Fiscal Deficits

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Econ520

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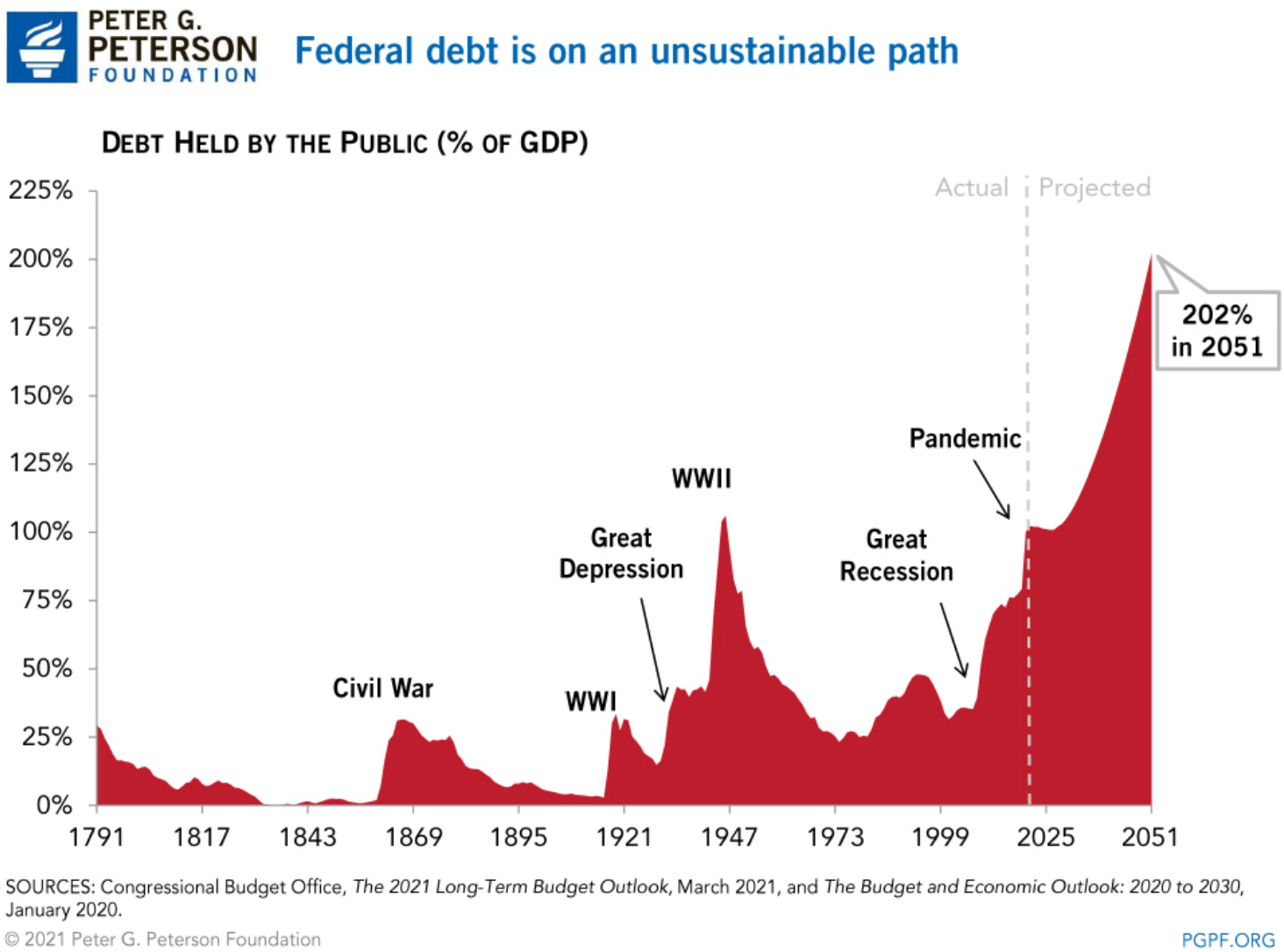
Topics

