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ASSESSING FISCAL SOUNDNESS

THEORY AND PRACTICE

by Nicola Giammarioli, Christiane Nickel, Philipp Rother and Jean-Pierre Vidal

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by Nicola Giammarioli, Christiane Nickel, Philipp Rother and Jean-Pierre Vidal[1]

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ABSTRACT

This paper presents a survey of methods for assessing fiscal soundness, i.e. the capability of governments to honour their obligations in the short run and in the long run. The need for a comprehensive monitoring of fiscal soundness derives from the risks to economic stability that arise from the actual or expected difficulty a government may have in honouring its obligations. For the long run, methods derived from the government's intertemporal budget constraint make it possible to assess the size of a necessary adjustment to achieve sustainability of the debt burden. Uncertainty regarding shocks to the fiscal situation or the behaviour of financial market participants calls for the monitoring of financial flows and government obligations in the short run. Vigilance needs to be all the higher, the greater the uncertainty regarding long-term sustainability.

I INTRODUCTION

Sound government finances are a prerequisite for price and macroeconomic stability and strengthen the conditions for sustainable growth. Thus, public finances have an immediate impact on the environment in which central banks operate. Sound government finances contribute to keeping inflationary expectations low, thus facilitating the central bank's task of maintaining price stability. Deviations from sound fiscal positions can disturb the macroeconomic environment, induce economic uncertainty and raise inflation expectations.

Monitoring fiscal soundness is especially necessary in a monetary union for two reasons. First, in a monetary union, national policy-makers may be inclined to run higher fiscal deficits since market signals via the national exchange rate are absent and interest rate risk premia may react more slowly to rising fiscal imbalances. Second, an unsound fiscal situation entails the risk that national policy positions may be geared increasingly towards short-term domestic objectives that may diverge from – or even run counter to – the common goals of the currency union. For example, countries with increasing fiscal problems would be in favour of a loose implementation of the EU fiscal policy rules, which could – over time – erode public confidence in the conduct of sound economic policies. Also, national policy objectives could conflict with those of the central bank as regards the need to preserve price stability.

The analysis of fiscal soundness needs to "operationalise" the concept, choosing appropriate indicators to identify emerging risks. The term "soundness" covers the health of public finances in the short run (fiscal stability) and in the long run (fiscal sustainability).[1] In the short run, stable public finances can be characterised as the government's ability to service all upcoming obligations. In the long run, fiscal sustainability refers to the fulfilment of the government's present value budget constraint, requiring that the present value of liabilities is not greater than the present value of assets.

Given the long time horizon underlying the concept of fiscal sustainability, its assessment is subject, by necessity, to considerable uncertainty. From a theoretical point of view, a full sustainability analysis would require the projection of fiscal and macroeconomic variables into the infinite future. But even more practicable approaches warrant coverage of long time periods so as to capture the impact of population ageing, for instance. By nature, such projections carry large margins of error.

The degree of uncertainty regarding fiscal sustainability determines the importance of analysing short-term fiscal stability: the higher the uncertainty regarding the long-term sustainability of public finances, the greater the need to assess a government's short-term financing conditions so as to gauge its ability to stay liquid. Long-term sustainability and short-term stability are linked via the behaviour of financial market participants. As long as investors are assured about the long-term sustainability of a government's finances, they will be willing to provide short-term liquidity if necessary. However, if sustainability is questioned, investors have to assess the potential risks for their credits. These risks are determined by the size of the long-term fiscal imbalance, as well as by short-term variables that shape the government's liquidity, such as the maturity and currency structure of its debt, the ability to raise funds internally at short notice and the exposure of public finances to exogenous shocks. As the assessment becomes less favourable, investors will tend to offer smaller amounts at shorter maturities and with higher risk premia, adding to the government's financing problems.

While numerous publications in the literature address the many specific aspects of fiscal soundness in the long and in the short run, a survey of the concepts and approaches, and of

1 For this distinction, see also IMF (2006).

the relationship between them, appears to be lacking. With the intention to help fill this gap, this paper presents the theoretical foundations, including the mathematic models, and discusses practical applications of fiscal analysis where formal relations play a lesser role. Some consequences of the discussion are worth highlighting, also from the ECB's perspective. The analysis of fiscal soundness needs to go beyond the conventional approach that focuses only on deficits, debt, GDP growth and interest rates. The assessment of long-term sustainability needs to account for all types of liabilities and to capture the impact of uncertainty. In addition, if long-term sustainability is no longer guaranteed, short-term financing conditions gain in importance for the assessment of fiscal soundness. For a central bank, monitoring developments in this area is indispensable.

Reflecting the breakdown of fiscal soundness into long-term and short-term aspects, the paper consists of two main sections: The first section presents the background for the analysis of long-term sustainability and discusses major practical applications. The second section focuses on short-term stability concepts, using the relevant analytical approaches as a background for the description of the relevant determinants of fiscal stability and presenting major practical applications of the concept. The final section concludes.

2 LONG-TERM SUSTAINABILITY CONCEPTS

Fiscal sustainability is generally defined as the government's ability to service its debt obligations in the long term. This section focuses on the approaches that are used to determine the long-term sustainability of fiscal policies. The first part deals with theoretical concepts that cover both the finite and the infinite time horizon. After introducing the intertemporal budget gap, two theoretical indicators are developed and further refinements regarding general equilibrium effects and the impact of uncertainty are discussed. The second part deals with practical approaches to gauge fiscal sustainability and shows examples of their use.

2.1 ANALYTICAL APPROACHES

2.1.1 THE INTERTEMPORAL SUSTAINABILITY GAP

The discussion of sustainability starts with the government flow budget constraint, which relates the change in debt to current fiscal policy and leads to the government's intertemporal budget constraint.[2]

The government's intertemporal budget constraint can be derived from the government flow budget constraint. In each budgetary year, the change in nominal government debt ($B_t - B_{t-1}$) is given by the sum of primary expenditure (E_t) and interest payments on outstanding government debt ($r_t B_{t-1}$) minus government revenue (T_t)[3].

$$B_t - B_{t-1} = E_t - T_t + r_t B_{t-1} \qquad [1]$$

In a growing economy, where output grows at rate of g_t ($Y_t = (1+g_t)Y_{t-1}$), the flow budget constraint [1] can be rewritten by dividing its elements by GDP:

$$\frac{B_t}{Y_t} = \frac{E_t}{Y_t} - \frac{T_t}{Y_t} + \frac{1+r_t}{1+g_t}\frac{B_{t-1}}{Y_{t-1}} \qquad [2]$$

Expression [2] shows that the evolution of the debt-to-GDP ratio depends on two sets of factors, namely on the primary deficit ratio $\left(\frac{E_t}{Y_t} - \frac{T_t}{Y_t}\right)$ and on the legacy of past fiscal policies $\left(\frac{1+r_t}{1+g_t}\frac{B_{t-1}}{Y_{t-1}}\right)$. It is clear that, if the nominal interest rate exceeds the growth rate, a primary surplus is needed to maintain the debt ratio at its current level. However, as the flow budget constraint is an accounting identity, it does not impose any restriction on current fiscal policy, unless a specific debt-to-GDP ratio is targeted for the current year. In other words, there is

2 Perotti et al. (1998) provide a wider concept of fiscal sustainability, focusing on the controllability of the deficit and the risk of disruptive adjustments.

3 Revenue from seignorage is assumed to be zero.

no restriction on current fiscal policy if any additional deficit can be financed by government borrowing. However, this additional borrowing will only be possible if lenders are confident as to the future solvency of the government, i.e. if they believe that government finances will remain sound. Therefore, it is of interest to answer the following question: Does the need to maintain long-term sustainability impose concrete restrictions on current and future fiscal policies?

In order to answer this question, it is useful to investigate the implications of the flow budget constraint [2] further. Assuming that the economy starting in year t = 0 inherits a stock of debt that resulted from past fiscal policies (B_{-1}/Y_{-1}), and substituting for B_0 by means of the government budget identity in year 1, you obtain:

$$\frac{B_{-1}}{Y_{-1}} = \frac{1+g_0}{1+r_0}\left(\frac{T_0}{Y_0} - \frac{E_0}{Y_0}\right) + \frac{(1+g_0)(1+g_1)}{(1+r_0)(1+r_1)} \left(\frac{T_1}{Y_1} - \frac{E_1}{Y_1}\right) + \frac{(1+g_0)(1+g_1)}{(1+r_0)(1+r_1)} \frac{B_1}{Y_1} \quad [3]$$

Further substitution forward up to year T-1 makes it possible to derive the government's intertemporal budget constraint from year 0 to year T:

$$\frac{B_{-1}}{Y_{-1}} = \frac{1+g_0}{1+r_0}\left(\frac{T_0}{Y_0} - \frac{E_0}{Y_0}\right) + \ldots + \frac{(1+g_0)\ldots(1+g_T)}{(1+r_0)\ldots(1+r_T)} \left(\frac{T_T}{Y_T} - \frac{E_T}{Y_T}\right) + \frac{(1+g_0)\ldots(1+g_T)}{(1+r_0)\ldots(1+r_T)} \frac{B_T}{Y_T} \quad [4]$$

It is worth noting that, in the absence of a target for government debt in year T, equation [4] does not impose any restrictions on fiscal policies between year 0 and year T. Any additional expenditure can be financed through an increase in government debt. However, if there is a binding debt target in year T, the government's intertemporal budget constraint requires that the present discounted value of primary surpluses must be equal to the difference between the initial debt and the present discounted value of the terminal debt:

$$\frac{B_{-1}}{Y_{-1}} - \rho_T \frac{B_T}{Y_T} = \sum_{i=0}^{T} \rho_i \left(\frac{T_i}{Y_i} - \frac{E_i}{Y_i}\right) \quad [5]$$

where the discount factor $\rho_i = \frac{1+g_i}{1+r_i}\rho_{i-1}$ is introduced for notational simplicity ($\rho_{-1} \equiv 1$). Equation [5] can be used to introduce a more precise definition of fiscal sustainability. A fiscal policy is considered sustainable over the considered horizon if it ensures that the terminal debt-to-GDP ratio is not greater than the initial debt-to-GDP ratio:

$$(1-\rho_T)\frac{B_{-1}}{Y_{-1}} \leq \sum_{i=0}^{T} \rho_i \left(\frac{T_i}{Y_i} - \frac{E_i}{Y_i}\right) \quad [6]$$

If the left-hand side of this equation is positive, primary deficits in some years have to be compensated for by primary surpluses in others.[4] If the left-hand side of this equation is negative, as is the case when the rate of interest is lower that the growth rate, there is no such restriction on fiscal policy and the government can run primary deficits in every year and still satisfy its intertemporal budget constraint, which only sets a limit on the size of primary deficits.

