3. Fiscal Policy

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The **public budget** simultaneously fulfils the three functions of **allocation**, **stabilisation**, and **redistribution** analysed in Chapter 1. In spite of this, the **notion of fiscal policy** usually refers to the **stabilisation function**, and can thus be defined as the set of decisions or rules regarding taxes and public expenditures for purposes of **dampening the fluctuations** of the economic cycle in order to keep unemployment close to its equilibrium value and thus avoid the build-up of deflationary or inflationary pressures (Samuelson, 1948).

Under this definition, **fiscal policy** emerges as a **twentieth-century invention** that owes considerably to the thinking of **John Maynard Keynes**. But it owes even more to the **general rise of the share of public expenditures in GDP** as a consequence of the generalization of government finances of social insurance, welfare, and education. Since World War II, governments in all countries have thus been transformed from an irrelevant macroeconomic player into a **major contributor to aggregate demand**.

Toward the end of the twentieth century, theoretical and empirical **doubts** surfaced about the **effectiveness of fiscal policy** as a stabilization tool. Experiences with **failed** fiscal expansions and fiscal consolidations in several countries as well as **policy-philosophy reversals** have created a theoretical and empirical ground for the reconsideration of old issues and exploration of new ones.

A **number of questions** have been raised concerning **fiscal policies**. Are **fiscal expansions** effective, mainly when **public debt** reaches a high level? Conversely, does **fiscal contraction** always have a recessionary effect on

demand? Is it possible and desirable to conceive, and use efficiently, **fiscal policy principles and rules**? Who eventually **pays** the **public debt**? After, 2008, **further questions** came to the fore in the wake of the financial and economic **crisis**, as **fiscal policy** was rehabilitated as a **key prescription** of the policy response: How big should **fiscal stimulus** package be? Should they rely on **tax cuts** or **spending increases**? For **how long** should they be maintained? How to keep a **sustainable debt** along the time? These are today some of a number of questions.

Note of Observation:

1. **For points 3.1 (Issues), 3.2 (Theories), and 3.3 (Policies), please follow the power points written by Benassy. Here don't pay much attention to the mathematics of debt sustainability (pp. 27, 28, 29, and 30).**
2. **Where the power points are not clear, complement your study by reading Chapter 3 of the recommended manual.**
3. **For Section 3.3 (Policies), it is better to follow the OECD AT 50 paper (2011) discussed in the tutorial class.**
4. **The Keynesian IS-LM approach must be studied from any manual of macroeconomics, or from the power points that is here included.**

3.1 Issues

3.1.1 What is all about?

a) What is a budget?

A ***public budget*** is a document that specifies the origin and volume of both **income** ("receipts") and its **intended spending** over a certain time horizon (usually a year). **Receipts** consist of income from direct and indirect taxation, social insurance contributions, revenues from – and possibly disposal of – public assets or sale of public services. **Spending** is made on activities such as defense, police, education, research, support to the economy, social policy, health, foreign policy, development assistance, and so on. Budgets are drafted at different levels of government, from municipalities to central governments, but the stabilization function is usually mainly shouldered by the central government.

Due to a number of reasons explained elsewhere, presently countries attempt to reduce the **public budget deficit**. Independently of any international obligation, some countries have adopted internal, more-or-less-binding fiscal rules, such as the **balanced budget rules** adopted by several US states, the ***golden rule of public finance*** adopted by Germany in the 1970s and by the UK in the 1990s stipulating that, in principle, only investment expenditures can be financed through debt, or the obligation, as prescribed in the German constitution in 2009, to limit the federal deficit to 0.35% of GDP over the cycle starting in 2016.

Because a large proportion of the budget is devoted to civil servant compensation and pensions, and core government missions such as security and justice, and because some expenditure categories (infrastructure, defense) are subject to multi-year programming, the freedom degree for fiscal policymakers is generally limited in the short run, which makes it difficult, for instance, to rapidly reduce public indebtedness, unless by selling government assets.

Moreover, given the length of the decision process, **fiscal policy** is difficult to use for counter-cyclical purposes, especially when decisions have to be taken outside the normal yearly budgetary process. In fact, both **monetary and fiscal policies** affect economic activity after a lag, but for different reasons. The impact of **monetary policy** is delayed due to fixed-rate indebtedness of households and firms, imperfect reaction of long-run interest rates, or lagging reaction of the banking sector. Conversely, **fiscal policy** has immediate impact on demand through public consumption and investment, or through households' disposable income, but the fiscal decision process is much longer than the monetary one because it requires several instances of negotiation within the government and with parliament. While some models treat fiscal and monetary policies in similar ways, these policies neither have the same flexibility nor the same reactivity.

The ***fiscal (or budgetary) balance*** is the difference between income and expenditure. Fiscal balance can also be calculated by excluding some categories of expenditures. Importantly, the ***primary balance*** excludes interest payments on public debt (cf. box 3.1); the UK government also publishes a **current fiscal balance** that excludes public investment spending.

There is a ***fiscal (or budget) surplus*** when the budget balance is positive and a ***fiscal (or budget) deficit*** when the balance is negative.

b) Deficit finance

Leaving out the option of selling assets, **deficits need to be financed**, either by borrowing from the national central bank, which amounts to creating money, or by borrowing from other public and private agents, including international organizations or foreign governments.

The ***monetization of the deficit*** consists of an overdraft or a loan granted by the central bank to the government that increases the money supply. This mechanism is a powerful source of inflation.

This link between **deficit finance** and **inflation** has led to explicit or implicit restrictions on how governments can borrow from their central bank. It is, for example, the reason why euro areas Treasuries are forbidden to seek funding from the European Central Bank or any of the national central banks. Such restrictions are now **widespread**. Hence, public deficits need to be financed in other ways, at least in normal times.

In advanced economies, ***public borrowing*** consists in selling **debt securities** to investors giving them the right, for a given period of time, to payments in capital and interest specified by the associated debt contract (box 3.1). In many emerging economies, governments also borrow from banks and from international institutions such as multilateral development banks.

Accumulated borrowing constitutes ***public debt***. Public debt represents the financial liabilities of the public sector in relation to private actors. It should not be confused with **external debt**, which represents the liabilities of all domestic actors relative to the rest of the world.

[Cf. Box 3.1, pp 158/159; we will write the text]

Central banks typically hold **Treasury bonds** as one of the counterparts of money; they buy (or accept as collateral in repurchase agreements, see Chapter 4) these securities from banks in exchange for providing liquidity. This mechanism differs from outright monetization of the deficit, since the central bank is not mandated by the government to buy or sell these securities and the amounts derive from monetary policy, not fiscal policy considerations.

Debt-financed public spending may still invite indirect or *ex post* monetization. For example, if the central bank aims at stabilizing the interest rate, a debt-financed fiscal deficit will induce money creation. A

government whose debt, held in the form of fixed-interest bonds, is perceived to be too high is often tempted – when the central bank is not fully independent – to engage in inflationary policies that will in effect devalue the debt and reduce the real value of the debt service (capital and interest).

c) Measuring the fiscal imbalance

The most widespread concept of **fiscal balance** focuses on the general government balance that consolidates central government, local governments, social insurance, and when appropriate, federal states. This is a coherent perimeter as it includes all agents whose income mainly comes from tax payments and mandatory contributions, while allowing for different degrees of decentralization. Most international comparisons rely on this concept.

Total fiscal balance also called ***net lending*** or ***financial balance***, is the difference between the income of the public sector and its expenditure. It represents the borrowing need of the government. The financial balance includes the **interest paid on public debt**. For example, the Belgian and Italian governments had to pay more than 10% of GDP as interest charges on the public debt in the early 1990s. Interest charges depend on the debt level and on long-term interest rates, two variables that, in the short run, are not in governments' hands. A better indicator of the deliberate fiscal action of government and of parliament is the **primary balance**, defined as **financial balance excluding interest payments**:

Financial balance (net lending) = primary balance - interest payment

or

Financial balance (net lending) = income – expenditure (interest payment not included) – interest payment

As we shall see shortly, primary deficit is a good measure for the understanding of the **dynamics of debt**.

A **general pattern** of fiscal balances [i.e. the difference between receipt and expenditure] is that they tend to rise when economic activity booms and to decline when it is slowing down. This is because most tax bases move in line with economic activity (for instance, VAT revenues depend on final consumption) whereas some components of public spending (e.g., unemployment benefits) slowdown in economic booms. This spontaneous

variation of fiscal balances – known as the ***automatic stabilizers*** – has a stabilizing effect on households' aggregate income since taxes paid, net of social transfers, increase during economic expansions, while the reverse occurs during downturns, without any policy change.

