Is US Consumption Sustainable?

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Abstract

Over the past several years, the US saving rate has reached historic lows, while borrowing from abroad has reached historic highs. Put another way, the US consumes significantly more than it produces. Several challanges threaten to make the situation worse in the near future: the retirement of the baby boomers, rising health care costs, higher commodity prices, higher interest rates. This has led to concern that the US will follow Iceland, Greece, Argentina, and other countries whose foreign creditors eventually stopped lending to them, and has raised the question Is US consumption sustainable? We address this question by quantifying the levels of future US borrowing our consumption entails, and the increase in saving necessary to meet sustainable deficit levels. We also analyze the potential impacts of retirement, and rising health care costs and interest rates.

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Throughout the financial crisis of the past few years, the US has been tormented with concerns over deficits and debt. The fallout from insufficient saving and excessive borrowing has afflicted every segment of the economy. Many households are overextended and lack adequate savings. The financial sector has suffered devastating losses. State and local governments are burdened with unfunded pension obligations. The federal government is running unprecedented deficits. The nation runs a trade deficit. These problems are made worse by recession in the short-term, and rising healthcare costs and an aging population in the long-term.

Although the financial crisis is now more than three years old, the discussion of how to solve these problems, or even to measure them, remains incoherent. People wonder whether major adjustments will be necessary to provide for retirement in a future of higher taxes, lower public benefits, or both. So far, leaders in Washington have given them no guidance. This uncertainty has surely eroded the confidence of consumers and businesses, hindering the economic recovery.

Our understanding of these issues has suffered for lack of a cohesive framework for analyzing short-term and long-term fiscal challenges. This paper attempts to provide such a framework. We develop a simple tool for analyzing the sustainability of national consumption under given sets of demographic and economic assumptions. This can be used to analyze the impact of long-term problems - such as rising healthcare costs and the aging population - on our standard of living. We can also analyze the threats posed by short-term problems like recession and stimulus spending in the context of longer-term challenges.

We address these questions from the perspective of total national needs and resources. Our framework combines business, household, and government sectors to obtain national aggregates for income, consumption and saving. We analyze the problems of aging, healthcare costs, and debt in terms of their implications for the future allocation of national income among saving, debt payments, healthcare and non-healthcare consumption. The sustainability of consumption can be gauged by the level of debt payments it entails. By analyzing the problem at the nationally aggregated level, domestic debts and assets offset eachother. This leaves debt vis-a-vis the rest of the world as the focus of interest. The sustainability of consumption is then a question of the sustainability of external borrowing.

By taking this approach we bridge two broad sets of literature. One consists of studies that focus on the balance sheets of individual sectors of the economy: households, federal government, pension funds, etc. Our work effectively aggregates the balance sheets of all sectors. This perspective is especially relevant today for several reasons. First, government bailouts of the financial system have blurred the line between public and private sector liabilities. Second, the recession has added to government deficits through tax cuts and stimulus spending. Increases in private saving have been offset by public borrowing. The

trade-off between the two makes the separate analysis of either sector less relevant. Third, the underfunding of long-term public programs such as Medicare and infrastructure is not simply a public sector liability; it will ultimately impose costs on the private sector either through higher taxes or reduced services. Finally, it is clear from the forecasts of federal deficits that long-term trends - aging, rising health care costs and income inequality - will necessitate major changes in taxation and entitlement programs, and in how health care and other resources are distributed among households, between generations, and between the public and private sectors. To evaluate policy changes of this magnitude requires an understanding of total national needs and resources.

The other set of literature related to our paper studies the sustainability of the US current account deficit. Some papers approach the issue by seeking to explain why the US is running such high deficits, and then analyzing whether these reasons are cause for concern (see e.g. Backus et al. (2006)). Higgins et al. (2006) studies the vulnerability of the US international investment position to changes in asset values. Several papers give forecasts of future deficits, as we do (Roubini and Setser, 2004; Cline, 2005; Higgins et al., 2005; Kitchen, 2007). These studies derive the deficit from simulations of borrowing costs and net exports. This approach says nothing about the effect of domestic economic forces. In contrast, we derive the deficit by simulating domestic production and consumption. This shifts the focus from international to domestic issues, such as aging and health care costs, and relates deficits back to consumption. There is a large literature on the capacity of international capital markets to accomodate large trade imbalances, and how exchange rates, interest rates, and net exports might adjust to restore equilibrium. This literature can be used to evaluate whether the deficits we forecast in this paper are sustainable.

We are able to confirm a number of important facts: The high deficits of recent years are the product of a steady increase in household consumption, recently abetted by rising government consumption. This has been driven largely by health care costs. The improvement in the current account in 2009 and 2010 is not due to household de-leveraging; household consumption has actually continued to increase. The improvement is instead due to lower investment spending, which will rise again as the economy improves. This will result in record deficits. Regarding future deficits: If the present age of retirement does not rise, the retirement of the baby boomers will reduce annual GDP growth by about 0.32 percentage points for the next 20 years. The aging of the population will increase health care spending by only 10 percent over the next 20 years. However, rising health care costs in general pose a great threat. If costs continue to rise at historical rates, the US will likely incur external debt of 50 percent of GDP over the next 10 years, even if all other categories of consumption do not grow at all. We also find that the US external balance sheet is so large and highly levered that even a modest deterioration in its value would have an enormous effect on the deficit.

The paper is organized as follows: Section 1 briefly reviews the concepts of national income accounting we will use in this study. Section 2 presents an overview of US external borrowing over the past 50 years. This gives some perspective on how the US came to be such a large borrower, and the forces driving this trend. Section 3 examines the potential impact of several factors that may increase future US borrowing needs - aging, rising health care costs, and the cost of borrowing. In Section 4 we consider these factors jointly by simulating future borrowing under a variety of economic scenarios, and offer some conclusions.

1 Review of Concepts

When a country's consumption and investment spending exceed national income, it must borrow the difference from abroad. This relationship is summarized by the income identity

$$Y = C + I + CA \tag{1}$$

where Y is national income, C is consumption, I investment spending and CA is the current account balance, which equals external lending or borrowing. If income exceeds consumption and investment spending, then the remainder is loaned to the rest of the world. From (1) the amount loaned is $Y - (C + I) = CA > 0$. This is known as a current account *surplus.* If spending on consumption and investment exceeds income, then $CA < 0$; the country has a current account *deficit,* and must borrow $-CA$ from abroad.

National saving S is defined as the difference between income and consumption:

$$S = Y - C \tag{2}$$

This gives another interpretation of the current account balance. From (1) and (2), CA is equal to the difference between saving and investment:

$$CA = S - I \tag{3}$$

If a country requires more investment spending than is provided by domestic saving, it must borrow the difference from abroad.

The current account balance has a third interpretation: it is equal to exports of goods and services EX net of imports IM, minus net investment income paid to foreigners NP and transfer payments to foreigners TP:

$$CA = EX - IM - (NP + TP) \tag{4}$$

To see how this definition relates to lending and borrowing, consider what happens when US imports from China exceed US exports to China. The US importer pays the Chinese

IM dollars, of which $EX < IM$ is used to purchase US exports. This leaves the Chinese with $IM - EX$ dollars, which they can invest in US assets. These could be financial assets like Treasury debt or corporate equity, or real assets such as real estate or a factory in the US. Whatever form this investment takes, it is a debt owed by the US in the sense that it is a claim on US assets. This claim has initial value $IM - EX$, and will result in a future payment to China. NP is the amount of payments to foreigners on their investments in the US, net of income the US receives on its investments abroad. NP is another means by which foreigners accrue dollars, so it adds to US borrowing. Transfer payments TP are voluntary payments to foreigners. These consist mostly of foreign aid and private remittances.

