UNIVERSITY OF CALIFORNIA
DEPARTMENT OF ECONOMICS

Economics 134
Spring 2018
Professor David Romer

LECTURE 17
THE LONG-RUN BUDGET OUTLOOK
MARCH 21, 2018

I. FEASIBLE AND INFEASIBLE BUDGET POLICIES
- A. The distinction between the debt and the deficit
- B. Do we have to pay off our debt eventually? Are there any constraints on fiscal policy?
- C. Examples of feasible and infeasible fiscal policies
- D. Enrichment: The Dynamics of the Debt-to-GDP Ratio

II. THE UNITED STATES'S FISCAL CHALLENGE
- A. Complications in defining "current" fiscal policy
- B. The unsustainable path of current fiscal policy
- C. Auerbach and Gale's framework for quantifying the magnitude of the problem
- D. Auerbach and Gale's results.
- E. A little about the sources of the long-run budget problem
- F. Are these reasonable forecasts?

III. THE CONSEQUENCES OF PERSISTENT BUDGET DEFICITS
- A. Baseline views of the effects of persistent budget deficits ("the usual slogans")
- B. The effects of sustainable deficits
- C. The effects of unsustainable deficits
  1. When do things break down?
  2. What happens when they do?
- D. How much truth is there in the slogans?

IV. REINHART AND ROGOFF'S EVIDENCE ON THE IMPACT OF HIGH PUBLIC DEBT ON GROWTH
- A. Possible mechanisms
- B. Reinhart and Rogoff's methodology
- C. Reinhart and Rogoff's results
- D. Is the relationship causal?
- E. Might three be a better approach
- F. Data, calculation, and replicability issues

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Announcement

- Problem Set 3 is being distributed.
  - It is due at the ***beginning*** of lecture on Wednesday, April 4.
  - Optional problem set work session: Monday, April 2, 6:45–8:15, in 597 Evans Hall.

I. Feasible and Infeasible Budget Policies

Basic Concepts: The Debt and the Deficit

- Debt: The total amount the government owes (currently about $15 trillion, excluding amounts owed by one part of the government to another).
- Deficit: The difference between expenditures and revenues over some period – that is, the amount the government borrows over some period (about $600 billion in the 2018 fiscal year).
- The link between the deficit and the debt:

  The deficit is the <u>change</u> in the debt.

- Thus, the amount of government debt will rise by about $600 billion in the 2018 fiscal year.

Issue: What Fiscal Policies Are Feasible?

- Do we have to pay off the debt at some point?
- Are there any limits on the government's ability to issue debt?

What Fiscal Policies Are Feasible?

- Let b denote the ratio of government debt to annual GDP (currently about 77%).
- Two assumptions about b that are very reasonable:
  1. There is some upper limit to b – at some point, the amount of government debt would be so large relative to incomes that people would be unable or unwilling to hold it.
  2. For a low enough value of b (for example, b = 20%): If b were at that level and there was no doubt that it would remain at that level, people would be willing to hold the debt.

What Fiscal Policies Are Feasible? (cont.)

- $b \equiv$ Debt/GDP.
- GDP is normally growing (from both real output growth and inflation).
- So if the debt is constant (that is, if there are no deficits), b will be getting smaller and smaller.
- Implications:
  - We do not have to pay off the debt.
  - In fact, we can run deficits forever.
- But: There are limits.

A Useful Fact

- If the deficit-to-GDP ratio and the growth rate of GDP are each constant, then the debt-to-GDP ratio will not fall or grow without bound, but will stabilize at some level.
- The level it will stabilize at is given by:

$$b_{\text{LONG-RUN}} = \frac{\text{Deficit/GDP}}{\Delta\text{GDP/GDP}}.$$

What Fiscal Policies Are Feasible? (cont.)

