

Tools of Budget Analysis

(Chapter 4 in Gruber's textbook)

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GOVERNMENT BUDGETING

Debt: The amount borrowed by government through bonds to individuals, firms, or foreign governments. 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

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

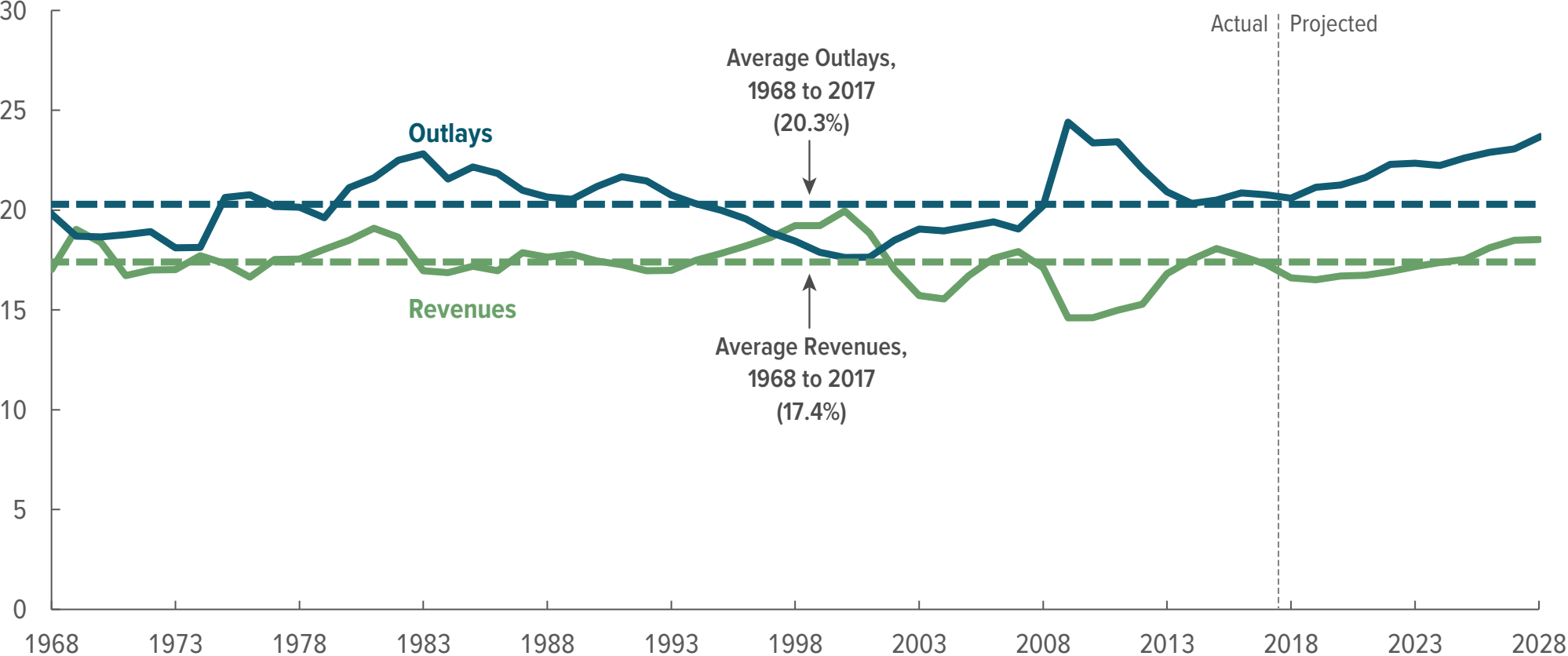
In 2019: US Federal debt (held outside govt) is \$16Tr around 80% of GDP (\$20Tr), US deficit is large 5.0% (\$1Tr) of GDP

US government owns assets worth about 80% of GDP

Figure 4-2.