Using these different definitions, a current account deficit can be viewed as arising from high consumption, high investment spending, low saving, high imports, low exports, or high net investment payments to foreigners.

The trouble with running a current account deficit is that future debt payments to foreigners NP will reduce domestic income, requiring even more borrowing in the future. Only through sufficiently strong economic growth can a country escape this cycle. Consider the difference between gross domestic product (GDP) and income. GDP is the value of total domestic production of goods and services, which can be defined as

$$GDP = C + I + EX - IM \tag{5}$$

From (1) and (5) income is the difference between GDP and payments to foreigners:

$$Y = GDP - (NP + TP) \tag{6}$$

Consider a country that consumes $C > Y - I$. From (1) this creates a current account deficit. The borrowing required to finance the deficit leads to future debt payments to foreigners NP. It is clear from (6) that GDP must increase by at least as much as the increase in total payments to foreigners $NP + TP$, or else income Y will decline. If Y declines, then from (1) even more borrowing will be required next period in order to maintain previous levels of C and I.

2 The US Current Account Deficit

Table 1 presents US income, consumption and investment spending, saving, and the current account balance as percent of GDP over the past 50 years. This data comes from the National Income and Product Accounts (NIPA) maintained by the Bureau of Economic Analysis (BEA). The data are grouped into time periods, which have been chosen to illustrate historical shifts in national spending patterns. The figures reported are averages of annual data over each time period.

A quick look at the table reveals a striking contrast between earlier and more recent periods. During 1960-1982 investment averaged slightly more than 20 percent of GDP, while consumption was slightly less than 80 percent. Since income was about 100 percent of GDP, this meant that the current account, $CA = Y - (C + I)$, was nearly balanced. This can also be viewed in terms of the saving rate. The saving rate averaged 20.9 percent, which was about equal to the investment rate; so by the identity $CA = S - I$, the current account was nearly balanced. During 2000-2007, consumption had risen to 85 percent of GDP and the saving rate had fallen to about 15 percent. Since the investment rate remained at roughly 20 percent, this resulted in a current account deficit of about 5 percent of GDP. Many observers have warned that this rate of borrowing is unsustainable (Summers, 2004; Roubini and Setser, 2004; Roach, 2004; Stiglitz, 2004; Obstfeld and Rogoff, 2007).

How did the US go from having a balanced current account to running such a large deficit? In the simplest terms, the rise in consumption spending has lowered the saving rate to a level that requires substantial borrowing to fund investment spending. By decomposing consumption into household and government components (the latter includes federal, state and local government), we can identify two major trends that have shaped this outcome. The first trend is the increase in household consumption, which has risen steadily from about 63 percent of GDP in the early 1980s to about 70 percent since 2000. The second trend is the reduction in government consumption during the 1990s, followed by a return to previous levels in recent years. During 1983-1989 the increase in household consumption caused an increase in total consumption, which led to a substantial current account deficit. During the 1990s household consumption increased further, though this was offset by a decrease in government consumption, leaving the deficit little changed (the deficit was lower during the low growth years of 1990-1993 due to reduced investment spending). During 2000-2007 household consumption continued to rise, and government consumption rose as well. This pushed total consumption to historic highs. Correspondingly, saving fell to its lowest level since the Great Depression, and record deficits ensued.

Over the past few years, the current account deficit has declined significantly, from a record 6.0 percent of GDP in 2006 to 2.7 percent in 2009 and 3.3 percent in 2010. Some have interpreted this as part of a process of "deleveraging," with households cutting consumption and saving more. The data in Table 1 show this interpretation to be false. Both household and government consumption, as percent of GDP, have actually increased since 2008. Correspondingly the aggregate saving rate has fallen. Saving rates in 2009 and 2010 were in fact the lowest since the Great Depression. This would seem to contradict the improvement observed in the *household* saving rate. The explanation for this divergence lies in the fact that the household saving rate is based on income after taxes and transfer payments received from the government. If taxes fall and transfer payments rise, household saving goes up even if consumption remains unchanged. This is precisely what happened

Table 1: National income, expenditures and current account as percent of GDP[a]

		1960-1982	1983-1989	1990-1993	1994-1999	2000-2007	2008	2009	2010
Income	Y	100.2	100.0	100.1	99.7	99.8	100.3	100.0	100.2
Consumption	C	79.3	81.9	83.2	82.2	85.0	86.9	87.9	87.6
Household		62.2	64.9	66.6	67.3	69.6	70.3	70.8	70.6
Government[b]		17.0	17.1	16.6	14.9	15.4	16.6	17.1	17.0
Investment	I	20.5	20.5	17.6	19.4	19.7	18.0	14.8	15.9
Saving[c]	S	20.9	18.1	16.8	17.5	14.9	13.4	12.1	12.7
Current account[c]	CA	0.3	-2.3	-0.8	-1.9	-4.8	-4.6	-2.7	-3.3
Exports	EX	6.7	7.9	9.8	10.8	10.4	12.8	11.2	12.5
Imports	IM	6.6	10.3	10.6	12.4	15.1	17.8	13.9	16.1
Net income pmts	NP	-0.8	-0.6	-0.5	-0.3	-0.6	-1.2	-1.0	-1.3
Inc payments		0.8	2.2	2.2	2.8	3.5	4.6	3.4	3.5
Inc receipts		1.6	2.8	2.7	3.1	4.1	5.8	4.5	4.8
Transfer pmts	TP	0.6	0.6	0.5	0.6	0.8	0.9	1.0	1.0

[a] Multi-year figures are averages of annual percentages, and may not add up because of averaging.
Source: National Income Product Accounts.
[b] Includes federal, state and local government consumption.
[c] Net of capital account transactions, a negligible item.

over the past couple of years. Of course, this adds to government borrowing. The decline in the *aggregate* saving rate reveals that the increase in goverment borrowing has more than offset the rise in household saving.

Table 1 shows that the improvement in the current account over the past few years is not due to lower consumption, but to a sharp decline in investment spending, which is typical for periods of low economic growth. As a share of GDP, investment spending in 2009 and 2010 was the lowest in the post-Depression period, about 3-4 percentage points below the historical norm. This suggests that when the economy recovers, investment spending will rise by 3 or 4 percent of GDP. From (1) borrowing will rise by the same amount, surpassing its previous level.

It is important to note that the rise in government consumption over the past few years is not due to higher transfer payments or the bailout of the financial sector. These costs contribute to government deficits but not to government consumption. The latter consists only of non-investment goods and services consumed, such as war funding and administrative costs. Therefore, there is no reason to expect it to decline when the economy recovers.

With consumption driving up US borrowing needs, it is logical to ask what has been driving up consumption. Table 2 gives a breakdown of household consumption for major spending categories. For several categories, spending as a percent of GDP has stayed level or declined over the past 50 years. These include food, clothing, and transportation.