- Two assumptions that provide a useful benchmark for thinking about feasible and infeasible policies:

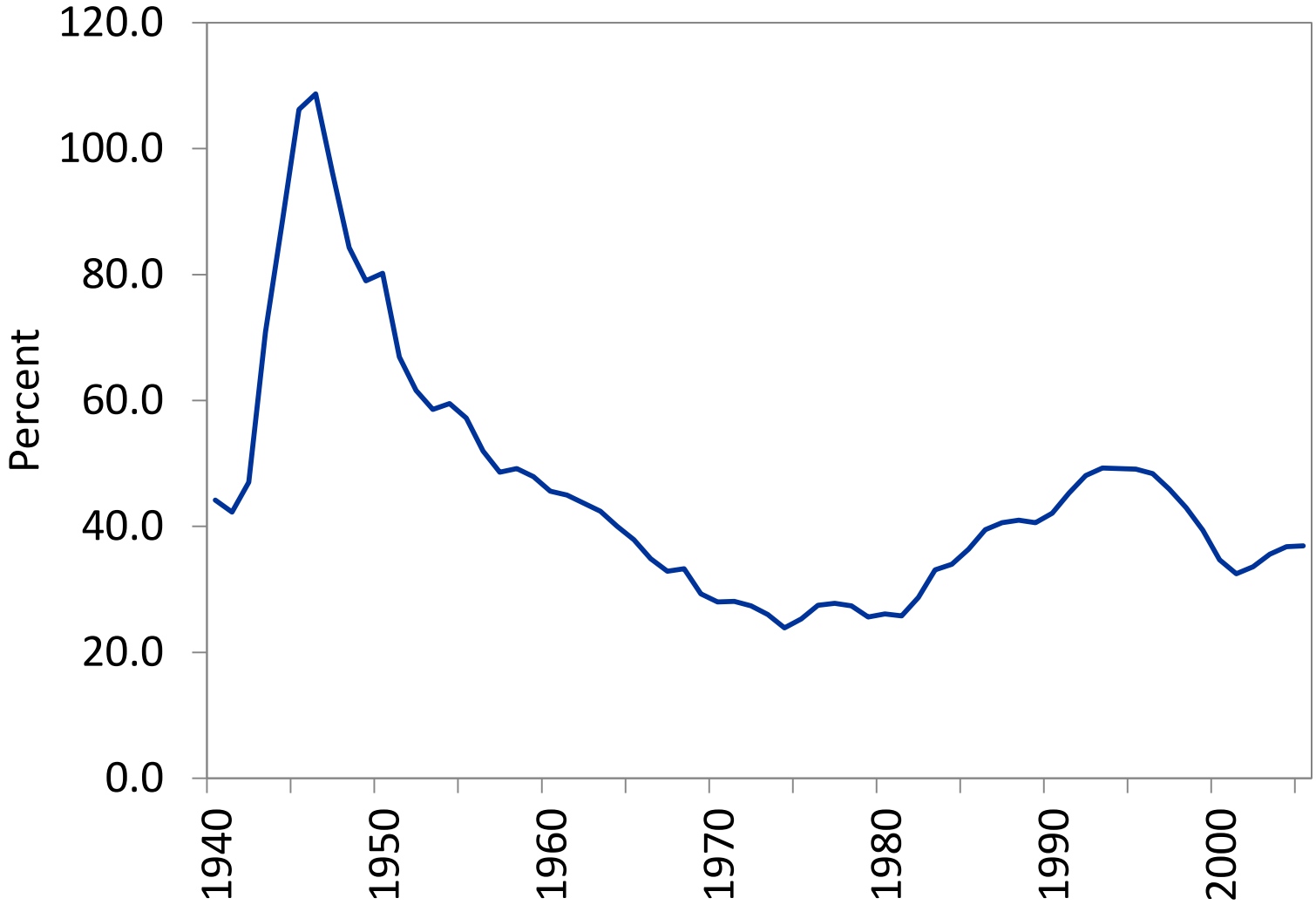
  1. There is some maximum level of b, b^{MAX}, that people are willing to hold.

  2. The growth rate of nominal GDP is steady at some level.

Examples of Feasible + Infeasible Fiscal Policies

- #1 The deficit-to-GDP ratio is steady, but at a level that implies that b will stabilize at some very high level (above b^{MAX}). INFEASIBLE
- #2 The deficit-to-GDP ratio is steady at a positive level that implies that b will stabilize at some low level (below b^{MAX}). FEASIBLE
- #3 The deficit-to-GDP ratio is at a level that, if maintained, implies that b would stabilize at a very high level (above b^{MAX}). But, before b rises very much, the deficit-to-GDP ratio falls permanently to a level that implies that b will stabilize at some low level (below b^{MAX}). FEASIBLE
- #4 The deficit-to-GDP ratio is growing without bound. INFEASIBLE

