LIFT 2050: A Framework For Making Very Long-term Economic Projections, with Illustrations

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Introduction

Over the past year or so, we have been building a set of tools that will allow us to produce very long-term projections of the U.S. economy, not only of macroeconomic indicators (GDP, interest rates, inflation rates, etc), but also of industrial output and employment composition. The impetus for this effort came from our association with the Health Care Financing Administration, and the work we have done with them on how the health care sector interacts with and influences the rest of the economy. Previous to the LIFT 2050 work, our forecast and simulation horizon extended only(!) through 2010. In many instances, the 2010 horizon was sufficient. However, there is a direct and obvious link between spending on medical services and the age composition of the population. Our previous horizon stopped just short of the years when the "baby-boom" generation -- those born between 1946 and 1964 -- reached retirement age and increased medical service usage age. Thus, lengthening our simulation horizon was necessary if we were to more completely analyze the role of the health care sector in the economy.

We have taken a three-stage approach to our work. First, we built a Demographic Projections Model (DPM) that allows us to start from basic demographic assumptions -- fertility rates, survival rates and immigration -- to create population projections by age and gender. The model uses the cohort component approach, and mimics the method used by the Census Bureau when it creates its projections. As a rule, we have stayed quite close to Census Middle Series for our basic variables in making our baseline projections for 2050. DPM gives us the flexibility to change some of these basic assumptions and examine their implications when run through a consistent, comprehensive interindustry-macroeconomic model (LIFT). Along with population, DPM produces forecasts of other demographic variables, like the number of households, the percentage of households in prime home-buying age and the share of the population that is institutionalized. DPM also takes account of the legislated changes in the Social Security retirement age, the first of which is scheduled to begin in 2000.

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Next, we lengthened the simulation horizon of our U.S. forecasting model, LIFT. This lengthening has necessitated basic rethinking of some of our forecasting equations. Several months of simulation work has been necessary to get the model "tuned" up for use as a very-long term projections tool. Some equations that appeared to do an adequate job when asked to simulate 17 years into the future turned out to be less than adequate when asked to simulate a 55-year horizon. In particular, equations that relied on trends or trend-like movements in economic variables needed considerable rethinking.

We are currently in the third stage of development. In this stage, we begin using LIFT 2050 as a policy simulation and forecasting tool. In our experience, using the model to simulate a wide variety of possibilities will reveal deficiencies -- which we hope are less than obvious. The next few months of work will likely entail further refinements to the tool, but little in the way of basic changes. In the rest of this paper, we present an overview of important factors behind creating a "base" forecast, that will be used as a benchmark for simulation studies. Then we illustrate LIFT 2050 capabilities and properties with four alternative scenarios.

Factors Behind Baseline LIFT 2050 Projections

Demographics

Table 1 shows history and DPM projections for several demographic variables. Between 1990 and 2050, the population is projected to increase 57 percent. Population growth is expected to slow progressively throughout the forecast. Excluding the decade ending 1940, which contained the Great Depression, by 2030 population growth is likely to be slower than in any other decade since 1850. The driving forces behind that projection are shown in the rest of Table 1. Birth rates are assumed to be relatively constant. Life expectancies for men and women are assumed -- largely in line with mid-range Census assumptions -- to increase by about 10 years between 1990 and 2050, similar to the increases in life expectancies that occurred between 1940 and 1990.[2]

While population growth influences economic growth, an equally influential facet of the demographic future is the distribution of the population across age groups. Table 2 shows the enormous influence the post World War II baby boom has had, and will continue to have, on the population composition.

The age composition of the population directly influences the economy several ways. First, the age composition affects labor force growth, a key determinant of the economy's capacity to produce goods and services. Table 2 highlights another aspect of the changing age distribution, the movements in the working-age population. The aging of the population slows the growth in the working age population, and although we assume some increases in labor force participation rates, these increases are barely sufficient to push labor force growth up to the level of population

[2] The Census Bureau data we used to build DPM was released in 1993. Census has recently released its 1995 projections, and we are currently working on incorporating them into DPM and LIFT.

growth. Slowing growth in the labor force is a primary reason we expect real GDP growth to be modest throughout the 2000-2050 horizon. (Details of our population and labor force projections are found in Table 6 below.)

Secondly, people of different ages demand different goods, that is, the age distribution helps determine demand by sector. Sectoral demand helps determine the industrial composition of output and employment. We attempt to capture the effects of the age structure of the population on consumption in the following way. We use cross-section data to estimate a set of adult-equivalent weights, where the weight on an adult aged 30-39 is set to unity. (In some cases, namely for most parts of medical services spending, we substituted weights we calculated from other sources in place of our estimated weights.) Then we multiply these weights by the relevant population time-series to calculate a specific population for each of LIFT's 80 consumption categories.

The resulting populations are then used when the time-series consumption estimation is done. Effectively, consumption in each category is unit elastic with respect to its specific population growth. Table 3 shows an index that is the ratio of these commodity-specific populations to total population for several years in the forecast. Each entry shows the contribution of the commodity-specific population to per-capita real spending on some aggregate PCE categories.

The table shows some interesting patterns. The aging population tends to raise per-capita spending on services and lower per-capita spending on durable goods. Although non-durable consumption is not affected overall, various nondurable goods are affected in different ways. Per-capita spending on Food and alcohol (both at home and in restaurants) is increased by an aging population, while per-capita spending on clothing is reduced. Among service categories, per-capita spending for medical services shows the largest demographic effect. These demographic influences suggest that a feature of any forecast depending on baseline demographics will continue to show economic activity skewed toward services and away from goods, especially durable goods.

Government Spending and Taxes

Assumptions about government spending and tax rates at all levels of government are especially important in LIFT and LIFT 2050. In general, in creating a base through 2050, we have tried to adhere to two principles:

- The federal deficit as a share of nominal GDP should be relatively constant and relatively low (using NIPA measures).

- The state and local government deficit on "other" funds -- non-social insurance funds -- should remain around 0 or be slightly positive throughout the forecast (using NIPA measures). This reflects current legal requirements in 49 states that their operating budgets be balanced.

There are interesting implications to trying to adhere to the first principle. It is generally agreed that the Hospital Insurance trust fund will be insolvent sometime in the next five-to-seven years. Even under "intermediate" economic assumptions, the Social Security Administration projects that the OASDI trust funds will be insolvent around 2030. While current social insurance fund surpluses mask a large "other" funds deficit at the federal level, as the economy moves toward 2020, social insurance surpluses turn into deficits and the large balances accumulated during the 1990 through 2015 period are drawn down. Without a tax increase, or further reduction in federal spending, the overall federal deficit would balloon after about 2025, when the simulation has another 25 years to go.

Our solution for the baseline has been to raise the social insurance contribution rate (FICA tax rate) from its current 7.65 percent level to 9.6 percent by 2050. The increases are applied smoothly, starting after 2010, in an attempt to keep abrupt changes in tax rates from setting off sharp economic cycles.

TABLE 1
Demographic Assumptions and Projections, DPM

	Population		Births per 1000 women aged 14-44	Life Expectancy at Birth, years		Immigration	
	Millions	Annual growth, decade ending	Total	Male	Female	Decade sum	Percent of population increase
1850	23.2		197.6			1.71	
1860	31.4	3.0	187.6			2.60	31.7%
1870	38.6	2.0	170.6			2.32	32.2%
1880	50.2	2.6	158.6			2.81	24.2%
1890	62.5	2.2	140.6			5.25	42.7%
1900	75.8	1.9	133.6	46.3	48.3	3.69	27.7%
1910	92.4	2.0	126.8	48.4	51.8	8.80	53.0%
1920	106.5	1.4	117.9	53.6	54.6	5.74	40.7%
1930	123.1	1.5	89.2	58.1	61.6	4.11	24.7%
1940	132.1	0.7	79.9	60.8	65.2	0.53	5.9%
1950	152.3	1.4	106.2	65.6	71.1	1.04	5.1%
1960	180.7	1.7	118.0	66.6	73.1	2.52	8.9%
1970	205.2	1.3	87.9	67.1	74.8	3.32	13.6%
1980	226.5	1.0	68.4	70.0	77.4	4.49	21.1%
1990	248.7	0.9	70.9	71.8	78.8	7.34	33.1%
2000	276.4	1.1	66.3	74.5	81.6	9.86	35.6%
2010	300.6	0.8	70.7	76.3	83.2	8.80	36.4%
2020	325.4	0.8	72.6	77.5	84.2	8.80	35.5%
2030	349.1	0.7	71.5	78.8	85.2	8.80	37.1%
2040	370.9	0.6	72.4	80.2	86.3	8.80	40.4%
2050	392.6	0.6	72.4	81.7	87.6	8.80	40.6%

Source: *Historical Statistics: Colonial Times to 1970, Statistical Abstract of the United States,* various issues, authors' calculations

TABLE 2
Age Composition of the Population 1850-2050

	Percent of Population in Age Groups								
	0-9	10-19	20-29	30-39	40-49	50-59	60+	75+	85+
1850	28.9	23.3	18.4	12.1	7.9	4.8	4.1	na	na
1900	23.8	20.6	18.3	13.9	10.2	6.8	6.4	na	na
1920	21.7	19.0	17.4	15.0	11.5	7.9	7.5	1.4	0.0
1940	16.1	18.2	17.3	15.1	13.0	10.0	10.5	2.1	0.2
1950	19.5	14.4	15.8	15.1	12.8	10.2	12.1	2.5	0.4
1960	21.7	16.8	12.2	13.6	12.5	10.0	13.2	3.1	0.5
1970	18.1	19.6	15.1	11.1	11.8	10.3	14.0	3.7	0.7
1980	14.6	17.4	18.0	13.9	10.0	10.3	15.7	6.4	1.0
1990	14.8	14.0	16.3	16.8	12.6	8.8	16.8	7.2	1.2
2000	14.6	14.0	13.5	15.0	15.3	11.1	16.6	6.2	1.7
2010	13.6	13.8	13.5	12.9	13.8	13.7	18.8	6.4	2.1
2020	13.6	13.0	13.4	12.9	11.9	12.4	22.8	6.9	2.2
2030	13.3	13.1	12.7	12.9	12.0	10.9	25.1	9.3	2.6
2040	13.2	12.9	12.8	12.3	12.1	11.1	25.4	11.5	3.9
2050	13.2	12.8	12.7	12.5	11.7	11.3	25.8	11.7	5.0

Source: *Historical Statistics: Colonial Times to 1970*, authors' calculations

TABLE 3
Index of Contributions of Baseline Age Composition Shifts to Real Per-Capita Consumer Spending 1995-2050
selected aggregate spending categories

	1995	2000	2010	2020	2030	2040	2050
Durable Goods	100.0	99.3	97.6	96.1	95.2	94.9	94.7
Motor Vehicles and Parts	100.0	99.0	98.1	97.4	96.7	96.5	96.5
Non-Durable Goods	100.0	100.3	100.6	100.7	100.9	101.0	101.0
Food and Alcohol	100.0	100.9	102.1	103.4	104.7	105.1	105.1
Clothing	100.0	99.6	98.6	97.5	96.6	96.4	96.3
Services	100.0	100.8	102.7	104.6	105.9	106.3	106.5
Medical Services	100.0	101.6	105.8	110.1	112.9	113.8	114.2

Health Care Sector

A key sector to analyze in any long-term projection is the health care sector. Assumptions about or forecasts of medical services prices exert a strong influence on the overall consumer inflation rate. As health care spending becomes an even larger share of consumer spending -- as demographics alone would suggest -- overall consumer inflation will move toward the medical inflation rate. Federal budget projections generally assume rapid growth in medical spending. A recent CBO analysis puts Medicare growth at about 10 percent annually, partly because the assumed rates of growth of consumer spending on medical services is more than 8 percent annually. Recent projections of national health expenditures by the Health Care Financing Administration put medical spending growth rates consistently about 2 full percentage points higher than nominal GDP growth -- all the way to 2030.

Previous work done by Monaco and Phelps (1995) has highlighted that such high growth rates are economically untenable in the long term. If most of the "excess" spending on health is due to high health-price inflation, returns to factors in the sector -- like labor -- would soon exceed average real returns in other sectors by such a large amount as to lead economist to reasonably expect factors to be drawn into the health sector and lower returns (and excess price growth). If most of the excess spending growth represents an increase in real spending on health, then either labor productivity in the health sectors must grow at heretofore unattainable rates, or we must soon employ most of our workers in the health care sector. Neither of these outcomes appears indicated by other assumptions -- real GNP growth, average labor productivity growth, or unemployment rates -- that are part of the typical medical-spending projections package.

