Public Spending

Macroeconomics I
Professor: Roberto Urrunaga
Teaching Assistant: Francisco Arizola*

Introduction: We now turn to the third component of aggregate demand: public spending. We will study fiscal accounts, fiscal policy, Ricardian equivalence, crowding-out effects, and other key concepts related to this component.

1. Fiscal Accounts

The analysis of public spending begins with a structured presentation of the fiscal accounts of the General Government. This section summarizes the main components of revenues, expenditures, and how they combine to generate the primary result and the overall fiscal result.[1]

1.1. General Government Revenues

Revenues are divided into two main categories:

- **Tax Revenues:** These include income from taxes such as the Income Tax (IR), the General Sales Tax (IGV), the Selective Consumption Tax (ISC), etc.
- **Non-Tax Revenues:** Other sources such as social contributions, royalties, and fees.

The sum of both is referred to as the Current Revenues of the General Government.

1.2. General Government Expenditures

Expenditures are divided into:

*Author of these notes. For questions or suggestions: fa.arizolab@up.edu.pe

[1]The presentation of fiscal accounts is based on the reports of *Operations of the Non-Financial Public Sector* prepared by the Central Reserve Bank of Peru. You can access the latest report by clicking here and selecting the most recent report on *Non-financial public sector operations*.

- **Current Expenditures:** Includes wages of public employees, purchases of goods and services, and current transfers.
- **Capital Expenditures:** Subdivided into *Gross Fixed Capital Formation* (infrastructure investment) and *Other capital expenditures*.

The sum of both is referred to as the Non-Financial Expenditures of the General Government.

1.3. Other Components

There are also other sources of income and operational results:

- **Capital Revenues:** Mainly proceeds from the sale of public assets.
- **Primary Result of State-Owned Enterprises:** Net profits generated by non-financial public enterprises.

The sum of both is categorized as Other.

1.4. Primary Result and Fiscal Result

From the elements above, we define:

- **Primary Result:** The operating result of the government excluding interest payments on debt:

  $$\text{Primary Result} \equiv \text{Current Revenues} + \text{Other} - \text{Non-Financial Expenditures}$$

  If Primary Result < 0, there is a **Primary Deficit**.
- **Fiscal Result:** Builds on the primary result by including financial expenses (i.e., interest payments on public debt):

  $$\text{Fiscal Result} \equiv \text{Primary Result} - \text{Interest Payments}$$

  If Fiscal Result < 0, we refer to it as a **Fiscal Deficit**.

These equations allow us to assess whether the General Government is operating sustainably. If there is a fiscal deficit, the government must issue debt to finance the gap. This debt is issued through sovereign bonds.

2. Crowding-Out Effect

When the government increases its spending—whether through higher public investment or increased current expenditures—it can generate a **crowding-out effect** on private investment or consumption. This phenomenon is known as *crowding-out*.

2.1. What is crowding-out?

It refers to the reduction in private spending in response to increased government spending. This can occur through several channels, the most classic being a rise in the real interest rate.

- If the government finances itself with debt, it increases the demand for loanable funds.
- This may push the interest rate (the price of loanable funds) upward.
- As a result, private consumption and investment decisions may be negatively affected.

Recall that private investment depends negatively on the interest rate:

$$I = I(r), \quad I' < 0$$

If the government increases spending financed by debt (i.e., a deficit), the resulting higher demand for funds drives r upward. Since $I' < 0$, this reduces private investment. In other words, public spending has *crowded out* private investment. The degree of crowding-out can vary — it may be null, partial, or complete depending on several factors, including the cyclical state of the economy, the magnitude of public spending, and how sensitive private investment is to interest rates.

It is crucial to consider the crowding-out effect when designing fiscal policy, as it reminds us that public spending does not occur in a vacuum and can induce indirect effects on the private sector that must be carefully evaluated.

3. Ricardian Equivalence

Ricardian Equivalence is a theoretical proposition stating that the method of financing public spending—either through current taxes or debt—is irrelevant for aggregate consumption and, therefore, for aggregate demand and output. It was initially proposed by David Ricardo and later formalized by Robert Barro in the 1970s.