In this section you will learn:

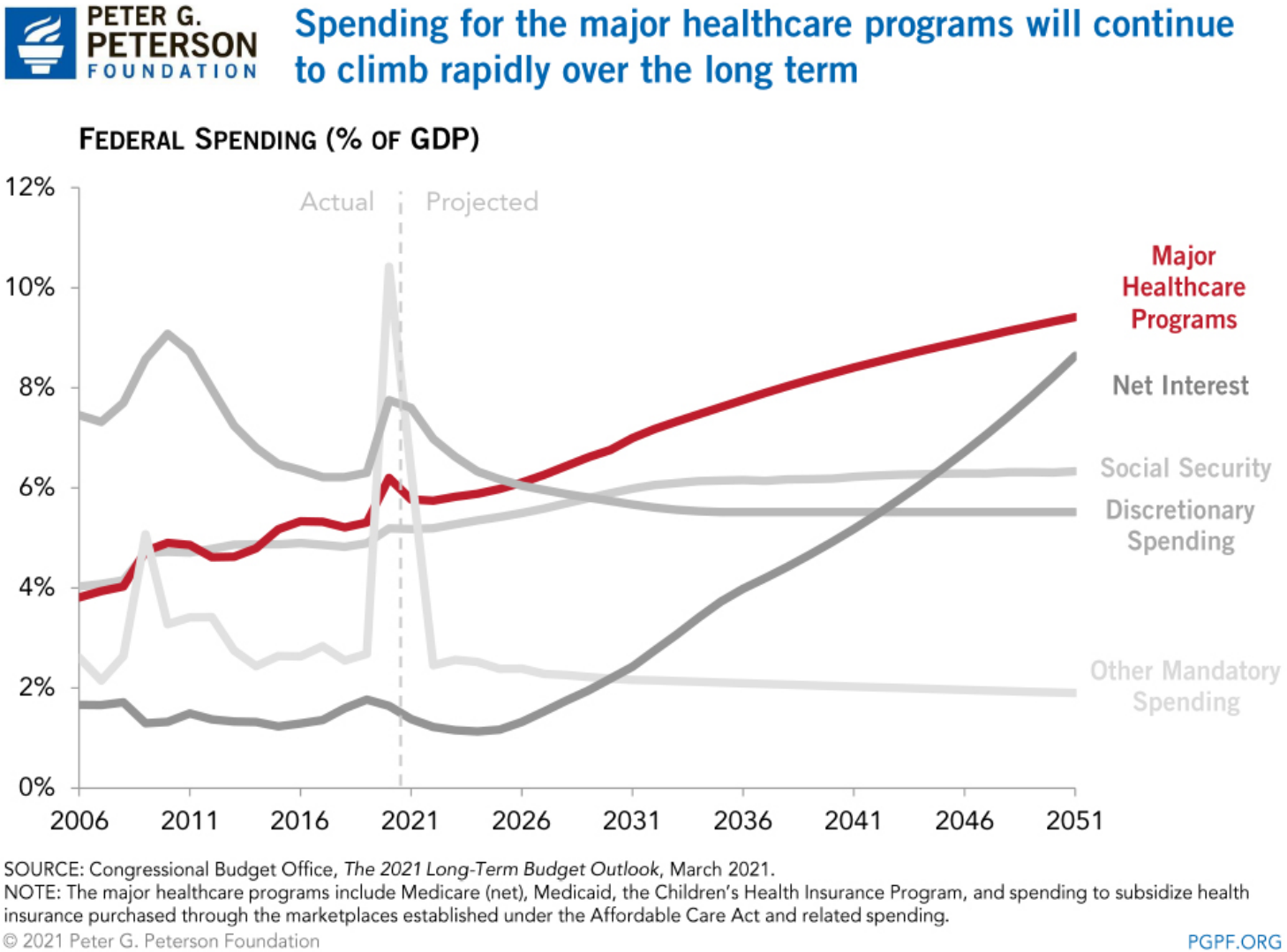
1. what the outlook for the U.S. government budget looks like
2. what deficits do

Public Debt is Rising



Source: PGPF, 2021

Main Driver: Health Spending



Source: PGPF, 2021

Rising fraction of older people + rising health care prices.