Assuming that government action extends to infinity, the government's intertemporal budget constraint becomes:

$$\frac{B_{-1}}{Y_{-1}} \leq \sum_{i=0}^{+\infty} \rho_i \left(\frac{T_i}{Y_i} - \frac{E_i}{Y_i}\right) + \lim_{T\to+\infty} \rho_T \frac{B_T}{Y_T} \quad [7]$$

If the discounted value of public debt, $\lim_{T\to+\infty} \rho_T \frac{B_T}{Y_T}$, were positive, there would be cases where the government's intertemporal budget constraint would be fulfilled even if the government runs primary deficits indefinitely by rolling its debt over and borrowing to finance its deficits; this would be the case in an economy where the

4 The debt criterion of the Maastricht Treaty (a ratio of debt to GDP below 60% or, if above, decreasing at a satisfactory pace) could be seen as an attempt to operationalise equation [6]. A debt-to-GDP target could be reached in T periods, guaranteeing sustainability, but – at the same time – allowing a certain degree of intertemporal smoothing of deficits and surpluses.

growth rate exceeds the interest rate.[5] However, if the government was running such a Ponzi game, it would imply that some agent would have to be holding government bonds at some point in time in the future and would reduce its consumption in at least one period. This outcome is strictly dominated, in welfare terms, by the option of not holding debt at all. To avoid this situation, a no-Ponzi-game restriction is commonly assumed, i.e. $\lim_{T\to+\infty} \rho_T \frac{B_T}{Y_T} \leq 0$, and a widely used definition of fiscal sustainability is obtained:

$$\frac{B_{-1}}{Y_{-1}} \leq \sum_{i=0}^{+\infty} \rho_i \left(\frac{T_i}{Y_i} - \frac{E_i}{Y_i} \right) \qquad [8]$$

This equation says that a fiscal policy is sustainable if the present discounted value of the ratio of primary surpluses to GDP is greater than, or equal to, the current level of public debt.[6] In other words, this solvency condition for the government sector states that, for a fiscal policy to be sustainable, a government that has debt outstanding will have to run primary budget surpluses in the future. Those surpluses should be large enough to satisfy equation [8].[7]

2.1.2 SIMPLE INDICATORS

Equation [8] can be used to derive simple indicators such as the intertemporal sustainability gap. The need to develop indicators is due to the fact that compliance with the intertemporal budget constraint in equation [8] cannot be assessed in real time. For instance, a fiscal policy plan whereby the government runs a primary deficit indefinitely would breach the solvency condition. This means that, sooner or later, the government will have to change its fiscal policy and run primary surpluses, either by increasing its revenue or by decreasing expenditure. Therefore, there is a need to specify indicators of the extent to which fiscal adjustment is necessary at a given point in time. In addition, changes in these indicators over time, e.g. from one fiscal year to another, allow an assessment of the extent to which a government's sustainability situation has improved or deteriorated, which may provide important signals for policy-makers.

Let us define a first indicator – the financing gap in year 0. It is the difference between the current debt ratio and the present discounted value of future primary surpluses:[8]

$$\Gamma_0 = \frac{B_{-1}}{Y_{-1}} - \sum_{i=0}^{+\infty} \left(\frac{1+g}{1+r} \right)^i \left(\frac{T_i}{Y_i} - \frac{E_i}{Y_i} \right) \qquad [9]$$

If Γ_0 is positive, the sustainability gap has a simple interpretation. It is the present discounted value of the increase in primary surpluses that is necessary to guarantee that the intertemporal budget constraint is fulfilled and measures the minimum effort required by the government to restore long-term fiscal sustainability. Looking at equation [9] from a different perspective, the sustainability gap represents the share of the public debt-to-GDP ratio that would, if repudiated today, make the fiscal policy plan sustainable.

For simplicity let us consider a fiscal policy plan characterised by constant tax and expenditure ratios. Both taxes and primary spending follow a linear rule, namely $T_i = \tau Y_i$ and $E_i = \varepsilon Y_i$. Therefore, the sustainability gap, as expressed in equation [9], can be simplified as follows:

5 No fiscal adjustment is necessary, for example, to ensure sustainability in an overlapping generation economy when the long-term growth rate of the economy is greater than the interest rate (dynamic inefficiency or over-accumulation of capital). In such a case, the government's intertemporal budget constraint cannot be defined. Moreover, on efficiency grounds, governments would have to increase their fiscal deficits with a view to increasing consumption.

6 Theoretically, the relevant concept of debt is one of net debt, i.e. the difference between government liabilities and assets. However, given the scarcity of available data on government assets, gross debt measures are more widely used. In practical terms, the flows of income from government-held assets can be discounted on the right-hand side of this equation, leaving gross debt on the left-hand side.

7 The so-called fiscal theory of the price level considers equation [8] from a different perspective: if, at the current price level, the amount of outstanding debt and the present value of future surpluses do not match in real terms, then the price level can jump to restore the equilibrium. This paper does not deal with this issue.

8 Interest and growth rates are assumed to remain constant thereafter.

$$\Gamma_0 = \frac{B_{-1}}{Y_{-1}} - \frac{1+r}{r-g}(\tau - \varepsilon) \qquad [10]$$

Two further simple indicators can be derived from this equation. The first is the gap between the current tax rate and the sustainable tax rate, while the second is the gap between the current expenditure ratio and the sustainable expenditure ratio. The sustainable tax rate (τ^*) and the sustainable expenditure ratio (ε^*) are the solutions to the equation $\Gamma_0 = 0$ and are given by:

$$\tau^* = \frac{r-g}{1+r}\frac{B_{-1}}{Y_{-1}} + \varepsilon \qquad [11]$$

$$\varepsilon^* = \frac{r-g}{1+r}\frac{B_{-1}}{Y_{-1}} - \tau \qquad [12]$$

The sustainable tax rate/expenditure ratio represents the tax rate/expenditure ratio that, if constant, would allow the intertemporal budget constraint to be fulfilled over the horizon taken into account (infinite, in our case), on the basis of given nominal growth and interest rates. The tax gap ($\tau^* - \tau$) and the expenditure gap ($\varepsilon - \varepsilon^*$) are sustainability indicators that are easy to interpret. Provided that the current tax rate is lower than the sustainable tax rate and that the given expenditure policy remains unchanged, the tax gap indicates the size of the tax adjustment required – a permanent increase in the tax rate if it were to take place immediately. Analogously, the expenditure gap indicates the size of the immediate adjustment required on the expenditure side if the tax regime were to remain unchanged.[9]

There is a clear symmetry between these two sustainability indicators. They only indicate the size of fiscal adjustment necessary to restore the solvency of the government sector in terms of either a permanent increase in the tax rate or a permanent decrease in the expenditure ratio. Although a positive tax gap points to the need for adjustment at some stage in the future, a tax gap of, say, 5% would be a source of greater concern in a country in which the current tax rate is 60% than in a country in which it is 30%. In this respect, one might prefer sustainability indicators that are able to discriminate between the two countries by capturing the extent to which governments have sufficient leeway to adjust fiscal policies. Such an indicator can be obtained by dividing the tax gap by $(1 - \tau)$,[10] the maximum amount of resources that the government can still appropriate.[11]

The size of the sustainability gap represents the amount of the increase in taxes (or decrease in expenditure) required "today" in order to preserve long-term fiscal sustainability. Postponement of such an adjustment would entail a cost, which can be measured by the increase in the required adjustment and can be represented as a simple function of the indicator itself. In the simple example given above, the cost of a delay of one year would be the difference between the debt ratios in two consecutive years $\left(\frac{B_0}{Y_0} - \frac{B_{-1}}{Y_{-1}}\right)$ multiplied by the discount factor $\frac{r-g}{1+r}$.

The indicators discussed so far were derived from the intertemporal budget constraint (equation [8]) at an infinite horizon. It is useful, however, to describe another set of indicators that can be derived from the intertemporal budget constraint at a finite horizon, as formalised in equation [5]. This is particularly useful for monitoring public finance developments in the medium term, once an objective for public debt has been established for a specific future period of time T.