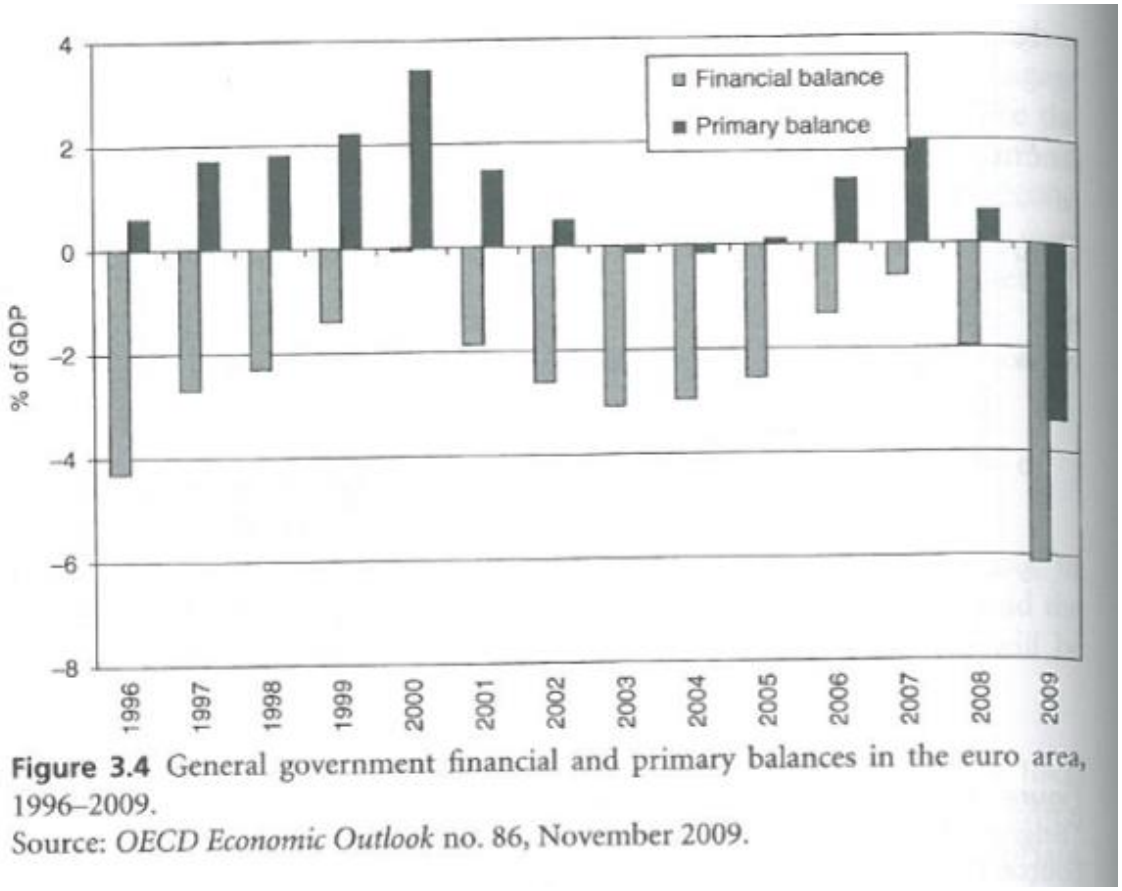

Figure 3.4 General government financial and primary balances in the euro area, 1996–2009.
Source: *OECD Economic Outlook* no. 86, November 2009.

In order to capture changes [effects of] in fiscal policy, it is therefore useful to calculate a ***cyclically adjusted balance*** (also called ***structural balance***) that measures what the financial balance would be, should output be at its potential level (cf. box 3.2). The change in the cyclically adjusted balance from one period to next is generally regarded as providing a measure of the ***discretionary*** component of fiscal policy because, in contrast to changes resulting from the automatic stabilizers, it results from a government decision. The evolution of the financial balance thus decomposes into a **cyclical component**, independent of the government's will, and a **discretionary component**, equal to the variation of the **structural balance**. The discretionary component provides a measure of the ***fiscal attitude***, i.e., of the orientation of fiscal policy.

Financial balance (net lending) = cyclical balance + cyclically adjusted balance, or

Financial balance (net lending) = cyclical balance + structural balance.

This measure of fiscal stance is the main indicator used by economists to shed light on policy debates. However it raises a host of **technical debates** related to the difficulty of measuring the **output gap** and the **elasticity of government expenditures and receipts** to the level of economic activity. For example, the change from one year to the next in the cyclically adjusted balance is meant to represent discretionary policy actions, but it often does not match **estimates** based on actual decisions regarding tax and spending – the difference sometimes being wide. Therefore, the concept of structural balance is an important one for policy discussions, but estimates are far from being perfectly reliable guides for policy decisions.

Box 3.2 Calculating the Structural (Cyclically Adjusted) Public Balance

The structural (or cyclically adjusted) public balance is the public balance that would obtain had GDP been at its potential level. To calculate it, the first step is to assess the position of the economy in the business cycle, as measured by the output gap, i.e., the divergence of production y from its potential level $\bar{y}$ (both variables being in logarithm). Then, it is necessary to estimate, from past observations, the average sensitivity of the financial balance s, measured as a percentage of the GDP, to a variation of the output gap:

(B3:2.1) $$\varepsilon = \frac{ds}{d(y-\bar{y})} > 0$$

The final step is to subtract the cyclical component $\varepsilon(y - \overline{y})$ from the financial balance s to get the cyclically adjusted, or structural, balance s^*:

(B3.2.2) $$s^* = s - \varepsilon(y - \bar{y})$$

The measure of s^* naturally depends on the method used to calculate potential output (cf. Chapter 1) and on the estimation of ε which is thought to be close to 0.5 in the four major euro area countries (Germany, France, Italy, Spain), and close to 0.7 in Finland and 0.8 in The Netherlands. When ε = 0.5, a 1% decline of the output gap mechanically raises financial balance by about 0.5% of GDP.

It can be useful to combine the **two decompositions** of the deficit (financial/primary, financial/structural) to calculate a *structural primary balance* (because governments mostly borrow at a fixed interest rate), one can write:

Financial balance (net lending) = cyclical primary balance + structural primary balance – interest payments on the debt.

Like the financial balance, however, primary and structural balances include a number of a number of non-recurrent, large one-off fiscal operations such as privatization proceeds. These one-off operations undermine the accuracy of structural balances as indicators of the fiscal stance. For that reason, the OECD has introduced in 2008 a new indicator, the ***underlying fiscal balance***, which measures cyclically adjusted fiscal deficits adjusted for one-off operations. In the same spirit, the OECD also publishes underlying primary fiscal balances. The above relation thus becomes:

Fiscal balance (net lending) = cyclical primary balance + one-off operations + underlying primary balance – interest payments on the debt.

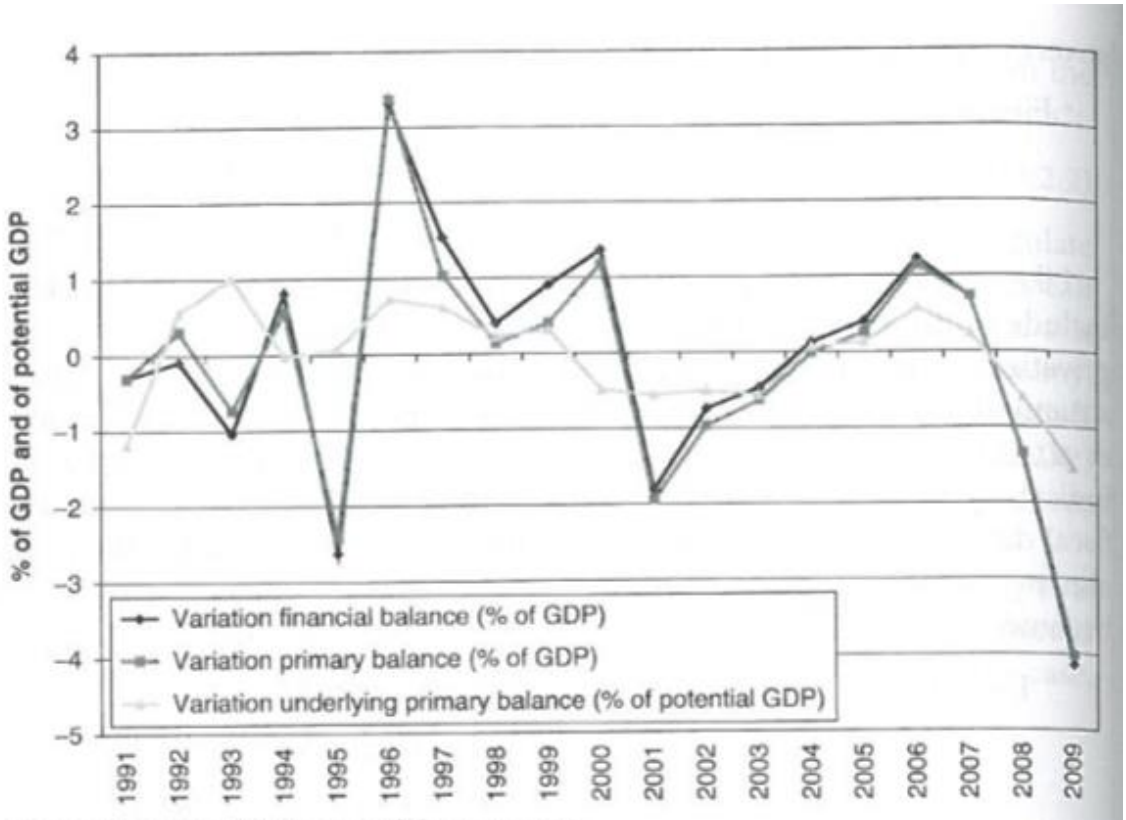

Figure 3.5 Fiscal balances of the euro area.
Source: *OECD Economic Outlook* no. 86, November 2009.