Policy Options

1. Cut spending
2. Raise taxes
3. Print money

Cut Spending

2020 budget:

- spending = \$6.6 trillion
- discretionary spending = \$1.6 trillion
- much of federal spending is entitlements (medicare, medicaid, social security, "welfare")

Summary: Facts

1. There are manageable short-term problems.
   largely a consequence of crisis spending
2. There are hard to solve long-term problems
   mainly the rising cost of health care
3. Your taxes will rise and your entitlements will be cut
   the only question is how soon

The government budget constraint

Government Debt

What does government debt do?

How much debt is sustainable?

How worrying is the situation?

Two views

THE NATIONAL DEBT IS ON AN UNSUSTAINABLE PATH

CBO estimates that federal debt, which is already at high levels, will climb significantly over the next 30 years. In CBO's latest projections, debt is expected to climb from 77 percent of GDP in 2017 to 150 percent of GDP in 2047, based on current law.

Debt at those levels would be unprecedented. – Peterson Foundation, 2017

Low interest rates also create numerous opportunities. They expand the scope for expansionary fiscal policy, make the debt more sustainable and increase the scope of public investments that will pay for themselves over time. – Furman and Summers (2020)

The government budget constraint

$$\underbrace{G_t + Tr_t + iB_t}_{\text{spending}} = \underbrace{T_t + \Delta M_t}_{\text{income}} + \underbrace{\Delta B_t}_{\text{borrowing}} \tag{1}$$

Sources of funds:

- Tax revenues: T
- New bond issues: $\Delta B_t = B_{t+1} - B_t$
- Seignorage: $\Delta M = M_{t+1} - M_t$

Uses of funds:

- Government spending on goods and services: G
- Transfer payments: Tr
- Interest payments on bonds: iB_t

The government budget constraint

Government income: $Y_t = T_t + \Delta M_t$

Government spending: $X_t = G_t + Tr_t$

Saving: $S_t = Y_t - X_t$

Budget constraint: $B_{t+1} = (1+i)B_t - S_t$.

This is intuitive ... and the same holds for a household or firm.

Intertemporal budget constraint

The budget constraint is accounting.

It says nothing about how much spending / debt is sustainable.

To see how much debt is sustainable, we need to look at the **intertemporal** budget constraint.

Then we will find:

$$\textbf{Present value of income} = \textbf{Present value of spending} + \textbf{initial debt}$$

Two period example

The world lasts for $t = 1, 2$.

The economy starts with debt B_1.

There is no money (or M is constant)

Budget constraint for $t = 1$:

$$B_2 = RB_1 - S_1 \tag{2}$$

Budget constraint for $t = 2$:

$$B_3 = RB_2 - S_2 \tag{3}$$

$$= R[RB_1 - S_1] - S_2 \tag{4}$$

where $R \equiv 1 + i$.

Two period example

Combine the 2 budget constraints (substitute out B_2):

$$B_3 = R^2 B_1 - RS_1 - S_2 \tag{5}$$

In words...

Rearrange

$$\frac{B_3}{R^2} = B_1 - \frac{S_1}{R} - \frac{S_2}{R^2} \tag{6}$$

The present value of debt at the end equals the present value of borrowing ("primary deficits") in all periods.

This is very general (not limited to examples with a few periods)

Many periods

We still have

$$\frac{B_{T+1}}{R^T} = B_1 - \frac{S_1}{R} - \frac{S_2}{R^2} \cdots - \frac{S_T}{R^T} \tag{7}$$

$$\frac{B_{T+1}}{R^T} = B_1 - PV(S;R) \tag{8}$$

$PV(S)$ is the present value of saving ("primary surpluses").

In words:

The increase in the present value of debt equals the present value of all dissaving ("primary deficits").