9 A combination of tax and expenditure changes could be also used to close the financing gap.

10 This indicator assumes that governments can appropriate 100% of GDP. This is obviously unrealistic in market economies where higher tax rates – i.e. rates above a given threshold – even lead to lower tax receipts. Among OECD countries, the maximum ratio of total revenue to GDP was observed in Sweden in 1989 (65.4% of GDP). Overall, considering that governments would find it difficult to appropriate more that around 60% of GDP, a more realistic indicator might therefore be obtained by dividing the tax gap by (0.6–τ).

11 Similar arguments could be used for the expenditure gap by considering that a country with a limited public sector finds it more difficult to cut spending than a country with a large public sector. It should be noted that there may be an incompressible level of public expenditure. Among OECD countries, the minimum ratio of total expenditure to GDP was observed in Korea in 1987 (18% of GDP).

Similar to what was done in the case of the financing gap discussed above, let us define the indicator Φ_0 as the difference between the current debt ratio and the present discounted value of the debt ratio at the time T plus the flow of primary surpluses between time 0 and time T, with both interest rates and growth rates being assumed to be constant:

$$\Phi_0 = \frac{B_{-1}}{Y_{-1}} - \rho_T \frac{B_T}{Y_T} - \sum_{i=0}^{T} \rho_i \left(\frac{T_i}{Y_i} - \frac{E_i}{Y_i} \right) \qquad [13]$$

where $\rho_i = \frac{1+g_i}{1+r_i} \rho_{i-1}$

If Φ_0 is positive, the indicator measures the present discounted value of the increase in primary surpluses that is necessary to reach the targeted debt level at time T. Although the indicator is unable to fully capture the long-term sustainability of public finance in a given country ($\Phi_0 = 0$ does not guarantee the fulfilment of the intertemporal budget constraint beyond time T), it might represent a useful monitoring tool in showing gross errors in fiscal strategies that are aimed at reaching a specific debt-to-GDP ratio.

As for the sustainable gap indicator, assuming a constant tax rate/expenditure ratio, it is possible to calculate the expenditure/tax gap that represents the size of the tax/expenditure adjustment needed to guarantee a reduction of the debt level towards the target within the period between year 0 and year T.

2.1.3 REFINEMENTS: FEEDBACK EFFECTS AND UNCERTAINTY

The standard models of fiscal sustainability discussed above highlight the necessary adjustment of the primary balance under exogenous assumptions on trend growth and interest rates. This means that they fail to capture two important aspects, namely (i) the relationship between public finances and macroeconomic developments and (ii) macroeconomic uncertainty and governments' capacity to fulfil their debt obligations in the face of economic shocks.

With regard to the first aspect, simple sustainability indicators hinge upon assumptions on the path of revenue and primary expenditure, economic growth and interest rates. Growth and interest rate assumptions are considered to be exogenous. The feedback effects[12] that unsustainable debt developments have on interest and growth rates are neglected. Since higher debt ratios may exert an upward pressure on interest rates and crowd out economic growth, thereby further exacerbating debt dynamics, simple sustainability indicators may be misleading, in particular in that they may underestimate the fiscal risks associated with a given path of primary deficits. Accounting for feedback effects requires a general equilibrium approach, in which macroeconomic developments are determined endogenously on the basis of public finance assumptions.

General equilibrium models have been widely used in academic literature to analyse the impact of population ageing on fiscal sustainability and macroeconomic developments. While such models are more consistent with economic theory than sustainability assessments based on simple indicators, their results are more difficult to communicate in the context of policy discussions. The cost of developing and maintaining such models is high, so that the trade-off between theoretical consistency and transparency or communicability thus far remains in favour of simple sustainability indicators.

Turning to the second aspect, uncertainty affects the upper bound of a country's sustainable debt level. Taking into account uncertainty about macroeconomic or public finance developments is crucial for assessing a government's capacity to fulfil its debt obligations regardless of economic shocks. The realisation of a series of particularly adverse macroeconomic or fiscal shocks can make it impossible for a government to fulfil its debt obligations. Even if the

12 Mongelli (1996) analyses the linkage between sustainability and fiscal discipline in a model in which the interest rate is determined endogenously as a function of public debt.

probability of such adverse developments is low, they have implications for a government's sustainable debt level.

Sustainability analysis under uncertainty assesses the likelihood that a government cannot repay its debt. Fiscal risks are estimated on the basis of a probabilistic approach. In particular in the presence of shocks to revenue or primary expenditure, the debt ratio in period T would depend on both the initial debt ratio and the realised sequence of primary deficits. From equation [5][13] one can easily derive the expected value (on the initial date) of the debt ratio on date T:

$$E_{-1}\left(\tilde{b}_T\right)=\sum_{i=0}^{T}\left(\frac{1+r}{1+g}\right)^{T-i}E_{-1}\left(\tilde{d}_i\right)+\left(\frac{1+r}{1+g}\right)^{T+1}b_{-1} \quad [14]$$

where E is the expectation operator, stochastic variables are indicated with a tilde, $b_{-1}=B_{-1}/Y_{-1}$ is the initial debt ratio, $\tilde{b}_T\left(=B_T/Y_T\right)$ the debt ratio on date T and $\tilde{d}_i\left(=E_i/Y_i-T_i/Y_i\right)$ the primary deficit on date i. In a nutshell, assessing fiscal risks amounts to estimating the probability that a sequence of adverse shocks would lead to an unsustainable debt ratio:

$$\text{Prob}\left(\tilde{b}_T\geq\bar{b}|b_{-1}\right)=f\left(b_{-1},r,g,\left\{\tilde{d}_i\right\}\right) \quad [15]$$

where $\bar{b}$ is defined as the debt ratio above which the government would no longer able to fulfil its debt obligations.[14] While this probability is clearly increasing in the case of the initial debt ratio and the interest rate and decreasing in that of the growth rate, its dependence on path of primary deficits is affected by the underlying stochastic process. Knowing the process driving primary deficits, one can assess the sustainability risks by generating a set of scenarios on the basis of which the probabilities of a government exceeding its maximum debt ratio by a given date are calculated.

This approach needs to be underpinned by a fully fledged model of the economy in order to estimate the probability of different macroeconomic scenarios. To be meaningful, risk scenarios have to account for the economic relationship between macroeconomic variables, in particular the correlations between observed shocks. Sustainability analysis under uncertainty is therefore often carried out in the context of an estimated macroeconomic model. This probabilistic approach is particularly relevant for countries that are subject to significant macroeconomic or revenue uncertainty, such as emerging market economies.[15]

A deterministic approach to assessing sustainability would clearly not be able to capture fiscal risks in countries characterised by significant macroeconomic or revenue volatility.[16] In the case of developed economies, which are in general less subject to macroeconomic volatility and in which long-term sustainability is less uncertain, deterministic sustainability assessments that are complemented with risk scenario analysis generally provide an adequate picture of the fiscal risks ahead.

2.2 PRACTICAL APPLICATIONS

This section sets out the different approaches that are used in practice to assess the long-term sustainability of public finances.

2.2.1 DEBT

From the theoretical part above, the debt ratio emerges as a central variable for the assessment of sustainability. An analysis of the behaviour of the debt ratio is therefore a first step in the analysis of fiscal sustainability.

The most straightforward and, for practical purposes, most widely used indicator underlying assessments of fiscal sustainability is *(gross) government debt*, usually expressed as a percentage of GDP. High and rising debt-to-GDP ratios indicate potential sustainability problems. Accordingly, governments trying to signal a substantive shift in their fiscal policies,

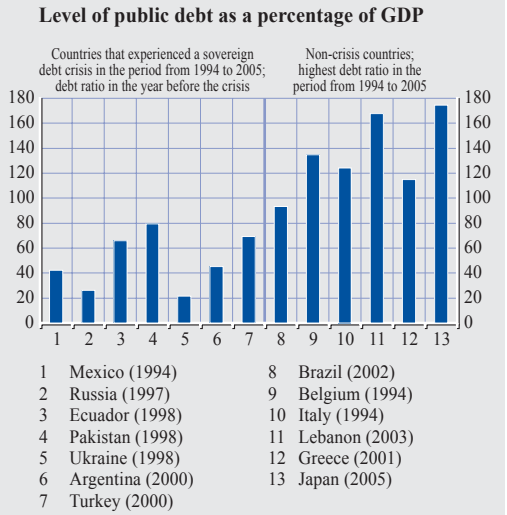
13 For the sake of simplicity, we assume here that both the interest rate and the growth rate are constant.
14 With regard to the endogenous determination of this debt limit, see Mendoza and Oviedo (2005).
15 See Mendoza and Oviedo (2004) and Celasun et al. (2006) for applications to emerging market countries.
16 See Hausmann and Purfield (2004) for a practical discussion.

e.g. to regain or establish credibility, have frequently used the announcement and implementation of declining ratios of public debt to GDP to convince markets of their ability to maintain long-term solvency. Furthermore, the stabilisation (and reduction) of the debt-to-GDP ratio is frequently part of IMF-supported stabilisation programmes. The advantages of this indicator are that it is easy to interpret and that the underlying data are usually widely available and relatively reliable.

In the EU framework for fiscal policies, the debt ratio (relative to GDP) features particularly prominently. Together with the deficit ratio, it serves as an indicator of the existence of excessive deficits that are deemed potentially harmful to economic stability and growth. In particular, countries with debt ratios above the reference value of 60% of GDP may be deemed to be in excessive deficit and called to correct this situation under the monitoring of the EU institutions. In practice, however, debt in excess of the debt reference value has thus far not been used in justification of the respective steps provided for under the excessive deficit procedure.

