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Principles of Economics and Management I

Session 12 · Fiscal Policy

Introduction



Where We Came From

The ECB has one lever. The state has the other: what it **spends** and what it **collects**.

Today we see how that lever works, and the trail it leaves behind: **public debt**. 

For anyone going into finance, this is the **sovereign debt** market.





Today's Map

1.  Revenue, spending and taxes
2.  Deficit and debt: do not confuse them
3.  The EU fiscal rules
4.  Multipliers and automatic stabilizers
5.  Debt dynamics and the r vs g rule

Part 1 · The Government Budget



Two Halves of the Budget

The government budget has two sides:



Spending: health, education, pensions, defense, public investment, interest on the debt.



Revenue: above all, **taxes**.



Types of Tax



On income: personal income tax (individuals), corporate income tax (firms).



On consumption: VAT, taxes on fuel and tobacco.

A tax can be **progressive** (the rate rises with income) or **regressive** (it weighs more on those with less).

 Source: OpenStax *Macro* 3e, [§17.2](#) “Taxation”, including “How does the marginal rate work?”; the spending side is [§17.1](#) “Government Spending”.



Deficit and Debt: Do Not Confuse Them

A very common confusion. They are different things:

Deficit: spending **minus** revenue **in one year**. It is a **flow**.

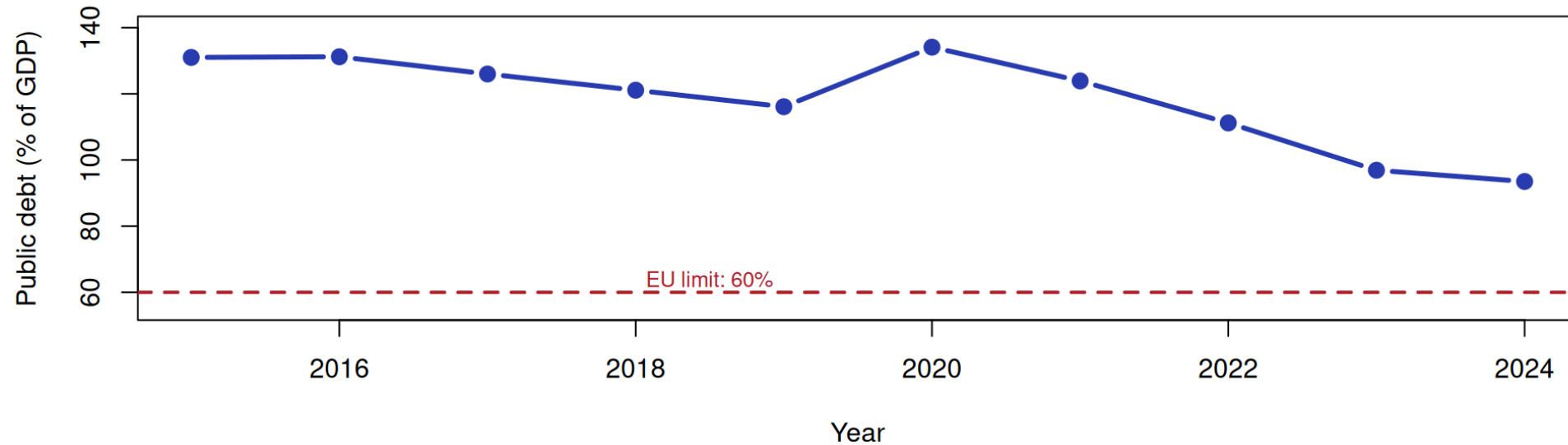
Debt: the accumulated sum of all past deficits. It is a **stock**.

Each year's deficit **adds** to the debt. 

 Source: OpenStax *Macro* 3e, §17.3 “Federal Deficits and the National Debt”, “What is the national debt?” and “The Path from Deficits to Surpluses to Deficits”.



How the Debt Grows



Portuguese public debt. The red line is the EU reference limit (60%). Source: Eurostat.

The EU Fiscal Rules

The **Stability and Growth Pact** sets reference values for euro area countries:

 **Deficit** below **3%** of GDP.

 **Debt** below **60%** of GDP (or on a downward path).

The idea: keeping public finances sustainable within a monetary union.

