set of characteristics has been the subject of much discussion, which will not be repeated here.[4] Instead, we focus on the implications of these

characteristics and other reasonable assumptions about how other sectors of the economy will evolve over the next 55 years.

The Aging Population and Medical Care Spending

As many others have pointed out, the aging Baby Boom cohort changes the structure of the population and puts some pressure on economic structures to change.[5] Table 2 shows how the age structure of the population has changed in the past and how, under assumptions very similar to those in the recently released Census Bureau projection, the structure of the population will change through 2050. The table shows that people in the 20-to-retirement age group currently constitute about 58 percent of the population. That percentage will rise until sometime after 2010, but will fall steadily thereafter, reaching 55 percent in 2050. The 20-retirement age group is significant because it has the strongest labor force attachment of the three groups shown. Thus, the slowing growth in this age group implies slowing labor force growth, unless there is some offsetting increase in participation rates or hours worked per week. Most analysts project slowing labor force growth, and it has become a standard feature of any number of projections that go well into the next century.

A second feature to note in Table 2 is the expected change in the number of people of working age relative to each of the dependent groups. In 1960, there were 5.7 people of working age for each person in the SSA eligible age-group. In these projections, by 2050, there will be only 3.1 potential workers for each potential elderly dependent.

Most long-term projections take account of slowing labor force growth and, to some extent, on the effect of aging on government outlays. Few, however, take account of the changing age distribution on the composition of final demand. Different age groups tend to consume different goods and services. We incorporate this in our consumer demand system by applying adult-equivalent-weights estimated on cross-section data to our time-series of population by age groups. We then estimate a time-series consumer demand system using prices, income, and the populations specific to the commodity demanded.[6] Table 3 shows the effect of holding price and income constant at their 1994 values, but letting the age distribution of the population follow history and the standard projection. Each entry in the table shows the percentage difference from 1994 in real per-capita consumption for selected commodities/services.

Table 2
U. S. Population Profile

	1960	1980	1995	2005	2015	2030	2050
Population, total (in millions)	180.7	227.7	263.2	286.7	310.4	345.8	390.5
0-19 years	69.5	72.5	75.6	80.0	83.5	92.3	105.2
20-SSA retirement age	94.5	129.5	153.8	172.7	185.0	193.5	215.4
SSA eligible	16.7	25.7	33.8	34.0	41.9	60.0	69.9
Shares of population							
0-19 years	38.5	31.8	28.7	27.9	26.9	26.7	26.9
20-SSA retirement age	52.3	56.9	58.4	60.2	59.6	56.0	55.2
SSA eligible	9.2	11.3	12.8	11.9	13.5	17.4	17.9
Eligible Workers per Dependent							
Total	1.1	1.3	1.4	1.5	1.5	1.3	1.2
Young	1.4	1.8	2.0	2.2	2.2	2.1	2.0
SSA Eligible	5.7	5.0	4.6	5.1	4.4	3.2	3.1

Source: Census Bureau and INFORUM Projections. SSA eligible population accounts for legislated changes in retirement ages.

Table 3
Real Per Capita Consumer Spending Changes due to Age Composition Shifts
Percentage Change relative to 1994

	1960	1980	2005	2010	2020	2030	2040	2050
Durable Goods	2.4	1.4	-1.5	-2.3	-3.7	-4.6	-4.8	-4.7
Motor Vehicles and Parts	-0.3	1.8	-1.6	-1.9	-2.5	-3.2	-3.3	-3.2
Furniture & Household Eqpt.	4.3	1.2	-1.4	-2.3	-4.0	-5.1	-5.3	-5.2
Non-Durable Goods	-1.2	-0.9	0.5	0.6	0.8	0.9	1.0	0.9
Food and Alcohol	-3.3	-2.5	1.4	1.9	3.1	4.3	4.5	4.2
Clothing	2.8	1.3	-0.8	-1.3	-2.4	-3.3	-3.4	-3.3
Services	-7.3	-3.4	4.0	6.6	9.4	14.5	26.4	35.9
Housing & Hshld. Operation	-0.5	-1.8	0.3	0.4	0.8	1.1	1.2	1.1
Transportation	-4.5	0.4	0.8	1.1	0.8	0.3	0.3	0.1
Medical Services	-26.5	-14.0	14.7	24.3	35.3	57.3	109.7	152.4
Education	-10.1	14.3	-0.8	-0.7	-3.7	-4.9	-4.9	-5.3
Personal & Recreation	-1.9	-2.0	1.0	1.9	4.8	7.5	7.8	7.7
Financial & Legal	-0.1	1.1	3.7	5.2	4.1	1.1	1.0	1.1

Source: Authors' calculations. Holding income and prices constant, a value of 1 indicates that real per capita spending is 1 percent higher relative to spending in 1994 due to the composition of the population.