Total Revenues and Outlays

Percentage of Gross Domestic Product

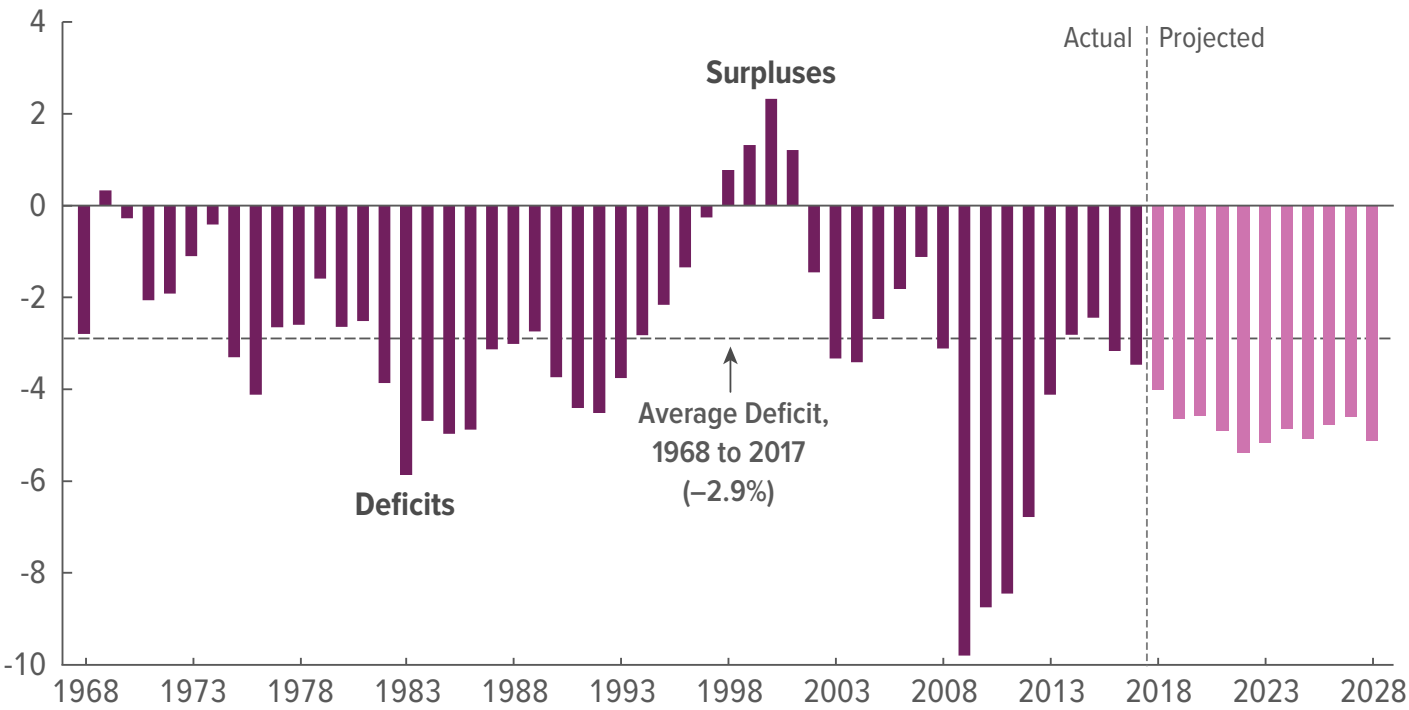


Source: Congressional Budget Office.

Figure 4-1.

