
The Global Outlook for Government Debt over the Next 25 Years: Implications for the Economy and Public Policy

Overview

In their extraordinary coordinated response to the global financial crisis of 2008–09, advanced economies issued government debt at a record pace and magnitude for peacetime. This deficit spending and the aggressive intervention by central banks no doubt helped to prevent the global economy from sinking into another Great Depression. But it also prompted anxiety in some circles about the potentially adverse long-term consequences of such drastic actions. For now, in the major advanced economies, investors have bought up the new debt avidly, keeping the rates of interest on government bonds near 50-year lows. On the other hand, investors have been much less keen to buy the rising debts of some peripheral members of the euro area, driving interest rates in these countries well above those of France and Germany. The interest rate increases were most acute for Greece and Ireland, forcing the governments in Athens and Dublin to take emergency loans from the European Union and the International Monetary Fund (IMF). Investors continue to demand elevated yields on government bonds issued by Greece, Ireland, Portugal, and, to a lesser extent, Spain and Italy.

According to some analysts, officials, and bankers, the euro-area debt crisis is a harbinger of the dangers of indebtedness and deficit-spending for all countries. They note that over the long term, on top of the most recent government actions, nearly all countries face ageing populations and rising health care costs, which are certain to put further pressure on government budgets and on their ability to fund their spending. There is concern that these problems could lead to a rise in interest rates on sovereign debt and even a debt crisis—if not now, then eventually—although there is little agreement on what form such a crisis might take.

This book explores whether, and to what extent, interest rates could rise sharply in the major advanced economies, including the United States. What would trigger a fiscal crisis in the major advanced economies? What are the long-run implications of rising interest rates on public debt for economic growth rates? How quickly should governments tackle this problem and what are the costs of delay? Of particular interest is the global nature of the increased fiscal deficits. How unprecedented is the run-up of government debt relative to the size of the global economy? What are the limits to the global increase in public debt?

That government debt will grow to dangerous and unsustainable levels in most advanced and many emerging economies over the next 25 years—if there are no changes in current tax rates or government benefit programs in retirement and health care—is virtually beyond dispute. Whether interest rates might rise slowly or rapidly, whether some currencies might depreciate sharply, or whether some other form of crisis might occur is of course highly speculative. For the major economies and the world more broadly, in the absence of any large and unexpected negative shock to economic growth, the danger zone is likely to be relatively far into the future, about 10 to 25 years ahead. Over the next 5 to 10 years, debt ratios are not projected to reach dangerous levels in most economies, including in the United States.

If government debt is allowed to grow as projected, interest rates eventually will rise, crowding out productive investments and slowing down the rate of economic growth. High and rising levels of debt would make it difficult or impossible for governments to respond forcefully to any future economic downturn. Indeed, a serious economic downturn in the future could quickly push government debt levels more rapidly into the danger zone and greatly increase the chances of a crisis.

Although we have time to act, time is not on our side. In the near term, spending cuts and tax increases should not be implemented in the next two years in the United States, the euro area, and Japan, to allow the economic recovery to achieve more solid footing. In this regard, the recent tax cuts announced in the United States are appropriate because they delay the onset of fiscal tightening for another year. However, the lack of any concrete steps toward long-run fiscal consolidation in recent US legislation is regrettable, and it contributed, at least in part, to the modest rise of long-term interest rates in late December 2010. The bond rating agency, Moody's Investors Service (2011), recently warned that pressures from entitlement programs and deficit spending during the recession increase the likelihood of a negative outlook on the US credit rating being adopted over the next two years.

There are many reasons why policymakers should begin the process now of planning for an adjustment to a sustainable path for government debt. First, adopting a credible long-run plan now to reduce fiscal deficits in the future can reassure the markets, keep interest rates low, and instill greater confidence and certainty about future tax and spending policies, thereby encouraging businesses to commit their resources to job-creating investment projects. In addi-

tion, it is undeniable that fiscal retrenchment accomplished over an extended period of time is less painful than when it is carried out abruptly under the pressure of a crisis. Accordingly, we propose that budget cuts currently being planned should be implemented in 2013–15 and that additional budget cuts should begin in 2016, although there is some scope for additional cuts in Japan starting in 2014. In addition, reaching agreement soon on long-run changes to curb retirement and medical costs even partially could send a signal to markets that advanced governments are prepared to deal with a problem that threatens to grow more serious in the next two or three decades.

Introduction

The financial crisis of 2008 brought about the most rapid increase in global government debt since World War II (Abbas et al., 2010b, p. 1). The International Monetary Fund (IMF 2010b) projects that, between 2007 and 2011, net general government debt (as a percent of GDP) will rise from 51 percent to 70 percent in the euro area, from 42 percent to 73 percent in the United States, from 38 percent to 74 percent in the United Kingdom, and from 82 percent to 130 percent in Japan.

The deficit spending that created this debt explosion helped to prevent the global economy from sinking into another Great Depression. More specifically, the newly issued public debt supported aggregate demand while the private sector retreated, defaulting on mortgages and loans in some cases, and also deleveraging and restructuring its balance sheet quickly. Suddenly, public sector debt became more attractive to frightened investors, and interest rates on government debt fell to their lowest levels in decades. Long-term interest rates in the major advanced economies remain near multi-decade lows. Financial markets in these economies appear to be more concerned at present over the weak prospects for economic recovery than they are about rising public sector debt levels. As a result, governments in these economies continue to have scope to support economic activity through fiscal deficits in the near term.

The same is not true for several smaller euro-area countries, however. Starting last spring, financial market concerns about the ability of these governments to service their debts led to sharp increases in interest rates on government bonds. It seems likely that the Greek government would not have been able to sell bonds at any interest rate in the absence of intervention by its European partners and the IMF, which provided a large emergency loan. Even though Ireland's government did not need to borrow until mid-2011, it also turned to the European Union and the IMF for an emergency loan to help forestall a run on Irish banks, which are supported by government guarantees. Significantly, both of these emergency loans came in conjunction with severe austerity plans for the Greek and Irish governments. Markets are also worried about the ability of Portugal and Spain to service their public debts.

For the global economy more broadly, there are reasons to be worried about the build-up of government debt over the long run. Even after economies recover

and temporary stimulus measures are withdrawn, many governments face significant budget deficits. All face trend increases in the costs of public pensions and health care as their populations age. There is a widespread debate about whether governments should continue stimulus programs or move toward fiscal consolidation out of concern that the experiences of Greece and Ireland could spread elsewhere. The G-20 group of major economic powers has held a series of summit conferences since the onset of the crisis in 2008, and yet these nations remain divided over this issue. In Toronto, they sought to resolve their differences by agreeing to a timetable for fiscal adjustment after the hoped-for end of the current crisis. Their statement at the end of that meeting alluded to their differences even while setting out a goal of reducing deficits within three years:

Sound fiscal finances are essential to sustain recovery, provide flexibility to respond to new shocks, ensure the capacity to meet the challenges of ageing populations, and avoid leaving future generations with a legacy of deficits and debt. The path of adjustment must be carefully calibrated to sustain the recovery in private demand. There is a risk that synchronized fiscal adjustment across several major economies could adversely impact the recovery. There is also a risk that the failure to implement consolidation where necessary would undermine confidence and hamper growth. Reflecting this balance, advanced economies have committed to fiscal plans that will at least halve deficits by 2013 and stabilize or reduce government debt-to-GDP ratios by 2016. (*The G20 Toronto Summit Declaration*, 2010, paragraph 10)

In Seoul, Leaders reaffirmed their Toronto commitment on fiscal policies without further elaboration.