Table 2: Household consumption by category, as percent of GDP[a]

	1960s	1970s	1980s	1990s	2000-7	2008	2009
Food (at home)	10.6	9.2	7.5	6.1	5.3	5.4	5.5
Food services & accommodations	3.8	4.1	4.3	4.3	4.1	4.3	4.3
Clothing	5.2	4.4	3.7	3.3	2.7	2.5	2.4
Transportation	7.6	7.9	8.1	7.5	7.7	7.2	6.3
Home furnishings and maintenance	4.8	4.2	3.7	3.4	3.4	3.1	3.0
Housing, utilities, fuel[b]	11.3	11.1	12.1	12.3	12.6	13.0	13.5
Health care	4.4	6.1	8.3	10.9	12.3	13.1	14.0
Recreation	4.0	4.6	4.9	5.9	6.4	6.4	6.4
Education[c]	0.8	0.9	1.0	1.2	1.4	1.5	1.6
Financial services & insurance	2.7	3.2	4.0	5.0	5.6	5.9	5.8
Other	6.7	6.7	6.7	7.1	8.0	8.1	8.2
Consumption excl. health care	57.4	56.4	56.1	56.1	57.3	57.2	56.9

[a] Multi-year figures are averages of annual percentages, and may not add up because of averaging. *Source*: National Income Product Accounts.
[b] This includes depreciation expense, but does not include new home construction or major home improvements, which are components of investment spending.
[c] This does not include government education funding, which in 2009 amounted to 5.6 percent of GDP.

The housing boom is often associated with a big jump in spending on homes. But taken together, the categories of housing consumption, utilities and fuel, and home furnishings and maintenance, did not increase much.[1] Other categories, including recreation, education and financial services have been steadily increasing. But by far the greatest increase has been in health care. As a share of GDP, personal health care spending has tripled since the 1960s, and in 2009 surpassed housing as the largest spending category. The last row in Table 2 shows that, excluding health care spending, household consumption as a percent of GDP is actually no higher today than it was in the 1960s. This means that, holding all else equal, were it not for the rise in health care spending, the aggregate saving rate would not have declined, and the US would have no current account deficit.

3 Future Deficits

In this section we consider three factors that are widely believed to place added burdens on US borrowing needs in the years to come: the aging population, rising health care costs, and higher borrowing costs.

[1] This does not include spending on new home construction or major home improvements, which are classified as investment spending.

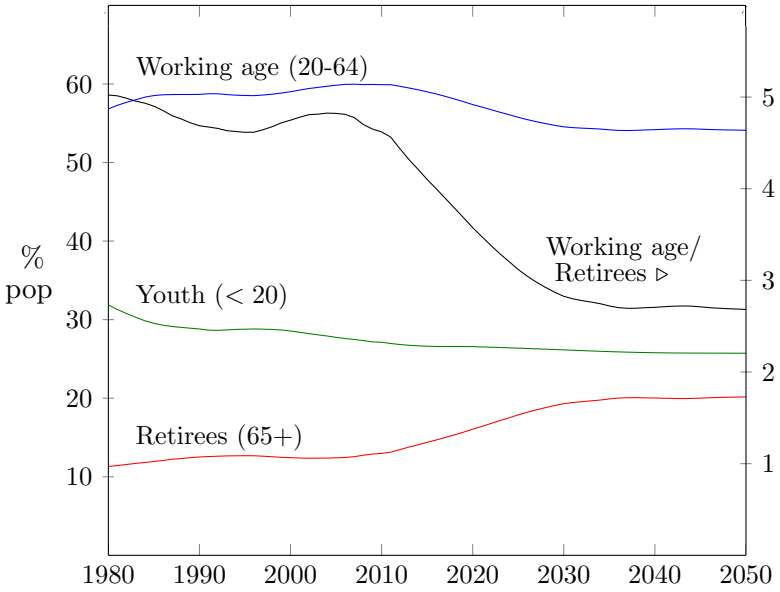

Figure 1: Percent of US population by age group (left axis) and ratio of working age to retirement age people (right axis)

3.1 The Aging Population and Production

The aging US population will have two effects on future borrowing: the increase in retirees will slow GDP growth by reducing labor force participation, and health care spending will rise as more people move into older, higher-cost age brackets. It has long been anticipated that these effects would start to manifest around 2010 as the baby boom generation begins to enter retirement age. Figure 1 gives a timeline of when these effects will play out. The graph is based on data from the US Census Bureau, which provides historical estimates of the US population by age each year from 1980 to the present, and projections of future populations to 2050. These projections indicate that the US is on the brink of a dramatic demographic shift. Figure 1 plots the portion of the population in different age groups from 1980 to 2050. The ratio of working age (20-64) to retirement age (65+) people is projected to decline from 4.6 presently to 2.8 by 2030, after which the ratio stabilizes. This means that for the next 20 years, the US will struggle with an ever-increasing burden of retirees and health care costs. In this section we quantify the effect of this demographic shift on production, and return to the effect on health care costs in Section 3.2.

The retirement of the baby boomers will reduce the size of the labor force relative to the population, and thereby reduce GDP per capita. The fact that older people work less is demonstrated by Table 3, which gives the labor force participation rate (LFPR) by gender and age cohort for 1955, 1994 and 2008. The pattern of decreasing participation among both men and women after age 60 is consistent across time periods.

We can estimate the effect of aging on GDP by calculating the future size of the labor

Table 3: Labor Force Participation Rates of Older Americans[a]

Age	45-49	50-54	55-59	60-64	65-69	70-74	75-79
Men							
1955	97.1	95.7	92.5	82.6	57.0	37.1	19.4
1994	91.0	86.7	76.9	52.8	26.8	15.8	8.6
2008[b]	88.0	88.0	78.8	59.9	35.6	21.9	10.4
Alt. scenario	90.0	90.0	90.0	80.0	55.0	35.0	10.4
Women							
1955	45.8	41.5	35.6	29.0	17.8	9.2	4.0
1994	77.6	70.7	59.2	37.8	17.9	8.7	3.5
2008[b]	76.1	76.1	67.7	48.7	26.4	14.3	5.2
Alt. scenario	80.0	80.0	80.0	70.0	55.0	35.0	5.2

[a] *Source*: BLS, and BLS data as compiled in Gendell (2008)
[b] For 2008, LFPR for age groups 45-49 and 50-54 is average LFPR of age group 45-54.

force under the assumption that LFPRs by age-gender cohort remain at 2008 levels. Let N_{ijt} be the population of age-gender cohort ij in year t, and $LFPR_{ij}$ the labor force participation rate. Then labor force per capita in year t is

$$L_t = \sum_{ij} N_{ijt} LFPR_{ijt} / N_t \tag{7}$$

The result is given by the lower line in Figure 2. The graph shows that L_t will decline by 6.9 percent by 2030 (about 0.32 percent per year) if LFPR by gender-age cohort remains unchanged. All else equal, this will reduce the growth rate of GDP per capita by a similar amount.

Although LFPR has always been lower among older cohorts, Table 3 shows that it has varied considerably over time. Among older men, LFPR was much higher in 1955 than it is today. After declining for decades, LFPR among men reached historic lows in the 1990s, but has since rebounded. This reversal has been attributed to several factors, including: changes in Social Security that create incentives to work past the minimum retirement age, the shift from defined benefit to defined contribution pension plans, the decline in employer-sponsored health insurance for retirees, the recent poor return on savings and financial assets, anti-age discrimination laws, and a shift in work away from physicially demanding jobs (Gendell, 2008). The trend for women is much different. Across all ages, participation has increased steadily over time. In fact, the rise in LFPR among women has so far offset the effect of declining LFPR among men, as well as the small effect of population aging to date.