? Multiple Choice 1

A country runs a smaller deficit this year than last. Its public debt:

A. Still rises, just by less than it did last year.

B. Falls, since the deficit fell.

C. Stays constant.

D. Cannot be determined from any amount of information.

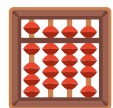
 **A.** A deficit is a **flow** added to the **stock**. Debt only falls when the flow turns into a surplus. Falling deficits shrink the rate of increase, not the level. (As a **share of GDP**, debt can still fall if growth outruns it, which is Part 3.)

? Multiple Choice 2

Under the Stability and Growth Pact, the 3 percent and 60 percent reference values apply respectively to:

- A. Debt and deficit, both as shares of GDP.
- B. Deficit and growth.
- C. Deficit and debt, both as shares of GDP.
- D. Inflation and debt.

☒ **C.** 3 percent caps the **flow** (deficit), 60 percent the **stock** (debt), or a credible path down toward it. Getting them the wrong way round is the standard slip.



Numerical Question

A country has GDP of 200 billion euros, public spending of 90 billion and revenue of 84 billion.

- a) Compute the deficit in euros.
- b) Express it as a percentage of GDP.
- c) Does it meet the 3 percent reference value?
- d) Debt is 150 billion. What is the debt ratio, and what will it be next year if nominal GDP grows 4 percent and the deficit repeats?



Solution

a) $90 - 84 = 6$ billion euros.

b) $6/200 = 3\%$.

c) Exactly at the limit: it complies, with nothing to spare.

d) Now $150/200 = 75\%$. Next year debt is 156 and GDP is 208, giving $156/208 = 75\%$.

Unchanged, because growth absorbed the new borrowing. That is the whole idea behind Part 3. 

Part 2 · Multipliers and Stabilizers



The Fiscal Multiplier

One euro of public spending generates **more** than one euro of output. Why?

Whoever receives that euro spends a fraction of it, the marginal propensity to consume c . That becomes someone else's income, who spends again.

$$\text{Multiplier} = \frac{1}{1 - c}.$$



The Fiscal Multiplier

With a propensity to consume $c = 0.8$, the chain is
 $1 + 0.8 + 0.8^2 + \dots$

$$\sum_{k=0}^{\infty} c^k = \frac{1}{1 - c} = \frac{1}{0.2} = 5.$$

Each euro of spending generates **5 euros** of output, in this simplified case. 

 Source: OpenStax *Macro* 3e, §17.4 “Using Fiscal Policy to Fight Recession, Unemployment, and Inflation”, “Expansionary Fiscal Policy” and “Contractionary Fiscal Policy”.

Why the Real Multiplier Is Much Smaller

Five is an upper bound from a model with no taxes, no imports and no central bank. Put those back:

 **Taxes.** Part of each round of income goes to the state, so the chain becomes $1/(1 - c(1 - t))$.

 **Imports.** Part of each round is spent abroad and stimulates somebody else's economy: subtract the marginal propensity to import m .

$$\text{Multiplier} = \frac{1}{1 - c(1 - t) + m}$$

With $c = 0.8$, $t = 0.3$ and $m = 0.3$: about **1.1**, not 5. Small open economies leak, and Portugal is a small open economy. 



And It Is Not a Constant



Monetary offset. If the central bank responds to the stimulus by raising rates, it cancels part of it. The multiplier depends on what the ECB does next.



Except at the lower bound. There the central bank cannot offset, so multipliers are **larger**, and estimates well above the 1.1 of the previous slide become plausible.

“The multiplier” depends on openness, taxes, the state of the cycle and monetary policy: there is no single figure that applies everywhere.



Crowding Out

The multiplier has one important brake.

If the state finances itself with debt, it raises the demand for funds and pushes the **interest rate up**.

Crowding out: higher rates reduce private investment, offsetting part of the stimulus.

 Source: OpenStax *Macro* 3e, §18.4, “Crowding Out Physical Capital Investment” and “The Interest Rate Connection”; §18.1 puts the same idea in the national saving and investment identity.



Automatic Stabilizers

Some mechanisms act **on their own**, with no new decision.

In a recession, unemployment benefits rise and taxes fall **automatically**.