In the LIFT 2050 baseline, we let the prices of medical services rise faster than the average for all goods through 2030, but we forced the difference between medical inflation and the general inflation rate to narrow progressively over time. After 2030, medical inflation matches the overall inflation rate. We implemented this adjustment by altering the relative labor compensation of medical service employees. Real spending on medical goods is determined endogenously by our consumer spending functions. These functions put real medical spending growth between 0.5 and 1 percentage point faster than spending on all other goods. We also assume that productivity growth in the medical services sector will slowly accelerate to the economy-wide average (around 1 percent a year) by 2050. The baseline results have the share of consumer spending on health care rising from 11.5 percent in 1995 to 19.6 percent in 2030 and 25.8 percent in 2050. Our results are well below the HCFA’s projected ratio. In 2030 HCFA projects a 30 percent ratio.

Baseline Forecast Tables

The next several pages show a small portion of the variables available in a LIFT 2050 run. The complete array of tables available for LIFT is available for LIFT 2050. A full LIFT 2050 databank includes more than 6,000 variables. Here are some highlights of each of the tables.

Table 4 shows macroeconomic results. In it we see:

- GDP is projected to grow 1.8 percent a year from 1995 through 2020 and 1.5 percent a year from 2020 to 2050.

- The share of fixed investment in real GDP rises from about 17 percent in 1995 to about 22 percent in 2050

- The share of consumer spending in real GDP falls from about 68 percent of GDP to about 65 percent of GDP between 1995 and 2050.

- Inflation averages about 2.8 percent, well below rates typically found in other long term forecasts.

Table 5 shows sectoral employment results. In it we see that:

- Manufacturing continues to decline as a share of total jobs, but the decline is less steep between 2000 and 2050 than it was between 1985 and 1995.

- Service-producing jobs rise as a share of the total, with most of the increase due to medical services employment.

Table 7 shows federal government spending and receipts. A striking feature of the table is that transfers to persons and states increases from 56 percent of total spending in 1995 to 78 percent in 2050. The bulk of that increase is due to two programs, Medicare and Medicaid. This is true despite lower rates of health care spending growth in our projection, than any other major long-term forecast.

Table 8 shows real consumer spending by aggregated LIFT 2050 PCE categories. The fastest growing segment of consumer demand is medical services.

Table 9 shows real labor income (labor compensation plus proprietor income) for major industry groups in 1995 dollars per hour. An interesting aspect of the table is the slow growth in hourly labor income across almost all sectors, with the notable exception of medical services.

Base 2050

TABLE 4
General Macroeconomic Summary

	1985	1995	2000	2010	2020	2030	2040	2050	85-95	95-00	00-10	10-20	20-30	30-40	40-50
Gross Domestic Product, bil 77$	2384	3058	3391	4068	4790	5548	6453	7520	2.5	2.1	1.8	1.6	1.5	1.5	1.5
Potential GNP, bil 77$	2368	3002	3369	4057	4810	5587	6491	7597	2.4	2.3	1.9	1.7	1.5	1.5	1.6
Components, bil 77$															
Personal consumption	1597	2070	2240	2603	3086	3587	4163	4852	2.6	1.6	1.5	1.7	1.5	1.5	1.5
Fixed investment	438	515	574	731	907	1101	1341	1647	1.6	2.2	2.4	2.2	1.9	2.0	2.1
Exports	242	486	634	933	1139	1304	1496	1690	7.0	5.3	3.9	2.0	1.4	1.4	1.2
Imports	363	549	619	813	994	1148	1305	1504	4.1	2.4	2.7	2.0	1.4	1.3	1.4
Federal government	212	185	185	185	186	188	190	191	-1.4	0.0	0.0	0.1	0.1	0.1	0.1
State & local gov.	251	327	356	408	447	495	556	620	2.6	1.7	1.4	0.9	1.0	1.2	1.1
Price Level and Inflation Indicators															
GNP deflator (77=100)	170.0	230.4	265.5	356.1	471.9	620.6	813.0	1055.6	3.0	2.8	2.9	2.8	2.7	2.7	2.6
PCE deflator (77=100)	233.5	325.1	381.4	527.9	706.9	938.1	1251.7	1641.7	3.3	3.2	3.3	2.9	2.8	2.9	2.7
Avg Hourly compensation	175.6	268.1	314.0	439.7	623.7	881.9	1233.1	1726.1	4.2	3.2	3.4	3.5	3.5	3.4	3.4
Private Labor Productivity	123.8	139.8	145.2	157.4	172.0	188.7	206.2	226.8	1.2	0.8	0.8	0.9	0.9	0.9	1.0
GNP Gap, % of potential	100.7	101.9	100.6	100.3	99.6	99.3	99.4	99.0	0.1	-0.2	-0.0	-0.1	-0.0	0.0	-0.0
Employment Indicators															
Total jobs, mil	111.4	130.5	140.8	158.8	172.9	183.9	197.9	210.7	1.6	1.5	1.2	0.9	0.6	0.7	0.6
Labor force, mil	115.5	132.2	141.9	159.8	174.0	185.2	199.2	211.5	1.4	1.4	1.2	0.9	0.6	0.7	0.6
Unemployment rate, %	7.2	5.8	5.3	5.2	5.3	5.4	5.3	5.1	-2.1	-1.7	-0.2	0.1	0.2	-0.1	-0.5
Financial Indicators															
M2 (bil $)	2486	4108	5183	8128	12539	18781	28018	41798	5.0	4.7	4.5	4.3	4.0	4.0	4.0
Three month T-bills, %	7.5	5.8	5.6	5.5	5.1	5.0	5.0	4.9	-2.5	-0.5	-0.2	-0.8	-0.3	-0.0	-0.2
10-year Treasury notes, %	10.6	7.1	6.8	6.6	6.0	5.9	6.0	6.0	-4.0	-0.9	-0.3	-1.0	-0.2	0.1	0.1
Foreign Indicators															
Avg foreign demand for US exports	166.9	384.4	492.1	817.0	1025.7	1132.7	1243.5	1353.9	8.3	4.9	5.1	2.3	1.0	0.9	0.9
Average effective relative prices															
Exports, US/foreign (1977=100)	116.9	94.5	91.0	90.2	90.3	86.8	82.5	79.1	-2.1	-0.8	-0.1	0.0	-0.4	-0.5	-0.4
Imports, foreign/US (1977=100)	81.9	92.8	93.9	91.3	89.5	92.2	96.1	99.4	1.2	0.2	-0.3	-0.2	0.3	0.4	0.3
Exchange rate scaler	1.00	1.01	1.04	1.05	1.01	0.98	0.95	0.92	0.1	0.6	0.1	-0.3	-0.3	-0.3	-0.4
Real disposable income	1762	2196	2411	2826	3305	3823	4443	5159	2.2	1.9	1.6	1.6	1.5	1.5	1.5
Savings rate, pct	6.4	4.5	4.8	5.3	4.1	3.8	4.0	3.6	-3.6	1.4	1.0	-2.6	-0.7	0.3	-1.0
Federal deficit, bil $	-180.8	-180.4	-197.4	-324.1	-334.5	-518.0	-1040.6	-1764.3	-0.0	1.8	5.0	0.3	4.4	7.0	5.3
relative to GNP	-4.5	-2.6	-2.2	-2.2	-1.5	-1.5	-2.0	-2.2	-5.6	-3.1	0.2	-4.1	0.2	2.8	1.1
Factor Payments															
Labor compensation	2383	4182	5303	8475	13282	20284	31125	47323	5.6	4.8	4.7	4.5	4.2	4.3	4.2
Corporate profits	225	557	615	873	1283	1900	2826	4202	9.1	2.0	3.5	3.8	3.9	4.0	4.0
Proprietor income	243	450	561	880	1343	1987	2971	4410	6.2	4.4	4.5	4.2	3.9	4.0	3.9
Depreciation	333	464	598	1004	1565	2381	3601	5448	3.3	5.1	5.2	4.4	4.2	4.1	4.1

Base 2050

TABLE 5
EMPLOYMENT AND POPULATION

	1985	1995	2000	2010	2020	2030	2040	2050	85-95	95-00	00-10	10-20	20-30	30-40	40-50
Civilian jobs (millions)	111.4	130.5	140.8	158.8	172.9	183.9	197.9	210.7	1.6	1.5	1.2	0.9	0.6	0.7	0.6
Private	93.7	109.8	118.4	133.6	146.0	154.7	166.1	176.4	1.6	1.5	1.2	0.9	0.6	0.7	0.6
Agric,Mining,Structures	10.2	10.2	10.7	11.7	12.7	13.6	14.8	16.1	-0.0	1.0	0.9	0.8	0.7	0.8	0.9
Durable goods manufacturing	11.5	10.8	11.3	11.9	12.0	12.1	12.3	12.6	-0.6	0.9	0.5	0.1	0.1	0.2	0.3
Non-durable goods mfg	7.7	7.5	7.5	7.4	7.1	6.8	6.5	6.3	-0.2	0.0	-0.2	-0.4	-0.5	-0.4	-0.3
Transp,Communic,Utilities	5.9	6.6	6.8	7.3	7.5	7.6	7.7	8.0	1.1	0.8	0.7	0.2	0.1	0.2	0.3
Trade	25.0	29.8	32.0	36.3	40.3	42.2	44.2	45.9	1.8	1.4	1.2	1.0	0.5	0.5	0.4
FIRE	6.5	7.4	7.9	8.9	9.6	9.9	10.3	10.8	1.2	1.3	1.2	0.8	0.3	0.4	0.4
Health services	7.1	10.3	11.8	14.2	16.0	18.4	23.6	28.0	3.7	2.7	1.9	1.2	1.4	2.5	1.7
Other services (w educ)	18.3	25.8	29.0	34.6	39.6	42.9	45.5	47.6	3.4	2.4	1.8	1.3	0.8	0.6	0.5
Domestic servants	1.6	1.3	1.3	1.3	1.2	1.2	1.1	1.1	-1.8	-0.4	-0.3	-0.3	-0.4	-0.4	-0.4
Civilian gov't.	17.7	20.8	22.4	25.2	26.9	29.2	31.8	34.3	1.6	1.5	1.1	0.7	0.8	0.9	0.8
Military jobs	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	-1.1	0.0	0.0	0.0	0.0	0.0	0.0
Goods-producing jobs, % of total	26.4	21.9	21.0	19.5	18.4	17.7	16.9	16.6	-1.9	-0.8	-0.7	-0.6	-0.4	-0.4	-0.2
Manufacturing jobs, % of total	17.2	14.1	13.4	12.2	11.0	10.3	9.5	9.0	-2.0	-1.0	-1.0	-1.0	-0.7	-0.8	-0.5
Private service-producing jobs, %	56.3	61.2	62.2	63.8	65.3	65.8	66.4	66.6	0.8	0.3	0.3	0.2	0.1	0.1	0.0
Avg weekly hrs per employee	36.0	35.4	35.1	34.6	34.3	34.3	34.1	34.1	-0.2	-0.2	-0.1	-0.1	-0.0	-0.1	0.0
Labor productivity, private, $/hr	12.4	14.0	14.5	15.7	17.2	18.9	20.6	22.7	1.2	0.8	0.8	0.9	0.9	0.9	1.0