This book explores the long-run fiscal outlook for key economies and the world overall. We project scenarios for future economic growth, interest rates, and government debt under current fiscal plans, including current benefit formulas for public pensions and public health care. The purpose is not to forecast the most likely outcomes. Rather it is to highlight the fact that current policies are unsustainable under a range of plausible circumstances, and to underscore the importance of actions to achieve the G-20 goals on reducing deficits.

Projected Paths of Government Debt

General Government Primary Balances

The starting point for this analysis is a set of projections by the IMF for general government primary balances in 2015.¹ These projections are based on policies adopted as of year-end 2010, and they incorporate the effects of announced

1. The primary balance is the difference between non-interest government revenues and spending on government programs. The primary balance excludes net interest payments. Because primary balances are negative in most economies, the discussion below refers to deficits rather than balances in order to avoid a plethora of minus signs. Data are from IMF (2010c) with updates for 2010–12 from IMF (2011).

government plans for specific spending cuts and revenue increases, even if these plans have not been formally enacted. The projections also assume that economic recovery will boost government revenues. For 2015, we use the cyclically adjusted primary balance.² The cyclically adjusted balance is a better starting point for extrapolating debt because GDP should be close to potential on average over the long run. The projections imply substantial declines in primary deficits over the next five years. As with any forecast, there is considerable uncertainty surrounding these projections, and they may well prove too optimistic. Nevertheless, they are a reasonable place to start the analysis. The top row of table 1 displays the projected primary deficits for 2015.³

We assume that the primary deficit would remain constant as a percent of GDP in the years beyond 2015 as long as GDP remains close to trend and there are no special factors, which we will discuss shortly. In other words, we assume that revenues and expenditures grow in proportion to GDP and therefore result in primary deficits that also remain in the same proportion to GDP. One special factor that tends to increase the primary deficit over time is the effect of population ageing and rising health-care costs on public pensions and public health care spending.⁴ The second and third rows of table 1 display estimates from the Organization of Economic Cooperation and Development (OECD) of the annual average increases in these costs over the period 2010 through 2025 under the assumption that current benefits formulas and contribution rates remain unchanged.⁵ Note that most of the increased spending is attributed to health care and not public pensions. We assume that these costs continue to rise at the same rates in the years after 2025. These rising costs of social benefits cause expected primary deficits to increase in all economies after 2015.

Another special factor affecting primary deficits is the projected slowing of GDP growth associated with rising public debts, as discussed below. We assume that any reduction of GDP below its previous trend increases the primary deficit by an amount proportional to the share of government revenues in GDP. The fourth row of table 1 shows the implied levels of primary deficits in 2035 under our baseline scenario after taking into consideration the above special factors.

2. Cyclical adjustment removes the effect of any shortfall or excess of actual GDP relative to potential GDP on revenues and spending programs that respond directly to GDP. In other words, it is an estimate of what the balance would be if GDP were at potential.

3. The advanced-economy aggregate is based on the IMF definition of advanced economies. It includes the United States, the euro area, and Japan, as well as other economies. The emerging-economy aggregate includes 27 important developing economies.

4. In the United States, “public pensions” refers to the Social Security old age and disability insurance programs and “public health care” refers to Medicare and Medicaid.

5. See OECD (2010b). The recent increase in the French retirement age is not factored into these estimates.

Table 1 Fiscal and economic assumptions

	United States	Euro area	Japan	Advanced economies	Emerging economies
Deficit components (percent of GDP)					
Baseline primary deficit (level in 2015)	2.0	-0.3	5.0	1.1	-0.6
Public pensions (annual increase)	.05	.05	.01	.06	.06
Public health care (annual increase)	.10	.15	.18	.12	.06
Baseline primary deficit (level in 2035)	7.7	5.6	11.4	6.7	2.3
Health care alternatives					
Optimistic (annual increase)	.04	.05	.06	.05	.02
Pessimistic (annual increase)	.25	.27	.26	.25	.10
2016–35 real GDP growth rate (percent)					
OECD 2016–25	2.4	1.6	1.1	2.2	5.0
Baseline	1.9	1.4	0.6	1.8	5.0
Optimistic	2.6	2.1	1.2	2.5	5.0
Pessimistic	1.0	1.1	-0.3	1.1	4.6
2016–35 nominal GDP growth rate in US dollars (percent)					
Baseline	3.9	3.4	2.6	3.9	8.0
Optimistic	4.6	4.1	3.2	4.6	8.0
Pessimistic	3.0	3.1	1.7	3.2	7.6

OECD = Organization for Economic Cooperation and Development

Notes: OECD health care projections include publicly funded long-term care. OECD projections are based on the period 2010–25 and are assumed to grow at the same rate in 2026–35. IMF projections are based on the period 2010–30 and are assumed to grow at the same rate in 2031–35. Advanced and emerging economies are based on IMF definitions. The advanced-economy aggregate includes the United States, the euro area, Japan, and other countries included in the IMF definition of advanced economies. The pension reforms recently passed by the French parliament are not factored into these estimates.

Sources: The baseline primary deficits in 2015 are cyclically adjusted primary deficits from IMF (2010c). Pension and health care projections are from OECD (2010b, Table 4.5). Health care alternatives are from IMF (2010a). Baseline growth rates are described in the text and are based on OECD (2010b, Table 4.2), and, for emerging economies, OECD (2010a, Table 4.2). Emerging economy growth rates are an unweighted average of rates for Brazil, China, India, Indonesia, Mexico, and Russia. Emerging-economy currencies are assumed to appreciate against advanced-economy currencies at an annual rate of 1 percent in real terms. Optimistic and pessimistic growth rates are described in the text.

Size of Economies (GDP)

In order to construct global debt measures, we project each economy's GDP in terms of US dollars. From 2005 through 2015, we use IMF data and projections. For 2016–25, OECD (2010b) projects GDP growth rates and inflation

rates under the assumption that net government debt ratios gradually stabilize by 2025. We use the OECD growth and inflation projections for our baseline estimates for 2016–20. Beginning in 2021, as net debt in our baseline scenario rises above that in the OECD projection, we reduce the GDP growth rates from those in the OECD projection in proportion to the growth in the ratio of net general government debt to GDP, assuming that each percentage point increase in the net debt ratio permanently reduces GDP by 0.03 percent.⁶ This effect occurs either because of rising interest rates or because of heightened uncertainty on the part of businesses and investors about future policies. We do not factor in any effect of the debt ratio on inflation, which is near 2 percent in all regions. We assume constant real exchange rates among the advanced economies and we assume that emerging economies experience an annual real appreciation against the advanced economies of 1 percent.⁷

The bottom half of table 1 displays the OECD projected real growth rates that are the basis of our projections. For each of the advanced regions, the baseline GDP growth rate is lower than the OECD projection on average, reflecting the negative effect of rising debt on GDP. This effect does not begin to affect emerging economies until the very end of the projection period. As described below, we also consider scenarios with more optimistic and more pessimistic growth rates, which are shown at the bottom of table 1.

Interest Rates

Interest rates have an important effect on any projection of government debt. For a given path of primary deficits, the future debt level will be higher if the government has to pay higher interest on its debt. Averaged over long periods of time, effective government interest rates in most economies have been close to average nominal GDP growth rates.⁸ We use the IMF projections of effective government interest rates through 2014, which are generally lower than

6. An effect of this size is incorporated in the OECD's macroeconomic model.

7. These paths for real exchange rates are not consistent with real interest rate parity across countries, but they are consistent with a constant relative purchasing power parity after allowing for a modest effect of faster productivity growth in developing economies relative to advanced economies. There is much more empirical support for long-run purchasing power parity than long-run real interest rate parity.