This cushions the fall without the government having to approve anything. It is a built-in shock absorber. 

 Source: OpenStax *Macro* 3e, [§17.5](#) “Automatic Stabilizers”, “Counterbalancing Recession and Boom”, which also explains the standardized employment deficit: what the balance would be at full employment.



The Limits of Fiscal Policy



Lags: deciding, approving and implementing takes time. The stimulus can arrive late.



Debt: successive deficits raise the debt and the interest to be paid.



Crowding out: more public demand for credit can raise rates and reduce private investment.

 Source: OpenStax *Macro* 3e, [§17.6](#) “Practical Problems with Discretionary Fiscal Policy”: “Long and Variable Time Lags”, “Temporary and Permanent Fiscal Policy” and the political constraints.

? Multiple Choice 3

The same stimulus is applied in a large closed economy and in a small open one. The multiplier will be:

- A. The same, since $1/(1 - c)$ does not mention openness.
- B. Larger in the small open economy, because it is more flexible.
- C. Impossible to compare across countries.
- D. Smaller in the small open economy, because part of each round leaks into imports.

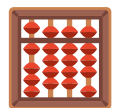
 **D.** Every euro spent on imports stimulates somebody else's economy. Add taxes and the leak is bigger still:

$1/(1 - c(1 - t) + m)$ falls fast as m rises.

? Multiple Choice 4

Crowding out describes:

- A. Lower taxes raising consumption.
- B. Deficits raising the interest rate and reducing private investment.
- C. The central bank lowering rates.
- D. Convergence across countries.
- ☒ **B.** Debt financing raises rates and crowds out private investment.



Numerical Question

The marginal propensity to consume is $c = 0.75$ and the state raises spending by 2 billion euros.

- a) Compute the naive multiplier and the effect on output.
- b) Now add a tax rate $t = 0.3$. Recompute.
- c) Now add a marginal propensity to import $m = 0.25$.
Recompute.
- d) Which of the three answers would you use for Portugal, and why?



Solution

- a)** $1/(1 - 0.75) = 4$, so the effect is $4 \times 2 = 8$ billion euros.
- b)** $1/(1 - 0.75 \times 0.7) = 1/0.475 \approx 2.11$, so about 4.2 billion. Taxes alone nearly halved it.
- c)** $1/(1 - 0.525 + 0.25) = 1/0.725 \approx 1.38$, so about 2.8 billion.
- d) (c)**, and even that is generous. Portugal is small and very open, so the leak into imports is large. Add a central bank that may tighten in response, and the realistic figure sits near one.



Part 3 · Debt and Sustainability



Debt Dynamics

What makes the debt (as a % of GDP) rise or fall? One central equation:

$$\Delta b = (r - g) b - s.$$

b is debt over GDP, r the real interest rate, g real growth and s the **primary balance** (the surplus before interest).



Debt Dynamics

If $r > g$: interest grows faster than the economy. The debt tends to **rise**, and needs surpluses to stabilize. ⚠️

If $r < g$: the economy grows faster than the interest. The debt tends to **dilute** over time. 

This is why growth and interest rates are decisive for sustainability.

Three Warnings About $r < g$

Between roughly 2014 and 2021, $r < g$ across most of the euro area, and it was tempting to conclude that debt no longer mattered. Three reasons to resist.

r is not exogenous. It is a market price, and it responds to b . Borrow enough and the very condition you were relying on stops holding.

Debt has to be refinanced. A country with short maturities sees a rate shock arrive within a couple of years, not gradually. **Average maturity** is a risk variable in its own right.

It flips without warning. 2022 turned $r < g$ into $r > g$ in months. And the higher b is, the more each point of r costs. ⚡

So $r < g$ is an opportunity to reduce b , while it lasts.



Ricardian Equivalence

A provocative idea: perhaps deficits do **not** stimulate the economy.

Ricardian equivalence: if people anticipate that today's debt will be repaid with tomorrow's taxes, they save the tax cut instead of spending it.

In that extreme case, fiscal policy would have no effect on demand.

Why It Fails in Practice

Ricardian equivalence is a limiting case, rarely exact.

People have finite horizons, credit constraints and are not perfectly rational.