Base 2050

TABLE 6
POPULATION AND LABOR FORCE

	1985	1995	2000	2010	2020	2030	2040	2050	85-95	95-00	00-10	10-20	20-30	30-40	40-50
DEMOGRAPHIC ASSUMPTIONS															
Population, total (in millions)	238.5	263.6	276.4	300.6	325.4	349.1	370.9	392.6	1.0	0.9	0.8	0.8	0.7	0.6	0.6
0-4 years	17.8	19.9	19.8	20.6	22.3	23.3	24.7	26.1	1.1	-0.1	0.4	0.8	0.4	0.6	0.6
5-14 years	33.7	37.9	39.8	40.8	43.2	46.2	48.3	51.2	1.2	1.0	0.2	0.6	0.7	0.4	0.6
15-19 years	18.8	17.8	19.0	21.0	21.0	22.6	23.9	25.0	-0.5	1.3	1.0	-0.0	0.8	0.6	0.4
20-29 years	43.3	37.6	37.2	40.6	43.5	44.2	47.6	50.0	-1.4	-0.2	0.9	0.7	0.2	0.7	0.5
30-39 years	37.8	44.1	41.5	38.7	42.1	45.0	45.8	49.2	1.6	-1.2	-0.7	0.8	0.7	0.2	0.7
40-49 years	25.7	37.8	42.3	41.4	38.7	42.0	44.9	45.8	3.8	2.3	-0.2	-0.7	0.8	0.7	0.2
50-64 years	33.0	34.7	41.4	57.4	60.9	56.3	59.5	64.6	0.5	3.5	3.3	0.6	-0.8	0.6	0.8
65-74 years	16.9	18.9	18.2	21.0	31.3	36.8	33.4	34.8	1.1	-0.8	1.4	4.0	1.6	-1.0	0.4
75-84 years	8.9	11.2	12.4	12.8	15.3	23.4	28.0	26.1	2.3	2.0	0.3	1.8	4.2	1.8	-0.7
85+ years	2.7	3.7	4.6	6.3	7.1	9.1	14.6	19.8	3.3	4.5	3.1	1.2	2.5	4.7	3.0
Households	86.8	99.0	105.0	118.4	130.4	140.6	154.1	169.3	1.3	1.2	1.2	1.0	0.7	0.9	0.9
% headed by persons aged 25-35	23.1	20.4	20.1	20.4	20.1	19.3	19.1	18.9	-1.2	-0.3	0.1	-0.1	-0.4	-0.1	-0.1
% with 2 earners	44.5	51.8	55.5	58.5	60.0	60.0	60.0	60.0	1.5	1.4	0.5	0.3	0.0	0.0	0.0
Working Age Population (millions)	176.0	193.8	203.8	223.9	243.4	259.9	272.1	284.2	1.0	1.0	0.9	0.8	0.7	0.5	0.4
Teenagers 16-19	14.7	13.8	15.1	16.5	16.5	17.7	18.8	19.7	-0.6	1.8	0.9	-0.0	0.7	0.6	0.4
Men, 20-64	66.0	73.6	77.8	85.6	89.3	90.8	96.0	101.8	1.1	1.1	1.0	0.4	0.2	0.6	0.6
Women, 20-64	70.4	77.4	81.4	89.2	92.5	93.3	98.3	104.0	0.9	1.0	0.9	0.4	0.1	0.5	0.6
Men, 65-84	10.4	12.4	12.7	14.6	20.7	26.9	27.7	28.1	1.8	0.6	1.4	3.5	2.6	0.3	0.2
Women, 65-84	14.5	16.7	16.8	18.0	24.4	31.2	31.4	30.6	1.4	0.1	0.7	3.0	2.4	0.1	-0.2
Civilian Labor Force (millions)	115.5	132.2	141.9	159.8	174.0	185.2	199.2	211.5	1.4	1.4	1.2	0.9	0.6	0.7	0.6
Teenagers 16-19	7.9	7.0	7.8	8.6	8.9	9.8	10.6	11.1	-1.2	2.0	1.1	0.3	1.0	0.7	0.5
Men, 20-64	58.5	66.0	70.2	77.3	81.4	83.7	89.0	94.5	1.2	1.2	1.0	0.5	0.3	0.6	0.6
Women, 20-64	46.1	55.5	60.1	69.1	76.2	80.9	87.8	93.8	1.8	1.6	1.4	1.0	0.6	0.8	0.7
Men, 65-84	1.7	2.1	2.3	2.7	4.1	5.6	5.9	6.1	2.0	1.1	1.8	4.1	3.1	0.6	0.2
Women, 65-84	1.2	1.5	1.6	2.1	3.4	5.3	5.9	6.0	2.7	1.5	2.4	5.0	4.3	1.2	0.1
Labor Force Participation Rates															
Teenagers, 16-19	53.8	51.0	51.6	52.4	54.0	55.3	56.1	56.4	-0.5	0.2	0.2	0.3	0.2	0.1	0.0
Men, 20-64	88.7	89.7	90.1	90.2	91.2	92.1	92.7	92.8	0.1	0.1	0.0	0.1	0.1	0.1	0.0
Women, 20-64	65.5	71.7	73.8	77.4	82.4	86.7	89.4	90.2	0.9	0.6	0.5	0.6	0.5	0.3	0.1
Men, 65-84	16.9	17.2	17.7	18.6	19.8	20.8	21.5	21.7	0.2	0.6	0.5	0.6	0.5	0.3	0.1
Women, 65-84	7.9	9.1	9.8	11.5	14.0	16.9	18.9	19.6	1.3	1.4	1.6	2.0	1.9	1.1	0.3

Base 2050

TABLE 7
FEDERAL GOVERNMENT SPENDING AND RECEIPTS, Billions of $

	1985	1995	2000	2010	2020	2030	2040	2050	85-95	95-00	00-10	10-20	20-30	30-40	40-50
						Billions of Current $									
Total Spending	970	1600	1964	3000	4624	7159	11152	16972	5.0	4.1	4.2	4.3	4.4	4.4	4.2
Purchases	344	448	506	664	888	1200	1614	2178	2.6	2.5	2.7	2.9	3.0	3.0	3.0
Defense	258	297	336	442	589	793	1060	1422	1.4	2.5	2.8	2.9	3.0	2.9	2.9
Transfers to persons & states	479	901	1157	1911	3203	5264	8515	13190	6.3	5.0	5.0	5.2	5.0	4.8	4.4
Hospital & medical	93	251	357	681	1234	2096	3776	6449	9.9	7.0	6.5	5.9	5.3	5.9	5.4
Net Interest	127	222	264	375	466	608	909	1456	5.6	3.5	3.5	2.2	2.7	4.0	4.7
Other	20	30	37	50	66	87	115	149	4.1	4.0	3.1	2.8	2.8	2.7	2.6
Total Receipts	789	1420	1766	2676	4289	6641	10111	15208	5.9	4.4	4.2	4.7	4.4	4.2	4.1
Surplus	-181	-180	-197	-324	-334	-518	-1041	-1764	-0.0	1.8	5.0	0.3	4.4	7.0	5.3
Addenda															
Debt of Federal Government	1499	3569	4272	6121	8317	11068	16273	25916	8.7	3.6	3.6	3.1	2.9	3.9	4.7
Social Insurance Solvency Ratio	0.43	1.60	1.89	2.02	1.52	0.75	-0.58	-2.30	13.1	3.4	0.6	-2.8	-7.1	0.0	13.8
Social insurance contribution rate	7.0	7.6	7.6	7.6	8.5	9.2	9.5	9.6	0.8	0.0	0.0	1.1	0.8	0.3	0.1
						Percent of Total Spending, in percent									
Total Spending	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Purchases	35.5	28.0	25.8	22.1	19.2	16.8	14.5	12.8	-2.4	-1.6	-1.5	-1.4	-1.4	-1.5	-1.2
Defense	26.7	18.5	17.1	14.7	12.7	11.1	9.5	8.4	-3.6	-1.6	-1.5	-1.5	-1.4	-1.5	-1.3
Transfers to persons & states	49.4	56.3	58.9	63.7	69.3	73.5	76.4	77.7	1.3	0.9	0.8	0.8	0.6	0.4	0.2
Medicare & Medicaid	9.6	15.7	18.2	22.7	26.7	29.3	33.9	38.0	4.9	2.9	2.2	1.6	0.9	1.5	1.2
Net Interest	13.1	13.8	13.4	12.5	10.1	8.5	8.2	8.6	0.6	-0.6	-0.7	-2.2	-1.7	-0.4	0.5
Other	2.1	1.9	1.9	1.7	1.4	1.2	1.0	0.9	-0.9	-0.1	-1.1	-1.5	-1.6	-1.7	-1.6
Total Receipts	81.4	88.7	89.9	89.2	92.8	92.8	90.7	89.6	0.9	0.3	-0.1	0.4	-0.0	-0.2	-0.1
Surplus	-18.6	-11.3	-10.1	-10.8	-7.2	-7.2	-9.3	-10.4	-5.0	-2.3	0.7	-4.0	0.0	2.5	1.1
						Real Federal Spending Per Capita, 1995 $									
Total Spending	5510	6071	6164	6458	6937	7615	8522	9436	1.0	0.3	0.5	0.7	0.9	1.1	1.0
Purchases	1956	1699	1590	1430	1333	1276	1233	1211	-1.4	-1.3	-1.1	-0.7	-0.4	-0.3	-0.2
Defense	1469	1125	1055	952	884	843	810	791	-2.7	-1.3	-1.0	-0.7	-0.5	-0.4	-0.2
Transfers to persons & states	2720	3418	3632	4113	4805	5599	6507	7333	2.3	1.2	1.2	1.6	1.5	1.5	1.2
Medicare & Medicaid	530	952	1120	1465	1851	2229	2885	3585	5.9	3.2	2.7	2.3	1.9	2.6	2.2
Net Interest	722	840	828	808	699	646	695	809	1.5	-0.3	-0.2	-1.4	-0.8	0.7	1.5
Other	113	114	115	108	100	93	88	83	0.1	0.2	-0.7	-0.8	-0.7	-0.6	-0.6
Total Receipts	4482	5386	5545	5761	6435	7063	7727	8455	1.8	0.6	0.4	1.1	0.9	0.9	0.9

Base 2050

TABLE 8
PERSONAL CONSUMPTION EXPENDITURES (BILLIONS OF 1977$)

	1985	1995	2000	2010	2020	2030	2040	2050	85-95	95-00	00-10	10-20	20-30	30-40	40-50
Personal Consumption Expenditures	1597	2070	2240	2603	3086	3587	4163	4852	2.6	1.6	1.5	1.7	1.5	1.5	1.5
Durable Goods	245	378	414	498	602	717	832	978	4.3	1.8	1.8	1.9	1.7	1.5	1.6
Motor Vehicles and Parts	106	126	132	156	195	236	270	318	1.8	0.9	1.7	2.2	1.9	1.4	1.6
Non-Durable Goods	580	697	743	841	979	1101	1218	1362	1.8	1.3	1.2	1.5	1.2	1.0	1.1
Food and Alcohol	280	323	344	391	446	500	553	617	1.4	1.3	1.3	1.3	1.2	1.0	1.1
Clothing	123	167	181	209	255	293	327	371	3.0	1.6	1.5	2.0	1.4	1.1	1.3
Services	772	996	1083	1264	1505	1769	2113	2512	2.5	1.7	1.5	1.7	1.6	1.8	1.7
Housing and Household Operation	318	387	411	465	527	590	654	727	2.0	1.2	1.2	1.2	1.1	1.0	1.1
Transportation	60	74	79	92	110	126	141	160	2.1	1.5	1.4	1.8	1.4	1.1	1.3
Medical Services	161	230	263	324	392	493	686	893	3.6	2.7	2.1	1.9	2.3	3.3	2.6
Physicians	39	54	57	64	77	87	96	108	3.1	1.3	1.1	1.8	1.2	1.0	1.2
Dentists & other prof service	27	43	44	46	51	55	56	58	4.5	0.5	0.4	1.1	0.7	0.3	0.3
Private & government hospital	71	100	123	166	208	280	427	581	3.5	4.1	3.0	2.3	3.0	4.2	3.1
Nursing homes	14	21	27	37	45	60	96	135	4.5	4.6	3.2	1.9	3.0	4.7	3.4
Other Services	216	296	322	378	474	561	640	745	3.2	1.7	1.6	2.3	1.7	1.3	1.5

Base 2050

TABLE 9

REAL LABOR INCOME PER HOUR, 95 $

	1985	1995	2000	2010	2020	2030	2040	2050	85-95	95-00	00-10	10-20	20-30	30-40	40-50
ALL PRIVATE INDUSTRIES	15.4	16.8	17.0	17.9	19.4	21.0	22.6	24.6	0.9	0.3	0.5	0.8	0.8	0.7	0.8
Farm & agricultural services	10.3	12.1	11.8	11.5	11.9	12.5	13.0	13.7	1.6	-0.5	-0.2	0.4	0.5	0.4	0.6
Mining	26.1	25.7	25.7	25.8	26.9	28.3	29.4	31.1	-0.2	0.0	0.0	0.4	0.5	0.4	0.6
Contract construction	18.0	17.4	17.0	17.2	18.3	19.6	20.6	21.9	-0.3	-0.5	0.1	0.6	0.7	0.5	0.6
Nondurables manufacturing	18.2	19.8	20.0	20.5	21.8	23.3	24.5	26.1	0.8	0.1	0.3	0.6	0.6	0.5	0.7
Durables manufacturing	20.5	21.5	21.5	21.8	23.1	24.6	25.8	27.5	0.5	-0.0	0.1	0.6	0.6	0.5	0.7
Transportation	19.2	19.0	18.7	18.5	19.3	20.3	21.0	22.1	-0.1	-0.3	-0.1	0.4	0.5	0.3	0.5
Utilities	24.8	26.7	26.6	26.9	28.4	30.3	31.7	33.8	0.7	-0.0	0.1	0.6	0.6	0.5	0.6
Wholesale and retail trade	14.5	15.1	15.0	15.0	15.6	16.4	16.9	17.7	0.4	-0.1	-0.0	0.4	0.5	0.3	0.5
Finance, insurance, real estate	16.8	22.8	22.7	22.8	24.0	25.3	26.4	28.0	3.1	-0.1	0.0	0.5	0.6	0.4	0.6
Non-medical services	16.8	18.9	18.9	19.2	20.0	21.2	22.1	23.6	1.2	-0.0	0.1	0.4	0.6	0.5	0.6
Medical services	20.6	25.6	28.7	35.5	43.5	48.5	50.8	54.3	2.2	2.2	2.1	2.0	1.1	0.5	0.7