8. The effective interest rate equals government net interest payments divided by net government debt. It is essentially a weighted average of the interest rates of outstanding bonds. Appendix 1 of IMF (2010c) shows that long-term bond yields in advanced economies generally exceeded growth rates in 1981–2000 and were close to growth rates in 2001–08. However, the 1981–2000 period was characterized by generalized disinflation that pushed nominal growth rates below nominal bond yields. The opposite phenomenon occurred in the 1960s and 1970s, and growth rates generally were above bond yields in 1960–80. Moreover, the effective interest rate on government debt tends to be lower than the long-term bond yield because a significant fraction of debt is issued at short maturities. In emerging economies, bond yields tend to be lower than nominal growth rates.

projected nominal GDP growth rates in 2011–14. In 2015 we assume that the effective interest rate equals the trend growth rate of nominal GDP.

A major concern about rising government debt is its potential to crowd out productive investment through higher interest rates, especially as debt ratios rise above historical ranges.⁹ As discussed in box 1, “Statistical Estimates of the Effect of Government Debt on Interest Rates,” recent studies have found surprising agreement as to the size of the effect of rising debt ratios on interest rates. Beginning in 2016, we assume that the effective interest rate equals the growth rate of nominal GDP plus an additional amount related to the growth of a country’s ratio of net government debt to GDP. Based on a mid-range estimate from existing studies, the interest rate rises above the nominal growth rate by 3.5 basis points for each percentage point increase in the ratio of net debt to GDP above its 2014 level.¹⁰ This feedback from debt to interest rates exacerbates the cost of serving that debt over time, which in turn makes the reduction of fiscal deficits more difficult.

Baseline Debt Projections Differ for Advanced and Emerging Economies

Table 2 and figures 1 to 6 display projections for general government net debt as a percent of GDP through 2035, showing a significant difference in the projected experience of advanced versus emerging economies. General government includes all levels of government (central, regional, and local) as well as government-run benefits programs. It does not include publicly owned corporations that operate on a market basis without routine subsidies. Net debt is defined as all financial liabilities minus all financial assets of the government sector. Net debt is the appropriate concept for evaluating long-run solvency.¹¹

Under the baseline scenario, general government net debt in the United States is projected to rise from 65 percent of GDP in 2010 to 99 percent of GDP in 2020 and 213 percent of GDP in 2035. The increase is more muted in the euro area, rising to only 133 percent of GDP by 2035. In Japan, however, the increase is dramatic. Japanese net debt is estimated to have been 121 percent of

9. Higher interest rates may also encourage additional saving, which reduces the crowding-out of productive investment. However, most economists believe the effects of interest rates on investment are greater than the effects on saving.

10. In light of very low interest rates in Japan despite record debt levels, we reduce this effect by 50 percent for Japan. OECD (2010b, Chapter 4) assumes a slightly larger effect (4 basis points versus 3.5) except for Japan, where the effect is 1 basis point.

11. For many countries, gross debt and net debt are nearly equal. In the United States, gross debt exceeds net debt by a significant amount because the Social Security system holds Treasury bonds. Most other countries have a pay-as-you-go public pension system which holds few financial assets. One of the main purposes of extrapolating deficits and debt out for 25 years is to calculate the extent to which public pension systems are underfunded. Thus, to use gross debt for the United States would double-count the cost of future Social Security deficits.

Box 1 Statistical estimates of the effect of government debt on interest rates

The effect of government debt on interest rates has been an active field of research. Many papers analyze the effect of both budget deficits and debt, but, from a theoretical point of view, the long-run effect on interest rates should be a consequence of the latter. Thus, we focus on the estimated effects of government debt. These papers all examine the effects on real interest rates, either by using measures of the real interest rate as regressands or by including measures of inflation expectations as regressors.

Engen and Hubbard (2005) find that an increase in US federal debt by 1 percentage point (pp) leads to an increase in the long-term real interest rate by roughly 3 to 5 basis points (bps), depending on the time period. Laubach's (2009) estimates are in the same range. Gale and Orszag (2004) find a slightly higher range of 3 to 6 bps. All of these studies use forward long-term interest rates and projected future values of the fiscal variables. Because the business cycle has opposite effects on interest rates and the fiscal position, using current values of these variables would introduce a negative correlation between these variables that biases downward estimates of the long-run relationship.

Focusing on a panel of OECD countries, Chinn and Frankel (2007) obtain a wide range of estimates, both negative and positive, perhaps because of their very short sample. We do not include their results in the table below. Kinoshita (2006) obtains results very similar to those described for the United States above. Gruber and Kamin (2010) obtain results at the low end of those described above. Baldacci and Kumar (2010) use panel regressions including both advanced and major developing economies. They, too, find an effect of about 3 to 5 bps.

(continued on next page)

GDP in 2010, and it is projected to rise to 183 percent of GDP in 2020 and 386 percent in 2035. For the advanced economies in aggregate, net debt is projected to rise from 67 percent of GDP in 2010 to 90 percent of GDP in 2020 and 178 percent in 2035. Net debt is much lower in the emerging economies—only 27 percent of GDP in 2010. It is projected to edge down to 24 percent of GDP in 2020 and then rise to only 40 percent in 2035. For the world, net debt is estimated to have been 54 percent of GDP in 2010, rising to 61 percent of GDP in 2020 and 98 percent of GDP in 2035.¹²

12. Mrsnik et al. (2010) project a median general government net debt of around 140 percent of GDP in 2035 for a sample of 32 advanced and 17 emerging markets on current policies. Although this projection is somewhat higher than our projection for average world debt, the Mrsnik sample

Box 1 Statistical estimates of the effect of government debt on interest rates *(continued)*

Conway and Orr (2002) and Ardagna, Caselli, and Lane (2004) find that the relationship between long-term interest rates and public debt is non-linear. They estimate that when government debt is 100 percent of GDP, a 1 pp increase in debt raises long-term interest rates about 1 bp, a value that is lower than the other estimates. However, Ardagna, Caselli, and Lane find that this effect increases to 3.5 bps when debt is 140 percent of GDP.

Study	Effect of 1 pp debt increase on real long-term interest rate	Countries	Time period
Conway & Orr (2002) Ardagna, Caselli, & Lane (2004)	1 bp (for debt at 100 percent of GDP but rising for higher debt levels)	OECD countries	1986–2002 1960–2002
Gale & Orzag (2004)	3-6 bps	US	1976–2004
Engen & Hubbard (2005)	3-5 bps	US	1953/76–2003
Kinoshita (2006)	2-5 bps	OECD countries	1971–2004
Laubach (2009)	3-5 bps	US	1976–2005
Baldacci & Kumar (2010)	3-5 bps	31 countries	1980–2008
Gruber & Kamin (2010)	2 bps	G-7 countries	1988–2007

For the United States, the baseline projection is moderately higher than that implied by the Congressional Budget Office’s “Alternative” (CBO-A) projection of federal debt held by the public.¹³ The main reason for the discrepancy is that our baseline allows for a negative effect on future GDP growth from rising government debt, whereas the CBO projection does not factor in any negative effect of debt on GDP.¹⁴ Without the negative feedback of debt

is composed primarily of advanced economies, for which we project an even higher average debt ratio.

13. Until the financial crisis of 2008, debt held by the public was essentially equal to net federal debt. CBO (2011) estimates that, at the end of 2010, the value of federal claims on the financial sector was 7 percent of GDP. The IMF net debt estimates for the United States do not appear to subtract these holdings.