Total Deficits or Surpluses

Percentage of Gross Domestic Product



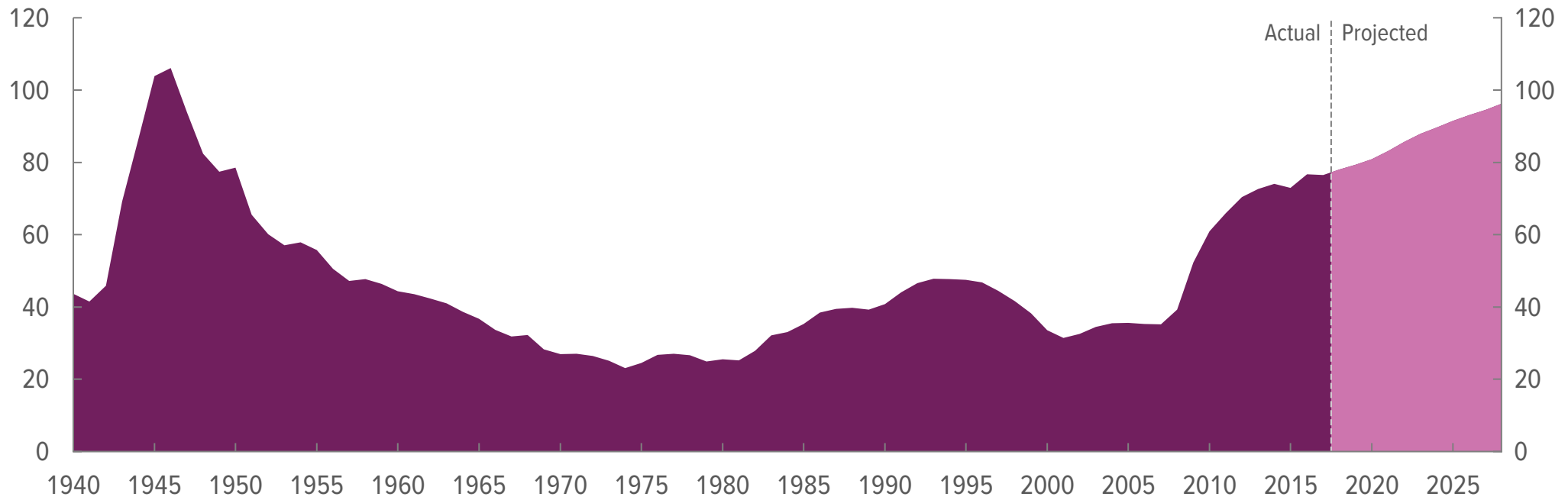
Deficits as a percentage of gross domestic product are projected to increase over the next few years and then largely stabilize. They exceed their 50-year average throughout the 2018–2028 period.

Source: Congressional Budget Office.

Summary Figure 2.

Federal Debt Held by the Public

Percentage of Gross Domestic Product



Source: Congressional Budget Office.

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)

In recent years, Senate vote requires 60/100 super-majority (due to filibuster)

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

Table 1-1.

CBO's Baseline Budget Projections, by Category

	Actual, 2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Total	
													2018- 2022	2018- 2027
In Billions of Dollars														
Revenues														
Individual income taxes	1,546	1,651	1,781	1,871	1,957	2,052	2,148	2,249	2,355	2,470	2,590	2,714	9,809	22,187
Payroll taxes	1,115	1,150	1,190	1,230	1,265	1,312	1,364	1,417	1,468	1,525	1,583	1,640	6,361	13,993
Corporate income taxes	300	320	340	352	382	377	381	385	396	408	422	439	1,832	3,882
Other	306	283	293	280	274	278	284	295	308	322	336	347	1,408	3,016
Total	3,267	3,404	3,604	3,733	3,878	4,019	4,176	4,346	4,527	4,724	4,931	5,140	19,410	43,078
On-budget	2,457	2,566	2,734	2,834	2,951	3,060	3,183	3,318	3,462	3,622	3,789	3,958	14,760	32,911
Off-budget ^a	810	838	870	899	928	959	993	1,028	1,064	1,102	1,142	1,182	4,649	10,168
Outlays														
Mandatory	2,429	2,484	2,585	2,764	2,925	3,097	3,329	3,455	3,583	3,827	4,076	4,305	14,700	33,946
Discretionary	1,184	1,209	1,210	1,238	1,257	1,284	1,315	1,340	1,367	1,405	1,439	1,475	6,304	13,330
Net interest	241	270	295	332	380	435	492	550	604	657	714	768	1,934	5,228
Total	3,854	3,963	4,091	4,334	4,562	4,816	5,135	5,346	5,554	5,890	6,228	6,548	22,938	52,504
On-budget	3,078	3,157	3,227	3,409	3,575	3,761	4,008	4,143	4,271	4,524	4,774	5,000	17,980	40,692
Off-budget ^a	776	806	864	925	987	1,055	1,127	1,204	1,283	1,366	1,454	1,548	4,958	11,812
Deficit (-) or Surplus	-587	-559	-487	-601	-684	-797	-959	-1,000	-1,027	-1,165	-1,297	-1,408	-3,528	-9,426
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Debt Held by the Public	14,168	14,838	15,416	16,092	16,845	17,704	18,721	19,776	20,858	22,078	23,430	24,893	n.a.	n.a.
Memorandum:														
Gross Domestic Product	18,403	19,157	19,926	20,661	21,378	22,168	23,037	23,948	24,899	25,889	26,917	27,985	107,171	236,809