SALARIES AND ADJUSTED PROPRIETOR INCOME PER HOUR, 95 $

	1985	1995	2000	2010	2020	2030	2040	2050	85-95	95-00	00-10	10-20	20-30	30-40	40-50
ALL PRIVATE INDUSTRIES	13.0	14.1	14.2	14.6	15.6	16.6	17.5	18.7	0.8	0.1	0.3	0.7	0.6	0.5	0.7
Farm & agricultural services	9.3	10.5	10.2	9.9	10.0	10.3	10.5	11.0	1.2	-0.6	-0.3	0.1	0.3	0.2	0.4
Mining	21.8	20.8	20.5	20.1	20.4	20.9	20.9	21.5	-0.5	-0.2	-0.2	0.1	0.2	-0.0	0.3
Contract construction	15.6	14.7	14.2	14.2	14.7	15.5	15.9	16.7	-0.6	-0.6	-0.0	0.3	0.5	0.3	0.5
Nondurables manufacturing	15.0	15.9	15.9	15.9	16.4	17.0	17.2	17.8	0.6	-0.1	0.0	0.3	0.4	0.1	0.4
Durables manufacturing	16.7	17.2	16.9	16.6	17.0	17.6	17.5	18.1	0.3	-0.3	-0.1	0.2	0.3	-0.0	0.3
Transportation	16.0	15.5	15.1	14.7	14.9	15.3	15.3	15.8	-0.3	-0.5	-0.3	0.1	0.2	0.0	0.3
Utilities	20.0	21.2	20.9	20.5	21.1	21.8	21.8	22.5	0.6	-0.3	-0.2	0.3	0.3	0.0	0.3
Wholesale and retail trade	12.6	12.8	12.6	12.4	12.6	12.9	12.9	13.2	0.2	-0.3	-0.2	0.2	0.2	-0.0	0.2
Finance, insurance, real estate	14.2	19.4	19.1	18.9	19.4	20.1	20.3	21.1	3.1	-0.2	-0.1	0.3	0.3	0.1	0.4
Non-medical services	14.9	16.6	16.5	16.5	16.9	17.5	18.0	18.9	1.1	-0.1	-0.0	0.2	0.4	0.3	0.5
Medical services	17.9	22.0	24.6	30.4	36.9	40.7	42.0	44.4	2.1	2.2	2.1	1.9	1.0	0.3	0.6

Proprietor income is reduced by what would be the employee share of contributions for social insurance.

Illustrations of LIFT 2050 as a Simulation Tool

There are at least two ways we use LIFT 2050, and we provide two illustrations of each use in the remaining sections of this paper. First, we use the model as a full-fledged policy simulation tool. That is, once we have created a base, we implement a policy scenario that makes changes to several -- sometimes many -- variables simultaneously, including guesses at the paths followed by LIFT's exogenous variables. For example, in a balanced federal budget scenario, we would very likely build in a monetary policy response, even though there is no model equation linking money growth and the federal deficit. In some instances, when our intuition is strong that a LIFT equation is missing an interaction that would likely be central to the proper analysis of the issue, we over-ride the LIFT equations with our own ideas.

Secondly, we often use LIFT to show us the implications of making a single change to the model, without explicitly letting other parts of the model change. Using the model this way often reveals dependencies and interactions that were not obvious, either to us or to our clients. These simulations indicate where "pressure points" will likely be. For example, as we show below, raising the average life expectancy at birth by as little as two years can have an enormous effect on the federal deficit, which itself leads to a whole host of economic effects. A full scenario approach would likely include changes to eliminate the "extra" deficit induced by the life-expectancy increase.

In what follows, we try to carefully analyze the effects of two separate alternative scenarios: a reduction in immigration and a reduction in Medicare spending. Along with each full alternative scenario, we also create a simple "one-change" alternative that helps to illustrate model linkages. In the case of Medicare, the companion simulation is an increase in life expectancy. In the case of an immigration reduction, the companion simulation is an assumed miniature "baby-boom."

Reducing Medicare Growth

As this paper is being written, most of the federal government has been shut down because Congress and the President have been unable to agree on the provisions contained in the continuing resolution that would keep federal activities funded. One major point of difference between the parties is disagreement on the size of the Medicare Part B premium. (Part B of Medicare is essentially a health insurance plan that covers doctors visits and treatments. Enrollees -- enrollment is not automatic -- pay a monthly premium to be covered. The difference in the premiums between the two parties appears to be about $6 a month.)

While this feature of Medicare moved to the center of the short-term policy debate, the general health of Medicare, and its contribution to rapid federal spending growth has become a central point of concern to the long-term balanced budget debate. Almost all parties agree that it is nearly impossible to balance the budget without reducing Medicare outlays or raising taxes considerably. Several budget analyses have been conducted showing how changing Medicare provisions will reduce the deficit. As is usual, there is little analysis that shows how reducing

Medicare spending will affect the economy as well as the deficit. In this section, we attempt to show both the effects on the economy and the effects on the federal budget deficit of reducing Medicare outlays.

How Medicare is Modeled IN LIFT

A complete description of how Medicare is modeled in LIFT can be found in Janoska (1994). Readers who want the details of our approach are recommended to that paper. A short description will suffice for our present purpose.

The key feature of our approach to modeling Medicare is that we recognize Medicare is a price-subsidy rather than an income-transfer. Medicare subsidizes the elderly (and certain others, like people with end-stage renal disease) in their purchases of health care services. Medicare encourages eligible people to increase their consumption of medical services by reducing the price of those services. By modeling the program as a price-subsidy, there is a direct link between the program and the consumption of medical services. Cuts in the program reduce purchases of these services by making the services more expensive.

Medicare is an entitlement program. The government establishes the level of the subsidy (or benefit) and total program outlays depend, not only on the number of recipients, but also on how much medical services they buy. As the recipients purchase more medical services, total Medicare outlays will increase because the government has left the purchase decision to the recipients. In this way, Medicare expenditures and medical services purchases are determined jointly.

Our price-subsidy approach differs from the income-transfer approach used by nearly all other models. In the income-transfer approach, the transfer is combined with disposable income and the transfer may be spent on any consumption items. Such an approach is fine if there is a single consumption good in the model. However, when there is more than one type of good, modeling the program as an income-transfer often leads to predictions that an increase in Medicare benefits has little effect on medical services but has a large effect on the other consumption categories, especially those with high income elasticities. Janoska (1995) contains a striking example of the inappropriate implications of modeling the program as an income-transfer. The price-subsidy approach in LIFT insures that any changes in the generosity of the program may be spent only on medical services.

Under our approach, the income available for purchasing goods and services equals disposable income (NIPA measure) less Medicare transfers. This is what we call "discretionary" income. Medicare affects consumption, but does so by subsidizing the price of medical services. Medicare does not affect consumption by changing the amount of discretionary income.

Reduced Medicare Simulation

To simulate a plan for reducing Medicare outlays, we capped the average annual growth in Medicare between 1995 and 2005 at 4.8 percent, compared to 7.3 percent growth in the base. This is approximately an 18 percent reduction in Medicare spending in 2005 or a 43 percent reduction in the growth rate of the program. This reduction is roughly equal to the reductions in some of the recent Medicare reform proposals. The cap was slowly relaxed over the period 2006-2010 and in the period 2011-2050, we allowed Medicare to grow at the same rate as nominal consumer spending on medical services.

As part of the simulation, we increased the Part B Medicare premiums to cover approximately 31 percent of the cost of Part B expenditures. Minor adjustments were made to the number of Part B recipients because some recipients would leave the program due to the increased price of the premium.

Table 10 presents some of the macroeconomic indicators from the Medicare reduction scenario. Real GDP is lower throughout the scenario, as are three measures of income - personal income, disposable income and discretionary income. Unemployment is higher throughout the alternate with a loss of 1.1 percent of the jobs in 2050.

While income and GDP are somewhat lower, the federal deficit is much lower under the Medicare scenario. The government runs a surplus beginning in 2022 and by 2050, the surplus equals 2.7 percent of GNP. Interest rates are also lower under the alternate, mainly due to the improved federal fiscal position.

Our price-subsidy approach is highlighted in the three measures of income and the last two entries of the table, Medicare as a share of disposable income. Discretionary income is lower in the model, but does not fall as much as disposable income. Approximately half of the drop in disposable income can be attributed to the reduction in Medicare. If LIFT modeled Medicare as an income-transfer program, we would have overestimated the income effects on consumption by 50 percent. In other words, the impact on non-medical consumption categories would be overestimated by a factor of two. The price-subsidy approach prevents this bias by separating the effects of reduced income from the effects of an increase in the perceived price of medical services.

Though not shown on this table, much of the change in disposable income is caused by a reduction in interest payments to persons. Interest payments fall because interest rates are lower throughout the forecast and because the improved budget position significantly reduces federal borrowing. In fact, had the simulation continued, the government would have been a net creditor by around 2065. These last results are an artifact of our assumption that the federal government would not adjust tax rates or spending to offset the accumulated surpluses of 2022-2050.

TABLE 10
Macroeconomic Indicators: Medicare Reduction Scenario

	2000	2005	2010	2020	2030	2040	2050
Differences as percent from base							
Nominal GDP	-0.7	-0.4	-0.6	-0.7	-0.9	-1.3	-1.3
Real GDP	-0.2	-0.3	-0.4	-0.3	-0.3	-0.7	-0.8
GDP Deflator	-0.5	-0.1	-0.2	-0.4	-0.6	-0.6	-0.5
Total Jobs	-0.2	-0.5	-0.6	-0.6	-0.8	-1.0	-1.1
Personal income	-1.0	-1.4	-2.0	-2.3	-3.0	-3.8	-4.1
Real Disposable Income	-0.5	-1.3	-1.8	-2.3	-2.8	-3.3	-3.7
Real Discretionary Income (Disposable Income less Medicare)	0.0	-0.4	-0.7	-1.0	-1.3	-1.6	-1.8
Differences from base, percentage points							
Unemployment rate	0.2	0.4	0.6	0.6	0.7	0.9	1.0
Three month bill rate	-0.3	-0.2	-0.3	-0.3	-0.5	-0.6	-0.7
10-year note rate	-0.3	-0.2	-0.4	-0.5	-0.7	-0.8	-1.0
Surplus as share of GNP, %	0.3	0.7	1.0	1.4	1.8	2.2	2.7
Nominal health PCE/GDP	-0.2	-0.4	-0.6	-0.7	-0.8	-0.9	-0.9
Medicare as share of gvt. transfers	-2.0	-4.0	-5.0	-5.2	-5.3	-5.7	-6.0
Medicare as Share of Disposable Income							
Medicare Share Under Base	3.7	4.1	4.5	5.2	5.7	6.7	7.5
Difference under Alternate	-0.4	-0.9	-1.1	-1.3	-1.4	-1.6	-1.8

Note: The Medicare reduction scenario resulted in a government surplus after 2022. The base was continuously in deficit through 2050

TABLE 11
Real Personal Consumption Expenditures: Medicare Reduction Scenario
Billions of 1977$

	2000	2005	2010	2020	2030	2040	2050
Differences as percent from base							
Personal consumption expenditures	-0.4	-0.9	-1.2	-1.6	-2.0	-2.2	-2.4
Durable Goods	-0.3	-0.7	-1.2	-1.3	-1.7	-1.7	-1.8
Motor Vehicles and Parts	-0.5	-0.5	-1.1	-1.0	-1.7	-1.5	-1.4
Non-Durable Goods	-0.0	-0.0	-0.2	-0.5	-0.9	-0.9	-1.0
Food and Alcohol	-0.1	-0.2	-0.4	-0.7	-1.0	-1.1	-1.3
Clothing	-0.1	-0.4	-0.8	-1.2	-1.6	-1.5	-1.6
Services	-0.6	-1.5	-1.9	-2.4	-2.7	-3.1	-3.4
Housing and Operations	0.1	-0.2	-0.4	-0.6	-0.8	-0.9	-1.1
Transportation	-0.2	-0.3	-0.7	-1.0	-1.4	-1.4	-1.5
Medical Services	-2.2	-4.3	-5.0	-5.3	-5.6	-5.5	-5.4
Other Services	-0.3	-1.0	-1.4	-2.0	-2.4	-2.7	-3.2
Detailed Medical Goods And Services							
Medical goods and services	-2.2	-4.3	-5.0	-5.3	-5.6	-5.5	-5.4
Physicians	-1.1	-2.0	-2.4	-2.9	-2.8	-2.7	-3.1
Dentists and other professionals	0.0	0.4	0.3	0.1	0.4	0.8	1.0
Hospitals	-3.7	-7.0	-7.8	-7.9	-7.9	-7.2	-6.7
Nursing Homes	-2.7	-5.2	-5.7	-5.8	-5.9	-5.5	-5.4
Drugs	3.1	6.9	7.6	7.2	7.6	7.9	7.6
Medical Durables	3.4	7.1	7.9	7.4	7.6	7.6	7.1

Table 11 shows total real personal consumption expenditures (PCE) fall with reduced Medicare spending. The upper portion of the table lists differences in PCE as a percent from the base for several broadly defined consumption categories. While consumption in all of these categories falls, we see that medical services have the largest reduction. This is an expected result.