The startlingly different sector is, of course, the medical services sector. The table suggests that holding other factors constant -- real income, prices, etc . -- real, per-capita spending on medical services will be more than 150 percent higher than spending in 1994 spending per capita, solely as a result of the aging population. As you might expect with an aging population, the sectors likely to face declining demands from population aging include Education and Durable Goods.

We can now begin to see why accounting for the health care sector in the rest of the economy can help us understand the future movement of the economy in the long term. The aging U.S. population tends to increase spending on medical care goods and services, which compared with the rest of the economy is a high-price, low productivity sector. Further, it is a sector in which a considerable portion of the output is purchased by the federal government, through programs whose eligibility is determined by age. If we assume that all sectors maintain their relative characteristics, we can derive a quick and dirty view of the U.S. economy over the long term. That view will include growing federal deficits, slowing aggregate productivity growth, and rising overall inflation rates. These aggregate effects occur simply because the medical services sector appears likely to become an increasingly important sector in the overall economy. As it does so, the aggregate economy will tend to take on characteristics more like the medical sector. We now take a quick look at two different experiments we have done with the model. In the first, we examine the system-wide effects of different age distributions. In the second, we examine the economic landscape when we allow social insurance trust fund outcomes to affect the economy.

Experimenting with Different Age Compositions

In this experiment, we allow the number of people in the U.S. to increase according to Baseline projections, but we keep the age composition fixed at the 1994 composition. This allows us to isolate the effect of the changing age distribution on the model. In the simulation reported here, we made a few other important assumptions.

- Medicare and Medicaid are assumed to maintain their share of nominal health spending. This essentially means that we are treating the program as one with spending caps on federal outlays that change with nominal health care spending, rather than an unlimited entitlement dependent on the size and usage of the beneficiary population. In this simulation, the assumption keeps the federal deficit from realizing the full

benefits of the different age structure.

- No government tax or spending changes to offset changing deficits in the Social Security and Medicare trust funds.

- Money supply growth -- both base money and M2 -- adjust to changing potential growth.

The results of holding the population age composition fixed are shown in Tables 4 and 5. Table 4 shows the macroeconomic effects. Keeping more of the population in the working-age years raises potential GNP by about 12 percentage points. Standard growth accounting suggests that, in the long term, the two major factors determining the size of the economy are the size of the labor force and the productivity of that labor force. In this simulation, the labor force itself is 7.6 percent higher in 2050 (not shown in the table). In addition to the higher labor force, labor productivity is 7 percent higher in the fixed age composition simulation relative to the Base.[7] Very little of the productivity change is due to higher productivity in individual industries. Instead, most of the increase in productivity is due to the changing distribution of production across LIFT industries. That is, the constant age distribution simulation shifts activity away from low-productivity service sectors into higher-productivity export-oriented (up more than 30 percent in total) and capital goods industries (fixed investment up 7.5 percent in 2050).

The story behind these shifts is straightforward. For the first 25 years of the simulation, little happens to the macroeconomy, since the age distribution in the Base and the alternative are very similar. After 2020, the age distribution differences begin to be felt. The overall consumption deflator is reduced as activity moves from relatively high-priced medical goods and services to other goods. At the same time, the federal government surplus begins to rise quickly, mostly because spending on transfer payments is lower, but also because the amount of debt to be financed is lower. As an added benefit, the emerging federal surplus puts downward pressure on real interest rates, which has several effects. First, it tends to lead to greater spending on the interest sensitive consumer goods and on residential building. Second, it tends to reduce the real exchange value of the dollar, promoting exports and reducing imports. Lower real interest rates have offsetting effects on income. Interest payments by the federal government are reduced as the federal debt is actually lowered. This in turn helps to create an even larger federal surplus through standard debt-deficit dynamics. However, lower interest payments reduces consumers' interest income, which helps retard consumption

spending. Consumer spending is also lowered because transfer payments for Medicare and Medicaid are much lower in real per capita terms. Overall, lower interest receipts and transfer income actually lead to lower real disposable income, despite a nearly 5 percent increase in real labor income. Lower disposable income ultimately keeps consumer spending in check. Private savings as a share of income (a chief stabilizer in the model) falls as public savings rise. The effect of the accumulation of the federal surplus is to pull activity away from consumer sectors and into export and capital goods sectors.