The idea is simple: if the government cuts taxes today and finances the gap by issuing debt, rational individuals anticipate that future taxes will rise to repay that debt. Thus, instead of spending the extra disposable income today, they save it to cover future tax liabilities. As a result, aggregate consumption remains unchanged.

3.1. Necessary conditions

For Ricardian equivalence to hold, several strong assumptions must be satisfied:

- Agents are **rational and have the same time horizon as the government**.
- Financial markets are perfect: no liquidity constraints and perfect information.
- Future fiscal policy is known and credible.
- Taxes are **lump-sum** (i.e., they do not distort individual decisions).

If any of these assumptions is violated, Ricardian equivalence breaks down. In practice, these conditions rarely hold all at once, so the equivalence is more of a theoretical benchmark than an empirical regularity. Nevertheless, the theory remains relevant as it offers useful insights into the design and effectiveness of fiscal policy.

3.2. Example in a two-period model

Suppose the government wants to finance public spending G in the first period. It has two options:

- Finance it with current taxes: charge a tax $T_1 = G$ in period 1 and $T_2 = 0$.
- Finance it with debt: set $T_1 = 0$ and charge $T_2 = (1 + r)G$ in period 2.

In the standard intertemporal model, the consumer faces the following budget constraint:

$$C_1 + \frac{C_2}{1+r} = (Y_1 - T_1) + \frac{Y_2 - T_2}{1+r}$$

In case 1:

$$C_1 + \frac{C_2}{1+r} = (Y_1 - G) + \frac{Y_2}{1+r}$$

In case 2:

$$C_1 + \frac{C_2}{1+r} = Y_1 + \frac{Y_2 - (1+r)G}{1+r} = Y_1 + \frac{Y_2}{1+r} - G$$

In both cases, the present value of available resources is the same: $Y_1 + \frac{Y_2}{1+r} - G$. Therefore, optimal intertemporal consumption is unchanged. A rational agent understands that a lower tax today implies higher taxes tomorrow and adjusts savings accordingly to keep consumption constant.

3.3. When does equivalence fail?

In practice, there are several reasons why Ricardian equivalence may not hold. Let's consider how each of the four assumptions may break:

- Agents do not share the same planning horizon as the government. If taxes are lowered today and raised after individuals are no longer alive, they will perceive the tax cut as a real increase in wealth and increase their consumption.
- **Liquidity constraints** exist: agents may be unable to borrow to smooth consumption. If taxes are raised and disposable income falls, these agents may be forced to reduce consumption.
- Taxes are distortionary: they affect other optimal decisions. For example, if the VAT is reduced today and increased tomorrow, this alters the relative price of current vs. future consumption, encouraging more consumption today.
- The government lacks fiscal credibility: If agents cannot predict future fiscal behavior with certainty, they are unable to properly assess how their wealth is affected.

Ricardian equivalence is a useful benchmark to understand how fiscal financing may or may not affect consumption. However, due to its restrictive assumptions, its practical applicability must be evaluated on a case-by-case basis. In many real-world situations, tax cuts today financed by debt do have effects on consumption and aggregate demand.

4. Public Debt and Sustainability

The analysis of fiscal sustainability revolves around the dynamics of public debt. The objective is to determine whether the government can maintain its fiscal policies without entering a path of explosive indebtedness, i.e., a continuously rising debt-to-GDP ratio.

4.1. Debt dynamics equation

Let B_t denote the public debt stock at the beginning of period t. Recall that sovereign debt issuance in a given period reflects the fiscal deficit. The fiscal deficit in period t is given by:

$$\text{Deficit}_t = B_{t+1} - B_t = i_t B_t + G_t - T_t$$
$$\text{Deficit}_t = B_{t+1} - B_t = i_t B_t + \text{Primary Deficit}_t$$

Where:

- G_t: public spending (current and capital)

- T_t: current revenues
- $i_t B_t$: interest payments on debt
- Primary Deficit$_t$: deficit excluding interest payments