14. Our baseline projection also takes into account the relatively small and stable amount of state and local net debt that is included in the general government baseline—about 5 percent of GDP as of this year. Due to balanced budget provisions in most state constitutions, state and local debts are not expected to expand at the same rate as federal debt. Another difference is that our projec-

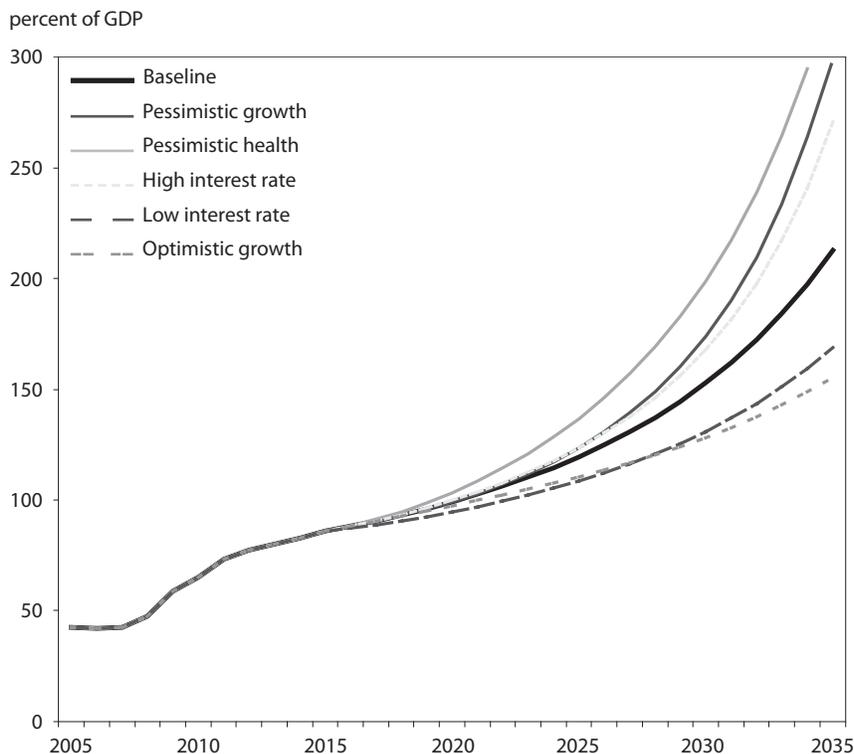
Table 2 General government net debt projections (percent of GDP)

	2005	2010	2015	2020	2035
United States					
Optimistic growth	43	65	86	97	155
Baseline	43	65	86	99	213
Pessimistic growth	43	65	86	99	302
Pessimistic health cost	43	65	86	103	331
High interest rates	43	65	86	100	270
CBO-A (federal debt held by the public)	37	62	73	87	185
Euro area					
Optimistic growth	55	67	73	74	72
Baseline	55	67	73	76	133
Pessimistic growth	55	67	73	76	155
Pessimistic health cost	55	67	73	80	224
High interest rates	55	67	73	76	144
Japan					
Optimistic growth	85	121	153	181	335
Baseline	85	121	153	183	386
Pessimistic growth	85	121	153	183	504
Pessimistic health cost	85	121	153	185	435
High interest rates	85	121	153	185	482
Advanced economies					
Optimistic growth	48	67	81	88	122
Baseline	48	67	81	90	178
Pessimistic growth	48	67	81	90	234
Pessimistic health cost	48	67	81	94	276
High interest rates	48	67	81	91	210
Emerging economies					
Optimistic growth	34	27	26	23	35
Baseline	34	27	26	24	40
Pessimistic growth	34	27	26	25	59
Pessimistic health cost	34	27	26	24	54
High interest rates	34	27	26	24	40
World					
Optimistic growth	45	54	59	60	74
Baseline	45	54	59	61	98
Pessimistic growth	45	54	59	62	130
Pessimistic health cost	45	54	59	64	144
High interest rates	45	54	59	61	110

Note: CBO-A is based on CBO (2010a). CBO (2011) has higher estimates for 2015 and 2020 (around 80 and 95 percent, respectively) but does not extend to 2035.

Source: Author calculations and IMF fiscal data and projections for 2005–14.

Figure 1 General government net debt projections—United States

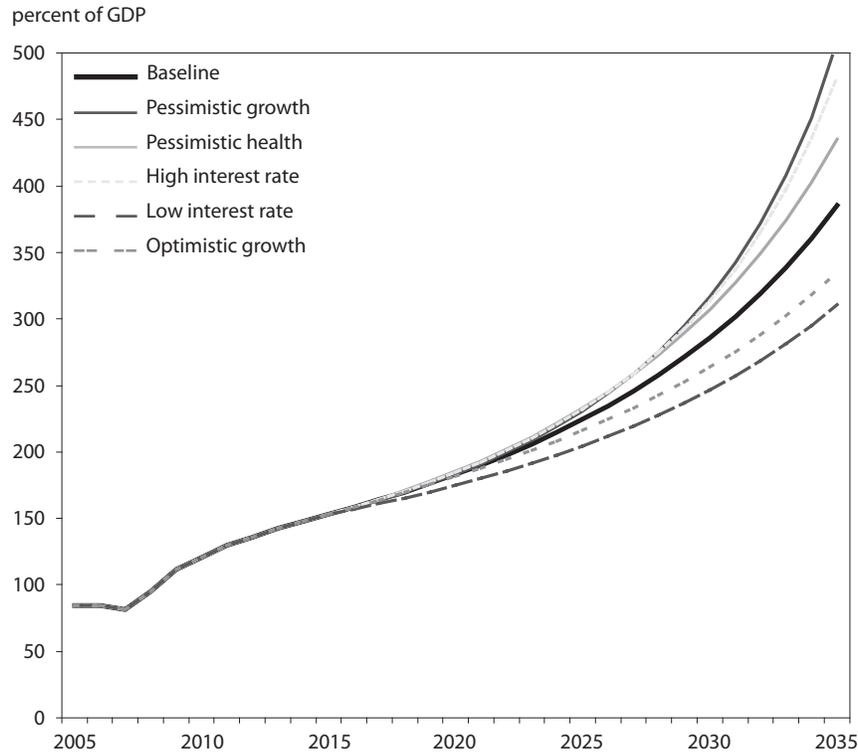


Source: Author calculations and IMF fiscal data and projections for 2005–14.

on growth, our baseline would imply a ratio of net debt to GDP in 2035 of 194 percent (versus 213 percent with the negative feedback). For US federal debt, it is widely agreed that the CBO-A projection is more realistic than the CBO baseline projection, because it embodies relatively realistic assumptions about future actions to address the issue.¹⁵

15. See CBO (2010a). The CBO baseline debt projection assumes that all the Bush tax cuts are allowed to expire, that coverage of the alternative minimum tax is expanded considerably, that Medicare payments to doctors will not be increased, and that other types of spending will decline as a share of GDP. The CBO-A debt projection assumes that the Bush tax cuts will be extended for most households, that the alternative minimum tax will not be allowed to expand, that Medicare payments will be increased, and that other spending will grow in line with GDP. CBO (2011) presents a revised version of the alternative projection that incorporates the effects of recent legislation. This projection does not extend beyond 2021, but it does show federal debt held by the public of around 80 percent of GDP in 2015 and 95 percent of GDP in 2020.