The first-round effects of reducing Medicare transfers are increases in the perceived prices of medical services. Price increases reduces medical spending. Other consumption categories will benefit from the shift away from medical services, which must occur if the own price

elasticity of demand for medical services is not zero. Some may question the ability of consumers to shift spending away from medical services, but we find this shift as a vindication of the goals of the Medicare program. The purpose of the program is to increase consumption of medical services of the recipient population because in the absence of the program, these persons would not purchase the medical care.

The lower portion of the Table 11 is a detailed breakdown of medical goods and services. The cap on Medicare decreases spending on Hospitals, Physicians and Nursing homes and increase spending on Dentists and other professionals, Drugs and sundries and Medical durables. The increases in these last three categories can be attributed to the decrease in their perceived price under the alternate. In essence, consumers are seeking less-expensive treatment alternatives due to the reduction in Medicare benefits.

TABLE 12
Nominal Federal Government Spending and Receipts: Medicare Reduction Scenario

	2000	2005	2010	2020	2030	2040	2050
Differences as percent from base							
Total Spending	-2.4	-4.1	-6.0	-8.2	-10.1	-12.6	-14.9
Purchases	-0.1	0.3	0.3	0.3	0.4	0.2	0.4
Defense	-0.1	0.3	0.3	0.4	0.4	0.3	0.4
Transfers to persons and states	-2.9	-5.1	-6.4	-7.2	-7.5	-8.5	-9.3
Medicare and Medicaid	-8.9	-16.0	-18.9	-19.3	-19.5	-19.6	-19.4
Net Interest	-4.7	-7.5	-15.6	-32.7	-54.2	-74.6	-89.0
Other	0.0	0.0	0.0	-0.2	-0.3	-0.4	-0.3
Total Receipts	-1.2	-0.8	-1.2	-1.5	-1.8	-2.3	-2.5
Budget Surplus Difference from base, Billions of dollars							
Budget Surplus	26	81	148	316	603	1162	2143
Solvency of Trust Funds, Actual Solvency Ratio							
Hospital Insurance fund (Base)	0.2	-1.3	-3.0	-5.9	-6.9	-7.7	-10.2
Hospital Insurance Fund (Alt)	0.5	-0.4	-1.3	-2.1	-0.6	0.3	-0.4
Difference	0.3	0.9	1.7	3.8	6.3	8.0	9.8
OASDI fund (Base)	2.8	4.7	6.5	9.1	10.0	11.4	14.6
OASDI fund (Alt)	2.8	4.6	6.4	8.7	9.2	10.0	12.0
Difference	0.0	-0.1	-0.1	-0.4	-0.8	-1.4	-2.6

Note: * indicates that Alternate has positive balance, Base negative balance.

Table 12 shows the effects on the Federal budget under the alternate. Spending in 2050 is down 15 percent compared to the base. The reduction in spending is due to the reduction in Medicare and the considerable decrease in Net interest payments. While Medicare is about 20 percent lower under the alternate, interest payments are nearly 90 percent lower. Despite the reduction in receipts, the government runs a surplus beginning in 2022.

The table illustrates the difficulties of running a deficit. An increase in non-interest payment spending today will force a reduction in this spending in the future since the interest on the debt will account for a larger and larger share of your current revenue. Currently, the Federal government would be running a surplus if not for the interest payment on the accumulated national debt. This leads to the conclusion that to balance the budget over a set period of time,

the less painful (in terms of reduced spending or increased taxes) path requires making the spending cuts and revenue increases as large as possible as soon as possible to lower future interest payments.

This is also illustrated in the last two entries of the table. The Medicare cap keeps the Medicare trust fund solvent through 2003. From 2003 though 2035, the trust fund is technically insolvent as it must borrow funds to meet its current obligations. From 2035 to 2045, the Medicare trust fund is solvent and carries a positive balance. The fund is once again insolvent in 2046 through the end of the simulation. During all of the periods that the fund is insolvent, the insolvency ratio never exceeds 2.5 years. This is compared to base scenario in which the funds is insolvent in 2001 and eventually reaches an insolvency ratio of 10.25 years.

The position of the fund is improved under the alternate for three reasons: reduced spending on the program itself; reduced debt; and reduced interest rates. The first and most important reason is that the Medicare cap reduces outflows from the fund, particularly in the early years of the simulation. The second reason is caused by the first reason. The reduction in outflows reduces the debt of the fund and thus reduces the interest payments the fund must make. These interest payments do not finance medical services, they merely service the accumulated debt of the trust fund. By reducing the non-interest outflows from the trust fund, the Medicare cap keeps the fund from going wildly in debt. The third reason, reduced interest rates, improves the fund's solvency by reducing debt service payments during the years in which the fund is insolvent. This means that fund is not driving itself further into debt simply to finance the spending of earlier years.

The solvency of the OASDI Trust fund (Social Security), however, is reduced by 2.5 years in 2050. There are two reasons for this, decreased employment and lower interest rates. The slight drop in employment reduces OASDI contributions, but this is a minor effect. The primary cause for the reduction in solvency is the fall in interest income due to lower interest rates. The reduction in interest rates lowers both current interest income, but future interest income as well since the fund cannot collect interest income in the future on the present year's lost interest income. The OASDI funds is still very solvent under the alternate with a solvency ratio of 12 years in 2050.

TABLE 13
Employment By Industry: Medicare Reduction Scenario

	2000	2005	2010	2020	2030	2040	2050
Differences as percentage from base							
Civilian Jobs	-0.2	-0.5	-0.6	-0.6	-0.8	-1.0	-1.1
Private sector jobs	-0.2	-0.4	-0.6	-0.6	-0.8	-1.0	-1.1
Agriculture, Forestry, Fish	0.0	0.1	0.0	0.1	0.0	-0.2	-0.3
Mining	-0.0	0.2	0.2	0.5	0.6	0.0	-0.2
Construction	-0.1	0.2	0.3	0.5	0.5	0.5	0.6
Nondurable manufacturing	0.0	0.1	0.2	0.5	0.6	0.1	-0.2
Durables manufacturing	0.6	0.8	1.6	1.9	1.3	1.3	1.3
Transportation	-0.1	-0.2	-0.2	-0.1	-0.0	-0.4	-0.7
Utilities	-0.0	-0.1	-0.1	0.1	0.1	-0.2	-0.2
Trade	-0.0	-0.1	-0.2	-0.3	-0.7	-0.7	-0.7
Finance, insurance, real est.	-0.1	-0.3	-0.4	-0.5	-0.6	-0.9	-1.0
Medical services	-2.3	-4.4	-5.0	-5.3	-5.5	-5.3	-5.2
Civilian Government	-0.3	-0.5	-0.6	-0.7	-0.7	-0.8	-0.8

Table 13 shows the change in employment by several broad industry groupings. Despite the overall drop in jobs, some industries are clear winners and some industries are losers with lower Medicare spending. Medical services are clearly the loser under the alternate, losing some 5 percent of jobs in 2050. This is not a surprising result since the primary impact of a Medicare reduction is reduced demand for medical services. Construction and Durables manufacturing see a net gain in jobs, mainly through increased construction and investment caused by the lower interest rates.

The price-subsidy approach to modeling Medicare is illustrated once again as the industry with the greatest percentage change in jobs is medical services. Had we modeled Medicare as an income-transfer, we would have forecasted a much smaller effect of Medical services jobs than under the price-subsidy approach. An income-transfer approach would have reduced the impact on medical services PCE because the approach is unable to make a distinction between a reduction in disposable income and discretionary income.

Increased Life Expectancy

In this scenario, we smoothly phased in an increase in survival rates of people 50 years and older beginning in 1996. This had the effect of raising life expectancy at birth by two years by 2002. We maintained that increase through 2050. No changes were made in the survival rates of the under-50 population. These population changes, both in terms of composition as well as actual number of people also changed our forecast of the non-age demographic variables used in the PCE equations and some of the residential construction equations.

TABLE 14
Population Changes: Increased Life Expectancy Scenario

	2000	2005	2010	2020	2030	2040	2050
Differences from base, as a percent							
Population	0.3	0.8	1.2	1.7	2.1	2.3	2.5
0-49 Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50-64 Years	0.2	0.7	0.9	0.9	0.9	0.7	0.6
65-74 Years	0.9	2.3	3.2	3.9	3.8	3.4	3.1
75-84 Years	1.9	5.3	7.8	9.7	9.9	9.3	8.5
85+ Years	5.4	15.4	23.1	32.3	33.3	31.0	31.6
Differences from base, Millions							
Population	0.8	2.3	3.6	5.6	7.2	8.7	9.9
0-49 Years	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50-64 Years	0.1	0.3	0.5	0.6	0.5	0.4	0.4
65-74 Years	0.2	0.4	0.7	1.2	1.4	1.2	1.1
85+ Years	0.2	0.8	1.5	2.3	3.0	4.5	6.2

By 2050, the two-year increase in life expectancy has increased population by 2.5 percent or 10 million persons. The largest increase occurs in the over-85 population, which is up 31 percent or 6.2 million persons. This cohort accounts for approximately two-thirds of the increase in population. As shown in the later tables, this increase in the over-85 population has major impacts on the budget and the Medicare trust fund. Based on information in Waldo *et al* (1989), we can clearly see that relative to the other age groups, persons in this age group tend to draw more heavily on Medicare and have higher medical spending.

The increase in this population will adversely affect the Hospital Insurance trust fund as well as the federal budget. The impact on the annual budget arises because most of Medicare Part B spending is financed from current revenues. An increase in Medicare Part B outlays will increase the budget deficit.

There are two reasons the over-85 age group sees the greatest increase. The first is the increase in the number of persons surviving to the age of 85. The second is that we have raised the probability that each person over the age of 85 will live an additional year. The two effects combined give us the results above.

TABLE 15
Macroeconomic Indicators: Increased Life Expectancy Scenario

	2000	2005	2010	2020	2030	2040	2050
Differences as percent from base							
Nominal GDP	-0.4	1.3	1.5	2.5	3.1	3.9	4.9
Real GDP	0.0	1.1	1.2	1.7	2.3	2.3	2.3
GDP Deflator	-0.4	0.3	0.3	0.8	0.7	1.5	2.4
Total Jobs	0.1	1.0	1.3	1.8	2.3	2.6	3.1
Personal income	0.2	2.4	3.5	6.0	7.7	10.1	13.0
Real Disposable Income	0.5	1.8	2.7	4.4	5.9	7.5	9.6
Real Discretionary Income (Disposable Income less Medicare)	0.5	1.6	2.3	3.8	5.3	6.8	8.9
Differences from base, percentage points							
Unemployment rate	0.0	-0.7	-0.8	-1.2	-1.6	-1.9	-2.4
Three month bill rate	-0.2	0.3	0.3	0.5	0.8	1.1	1.5
10-year note rate	-0.1	0.4	0.4	0.6	0.9	1.4	2.0
Surplus as share of GDP, %	-0.3	-0.5	-0.9	-1.7	-2.5	-3.7	-5.4
Nominal health PCE/GDP	0.3	0.8	1.4	2.3	2.8	3.6	4.3
Medicare as share of gvt. transfers	-0.1	-0.1	-0.0	0.3	0.4	0.3	0.3

Table 15 shows the macroeconomic indicators for the increased life expectancy simulation. The information at the top of the table seems to indicate that there are no costs associated with increased survival rates among the elderly. Real GDP is 2.3 percent higher in 2050. Real disposable income sees strong growth (10 percent higher in 2050) and the economy has employed 3.1 million more workers. It is only when we examine the lower portion of the table that we see the costs associated with increased survival rates.