It is plausible, then, that economic incentives and higher participation among women will

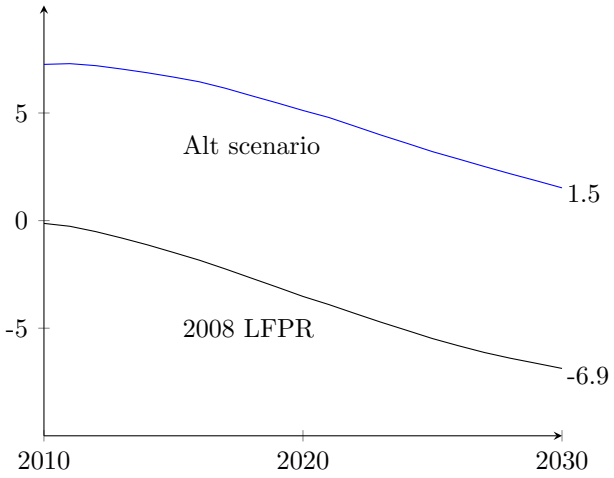

Figure 2: Percent change in labor force per capita from 2008, under the assumption of 2008 labor force participation rates by age-gender cohort, and under the alternative scenario.

increase LFPR among older cohorts in the future. Toossi (2009) believes that these factors are likely to increase the participation rate to some extent. To gauge the potential effect on GDP, we consider the alternative scenario described in Table 3. Under this scenario, LFPR for men is chosen to be close to 1955 levels. Since work is less physically demanding now and older people are more healthy, these rates of participation should be attainable.[2] LFPR for women is chosen based on the recent high rates of participation among women 45-54, which are only about 10 percent less than men. Women presently in the 45-54 cohorts will be the ones in the older cohorts over the next 20 years. Since they presently have historically high participation, they should be able to continue high rates of participation in their older years.

Figure 2 shows that under the alternative scenario, L_t in 2030 is about the same as it is today. This demonstrates that a large, but feasible, increase in labor force participation among older workers could potentially negate the effect of aging on the labor force.

3.2 Health Care Costs

Future health care spending will be driven by population aging as well as other cost increases (what we call *secular* cost growth). We will estimate the two effects separately to gauge their individual importance. We consider the effect of aging first.

Health care spending increases greatly with age. In 2008 average annual personal health care spending was $6,200 for those aged 45-54, $9,300 for 55-64, $12,900 for 65-74, $19,600

[2]LFPR for men under the alternative scenario is probably close to maximum possible levels. Munnell and Sass (2007) finds that 15 to 20 percent of men in their late 50s and 60s are unable to work due to disabilities or health problems.

for 75-84, and $30,700 for those 85 and over.[3] As Figure 1 shows, more Americans will be moving into higher cost age cohorts, driving up total health care spending. Assuming the cost of health care for each age cohort remains at 2008 levels, we can calculate future health care spending based on the Census projections. Total national health care spending consists of personal and non-personal spending (that not attributable to individual patients). Let PHC_i denote 2008 personal health care costs per person for age cohort i, and $NPHC$ denote 2008 non-personal health care costs per capita. Assuming these costs remain at 2008 levels, total health care spending for year t is

$$HC_t = \sum_i N_{it} PHC_i + N_t NPHC \tag{8}$$

This calculation reveals that aging will have a significant effect on health care costs, but not a huge one: health care spending per capita will be 5 percent higher by 2020, and 10 percent higher by 2030. This implies an annual growth rate of about 0.4 percent. This is rather small compared to the historical real growth rate of per capita health care spending, which has averaged 3.5 percent in real terms over the past 10 years. If this trend continues, the secular rise in health care costs, rather than aging, will be the primary driver of future spending growth.

As we saw in Section 2, the rise in health care spending has been the greatest force behind US consumption and borrowing needs. As a share of GDP, total health care spending has increased from 5.0% in 1960 to 8.6% in 1980, 13.0% in 2000 and 15.5% in 2008.[4,5] In those same years, total healthcare spending per capita was $777, $2,193, $5,152 and $6,770 (in 2005 dollars). The future rate of secular cost growth is obviously crucial to future consumption and borrowing. Unfortunately, it is extremely difficult to forecast. One reason is that the causes behind rising costs are complex and not well understood. The general consensus among health economists is that innovations in medical technology are the principal cause (Newhouse (1992); Cutler and McClellan (2001)). New technologies can increase costs by replacing older treatments with more expensive ones, or by offering treatment where none was previously available. However, research has found that costly treatments are often overused, due to the incentives our insurance system creates for patients and doctors (Cutler (2000); Fisher et al. (2009)). Thus the issue of technology-driven cost growth is tied to issues of the insurance system, public policy, and reform. Forecasts of cost growth are also subject to the unpredictability of future technological innovations. Costs are also influenced by trends in public health such as smoking and obesity, which are themselves

[3]Source: Centers for Medicare and Medicaid Services (CMS). The most recent CMS data on costs by age cohort is for 2004. We estimate 2008 levels by scaling 2004 levels based on the change in total health care costs from 2004 to 2008, adjusting for the change in population distribution among cohorts.

[4]These figures differ from those in Table 2, which include only *personal* health care spending.

[5]Throughout our discussion of health care spending we exclude the portion classified by NIPA as investment spending.

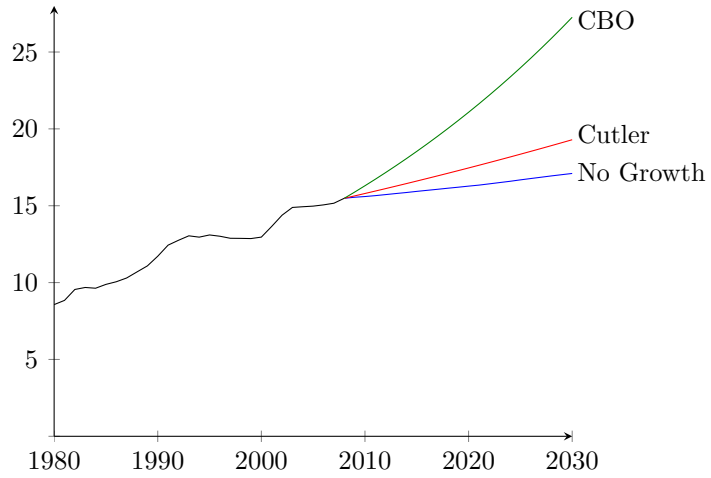

Figure 3: Historical data and future scenarios of health care costs are graphed as percent of GDP. In the "No Growth" scenario cost growth is driven only by the effect of aging (no secular cost growth).

hard to predict.

For these reasons, forecasts are typically based on extrapolation of historical trends. The Congressional Budget Office (CBO) makes projections of health care spending for the next 50 years. Their projections are based on the assumption that cost growth will exceed GDP growth by the same amount as it has since 1975, adjusting for the age distribution[6]. This results in a projection of health care cost in excess of GDP growth of about 2.6 percent. We will refer to this as the *CBO scenario*. The Centers for Medicare and Medicaid Research (CMS) make projections through 2019 by extrapolating general trends over the past 30 years.[7] Their projections are similar to the CBO scenario. Cutler (2003) cites a "consensus estimate" that spending will continue to grow one percent faster than GDP. We will refer to this as the *Cutler scenario*. In each of these studies, the authors stress that their projections should be interpreted as scenarios rather than predictions of likely cost growth.

Figure 4 illustrates these scenarios. It plots historical health care spending, and scenarios of future spending, as percent of GDP. Under the Cutler scenario, spending growth slows from its historical rate, but still rises from 15.5 percent of GDP in 2008 to 19.3 percent by 2030. To relate this to the current account deficit, suppose all terms on the right hand side of (9) remained fixed at their 2008 levels as a share of GDP. Then the rise in health care spending would necessitate an increase in the current account deficit of 3.8 percent of GDP. The CBO scenario is even more grim. Health care spending rises to 27 percent of GDP by 2030. This would increase the current account deficit by an incredible 11.5 percent of GDP.