The use of the debt ratio for assessing sustainability in practice is impeded by the fact that neither theory nor practical experience give a clear indication of which debt level is too high and would thus threaten the fiscal sustainability of a country. Looking at country experiences over the past 20 years, solvency crises occurred at very different levels of debt-to-GDP ratios. The IMF found that more than half of the sovereign debt crises had occurred at public debt levels of below 40% and two-thirds at public debt ratios below 60%. Likewise, solvency crises did not occur at debt levels very similar to, or even higher than, those of crisis countries. The chart below shows this point. On the one hand, the chart depicts countries that had a solvency crisis in the past 20 years, together with the debt ratio recorded in the year before the crisis. In addition, it depicts selected high-debt European and other countries that did not have a solvency crisis. In this regard, the use of the debt-financed resources is important. If debt is used to finance productive investment that yields higher long-term growth rates, overall fiscal sustainability will be likely to improve. By contrast, using debt to finance unproductive expenditure puts pressure on sustainability.

A comparison of public debt-to-GDP ratios in crisis and non-crisis countries



Sources: IMF World Economic Outlook. The crisis dates for countries that experienced a sovereign debt crisis were taken from Roubini and Setser (2004).

The shortcomings of the debt ratio as an indicator of fiscal sustainability point to three areas of further development.[17]

First, as the debt ratio on its own cannot explain the sustainability of public finances ex ante, a wide range of ratios is used that express the *debt level as a percentage of other economic variables*, e.g. the debt-to-revenue ratio. As does the debt-to-GDP ratio, however, these other ratios suffer from the difficulty of determining an appropriate ex ante threshold. Because this aspect is closely related to short-term stability concepts, it will be discussed in the section on short-term stability.

17 See also Mink and Rodriguez-Vives (2004) for a discussion of the debt concept from a statistical perspective.

Categories of government liabilities

	Non-contingent liabilities (the existence of government obligations does not depend upon particular events)	Contingent liabilities (the existence of obligations depends upon the occurrence of particular events)
Explicit (government obligations have legal basis)	– Government debt – Government expenditure commitments (legally enforceable) – Provisions (e.g. clearly defined accrued pension rights not backed by a fund)	– Government guarantees on specific debt liabilities issued by public and private entities – Government umbrella guarantees (e.g. on household mortgages, etc.) – Government insurance schemes (for bank deposits, for returns on private pension funds, etc.)
Implicit (government obligations do not have a legal basis and arise as a consequence of expectations created by past practices or pressures from interest groups)	– Future welfare payments (pension payments related to pension rights that have not yet matured, future health care payments, etc.) – Future government expenditure related to recurrent operations (e.g. capital stock refurbishment, etc.)	– Bail-out of defaulting public sector or private entities (public corporations, banks or other private financial institutions, pension and social security funds, etc.) – Disaster relief – Environmental damage – Military financing

Source: Brixi Polackova and Mody (2002).

Second, the debt concept should take account of those assets that could quickly be liquidated to repay gross debt. The gross debt is the value of total financial liabilities outstanding. Net debt equals gross debt less liquid financial assets (e.g. equity shares and bonds) held by the government. The net debt is more relevant because financial assets can be sold to service the debt. In the EU, financial assets are estimated to total 27% of GDP. An extreme example is Japan where the difference between gross debt and net debt is about 100% of GDP, indicating that the Japanese Government holds considerable financial assets (gross debt is given at 161% of GDP, while net debt is 62%).[18] The disadvantage of the net debt concept is the difficulty of assessing the extent to which assets might be actually available for immediate liquidation to meet outstanding liabilities. In particular, a government's attempt to sell large amounts of financial assets, e.g. holdings in large companies, may depress their market value, so that their true value in an emergency situation is far less than that expected in normal circumstances.

Third, the definition of the gross debt ratio, as recorded in the national accounts, needs to be expanded. *Other liabilities* that are traditionally not recorded as public debt (e.g. government guarantees, etc.) are often an important source of increases in public liabilities. The most prominent examples are implicit guarantees extended to the financial system and large non-financial enterprises. The average fiscal costs of banking crises have been estimated at about 16% of GDP for a large sample of past crises and can be even higher when banking crises are accompanied by currency crises (for the crises in Sweden and Finland, the fiscal costs have been estimated at up to 15% of GDP). It follows that the definition of debt should be as comprehensive as possible, which implies that any obligations that the government has assumed outside its budgetary system (e.g. pension liabilities, government guarantees, etc.) should be taken into account as well.

In order to account for all fiscal obligations, it is useful to categorise fiscal liabilities by their particular degree of certainty and the existence of a legal basis for such an obligation. If government obligations arise only when a particular event occurs, then the corresponding liabilities are contingent liabilities. If the liability arises in any event, by contrast, it is a non-contingent liability. If government obligations have a legal basis (i.e. are backed by law or contracts), then the corresponding liabilities are said to be explicit. If they are generated, instead, by legitimate expectations in the general public that are related to a past pattern of government behaviour or to pressure

18 OECD Economic Outlook, Statistical Annex.

from interest groups, the corresponding liabilities are said to be implicit. Table 1 lays out the categories of public liabilities.[19]

Conventional fiscal analysis tends to concentrate on governments' *non-contingent explicit liabilities*. In the national accounts, liabilities arise for the government only as a result of obligations backed by law and if the obligation is independent of a particular event. These include repayments of sovereign debt, already committed budget expenditures and future expenditures for legally mandated obligations (such as civil service pensions).

Non-contingent implicit liabilities are often a presumed, longer-term consequence of fiscal policies and are generally not captured in government balance sheets. In countries with pay-as-you-go pension schemes, for example, future pensions constitute non-contingent implicit liabilities. Their magnitude is determined by the level of the pension benefits and the eligibility. Often expenditure on health care and education is included in estimations of non-contingent implicit liabilities. In contrast to future pensions, there is no intergenerational contract for health and education expenditures beyond a minimum provision. And even in the case of pension obligations – which are usually considered to be a clear-cut case of non-contingent implicit liabilities – it could be argued that the legal basis might, in principle, be changed at any time. Nevertheless, efforts are currently underway to capture accrued liabilities from public pension systems within the statistical framework of the national accounts and to generate comparable estimates across countries.[20]

Contingent explicit liabilities are legal obligations for governments to make payments only if particular events occur. Common examples are government guarantees and government insurance schemes. Guarantees are normally issued for beneficiaries on an individual basis via contracts. In contrast to government guarantees, the government's risk attached to insurance schemes is not necessarily related to the liabilities of particular entities and may involve a wide set of events. Typically, they cover risks that are deemed to be uninsurable via private contracts, e.g. those of infrequent but potentially very large losses. An example could be the insurance, by the government, of private pension schemes where the purpose is to reduce the risk of private pension subscribers in the event of the private pension scheme failing. *Contingent implicit liabilities* are not officially recognised until such time as a failure occurs. The triggering event, the value at risk, and the amount of the government outlay that could eventually be required are all uncertain. In most countries, the support of the financial system in the case of crisis represents the most serious contingent implicit liability. Experience has shown that, when the stability of a country's financial system is at risk, markets usually expect the government to provide the necessary financial support to stabilise the system.

2.2.2 DEBT PROJECTIONS

Given the long-term nature of the concept of fiscal sustainability, not only the current level of the debt ratio (even if expanded to cover additional potential liabilities) is relevant, but also its future development.

Projections of the development of the debt ratio thus represent a central element for the assessment of fiscal sustainability. In their simplest form, such projections use equation [2] to derive the behaviour of the debt ratio for a specific set of assumptions regarding the other variables, i.e. output and the interest rate as well as government revenue and expenditure. This simple approach can be expanded to capture additional risks and macroeconomic interlinkages. For example, scenario analysis makes it possible to assess the impact of alternative growth and interest rate assumptions on the results. For small open economies, assumptions regarding exchange rates may also play a major role as they determine the foreign

19 See Brixi Polackova and Mody (2002).
20 See, for example, Mink and Rother (2006).

currency-denominated debt burden and also have a major impact on the behaviour of output. Contingent liabilities, e.g. the costs of banking crises, can be added to assess the risk of an explosive debt path as a result of a one-off shock to the debt ratio. As a practical example, IMF country reports routinely incorporate debt sustainability analysis for the medium term that is based on projections regarding fiscal and macroeconomic variables.

For the industrialised countries, demographic ageing has been identified as a major source of future public expenditure obligations with important effects on fiscal sustainability.[21] Consequently, the fiscal burden arising from population ageing has received particular attention for the assessment of sustainability. In the European context, the Economic Policy Committee (EPC) and the European Commission have developed projections of ageing-related expenditure until 2050 (see Box 1). Such projections can then be used to project the development of the debt ratio.

21 See Maddaloni et al. (2006) for a comprehensive presentation of the economic consequences of demographic ageing.

Box 1

PROJECTIONS ON THE IMPACT OF AGEING ON PUBLIC EXPENDITURE

The Economic Policy Committee (EPC) and the European Commission published their report "Age-related public expenditure projections for the EU25 Member States up to 2050" on 14 February 2006. The report presents projections of the impact of demographic ageing on public expenditure until 2050 for all EU countries. The report is an update of earlier studies by the Working Group on Ageing, including a similar report of 2001, which was endorsed by the Ecofin Council in November 2001.