The Debt-to-GDP Ratio, 1940-2005



Enrichment: The Dynamics of the Debt-to-GDP Ratio

- Let B(t) be the amount of debt, Y(t) nominal GDP, and Deficit(t) the deficit. (Thus, by definition, Deficit(t) = dB(t)/dt.)
- Define:
  - Debt-to-GDP ratio: b(t) = B(t)/Y(t).
  - Deficit-to-GDP ratio: d(t) = Deficit(t)/Y(t).
  - Growth rate of nominal GDP: $g_Y(t) = [dY(t)/dt]/Y(t)$.

The Dynamics of the Debt-to-GDP Ratio (cont.)

- Debt-to-GDP ratio: b(t) = B(t)/Y(t).
- Deficit-to-GDP ratio: d(t) = Deficit(t)/Y(t).
- Growth rate of nominal GDP: $g_Y(t) = [dY(t)/dt]/Y(t)$.
- The dynamics of b:

$$\frac{db(t)}{dt} = \frac{dB(t)/dt}{Y(t)} - \frac{B(t)}{[Y(t)]^2}\frac{dY(t)}{d(t)}$$

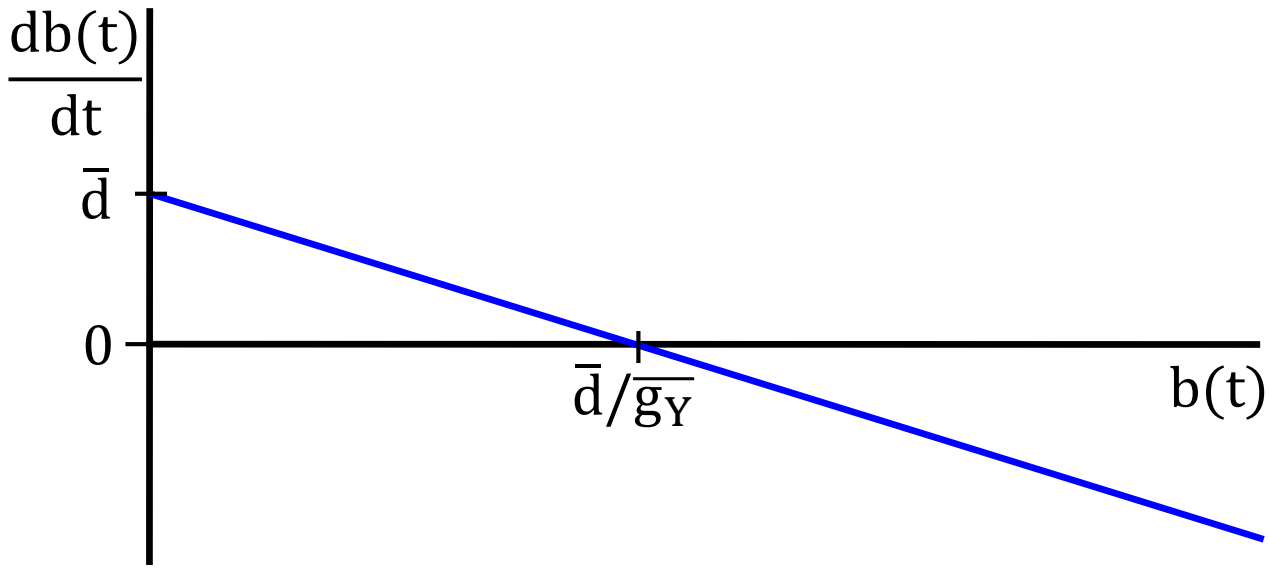
$$= \frac{\text{Deficit}(t)}{Y(t)} - \frac{B(t)}{Y(t)}\frac{dY(t)/dt}{Y(t)}$$

$$= d(t) - b(t)g_Y(t).$$

The Dynamics of the Debt-to-GDP Ratio (cont.)

- If d(t) (the deficit as a share of GDP) and $g_Y(t)$ (the growth rate of nominal GDP are constant:

$$\frac{db(t)}{dt} = \bar{d} - \overline{g_Y} b(t).$$



- So: Regardless of where it starts, b converges to $\bar{d}/\overline{g_Y}$.