Case 1: Finite Horizon

E.g., a person who cannot die in debt: $B_{T+1} = 0$

Consider the case of $B_1 = 0$.

- Any deficit must be offset by savings of equal present value.
- If the agent borrows now, they must save later.

With initial debt, just add repayment of the debt to $t = 1$ spending.

But this does not apply to governments (or firms)!

Case 2: Infinite Horizon

Now what is the constraint on the present value of future debt B_{T+1}/R^T?

The depends on the path of output

- because tax revenues and spending rise with it.

Write output shares as lower case: $b_t \equiv B_t/Y_t$.

Assume output grows at a constant rate: $Y_t/Y_1 = g^{t-1}$.

Case 2: Infinite Horizon

Then we have

$$\frac{B_{T+1}}{R^T} = \frac{b_{T+1}}{R^T} Y_{T+1} = \frac{b_{T+1}}{R^T} g^T Y_1 = \frac{b_{T+1}}{(R/g)^T} Y_1 \tag{9}$$

Apply the intertemporal budget constraint (divided by Y_1):

$$\frac{b_{T+1}}{(R/g)^T} = \frac{B_1}{Y_1} - \frac{S_1/Y_1}{R} - \frac{S_2/Y_1}{R^2} - \cdots - \frac{S_T/Y_1}{R^T} \tag{10}$$

$$= b_1 - \frac{s_1}{R} - \frac{s_2}{R^2}\frac{Y_2}{Y_1} - \cdots - \frac{s_T}{R^T}\frac{Y_T}{Y_1} \tag{11}$$

$$= b_1 - g\left[\frac{s_1}{R/g} - \frac{s_2}{(R/g)^2} - \cdots - \frac{s_T}{(R/g)^T}\right] \tag{12}$$

$$= b_1 - gPV(s; R/g) \tag{13}$$

Note: the race between interest and output growth!

Case 2: Infinite Horizon

Assume that $s_t \equiv S_t/Y_t$ is constant at $\bar{s}$.

Then

$$\frac{b_{T+1}}{(R/g)^T} = b_1 - g\sum_{t=1}^{T}(R/g)^{-t} \tag{14}$$

Or

$$b_{T+1} = b_1(R/g)^T - g\bar{s}\sum_{t=1}^{T}(R/g)^{T-t} \tag{15}$$

Note: $\sum_{t=1}^{T}(R/g)^{T-t} = \sum_{t=0}^{T-1}(R/g)^t = \frac{(R/g)^T-1}{(R/g)-1}$ is just a number.

Now what happens depend on R versus g.

Traditional view: $R > g$

Output growth: perhaps 3% p.a.

Real interest rate (on stocks!): averages about 7% p.a. over that last 100 years.

$R/g > 1$ and therefore $(R/g)^t$ grows over time.

Let's set initial debt to 0.

If the government always borrows, the debt-to-gdp ratio keeps growing.

$$b_{T+1} = -g\bar{s}\frac{(R/g)^T - 1}{(R/g) - 1} \tag{16}$$

Then the interest share of the government budget keeps growing without bounds.

Not sustainable.

Traditional view

If the government borrows today, it has to save in the future.

This is true even though

- government debt can grow without bounds
- the government never has to repay its debts

The constraint simply comes from the need to keep debt-to-output finite.

Implications

1. If the government borrows today, taxes will be higher in the future (or spending must be cut)
2. The longer the government waits before stabilizing the debt, the higher taxes must rise
   - 2.1 because the debt grows due to accumulated interest
   - 2.2 but the present value of the tax collection does not depend on when the debt gets repaid