Figure 3.5 illustrates the usefulness of these decompositions in the case of the euro area.

d) Public debt

Like private companies (but unlike households), the public sector need not repay its debts entirely because it is not expected to die. If **debt grows too rapidly**, however, investors who buy debt securities may become concerned about the future capacity of the government to raise new financing; hence some doubts may arise about the **solvency** of the public sector. As seen before (cf. Box 3.1), such doubts may push up the interest rate at which the government borrows. However, the same rate of debt accumulation will not have the same meaning in a low-growing country as in a fast-growing country, because the capacity of the government to raise taxes broadly depends on nominal GDP. Therefore, public debt is generally measured as a ratio to GDP. As detailed in box 3.3, the same primary deficit leads to faster debt accumulation the higher the real interest rate and the lower the GDP growth rate. When **the growth rate is higher than the interest rate**, a country can stabilize its debt ratio even while maintaining a permanent primary deficit. Conversely, when the interest rate is higher than the growth rate, there must be a primary surplus to stabilize the ratio of debt to GDP; and the larger the (positive) difference between the interest rate and the growth rate, the larger the necessary primary surplus.

Figure 3.6 provides an illustration of this arithmetic: In the 1990s, the US and France both experienced large fiscal deficits; but the debt-to-GDP ratio increased continuously in France while it stabilized in the US. The reason why deficits of similar relative magnitude in France and the US did not result in the same **debt dynamics** is that the US growth rate was higher than the French rate.

Like for private companies, the same debt dynamics may not have the same meaning, depending on what the borrowing resources are used for. For instance, financing new infrastructures may not worsen the long-term fiscal position of the government, for two reasons. First, additional infrastructure may raise GDP growth and hence curb the future debt ratio. Second, public infrastructures are assets that may be sold if necessary at a later point in time. This second reason suggests another way to assess public debt: By comparing it to public assets. Table 3.1 provides calculations of the ***net public debt*** (i.e. the difference between the ***gross public debt*** measured at market value and the value of public assets) for a few countries. Unsurprisingly, the net debt ratio is generally much lower than the gross

one. It is sometimes even negative, meaning that public assets exceed public debts.

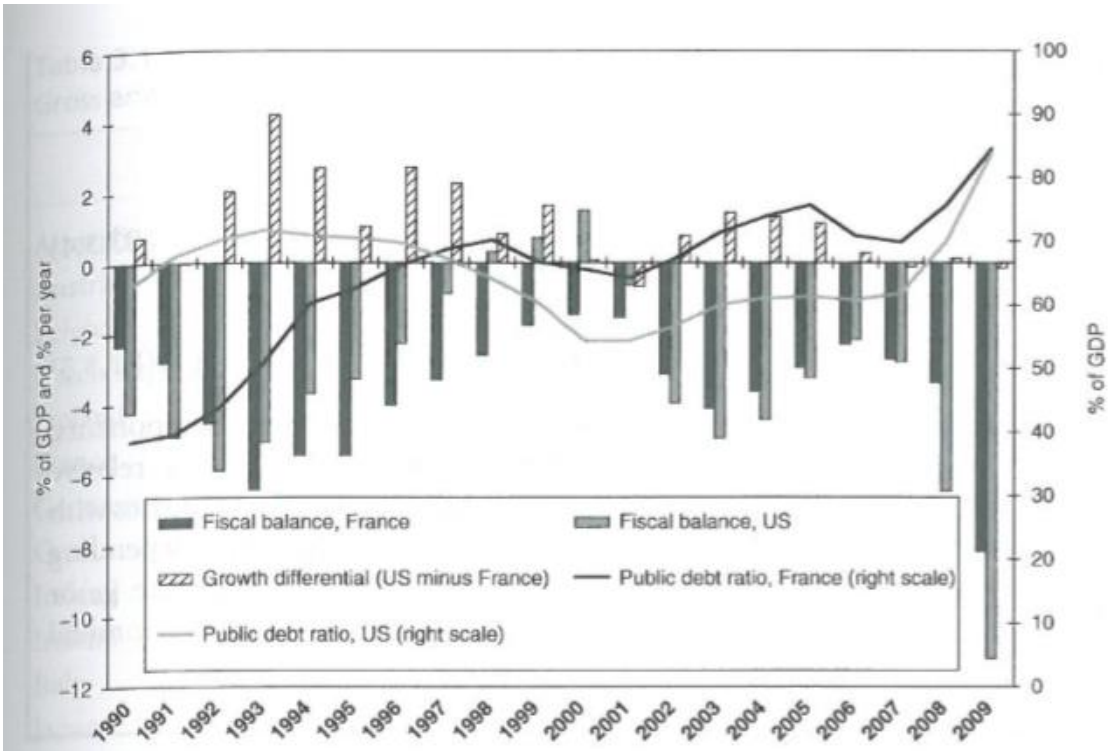

Figure 3.6 Debt dynamics in France and the US.
Source: *OECD Economic Outlook* no. 86, November 2009.

Table 3.1
Gross and net public debt ratios in selected OECD countries in 2009 (% of GDP)

	Gross debt ratio	Net debt ratio
Australia	19.2	−3.8
Austria	70.3	37.2
Belgium	101.0	80.7
Czech Republic	42.1	−0.6
Finland	52.6	−63.2
France	86.3	50.6
Germany	76.2	48.3
Greece	119.0	87.0
Iceland	122.7	41.0
Ireland	70.3	27.2
Italy	128.8	101.0
Japan	192.9	108.3
Luxembourg	18.2	−46.1
Norway	49.2	−153.4
Portugal	87.0	57.9
Spain	62.6	34.8
Sweden	51.8	−23.4
UK	72.3	43.5
US	83.0	58.2
Euro area	86.3	53.8
OECD	90.3	51.5

Note: Gross debt ratios are measured by the OECD at market value and may thus differ from other figures quoted in this chapter, which are sometimes measured at face value.

Source: *OECD Economic Outlook* no. 87, April 2010.

Box 3.3 Public Debt Dynamics

Let us denote as D the **primary public deficit** and B the **public debt** at year-end, both in euros, and i the **nominal interest rate**. We neglect cash revenues or disbursements (such as asset sales and purchases) that may impact public debt for a given public deficit. We also suppose that debt is measured at face value and not at current market value, thus ignoring valuation effects. Such assumptions are not innocuous: In emerging countries, part of the public debt is US dollar-denominated, and exchange-

rate movements impact on debt dynamics.

Indexing by -1 the values of the preceding period, the **debt dynamics** can be written as:

(B3.3.1) $$B = (1 + i)B_{-1} + D$$

Denoting as *d* and *b*, respectively, the primary deficit and the debt ratio as a percentage of nominal GDP, *n* the nominal growth rate (growth in volume + inflation), *g* the real growth rate, π the rate of inflation and *r* the real interest rate, we have:

(B3.3.2) $$n = g + \pi$$

(B3.3.3) $$i = r + \pi$$

Debt dynamics can thus be expressed as:

(B3.3.4) $$b = \frac{(1+i)}{(1+n)} b_{-1} + d \cong (1 + i - n)b_{-1} + d \cong (1 + r - g)b_{-1} + d$$

or, equivalently:

(B3.3.5) $$b - b_{-1} = b_{-1}(i - n) + d = ib_{-1} + d - nb_{-1}$$

The variation of the debt ratio breaks up into three components: Interest payments on past debt, the primary deficit, and a relative diminution of the debt ratio through nominal growth. Two countries with similar primary deficit *d* will experience different dynamics depending on their real interest rate *r* compared to their real growth rate *g*, or equivalently, on their nominal interest rate *I* compared to their nominal growth rate *n*.

The use of net public debt is, however, debatable, since a number of public assets cannot be sold. Net debt ratios are therefore partial images of the government's financial position and they tend to give an unduly favorable image of its financial situation.