When discussing public debt sustainability, it is common to express the variables as a share of GDP. For instance, a debt of US$100 million is relatively small if GDP is US$2,174 million. Define:

$$b_t \equiv \frac{B_t}{Y_t}, \quad dp_t \equiv \frac{D_t}{Y_t}$$

Dividing by Y_t:

$$\begin{aligned}
\frac{B_{t+1}}{Y_t} - \frac{B_t}{Y_t} &= \frac{i_t B_t}{Y_t} + \frac{\mathrm{DP}_t}{Y_t} \\
\frac{B_{t+1}}{Y_t} \cdot \frac{Y_{t+1}}{Y_{t+1}} - b_t &= i_t b_t + dp_t \\
b_{t+1} \cdot \frac{Y_{t+1}}{Y_t} - b_t &= i_t b_t + dp_t \\
b_{t+1}\gamma - b_t &= i_t b_t + dp_t
\end{aligned}$$

Where $\gamma = \frac{Y_{t+1}}{Y_t}$ is the GDP growth rate. For debt to be sustainable, it should not grow relative to GDP, i.e., $b_{t+1} = b_t$. Imposing this and rearranging:

$$\begin{aligned}
dp_t &= \gamma b_t - b_t - i_t b_t \\
dp_t &= -(i_t - \gamma) b_t
\end{aligned}$$

This is the debt sustainability condition.

4.2. Interpretation

In the long run, we can assume that the economy's growth rate is relatively low, so $i_t > \gamma$. Therefore, to maintain a positive debt-to-GDP ratio $b_t > 0$, the sustainability condition requires the existence of a primary surplus (to make the equation's signs consistent). Additionally, three key insights emerge:

- A higher debt-to-GDP ratio requires a larger primary surplus.
- A higher interest rate also requires a larger primary surplus.
- A higher economic growth rate allows for a smaller primary surplus.

In other words, debt sustainability depends not only on the debt level, but also on GDP growth, the primary fiscal balance, and the cost of debt.

5. Fiscal Policy

Fiscal policy plays a fundamental role in both the short and long term. In the short run, it can be used as a tool for macroeconomic stabilization. In the long run, it should be designed to minimize distortions and ensure fiscal sustainability. This section addresses both roles.

5.1. Countercyclical fiscal policy

A **countercyclical fiscal policy** implies increasing public spending during recessions and doing the opposite during expansions. The goal is to smooth the business cycle and stabilize output and employment.

- In a recession, a higher fiscal deficit (due to increased spending) may help boost aggregate demand.
- In an expansion, a surplus (or reduced spending) may help cool down the economy or build fiscal space for future downturns.

This logic is based on Keynesian principles. Note that the key word here is *may*. A larger fiscal deficit does not guarantee a boost to aggregate demand (due to crowding-out or Ricardian equivalence), and a surplus does not guarantee cooling or sufficient space for future crises. The crucial idea is that governments should accumulate fiscal space in good times to be able to act in bad times.

5.2. Tax Smoothing

A fundamental principle in optimal fiscal theory is **tax smoothing**: taxes should remain stable over time to minimize their distortionary effects.

- Frequent or abrupt changes in tax rates negatively affect investment, labor, and consumption decisions.
- To finance temporary spending (e.g., war, pandemic, or recession), it is better to borrow and repay over time with stable taxes.

Formally, the government should choose a tax path that minimizes welfare losses subject to an intertemporal solvency constraint. If taxes generate convex (increasing) marginal losses due to distortions, then constant taxes are optimal.

5.3. Distortionary taxes

In practice, most taxes are **distortionary**. A distortionary tax is one that affects agents' decisions. Some examples:

- Income tax → discourages labor supply due to lower disposable income.
- Corporate profit tax → reduces incentives to invest.
- VAT (consumption tax) → if it changes over time, it can affect the intertemporal allocation of consumption.

These distortions create **efficiency losses** (deadweight loss). Therefore, the tax system should aim to be as non-distortionary as possible. This allows better planning by economic agents and a more stable allocation of resources. A well-designed fiscal policy can smooth the economic cycle and foster confidence among economic agents.