

Tools of Budget Analysis

(Chapter 4 in Gruber's textbook)

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GOVERNMENT BUDGETING

Debt: The amount borrowed by government through bonds from individuals, firms, or foreigners. Debt is a **stock**

Deficit: government's spending + interest payments on debt minus government revenues in a given year. A negative deficit is called a surplus. Deficit is a **flow**

Evolution of debt from year to year:

$$\text{Debt}_{t+1} = \text{Debt}_t + \text{Deficit}_t = \text{Debt}_t \cdot (1 + r_t) + \text{Spending}_t - \text{Revenue}_t$$

with r_t interest paid on government debt

$$\text{Primary Deficit} = \text{Spending} - \text{Revenue}$$

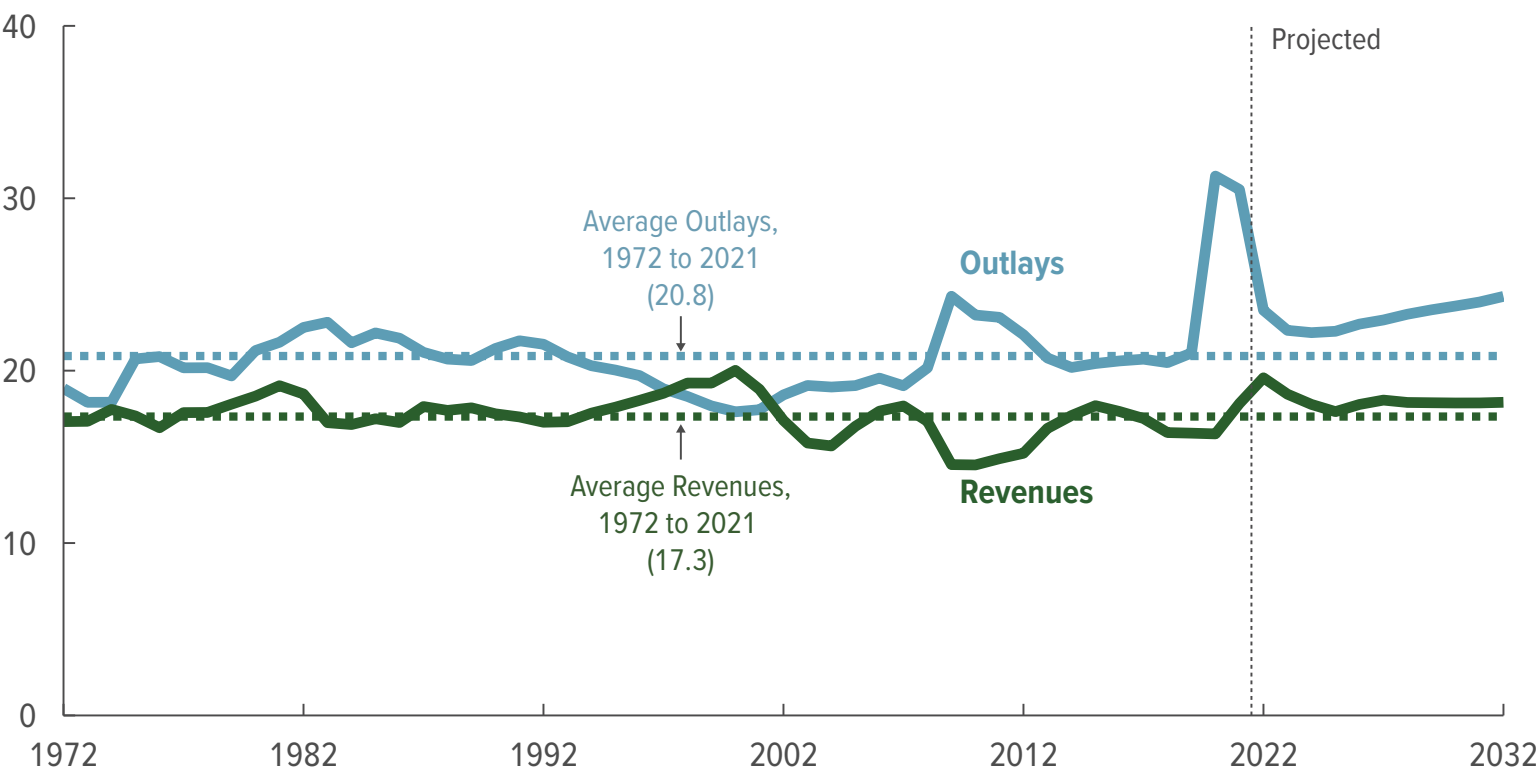
US Federal debt (held outside govt) is \$24Tr around 95% of GDP, 2021 US deficit huge 14% (\$3T) of GDP bc COVID

US government owns assets worth about 80% of GDP

Figure 1-2.