The line labeled "No Growth" plots health care spending under the assumption of zero

[6]Congressional Budget Office: The long-term outlook for health care spending, 2007

[7]The Centers for Medicare and Medicaid Research: National health expenditure projections 2009-2019.

secular cost growth. In this scenario, cost growth is driven only by the effect of aging; we use the projection of HC_t given by (8). To express this as a percent of GDP, we calculate GDP_t by assuming that GDP per capita remains at its 2008 level. This scenario yields less drastic implications: health care costs rise to 17.1 percent of GDP by 2030. Since GDP per capita is likely to grow over time, this is a conservative estimate. In fact it would require annual GDP per capita growth of only 0.5 percent to keep HC_t/GDP_t constant in this scenario. Therefore, in the absence of secular cost growth, health care spending is likely to remain stable or decline relative to GDP. Although a future of low or zero secular cost growth would be a stark reversal of the long-term trend, there is reason to consider the possibility. Countries in Western Europe, with age profiles similar to the US, have much lower health care spending per capita. And unless the efficiency of health care is actually declining, we should expect to receive the same level of health care in the future as we do presently without paying more.

3.3 Borrowing Costs

All the economists who warn that the US current account deficit is unsustainable essentially argue that it will cause debt payments NP to rise faster than GDP, and eventually lead to an ever-increasing share of national production going to finance the debt. But so far, this has not happened. Table 1 reveals that net investment payment to foreigners NP has not contributed to the deficit. In fact, in every time period we observe $NP < 0$, meaning the US has been a net recipient of international investment income. Apparently the US has been able to borrow at very low cost. This has kept the current account deficit from being even worse than it has been, and is obviously crucial to the sustainability of future borrowing. Whether the US can continue to borrow at low cost is a subject of much debate.

Table 4 summarizes the history of US cross-border investments over the past 10 years. It presents the value of US-owned assets abroad and foreign-owned assets in the US at year-end for 1999, 2007 and 2009. In each year, the US net international investment position (NIIP) is negative, indicating the US is a net debtor. However, the US debt position has not grown over time nearly as much as would be suggested by US borrowing. The two columns labeled "Flows" equal the sum of reported investment flows from 2000 to 2007, and 2008 to 2009, respectively. In theory, the net inflow of foreign investment equals the current account deficit. In practice, the two differ due to measurement error. The columns labeled "Income" are the sums of investment income during the two periods, and correspond to income receipts and payments reported in Table 1. From 2000 to 2007 the US net investment flow was \$-4.5 trillion. Yet by 2007 NIIP was \$-1.9 trillion, a decline of only \$1.2 trillion from the beginning of the decade. This implies that US assets have had much higher captial gains than US liabilites. These figures likely understate the true US NIIP, since the value of direct investment is measured at replacement cost, while earnings on US

direct investment abroad suggest a higher market value (foreign direct investment in the US, on the other hand, has historically had low earnings.) These capital gains, combined with higher investment income on US assets, imply that US assets have had much greater returns than US liabilities.

This has led to a vigorous debate over whether the US enjoys an "exorbitant privilege" that allows it to borrow at low cost by virtue of the dollar's role as the international reserve currency. This view is supported by Gourinchas and Rey (2007), Obstfeld and Rogoff (2005), Lane and Milesi-Ferretti (2005), and Meissner and Taylor (2006). These studies find that the US has enjoyed a returns differential of over 3 percent per annum. Curcuru, Dvorak and Warnock (2008, 2009) dispute this finding, and argue that the observed returns differential is mostly due to inconsistencies among reported values and flows. They also find that the remaining difference is due to the fact that US liabilities are concentrated in lower yielding bonds while US assets abroad are concentrated in higher-yielding equity investements. They find that US-issued bonds held by foreigners do not have lower returns than US investments in bonds overseas. But this begs the question *Why are foreigners willing to hold so much low-yielding US debt?* One theory is that emerging market countries hold US debt to maintain low exchange rates against the dollar. Large official purchases of Treasury debt in recent years seen in Table 4 seem to support this view. Whether foreigners will continue buying US debt is obviously crucial to the sustainability of US deficits, but the limits of foreign demand are uncertain (see Roubini and Setser (2004)). This makes it difficult to put bounds on reasonable estimates of future borrowing costs.

Uncertainty also comes from the asset side of US international investment positions. Table 4 shows that the end-2009 US net international investment position was -$2,738, or about -19 percent of GDP. But gross US assets and liabilites were far greater, both over 100 percent of GDP. The bulk of US assets abroad are in corporate stock and direct equity investments, while most US liabilites are in debt. In effect, the US has borrowed not only to finance current account deficits, but also investment abroad. Higgins et al. (2006) characterizes this as a "levering up" of the US NIIP. They make the case that the concentration of US assets in equities, and US liabilities in debt, exposes the value of the US NIIP to exchange rate and market risk. An appreciation of the dollar, or a decline in worldwide equity values, would reduce the value of US assets more than US liabilities.

It is clear from Table 4 that the positive net investment income the US has enjoyed is a result of this levered position. Most US investment income has accrued from large and successful investments in stocks and direct investment abroad. If earnings on these equity investments suffered a decline, NP could shift drastically. For instance, in 2008 and 2009, income from these investments totaled $1 trillion, about 73 percent of all US investment income. This was an earnings rate of about 5.7 percent per annum on the $8.8 trillion value of these assets at year-end 2007. If instead these assets earned 4 percent per annum,

Table 4: International Investments[a]

	1999	2000-2007		2007	2008-2009		2009
	Value	Flows	Income	Value	Flows	Income	Value
US-owned assets abroad	5,974	5,908	3,681	15,852	2	1,379	14,995
Direct investment	1,414	1,617	1,853	3,553	620	749	4,051
Corporate stock	2,004	907	467	5,248	24	251	3,977
Credit instruments and official assets	2,556	3,348	1,361	6,980	-660	378	6,838
Official reserves & govt assets[b]	221	-2		372	45		487
Bonds[c]	548	660		1,587	-14		1,494
Other non-official[d]	1,787	2,690		5,021	-691		4,858
Derivatives (net)[e]	na	na		71	18		128
Foreign-owned assets in US	6,705	10,428	3,221	17,768	760	1,090	17,733
Direct investment	1,102	1,409	688	2,411	463	210	2,673
Corporate stock	1,526	790	265	2,901	247	129	2,446
Credit instruments and official assets[f]	4,078	8,228	2,268	12,456	50	751	12,614
US Treasury sec (official)[c]	618	967		1,737	1,110		2,871
Agency and GSE sec (official)[c,g]	76	763		954	-188		761
Other official assets	264	361		721	79		741
US Treasury sec (non-official)[c]	441	342		640	184		826
Agency and GSE sec (non-official)[c,g]	156	395		628	-215		426
Corporate bonds[c]	669	1,951		2,661	-383		2,415
Other non-official[d]	1,854	3,449		5,116	-537		4,573
US net international investment position	-731	-4,520	460	-1,916	-758	289	-2,738

[a] "Value" is asset value at year end; "Flows" is asset acquisitions net of sales for the intervening years; "Income" is investment income for the intervening years. Gold, currency and traded securities are valued at market price. Direct investment is valued at current cost (historical costs of land and capital equipment minus depreciation, indexed to their current costs). Data are obtained from BEA's International Transactions Accounts (ITA), except: Flows for US-owned corporate stock and bonds, obtained from the Flow of Funds Accounts (FFA); Value and Flows for foreign-owned US Treasury and Agency and GSE securities, from FFA; Value and Flows for foreign-owned US corporate bonds are calculated by subtracting figures for non-official holdings of US Treasury and Agency and GSE securities from figures for "corporate and other bonds" from ITA.