Budget Policies and Deficits at the State Level

Balanced budget requirement (BBR): Law forcing a government to balance its budget each year (spending = revenue).

ex-post BBR: government needs to balance its budget by the end of each fiscal year

ex-ante BBR: government needs to submit/pass a balanced budget at the start of each fiscal year, or both (easier to evade with rosy predictions)

California has ex-ante BBR: 2008 recession lowered tax revenue and forced cuts in government spending (now CA has built a rainy fund but still pretty small)

STATIC VS. DYNAMIC SCORING

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

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). Paul Ryan pushed for dynamic scoring (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

Intertemporal budget constraint: An equation relating the present discounted value of the government's obligations to the present discounted value of its revenues.

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

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

ALTERNATIVE MEASURES OF LONG-RUN GOVERNMENT BUDGETS

Long-run Fiscal Imbalance

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?

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

PROBLEMS WITH LONG-RUN FISCAL MEASURES

The fiscal imbalance calculations are fairly tenuous:

1) They depend critically on many assumptions about future growth rates in costs and incomes, and the interest rate used for discounting

⇒ Those assumptions become heroic for long-distance future (example: how will health care costs evolve?)

2) The calculations also assume that government policy remains unchanged (but if big imbalance arises, then government will typically be forced to act and fix it)

⇒ Makes most sense to consider a time window that is longer than 1 year but less than infinity

Actual Values and CBO's Projections of Key Economic Indicators

CBO projects that economic activity will expand at a pace this year and next that will lower the unemployment rate and place upward pressure on inflation and interest rates.



Source: Congressional Budget Office, using data from the Bureau of Economic Analysis, the Bureau of Labor Statistics, and the Federal Reserve.

PROBLEMS WITH LONG-RUN FISCAL MEASURES

Some programs are easier to project than others.

Example: social security retirement benefits are easier to project than medicare benefits

Social security benefits depend on demography and longevity (slow moving variables) \Rightarrow Social security does fairly reliable 75 year projections