II. The United States's Fiscal Challenge

Complications in Defining "Current Policy"

- Using current law is not reasonable, so we have to use some judgment.
- Policies are changing.
- There is a lot of disagreement about the likely path of government health care spending.

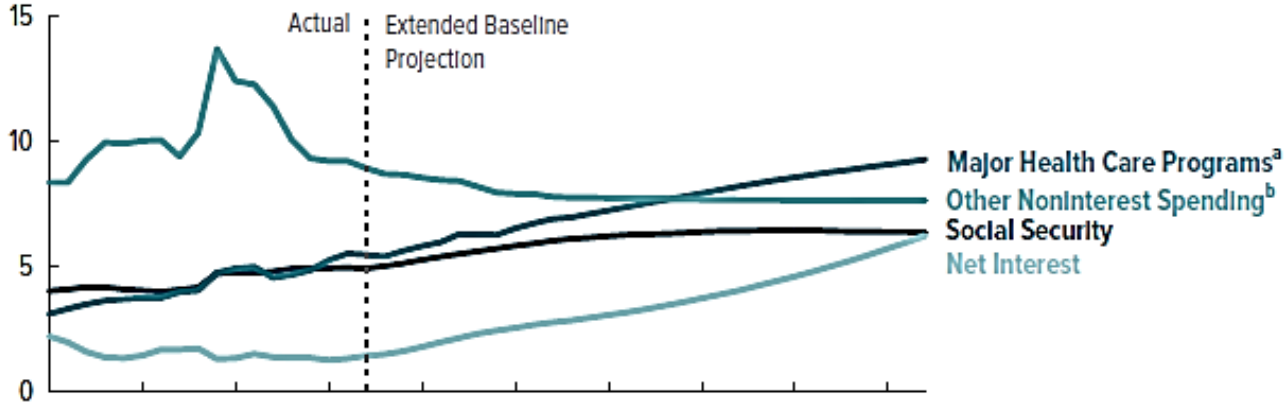
Auerbach and Gale's "Extended Policy" Scenario

- Discretionary spending is roughly constant in real terms for the next decade, then roughly constant as a share of GDP.
- Tax increases that are nominally scheduled to go into effect do not.
- 3 different possibilities for path of government health care spending: optimistic (Medicare trustees); pessimistic (CBO); intermediate (Medicare actuary).
- Their analysis predates recent budget changes (tax bill and budget deal).

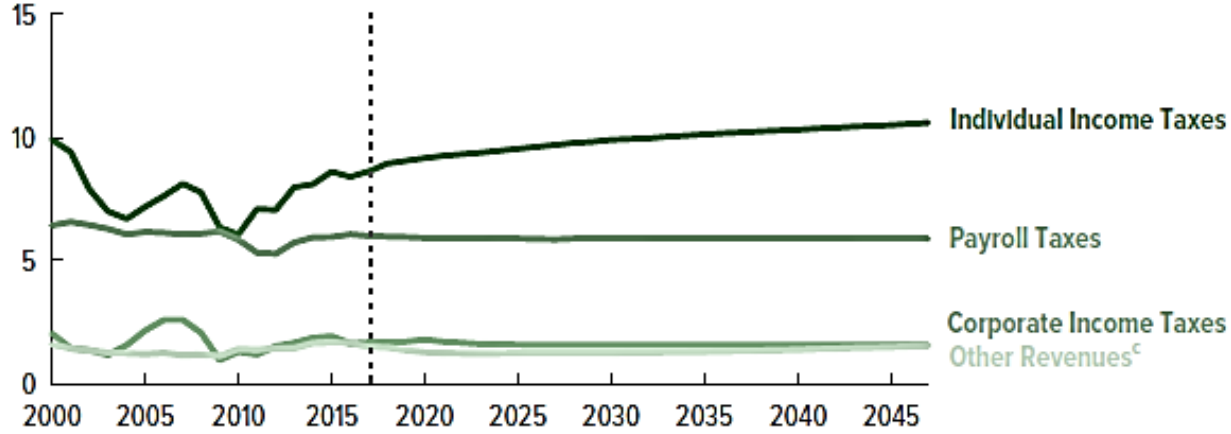
Federal Debt, Spending, and Revenues

Percentage of Gross Domestic Product

Certain **components of spending**—Social Security, the major health care programs, and net interest—are projected to rise in relation to GDP; other spending, in total, is projected to decline.