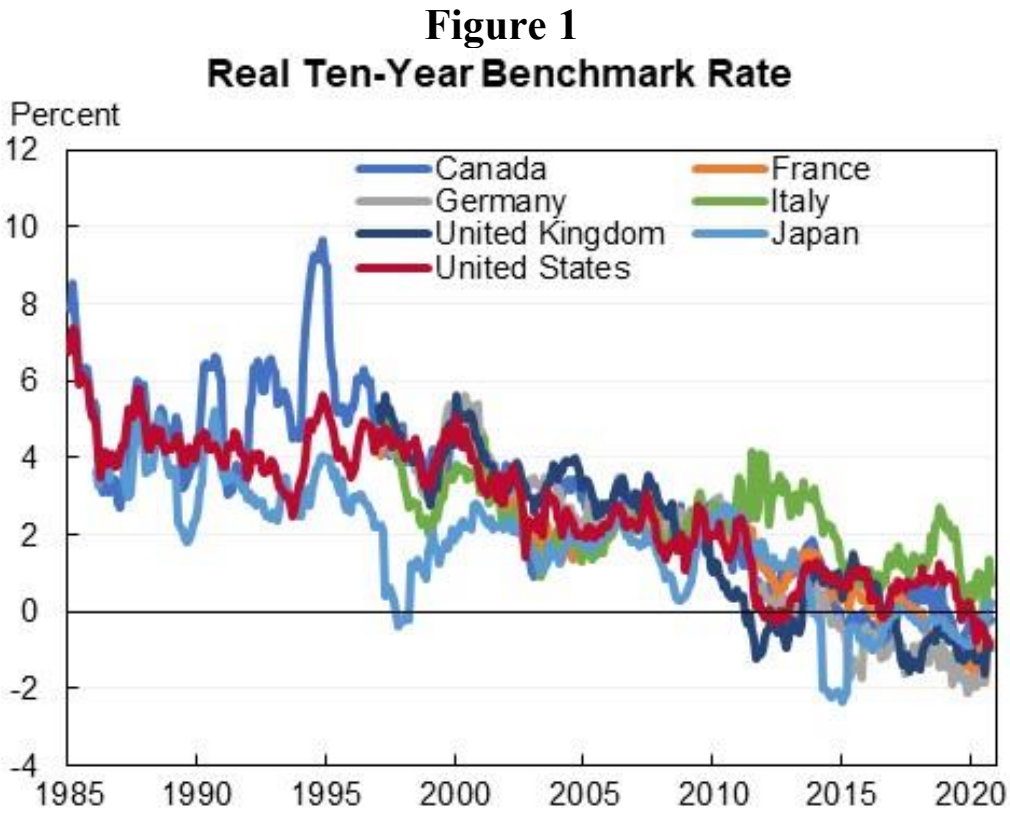
Low Interest Rates: $R < g$

$$b_{T+1} = -g\bar{s}\frac{(R/g)^T - 1}{(R/g) - 1} \to -g\bar{s}\frac{1}{1 - R/g} \tag{17}$$

Now there is enough growth and interest rates are so low that the government can keep borrowing forever.

The debt-to-output ratio does not blow up.

Low Interest Rates



Source: Furman and Summers (2020)

Real interest rates have been falling for a long time (why?).