Figure 2 General government net debt projections—Japan

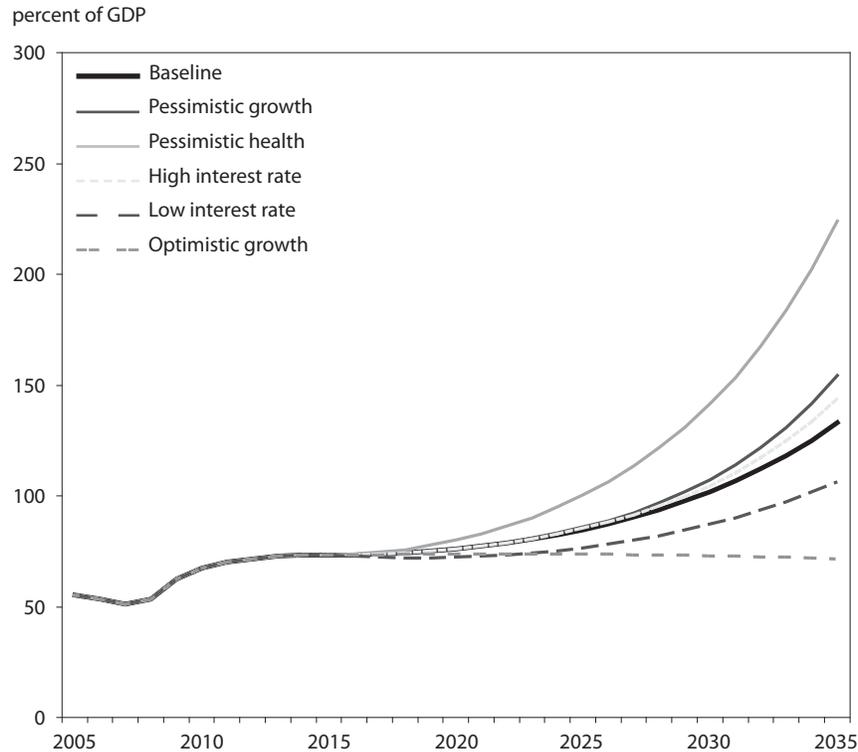


Source: Author calculations and IMF fiscal data and projections for 2005–14.

The large increases in net debt in our baseline scenario should not be viewed as a forecast of likely outcomes. Rather they should be understood to indicate the magnitude of the looming fiscal challenges. For the United States and Japan, the challenges in the baseline scenario are so great that a crisis is likely to happen before 2035 if policies are not corrected. We return to the issues of fiscal crises and policy options later.

Two factors explain why the global increase in debt as a share of global GDP is considerably less than the increase in advanced economies only. First, debt ratios in the emerging economies are projected to grow much more slowly than in the advanced economies, and they are not projected to grow at all over the next 10 years. Second, GDP in the emerging economies is growing more rapidly than in the advanced economies. In what will likely be a transforming shift in the wealth and prosperity of different parts of the globe over the next generation or two, the emerging economies' share of global GDP is projected to rise from 34 percent in 2010 to 58 percent in 2035. The implications for the

Figure 3 General government net debt projections—Euro area



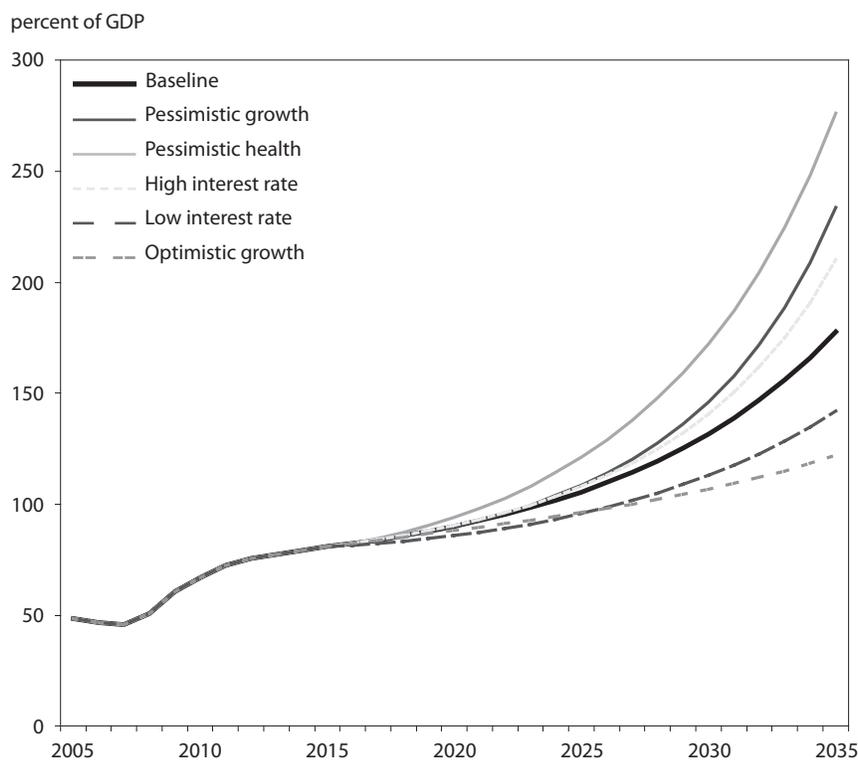
Source: Author calculations and IMF fiscal data and projections for 2005–14.

ability of the advanced economies to market their growing debt are impossible to predict. To some extent, the emerging economies have been and may continue to be a natural buyer of advanced-economy government debt. But, as discussed later, under some scenarios the projected increases in the net debt ratio for the emerging economies by 2035 are large relative to their historical experience and possibly unsustainable. Moreover, the increasing depth and efficiency of emerging financial markets may tempt governments in these economies to run larger fiscal deficits than projected. Both developments would tend to reduce the ability of emerging markets to absorb advanced-economy government debt.

The Optimistic and Pessimistic Health Care Cost Scenarios

By far the most important contributor to concerns about mounting government debts and deficits is the exploding cost of health care over the next several decades. As many studies have demonstrated, these costs result from

Figure 4 General government net debt projections—Advanced economies

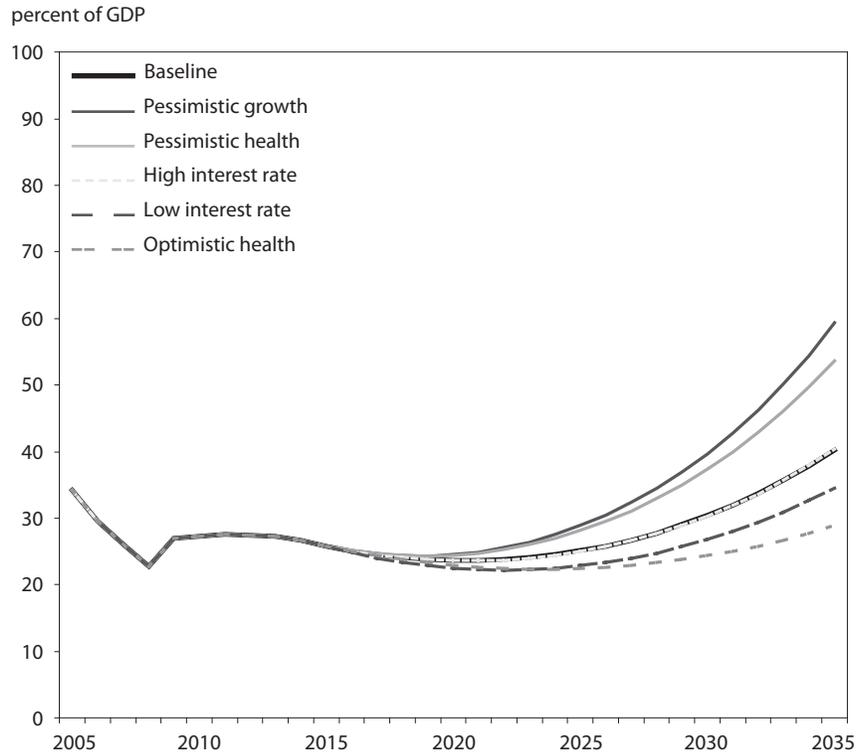


Source: Author calculations and IMF fiscal data and projections for 2005–14.