3.1.2 Lessons from history

A quick glance at history points to a **number of stylized facts**. We focus here on five of them:

1. A generalized practice of **public deficits** was developed in the 1970s.

2. It has resulted in growing **public debt** levels and, for some countries, in a deterioration of public debt to GDP ratios.
3. **Debt ratios** reached at the beginning of the twenty-first century were appreciably lower than some of the debt ratios experienced in the past, which could eventually be substantially reduced; the fiscal response to the severe economic crisis that started in 2008, however, resulted in a significant increase in debt ratios in many countries, of an unprecedented scale since the end of World War II.
4. The developments of the 1990s and 2000s reflect very different **philosophies** concerning the use of fiscal policy.
5. The **effects** of an active use of fiscal policy, whether toward expansion or contraction, are not stable either in time or in space.

For the explanation of these stylized facts, see the manual recommended, pp. 170-180.

3.2 Theories

John Maynard Keynes's *General Theory of Employment, Interest and Money* (1936) has provided, since its publication, the **conceptual framework** for the use of **fiscal policy** to influence the level of **aggregate demand**. Whereas the classical theory was primarily concerned about public finance solvency, in other words, about the debt ***stock***, Keynes's analyses focused on the role of ***flows*** of public receipts and expenditures in the determination of the aggregate macroeconomic equilibrium. By definition, however, debt results from the accumulation of deficits. Yet, this obvious fact was **consistently ignored** in the first three decades after World War II. It was only in reaction to an excessive reliance on fiscal policy in the 1970s, to the associated permanent deficits and to the resulting increase in public debt ratios, that **debt-related concerns** gradually came to the fore. In response to these concerns, economists developed **models** to represent **public debt dynamics** and their effects on the economy.

In this section, we first briefly sketch the **Keynesian theory** and the main criticisms of it. We then examine the **dynamics and sustainability of public debt**. We finally present **more-comprehensive approaches** that combine, in a single model, issues of debt sustainability and fiscal policy effectiveness.

3.2.1 Demand-side effects: Keynes and his critics

a) The Keynesian analysis

The **standard Keynesian approach** starts from the assumption of **price rigidity** or at least stickiness in the **short term**. This implies that prices do not adjust immediately to ensure macroeconomic balance. In other words, the supply of goods and services is elastic and macroeconomic balance – output and employment – is determined by the level of aggregate demand. When aggregate demand is insufficient, this results in the underemployment of production factors in the economy. A fundamental role of **macroeconomic policy** – be it fiscal or monetary – is to ensure that the level of aggregate demand is such that the economy remains at, or close to, a level corresponding to full employment.

In the elementary model, **nominal rigidity** is simply postulated, or it is regarded as a fact of life resulting from the existence of contracts specified in nominal terms. Since the 1980s, however, the so-called "New-Keynesian" economists have developed micro-founded models of nominal rigidities relying on optimizing behavior by individual agents. Another assumption is that households are somewhat myopic so that consumption depends on current income.

Under these conditions, **macroeconomic equilibrium** does not result from price movements; rather, it is determined by the level of aggregate demand. An exogenous variation in aggregate demand (a demand shock) results in a proportional variation in the level of output. The ratio between output variation and the initial exogenous variation of aggregate demand is called the ***Keynesian multiplier*** (Box 3.4).

Box 3.4 A Briefing on the Keynesian Multiplier

Suppose that household consumption C is a linear function of current income Y:

(B3.4.1) $$C = aY + b, \quad a, b > 0$$

The parameter a is the ***marginal propensity to consume*** (meaning that out of one additional dollar or euro of disposable income, households spend a and they save $(1- a)$).

Suppose that **supply is perfectly elastic**, so that output adjusts to the level

of aggregate demand at constant prices. The product market equilibrium is written as:

(B3.4.2) $$Y = C + \bar{I} + \bar{G}$$

where $\bar{I}$ and $\bar{G}$ are aggregate investment and government demand. Both are assumed to be **exogenous**.

Suppose the government increases public spending by one unit (and assume for the time being that there is no tax increase). This will initially lift output, and thus income distributed to households, by one euro. Out of this additional unit, 80 cents will be consumed and will lift output – thus disposable income – further. At the end of the process, the total increase in output is:

$$1 + a + a^2 + a^3 + \ldots = 1 + 0.8 + 0.8^2 + 0.8^3 + \ldots = 1/ (1\text{-}a) = 1/ (1\text{-}0.8) = 5$$

Hence, we have:

(B3.4.3) $$\Delta Y = {\Delta \bar{G}}/{(1 - a)}$$

In this example the **multiplier** is very large and fiscal policy is therefore extremely powerful. There are however many factors that may lower the multiplier:

1. Not all the all the additional income accrues to consumers. A fraction may be retained by firms in the form of retained earnings. Even disregarding this factor, another fraction is necessarily **taxed** away by the government. So equation (B3.4.1) needs to be rewritten as:

$$C = a\ (1 - t)\ Y + b$$

where *t* is the tax rate and the **multiplier** becomes $1/ [1 - a\ (1 - t)]$.

2. In an **open economy**, an additional euro of disposable income leads households to consume more of both domestic and imported products and firms to import more intermediate goods. Assuming that the **marginal propensity to import** *m* (meaning that an additional euro of income will lead to *m* euros of imports), the **Keynesian multiplier** becomes:

$$1 / [1 - a\ (1 - t) + m]$$

3. The assumption of complete **price rigidity** is extreme. If prices adjust upward, part of the increase in demand does not result in an increase of the ***volume*** of products consumed but in an increase in their price. This especially applies over time, as prices adjust gradually.

4. The **central bank** may respond to an increased demand for products with a less accommodative monetary policy and engineer a rise in the **interest rate**. In this case investment demand (from firms) declines because firms compare the yield of investment projects with the financing cost or with the return to financial investments. A ***crowding-out effect*** appears: Part of the increase in public demand results in lower private investment by firms (due to the interest-rate increase, private investment is crowded out by public demand).

All these factors weaken the impact of fiscal expansion on aggregate demand and income.

The Keynesian assumptions can be represented within the "**aggregate supply, aggregate demand**" (AS-AD) model presented in Chapter 1. The price stickiness assumption implies that the **aggregate supply (AD) curve** is upward-sloping but not vertical [i.e. there is a spare capacity for production] in the **short run**. In the elementary model, the slope of AS is low, so that supply is highly responsive to price movements. Production can therefore be increased or decreased without a major impact on prices. The **aggregate demand curve** is downward-sloping due to the negative impact of inflation on demand for goods and services, either through a wealth effect or through the impact of an endogenous rise of the interest rate. A **fiscal expansion** (through a rise in public spending or a cut in taxes) results in the demand curve moving to the right: Production increases at any given price level. If the slope of the supply curve is low, this does not have a major impact on the price level and the **adjustment** takes place through a variation in the output level (movement of E1 to E2 in Figure 3.14).

Here we have simply postulated the AD curve that summarizes the demand side of the economy. It can be derived from the ***IS-LM model*** introduced in the late 1930s on the basis of Keynes's *General Theory* [The IS-LM model was introduced in 1937 by John Hicks (Hicks, 1937) and popularized by Alvin Hansen (e.g. Hansen, 1953). For a presentation of the model, see Blanchard (2005) or Mankiw (2007)]. This model, which consists of two curves that relate output and the interest rate, the IS curve describes the product market equilibrium and the LM curve the money market

equilibrium, both ***at a given price***:

- The **IS curve** represents the combination of output and interest rate that results in a product market equilibrium. It is downward-sloping since a higher interest rate results in a lower demand for products;
- For a given money supply, the **LM curve** shows the combination of output and interest rate that implies equilibrium in the money market. With a fixed money supply, the positive relationship between output and the interest rate relies on the demand for money, which is supposed to be an increasing function of output (as output grows, more money is needed for transactions) and a decreasing function of the interest rate (as the interest rate grows, private agents prefer to hold interest-bearing assets rather than cash). [**Modern analysis of interest** rate formation no longer starts from a given money supply. Rather, the **short-term interest rate** is supposed to be set by the central bank in response to economic developments, in order to ensure macroeconomic stability in the medium run. As a result (this is further developed in Chapter 4), the interest rate becomes an increasing function of the demand for goods and services, which is analogous to the formulation of the LM curve.]

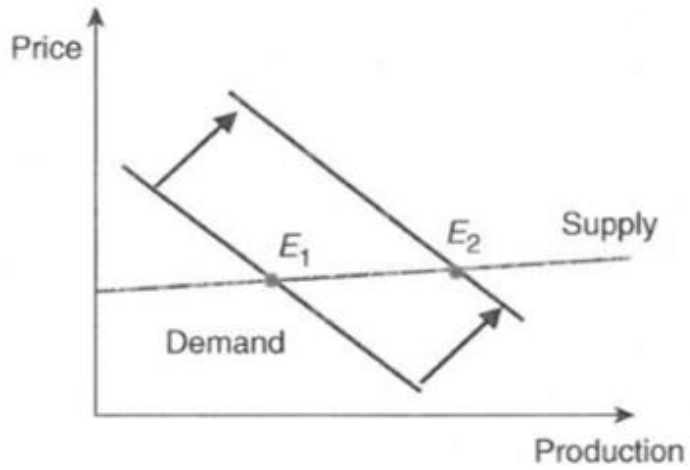

Figure 3.14 Effect of a Keynesian expansionary fiscal policy.