Table 5 shows the full-simulation effects on the distribution of jobs by industry. The constant age composition simulation produces modest job losses and gains through 2020, but as activity shifts by ever larger percentages, the jobs required by each sector begin to change noticeably. In 2050, the simulation has produced a 5 percent increase in jobs, with a 7 percent increase in private jobs and a 5.5 percent decrease in civilian government jobs. This latter decline reflects the reduction in employment at state and local hospitals which occurs because of the decline in the elderly population share. The distribution of job changes reflects the macro story and the large change in the demand for medical services that arises from the reduction in the elderly population. Medical services jobs are down by 40 percent from the Base, while manufacturing, mining, and transportation jobs are up by the largest percentages.

Overall, this simulation illustrates the importance of the age composition of the population not only to the distribution of activity in the economy, but on the level of activity itself. It is also interesting to view these results from the perspective of the current population distribution, that is, to reverse the interpretation of the Base (a changing age distribution) and the Alternative (a constant age distribution). Then we could tentatively conclude that the shift of the age distribution toward the elderly, will, under current institutional arrangements, shift economic activity toward services, especially medical services, reduce aggregate productivity by about 7 percent, raise the federal deficit and real interest rates, relative to an economy in which people did not age. Loosely, our simulation results suggest that potential output would be about 10-15 percent lower, and the federal deficit will grow about 7 percentage points relative to GNP. In the next experiment, we look more closely at the interaction of aging, federal social insurance programs, and the federal deficit.

Table 4
Macroeconomic Summary
Population Shares Constant Simulation

	2005	2010	2020	2030	2040	2050
Percentage Deviations from Base						
Gross Domestic Product	-0.6	-1.0	0.5	3.1	6.4	10.5
Potential GNP	-0.9	-1.0	1.1	5.0	8.7	11.6
Personal Consumption	-0.2	-0.8	-0.5	0.5	0.6	-0.4
Fixed investment	-1.5	-1.4	0.8	2.5	4.8	7.5
Residential Structures	-4.2	-2.9	0.6	0.8	3.1	4.9
Non-resid. Struct.& Equip.	-0.8	-1.1	0.8	2.9	5.1	7.8
Exports	-0.1	-0.1	1.8	7.0	16.8	31.9
Imports	0.5	0.1	-1.0	-3.5	-6.6	-10.1
PCE Deflator	-0.6	-1.1	-3.8	-10.8	-20.7	-27.6
Avg. Hourly Compensation.	0.9	1.5	-0.6	-7.3	-15.3	-22.0
Exchange Rate ($/For Cur)	0.7	1.4	2.3	2.7	4.1	9.0
Private Labor Productivity	0.4	0.8	1.3	2.4	4.7	7.0
Real Disposable Income	0.4	-0.5	-1.1	-1.7	-2.0	-2.1
Deviations from Base Values						
Three month T-bills, %	0.2	-0.1	-1.0	-2.3	-2.9	-2.9
Savings rate, %	0.3	0.0	-0.9	-2.4	-3.0	-2.2
Ratio Surplus to GNP %^	-0.1	0.4	1.7	3.2	5.0	6.6
Deviations from Base Growth Rates						
	1995-05	05-20	20-30	30-40	40-50	
Gross Domestic Product	-0.1	0.1	0.3	0.3	0.4	
Potential GNP	-0.1	0.1	0.4	0.3	0.3	
M2	-0.1	0.1	0.4	0.3	0.3	
PCE deflator	-0.1	-0.2	-0.8	-1.2	-0.9	
Private Labor Productivity	0.0	0.1	0.1	0.2	0.2	
Total jobs, mil	-0.1	0.1	0.3	0.1	0.1	
Labor force, mil	-0.2	0.2	0.4	0.1	0.1	

Source: Authors' calculations. ^ Base value is deficit alternative is surplus. *A value of 1 indicates that the variable is up 1% relative to the base. ** A value of 1 indicates that the variable is 1percentage point higher than the value in the base. *** A value of 0.1 indicates that the variable is growing one-tenth of a percentage point faster.