Interest Payments

Figure 14a

U.S. Federal Debt Held by The Public

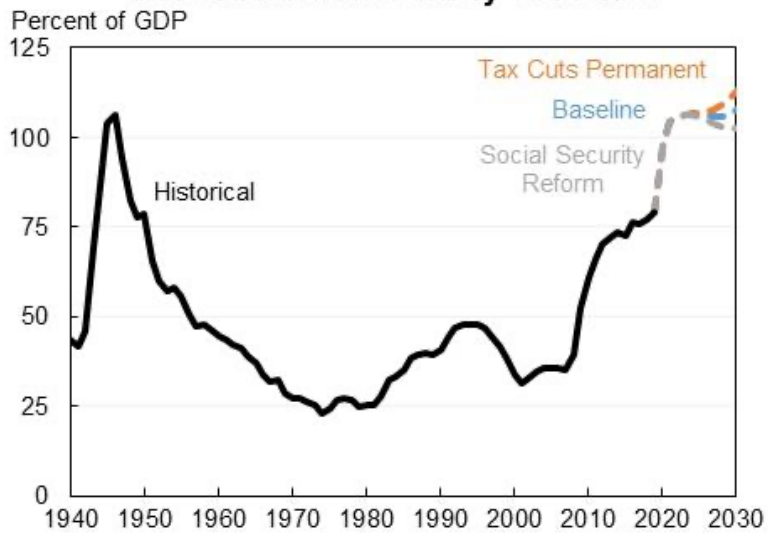
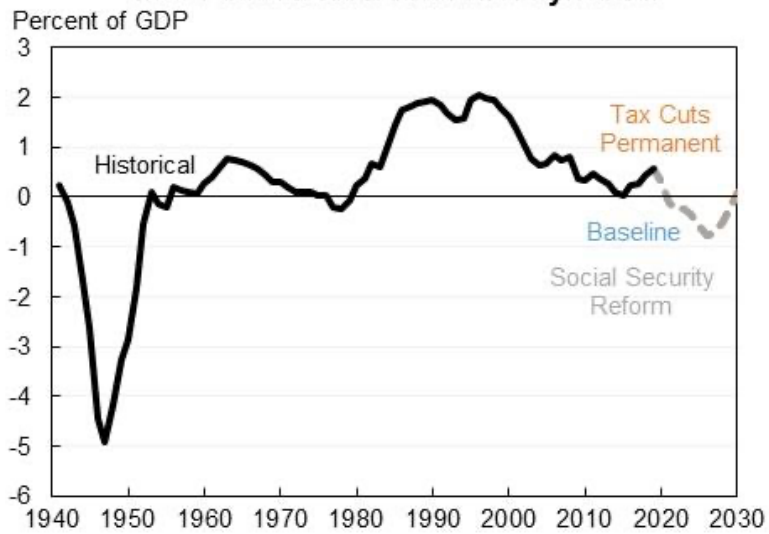


Figure 14b

U.S. Federal Real Interest Payments



Source: Furman and Summers (2020)

Key point

It's not the size of the debt that matters, its the size of interest payments relative to output.

Does this mean that government debt is a free lunch?

Should the government borrow a lot?

The Effects of Deficits

What Do Deficits Do?

- Does a higher deficit imply that interest rates rise?
- Does government borrowing crowd out private investment?

Crowding out

- Start from the NIPA identity

$$Y = C + G + I + EX - IM$$

- Rewrite as

$$\underbrace{Y - T - C}_{private\ saving} + \underbrace{T - G}_{public\ saving} + \underbrace{IM - EX}_{foreign\ saving} = I$$

- Everything else equal, higher government deficits reduce investment.
- But everything else is not equal...

Crowding out

- There are reasons to believe that private saving rises when government deficits rise.
- Which ones?

Ricardian Equivalence

- The government budget constraint implies
  - a current tax cut + borrowing does not change the present value of taxes collected
- The household budget constraint implies
  - present value of consumption = [present value of income] - [present value of taxes]
- Households "should" not change consumption in response to deficits + tax cuts
  - what should they do?
  - what is then the effect of a deficit?