The **solution** of the IS-LM model shows an equilibrium output and interest rate for a given price level. As price grows, the demand for products declines (because the real value of nominal balances diminishes, making consumers poorer), the IS curve shifts downwards and the equilibrium level of output is also lower. This implies that the AD curve is downward-

sloping.

A **fiscal expansion** is represented in the model as a shift to the right of the IS curve. For any given price level, the fiscal expansion results in a higher output and interest rate, therefore in a shift to the right of the AD curve as in Figure 3.14.

Because monetary and fiscal policies are to a large extent **substitutable**, the Keynesian approach naturally leads to thinking in terms of **policy-mix**, i.e. of combination of them. In particular, in this framework fiscal policy is more effective when it is supported by monetary policy. At the limit, a perfectly **accommodative monetary policy** that does not lead to increasing the interest rate in response to a fiscal expansion results in a maximum multiplier effect. When the central bank is independent, however, it may choose not to accommodate the effects of fiscal policy if it perceives as potentially inflationary. Generally speaking, fiscal policy cannot be studied in isolation from monetary policy.

The Keynesian approach can easily be extended to the **open economy**, in particular within the **Mundell-Fleming** model. This open-economy extension of the IS-LM model introduces the **exchange-rate regime** as a key determinant of the **Keynesian multiplier**. In a **flexible** exchange-rate regime, the fiscal multiplier is lowered – even nullified if capital is perfectly mobile across countries – by the appreciation of the exchange rate that follows a fiscal expansion. Conversely, the multiplier is larger in a fixed exchange-rate regime because there is little crowding out (see Box 3.5).

Box 3.5 The Mundell-Fleming Model

The canonical Mundell-Fleming model studies **policy effectiveness** in a small country under **perfect capital mobility** (and under the Keynesian assumption of underemployment of resources).

Perfect capital mobility implies that the interest rate cannot deviate from the world interest rate (otherwise capital would flow in or out in search of yield). This is represented by the horizontal interest rate arbitrage condition schedule. At the same time, the **internal equilibrium** is represented by the IS and LM curves, representing respectively product market and money market equilibrium.
The **open-economy equilibrium** seems to be overdetermined since it

results from the intersection of three different curves. To see how the model works, one needs to distinguish the cases of **floating** and **fixed** exchange rates.

Consider first the case of a **floating** exchange-rate regime. Assume that the central bank keeps **money supply constant** and that the **exchange rate** is **market determined**. A fiscal expansion leads to an increase in output and income, and thereby to an increase in money demand. With constant money supply, there is a rising pressure on the interest rate. This leads to capital inflows that cause an exchange rate appreciation and a loss of export competitiveness. The IS curve thus shifts to the left as the demand for the country's products diminishes. Since the open-economy equilibrium is determined by the intersection of LM and the international interest rate arbitrage condition, the only solution is that the exchange rate appreciates up to the point where aggregate demand returns to its original level before the expansion. **Public demand** here **crowds out** not the residents' investment (in a small country under perfect capital mobility, the interest rate remains fixed at the world level **ex-post**), but the nonresidents' net demand for the **country's exports**.

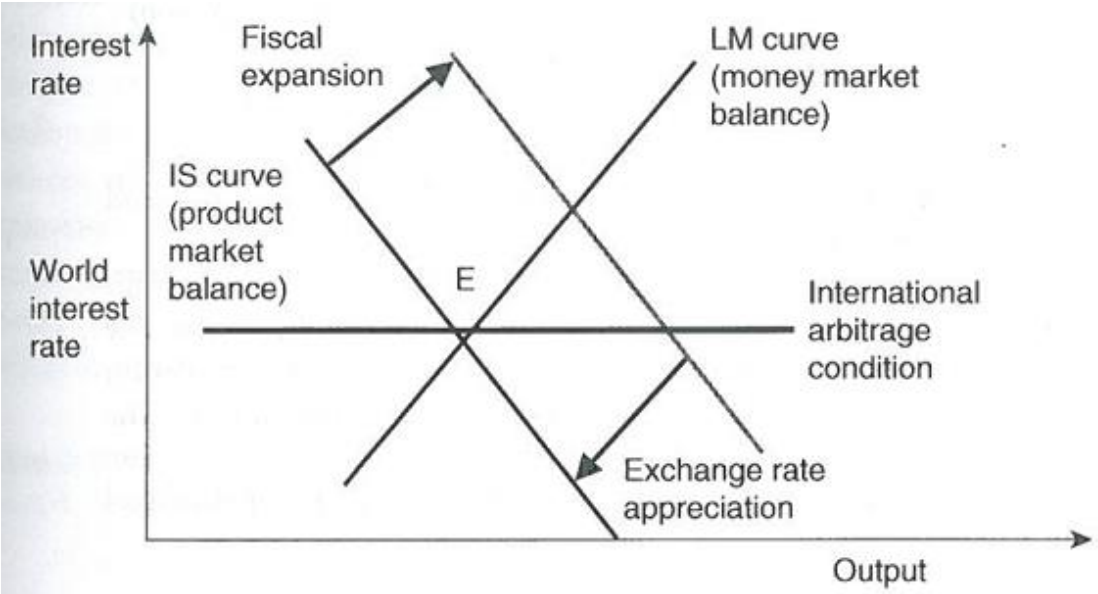

Figure B3.5.1 Fiscal expansion under flexible exchange rates and perfect capital mobility.

Now suppose that the exchange rate is **fixed**, meaning that the **central bank intervenes on the foreign exchange market** through buying and selling foreign currency. The capital inflows consecutive to a fiscal expansion result in the central bank selling the domestic currency for the foreign one, and thereby in an accumulation of foreign exchange reserves

by the central bank. This increases the money supply and makes the LM curve move to the right. This **endogenous monetary expansion** leads to a **positive fiscal multiplier**.

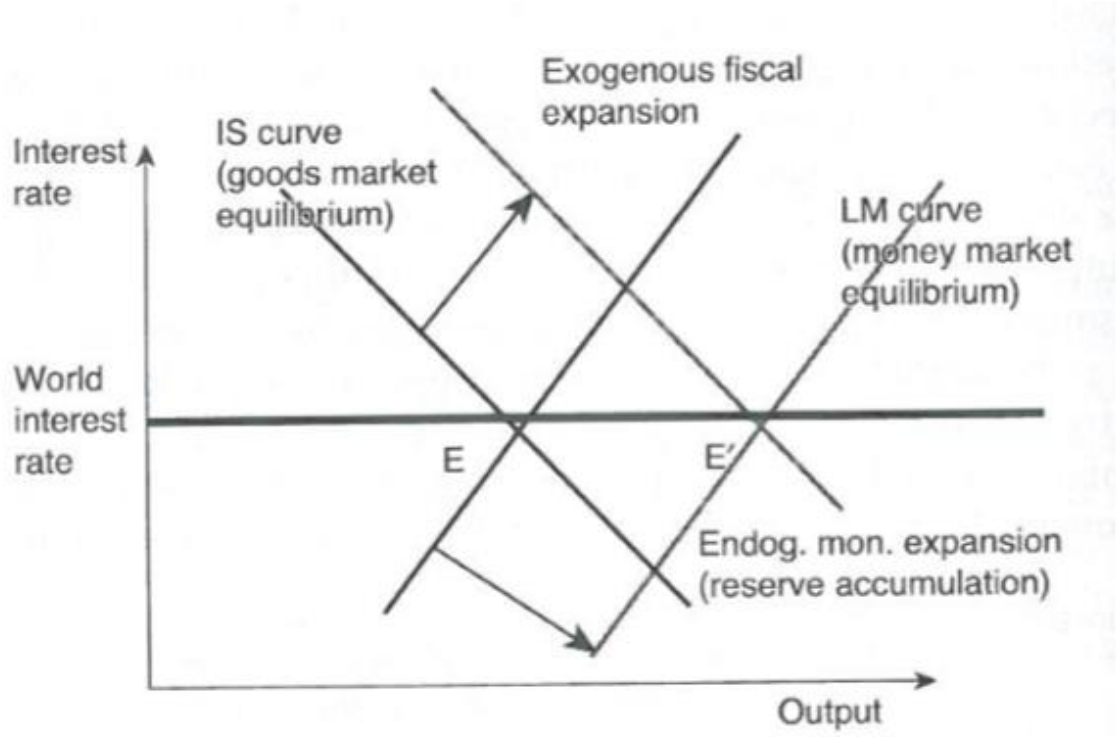

Figure B3.5.2 Fiscal expansion under fixed exchange rates and perfect capital mobility.