The five areas of public expenditure considered in this report are: pensions, health care, long-term care, education and unemployment benefits. The projections are based on commonly agreed assumptions regarding the future behaviour of demographic and key macroeconomic variables. The demographic projections were provided by Eurostat, in cooperation with national statistical institutes. With regard to macroeconomic variables, the overall employment rate (age 15-64) in the countries now forming the EU25 is assumed to rise from 63.1% in 2003 to 70.9% in 2050, reflecting higher participation rates and declining unemployment. In particular, the aggregate unemployment rate would fall from 9.3% to 6.1%. Labour productivity growth in the EU15 would rise from an average of 1.3% in the period from 2004 to 2010 to 1.8% in that from 2011 to 2030, and remain broadly stable thereafter. Labour productivity growth rates in the EU10 countries would be about 1.2 percentage points higher, on average, than in the EU15 until 2030, and only slightly higher thereafter. Potential GDP growth is derived by combining the employment and productivity assumptions. For the EU25, the annual average potential GDP growth rate is projected to decline from 2.4% in the period from 2004 to 2010 to 1.2% in that from 2031 to 2050. The projected fall in potential growth rates is much higher in the EU10. For the EU10, an average potential GDP growth rate of 4.5% between 2004 and 2010 is projected to fall to 0.9% between 2031 and 2050. In addition, a real interest rate of 3% is assumed throughout the projection period, while inflation is set at 2%. Sensitivity tests are carried out to assess the elasticity of the results with regard to changes in the underlying assumptions.

Different methodologies are applied to estimate the change in ageing-induced expenditure in the individual areas. Pension projections were carried out by national authorities, using their

own respective methods. In the areas of health and long-term care, by contrast, as well as in those of education and unemployment benefits, the European Commission has estimated the effects. For this, the Commission combined country-specific information with a commonly agreed projection methodology.

The results for the baseline assumptions point to substantial ageing-induced expenditure pressures in many EU countries (see table). By 2050, the increase in spending will amount to 3% of GDP per annum or more in thirteen countries and will be close to, or exceed, 7% in Spain, Luxembourg, Portugal, Cyprus, Hungary and Slovenia (even without long-term care expenditure for some countries). For some countries, by contrast, the projected burden is relatively small, reflecting mainly low (or even negative) additional expenditure for pensions. At the aggregate level, in spite of the reforms implemented in several countries, the results are similar to those of the earlier study. Changes in the projected burden at the country level reflect the implementation of reforms, but also different assumptions regarding demographic and macroeconomic variables, as well as coverage of the simulations.

From a policy perspective, the projections point to a clear need for some countries to address the issue of ageing-induced expenditure pressures as a matter of urgency. The need for reforms is also reflected at the European level. In the current broad economic policy guidelines, it was agreed that "Member States should, in view of the projected costs of ageing populations, undertake a satisfactory pace of government debt reduction to strengthen public finances, reform pension and health care systems to ensure that they are financially viable while being socially adequate and accessible, and take measures to raise employment rates and labour supply". The report shows that countries that have reduced their pension obligations by reforming their pay-as-you-go pension systems and by introducing privately funded arrangements have alleviated the ageing-induced pressure on public finances significantly. In the area of health care, the extent of public financing of health care services may need to be reviewed. Higher employment ratios, including those of older people, could also contribute significantly to improving fiscal sustainability.

Uncertainty with regard to the projection results calls for increased prudence to ensure fiscal sustainability. For example, the assumptions on employment and productivity growth may be optimistic and not materialise fully. In the area of health care costs, the impact of other factors, in addition to ageing, such as the introduction of new expensive technologies, may have been underestimated. Education expenditure projections are based on the assumption that employment is adjusted rapidly to the declining number of students. In addition, the pension projections are based on national models whose structure has not been disclosed in detail, so that the derivation of the results is not fully transparent and their assessment tentative. The national institutions assigned to make the projections are often those responsible for designing social policy. On the policy side, while some public pension systems may appear financially sustainable, this may reflect very low benefits for future pensioners, raising questions as to future political pressures to raise benefit levels. Similarly, further fiscal risks could arise if private pension systems fail to provide the envisaged pension benefits, forcing governments to take on additional burdens.

Overall, the projections of the Working Group on Ageing represent a useful contribution to the discussion of long-term fiscal sustainability. It is expected that they will form an important

basis for a wider assessment of fiscal sustainability in EU countries. The fiscal challenges related to the ageing process and the role that long-term projections are assuming in the Stability and Growth Pact call for further technical efforts at the EU and national levels to improve the quality and comparability of the projections. Assumptions, models and results should be described in great detail in order to ensure transparency.

Projected changes in age-related public expenditure between 2004 and 2030/2050

(percentage of GDP)

	Pensions		Health care		Long-term care		Unemployment benefits		Education		Total	
	Change from 2004 to:		Change from 2004 to:		Change from 2004 to:		Change from 2004 to:		Change from 2004 to:		Change from 2004 to:	
	2030	2050	2030	2050	2030	2050	2030	2050	2030	2050	2030	2050
Belgium (BE)	4.3	5.1	0.9	1.4	0.4	1.0	-0.5	-0.5	-0.6	-0.7	4.5	6.3
Denmark (DK)	3.3	3.3	0.8	1.0	0.6	1.1	-0.3	-0.3	-0.4	-0.3	4.0	4.8
Germany (DE)	0.9	1.7	0.9	1.2	0.4	1.0	-0.4	-0.4	-0.8	-0.9	1.0	2.7
Greece (EL)			0.8	1.7			-0.1	-0.1	-0.5	-0.4		
Spain (ES)	3.3	7.1	1.2	2.2	0.0	0.2	-0.4	-0.4	-0.7	-0.6	3.3	8.5
France (FR) [1]	1.5	2.0	1.2	1.8			-0.3	-0.3	-0.5	-0.5	1.9	2.9
Ireland (IE)	3.1	6.4	1.2	2.0	0.1	0.6	-0.2	-0.2	-0.9	-1.0	3.3	7.8
Italy (IT)	0.8	0.4	0.9	1.3	0.2	0.7	-0.1	-0.1	-0.8	-0.6	1.0	1.7
Luxembourg (LU)	5.0	7.4	0.8	1.2	0.2	0.6	0.0	-0.1	-0.5	-0.9	5.4	8.2
Netherlands (NL)	2.9	3.5	1.0	1.3	0.3	0.6	-0.2	-0.2	-0.2	-0.2	3.8	5.0
Austria (AT)	0.6	-1.2	1.0	1.6	0.3	0.9	-0.1	-0.1	-0.9	-1.0	0.9	0.2
Portugal (PT) [1]	4.9	9.7	-0.1	0.5			-0.1	-0.1	-0.6	-0.4	4.1	9.7
Finland (FI)	3.3	3.1	1.1	1.4	1.2	1.8	-0.4	-0.4	-0.6	-0.7	4.7	5.2
Sweden (SE)	0.4	0.6	0.7	1.0	1.1	1.7	-0.2	-0.2	-0.7	-0.9	1.3	2.2
United Kingdom (UK)	1.3	2.0	1.1	1.9	0.3	0.8	0.0	0.0	-0.5	-0.6	2.2	4.0
Cyprus (CY) [1]	5.3	12.9	0.7	1.1			0.0	0.0	-1.9	-2.2	4.1	11.8
Czech Republic (CZ)	1.1	5.6	1.4	2.0	0.2	0.4	0.0	0.0	-0.9	-0.7	1.8	7.2
Estonia (EE) [1]	-1.9	-2.5	0.8	1.1			0.0	0.0	-1.1	-1.3	-2.3	-2.7
Hungary (HU) [1]	3.1	6.7	0.8	1.0			0.0	0.0	-1.0	-0.7	2.8	7.0
Lithuania (LT)	1.2	1.8	0.7	0.9	0.2	0.4	-0.1	-0.1	-1.6	-1.6	0.3	1.4
Latvia (LV)	-1.2	-1.2	0.8	1.1	0.1	0.3	-0.1	-0.1	-1.2	-1.4	-1.5	-1.3
Malta (MT)	1.7	-0.4	1.3	1.8	0.2	0.2	-0.2	-0.2	-1.2	-1.2	1.8	0.3
Poland (PL)	-4.7	-5.9	1.0	1.4	0.0	0.1	-0.4	-0.4	-2.0	-1.9	-6.1	-6.7
Slovakia (SK)	0.5	1.8	1.3	1.9	0.2	0.6	-0.2	-0.2	-1.5	-1.3	0.3	2.9
Slovenia (SI)	3.4	7.3	1.2	1.6	0.5	1.2	-0.1	-0.1	-0.7	-0.4	4.4	9.7
EU25	1.3	2.2	1.0	1.6	0.2	0.6	-0.3	-0.3	-0.7	-0.6	1.6	3.4
EU15 (old EU)	1.5	2.3	1.0	1.6	0.3	0.7	-0.2	-0.2	-0.6	-0.6	1.9	3.7
Euro area	1.6	2.6	1.0	1.5	0.2	0.5	-0.3	-0.3	-0.7	-0.6	1.9	3.7
EU10 (new MS)	-1.0	0.3	0.9	1.3	0.1	0.2	-0.2	-0.2	-1.5	-1.3	-1.8	0.2
EU9 (EU10 excl PL)	1.6	4.8	0.9	1.3	0.2	0.3	-0.1	-0.1	-1.1	-0.9	1.5	5.4

Source: EPC/AWG, EU Commission (2006), Age-related public expenditure projections for the EU25 Member States up to 2050.
Notes: These figures refer to the baseline projections for social security spending on pensions, education and unemployment transfers. For health care and long-term care, the projections refer to "AWG reference scenarios".
1) Total expenditure for FR, PT, CY, EE and HU does not include long-term care.