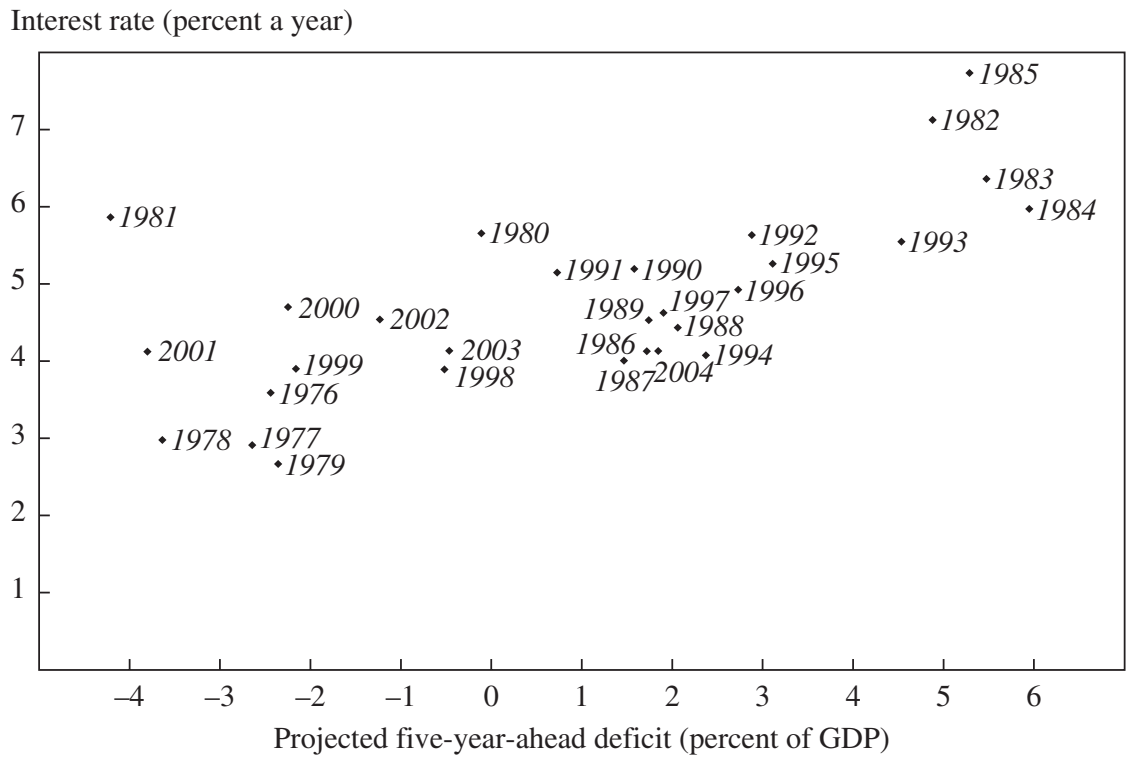
Deficits and Private Saving

- The evidence suggests: a \$100 increase in the deficit leads to
- a \$25 increase in private saving
- a \$25 capital inflow from abroad
- a \$50 reducting in U.S. investment (Sinai et al. 2004).

$$\underbrace{Y-T-C}_{+\$25}+\underbrace{T-G}_{-\$100}+\underbrace{IM-EX}_{+\$25}=\underbrace{I}_{-\$50}$$

Deficits and Interest Rates

Figure 8. Forward Ten-Year Real Treasury Rates and Projected Deficits, 1976–2004[a]



Source: Gale and Orszag (2004)

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Best estimates suggest: increase in government deficit by 1% of GDP raises interest rates by 0.3 to 0.6%.