A projected boost in one **type of revenues**—individual income taxes—accounts for the rise in total revenues in relation to GDP. Receipts from all other sources, taken together, are projected to decline slightly.

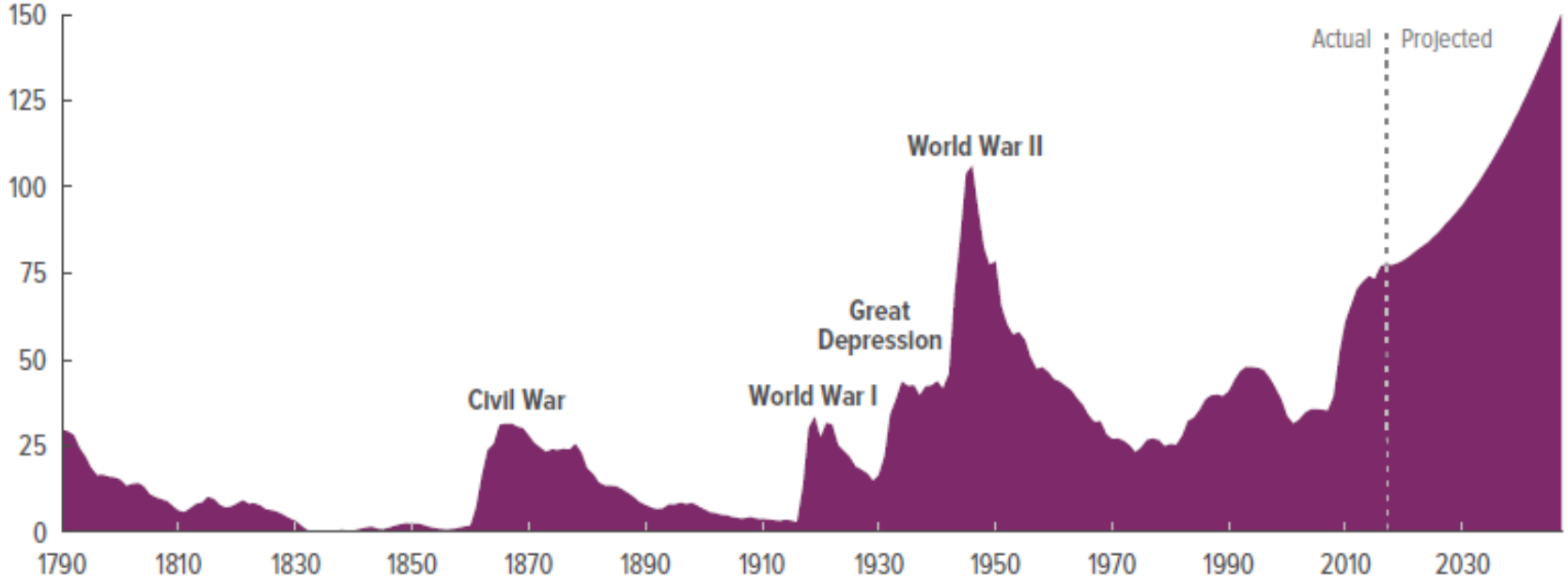


Source: Congressional Budget Office (March 2017).

Figure 2.

Federal Debt Held by the Public

Percentage of Gross Domestic Product



Source: Congressional Budget Office. For details about the sources of data used for past debt held by the public, see Congressional Budget Office, *Historical Data on Federal Debt Held by the Public* (July 2010), www.cbo.gov/publication/21728.

Source: Congressional Budget Office (March 2017).

Auerbach and Gale's Question (for Quantifying the Size of Our Long-Run Fiscal Problem)

- Starting from "current policy," suppose we enacted spending cuts and/or revenue increases that subtracted a constant fraction of GDP each year from the deficit excluding interest payments from what it would be under current policy.
- What constant fraction of GDP would we have to reduce the noninterest deficit by so that in the long run, the debt-to-GDP ratio would stabilize at its current level?