When capital is **not mobile**, results are reversed: Under a **floating** exchange-rate regime, the deterioration of the **current account balance** induced by fiscal expansion (because of the increase in import demand) leads to an exchange-rate depreciation and to an improvement of export competitiveness, strengthening the initial demand impact of the fiscal expansion. Under **fixed** exchange rates, the current account deterioration results in a reserve loss and in a monetary contraction that counters the initial expansion. Ultimately, the current account must balance – which means that output is determined by the external constraint.
Differences in capital mobility and exchange-rate regimes thus explain why similar fiscal policies can have contrasted effects on output.

The main results of the model are summarized in Table 3.3. A **monetary union** behaves as a whole like a **flexible exchange-rate regime** in relation to the rest of the world. If capital is fully mobile, fiscal policy is relatively ineffective. However, for a **given member** of the zone, fiscal policy is

effective because crowding-out effects are diluted within the zone. Hence, the Mundell-Fleming model suggests the use of fiscal policy by individual member states that may be hit by asymmetric shocks, but less so as a collective response to a symmetric shock, because in the latter case the exchange-rate adjustment would **partially** offset the stabilizing effect of the fiscal policy. [Since the euro area is not a small economy, the crowding out by the exchange rate is less than perfect in this case.]

Table 3.3
Short-term effectiveness of fiscal policy in an open economy

	High capital mobility	Low capital mobility
Floating exchanges rates	Ineffective or not so effective	**Effective**
Fixed exchange rates	**Effective**	Not very effective

b) The neoclassical critique

The neoclassical critique of the multiplier rests on three separate arguments:

- **Full financial crowding-out**: After a fiscal expansion, the deterioration of the public balance causes a rise in the interest rate which depresses private demand (crowding-out effect). In the AS-AD model, the demand curve does not move (or moves little) in the event of a fiscal shock: Total demand is not affected by a rise of public demand, but its composition is modified by the substitution of public for private demand.
- **Supply rigidity**: The relative price adjustment is sufficiently rapid so that the goods-market equilibrium is determined by supply. In the AS-AD model, the demand curve moves toward the right but the supply curve is very steep and almost vertical: Producers agree to slightly increase supply only if prices increase a lot. Private demand is penalized **ex-post** by the rise in prices.

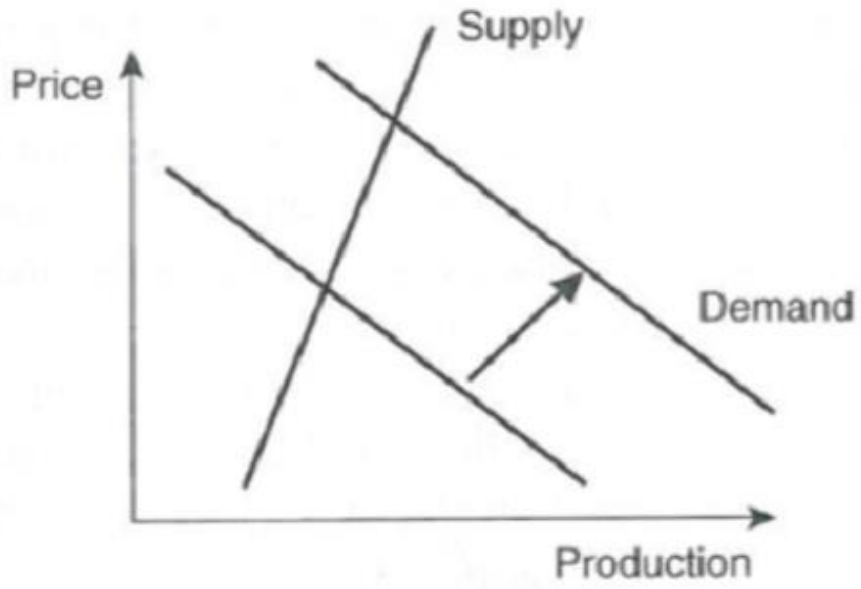

Figure 3.15 Effect of an expansionary fiscal policy with inelastic supply.

- **Ricardian equivalence**: Even if the supply of goods and services is elastic, **rational households** will respond to an increase in public demand (or a cut in taxes) by restricting their consumption, because they expect today's deficit to translate into higher future taxes and they prepare for it by increasing their savings rate. If their discount rate is equal to the interest rate on public debt, the present value of the expected future taxes will be exactly equal to the cut in current taxes (or increase in current public demand). Accordingly, households' wealth does not change and the tax cut does not have any effect on the activity. In the case of an increase in public demand, they will also cut their private consumption by the same amount, with the result that aggregate demand does not change. Again, there is **full crowding-out**, but this time due to households' expectations. The interest rate does not move.

Regarding the **first argument**, a rise in the interest rate unquestionably penalizes private investment, which affects demand and, in the long run, harms capital accumulation. This is illustrated in Table 3.4 by the **fiscal multiplier** being lower when **monetary policy** is allowed to react endogenously. However, the relevance of financial crowding-out has been greatly reduced by **international capital mobility**, which limits the possibility for the long-term domestic interest rate to differ from the world interest rate, except when the very poor state of public finances induces a **risk premium** that compensates asset holders for the risk that the debt is

not refunded.

The **second argument** raises and empirical question: What is the slope of the supply curve? Available estimates suggest that it is upward-sloping in the short run, which leaves room for fiscal policy effectiveness. All depends, in fact, on the **selected time-horizon**: Within a period of a few months or quarters, prices are rigid; within a few years, they adjust. Fiscal policy effectiveness is therefore limited in time. This is confirmed by Table 3.4, which shows that the multiplier is close to zero, after one year.

Finally, the **third argument** cannot be invoked simultaneously with the first one, since they are contradictory: The first assumes that the public deficit creates a [private] savings shortage which pushes the interest rates upward, while the third one stipulates a **domestic rise in private savings** in response to public dissaving. The latter arguments is attributed do David Ricardo (1817). This argument was re-introduced in a formal shape by Robert Barro (1974), who showed that infinitely-lived individuals [households] would fully integrate in their current savings decisions of the future tax increases needed to repay debt. This argument is regularly invoked to deny the effectiveness of fiscal policies. But it must be noticed that full Ricardian equivalence rests on **very strong hypothesis** (incidentally, Ricardo himself did not believe it to hold:

- **Rational expectations**. Households need to "see through" the effect of the short-term fiscal expansion and anticipate future taxes.
- **Unproductive public spending**. Fiscal expansion is supposed to have no positive on supply, which is unrealistic: Some public expenditures, notably in research, education or public infrastructure, are likely to lift individuals' future incomes because their social return is higher than the interest rate.
- **A perfect functioning of the credit market (no liquidity constraints)**: In order for households to be indifferent to a change in current taxes (in exchange for future taxes), they must be able to borrow today against lower future taxes, or, on the contrary, to save in preparation for a future tax rise.
- **Infinitely lived households** or households who treat the well-being of the forthcoming generations in the same way as they treat their own. Real households, however, are mortal, and do not care about future generations as much as they care about themselves or their own children. This is why fiscal policy is effective.

A simple and rudimentary check consists in comparing the respective changes in **private and public savings over time**. Figure 3.16 (see the

manual) shows the case of Japan, where a growing public debt presumably made individuals more "Ricardian". If Ricardian equivalence held, one would observe a perfectly negative correlation between public and private savings, which is not the case. In fact, empirical tests reject full Ricardian equivalence but tend to confirm the reality of some Ricardian effects that reduce the effectiveness of fiscal policy.