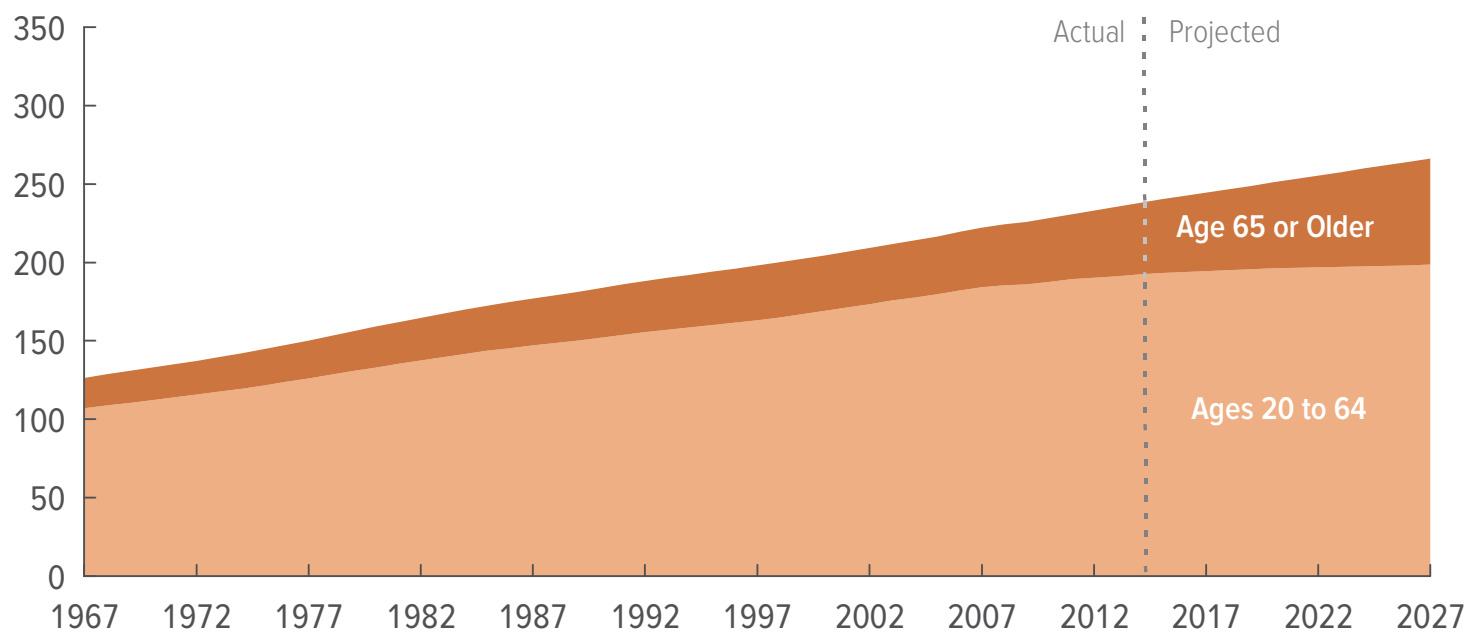
Medicare depends on growth of health care costs that have been growing very fast (before the Great recession) \Rightarrow such a rate of growth is not sustainable for ever so making a long-run projection based on those rates is not meaningful

CBO makes budget projections over the next 10 years in its official budget projection

Figure 1-6.

Population, by Age Group

Millions of People



The number of people age 65 or older in the United States—now more than twice what it was 50 years ago—is expected to grow by more than one-third over the next 10 years. Thus, enrollment in Social Security’s Old-Age and Survivors Insurance program and Medicare will continue to rise.