Auerbach and Gale's Answer

- What constant fraction of GDP would we have to reduce the noninterest deficit by so that in the long run, the debt-to-GDP ratio would stabilize at its current level?
  - If growth of health care spending is low: About 5.5%.
  - If it is intermediate: About 7.7%.
  - If it is high: About 9.6%.
- For comparison:
  - Total Federal noninterest spending is about 19% of GDP.
  - Personal income tax revenues are about 9% of GDP.
  - Defense spending is about 4% of GDP.
- And: This leaves out the recent tax bill and budget deal.

A Little about the Sources of the Long-Run Budget Problem

Should We Take These Projections Seriously?

- There is substantial uncertainty.
- But the fact that there is substantial uncertainty means that things could turn out quite a bit better than these projections suggest, or that they could turn out quite a bit worse. So uncertainty is not a reason for lack of concern. If anything, it is an argument for greater concern.
- In some key aspects, the projections, dire as they are, look overly optimistic.

III. The Consequences of Persistent Budget Deficits

The Effects of Persistent Budget Deficits – Rounding Up the Usual Suspects

- “We are mortgaging our children’s future.”
- “The United States is headed for Chapter 11.”
- “But we mainly owe it to ourselves.”
- “We should save our ammo until we need it.”

The Effects of Sustainable Persistent Budget Deficits

- Budget deficits lower national saving, and so cause future standards of living to be lower than they would otherwise be.
- This is true regardless of whether the debt is held by Americans or foreigners.

Unsustainable Persistent Budget Deficits

- Stein's law: "If something cannot go on forever, it will stop."

The Effects of Unsustainable Persistent Budget Deficits

- Sooner or later, there would be some type of crisis or meltdown.
- Things will not break down when we get to the level of debt that exceeds what people are willing to hold. They will break down earlier, when people conclude that the government is not going to do anything to keep the debt from reaching that level.
- When that happens, the government's only choices are to default or to pay off the debt by printing money, which would lead to very high inflation.

The Effects of a Crisis or Meltdown

- Major disruptions of financial markets.
- A dramatic fall in the value of our currency.
- A severe recession, likely followed by an extended period of slow growth.
- Major disruptions at the individual level: large redistributions of wealth; huge tax increases; a sharp fall in support for the elderly; ….

So How Much Truth Is There in the Slogans?

- "We are mortgaging our children's future."
  True, in the sense that persistent deficits cause living standards to be lower than they otherwise would be.
- "The United States is headed for Chapter 11."
  True, in the sense that trying to follow an infeasible path for too long would eventually lead to some type of crisis or meltdown.
- "But we mainly owe it to ourselves."
  False, in the sense that persistent deficits have costs regardless of who buys the debt.
- "We should save our ammo until we need it."
  We'll come back to this near the end of the semester.