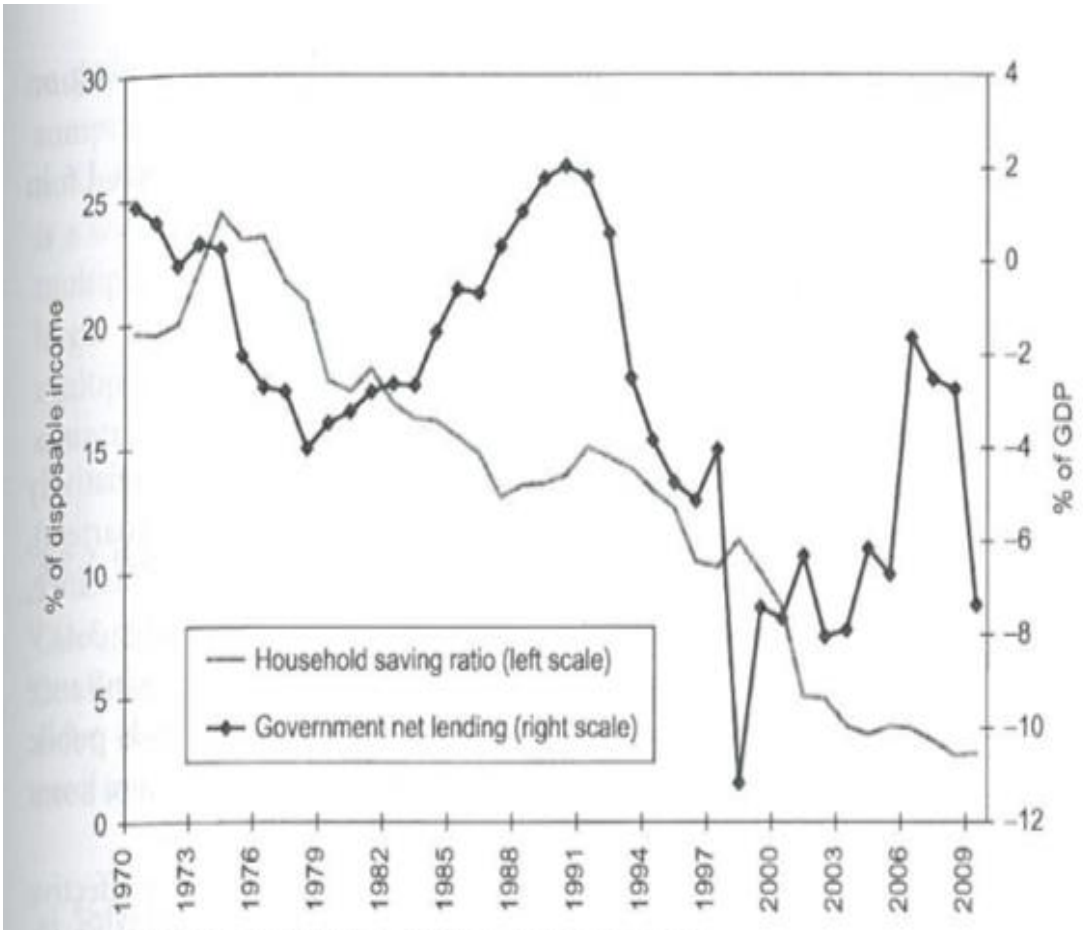

Figure 3.16 Households' and public savings in Japan.
Source: *OECD Economic Outlook* no. 86, November 2009.

Table 3.4
Impact on GDP of a 1%-of-GDP increase in public consumption during one year (in %). Simulation results using four macroeconometric models.

Assumptions on interest rates		Short run (up to 1 year)				Long run (> 1 year)			
		Germ	France	UK	US	Germ	France	UK	US
QUEST (EU)	Constant interest rate	0.9	0.9	1.0	na	0.0	0.0	0.0	na
	Price level target	0.6	0.8	0.5	na	0.0	0.0	0.0	na
NIGEM (NIESR)	Constant interest rate during one year, then inflation target	1.0	0.8	0.6	na	0.0	0.0	-0.1	na
MULTIMOD (IMF)	Constant interest rate during one year, then inflation target	1.3	1.3	na	1.1	-0.2	-0.2	na	-0.6
INTERLINK (OECD)	Constant interest rate and exchange rate	1.5	0.8	na	1.1	-0.3	0.2	na	0.1

na: Not available.
Source: Hemming et al. (2002)

3.2.2 Public debt sustainability

The analysis so far has focused on **flows** – receipts, expenditure, and deficits. But flows result in **stock accumulation**, meaning that deficits give rise to debt. Debt, in turn, needs to be serviced, which impacts on deficits. We therefore need to look into the **public debt accumulation** issue.

a) Solvency

States borrow to fulfill the financial requirements for their expenditures. Is there any limit to the state's borrowing capacity? Asking this question amounts to assessing the state's **solvency** (i.e. the availability of resources allowing it to meet its commitments).

An important point is that "debt can always be serviced in some abstract sense, through additional taxation and through the diversion of yet more domestic production to exports to generate the revenue and foreign exchange needed to service the debt. But there is a political and social, and perhaps moral, threshold beyond which policies to force these results become unacceptable" (J. Boorman, 2002).

This is why evaluating the solvency of a state and devising adjustments programs are essential exercises.

Moreover, in general, there is **no collateral** for sovereign debt. Thus, assessing the solvency of a state requires an evaluation of its willingness to pay.

It must be noted that there is a risk that the government defaults even though it is solvent: This is a **liquidity crisis**.

b) From solvency to sustainability

At a given moment in time, the situation of a public finance is defined by its degree of **solvency**. But in view of the inertia of public expenditures and receipts, it is always important to be able to anticipate possible insolvency at any future time. This is what the concept of **sustainability** addresses.

Public finance is said **unsustainable** if, on the basis of the current economic policy and of available forecasts, the expected development of the public debt leads inevitably to a situation of insolvency.

Public finance sustainability is especially important in a **monetary union**

where the central bank is independent, as is the case in the euro area. Suppose that a member state cannot service debt (interest and principal). Since it cannot rely on monetization by the central bank, there are **three options**: (i) A massive adjustment combining cuts to primary expenditures and tax increases; (ii) temporary support by other member states and the International Monetary Fund; or (iii) a partial default whereby the government negotiates a debt reduction with its creditors.

More generally, solvency crises are rather frequent events, as documented by Reinhart and Rogoff (200). In practice, they are generally solved by a combination of the three options above referred to.

c) Assessing debt sustainability

There is no universal criterion for assessing public debt sustainability. A **first**, very rough ones, relies on the **stability of the debt-to-GDP ratio**. A **second**, more rigorous definition of sustainability starts from the **government's intertemporal budget constraint**: Public finance is supposed sustainable if the present value of all future public receipts is **at least equal** to the present value of future spending plus the initial value of outstanding debt (cf. Box 3.8, pp. 201/2).

Regarding the **first criteria**, consistently, the observed primary balance is compared to the primary balance that would allow the debt ratio to stay constant, called the **debt-stabilizing deficit**. The latter depends on the debt ratio and on the difference between GDP growth and the interest rate, as shown in Box 3.7.

Box 3.7 How to stabilize the debt-to-GDP ratio

Here we start from Box 3.3 that describes debt accumulation as the following process:

(B3.7.1) $$b = \frac{(1+i)}{(1+n)} b_{-1} + d \cong (1 + i - n)b_{-1} + d \cong (1 + r - g)b_{-1} + d$$

Again, we neglect market valuation and all stock adjustments such as privatizations. A rough approach to sustainability then requires the ratio of public debt to GDP to be constant: $b = b_{-1}$. To obtain this stability, the primary deficit needs to be:

(B3.7.2) $$d = \frac{n-i}{1+n} b \cong (n-i)b \cong (g-r)b$$

And the financial deficit:

(B3.7.3) $$d + ib \cong nb$$

For a debt ratio of 60% of GDP and a nominal growth rate of 5% (namely 3% of real growth plus 2% inflation), the financial deficit consistent with a constant debt ratio is 3% of GDP. This is where the **fiscal discipline criteria** imposed in the Maastricht Treaty come from. Moreover, for a real interest rate of 2%, the primary deficit compatible with the stability of the debt ratio at 60% of GDP amounts to 0,6% of GDP. Conversely, the primary balance has to be in surplus when the real interest rate exceeds the real growth rate. Such a situation prevailed in Europe in the 1980s and 1990s. Countries such as Italy and Belgium had to run considerable primary surpluses (negative primary deficits) in order to reduce their public debt ratios. [See more in p. 199, manual].

A simple application based on 2009 data is provided in the box for a few advanced countries. The global crisis brought GDP growth rates lower than interest rates, requiring primary surpluses to stabilize debt ratios. However, governments ran primary deficits as an attempt to stabilize their economies.

The problem with this first approach is that the **observed** debt-to-GDP ratio may not correspond to an **optimal, long-run level**.

Sustainability is difficult to define as it should take into account the possibility of a state remaining permanently in debt (because it is infinitely lived) but must exclude "pushing the debt ahead" [i.e. accumulating debt increasingly] as in speculative chains or **Ponzi games**.

Regarding the **second approach** based on government's intertemporal budget constraint, the sustainability of public finance can be assessed by comparing the common tax pressure with the **sustainable tax rate** that ensures debt sustainability, for a given path of public expenditures and depending on assumptions about growth and interest rates. This approach is now used in the EU to monitor the fiscal position of member countries in the framework of the Stability and Growth Pact, as a complement to debt and deficit analysis.

This approach, of course, is **fragile** in that it relies on long-term projections

of growth, interest rates, and especially public expenditures. Furthermore, it provides a global assessment of debt sustainability but does not give any clue as to what the adjustment path should be. Finally, it should be noted that the sustainable tax rate can "jump" in response to a change of economic policy scenario – for example, a pension reform which reduces future government spending relaxes instantly the sustainability constraint.