2.2.3 SYNTHETIC INDICATORS: SUSTAINABILITY GAPS

Synthetic indicators can be computed from debt projections to gauge the size of a fiscal adjustment necessary for the achievement of a specific debt target in the future. For example, the European Commission has presented two indicators reflecting finite and infinite horizon considerations respectively. The S1 indicator is the difference between the ratio of the constant primary balance to GDP that is required to reach a gross debt ratio of 60% of GDP in 2050 and the current primary balance ratio. It is therefore similar to the sustainability gap with a finite horizon and the fixed debt ratio discussed in equation [13]. The S2 indicator shows the change in the ratio of the primary balance to GDP that would be needed to equate the present discounted value of future primary balances over the infinite horizon with the current level of debt. The S2 indicator is therefore derived in the same spirit of equation [9]. These indicators provide a gauge of the scale of budgetary adjustment required for a Member State to reach a sustainable public finance position. Box 2 presents an example of the calculation of the S1 and S2 indicators.

Box 2

A STYLISED EXAMPLE OF THE USE OF THE S1 AND S2 INDICATORS

The mechanics of the application of the S1 and S2 indicators can be shown on the basis of a hypothetical model country with a debt ratio of 60% of GDP, a nominal interest rate of 6%, a nominal growth rate of 4% and a (fixed) revenue ratio of 42.6% of GDP. With an initially balanced budget, total primary expenditure totals 39% of GDP and interest expenditure amounts to 3.6% of GDP. Assuming further that there will be a linear increase in ageing-related expenditure totalling 5 percentage points between 2010 and 2030, the primary expenditure ratio will rise to 44% of GDP by 2030.

Without any adjustment, the model country initially moves from a balanced budget to fiscal surpluses which will peak in 2010, reflecting lower interest costs with a declining debt ratio (see thick line in charts A and B below). With the onset of the ageing-induced cost pressures, however, total expenditure rises and the country starts to run increasing deficits in 2015. Until 2030, these deficits are driven by the combined effect of higher interest expenditure and the rising ageing-related costs. The termination of the latter effect in 2030 reduces the slope of the fiscal balance curve. The debt ratio declines until 2021, and then rises to more than 100% of GDP by the end of the projection period, with a steep upward trend.

The S1 indicator is calibrated to achieve a debt ratio of 60% in 2050. For the given parameters, this requires an immediate and permanent increase of 0.6% of GDP in the primary balance. As can be seen from the thin lines in charts A and B below, this adjustment shifts the balance and debt curves upwards. With this fiscal adjustment, high and more rapidly rising deficit and debt ratios can be delayed, but they will not be averted, and the debt ratio is on an unsustainable path at the end of the projection horizon.

Fiscal adjustment in line with the S2 indicator ensures fiscal sustainability over the infinite horizon. As is shown by the dotted line in charts A and B below, this requires an immediate and permanent increase of 1.3% of GDP in the primary balance. Such an adjustment will set the debt ratio on a permanently declining path as it is sufficient to cover the total ageing-related cost increase as well as the ongoing costs of the initial debt burden. After peaking at 2.4% of

GDP in 2010, the overall fiscal balance declines to close to zero in 2030. The debt ratio declines rapidly and converges to a negative value (i.e. an asset position) of 4% of GDP.

It should be noted that the model country starts from the relatively favourable position of a balanced budget and a solid primary surplus before the onset of the ageing-induced fiscal burden. A lower primary surplus or even a primary deficit would translate fully into a larger adjustment need at the start of the projection period.

Chart A Public debt ratio

(as percentage for GDP)

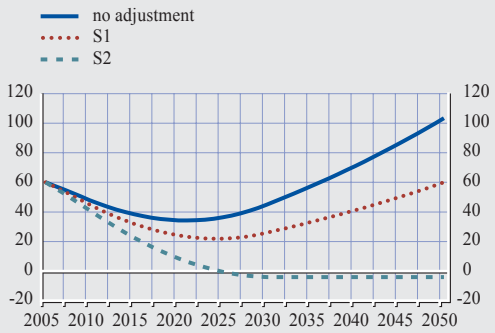
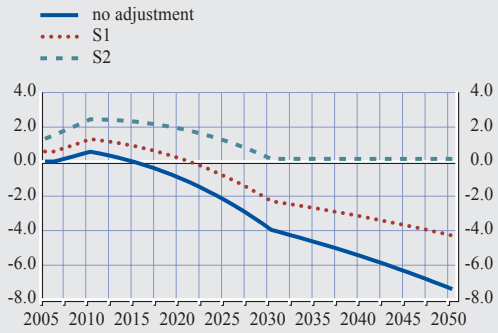


Chart B Fiscal balance

(as percentage for GDP)



On the basis of this approach, the Commission and the Ecofin Council regularly assess long-term sustainability in the context of the Stability and Growth Pact. These assessments are an integral part of budgetary surveillance in the EU. An overview of these assessments is usually made available in the Commission's reports on "Public Finances in EMU".[22] In addition, the Commission published its report on "The long-term sustainability of public finances in the European Union" in October 2006, drawing on the projections in the report of the EPC and the European Commission.

The main quantitative results of the 2006 report[23] are as follows: the Commission projects that population ageing will lead to an increase of up to 12 percentage points in public spending by 2050, if no corrective action is taken. Due to the increase in age-related expenditure, around two-thirds of the EU Member States will experience debt levels above 60% of GDP in 2050 even if current fiscal plans, as provided in stability and convergence programmes, are implemented in full. The risk of debt levels above 60% of GDP increases considerably if the Member States do not achieve their own targets. The sustainability gap indicates that, if consolidation policies are implemented in countries with fiscal imbalances over the next few years, an additional permanent budgetary adjustment – over and beyond the attainment of the current fiscal targets – of 2% of GDP or more is needed in more than half of the Member States to ensure the long-term sustainability of public finances. In some countries, the required adjustment is much higher. Should countries fail to implement such consolidation policies in the near term, the necessary budgetary adjustment can go up by several additional percentage points.

22 The long-term budgetary projections and the methodology underpinning the quantitative indicators used to assess the sustainability of public finances were prepared by the Working Group on Ageing attached to the EPC. The actual assessment of the sustainability of public finances based on stability and convergence programmes is made by the Commission. Another example for the application of synthetic indicators is the approach used by the Treasury in the United Kingdom (see HM Treasury (2005)).

23 See European Commission (2006), Special Report No 4.

The limitations of the use of synthetic indicators are clear and the results need to be interpreted with caution. Based on a mechanical, partial equilibrium analysis, projections are sensitive to the underlying assumptions and, in some cases, show highly accentuated profiles. In particular, alternative assumptions regarding the primary balance at the start of the projection period can result in sizeable differences in the projected behaviour of the debt ratio. In addition, different assumptions regarding the real interest rate and the growth rate (possibly reflecting measurement problems for past values) can lead to substantial differences in the assessment. As a consequence, the projected evolution of debt levels is not a forecast of possible, or even likely, outcomes. Instead, the indicators are a tool to facilitate policy debate and, at best, provide an indication of the timing and scale of emerging budgetary challenges that could occur on the basis of a policy of "no change". For this reason, the Commission assessment supplements the quantitative indicators with qualitative assessments of the overall economic and fiscal situation.

2.2.4 OTHER INDICATORS

Over and beyond the information provided by debt ratios and sustainability gaps, the method of generational accounting adds a further dimension to long-term fiscal analysis. This dimension is the net contribution of an average member of an individual cohort (i.e. a group of people born at roughly the same time and bonded by common life experiences) to public finances. In particular, generational accounts are defined as the present value of taxes paid minus transfer payments received by individuals of different cohorts over their remaining lifetimes. As a result, the accounts show each generation's net contributions to or net benefits from the public.

The underlying projection methodology of generational accounts is similar to that outlined above. In particular, fiscal projections are generated using a set of macroeconomic and fiscal policy assumptions. To project the generational accounts, it is assumed that cohort-specific transaction patterns remain stable. For example, a typical agent of 40 years of age is expected ten years ahead to pay the same net transfer to the public household as today's typical agent of 50 years of age. An adjustment is made for productivity increases.

The use of generational accounts is twofold. They allow fiscal sustainability to be assessed in a manner similar to the approaches discussed above and they permit an analysis of the distribution of fiscal burdens across generations. This applies, in particular, to the area of public pensions where the issue of inter-generational transfers features most prominently. Regarding fiscal sustainability, the basic generational accounting approach to assess fiscal sustainability is akin to the aforementioned approaches. The generational accounts of all living generations are used to compute the difference between total public revenues and expenditures in net present value terms. The sustainability gap is then assumed to be borne entirely by future generations. For the sake of simplicity, it is generally assumed that all future generations will bear the same share of the burden.

Information regarding the distribution of the fiscal burden represents the major benefit from generational accounts. This is of particular interest when assessing the distributional impact of fiscal reforms, most notably changes in pension arrangements. While their impact on fiscal sustainability can be computed without regard to specific generational effects, the answer to the question as to who will eventually be paying for the reform needs to be based on a generational comparison. Thus, generational accounts are useful to determine also the political acceptability of certain reform proposals by identifying the respective groups that will profit or lose.