IV. Reinhart and Rogoff's Evidence on the Impact of High Public Debt on Growth

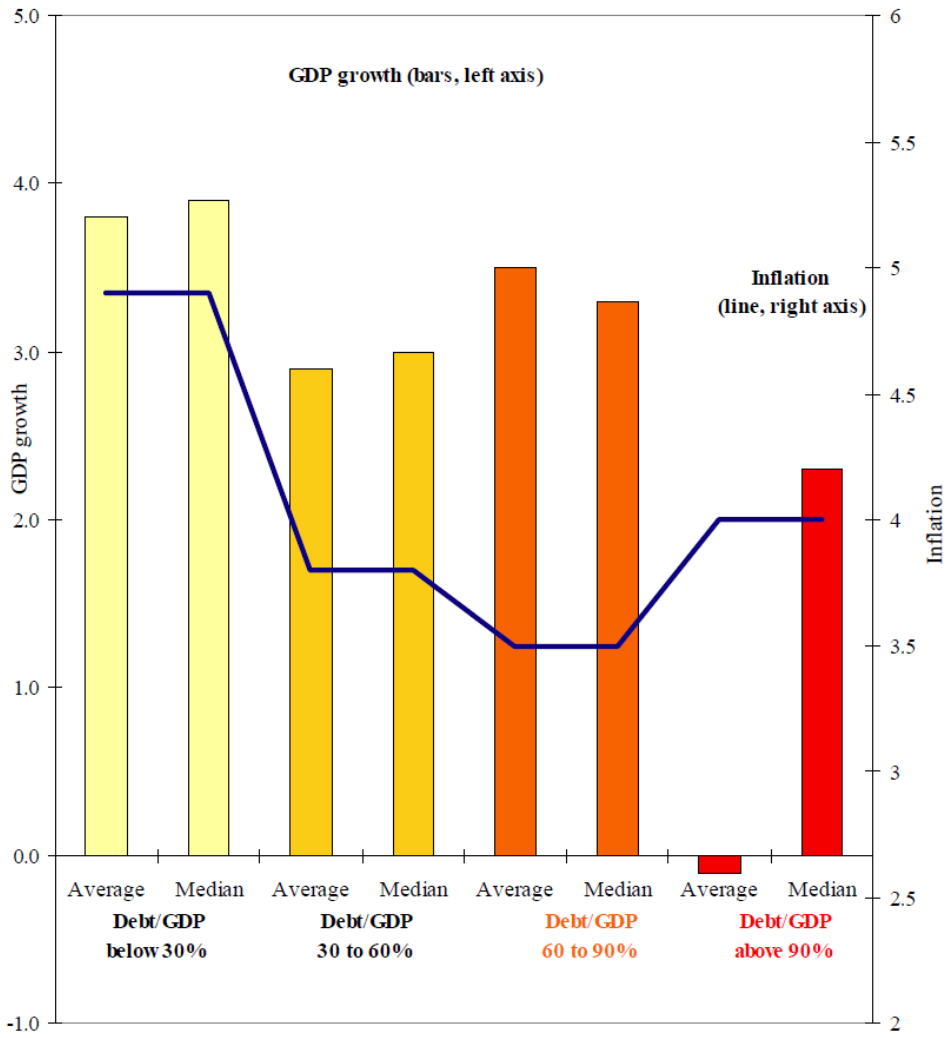
Reasons Why High Government Debt/GDP May Lower Growth:

- Large deficits and debt may raise interest rates and crowd out private investment.
- High debt and high interest payments may require large distortionary taxes.
- High debt may eventually lead to a fiscal crisis, which in turn, may trigger a financial crisis and require painful adjustments.

What do Reinhart and Rogoff do?

- Get data on Debt/GDP and real GDP growth annually for 20 countries since 1946.
- Put data by country by year into 4 bins based on Debt/GDP: 0-30%; 30-60%, 60-90%, over 90%.
- Get average GDP growth in a country for each bin.
- Average countries in each bin.

Figure 2. Government Debt, Growth, and Inflation: Selected Advanced Economies, 1946-2009