In practice, fiscal policy **does** have an effect, but a smaller one than the simple multiplier suggests. 

 Source: OpenStax *Macro* 3e, [§18.3](#) “How Government Borrowing Affects Private Saving”, which is the section on Ricardian equivalence and on how far the evidence supports it.



Sovereign Debt and Risk

When sustainability is called into question, investors demand higher rates.

Risk premium (spread): the extra interest a country pays relative to a safe issuer (Germany, for example).

This was at the center of the euro debt crisis (2010 to 2012), with spreads exploding in the periphery. 🔥

 Source: OpenStax *Macro* 3e, §18.2, “From Budget Deficits to International Economic Crisis”, which traces the same sequence from deficits to capital flight.



Ratings and Markets

Rating agencies assess a country's ability to pay, and the rating conditions the cost of its debt.

Deficit, debt, growth and fiscal credibility are everything a sovereign debt analyst watches. 

? Multiple Choice 5

Two countries both have $r - g = 1$ percentage point. One has $b = 40\%$ of GDP, the other $b = 130\%$. Compared with the first, the second needs a primary surplus that is:

- A. The same, since the gap $r - g$ is identical.
 - B. Smaller, since a large debt is diluted faster by growth.
 - C. Larger, because the snowball term $(r - g) b$ scales with b .
 - D. Irrelevant, since only the 3 percent deficit rule matters.
- ✓ **C.** Stabilizing requires $s = (r - g) b$: that is 0.4 percent of GDP for the first country and 1.3 percent for the second. The same rate shock is a far heavier lift at high debt, which is exactly why the level matters.

? Multiple Choice 6

Ricardian equivalence suggests that a debt financed tax cut:

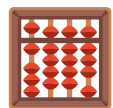
A. May be saved rather than spent, if households anticipate the future taxes.

B. Always raises consumption one for one.

C. Eliminates the debt on its own.

D. Lowers the interest rate.

✓ **A.** It is a **limiting case**, and it needs infinite horizons, no credit constraints and full rationality. Households facing a binding credit constraint spend the cut, which is why the effect is damped in practice rather than zero.



Numerical Question

Debt $b = 100\%$ of GDP, real rate $r = 3\%$, growth $g = 1\%$, primary balance $s = 1\%$ of GDP.

- a) Does the debt ratio rise or fall this year, and by how much?
- b) What primary balance would exactly stabilize it?
- c) Growth recovers to $g = 4\%$, everything else unchanged. Redo (a).
- d) In case (c), what does the sign of the change tell you about austerity versus growth?



Solution

- a) $\Delta b = (0.03 - 0.01)(1.0) - 0.01 = +0.01$, so it **risers by 1 point** of GDP.
- b) Set $\Delta b = 0$: $s = (r - g) b = 0.02$, a primary surplus of **2 percent** of GDP.
- c) $\Delta b = (0.03 - 0.04)(1.0) - 0.01 = -0.02$: the ratio **falls by 2 points**, with no change in the budget at all.
- d) Growth reduced the debt ratio with no change in the budget at all. But note the trap: austerity that cuts g can raise b , which is the core of the euro crisis debate. 

Wrap-Up

What to Take From This Session

 The **deficit** is an annual flow; the **debt** is the accumulated stock. Do not confuse them.

 The **multiplier** amplifies public spending, but crowding out can shrink it.

 Debt as a percentage of GDP is sustainable if $g > r$: the economy grows faster than the interest.

 This is where **credit ratings** and sovereign risk premia come from.



To Review

OpenStax *Macro* 3e, the sections this session used:

- **Ch. 17, Government Budgets and Fiscal Policy:** [§17.1](#) · [§17.2](#) · [§17.3](#) · [§17.4](#) · [§17.5](#) · [§17.6](#)
- **Ch. 18, The Impacts of Government Borrowing:** [§18.1](#) · [§18.2](#) · [§18.3](#) · [§18.4](#)

For the formal treatment: Blanchard, Amighini and Giavazzi, chapters 3, 5, 22 and 23.

Then problem set 12.

Next Session

The Open Economy.

What is still missing is the rest of the world: trade, exchange rates and capital flows. 

See you next week. 