Total Outlays and Revenues

Percentage of Gross Domestic Product



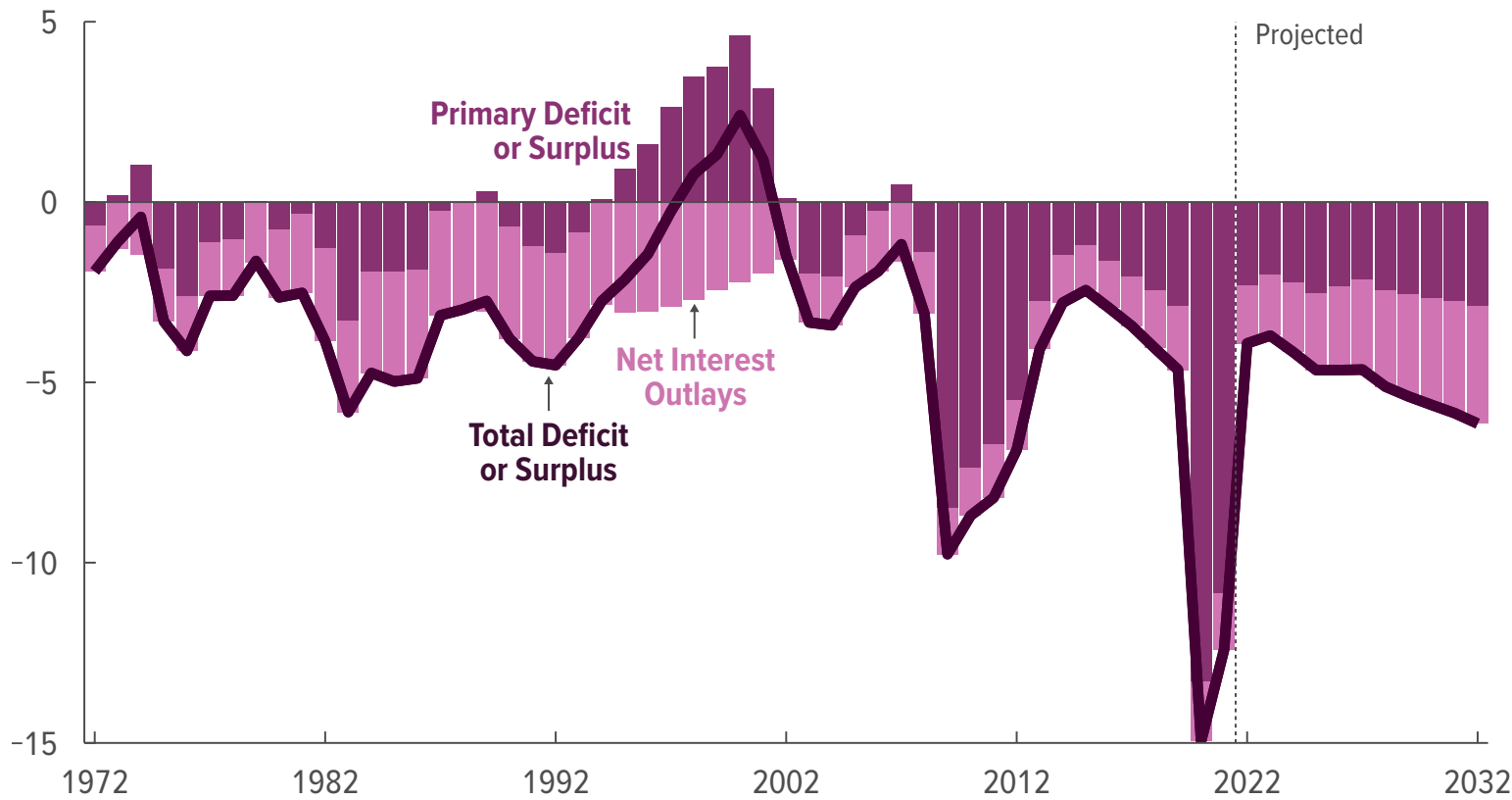
Outlays are projected to drop from recent highs, as pandemic-related spending wanes, and then trend upward, as they did before the pandemic. Revenues are projected to increase sharply this year and then hover around their historical average as a share of the economy.

Data source: Congressional Budget Office. See www.cbo.gov/publication/57950#data.

Figure 1-1.

Total Deficits, Primary Deficits, and Net Interest Outlays

Percentage of GDP



In CBO's projections, primary and total deficits initially shrink as a percentage of GDP and then generally increase, particularly in the second half of the projection period. The aging of the population and the rising costs of health care boost primary deficits; net interest outlays, which double as a percentage of GDP over the projection period, further increase total deficits.

Data source: Congressional Budget Office. See www.cbo.gov/publication/57950#data.

Primary deficits exclude net outlays for interest.