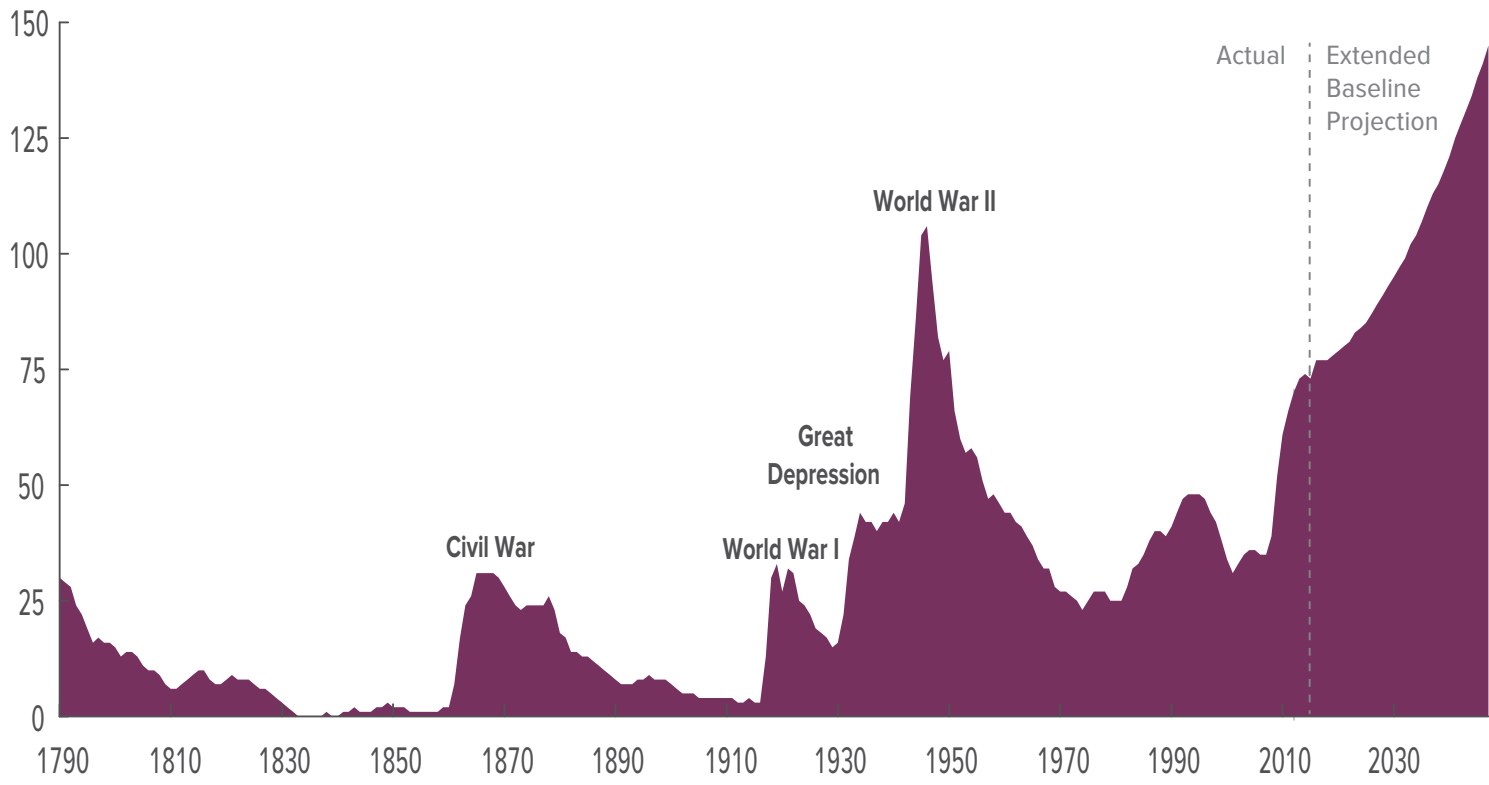
Source: Congressional Budget Office.

This figure shows actual data through calendar year 2014, the most recent year for which such data are available.

Figure 1-8.

Federal Debt Held by the Public

Percentage of Gross Domestic Product



High and rising federal debt would reduce national saving and income in the long term; increase the government’s interest payments, thereby putting more pressure on the rest of the budget; limit lawmakers’ ability to respond to unforeseen events; and increase the likelihood of a fiscal crisis.

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.

The extended baseline generally reflects current law, following CBO’s 10-year baseline budget projections through 2027 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period (in this case, through 2047).

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Short-Run Effects of the Govt on the Macroeconomy