The additional information from generational accounts comes at a cost. On the technical side, the method is quite data-intensive as it requires information regarding the distribution across age groups of all current payment streams

between the public accounts and households. In other words, all taxes and social security contributions as well as all transfer payments need to be allocated across the age structure of the population. From the theoretical perspective, the usefulness of the information from generational accounts regarding distributional effects hinges on the validity of the life-cycle hypothesis.[24] Only if consumers maximise utility exactly over their entire lifetime can changes in payment streams to and from the public accounts be used to determine changes in welfare. By contrast, if the utility maximisation period exceeds the lifetime (e.g. in the case of altruism for future generations), or if it falls short (in the case of myopic behaviour or borrowing constraints), generational accounts no longer reflect the welfare implications of fiscal policy measures. It should be noted that empirical support for the life-cycle hypothesis is mixed. In addition, generational accounts generally have nothing to say about the distributional effects of government consumption, which accounts for some 20% of GDP in the euro area. In view of the difficulties in allocating the implicit transfers, public consumption is generally assumed to be neutral in terms of distribution.

An alternative empirical avenue to assess fiscal sustainability from a backward-looking perspective is based on econometric tests of the past time series behaviour of fiscal variables.[25] In particular under certain assumptions regarding the behaviour of GDP growth and interest rates, stationarity and co-integration tests can be used to assess fiscal policy sustainability. One approach focuses on the stationarity properties of public debt. Another approach looks at the behaviour of the determinants of the deficit ratio, i.e. the growth rates of expenditure and revenue. If the two variables are co-integrated, the fiscal deficit is stationary and fiscal policies are deemed sustainable. Finally, co-integration between the primary balance and public debt has been proposed as a test of sustainability, as – broadly speaking – given constant interest rates, sustainability is ensured if primary surpluses rise with rising public debt. The advantage of the ex post approach is its relatively intuitive explanation and connection to the theoretical foundations as explained above. From a practical point of view, however, its major downside is its backward orientation. According to this approach, the fiscal policies of many industrialised countries in the past 30 years qualify as "unsustainable" even though no solvency crises occurred.

Finally, the government net-worth approach moves beyond the usual separation of stock and flow variables in the analysis of sustainability and focuses instead on a balance sheet view of the government, similar to that of corporations.[26] Fiscal sustainability is equivalent to the government having a positive net worth. While intuitive, the approach faces a number of practical difficulties. In particular, the assessment requires setting up a comprehensive balance sheet for the entire public sector. This includes evaluating all future financial flows from assets and liabilities and discounting these to the present at an appropriate discount rate. Nevertheless, the approach has received interest from some governments and has been applied to a number of countries by academics.[27]

3 SHORT-TERM STABILITY CONCEPTS

In addition to the long-term fiscal sustainability discussed in the previous section, another dimension of a government's financial position is crucial for fiscal soundness, namely financial stability, i.e. its ability to fulfil short-term payment obligations without causing disruptions in the economy. As discussed above, the importance of analysing short-term stability increases the more uncertain are the prospects of the government's ability to honour its obligations in the long term. Essential for maintaining financial stability is the availability

24 See Buiter (1995) for a discussion.
25 See Chalk and Hemming (2000) for a discussion of the concepts, and Afonso (2005) for a recent application to European countries.
26 See Tanzi (2006) for a discussion.
27 See also Schick (2005).

of liquid assets. Financial stability derives from two sources, namely (i) the government's ability to generate the necessary resources internally via revenue increases or expenditure reductions and (ii) its access to borrowing liquidity on the financial market. By contrast, instability could arise in response to short-term liquidity shortages that force a government to adopt emergency tax or expenditure measures to preserve its ability to pay its obligations. Alternatively, disruptions can emerge when an illiquid government is forced to borrow at very high interest rates due to a loss of creditworthiness.

This section focuses on the factors determining access to external financing in the short run. This is because, given the size of their liquidity needs, most governments rely to a large extent on continuous market financing. In view of the voluntary nature of such transactions, the assessment of financial stability needs to take the determinants of investor behaviour into account.

3.1 ANALYTICAL APPROACHES

Two approaches in literature on the underlying theory provide insight into why financial market participants may cease to provide external financing to governments. Basically, unwillingness by investors to provide financing for governments reflects the expectation that the government may not redeem the credit granted, given that governments cannot credibly commit to honour their obligations ex ante. The first (fundamentals-based) approach focuses on a government's failure to ensure fiscal sustainability as discussed above. Once investors become convinced that a government will not be able to service its debt obligations, they may shut off access to further financing or raise the risk premia. The second (expectations-based) approach reflects the fact that a large number of lenders cannot coordinate their activity among themselves. Thus, once an individual investor becomes convinced that the other investors will terminate their financing to the government, that investor will end his own extension of credit. This behaviour can result in a self-fulfilling creditor run where a government finds itself shut off from external financing even if all creditors agree collectively that its fiscal position is sustainable in the long run.

3.1.1 FUNDAMENTALS-BASED APPROACH

In the first approach, the unwillingness of financial market participants results from their perception that government finances are not sustainable. Such a change in perception could be brought about by a shock to one of the variables entering the sustainability assessment. For example, an increase in the interest rate level would increase the government's debt servicing burden. Alternatively, a negative shock to public finances due to the need to assume additional debt to resolve a banking crisis could lead to the perception that the new debt level is no longer sustainable. Thus, in this approach, the investor behaviour simply transforms the unsustainability of the fiscal position, which would necessitate some adjustment in the future, into a fiscal crisis in the present.

The perception of a decline in expected long-term fiscal sustainability can trigger an actual fiscal crisis in the short run.[28] Reduced willingness by investors to supply funds would ceteris paribus result in higher risk premia and, consequently, in a larger fiscal debt servicing burden. In addition, investors may increasingly be willing to lend only at short maturities. While borrowing at shorter maturities tends to be cheaper for the government, it increases the frequency with which the government has to draw on the capital market for its financing. As a consequence, a decision by market participants not to roll over debt, or to do so at much higher risk premia, would affect a larger share of total public debt and could eventually force the government into default.

28 See Krugman (1979).

3.1.2 CREDITOR CO-ORDINATION BASED APPROACH

The second approach takes into account that governments generally borrow from a relatively large number of financial market participants who cannot coordinate their lending decisions among themselves. Uncertainty over the lending behaviour of other investors results in the existence of multiple equilibria where the outcome is driven by market participants' expectations. As long as the individual lender expects other participants to continue their financing of the government at low risk premia, he will also provide financing in anticipation that the government will be able to redeem the old credit by taking up new credit. However, if expectations switch, risk premia will rise and government credit will dry up. In the simplest case, once the individual investor expects that the government may fail to raise sufficient credit to cover its existing obligations, he will cease entirely to provide financing. Alternatively, the individual investor may raise the risk premium for new lending if he assumes others are behaving in a similar manner.

In the aggregate, if a sufficient number of investors share this expectation, the outcome will be in line with those expectations: In the simplest case, government credit is terminated entirely. Calvo pointed to the existence of multiple perfect-foresight equilibria in the context of domestic debt issuance where the government could default on its nominal debt via inflation.[29] With adjustable risk premia, the government's cost of servicing its debt rises and, consequently, the risk of default.[30] Thus, investor expectations turn into self-fulfilling prophecy.

In contrast to the first approach, the mechanism in the second approach may be triggered even if government finances are widely considered to be sustainable. As investors, in this approach, are concerned with the government's ability to honour its obligations in the short run, the sustainability assessment does not necessarily determine investor considerations. This approach to modelling sovereign debt crises is similar to bank-run models, where the fear of depositors that a bank may not have sufficient liquidity to cover their withdrawals can trigger a run on the bank's short-term obligations.[31]

A number of policy consequences follow from these considerations. On the side of the borrowing government, self-insurance against the unfavourable equilibria is possible by issuing long-term debt that is less prone to creditor runs, as shown by Cole and Kehoe, in a dynamic stochastic general equilibrium model.[32] In addition, Detragiache as well as Drudi and Prati show how governments can build up a reputation for fulfilling their debt obligations and thus contribute to the formation of favourable investor expectations that should reduce the probability of abrupt changes in investors' attitudes.[33] On the side of lenders, institutional mechanisms allow the risk of crises due to insufficient coordination among creditors to be alleviated. For example, the existence of a lender of last resort, who would guarantee the redemption of government debt, would reduce the risk of a creditor run. Similarly, debt contracts could be designed to incorporate so-called collective action clauses to reduce investors' risk of being excluded from repayments in a sovereign crisis.[34]

3.2 DETERMINANTS OF FISCAL STABILITY

The theoretical considerations above make it clear that the lending decision of potential creditors plays an important role in the assessment of fiscal stability. While the precise design of the debt contract may vary, standard credit contracts are asymmetric, i.e. creditors bear the risk of default, but do not participate if economic developments turn out more favourable than expected. Consequently, potential creditors are interested only in

29 See Calvo (1988).
30 See Cohen and Portes (2004).
31 See also Alesina et al. (1989).
32 See Cole and Kehoe (1998).
33 See Detragiache (1996) and Drudi and Prati (2000).
34 See Rogoff and Zettelmeyer (2002) for a survey of proposals.

downside risks to governments' willingness and ability to service their debt obligations. The downside risks for creditors are determined by the probability and size of potential shocks and their impact on the government's financial situation. A further determinant is the government's ability to offset such effects, e.g. by drawing on an existing safety net or by implementing offsetting measures.

3.2.1 SHOCKS

The list of shocks to be considered by potential creditors comprises a wide range of variables. Under the fundamentals-based approach to fiscal stability, all factors that affect the government's *long-term fiscal sustainability* can also have an impact on stability. For example, changes in growth expectations, in particular with regard to the long-term trend growth of potential output, and new information on a government's overall obligations and capacity to generate revenue have a bearing on the stability assessment.