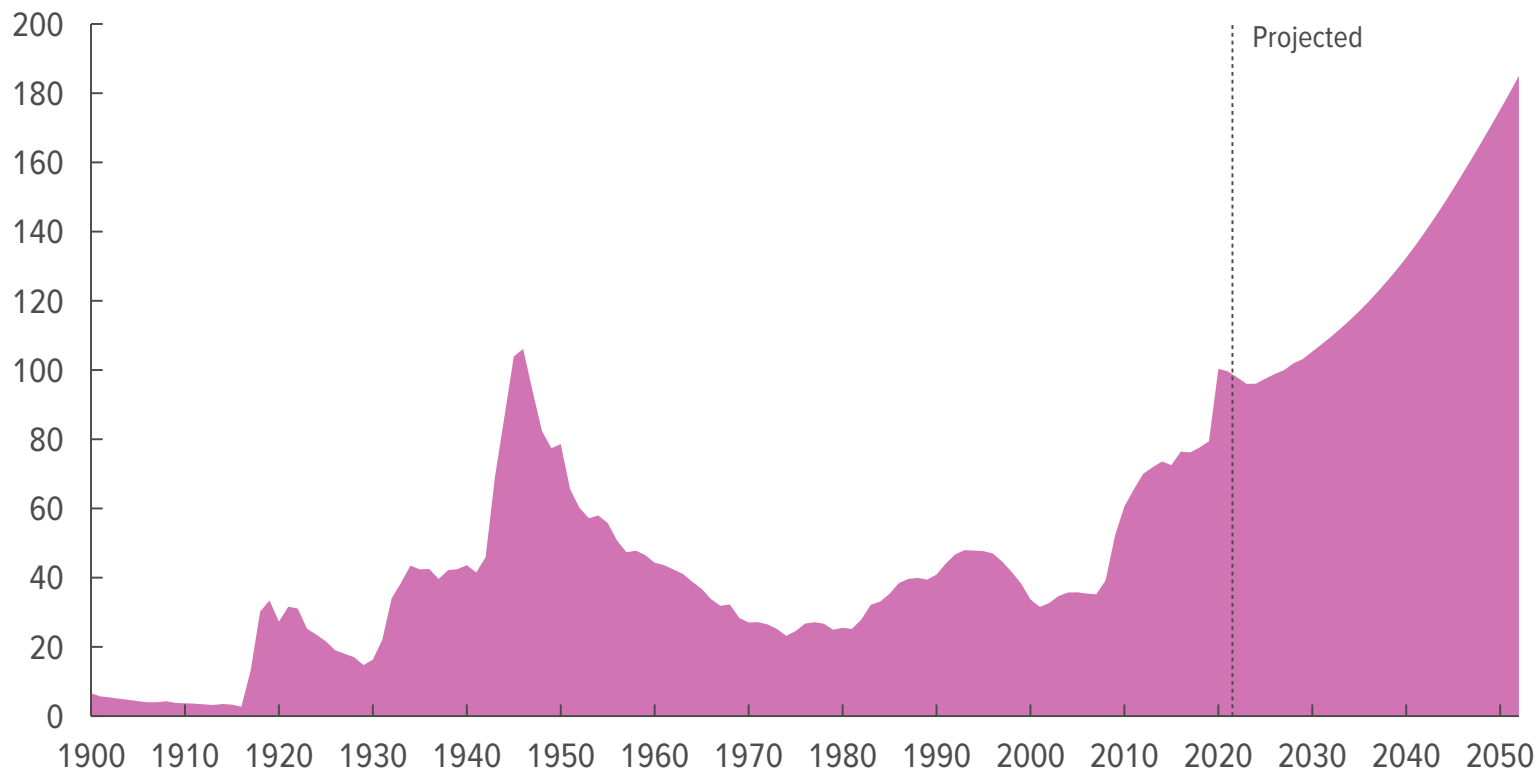
When October 1 (the first day of the fiscal year) falls on a weekend, certain payments that would have ordinarily been made on that day are instead made at the end of September and thus are shifted into the previous fiscal year. All projections have been adjusted to exclude the effects of those timing shifts. Historical amounts have been adjusted as far back as the available data will allow.

GDP = gross domestic product.

Figure 1-8.

Federal Debt Held by the Public, 1900 to 2052

Percentage of GDP



Federal debt held by the public is projected to increase in most years in the projection period, reaching 110 percent of GDP in 2032—higher than it has ever been. In the two decades that follow, growing deficits are projected to push federal debt higher still, to 185 percent in 2052.

Data source: Congressional Budget Office. See www.cbo.gov/publication/57950#data.

GDP = gross domestic product.