Table 5
Aggregate Sector Employment
Population Shares Constant Simulation

	Percentage Deviations from Base					
	2005	2010	2020	2030	2040	2050
Civilian jobs	-1.4	-2.1	0.1	3.0	3.9	5.0
Private sector jobs	-1.5	-2.1	0.3	3.8	5.4	7.0
Ag., forestry, fishery	-1.2	-1.5	-0.4	1.5	3.9	6.6
Mining	-1.1	-1.4	1.1	5.7	12.0	19.6
Construction	-1.5	-1.5	0.7	2.9	4.6	6.2
Non-Durables Mfg.	-0.4	-0.7	1.0	5.0	10.7	17.8
Durables Mfg.	0.0	0.4	3.9	9.5	17.5	26.5
Transportation	-1.0	-1.4	1.5	6.6	12.2	18.4
Utilities	-0.7	-1.2	-0.3	2.1	5.8	10.3
Trade	0.3	0.6	4.1	9.5	13.8	16.2
Finance, Ins, Real Est	-1.4	-2.2	-0.1	4.7	9.2	13.1
Non-Medical Services	-0.7	-0.9	1.7	6.4	10.6	13.6
Medical services	-10.4	-14.8	-15.8	-20.1	-32.9	-39.7
Civilian Government	-1.2	-1.8	-0.6	-1.4	-3.8	-5.5

Source: Authors' calculations. A value of 1 indicates that there are 1 percent more jobs in the sector in the population constant simulation than in the Base.

Experimenting with Feedback and HCFA and SSA Trust Fund Assumptions

Concerns about the adequacy of the U.S. system of social insurance trust funds are again at the top of the nation's policy agenda. The Hospital Insurance (HI) trust fund and the Disability Insurance (DI) trust fund, are both projected to be insolvent before 2002. The trustees of the Old Age and Survivors Insurance (OASI) trust fund predict that the Baby Boom retirees will drive the fund into insolvency around 2030. Most private analyses of the trust fund solvency issues begin with projections published in the various Board of Trustees Reports.

All of these reports use a similar method -- based on sound actuarial practice -- to calculate the projected adequacy of their respective trust funds. All start from a common set of demographic and economic

assumptions. Economic assumptions, combined with constant tax or contribution rates largely determine revenue inflows to the programs. Beneficiary populations and other assumptions about the "current law" costs per beneficiary largely determine fund outflows. Taken together, fund inflows and outflows determine the solvency of the fund. The projections for the HI, SMI, OASI, and DI trust funds are published each year, usually in the Spring.

Economic assumptions about labor productivity, wage growth, price inflation, interest rates, and a handful of other variables exert considerable influence on the projected solvency of the trust funds. The Social Security Administration (SSA) is chiefly responsible for the economic assumptions. Reasonable analysts may disagree about the particular values assumed for any of the economic assumptions, but SSA incorporates High Cost, Intermediate, and Low Cost assumptions in an attempt to bracket these reasonable differences. It is important to note, however, that in these reports, projected trust fund outcomes do not affect economic assumptions. In other words, the changing solvency of the social insurance trust funds exerts no influence on the projections of economic growth, productivity, inflation, or interest rates.

Not accounting for feedback between the trust fund outcomes and the economic assumptions may result in an overall outlook for both the funds and the economy that is too optimistic. It's useful to begin by remembering that trust fund deficits are federal deficits. Although the federal deficit is not specifically projected as part of the trust fund reports, we can get an idea of the size of the federal deficits implied by making some simple assumptions and using the information the reports contain. To make matters simple, we look at the primary surplus, defined as federal receipts less expenditures excluding interest payments on debt. The primary surplus gives an idea of the current receipts/spending picture without the "dead hand of the past." Interest payments are a large portion of federal spending. For example, while the estimate for the federal surplus on a national accounts basis for 1995 is $-162 billion, the estimate of the primary surplus is $67.4 billion.

We can roughly calculate the projected primary surplus relative to nominal GDP by subtracting projected increases in GDP shares for all trust funds from the 1995 surplus as share of GDP.[8] The resulting figures are estimates of the primary surplus, holding constant all other federal spending and receipts at their 1995 share of GDP. The picture that results from these calculation is Chart 1, which shows an enormous drop in the primary surplus as a share of GDP. The share exceeds the worst year (1975) in 2020 and by 2050 is about 2 times the worst historical year (since 1960). As a point of reference, the three paths for real interest rates

assumed in the trust fund reports are shown in Chart 2.