Interest rates are over 150 basis points higher in 2050 than in the base. The deficit, as a share of GDP increases 5.4 percentage points. Here we find the costs of the increased life expectancy - a higher federal deficit and larger federal debt. This result is an artifact of our assumption that tax rates would remain unchanged even though the government runs a a

significantly larger deficit than under the base. This assumption illustrates an important implication of increased survival rates among the elderly - the government will need to increase taxes or cut spending if it is to avoid a run-away debt.

TABLE 16
Real Per-Capita Personal Consumption Expenditures: Increased Life Expectancy Scenario
Billions of 1977$

	2000	2005	2010	2020	2030	2040	2050
Differences as percent from base							
Personal consumption expenditures	-0.2	0.7	0.9	1.5	2.1	2.9	3.9
Durable Goods	-0.8	0.3	-0.2	-1.2	-1.3	-1.6	-1.4
Motor Vehicles and Parts	-1.7	1.3	0.1	-1.6	-2.1	-3.0	-3.4
Non-Durable Goods	-0.3	0.1	-0.1	0.0	0.2	0.0	0.2
Food and Alcohol	-0.2	0.7	0.7	0.8	0.8	0.9	0.9
Clothing	-0.6	-0.8	-1.4	-1.7	-1.9	-2.5	-2.7
Services	0.2	1.3	2.1	3.5	4.6	6.2	8.1
Housing and Operations	0.1	0.3	0.8	0.7	1.0	1.3	1.7
Transportation	-0.9	0.1	-0.7	-0.7	-0.8	-1.1	-1.0
Medical Services	1.8	5.8	9.3	13.7	15.4	18.0	20.3
Other Services	-0.6	-0.8	-1.7	-0.6	0.0	0.2	1.3
Detailed Medical Goods And Services							
Medical goods and services	1.8	5.8	9.3	13.7	15.4	18.0	20.3
Physicians	-0.1	-1.0	-1.4	-0.1	1.3	0.5	0.1
Dentists and other professionals	-0.1	-0.2	-0.4	-0.9	-1.0	-2.9	-5.1
Hospitals	3.5	11.1	17.2	23.9	25.0	27.1	29.2
Nursing Homes	4.2	13.0	19.7	27.4	28.4	29.2	31.0
Drugs	0.2	1.3	1.3	3.1	5.2	3.7	2.8
Medical Durables	0.2	1.1	1.1	3.3	5.5	4.4	4.1

Table 16 shows the percent change in per-capita PCE with longer life expectancies. The PCE results are stunning. While per-capita PCE has increased a little over 4 percent by 2050, per-capita medical services have increased by over 20 percent. Given the overwhelming demand for medical services, one should not be surprised to discover that nearly all other categories of PCE have fallen in per-capita terms.

At first glance, it may seem odd that the durables and non-durables categories have a modest increase in 2005. There are two competing and opposite effects of the increase in the over-50 population. As explained earlier in this paper, the increase in the over-50 cohort will have a negative effect on per-capita consumption of these items. However, the increase in discretionary income will increase consumption of these items. The full impact of the changing age structure of the population is not felt yet at the turn of the century and the income effect is larger than the age effect. In the later years of the simulation, increased interest rates will have a negative effect on some of the durable items. By 2050, when we feel the full effect of the changing age structure and higher interest rates, the income effect is overwhelmed and per-capita consumption falls in these categories.

Some of the medical PCE categories had per-capita decreases. This result is due in part to the way in which we forecast Medicare as well as the age effects on PCE categories. As described above, we constrain Medicare to grow at the same rate as nominal medical PCE. Without this intervention, the Medicare program becomes so large as to become ridiculous and the model is unable to find a solution. However, by restricting the growth of Medicare in the base, we remove some of the endogenous nature of the Medicare spending-by-category forecasts. We force the sum of spending-by-category to equal some specified total. This results in the scaling downwards of spending-by-category. Those categories with small age distribution effects are "squeezed" out of Medicare funds by their faster growing neighbors.

Dentists and other professionals is a category in which the direct age effect has very little impact on expenditures. This can be compared to a category like Hospitals in which age effects are very strong. Thus, prior to scaling, the growth rate of Medicare benefits going to Dentists and other professionals is slower than the growth of Medicare benefits going to Hospitals. Relative to benefits going to Hospitals, the scaling leaves Dental benefits lower. Once could think of this as a situation where we have excess demand for Medicare benefits. Consumers use the benefits to purchase Hospitals and shy away from Dentists.

With this in mind, we can now examine the results of the lower-half of the table. In all of the medical categories, an increase in the share of the over-50 population increases the demand for medical services. However, the effect on Hospitals and Nursing homes of an increase in these age shares is much larger than in the other medical categories. In addition, Hospitals and Nursing homes also make a distinction between the 65-85 population and the over-85 population (the other categories use a single elderly cohort defined as the over-65 population). Given the sharp increase in the over-85 cohort, it should come as no surprise that per-capita expenditures on Hospitals increased nearly 30 percent in 2050 while per-capita Nursing home expenditures increased over 30 percent.

TABLE 17
Nominal Federal Government Spending and Receipts: Increased Life Expectancy Scenario

	2000	2005	2010	2020	2030	2040	2050
Differences as percent from base							
Total Spending	0.7	4.1	6.7	12.5	16.9	2.3	33.7
Purchases	-0.4	-0.4	-0.8	-1.1	-1.5	-1.9	-2.1
Defense	-0.4	-0.4	-0.8	-1.1	-1.5	-1.9	-2.1
Transfers to persons and states	1.4	5.1	8.1	12.0	13.3	15.9	18.6
Medicare and Medicaid	3.1	10.4	16.1	22.4	24.2	26.8	29.5
Net Interest	-0.6	8.0	13.6	43.5	86.9	147.1	227.5
Other	0.0	0.0	0.0	0.6	0.5	1.2	2.2
Total Receipts	-0.8	1.9	2.4	3.9	4.8	6.2	8.0
Difference from base, Billions of dollars							
Budget Surplus	-225	-338	-462	-746	-1412	-3077	-6280
Solvency of Trust Funds, Actual Solvency Ratio							
Hospital Insurance fund (Base)	0.2	-1.3	-3.0	-5.9	-6.9	-7.7	-10.2
Hospital Insurance fund (Alt)	0.2	-1.4	-3.2	-6.9	-9.3	-11.4	-16.0
Difference	0.0	-0.1	-0.2	-1.0	-2.4	-3.7	-5.1
OASDI fund (Base)	2.8	4.7	6.5	9.1	10.0	11.4	14.6
OASDI fund (Alt)	2.7	4.2	5.6	7.2	7.5	8.2	10.6
Difference	-0.1	-0.5	-0.9	-1.9	-2.5	-3.2	-4.0

Table 17 shows federal receipts and spending. This table illustrates in a striking manner the difficulties of consistent deficit financing of current consumption. The deficits created by the increased government exposure through the entitlement programs of Medicare and Medicaid have increased net interest payments by over 225 percent by 2050. Over 14 percent of spending in 2050 goes towards debt maintenance. Despite a nearly 30 percent increase in Medicare and Medicaid transfers, these two items fall as a share of the budget because of the dramatic increase in net interest payments. Net interest payments rise because we continue to add new debt, cannot service the old debt without additional borrowing, and, because the large deficits increase interest rates. Thus we are paying more for the debt we had already accumulated.

Under this scenario, the Hospital Insurance trust fund is insolvent in 2001 and the insolvency rate continues to grow at an accelerating rate. By 2038, interest payments on the Medicare Trust

fund debt exceed social insurance contributions. In 2050, the fund pays more in debt service than it pays in benefits. The fund loses solvency and is in worse shape under the alternate because the number of eligible recipients increases and because of an increase in the debt burden.

Despite the higher interest rates, the OASDI (Social Security) trust fund is less solvent, but by no means, insolvent under the alternate. The increase in payouts without a proportional increase in the contributing population forces the fund to sell down some of its accumulated assets. The fall in the solvency of the OASDI trust fund is cushioned to some extent by the higher interest rates under the alternate and by increased premiums due to the drop in unemployment. The accumulated surpluses of previous years continue to generate income for the Trust fund. In a sense, higher interest rates make the OASDI fund more solvent because each increase means higher interest revenues for the fund.

We can contrast this cushioning effect to what happens to the Medicare trust funds. Essentially, the Medicare fund has no surplus accumulated. Any shock, whether it be a demographic shock or a recession, can throw the fund easily into insolvency. Under the alternate the Medicare fund quickly falls into insolvency and the increase in interest rates hurts, rather then helps this fund since higher interest rates means that it has higher net interest payments. The OASDI fund has accumulated its surplus through the OASDI Reform legislation of the early 1980's. The motivation for the reform was the preservation of the funds when the baby boom retired.

Until recently, no comparable step has been taken in regards to the Medicare trust fund. Consequently, the fund is ill prepared for the present and will be completely overwhelmed as soon as the baby boom reaches eligibility. The fund will be exhausted long before the baby-boom are eligible. Given the onerous nature that accumulated debt will have on the Trust fund, policy makers would be wise to move the fund towards long-run solvency as quick as possible. The quick move reduces the amount that the program must cut to maintain solvency since front-loaded cuts/increases in spending/taxes have a major impact on future interest payments.

Restricting Immigration

During Fourth of July speeches, it is customary for the phrase "we are a nation of immigrants" to appear somewhere. Yet it is always surprising to find the extent to which that hackneyed phrase is true. As Table 1 showed, in some decades, immigration accounted for more than half of the overall increase in U.S. population. Even when we use the rather modest Census Bureau assumption of 880,000 (net) immigrants each year in our population forecasts, we find that immigration accounts for about 40 percent of the total population increase for most decades.

Julian Simon, a strong supporter of relaxed immigration policies, points out that we have a love/hate relationship with immigrants. According to Simon, "[t]he attitude in each generation may be characterized as: 'The immigrants who came in the past were good folk. But the ones coming now are scum.'" (McCloskey, p. 21) Simon's position is that immigrants are generally "...in their twenties and thirties, the ages of greatest physical and mental vigor, when people are

flexible about job location and therefore help the economy adjust to changing conditions." (McCloskey, p. 22)

Opponents of relaxed immigration laws (proponents of reduced immigration) take a different view, similar in spirit to the views expressed by the first president of the American Economic Association, Francis Walker in 1896.

> The question today is protecting the American rate of wages, the American standard of living, and the quality of American citizenship from degradation through the tumultuous access of vast throngs of ignorant and brutalized peasantry.... The entrance into our political, social, and industrial life of such vast masses of peasantry, degraded below our utmost conceptions, is a matter to which no intelligent patriot can look upon without the gravest apprehension and alarm. (McCloskey, p 20.)

Although Francis Walker made this statement a century ago it easily could represent the sentiments of many people today. Today we are witnessing the same levels of immigration that were seen at the turn of the century. In Table 1 the decade sum for the decade starting in 1901 was 8.8 million; the decade sum for the 1990's is projected to be 9.8 million.

Today, economists are of two minds on whether immigration is good for the economy. LaLonde and Topel (1991) find, using cross-sectional analysis, that immigrants have a small negative effect on wages of other immigrants, and they suggest this effect is an upper bound on the extent to which immigration reduces wages of natives. Goldin (1994) and Altonji and Card (1991) find that increases in the number of immigrants tend to reduce the unemployment rate. Moreover, wildly different estimates of the costs to society of immigrants can be found. Passel and Clark (1994) claim that immigrants pay in taxes more than they receive by $27 billion. Huddle (1993) however asserts that immigrants are net recipients from the government of $40 billion. These are only a few examples of the different estimates of the effects of immigration on the economy.