[b] Official gold and currency reserves, special drawing rights, IMF reserve positions, and non-official government assets.

[c] Securities with original maturity of more than one year.

[d] Includes short-term securities, bank deposits, loans and other assets.

[e] Value of US positions in derivatives contracts with foreign counterparties. Not reported prior to 2006.

[f] Foreign-owned official assets include holdings of sovereign wealth funds.

[g] Securities backed by federal government agencies, Fannie Mae and Freddie Mac.

this would have wiped out the entire positive net investment inflow of $289 billion for the period. Since most US liabilites are in the form of debt, their payments are unlikely to fall by a similar amount. A decline in earnings on US assets, or an increase in the interest rate paid on US liabilities, could quickly reverse the flow of net income payments.

4 Simulating Future Deficits

In this section we simulate future current account deficits based on given levels of consumption. Because health care costs play such a large role, it will sometimes be convenient to divide consumption into health care (HC) and non-health care (C^*) components: $C = HC + C^*$. Substituting (1) into (6), the current account balance in year t is

$$CA_t = GDP_t - C_t^* - HC_t - I_t - NP_t - TP_t \tag{9}$$

We have already discussed the individual effects of the aging population, rising health care costs, and higher borrowing costs on the right-hand side terms. In this section we consider these effects jointly.

We will use lower-case letters to denote variables in terms of percent of GDP. Dividing (9) by GDP_t yields

$$ca_t = 1 - c_t^* - hc_t - i_t - np_t - tp_t \tag{10}$$

Our goal is to form estimates of the right-hand-side terms in (10) based on future scenarios of population aging, rising health care costs and higher borrowing costs, and use these estimates to derive CA_t in future years. We quantify the impact of these factors by the future levels of borrowing these scenarios generate. We can answer the question *"Is US consumption sustainable?"* by placing the current level of C^* in (9) and observing whether it returns a sustainable level of borrowing. If not, we can lower C^* to find the level of consumption and saving that is sustainable. Our scenarios will begin at the start of 2011 and end in 2030. We will thereby cover the period in which most of the demographic shift takes place (see Figure 1).

To begin, we will consider two scenarios that represent opposite ends of the consumption spectrum. In the first scenario, US consumption remains at roughly its present level as a share of GDP, while investment spending rises to a level consistent with normal economic growth. We will use the values $c_t = 0.87$ and $i_t = 0.19$ for all years (see Appendix **??** for a detailed discussion of our assumption for investment spending). We will also assume that net investment income from *present* US assets and liabilities equals 1 percent of GDP (roughly its average level for 2008-2010). Hence $np_{2011} = -0.01$. This is equivalent to assuming the US has no liabilities, and has an asset that earns 1 percent of US GDP in perpetuity. Finally, assume $tp_t = 0.01$ in all years. Placing these values in (10) yields $ca_{2011} = -0.06$, a current

account deficit of 6 percent of GDP in 2011, similar to pre-recession levels. This scenario quickly leads to high debt levels even under optimistic assumptions. Suppose real GDP grows at 3 percent per annum and the borrowing cost is zero. Then the US accumulates debt equal to 47 percent of GDP by 2020, and 86 percent by 2030.

More realistic assumptions of growth and borrowing costs yield even more dire results. Most estimates of long-run US GDP growth are closer to 2.5 percent (see Appendix A for a range of official and Blue Chip forecasts). An optimistic scenario for borrowing costs might be close to the historical real rate of return on US Treasuries. From 2003 to 2007 the real yield on 10-year Treasuries (as implied by Treasury Inflation Protected Securities) ranged from about 1.7 to 2.3 percent, while for 5-year Treasuries the range was 1.0 to 2.2 percent. Consensus forecasts predict higher real yields over the next 10 years: about 3.2 percent for 10-years and 2.8 percent for 5-years. Borrowing costs are likely to be higher still if the US runs large deficits. Assuming GDP growth is 2.5 percent and the real borrowing cost is 3 percent, then debt/GDP is 54 by 2020 and 116 by 2030. Roubini and Setser (2004), among others, argue that this level of borrowing is unsustainable, particularly for an economy as large as the US.

In contrast, consider a scenario in which consumption does not grow with GDP. Suppose non-health care consumption C^* remains at its 2010 level per capita, and health care consumption follows the "No Growth" scenario. Again assume $i_t = 0.19$ and $tp_t = 0.01$ for all years. In this scenario we will drop the assumption that the US continues to earn income on present NIIP, and assume np_{2011} is zero. This yields $ca_{2011} = -0.07$. Although the current account deficit is initially very large, the lack of consumption growth soon rectifies the problem. Figure 4 shows future deficits and debt under the assumption of 2 percent GDP growth, and borrowing cost of 3 percent. Even under this modest assumption of GDP growth and conservative assumption of investment income, the current account is in balance by 2021, and a large surplus develops by 2030. Assuming the US starts from a position of zero debt presently, debt/GDP reaches 36 in 2021, but declines rapidly thereafter and is close to zero by 2030. The constraint we place on consumption causes it to shrink from 87 percent of GDP to 80 percent by 2020. Also, the saving rate rises drastically. This scenario provides a direct way of answering the question posed by the title of the paper: present US consumption is sustainable in the long-term, even after factoring in rising health care costs due to the aging population. In the short-term, though, the US would still run very large deficits for the next several years.

The major problem with this scenario is that it assumes that GDP can grow without growing consumption. This implies that GDP must grow through exports. Figure 4 shows the cumulative annual growth rate in exports implied by this scenario.[8] Exports grow by an

[8]It is assumed that imports per capita remain at the 2010 level.

average of 3.4 percent per annum through 2020.[9] The US has achieved such export growth in the past; real exports grew at an average rate of 4.3 percent from 1998 to 2008. However, export growth is highly cyclical. US exports fell by 17 percent in 2009, but recovered to 2008 levels in 2010.

The rate of export growth necessary to achieve a given debt/GDP target in the future will depend on our assumptions of GDP growth, income on present NIIP, and the cost of future borrowing. Specifically, the required rate of export growth is decreasing in GDP growth and income on NIIP, and increasing in borrowing costs. Export growth must also be greater when domestic consumption growth is greater, in order to offset the higher imports this entails. Figure 5 plots the combinations of average export growth and GDP growth necessary to achieve given levels of debt/GDP in 2020 (assuming the US begins 2011 with zero external debt). This "iso-debt" curve is shown for different assumptions about income on present NIIP and future borrowing costs. Non-health care consumption is assumed to remain at the 2010 per capita level, but we vary the rate of health care consumption following the "No Growth," Cutler, and CBO scenarios. It is assumed that $i_t = 0.19$ and $tp_t = 0.01$ in all years. The left endpoint of the iso-debt curve indicates the lower bound on GDP growth for which the given debt/GDP level is attainable for *any* rate of export growth.