Any analyst who believes that higher federal deficits generally signal higher interest rates will be disappointed by the simple story told in Charts 1 and 2. Despite continuously rising deficits, real interest rates are constant after 2005. It is important emphasize that Chart 1 understates the actual amount needed to be funded, because it does not account for interest payments. The amount needed to be financed increases substantially when interest payments on accumulated debt are added back in. The interest payment amount is included in model simulation shown below.[9]

Chart 1: Implied Primary Surplus

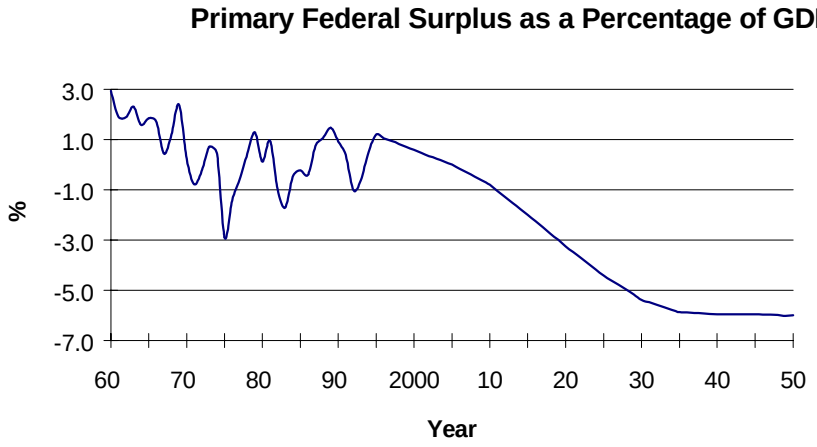
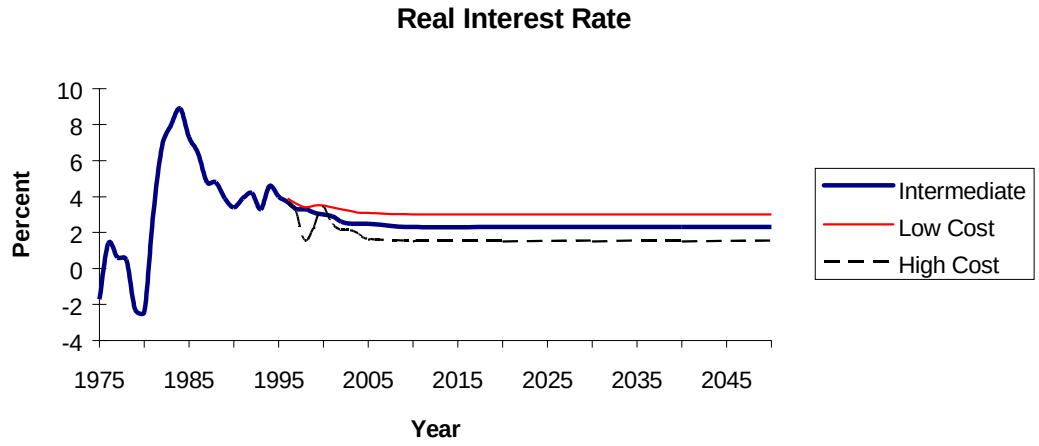


Chart 2: Social Security Administration Assumptions



In our experiment, we looked at what happens when trust fund outcomes influence projected economic activity. To do this, we set up a Base that tried to get close to SSA economic assumptions, but did so with Medicare as a constant fraction of nominal health care spending. Medicare as a share of GDP in the Base is much lower than projected in HI and SMI reports. For example, in 2025 the Base Medicare share is about 4 percent, while the share projected in the HI and SMI reports is nearly 7 percent; in 2050, the Medicare share of GDP in the Base is slightly above 5 percent, compared with an 8 percent share projected in the HI and SMI reports. After we assembled a Base, we imposed increases in Medicare spending to match the shares of GDP reported in the Trustees' reports. General macro results are shown in Table 6.

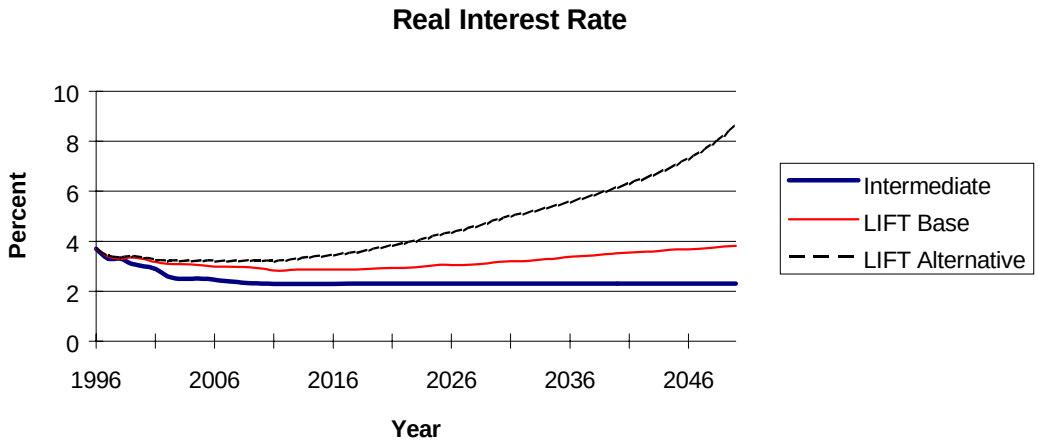
Table 6
Macroeconomic Results with Trust Fund Outcome Feedback