GOVERNMENT DEBT SUSTAINABILITY

$$\text{Debt}_{t+1} = \text{Debt}_t + \text{Deficit}_t$$

Debt/GDP stable ≤ 1 if deficit $\leq g \times \text{GDP}$ with g nominal GDP growth

If $\text{Debt}_t = \text{GDP}_t$ and $\text{Deficit}_t = g \cdot \text{GDP}_t$ then $\text{Debt}_{t+1} = \text{GDP}_t + g \cdot \text{GDP}_t = \text{GDP}_{t+1}$

Pre-COVID: g around 5% per year = 2% price inflation + 1% population growth + 2% real growth per capita

$$\text{Deficit}_t = r_t \cdot \text{Debt}_t + \text{Spending}_t - \text{Revenue}_t$$

with r_t nominal interest on debt

Debt can snowball when r_t exceeds g_t

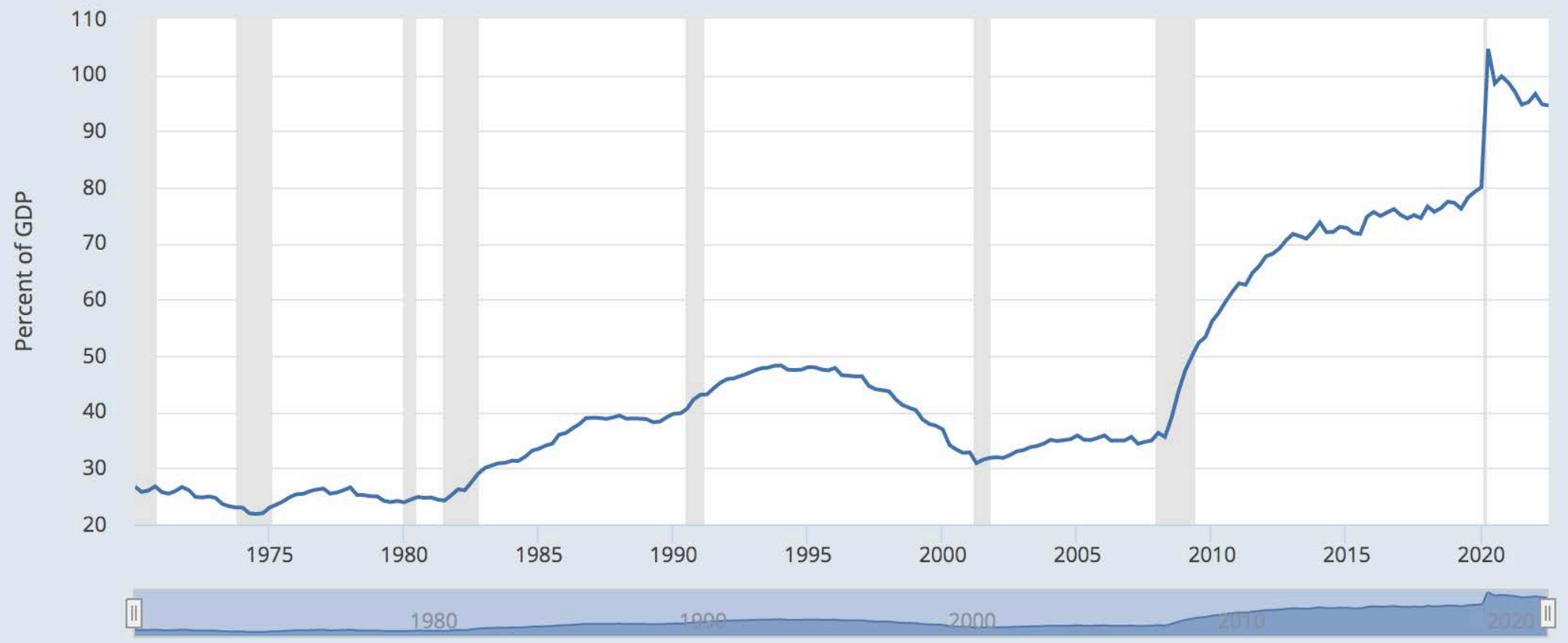
Since 2008, in the US, $r_t \simeq 2\%$ much lower than $g_t = 5\%$

\Rightarrow US debt sustainable as long as primary deficit $\text{Spending} - \text{Revenue}$ less than 3% of GDP and r stays low (below 2%)

High COVID price inflation shrinks US debt (as long as r stays low)



Federal Debt Held by the Public as Percent of Gross Domestic Product



Sources: OMB; St. Louis Fed

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GOVERNMENT DEBT IN CLOSED ECONOMY

Govt borrows from private sector (ultimately individuals)

Govt debt increases private wealth and decreases public wealth

No effect on national wealth = private wealth + public wealth

Govt debt is not borrowing on the back of future generations but rather changing the distribution of wealth

High debt with high interest rate limits spending ability of govt (as taxes must pay first interest on debt)

Today: US (and most EU countries and Japan) have very low interest rate on govt debt: about 0% in real terms pre-COVID, -4% with COVID inflation of 6%, about 0% again in 2023.

