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 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.

Primary Deficit = Spending - Revenue

US Federal debt (held outside govt) is $24Tr around 100% of GDP, 2021 US deficit huge 14% ($3T) of GDP bc COVID

US government owns assets worth about 80% of GDP.
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 hover around their historical average as a share of the economy.


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 presented here 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.
ADDITIONAL INFORMATION ABOUT THE UPDATED BUDGET AND ECONOMIC OUTLOOK: 2021 TO 2031 JULy 2021

By contrast, revenues are projected to increase, from 16.3 percent of GDP in 2020 to 17.2 percent in 2021, close to their historical average of 17.3 percent (see Figure 1-3 on page 11).

Outlays

In CBO's projections, federal outlays in 2021 total $6.8 trillion—about $0.3 trillion (or 4 percent) more than the amount recorded in 2020. (Because GDP is projected to grow faster than outlays this year, outlays fall in relation to the size of the economy despite the increase in nominal terms.) Nearly all of that growth is attributable to mandatory outlays. Recently enacted legislation—primarily the American Rescue Plan Act of 2021 (P.L. 117-2, enacted on March 11, 2021)—increased projected outlays for this year by $1.1 trillion and, along with legislation enacted in 2020 in response to the pandemic, contributes significantly to keeping outlays in 2021 high by historical standards. (By comparison, in 2019, outlays totaled 21.0 percent of GDP, nearly 10 percentage points less than CBO projects for 2021.)

Mandatory Spending.

Mandatory, or direct, spending includes outlays for some federal benefit programs and for certain other payments to people, businesses, non-profit institutions, and state and local governments. Such outlays are generally governed by statutory criteria and are not normally constrained by the annual appropriation process. Certain types of payments that federal agencies receive from the public and from other government agencies (such as premiums paid by Medicare beneficiaries and payments made by federal agencies to employees' retirement plans) are classified as offsetting receipts and are accounted for in the budget as reductions in mandatory spending.

In CBO’s projections, total deficits and primary deficits shrink as a percentage of GDP for the next few years. Over the latter part of the projection period, growing primary deficits (which reflect underlying trends related to the aging of the population and the rising costs of health care) and rising net interest costs increase total deficits.

Data source: Congressional Budget Office. See www.cbo.gov/publication/57263#data.

Primary deficits exclude net outlays for interest.

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GDP = gross domestic product.
Federal Debt Held by the Public, 1940 to 2031

By 2031, federal debt held by the public is projected to exceed 106 percent of GDP—about equal to debt in 1946, when it was the highest it has ever been.

Data source: Congressional Budget Office. See www.cbo.gov/publication/57263#data.

GDP = gross domestic product.
GOVERNMENT DEBT SUSTAINABILITY

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

Debt/GDP stable when deficit less than GDP nominal annual growth \( g \)

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, \( r_t \simeq 1.5\% \) much lower than \( g_t = 5\% \)

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

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

⇒ 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
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 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)

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
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
% 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 exarcebates 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.

E.g. 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 $F_1$, $F_2$, $F_3$, ... in each future year, then the PDV is computed as:

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

If $F_1 = F_2 = .. = F$ then

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

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 debt around the world. Not clear how this will be resolved (inflation, taxes, less govt spending)
REFERENCES

Jonathan Gruber, Public Finance and Public Policy, 2019 Worth Publishers, Chapter 4


Congressional Budget Office “The Budget and Economic Outlook: Fiscal Years 2019 to 2029”, August 2019 (web)

Congressional Budget Office “An Update to the Budget Outlook: 2020 to 2030”, September 2020 (web)

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