	2005	2020	2050
Percentage difference from Base			
Potential GDP	-0.1	-1.0	-8.6
Labor force	0.0	0.0	0.0
Private labor productivity	-0.1	-1.3	-8.0
GDP	0.1	-0.8	-12.6
Consumer spending	0.6	2.3	8.1
Fixed investment	-0.0	-0.8	-8.7
Exports	-0.2	-3.5	-29.3
Imports	1.0	6.5	44.9
Exchange rate ($/For Cur)	-0.0	-17.0	-42.0
Differences from Base in percentage points			
10-year Treasury notes	0.2	1.0	4.2
Federal deficit/GDP	0.4	2.2	14.1
Source: Authors' calculations			

Table 6 shows large economic effects of allowing the economy to be influenced by trust fund outcomes. Potential GDP is reduced by nearly 9 percent in 2050, almost entirely because economic activity is shifting to lower-productivity sectors at the expense of other sectors. The federal deficit as a share of GDP is more than

14 percentage points above the Base. This raises real and nominal interest rates and the exchange value of the dollar. (Interest rate results are shown graphically in Chart 3.) Exports are reduced by 29 percent and imports are raised by nearly 45 percent. The results look like a magnified version of the mid-1980s.

Chart 3: Implications of Trust Fund Imbalances



Throughout this work, we attempted to make assumptions that keep the federal deficit from rising too much. For example, we held Medicaid outlays constant as a fraction of medical care spending rather than letting it rise with the rising population of beneficiaries. Second, it is important to note that even the trust fund reports were conservative in their projections of outlays as a percent of GDP. SMI as a percentage of GDP was held down in the Trustees report because "...assuming a continuation of the historical trend would result in an SMI program so large as a percentage of GDP that it would be implausible given other demands on those resources."[10]

From this exercise, we conclude that a model that simultaneously accounts for economic growth, inflation, interest rates, and trust fund outcomes would be a useful complement to the current practice. The work shows that the projected imbalances in the social insurance trust funds will tend to worsen economic performance. As the economy worsens, it becomes harder to deal with a rising deficit. Policy makers need to be able to take these interactions into account as they seek to change the system. Perhaps even more importantly, these results point out that the “crises” in the federal trust fund programs are not isolated from the rest of the economy. Indeed, these results suggest that reforming health care policy, or changing the current Social Security system is key to sustaining overall economic growth.

Conclusions and Future Work

A few themes run through all of these simulations. First, anything that tends to shift activity into the medical sector, either real or nominal activity, tends to hurt measured economic growth. This happens primarily because increased medical spending puts upward pressure on the federal deficit. Deficit spending tends to raise real interest rates, reducing investment spending and exports. Potential GDP is lowered because activity shifts from higher productivity sectors to lower productivity sectors. It's also useful to point out that the results happen gradually, so that, it takes 55 years of gradual adjustment for the economy to reach these results. Much of the effects happen after 2015, when the age distribution begins to change substantially.

A second theme implicit in most of the discussion concerns measurement. Health sector productivity growth figures prominently in many of these results. Standard measures of sectoral productivity growth put the health care sector near the bottom of all sectors. It is somehow intuitively difficult, however, to accept, as Table 1 figures would have us believe, that the medical services sector was more productive in 1977 than it is today. This suggests that we are mismeasuring real output in the medical services sector. One way this can occur is through an overstatement of prices. Graboyes (1994) cites several studies that suggest prices are overstated. In one case, for CAT scanners, three methods of constructing price indexes differ by a factor of 3,700![11] Aaron (1994) goes even further when he says: "To put the matter bluntly, health care price indicies are largely worthless..."[12]

If we suddenly lowered the health care prices, say, to account for "quality of care", real output of the sector would be raised and productivity estimates would be higher (so would overall GDP). Naturally, this would affect past measurement of real activity in the health sector and GDP as well. But, since many of the results here depend, to some extent, on how productivity differs across sectors, good measures of sectoral productivity measures are absolutely paramount. To the extent that public policy will address some of the issues discussed in this paper, it would be prudent for our data collections/dissemination agencies to look more closely at this admittedly difficult area.