three factors: (1) an ageing population, (2) the increasing cost of medical technologies and technological breakthroughs that become a basic part of what patients expect, and (3) the poorly organized and inefficient incentives that drive up costs in the American health care system, in particular. But there is considerable uncertainty surrounding the future path of public health care expenses, even with the benefit formulas and contribution rates held constant. A recent study by the IMF (2010a) presents both optimistic and pessimistic projections of health care costs, which are shown in the middle rows of table 1.¹⁶ By the year 2035, the annual increase in health care costs under the pessimistic assumptions leads to a net increase in health costs that exceeds those

16. IMF (2010d) updated these estimates, mainly lowering the pessimistic projections, especially in Europe. We chose not to use the updated estimates because they seemed too low compared to those of the OECD.

Figure 5 General government net debt projections—Emerging economies

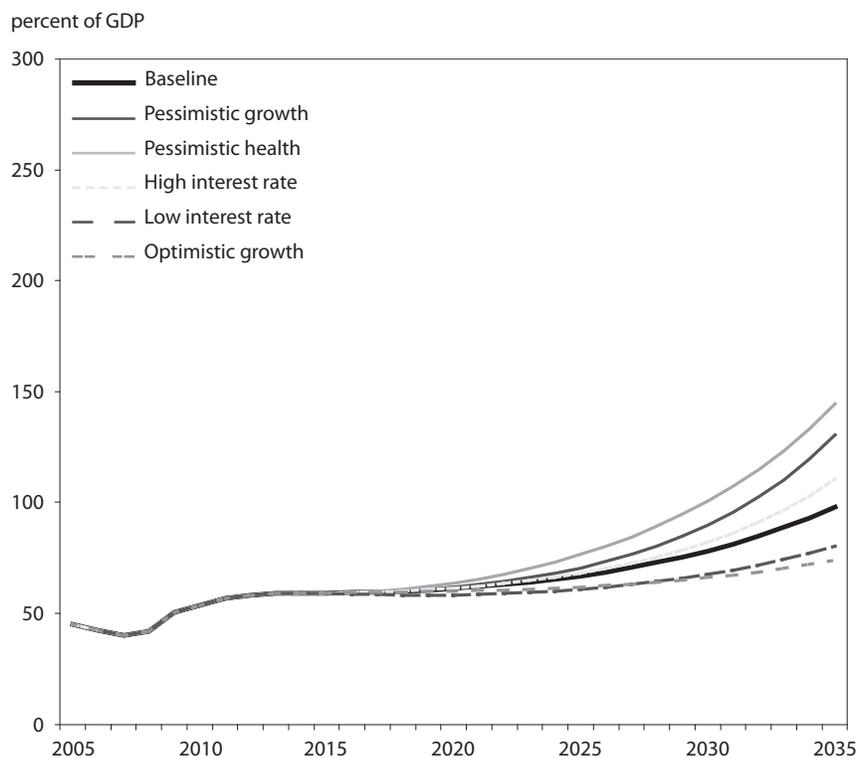


Source: Author calculations and IMF fiscal data and projections for 2005–14.

under the optimistic assumptions by about 4 percent of GDP in each of the advanced economies and 1½ percent of GDP in the emerging economies. The major sources of this uncertainty are health care technology and the scope for improvements in the efficiency of health care delivery.

For each of the advanced economies, the projected future debt ratios under the optimistic health care scenario are only modestly lower than those of the baseline scenario. To save space, they are not displayed in table 2 or figures 1–4 and 6. For the emerging markets, the optimistic health care scenario is shown in figure 5, and it has the lowest path of debt among the scenarios. The future debt ratios under the pessimistic health care scenario are displayed in table 2 and figures 1–6. These are significantly higher than those under the baseline scenario for all regions.

Figure 6 General government net debt projections—World



Source: Author calculations and IMF fiscal data and projections for 2005–14.

Two Interest Rate Scenarios

Because there is considerable uncertainty about the future path of interest rates, this book projects the ability of governments to cope with higher deficits and debts under two alternative interest rate scenarios, one optimistic and the other more dire.

The “low interest rates” scenario is based on the implied prediction of low future interest rates built into current long-term bond yields. For example, the 10-year interest rate in the United States is around 3½ percent and the 30-year rate is around 4½ percent. These rates appear to indicate that markets expect short-term interest rates to remain low for decades. It is unlikely, however, that interest rates would remain low over the next 20 to 30 years if government debt were to rise as projected in the baseline scenario. To the extent that rates are low, it is probably because financial market participants expect that

governments will take steps, however unknown or undefined, to prevent such alarming increases in debt over the long run.

Despite the hope of many that deficits will come under control over time, we believe that most US market participants do not expect faster fiscal cuts in the next few years than are built into our baseline scenario.¹⁷ Thus, it may be reasonable to assume that long-term interest rates will remain low even if debt ratios rise as projected in the baseline scenario over the next few years. Current 5-year forward interest rates, at 2-year and 5-year maturities, are a good measure of market expectations of government borrowing costs in 2015. For the United States, these rates are around 4 to 5 percent, close to the projected growth rate of nominal GDP.

Effective interest rates tend to adjust slowly to any change in market interest rates. This is because effective interest rates include the rates paid on long term bonds issued many years previous. For example, the effective interest rates estimated by the IMF for each of these economies in 2010 are higher than the average yields on newly issued government debt. Accordingly, even if market interest rates were to rise according to the implied prediction of current yield curves, the effective rates might continue to decline for a few years. The low interest rates scenario thus assumes that effective rates stay about 1 percentage point below the nominal GDP growth rate through 2015 and then rise smoothly in proportion to the growing debt ratio using the same relationship as in the baseline scenario.

To save space the low interest rate scenario is not included in table 2 but it is displayed in figures 1–6. In all regions, the future debt ratios under the low interest rates scenario are lower than those under the baseline scenario.

The “high interest rates” scenario uses a larger coefficient (5.5) for the effect of the debt ratio on the interest rate (compared to 3.5 in the baseline scenario).¹⁸ This estimate is near the high end of the range discussed in box 1. With a larger effect of debt on interest rates, the dynamics of fiscal deficits multiply rapidly and debt ratios rise well above baseline, except in the emerging markets, where debts are on a downward trajectory for the next 10 to 15 years.

The Optimistic Growth Scenario

The baseline growth projections for the advanced economies are somewhat lower than their average growth rates before the global financial crisis, and there is little rebound from the recession of 2009. As shown in the bottom of table 1, the “optimistic growth” scenario assumes higher growth than the

17. See, for example, Lupton and Hensley (2010, p. 13), who forecast changes in primary balances between 2010 and 2013 for the euro area, Japan, and the United States that are close to those in our baseline scenario.