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

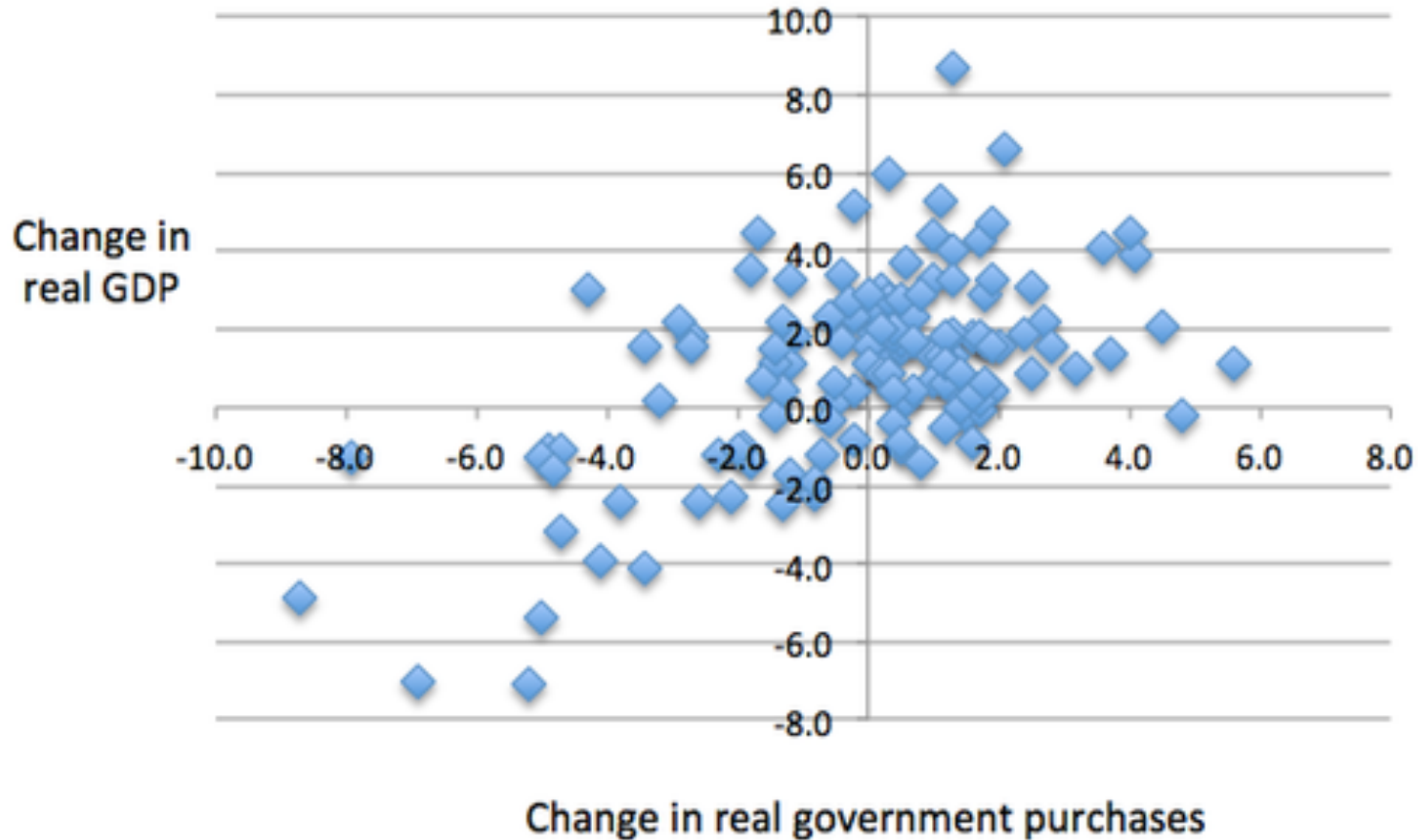
Short-run stabilization: Govt can use taxes and spending policies to smooth the peaks and troughs of the business cycle

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, unemployment insurance extensions)

⇒ Ability to run deficits in recessions is a great tool for short-run business cycle stabilization (but need to reduce debt during good times to keep ability to run deficits when needed)

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

LONG-RUN EFFECTS OF GOVERNMENT DEBT

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

savings = investment + new govt debt

With more government debt, if 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 reforming retirement and health care benefits?

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

Health care cost growth has slowed down sharply since 2008, substantially improving the long-term Federal budget outlook

REFERENCES

Jonathan Gruber, *Public Finance and Public Policy*, 2016 Worth Publishers, Chapter 4

Barro, Robert J. "Are government bonds net wealth?." *The Journal of Political Economy* 82.6 (1974): 1095-1117.(web)

Congressional Budget Office "The Budget and Economic Outlook: Fiscal Years 2018 to 2028", April 2018 (web)

Lynch, Robert 2015 "The benefits and drawbacks of using dynamic scoring in the federal budget", *Equitable Growth* (web)

Piketty, Thomas, *Capital in the 21st Century*, Cambridge: Harvard University Press, 2014, (web)