In the future, we hope to refine our models and simulations further. We are currently working on modeling fertility and retirement behavior, linking these decisions to the economic variables generated in the model. Further, we are working to develop a time series of the adult-equivalent weights, to follow the changing pattern of consumer spending by age over time. However, while these refinements will improve the

simulation results, they are not likely to affect the basic messages presented here.

ENDNOTES

1. Work on the model and simulations was funded by the Health Care Financing Administration, HCFA Contract 500-93-007. We gratefully acknowledge HCFA's financial support. Opinions expressed here are the authors'; they do not represent opinions of HCFA or the University of Maryland.

2. A recent description of the model can be found in McCarthy (1991).

3. See Levit., page 234.

4. There are many books and papers that describe the evolution of the health care sector. A good summary can be found in CBO (1992).

5. See, for example, Easterlin (1991) and Cutler et.al. (1990).

6. For details see Dowd, Monaco, and Janoska (1996).

7. Equations for average weekly hours also help to determine potential GDP growth. These are functions of the unemployment rate, so that higher unemployment rates generally are associated with lower average weekly hours.

8. These are calculated using Intermediate SSA economic assumptions.

9. Recently, other analysts have become interested in the relationship between the projected trust fund outcomes and the economic assumptions. The 1994-95 Advisory Panel on Technical and Demographic Assumptions has recommended that: "The SSA actuaries should work with outside economists to develop a model of national savings that can be integrated with their model. *Such a model would incorporate a feedback between national savings, real wage growth, and the status of the trust funds.* (emphasis added) The model would necessarily be preliminary at first, but might be used in the future to prepare conditional forecasts and to analyze the effects of various policy reforms on the trust funds." (p. 46)

10. See HI Trust Fund Report, p. 71.

11. See Graboyes, p. 75.

12. See Aaron, p. 10.

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Table 1
Medical Services and the Rest of the Economy
average annual growth, 1977-94

	Medical Services	Aggregate
Real consumer spending	3.5	2.7
Consumer spending deflator	6.9	4.8
Jobs	3.7	1.8
Labor productivity	-0.3	0.9

Source: INFORUM data files.

Table 2
U. S. Population Profile

	1960	1980	1995	2005	2015	2030	2050
Population, total (in millions)	180.7	227.7	263.2	286.7	310.4	345.8	390.5
0-19 years	69.5	72.5	75.6	80.0	83.5	92.3	105.2
20-SSA retirement age	94.5	129.5	153.8	172.7	185.0	193.5	215.4
SSA eligible	16.7	25.7	33.8	34.0	41.9	60.0	69.9
Shares of population							
0-19 years	38.5	31.8	28.7	27.9	26.9	26.7	26.9
20-SSA retirement age	52.3	56.9	58.4	60.2	59.6	56.0	55.2
SSA eligible	9.2	11.3	12.8	11.9	13.5	17.4	17.9
Eligible Workers per Dependent							
Total	1.1	1.3	1.4	1.5	1.5	1.3	1.2
Young	1.4	1.8	2.0	2.2	2.2	2.1	2.0
SSA Eligible	5.7	5.0	4.6	5.1	4.4	3.2	3.1

Source: Census Bureau and INFORUM Projections. SSA eligible population accounts for legislated changes in retirement ages.

Table 3
Real Per Capita Consumer Spending Changes due to Age Composition Shifts
Percentage Change relative to 1994

	1960	1980	2005	2020	2030	2050
Durable Goods	2.4	1.4	-1.5	-3.7	-4.6	-4.7
Motor Vehicles and Parts	-0.3	1.8	-1.6	-2.5	-3.2	-3.2
Furniture & Hhld Eqpt.	4.3	1.2	-1.4	-4.0	-5.1	-5.2
Non-Durable Goods	-1.2	-0.9	0.5	0.8	0.9	0.9
Food and Alcohol	-3.3	-2.5	1.4	3.1	4.3	4.2
Clothing	2.8	1.3	-0.8	-2.4	-3.3	-3.3
Services	-7.3	-3.4	4.0	9.4	14.5	35.9
Housing & Hhld. Operation	-0.5	-1.8	0.3	0.8	1.1	1.1
Transportation	-4.5	0.4	0.8	0.8	0.3	0.1
Medical Services	-26.5	-14.0	14.7	35.3	57.3	152.4
Education	-10.1	14.3	-0.8	-3.7	-4.9	-5.3
Personal & Recreation	-1.9	-2.0	1.0	4.8	7.5	7.7
Financial & Legal	-0.1	1.1	3.7	4.1	1.1	1.1

Source: Authors' calculations. Holding income and prices constant, a value of 1 indicates that real per capita spending is 1 percent higher relative to spending in 1994 due to the composition of the population.