⇒ Makes govt debt more attractive than taxes in short-run

GOVERNMENT DEBT IN OPEN ECONOMY

Govt debt can also be borrowed from abroad

In this case, govt debt is indeed making future generations poorer (indebted to other countries)

1/3 of US debt (\$7T) is held abroad but US also owns foreign assets that pay higher returns

US debt held abroad primarily by foreign central banks that use it as reserves

While interest rate is low, this is a good deal for the US

If interest rate on US debt increases, it will be perceived in US as a heavy burden to be paid to foreigners

THE CENTRAL BANK AND DEBT MONETIZATION

During COVID, US fed government ran huge deficits (12-15% of GDP in 2020 and 2021)

This extra debt was almost entirely purchased by US central bank (federal reserve bank or “the fed”) and counted in debt held by private sector (although the fed is a quasi-govt entity)

Effectively: Central bank creates money (out of thin air) and purchases new US debt from US govt, US govt then spends the money (large COVID related transfers)

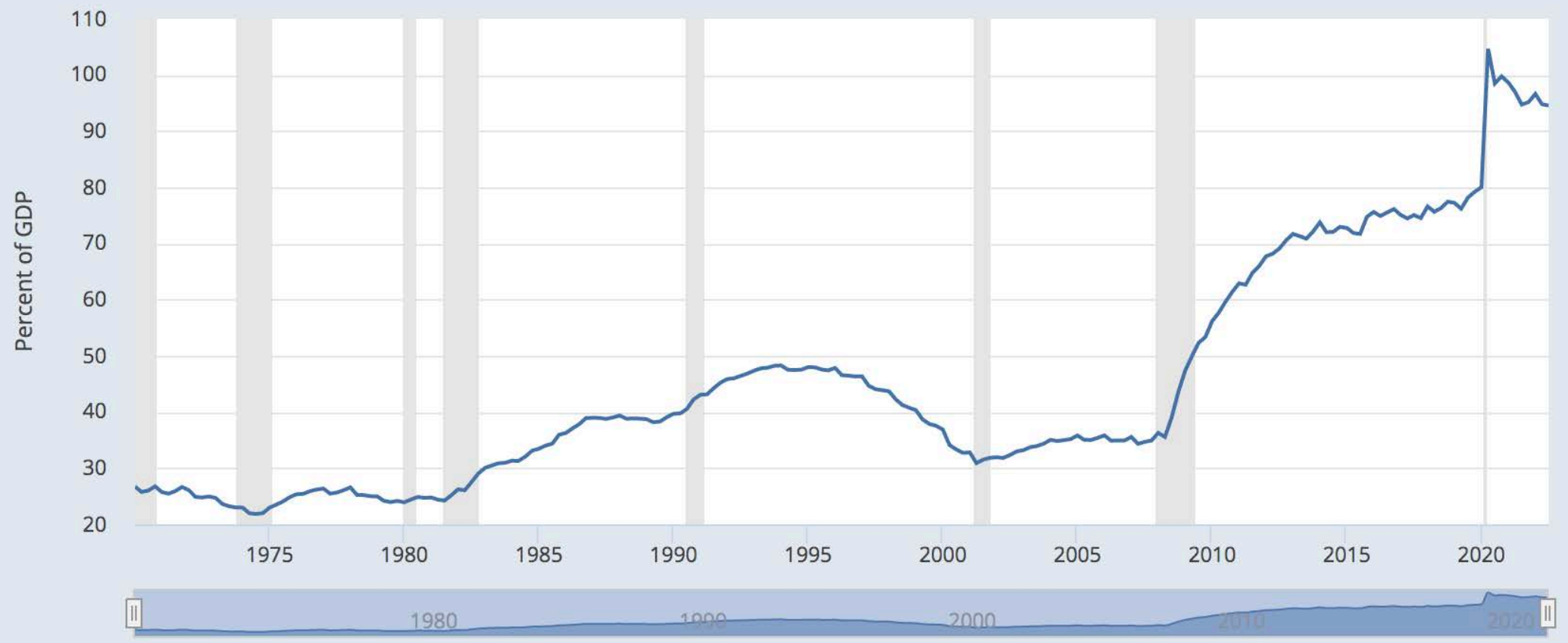
This is called “debt monetization”

Very effective to give govt huge spending power without raising taxes but can led to inflation when the economy recovers

Temporary inflation is good to reduce debt (after WW2) but bad if it becomes permanent (US 1970s, Argentina since 2002)



Federal Debt Held by the Public as Percent of Gross Domestic Product



Sources: OMB; St. Louis Fed

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Federal Debt Held by Federal Reserve Banks as Percent of Gross Domestic Product



Sources: OMB; St. Louis Fed

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Federal Debt Held by the Public as Percent of Gross Domestic Product-Federal Debt Held by Federal Reserve Banks as Percent of Gross Domestic Product