One way of interpreting the results is to consider some "reasonable" expectations for export and GDP growth. Focusing on the box to the bottom left of these levels, observe the set of feasible debt/GDP ratios. For instance, consider the region bounded by 4.0 percent export growth and 2.5 percent GDP growth. The graph in the upper left of the figure presents the results under the most favorable assumptions of borrowing costs and income on present NIIP. Even under these conditions, debt/GDP rises above 40 percent in the CBO scenario. Only by drastically reducing health care cost growth is future debt reduced. Comparing these results with those in the lower left graph, we see that the interest rate on future borrowing costs is not very important. The graphs on the right reveal that income on present NIIP is very important. Even with zero cost on future borrowing, an adverse change in income on the large present balance of external assets and liabilities has drastic effects. Reducing this income from 1 percent of GDP to -1 percent results in debt/GDP of at least 50 percent unless GDP growth is very high, or secular health care cost growth is virtually zero.

Another important result is the effect of health care cost. Higher levels of cost growth act to increase the minimum necessary GDP growth, regardless of export growth. For instance, under the CBO scenario debt/GDP reaches 50 percent or greater unless GDP growth exceeds 2.5 percent.

[9]This calculation uses 2008 exports as the base rather than 2010 exports, which are lower due to the global recession.

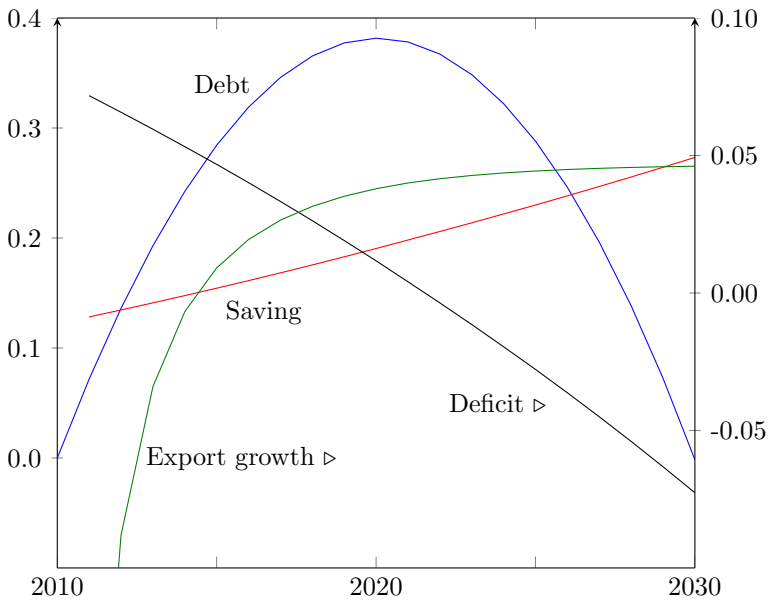

Figure 4: External debt (left axis), the current account deficit (right axis), and saving (left axis) are graphed as fractions of GDP, assuming health care spending growth follows the "No Growth" scenario, non-health care consumption per capita remains at the 2010 level, annual real GDP growth is 2 percent, the real interest rate on borrowing is 3 percent, and the US begins 2011 with no debt. Implied cumulative export growth (right axis) assumes imports per capita remain at the 2010 level.

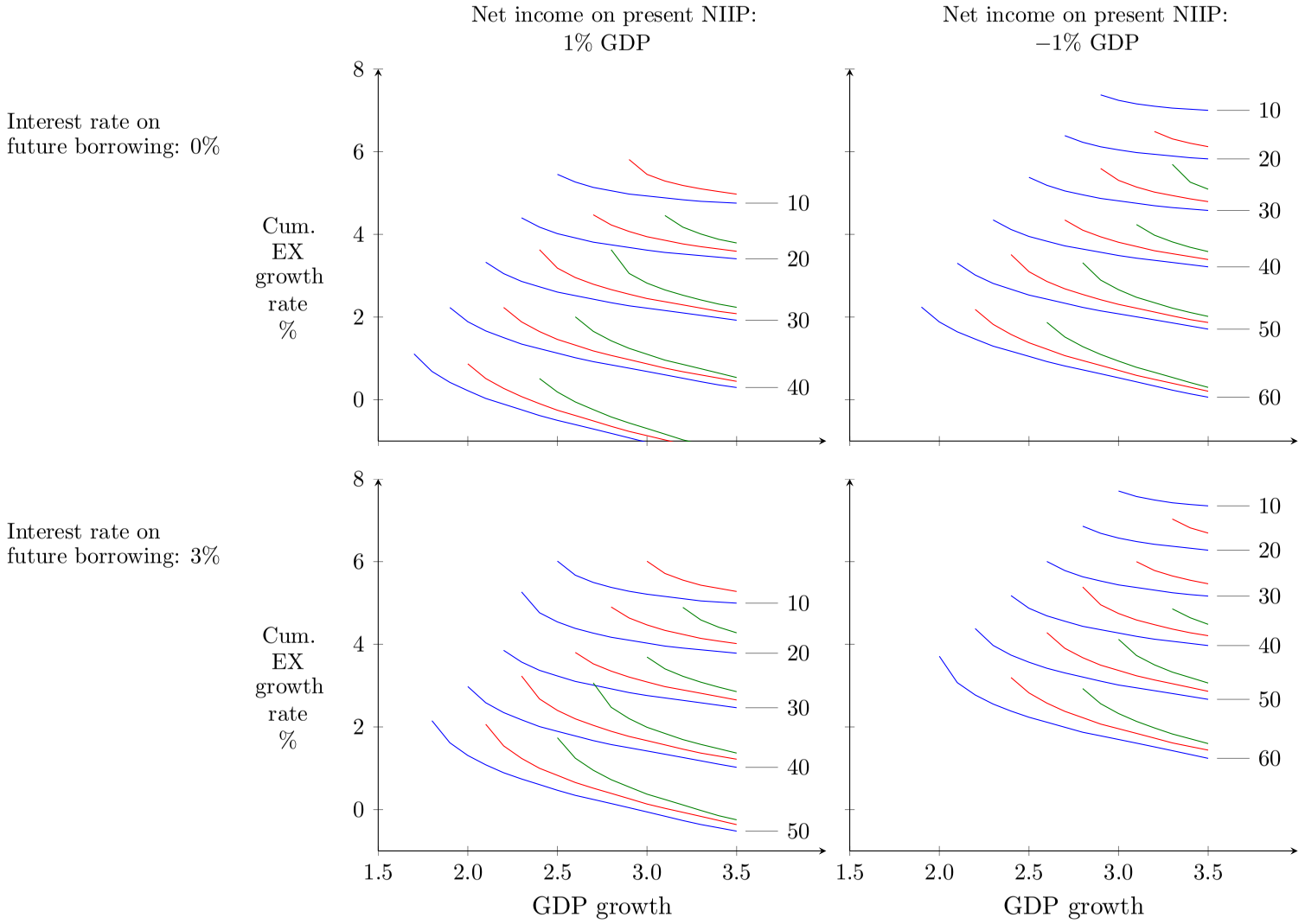

Figure 5: Each curve represents a given Debt/GDP ratio in 2020, assuming the US starts with no external debt in 2011. The curves plot combinations of annual real GDP growth and cumulative annual export growth through 2020 that yield the given Debt/GDP ratio, assuming non-health care consumption remains at 2010 levels, and transfer payments are 1 percent of GDP. Blue curves pertain to the "No Growth" scenario for health care costs, red the Cutler scenario, and green the CBO scenario.