Table 4
Macroeconomic Summary
Population Shares Constant Simulation

Percentage Deviations from Base	2005	2010	2020	2030	2050
Gross Domestic Product	-0.6	-1.0	0.5	3.1	10.5
Potential GNP	-0.9	-1.0	1.1	5.0	11.6
Personal Consumption	-0.2	-0.8	-0.5	0.5	-0.4
Fixed investment	-1.5	-1.4	0.8	2.5	7.5
Residential Structures	-4.2	-2.9	0.6	0.8	4.9
Non-resid. Struct.& Equip.	-0.8	-1.1	0.8	2.9	7.8
Exports	-0.1	-0.1	1.8	7.0	31.9
Imports	0.5	0.1	-1.0	-3.5	-10.1
PCE Deflator	-0.6	-1.1	-3.8	-10.8	-27.6
Avg. Hourly Compensation.	0.9	1.5	-0.6	-7.3	-22.0
Exchange Rate	0.7	1.4	2.3	2.7	9.0
Private Labor Productivity	0.4	0.8	1.3	2.4	7.0
Real Disposable Income	0.4	-0.5	-1.1	-1.7	-2.1
Deviations from Base Values					
Three month T-bills, %	0.2	-0.1	-1.0	-2.3	-2.9
Savings rate, %	0.3	0.0	-0.9	-2.4	-2.2
Ratio Surplus to GNP %^	-0.1	0.4	1.7	3.2	6.6

Source: Authors' calculations. ^ Base value is deficit alternative is surplus. *A value of 1 indicates that the variable is up 1% relative to the base. ** A value of 1 indicates that the variable is 1percentage point higher than the value in the base. *** A value of 0.1 indicates that the variable is growing one-tenth of a percentage point faster.

Table 5
Aggregate Sector Employment
Population Shares Constant Simulation

Percentage Deviations from Base					
	2005	2010	2020	2030	2050
Civilian jobs	-1.4	-2.1	0.1	3.0	5.0
Private sector jobs	-1.5	-2.1	0.3	3.8	7.0
Ag., forestry, fishery	-1.2	-1.5	-0.4	1.5	6.6
Mining	-1.1	-1.4	1.1	5.7	19.6
Construction	-1.5	-1.5	0.7	2.9	6.2
Non-Durables Mfg.	-0.4	-0.7	1.0	5.0	17.8
Durables Mfg.	0.0	0.4	3.9	9.5	26.5
Transportation	-1.0	-1.4	1.5	6.6	18.4
Utilities	-0.7	-1.2	-0.3	2.1	10.3
Trade	0.3	0.6	4.1	9.5	16.2
Finance, Ins, Real Est	-1.4	-2.2	-0.1	4.7	13.1
Non-Medical Services	-0.7	-0.9	1.7	6.4	13.6
Medical services	-10.4	-14.8	-15.8	-20.1	-39.7
Civilian Government	-1.2	-1.8	-0.6	-1.4	-5.5

Source: Authors' calculations. A value of 1 indicates that there are 1 percent more jobs in the sector in the population constant simulation than in the Base.

Table 6
Macroeconomic Results with Trust Fund Outcome Feedback

	2005	2020	2050
Percentage difference from Base			
Potential GDP	-0.1	-1.0	-8.6
Labor force	0.0	0.0	0.0
Private labor productivity	-0.1	-1.3	-8.0
GDP	0.1	-0.8	-12.6
Consumer spending	0.6	2.3	8.1
Fixed investment	-0.0	-0.8	-8.7
Exports	-0.2	-3.5	-29.3
Imports	1.0	6.5	44.9
Exchange rate	-0.0	-17.0	-42.0
Differences from Base in percentage points			
10-year Treasury notes	0.2	1.0	4.2
Federal deficit/GDP	0.4	2.2	14.1
Source: Authors' calculations			