Sources: OMB; St. Louis Fed

myf.red/g/pDQ2

HISTORICAL EXPERIENCES WITH GOVT DEBTS

Countries have incurred debts of 100-300% of GDP due to crises, wars, foreign coercion. Several ways out:

- 1) Repay debt over many decades (UK in 19th century): wealthy debt holders win, govt spending suffers
- 2) Repudiate debt (Soviet Union with Russian debt in 1917): foreign wealthy debt holders lose but hard to borrow afterwards
- 3) Inflate debt away (US, EU countries after World War II): Debt holders (and many others) lose, risk of hyperinflation if govt cannot fund itself with taxes (Germany 1920s)
- 4) Exceptional wealth taxes: (partly Germany, Japan after World War II): wealthy in general lose not just debt holders

Debt financing looks attractive in short-run but who ultimately pays is not as clear as with tax financing

THE US FEDERAL PROCESS

Taxes, spending, and debt ceiling are decided by Congress and the President

Any new law requires majority vote both in House and in Senate along with President's signature (veto power)

Two forms of spending:

Entitlement spending: Mandatory funds for programs for which funding levels are automatically set by the number of eligible recipients (ex: medicare, social security)

Discretionary spending: Optional spending set by appropriation levels each year, at Congress's discretion (ex: defense)

Failure to pass appropriation results in Fed govt shutdown

Short-Run Effects of Fiscal Policy on Economic Growth

Keynesian theory (IS-LM macro model): More government spending or tax cuts stimulates the economy in the short-run [and conversely]:

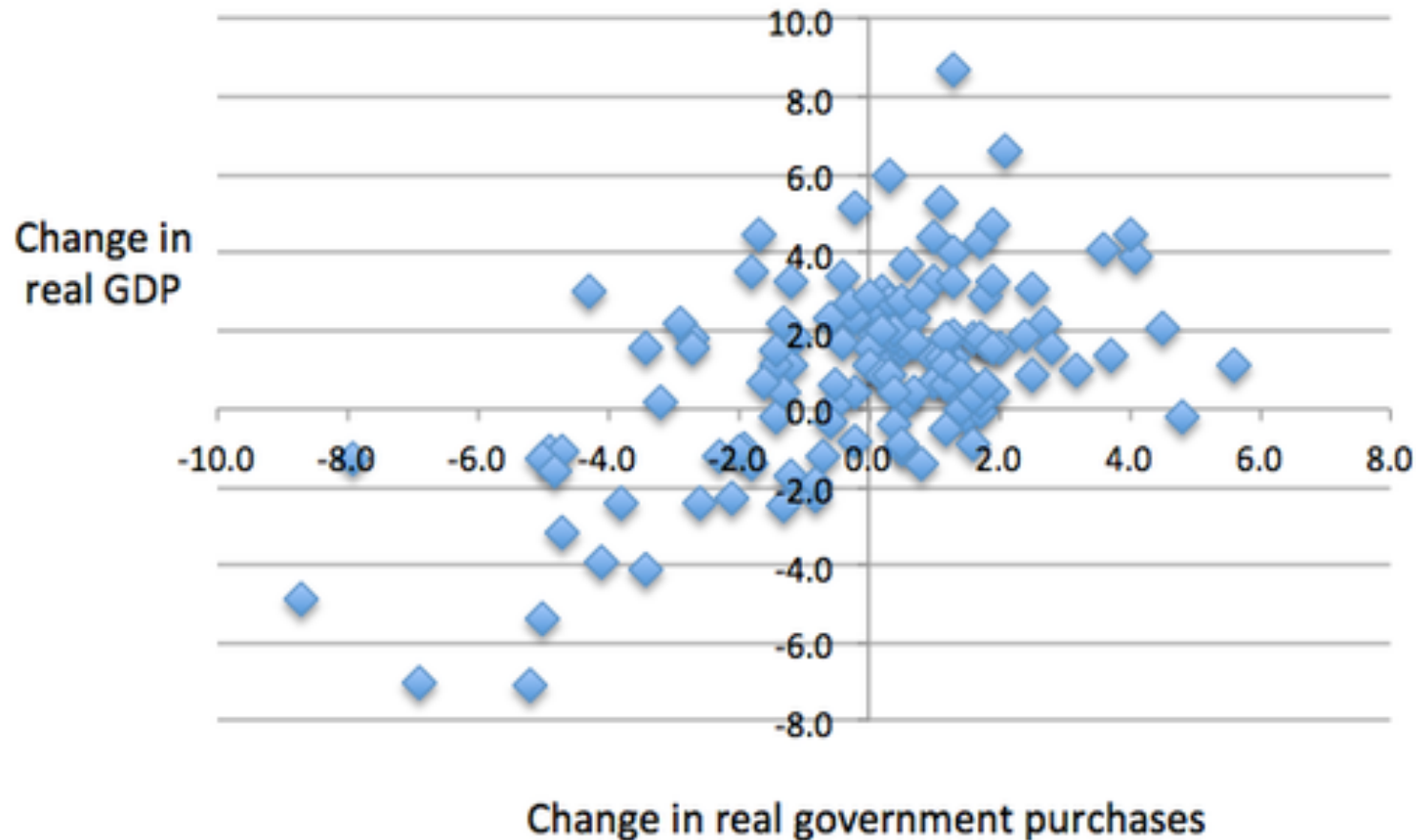
Short-run stabilization: Govt can use taxes and spending policies to smooth the peaks and troughs of the business cycle