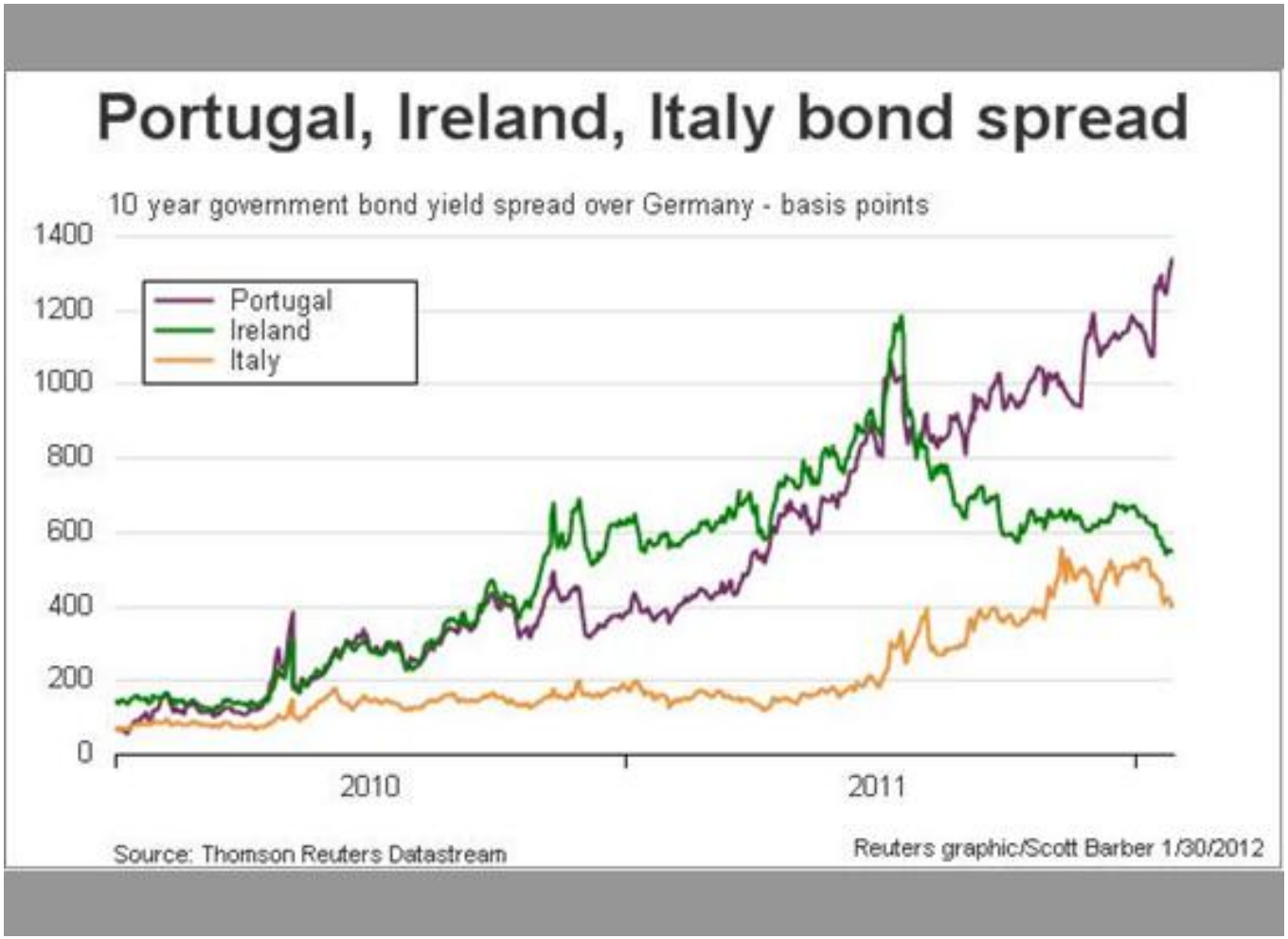
Debt Raises Borrowing Rates

- Investors worry about runaway dynamics (Greece and Italy)
- Holding debt stable requires a primary surplus that pays the interest on the debt:

$$B_{t+1} - B_t = rB_t - (\underbrace{T_t - G_t - Tr_t}_{\text{primary surplus}}) \tag{18}$$

- If investors start to doubt the government's ability to roll over the debt, r rises (risk premium)
- That makes it harder to stabilize debt
- A possible self-fulfilling prophecy

Debt Raises Borrowing Rates



Is Today Different?

Does it look like crowding out is a major concern today?

One view: Furman and Summers (2019).

Other Effects of Deficits

1. Higher inflation - why?
2. Currency depreciation - why?

Sudden Stops

- Low income countries often experience sudden stops in foreign lending.
  - The Asian crisis of 1987.
- Serious disruption of credit markets and investment.
- Currency depreciation.
- Resulting from loss of investor confidence.
- This may be the most serious drawback of running large deficits.

Reading

Blanchard (2018), ch. 23

Also useful:

- Time to Worry Less about Federal Budget Deficits? (Timothy Taylor's summary of Furman & Summers)
- Jones (2013), ch 13.

Advanced Reading

- Ball and Mankiw (1995): informal. Ideas
- Gale and Orszag (2004): summarizes the evidence of the effects of deficits on interest rates
- Rubin et al. (2004) http://www.brookings.edu/papers/2004/0105budgetdeficit_orszag.as
  - nice summary of possible consequences of budget deficits.

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