There are other criterion for assessing public debt sustainability. For these, see the recommended manual, pp. 203-205.

On the whole, there still remains a gap between the theoretical and empirical approaches. The latter suffer from the absence of data of sufficient quality on public accounts, and of a dependency on the models and the assumptions used. The indicators informing economic policy-making therefore remain very rudimentary.

Box 3.8 Mathematics of Debt Sustainability – Brief Observation

Since states do not have a predefined, finite lifetime, there is no need for the net public debt to fall to zero at a given date in the future. Rather, debt sustainability implies that ***the present value of debt at time t tends toward zero as t tends to infinity***. This condition, called the **transversality condition**, is equivalent to the equality between the present value over time of the government future income and expenditure streams corrected for the initial level of debt. Note that it does not imply that the debt ratio goes to zero when time *t* tends to infinity, since a nonexplosive debt ratio is consistent with sustainability. [See more on pp. 202/3].

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d) The political economy of debt

One specificity of fiscal policy is that it may provide benefits in the short run while reducing the room for maneuver of future governments, or even future generations, who will have to face an inflated public debt. This intertemporal feature has implications for policymaking. It is the task of political economy to uncover them and thus find an equilibrium of social interests of different groups of population.

3.2.3 Supply-side effects and reconciliation attempts

So far, we have explained how fiscal policy can be expected to **affect**

output in the short run, and we have enumerated several factors – propensity to save or to import, interest-rate or exchange-rate crowding-out, rational expectations – that could **reduce** the short-run impact of fiscal policies. Next, we have explored the concept of debt sustainability and suggested how public debt can be used strategically. All these clouds that accumulated over the **efficient use of fiscal policy** led to some discredit of this type of counter-cyclical policy in the 1980s and 1990s. This was a period when fiscal policies across the world should have been devoted to ensuring debt sustainability. This is because **tax cuts** were then believed to have a positive, long-run impact on growth through supply-side effects.

a) Keynes under attack

For the reasons listed in Section 3.2.1, neoclassical (and "new classical") economists generally deny any significant impact of counter-cyclical fiscal policies. However, they underline the usefulness of a **tax cut** to **stimulate aggregate supply** and hence raise **potential output**: In the AD-AS representation, a tax cut moves the supply curve downward (it reduces the output price for any production level), which stimulates the activity and causes prices to decline, as shown in Figure 3.18. Thus, neoclassical economists join the Keynesians in recommending tax cuts when growth is mediocre; but the neoclassical view is that these stimulate **supply**, while for the Keynesians, they boost **domestic demand** through the induced rise in disposable income.

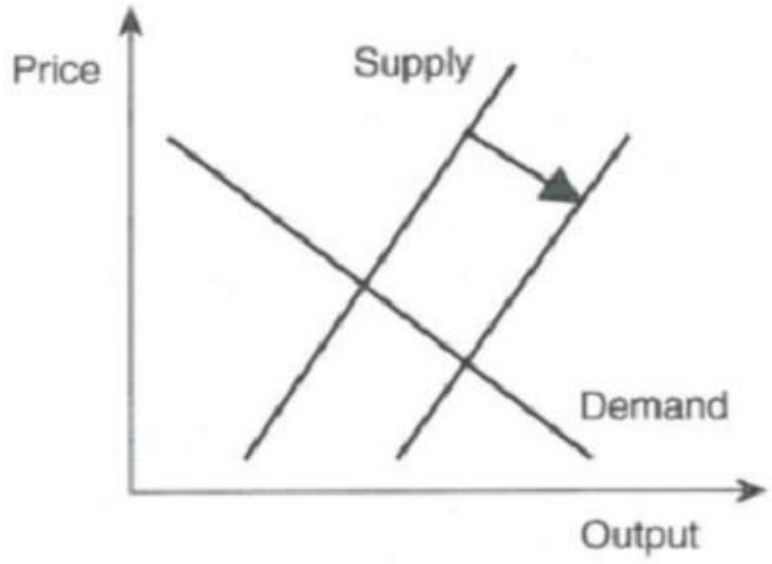

Figure 3.18 Supply-side effects of a tax cut.

As for **public spending**, the disagreement between neoclassical and Keynesian economists is maximum. The former deny any positive short-run effect of public spending while emphasizing its implications in terms of future rises in taxes which, if rationally anticipated, have a negative short-term impact on consumption. Conversely, they applaud spending cuts because they pave the way for tax cuts that are favorable to long-term growth and in turn force further spending cuts.

However, neoclassical economists agree with Keynesian not to balance the budget at every point in time, but rather to let the public balance go into deficit in a recession (and into surplus in a boom). As observed by Robert Barro (1979), because taxes are distortionary, it is not optimal to raise tax rates when tax receipts are affected by a recession, and it is preferable to keep them constant over the cycle. **Tax smoothing**, as it is known, thus results in a prescription similar to that of the Keynesian advocacy of letting automatic stabilizers play in full, but on very different grounds.

b) Non-Keynesian effects

A number of models were proposed in the 1990s to go beyond standard controversies and try to **reconcile** the apparently contradictory facts mentioned in Section 3.1. Rather than building a general model of fiscal policy effects, they aimed at providing a **framework** in which Keynesian, non-Keynesian (when fiscal expansion has no effect), and anti-Keynesian (when the multiplier becomes negative) behavior could be explained. Starting from different premises, these models suggested that the economy could be Keynesian in normal times, but non-Keynesian or anti-Keynesian in specific budgetary circumstances. In particular, large-scale fiscal adjustments would more likely result in non-Keynesian behavior, because they generally take place during critical periods when agents' **expectations** are changed.

A first series of models (**neoclassical models with composition effects**) builds on the neoclassical framework, but brings **two additional features** (Blanchard et al, 1991); Alesina and Perotti, 1995; Perotti, 1996). The **first** one introduces **fiscal distortions**, implying that a tax rise (or a spending rise, since a permanent increase in expenditures generates expectations of future tax rises) reduces output through **supply-side effects**. Under this assumption, the **key variable** is the **permanent public expenditure level**. Large-scale fiscal policy changes, which are likely to have a permanent effect on the expenditure level, can therefore have an impact on output. The

next step, and it is the **second addition**, is to assume that in **normal times** fiscal adjustments generally take the form of tax increases (which validate a pre-established expenditure level, but do not affect it), while **periods of fiscal distress** more often lead to permanent spending cuts, and therefore likely to have positive effects on supply.

However, these models with composition effects (between **income** and **spending**) are rather extreme in that they can produce non-Keynesian or anti-Keynesian effects, but never Keynesian effects that can nonetheless still be observed in reality.

The second category of models (**Keynesian models with threshold effects**) also rests on the introduction of **nonlinearities**, but they are built on Keynesian assumptions. The **accumulation of public debt** was suggested by Blanchard et al (1991) as the key mechanism. As long agents believe that public debt remains **sustainable**, they can ignore its consequences, find it acceptable that they will be borne by future generations, and adopt a non-Ricardian behavior. But if the **debt** reaches some **critical level**, and if its monetization or its repudiation are ruled out, they know that a **stabilization program** must happen shortly. In the event of an expected tax rise, they save accordingly; in the event of permanent fall in expenditure, which will improve their intertemporal wealth, they start to consume (cf. Bertola and Drazen, 1993). For some debt levels, a negative (anti-Keynesian) correlation will be observed between public and private savings. At some other debt levels, a positive ("pseudo-Keynesian") correlation will obtain.

Table 3.6 summarizes the expected effects of fiscal contraction according to the various theoretical framework.

Table 3.6
Effect of a restrictive fiscal policy within various theoretical frameworks

	Hypothesis	Mechanisms	Effect of a fiscal contraction
Neo-Keynesian models	Short-medium-term horizon. Flexible supply conditions.	Partial financial crowding-out. Absence of nonlinearities. **KEYNESIAN**	Recessionary
Ricardian equivalence	Intertemporal budget constraint. Consumers with infinite horizon. Rational expectations.	Crowding-out one for one of private consumption by public consumption. Neutrality of the deficit. **NON-KEYNESIAN**	Neutral
Neoclassical models with composition effects	Neo-Ricardian framework. Fiscal distortions. The composition of the adjustment depends on the initial conditions (debt levels ...)	Super-crowding-out due to supply-side effects. **ANTI-KEYNESIAN**	Expansionary (if poor initial conditions, i.e. high debt)
Keynesian models with threshold effects	Keynesian rigidities. Consumers with finite horizon. Probability of "stabilization" grows with the debt	Keynesian mechanisms under standard conditions. Inversion of the effects under poor public finance situation. **KEYNESIAN OR ANTI-KEYNESIAN**	Recessionary if debt is low. Expansionary if debt is high.

3.3 Policies