Automatic stabilization: Policies that automatically alter taxes or spending in response to economic fluctuations to offset changes in household consumption levels (ex: unemployment insurance, progressive taxation, corporate profits tax)

Discretionary stabilization: Policy actions taken by the government in response to business cycle (ex: Fiscal stimulus with Spring 2008 rebate checks, 2009-12 Obama stimulus, COVID care acts in 2020 and 2021)

⇒ Ability to run deficits in recessions is a great tool for short-run business cycle stabilization

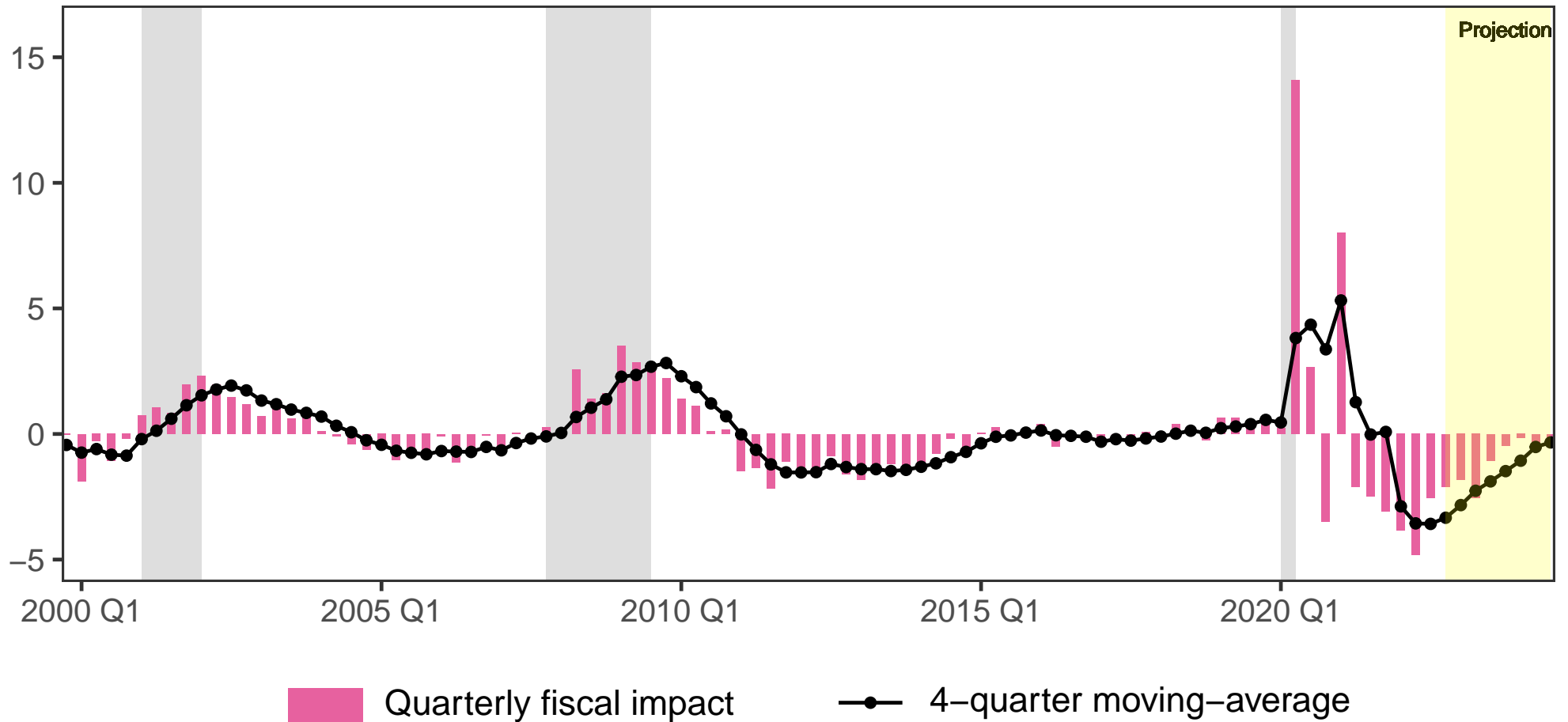
Government spending and growth, 2010-2013



% changes in annual real govt spending and changes in real GDP, 33 EU countries, 2010-11, 2011-2, 2012-3 (=99 dots). Source: Krugman NYtimes blog, January 6, 2015

Hutchins Center Fiscal Impact Measure: Total

Fiscal Policy Contribution to Real GDP Growth, percentage points



Source: Hutchins Center calculations from Bureau of Economic Analysis and Congressional Budget Office data; grey shaded areas indicate recessions and yellow shaded areas indicate projection.