18. As in the other scenarios, the interest rate effect in Japan is assumed to be only half as large as in the other economies.

baseline GDP growth projections for advanced economies.¹⁹ One factor that would make the optimistic growth scenario plausible is the potential for a global rebalancing of demand toward the advanced economies. Although China and some other emerging economies have been slow to move in this direction, they are likely to come under increasing pressure to do so in the future. In such a rebalancing, emerging economies with large current account surpluses would allow their exchange rates to appreciate, reducing the rate at which they accumulate foreign exchange reserves and directing more of their savings to domestic projects. As a result, interest rates in this scenario decline 1 percentage point in the emerging economies and they rise by an amount equal to the increase in GDP growth rates in the advanced economies.

An increase in GDP, on the other hand, lowers primary deficits in advanced economies by an amount proportional to the share of general government gross revenues in GDP as projected by the IMF for 2015.²⁰ Table 2 and figures 1–4 and 6 show that relatively moderate but persistent increases in economic growth do significantly reduce projected debt ratios in the advanced economies and the world.²¹ Sustained growth is thus, as always, an excellent remedy for deficits, however unsustainable they may be. But the higher growth rates projected in this scenario are not sufficient to prevent debt ratios from rising in the major economic regions—except for the euro area.

The Pessimistic Growth Scenario

The “pessimistic growth” scenario results from the fulfillment of fears that rising debts will choke off investment and threaten a potential crisis. In this sense, the scenario may be viewed as a crisis scenario, though the nature of an actual crisis—not to mention its effects—is extremely hard to predict. The pessimistic growth scenario deepens the negative drag on GDP that would result from rising debt ratios, reflecting the effects of “crowding out” of productive investment when governments run large deficits after economic activity has fully recovered from recession. Beginning in 2016, the levels of real and nominal GDP are reduced by 0.06 percent for each percent increase in the ratio of net government debt to GDP, double the effect in the baseline scenario. In addition, the effect of debt on interest rates is assumed to be the same as that assumed in the “high interest rates” scenario. These changes tend to increase GDP growth initially in emerging economies because their debt ratio is falling, so in this scenario we exogenously reduce GDP growth in the

19. Trend GDP growth in each advanced region is 0.5 percentage points higher than in the baseline after 2015. A small additional positive effect on growth occurs because of the reduced accumulation of public debt.

20. For example, when the revenue share is 50 percent, a one percent increase in GDP lowers the primary deficit 0.5 percentage points. See IMF (2010c).

21. The optimistic growth scenario is not included in figure 5 because it is identical to the low interest rate scenario for the emerging economies.

emerging economies by 0.5 percent per year. As shown in the bottom rows of table 1, this scenario implies a large reduction in the US growth rate and a negative average growth rate of Japanese real GDP. The pessimistic growth scenario may exaggerate the negative effect of government debt on GDP, but it does help to flesh out the range of possible outcomes.²² The feedback from higher debt to both higher interest rates and lower GDP creates much larger increases in debt ratios over time in all economies.

Little Comfort from Net Debt Projections

None of the optimistic scenarios discussed above leads to a decline in net debt ratios for any economy, with the sole exception of the euro area under optimistic growth assumptions. Under more pessimistic assumptions about future economic growth, health care costs, or interest rates, the implied increases in net debt ratios by 2035 in all of the advanced economies are enormous. For all of the advanced regions, the large increases in debt under some of the pessimistic scenarios almost certainly are not feasible, and even the baseline path for debt is probably not feasible. These scenarios likely would lead to a fiscal crisis in which governments would be forced to choose some combination of higher taxes, reduced spending, default on debt, or monetization of debt before 2035. The limits of debt are the topic of the next section.

The Burden of Debt and Fiscal Limits

How much debt is “sustainable”? Ultimately, the level of sustainable debt depends not on some abstract formula, but on the willingness of society and government to pay the interest on the debt and to accept the reduction in GDP caused by the higher interest rates and higher tax rates associated with such a burden. There is no automatic way to calculate that effect but some obvious economic and financial norms do apply. The following analysis seeks to apply the lessons of history for understanding likely future developments. We note that our analysis does not make any strong assumptions about rationality or

22. Reinhart and Rogoff (2010) suggest that the effect of debt on GDP growth may be highly nonlinear, with relatively little effect when debt is less than 90 percent of GDP and a large effect when debt is greater than 90 percent of GDP. They do not estimate a specific functional relationship between debt and growth. Caner et al. (2010) and Checherita and Rother (2010) find significant nonlinear relationships between government debt and GDP growth for developing economies and euro-area economies, respectively, with inflection points around 70 to 100 percent of GDP. Kumar and Woo (2010) also find a negative effect of debt on GDP for a broad panel of advanced and developing economies. Irons and Bivens (2010) point out that the Reinhart-Rogoff result is heavily influenced by the experiences of developing economies with poor institutions and by major wars in advanced economies. They also suggest that the causality seems to run from low growth to high debt rather than the reverse. We note that the results of Caner et al., Checherita and Rother, and Kumar and Woo are obtained in samples dominated by government borrowing in currencies not under the control of the sovereign, for which interest rate effects and debt intolerance appear to be greater.

foresight of either the public or the private sector. However, there is no guarantee that markets or governments will behave the same in the future as they did in the past.

Effect of Debt on Interest Rates and Interest Payments

Table 3 and figures 7–11 display effective interest rates on government debt, both past and projected. Since 2006, interest rates have fallen in the United States and the euro area, in part because of the economic downturn, which led investors to buy government securities in dollars and euros as a safe haven, and in part because of the trend increase in reserve accumulation by many governments in developing economies. At the same time, rates have risen in Japan because of the end of the quantitative easing policy. In the baseline scenario, interest rates are projected to equal the trend growth rate of nominal GDP in all economies in 2015, roughly consistent with historical average behavior and the assumption that output will be near its long-run potential. This projection implicitly assumes that developing economies will slow their rapid purchases of bonds in the advanced economies.

What is significant is that beyond 2015, interest rates gradually rise in line with net debt ratios. The cumulative increase is most notable in the United States and Japan, where rates are at very low levels at present, but it is also significant in Europe. The projected levels of interest rates in 2035 may seem rather modest given the large increases in government debt in some regions. Three factors explain this muted rise in interest rates.

First, and perhaps most important, our estimates of the effect of government debt on interest rates essentially assume that there is no risk of default. This assumption is appropriate for governments that borrow in currencies they control because they can print money to pay their debts in extremity. The United States, the euro area as a whole, Japan, most other advanced economies, and some emerging economies borrow in currencies they control. But individual euro-area countries and many emerging economies borrow in currencies they do not control; in such cases, default becomes a serious risk when debt levels rise. A number of studies have found large effects of debt on interest rates for governments that borrow in currencies they do not control.²³

Second, all of our scenarios assume constant low inflation and stable inflation expectations. There is no way of predicting how future fiscal developments would affect inflation and prices, but the behavior of central banks over the past 20 years suggests that there is a reasonable chance that inflation may

23. See, for example, Baldacci et al. (2008) and Bayoumi et al. (1995). Prior to 2008, bond yields in the euro area were not sensitive to debt ratios, probably reflecting market expectations that fiscal transfers would prevent any defaults. Despite the partial confirmation of these beliefs with the loan packages for Greece and Ireland, markets appear to have substantially revised upward their views concerning the possibility of future defaults or restructurings. See Caceres et al. (2010a), Haugh et al. (2009), Schuknecht et al. (2009), and Sgherri and Zoli (2009).