This simulation tries to analyze the long term effects of more restrictive immigration policy. We reduce immigration by 350,000 annually from 1996 to 2050. In order to do this we needed to make three assumptions:

- We assumed that immigrant households disproportionately use public assistance programs;

- We assumed deficit neutrality. The federal deficit as a percent of GDP is held at the base levels;

- We assumed full employment in the base and the alternative. The unemployment rate is held roughly constant at the base levels.

The 350,000 immigrant reduction is of the same magnitude as those being considered by the

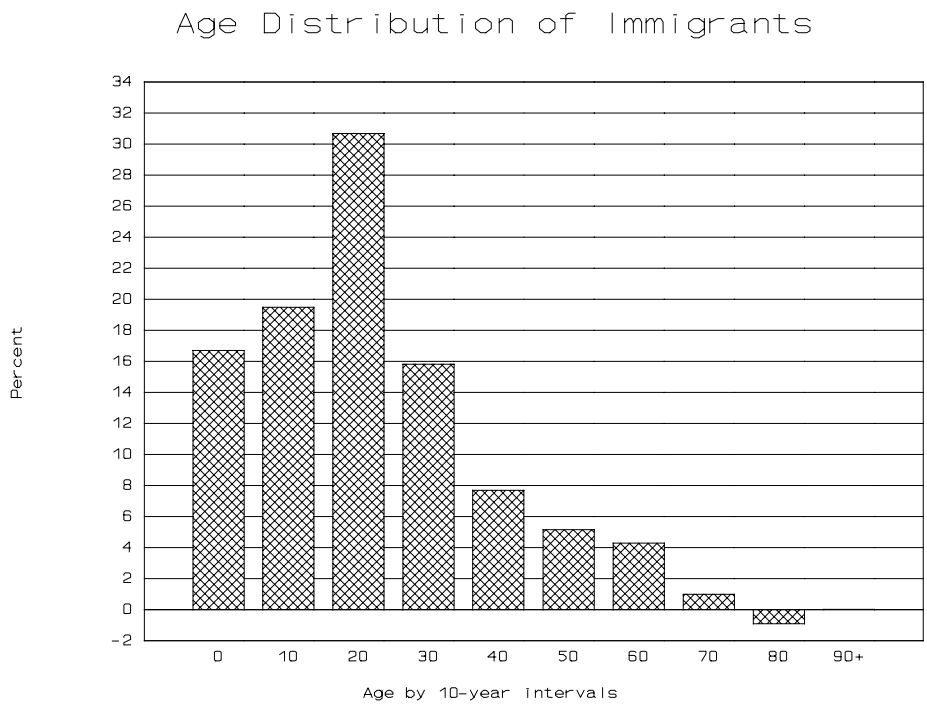
Congress. Table 18 shows the proposed legislation and the recommendations of the U.S. Commission on Immigration Reform.

TABLE 18
Comparing Immigration-Restricting Proposals

Legal Immigrant Categories	Sen. Shelby S.160	Rep. Smith H.R. 2202	Sen. Simpson S..1394	Jordan Commission 1995 Report to Congress	Status Quo
Family based	Residual	330,000	450,000	400,000	480,000
Skill based	Max 50,000	135,000	90,000	100,000	140,000
Refugee	Max 50,000	70,000	------	50,000	Variable
Diversity	0	27,000	------	0	55,000
Total	325,000	600,000	------	550,000	800,000
Approx. Change	475,000	200,000	80,000	250,000	-------

Data was obtained from the 104th Congress S.160, S.1394, H.R. 2202, and The U.S. Commission on Immigration Reform, Legal Immigration: Setting Priorities A Report to Congress, June 1995.

FIGURE 1



All of the bills, with the exception of the Simpson Bill, impose a hard limit on the number of immigrants allowed in the country. The cap-like feature takes away the flexibility of the current laws. Specifically, the president can currently set the number of refugees admitted.

As Simon suggested, the large proportion of immigrants are in their twenties and early thirties. This can be seen in Figure 1 where the distribution of immigrants by ten year age grouping is shown. Immigrants tend to be in the early years of their working lives. We have maintained this distribution of immigrants under the restrictive alternative. An direct implication of the immigration reduction is an immediate reduction in the labor force.

Results of Restricted Immigration Scenario

Table 19 shows the results from the DPM. In 2050 the population is 28.8 million smaller, and, over half of that decline is in the age group 20-64. There is a relatively small decline in the number of people older than 65. This indicates that the elderly as a share of total population is increasing with more restrictive immigration. The changes in the total labor force and the composition of the labor force are consistent with the changes in the population groups. At the bottom of the table, the assumed differential propensities to participate in public assistance programs are shown. Following Borjas (1994), natives are assumed to participate at 7.4 percent and immigrants 9.1 percent. We used these different participation rates to determine the reductions in Medicaid, Food Stamps, and AFDC spending.

Simulation Results

- GDP is increasingly lower through the forecast and finally in 2050 is 8.8 percent lower than in the base.

- The unemployment rate is essentially unchanged this is due to our full employment assumption.

- GDP, PCE, and Real Disposable Income are all down in per capita terms. Specifically, GDP per capita is 1.5 percent lower with restricted immigration.

- The deficit-to-GDP ratio is unchanged by assumption. It is interesting to note that the deficit per capita is 11.4 percent larger with restricted immigration.

- Public assistance transfers are down by 3.2 percent for Medicaid and 6.4 percent for Food Stamps and AFDC. These are the assumed reductions from the base values, resulting from reduced participation in the public assistance programs.

The reductions in social assistance spending due to fewer immigrants do not make up for lost government revenue from a smaller economy. The federal government still has to make payments to the elderly in the population -- a group largely unchanged by immigration. Consequently, reductions in the size of the labor force reduce the tax base. In order to maintain deficit neutrality, we raised the income tax as a share of personal income. This results in lower GDP per capita, and also in lower PCE per capita.

Alternatively we could have assumed deficit neutrality by maintaining the deficit per capita at the same level as in the base. This would have forced us to raise the tax share of personal income even more. The larger increases in taxes would have caused even larger declines in GDP per capita.

Table 22 shows the sectoral employment results from restricted immigration. Total civilian jobs are down by 17 million. The sectors that take the biggest hits are mining, nondurables, and

durables manufacturing. These sectors are contracting because higher U.S. prices (relative to the base) have reduced our competitiveness in foreign markets. Utilities employment contracts along with the manufacturing sector.

TABLE 19
Demographic Variables: Restricted Immigration Scenario

Year	2000	2010	2020	2030	2040	2050
Population, total (in millions)	276.4	300.6	325.4	349.1	370.9	392.6
Reduction in alternative	-1.9	-6.2	-11.1	-16.5	-22.5	-28.8
Age Groups deviations from base						
0-19 years	-0.7	-2.2	-3.7	-5.2	-6.9	-8.5
20-64 years	-1.2	-3.8	-6.8	-10.2	-13.5	-16.7
65-100 years	0.0	-0.2	-0.6	-1.1	-2.1	-3.6
Civilian Labor Force	141.9	159.8	174.0	185.2	199.2	211.5
Reduction in alternative	-1.0	-3.4	-6.3	-9.8	-13.3	-16.7
Labor force groups deviations from base						
Teenagers 16-19	-0.1	-0.2	-0.4	-0.6	-0.7	-0.9
Men, 20-64	-0.5	-1.6	-3.0	-4.6	-6.1	-7.6
Women, 20-64	-0.4	-1.5	-2.8	-4.4	-6.0	-7.5
Men, 65-84	0.0	0.0	0.0	-0.1	-0.2	-0.3
Women, 65-84	0.0	0.0	0.0	-0.1	-0.2	-0.3
Number of Households (in thousands)	105.0	118.4	130.4	140.6	154.1	169.3
Reduction in alternative	-0.8	-2.7	-4.8	-7.4	-10.2	-13.2
Differential rates of household participation in Public Assistance*						
Native	7.4	7.4	7.4	7.4	7.4	7.4
Immigrant	9.1	9.1	9.1	9.1	9.1	9.1

*Source Borjas (1994) p. 1701.

TABLE 20
Macroeconomic Results: Restricted Immigration Scenario

Year	2000	2010	2020	2030	2040	2050
Percentage Changes						
Gross Domestic Product	-0.8	-2.0	-3.5	-5.2	-7.0	-8.8
Potential GNP	-0.7	-2.1	-3.4	-5.0	-6.6	-8.2
Price Level and Inflation Indicators						
Avg Hourly compensation	0.9	4.4	7.6	11.1	15.2	19.3
GNP deflator (77=100)	0.8	4.1	7.3	10.8	14.9	18.9
Employment Indicators						
Total jobs, mil	-0.7	-1.9	-3.4	-5.1	-6.7	-8.1
Labor force, mil	-0.7	-2.1	-3.6	-5.3	-6.7	-7.9
Unemployment rate, %	0.0	-0.2	-0.2	-0.2	0.0	0.2
Per Capita Measures						
Gross Domestic Product	-0.1	0.1	0.0	-0.4	-1.0	-1.5
Personal Consumption	-0.1	-0.1	-0.2	-0.2	-0.2	-0.2
Government Federal Deficit	4.2	4.1	7.2	7.1	12.0	11.4
Real Disposable Income	0.0	0.1	0.0	-0.1	-0.3	-0.5
Financial Indicators						
M2 (bil $)	-0.6	-1.6	-3.0	-4.1	-5.1	-6.0
Three month T-bills, %*	0.2	0.4	0.3	0.3	0.3	0.2
Real disposable income	-0.7	-2.0	-3.4	-4.9	-6.3	-7.8
Savings rate, pct*	0.1	0.2	0.1	0.0	-0.2	-0.3
Federal deficit, bil $	3.5	2.0	3.6	2.0	5.2	3.2
relative to GNP*	-0.1	0.0	0.0	0.0	0.0	0.1
Income tax share of personal income*	0.1	0.2	0.2	0.3	0.3	0.4
Reductions in public assistance from the base						
Medicaid transfer payments	-0.4	-1.2	-1.8	-2.4	-2.8	-3.2
Transfer payments Food Stamps	-0.9	-2.3	-3.6	-4.8	-5.7	-6.4
Transfer payments AFDC	-0.9	-2.3	-3.6	-4.8	-5.7	-6.4

*Percentage Point changes

TABLE 21
Sectoral Employment Results: Restricted Immigration Scenario

Year	2000	2010	2020	2030	2040	2050
Civilian jobs	140.8	158.8	172.9	183.9	197.9	210.7
	-1.0	-2.9	-5.9	-9.3	-13.2	-17.1
Deviations, Percent Change						
Private sector jobs	-1.0	-2.9	-5.5	-8.6	-12.0	-15.3
	-0.8	-2.2	-3.8	-5.5	-7.2	-8.7
Agriculture, forestry, fishery	0.0	0.0	-0.1	-0.1	-0.1	-0.2
	-0.5	-1.2	-2.2	-3.5	-4.8	-6.1
Mining	0.0	0.0	0.0	0.0	-0.1	-0.1
	-1.0	-2.8	-4.9	-7.4	-10.2	-12.6
Construction	-0.1	-0.2	-0.4	-0.5	-0.8	-1.0
	-1.3	-2.4	-3.9	-5.2	-6.7	-7.8
Nondurables manufacturing	-0.1	-0.2	-0.3	-0.4	-0.6	-0.7
	-0.7	-2.2	-3.9	-6.0	-8.4	-10.5
Durables manufacturing	-0.1	-0.3	-0.6	-0.9	-1.2	-1.5
	-0.9	-2.6	-4.6	-7.0	-9.7	-12.0
Transportation	0.0	-0.1	-0.2	-0.3	-0.4	-0.6
	-0.6	-2.0	-3.6	-5.5	-7.5	-9.4
Utilities	0.0	0.0	-0.1	-0.1	-0.2	-0.2
	-0.7	-2.2	-4.1	-6.3	-8.8	-11.2
Trade	-0.3	-0.9	-1.7	-2.5	-3.3	-4.0
	-1.0	-2.5	-4.2	-6	-7.5	-8.6
Finance, insurance, real estate	0.0	-0.2	-0.3	-0.5	-0.7	-0.8
	-0.6	-1.7	-3.1	-4.7	-6.4	-7.9
Services, nonmedical	-0.2	-0.7	-1.4	-2.3	-3.1	-3.9
	-0.7	-2.1	-3.5	-5.2	-6.7	-8.1
Medical services	-0.1	-0.2	-0.5	-0.9	-1.5	-2.3
	-0.6	-1.7	-3.2	-4.9	-6.5	-8.2
Civilian Government	0.0	0.0	-0.4	-0.8	-1.3	-1.8
	0.0	-0.1	-1.5	-2.7	-4.0	-5.2

Taking into account the reduction in expenditures on welfare programs we find that restrictive immigration reduces per capita income and increases the deficit per capita. LIFT 2050 does not discriminate between types of people except by age and gender. Different ages and consume different bundles of goods. These results highlight the future need for workers. To a some degree, the U.S. needs a large labor pool to support transfer programs. Reducing immigration substantially reduces the work force while not substantially affect the number of transfer-payment recipients.