Budget Policies and Deficits at the State Level

In contrast to Federal govt, States have budget balance requirements forcing spending to equate tax revenue each year

In downturns, tax revenue falls due to decreased incomes ⇒
Forces states to either cut spending and increase taxes ⇒
Further exacerbates the economic downturn

California had to cut spending drastically during Great Recession 2008-2010 ⇒ California established a rainy fund for future hard times but it remains too small

2021 COVID stimulus by Biden included lots of state funding allowing states to weather the COVID crisis (otherwise they would have had to cut spending)

CA and NY in surplus in 2022 because the very rich did well during COVID and have continued to pay taxes

STATIC VS. DYNAMIC SCORING

Govts have agencies evaluating effects of proposed reforms on govt deficit (Congressional Budget Office for US fed govt)

Static scoring: A method used by budget modelers that assumes that government policy changes only the distribution of total resources, not the amount of total resources.

Dynamic scoring: A method used by budget modelers that attempts to model the effect of government policy on both the distribution of total resources and the amount of total resources.

Example: tax decreases on the rich, static scoring assumes no effect on GDP, dynamic scoring incorporates effects on growth

Static scoring is safest in the absence of good empirical estimates of growth effects (dynamic scoring can be manipulated by ideologues, see Lynch 2015 for detailed pros/cons)

Intertemporal Government Budget Constraint

Policy debates have traditionally focused on the extent to which this year's governmental spending exceeds this year's governmental revenues.

The existence of implicit obligations in the future, however, suggests that this does not capture the full picture

Example: population aging increases cost of social security and Medicare

Intertemporal budget constraint: Relates the Present Discounted Value of the government's obligations to the Present Discounted Value of its revenues (assuming no debt default):

$$PDV \text{ of Tax Payments} = PDV \text{ of All Future Govt Spending} + \text{Current Govt Debt}$$

BACKGROUND: PRESENT DISCOUNTED VALUE

For govt, spending F now has the same cost as spending $F \cdot (1 + r)$ next year with r interest rate on government debt

Present discounted value (PDV): The value of each period's dollar amount in today's terms.

Govt spends F_1, F_2, F_3, \dots in each future year, then the PDV is computed as:

$$PDV = \frac{F_1}{(1+r)} + \frac{F_2}{(1+r)^2} + \frac{F_3}{(1+r)^3} + \dots$$

If $F_1 = F_2 = \dots = F$ then

$$PDV = \frac{F}{1+r} \cdot \left[1 + \frac{1}{(1+r)} + \frac{1}{(1+r)^2} + \dots \right] = \frac{F}{1+r} \cdot \frac{1}{1 - \frac{1}{1+r}} = \frac{F}{r}$$

Paying F in perpetuity is equivalent to paying F/r upfront

LONG-RUN FISCAL IMBALANCE

It is defined as gap between

- 1) PDV of All Future Govt Spending + Current Govt Debt
- 2) PDV of Tax Payments

If the government continues with today's policies, how much more will the government spend than it will collect in taxes over the entire future?

A long-run fiscal imbalance means that policies will have to be adjusted at some point

Some policies can drastically change the long-run fiscal imbalance even if they don't affect the current deficit much

Example: In 2003, the government added roughly \$20 trillion to the fiscal imbalance (due to tax cuts and medicare prescription drug benefit of Bush administration)

LONG-RUN EFFECTS OF GOVERNMENT DEBT

In the long-run, government debt affects the capital market where savers meet investors

In closed economy: private savings = investment + new govt debt

With more government debt, if private savings do not change, less funds available for investment: investment decreases

Two mitigating factors:

1) In an open economy, investment or govt debt can be funded with foreign savings

2) If individuals are forward looking, they understand that higher debt implies high taxes later on and hence they save more to be able to pay higher taxes later on [Ricardian equivalence but not much empirical support]

CONCLUSION

The deficit has been a constant source of policy interest and political debate over the last decade

Short-run: should the govt spend more and increase deficit to stimulate the economy?

Long-run: should the govt address long-term deficits by increasing taxes or cutting spending?

International evidence shows that austerity during the Great Recession worsens the recession

COVID response has led to a huge increase in govt deficits around the world but not much of an increase in debt to GDP thanks to inflation (hopefully temporary)

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