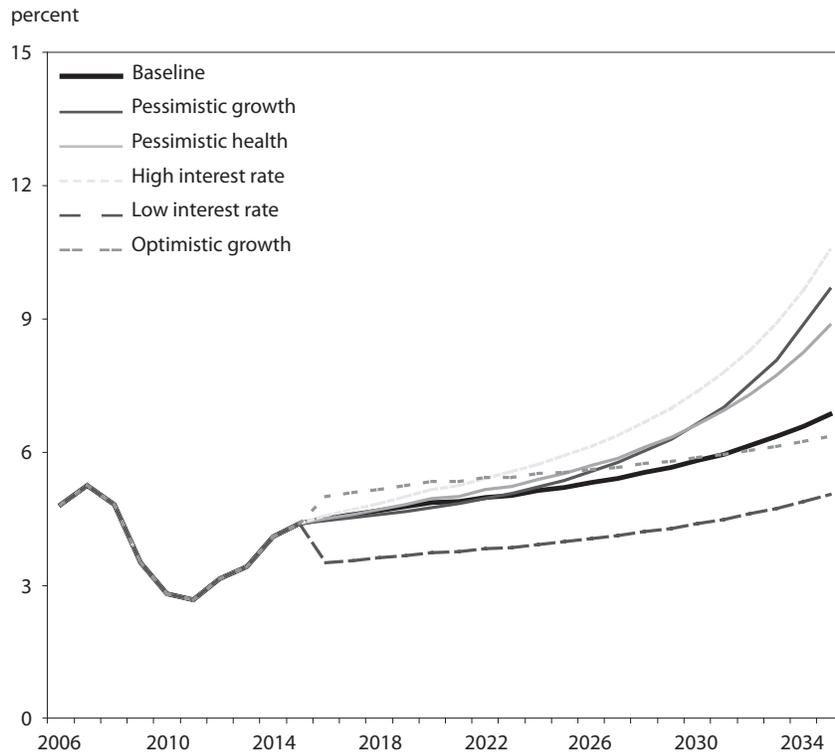
Table 3 Effective interest rate on government debt (percent)

	2006	2010	2015	2020	2035
United States					
Optimistic growth	4.8	2.8	4.4	5.3	6.4
Baseline	4.8	2.8	4.4	4.9	6.9
Pessimistic growth	4.8	2.8	4.4	4.7	9.7
Pessimistic health cost	4.8	2.8	4.4	5.0	8.9
High interest rates	4.8	2.8	4.4	5.2	10.6
Euro area					
Optimistic growth	4.8	4.0	3.6	4.1	4.1
Baseline	4.8	4.0	3.6	3.7	4.7
Pessimistic growth	4.8	4.0	3.6	3.7	5.6
Pessimistic health cost	4.8	4.0	3.6	3.8	6.3
High interest rates	4.8	4.0	3.6	3.7	5.9
Japan					
Optimistic growth	0.6	1.3	3.1	4.1	5.4
Baseline	0.6	1.3	3.1	3.6	5.4
Pessimistic growth	0.6	1.3	3.1	3.4	7.5
Pessimistic health cost	0.6	1.3	3.1	3.6	5.8
High interest rates	0.6	1.3	3.1	3.9	8.7
Advanced economies					
Optimistic growth	3.7	2.9	4.3	5.1	5.7
Baseline	3.7	2.9	4.3	4.6	6.1
Pessimistic growth	3.7	2.9	4.3	4.5	8.1
Pessimistic health cost	3.7	2.9	4.3	4.7	7.8
High interest rates	3.7	2.9	4.3	4.8	8.6
Emerging economies					
Optimistic growth	7.3	9.0	8.0	6.9	7.1
Baseline	7.3	9.0	8.0	7.9	8.2
Pessimistic growth	7.3	9.0	8.0	7.6	8.7
Pessimistic health cost	7.3	9.0	8.0	7.9	8.4
High interest rates	7.3	9.0	8.0	7.8	8.4

Source: Author calculations and IMF fiscal data and projections for 2005–14.

remain low even with large increases in debt. At some point, however, increases in the cost of servicing debt are bound to force governments to resort to inflationary money creation. If inflation were to increase significantly, interest rates would surely be even higher than projected here. But the real rate of interest

Figure 7 Effective interest rate on general government debt—United States



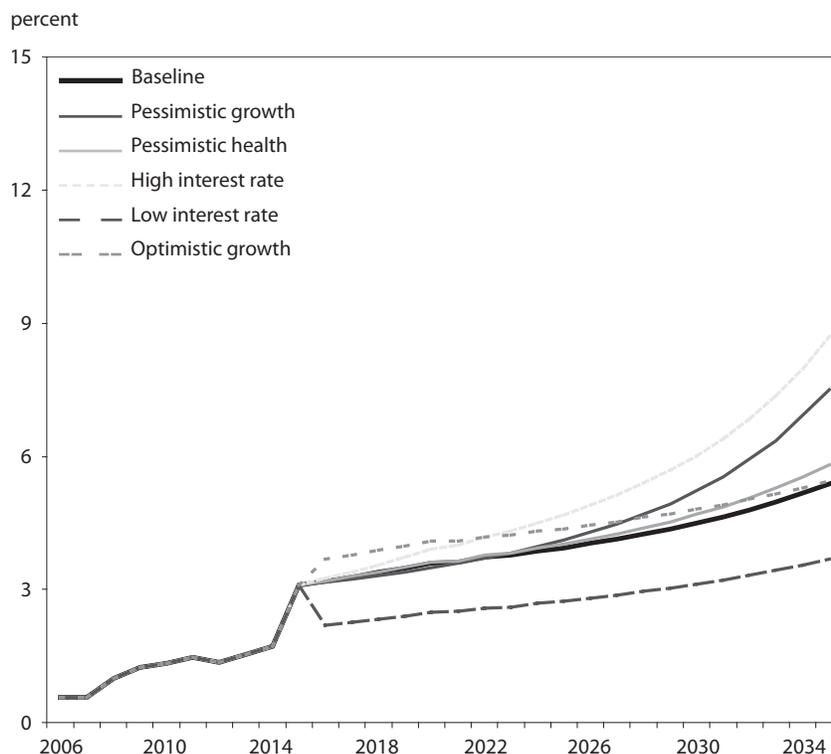
Source: Author calculations and IMF fiscal data and projections for 2005–14.

(i.e., the nominal interest rate minus the expected inflation rate) might move by an amount consistent with the empirical results in table 3. Higher real rates of interest are the primary channel through which government budget deficits crowd out productive investment and ultimately reduce the growth rate of the economy.

The third, and probably least important, factor is that in our scenarios the increase in government debt restrains the growth of GDP, which holds down interest rates. This factor becomes significant only in the final few years of the more extreme scenarios.

Table 4 and figures 12–16 display net debt interest payments as a percent of GDP in each economy. Except for the optimistic growth scenario in the euro area and the emerging markets, interest payments are rising in all economies under all scenarios. Net debt interest payments rise most dramatically in Japan, reflecting the larger growth of debt projected for Japan.

Figure 8 Effective interest rate on general government debt—Japan



Source: Author calculations and IMF fiscal data and projections for 2005–14.

The Limits of Debt

A sovereign default by the United States or a major country in Europe is obviously unthinkable for policymakers. Nevertheless, markets can react to the possibility of such an occurrence in the long-term future. It is extremely difficult to lay down a hard and fast rule on the limits of borrowing, and the prospect for default, for economies in the modern era. Reinhart, Rogoff, and Savastano (2003)—in their study of the history of borrowing and default around the world, with a particular focus on emerging economies—have shown that economies differ sharply in the levels of debt that governments have tolerated without default. The question for the future is whether markets will continue to be more worried about a given level of debt in emerging economies than the same level of debt in advanced economies. In many emerging economies, the debt ratios at which defaults have occurred are much lower than the debt ratios that many advanced economies have sustained for decades. These