We have ignored all costs and benefits associated with having a more culturally diverse society. We have also ignored any effects of different education levels of immigrants versus natives. Borjas (1994) suggests that the differential in education attainment between current immigrants and natives is widening. Many of the current proposals for immigration reform in Congress will increase the share of skill based immigrants to the total. This may have an effect on the education differential between immigrants and natives. Nonetheless the results do highlight the importance of looking at the long term effects of restrictive immigration policies. GDP per capita does not start to decline until 2030, when the labor force changes become large.

Baby Boom Scenario

A different type of simulation examines what happens when we increase the population. As the title of this section suggests we posit a baby boom similar to the increases in fertility between 1946-1964. We increased the fertility rates starting in 1996 by the same percentage increases that occurred during the baby boom period. Table 23 shows the population effects of a baby boom today. Two major results are:

- Population increases by 38.1 million in the year 2050;
- Labor force changes are slow to occur.

Unlike the immigration scenario the effects are initially not located in the work force ages. We do not get work force changes until the year 2020. Moreover there is no change in the forecast period to the elderly population. Early on, we have more dependents in the society and the labor force as a share of the population is smaller. However, by 2020 we start to get increases in the number of workers. These increases late in the forecast horizon will help the economy adjust to the retiring actual baby boom.

Table 23 shows the raw results of a LIFT 2050 simulation. GDP is up by 9.1 percent in 2050. The federal deficit, both in per-capita terms, and as a share of GDP is much smaller. The reduction in per-capita GDP in 2050 is an artifact of the unchanged tax rates. We have not allowed the government to respond to the decreasing deficit by lowering taxes. In a full policy scenario, we would reduce taxes to maintain deficit neutrality. The decrease in inflation is similarly a result due to no change in the money supply. We have increased potential with increases in the labor force but have not allowed there to be a subsequent increase in money supply. This puts pressure on wages which reduces inflation.

Table 24 shows the sectoral employment results of increased fertility. In 2050 we get an increase of 19.9 million civilian jobs. There are a number of industries that are gainers. Specifically, mining and both durable and nondurable manufacturing are up. This is primarily due to our increased competitiveness from the reductions in inflation.

Table 25 shows consumer spending results in $95 per capita. Initially PCE per capita is down because we have more people, but the same number of workers. PCE then starts to return to the base levels. In per-capita terms, durable goods expenditure is up because of the younger nature of the population. Similarly, services per-capita are down because it is the elderly that consume more services. Medical services spending per-capita are much lower. In 2050 there is $207 less spent per capita on medical services.

TABLE 22
Demographic Results: Baby Boom Scenario

Year	2000	2010	2020	2030	2040	2050
Population, total (in millions)	276.4	300.6	325.4	349.1	370.9	392.6
Deviation	1.5	13.5	18.1	24.2	32.5	38.1
Households	105.0	118.4	130.4	140.6	154.1	169.3
Deviation	0.2	1.9	3.6	11.2	15.2	18
Age Groups deviations						
0-19 years	1.6	13.5	16.5	10.8	14.8	14.5
20-64 years	0.0	0	1.5	13.4	17.7	23.6
65-100 years	0.0	0	0	0	0	0
Civilian Labor Force base	141.9	159.8	174	185.2	199.2	211.5
Deviation	0.0	0	3.1	13.9	16.8	23.5
Labor Force Groups deviations from base						
Teenagers 16-19	0.0	0.0	1.8	2.1	0.9	2.1
Men, 20-64	0.0	0.0	0.7	6.1	8.1	10.9
Women, 20-64	0.0	0.0	0.6	5.7	7.8	10.5
Men, 65-84	0.0	0.0	0.0	0.0	0.0	0.0
Women, 65-84	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 23
Macroeconomic Results: Baby Boom Scenario

	2000	2010	2020	2030	2040	2050
Gross Domestic Product	0.1	1.4	3.6	6.0	6.9	9.1
Potential GNP	0.1	1.3	3.8	6.7	7.6	9.9
Price Level and Inflation						
Avg Hourly compensation	0.0	-0.9	-3.3	-6.1	-6.8	-8.6
GNP deflator (77=100)	0.0	-0.9	-3.2	-6.2	-7.0	-9.0
Employment Indicators						
Total jobs, mil	0.0	-0.1	2.1	6.3	6.9	9.4
Labor force, mil	0.0	0.0	1.8	7.5	8.4	11.1
Unemployment rate, %*	0.0	0.1	-0.3	1.1	1.4	1.4
Per Capita Measures						
Gross Domestic Product	-0.4	-3.0	-1.9	-1.0	-1.7	-0.6
Personal Consumption	-0.4	-2.3	-1.1	-0.1	-0.9	0.0
Government Federal Deficit	0.7	4.1	-20.0	-30.3	-23.4	-31.2
Real Disposable Income	-0.3	-2.1	-1.4	-1.0	-1.7	-0.9
Financial Indicators						
M2 (bil $)	0.0	0.0	0.0	0.0	0.0	0.0
Three month T-bills, %*	0.0	-0.1	-0.3	-0.4	-0.3	-0.4
Real disposable income	0.2	2.4	4.1	5.9	6.9	8.7
Savings rate, pct*	0.1	0.1	-0.3	-0.8	-0.6	-0.8
Federal deficit, bil $	1.2	8.8	-15.5	-25.5	-16.7	-24.5
relative to GNP*	0.0	-0.2	0.2	0.4	0.3	0.5
Percentage Point Changes						

TABLE 24
Sectoral Employment Results: Baby Boom Scenario

Year	2000	2010	2020	2030	2040	2050
Top row deviations from base Bottom row Percent deviations						
Civilian jobs, base	0.0	-0.1	3.7	11.5	3.6	19.9
Alternative deviations	0.0	-0.1	2.1	6.3	6.9	9.4
Private sector jobs	-0.1	-0.2	3.4	11.2	13.1	19.1
	0.0	-0.1	2.3	7.3	7.9	10.8
Agriculture, forestry, fishery	0.0	0.0	0.0	0.1	0.1	0.2
	0.1	0.2	1.3	4.2	4.9	7.2
Mining	0.0	0.0	0.0	0.1	0.1	0.1
	0.3	2.1	4.8	8.7	10.1	13.2
Construction	0.0	0.2	0.4	0.7	1.0	1.3
	0.3	2.7	4.4	6.8	8.6	10.0
Nondurables manufacturing	0.0	0.1	0.3	0.5	0.6	0.7
	0.2	1.7	3.8	7.4	8.3	11.0
Durables manufacturing	0.0	0.2	0.6	1.0	1.2	1.6
	0.2	1.8	4.5	7.9	9.4	12.1
Transportation	0.0	0.0	0.1	0.4	0.4	0.6
	-0.2	-0.7	1.7	6.4	6.8	10.1
Utilities	0.0	0.1	0.1	0.1	0.2	0.2
	0.3	2.4	4.6	7.8	9.9	12.7
Trade	-0.1	-0.7	0.5	3.8	4.1	6.2
	-0.3	-2.0	1.2	8.9	9.4	13.5
Finance, insurance, real estate	0.0	0.0	0.2	0.6	0.7	1.0
	0.0	0.1	2.1	6.1	6.4	9.1
Services, nonmedical	0.0	-0.2	0.9	3.2	3.5	5.2
	-0.1	-0.6	2.2	7.1	7.5	10.6
Medical services	0.0	0.2	0.3	0.8	1.3	2.1
	0.2	1.2	2.2	4.7	5.8	7.5
Civilian Government	0.0	0.1	0.3	0.3	0.5	0.8
	0.0	0.2	1.0	1.0	1.4	2.3

TABLE 25
Consumer Spending Results: Baby Boom Scenario

Year	2000	2010	2020	2030	2040	2050
Personal Consumption Expenditures Per Capita, $95	-92.9	-650.9	-338.1	-41.4	-346.1	-8.3
Durable Goods	-24.7	-138.2	2.8	88.5	27.9	84.3
Motor Vehicles and Parts	-8.8	-48.5	22.7	65.5	49.1	63.3
Non-Durable Goods	-25.1	-180.2	-104.8	-6.0	-68.5	49.3
Food and Alcohol	-14.0	-104.2	-81.1	-42.3	-61.5	9.8
Clothing	-4.5	-23.8	9.7	32.6	11.5	32.8
Services	-43.0	-332.5	-236.1	-123.9	-305.5	-141.9
Housing	-2.0	-29.6	-53.2	-29.8	-43.5	-18.6
Household Operation	-3.4	-23.7	-9.5	2.0	9.3	28.9
Transportation	-5.3	-37.5	-17.5	1.2	-13.9	2.3
Medical Services	-8.5	-82.7	-107.3	-120.9	-203.1	-207.1
Physicians	-2.2	-20.2	-23.3	-7.2	-25.9	-17.4
Dentists & other prof services	-2.9	-6.4	3.9	-5.8	-3.7	-3.5
Private & government hospitals	-0.7	-34.4	-66.9	-82.2	-141.8	-154.3
Nursing homes	-1.5	-13.3	-10.9	-13.0	-15.4	-14.1
Other Services	-21.0	-147.5	-79.3	-45.8	-100.9	-21.2

Conclusions

In this paper, we briefly examined the LIFT 2050 framework for making very long term projections of economic activity. Our simulations have highlighted the important role played by the age distribution of the population in defining the problems that will likely afflict the policymakers of the next 20-to-50 years. At the same time, our simulations have pointed out that assumptions made concerning federal budget policy can significantly change the model's results. Analysts engaged in very long term policy analysis need to be aware that assumptions about how future policymakers react, or what rules they follow, will have a more significant influence on their results than they do in very short-run analyses, even those that extend three-to-five years. One benefit of examining these assumptions over the very long term is allowing us to see the differences in policies whose effects take several years to be felt. If one goal of policymakers is to put in place "good" long-run policies, a very long term projections framework is an essential tool.

REFERENCES

Altonji, Joseph, and David Card, "The effects of Immigration on the Labor Market Outcomes of Less-Skilled Natives." In Abowd, J., and R. Freeman, eds., *Immigration, Trade and the Labor Market*. Chicago: University of Chicago Press, 1991, pp. 201-34.

Borjas, George J., "The Economics of Immigration", *Journal of Economic Literature*, vol XXXII, December 1994,

Goldin, Claudia, "The Political Economy of Immigration Restriction in the United States, 1890-1921." In Goldin, C., and G. Libecap, eds., *The Regulated Economy: A Historical Approach to Political Economy*. Chicago: University of Chicago Press, 1994, pp. 223-257.

Huddle, D., "The Costs of Immigration." Rice U., July 1993, cited in Borjas (1994).

Janoska, Jeffry J., "An Approach to Modelling Medicare Benefits", INFORUM Working Paper, 94-010, April 1994.

_____ , "Medicare as a Price Subsidy: Implementation and Simulation Results", INFORUM Working Paper 95-001, April 1995.

Lalonde, Robert, and Robert Topel, "Labor Market Adjustments to increased Immigration" In Abowd, J., and R. Freeman, eds., *Immigration, Trade and the Labor Market*. Chicago: University of Chicago Press, 1991, pp. 167-200.

McCloskey, Donald, (ed). *Second Thoughts: Myths and Morals of U.S. Economic History*. Oxford University Press, 1993.

Monaco, Ralph M., and J.H. Phelps, "Health Care Prices, The Federal Budget, And Economic Growth", *Health Affairs*, Vol. 14, Summer 1995, pp.248-259.

Passel, J., and Rebecca Clark, "How Much do Immigrants Really Cost? A reappraisal of Huddle's 'The Costs of Immmigrants'." Urban Institute, Feb. 1994.

Waldo, Daniel R., S.T. Sonnefeld, D.R. McKusick, and R.A. Arnett III, "Health Expenditures by Age Group, 1977 and 1987", *Health Care Financing Review*, Vol 10 (4), pp.111-120.