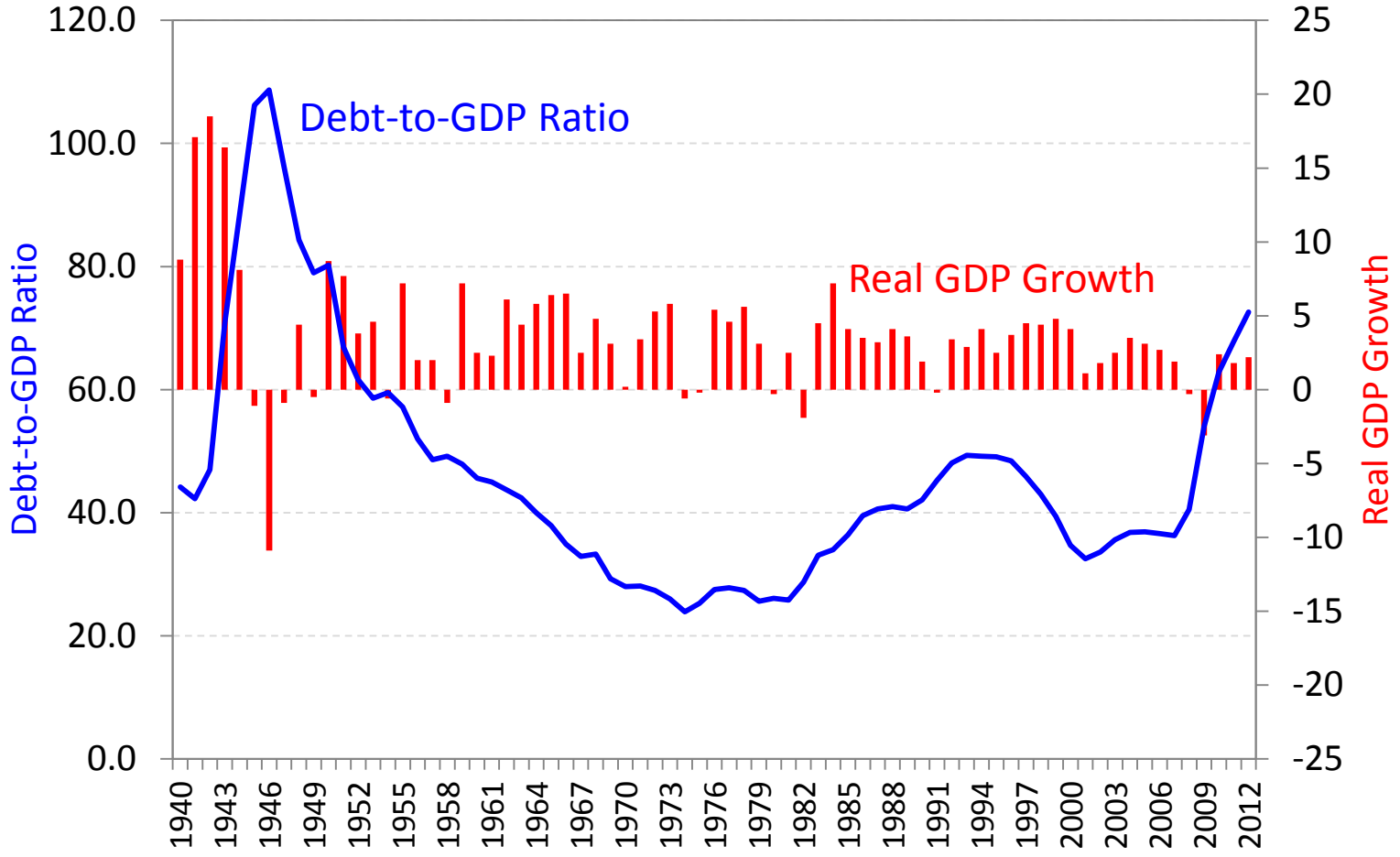


Source: Reinhart and Rogoff, “Growth in a Time of Debt”

Is Reinhart and Rogoff's Relationship Causal?

- Could there be omitted variable bias?
  - Countries mess up in multiple ways: Bad policies lead to low growth and high debt.
  - In the case of the U.S.: World War II led to high debt, and end of war led to negative growth.

Debt and GDP Growth in the U.S., 1946-2012



Is Reinhart and Rogoff's Relationship Causal?

- Could there be reverse causation?
  - Low growth leads to high debt/GDP.
  - Japan is a case where that seems to be true.
  - Reinhart and Rogoff's response.

Is there a better way to look for a relationship between debt and growth?

- Clever instruments?
- Narrative evidence?
- Focus on transmission mechanism, such as interest rates or financial crises?
- Rely on theory?

Critique by Herndon, Ash, and Pollin

- Background
- Replicability of results is a big issue in economics.

Data and Calculation Issues

- Spreadsheet coding mistake
  - Reinhart and Rogoff left out 5 countries.
- Selective omission
  - Data for New Zealand, Australia, and Canada for late 1940s left out. NZ had very high debt and high growth in the omitted years.
- Weighting
  - Each country in a bin gets the same weight regardless of number of years with debt/GDP in that range.

Table 3: Published and replicated average real GDP growth, by public debt/GDP category

Method/Source	Public debt/GDP category			
	Below 30 percent	30 to 60 percent	60 to 90 percent	90 percent and above
Corrected results				
Country-year weighting, all data	4.2	3.1	3.2	2.2
Interactive effects of RR calculations				
Spreadsheet error + Selective years exclusion	4.2	3.0	3.2	1.7
Spreadsheet error + Country weights	4.1	2.9	3.4	1.4
Selective years exclusion + Country weights	4.0	3.0	3.0	0.3
Spreadsheet error + Selective years exclusion + Country weights	4.1	2.9	3.4	0.0
Spreadsheet error + Selective years exclusion + Country weights + Transcription error	4.1	2.9	3.4	−0.1
RR Published Results				
RR 2010a Figure 2 (approximated)	4.1	2.9	3.4	−0.1
RR 2010b Appendix Table 1	4.1	2.8	2.8	−0.1

Source: Herndon, Ash, and Pollin, “Does High Public Debt Consistently Stifle Economic Growth?”