A GDP Forecasts

Table 5: Forecasts of real GDP growth (percent)

	2011	2012	2013	2014	2015	2016	2017-21
Blue Chip[a]							
Top 10 ave.	4.1	3.9	3.9	3.7	3.2	3.0	2.9
Consensus	3.2	3.4	3.2	2.9	2.7	2.6	2.6
Bottom 10 ave.	2.1	2.7	2.5	2.5	2.4	2.3	2.3
CBO[c]	2.7	3.1	3.1	3.5	3.8	3.0	2.4

[a] Blue Chip Economic Indicators, June 2010.
[b] *The Budget and Economic Outlook,* Congressional Budget Office, January 2011.

B Investment Spending

Accounting for about one fifth of GDP, investment spending is a crucial item in the current account balance. To some extent, the level of future investment depends on unknowables, such as technologies that have yet to be invented. But to a large extent, investment needs are predictable: the replacement of depreciating capital, the expansion of productive capacity to accommodate economic growth, and new housing for a growing population. Table 1 shows that investment spending has averaged about 20 percent of GDP over the past several decades. Table 6 breaks down investment spending by category. Except for the low-growth years of 1990-1993 and 2008-2009, the investment rate has been quite stable over time. It was about one percent lower in 1994-2007 than in the 1970s and 80s, though some of this difference can be accounted for by a decline in defense investment. The remaining difference may be due to the higher rate of GDP growth in the earlier years.

The stability of the non-defense investment rate at around 19 percent suggests this may be a reasonable forecast for the future, though there is some basis for arguing that it will be slightly lower. The GDP growth rate in 2000-2007 is similar to the long-run growth rate in the GDP forecasts, and the population growth rate in this period equals the rate forecast by Census for 2010-2030. This suggests that the investment rate in 2000-2007 may be the most appropriate basis for a forecast. But note that in these years residential investment was especially high, and as we now know, supported an excessive level of new home construction. Future residential investment might be closer to the long-run historical average, or perhaps slightly less due to lower population growth and excess inventory from the housing boom. If the residential investment rate were four percent rather than 5.1 percent, non-defense investment for the period would fall to 18.1 percent. Proposed cuts to defense spending suggest a lower rate of defense investment as well. Adding a defense investment rate of 0.4

percent (one half its 2009 level) yields a total investment rate of 18.5 percent.

Table 6: Growth and Investment

		1970s	1980s	1990-3	1994-9	2000-7	2008	2009
Real GDP growth rate		3.2	3.0	1.9	3.9	2.6	-0.4	-2.5
Population growth rate		1.1	1.0	1.3	1.2	1.0	0.9	0.9
Investment as % of GDP[a]								
Total investment		20.4	20.5	17.6	19.4	19.7	18.0	14.7
Private:	Residential[b]	4.9	4.4	3.8	4.3	5.1	3.3	2.5
	Non-residential	11.1	12.1	10.1	11.4	11.2	11.5	9.6
Govt:	Defense	0.8	1.2	1.0	0.6	0.6	0.7	0.8
	Non-defense	2.8	2.5	2.6	2.5	2.6	2.7	2.8
Total ex. defense		19.6	19.3	16.6	18.8	19.2	17.3	13.9
Total ex. defense, residential		14.7	15.0	12.9	14.5	14.0	14.0	11.5

[a] *Source:* National Income Product Accounts.
[b] Includes new construction and major home improvements.

Although the investment rate has been stable in the long-run, it fluctuates greatly over the business cycle. If we consider a scenario of depressed economic growth, it is realistic to assume a lower investment rate as well. Figure 6 plots annual real GDP growth and the non-defense investment rate for 1930 to 2009, excluding the war years 1941-1945. We remove changes in inventory from investment because they add noise to annual observations. The plot reveals that years of negative growth typically have very low investment rates, though there is extreme variation. The lowest investment rate in recent history occurred in 2009, also the year of most severe economic contraction. After removing change in inventories, non-defense investment was only 14.8 pecent of GDP. Table 6 shows that this was due to a fall-off in both residential and non-residential private-sector investment. The experience of the 1930s suggests that investment can remain low as long as economic growth remains depressed.[10] This suggests that if economic growth remains low, the US may benefit from a period of low investment needs. However, the relationship between GDP growth and investment in low-growth years is a loose one. It is difficult to forecast investment in a low-growth scenario.

Does the recent low investment rate mean the US will require above-average investment when economic growth resumes? History suggests not. Figure 6 shows that the investment rate was not especially high following World War II, even though non-defense investment had been extremely low from 1930 to 1945. Nor was investment very high following below-average rates in 1990-1993. Also, Table 6 reveals that about half the decline in investment over the past couple years is due to lower residential investment. But with the overhang of

[10] Figure 6 shows that investment was low even in high growth years during the 1930s, perhaps because the economy was functioning so far below existing capacity.

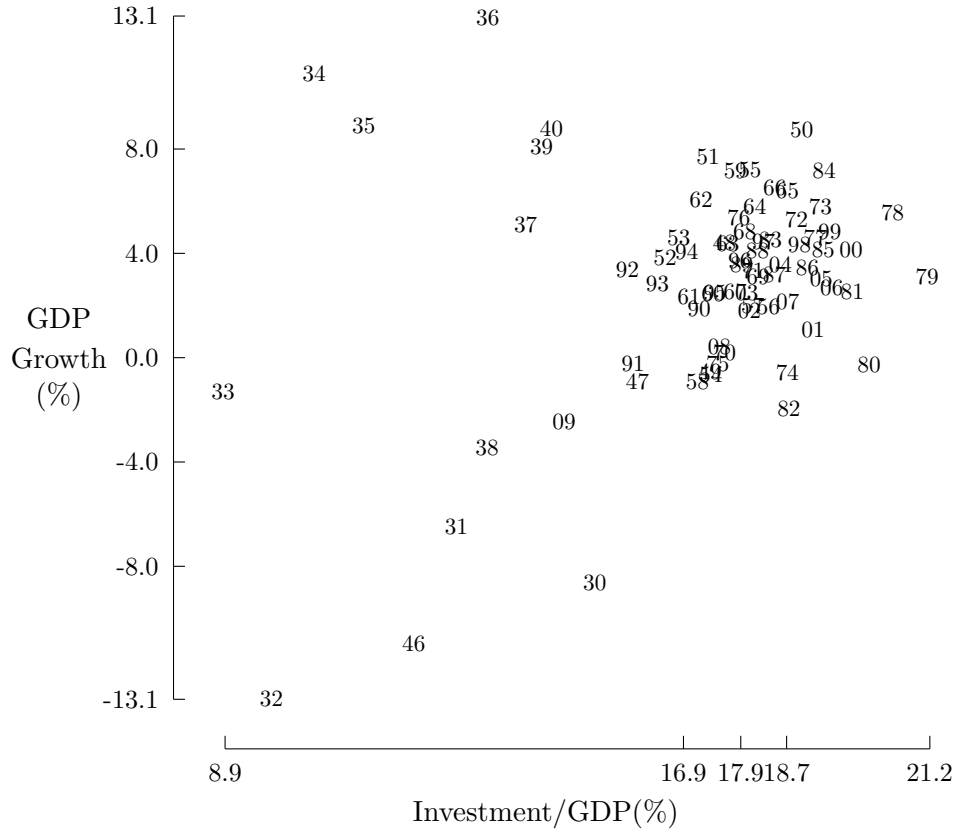

Figure 6: Annual real GDP growth vs. non-defense investment/GDP: 1930-1940, 1946-2009; Investment excludes change in inventories. Horizontal axis labels min, max, quartiles

unoccupied real estate created during the housing boom, the US will not need to make up for this with higher residential investment later.

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