In addition, numerous short-term variables can affect fiscal stability. Starting with the *international environment*, changes in international interest and exchange rates directly affect public debt servicing obligations, with the size of the impact depending on the currency and maturity structure of outstanding debt. Similarly, changes in international risk attitudes may trigger fluctuations in liquidity and financing conditions in government bond markets. Moreover, international energy price increases can affect the situation of public finances, if governments try to keep domestic energy prices at lower levels via subsidies. Adverse effects on economic activity that result from price changes would contribute further to the fiscal pressure.[35]

On the *domestic side*, government finances can come under pressure due to the government's explicit or implicit obligation to support large enterprises in difficulties, or the domestic banking system in times of crises. For the stability analysis, such sectoral links make it necessary to analyse not only the situation of public finances in a narrow sense, but also the risk of imbalances in other sectors that might create financial pressures for the government. Looking at the period since the late 1980s, a number of studies have shown that the adjustment of domestic, external and asset price disequilibria has, in a number of industrialised countries, resulted in both major deteriorations in fiscal balances and significant bailout costs in the enterprise and banking sectors.[36] These countries experienced increases of between 10 and 50 percentage points in the debt-to-GDP ratio in the 1990s. They included economies which experienced sharp downturns and exchange rate devaluations, but – in some cases – also drawn-out adjustment periods without significant devaluations.

Shocks can also negatively affect a *government's reputation,* i.e. investors' beliefs about the government's willingness and ability to meet with its debt obligations. Such changes in perception could be linked to changes in government, as evidenced by the fact that several sovereign crises started close to general elections. But government behaviour, too, can induce changes in its reputation. For example, a government's persistent failure to achieve its own fiscal targets not only undermines fiscal sustainability, but can also lead to a switch in investor confidence regarding the government's ability to implement politically difficult consolidation measures. In this regard, the implementation and application of a credible framework of fiscal rules can lend support to a government's credibility. One example is the framework of rules provided by the Maastricht Treaty and the Stability and Growth Pact in EMU. However, analogous to the consequences of missing fiscal targets, non-compliance with previously agreed rules can undermine public confidence in the soundness of economic policies. On the structural side, a government avoiding or postponing crucial structural reforms will reduce investors' trust in its ability to maintain the necessary conditions for stable

35 See Tanzi (1986) for a discussion of exogenous shocks in developing countries.
36 See Eschenbach and Schuknecht (2004).

and balanced growth. Finally, the reputation of the government can be undermined by the disclosure of previously hidden fiscal obligations, pointing to deficiencies in the transparency of fiscal data.[37] Once investors doubt the official fiscal data, uncertainty over the true fiscal position rises, possibly also leading to the perception that the respective government is trying to deceive potential creditors.

In this context, the independence of monetary policy-makers can provide an additional important signal regarding the government's intentions. In economies where the independence of monetary policy-makers is curtailed, governments may seek to take recourse to printing money to finance fiscal deficits and so escape necessary fiscal and structural reforms. Over time, this erodes the credibility of economic policies, in general, and of a stable currency, in particular. By contrast, establishing a credibly independent central bank, a government signals its intention to refrain from monetary financing and put its finances on a sound and sustainable footing.

Finally, in view of the findings of the expectations-based approach, creditors will need to take the expected *behaviour of other potential lenders* into account. Thus, the financial stability assessment depends also on perceptions regarding the willingness of financial markets to provide financing. This will reflect, in particular, global financial conditions, such as investors' risk appetite, as well as the borrower's reputation for servicing its obligations.

3.2.2 SAFETY NETS AND FLEXIBILITY

The government's ability to withstand shocks can derive from an existing safety net or from its ability to adapt to changes in the environment and maintain a safe financial position. Prime examples for an existing safety net are government holdings of liquid assets, including foreign reserves, and access to existing credit lines. In practice, however, the valuation of most public assets is very difficult, as there is no liquid market for a large proportion of those assets and as price estimates are uncertain. In addition, potential creditors will assess the likelihood of a government receiving emergency financial assistance from other countries or international financial institutions in times of difficulty. In the context of EMU, the no-bail-out clause of the Maastricht Treaty[38] deserves particular attention. While the expectation of a bail-out can support investors' willingness to extend credit, it can create adverse incentives for governments to over-borrow. Therefore, the no-bail-out clause in EMU ensures that unsound policies in one country of the union does not undermine the stability of the entire union.

With regard to a government's ability to adapt to shocks, the size of the current fiscal deficit and debt burden are crucial. With a low deficit and a sustainable debt burden, unforeseen fiscal pressures will not destabilise public finances.[39] Governments can resort to external financing to alleviate immediate pressures while gaining time to adjust to the new environment. Over and beyond these core variables, further important criteria are the flexibility of revenue and expenditure arrangements. On the revenue side, low tax rates and broad tax bases can generally be expected to provide a government with the option of generating additional revenue by raising tax rates moderately without creating major disruptions. The lower the overall tax burden in the economy, the greater would be the expected flexibility on the revenue side. On the expenditure side, an essential factor determining fiscal flexibility is the share of expenditure that is open to discretionary changes by the government. Conversely, if a large part of expenditure is tied up in mandatory programmes, as in the case of pension expenditure and social transfers, short-term adjustments on the expenditure side will become more difficult. The rating agency Standard & Poor's regularly

37 See Balassone et al. (2004) for the implications in the EU context.

38 Article 103 of the Treaty establishing the European Community.

39 See Fernández-Huertas Moraga and Vidal (2004) and Michel et al. (2006) for theoretical illustrations of how the size of fiscal imbalances affect a government's ability to react to shocks.

monitors governments' ability to react to shocks through its Fiscal Flexibility Index.[40] The index combines measures for flexibility on the revenue side and on the expenditure side. On the revenue side, the index captures the overall level of taxation as well as tax productivity, i.e. the ratio of taxes actually collected to those implied by applying a given tax rate to a given base. On the expenditure side, the index measures the past ability to adjust spending in fiscal consolidation periods. While caution is warranted in the interpretation of the index, given different economic and political constraints in the individual countries, countries with large fiscal imbalances and low flexibility may be at a high risk of experiencing destabilising fiscal shocks.

3.3 PRACTICAL APPLICATIONS

The importance of the above factors is reflected in their impact on the assessment of fiscal stability in financial markets, in international financial institutions and in academic literature.[41] In particular, the factors have entered into empirical literature dealing with the prediction of sovereign crises. In addition, they have been found to contribute to the explanation of the behaviour of bond spreads. Finally, they are also taken into account in the practical work of sovereign rating agencies and the country assessments of the IMF.

3.3.1 SOVEREIGN CRISIS LITERATURE

In trying to determine the drivers of sovereign debt crises and develop possible early indicators, sovereign crisis literature has focused on emerging markets. As some of the EU countries that are to participate in Monetary Union share major characteristics with emerging markets (e.g. represent small open economies with relatively low integration in global capital markets), this literature is immediately relevant for the assessment of fiscal stability in the EU. In addition, the lessons learnt from emerging markets may also be important for the analysis of current euro area countries, given that exchange rate-based adjustments for the correction of macroeconomic imbalances are precluded by their status as members of a currency union.

The literature on sovereign crises puts emphasis on the link between countries' exposure to macroeconomic volatility and the risk of default. In a relatively early contribution, Gavin et al. assessed the importance of macroeconomic volatility in explaining the relatively frequent fiscal crises in Latin America.[42] They find that reliance on small and volatile fiscal revenue bases induces fiscal volatility which, in turn, augments macroeconomic fluctuations. With high debt ratios, this destabilisation mechanism can raise the likelihood of default as risk-averse investors limit external financing when crises occur. More recently, Catão and Kapur presented a theoretical model and empirical evidence showing that differences in macroeconomic volatility are key determinants of fiscal stability.[43] Macroeconomic volatility raises the need for international borrowing to smooth domestic consumption, but – at the same time – the ability to borrow is constrained by the higher risk of default. An empirical study of 26 emerging market economies did, indeed, show a close correlation between volatility and the frequency of default. At the country level, Hausmann and Purfield identified the relatively high macroeconomic stability in India as an explanation for the country's ability to maintain relatively high levels of public debt without adverse market reactions.[44] Finally, Barnhill and Kopits explicitly incorporated the impact of macroeconomic volatility in their assessment of fiscal stability by constructing a value-at-risk model for government finances.[45] This approach, which is widely applied in the financial sector, captures the quantitative impact of macroeconomic shocks, including their correlation with government financial positions on the basis of historically observed patterns. Thus, it simulates a distribution of

40 See Standard & Poor's (2006).
41 See Manasse and Roubini (2005) for a survey of the related literature.
42 See Gavin et al. (1996).
43 See Catão and Kapur (2004).
44 See Hausmann and Purfield (2004).
45 See Barnhill and Kopits (2003).

possible future financial conditions for the government and makes it possible to gauge the probability of financial failure.

Other liquidity factors have also been found to contribute significantly to the explanation of fiscal crises. Manasse et al. find that the ratio of short-term debt to international reserves and measures of debt-servicing obligations contribute to explaining sovereign crises.[46] With a wider set of explanatory variables, Detragiache and Spilimbergo also find that short-term debt, debt service and reserves enter an explanatory regression model.[47]

As a consequence of the possible macroeconomic spill-over effects, comprehensive stability analyses try to identify liquidity risks anywhere in the economy. Under the macroeconomic balance sheet approach, a financial balance sheet is constructed for the entire economy, detailing – for each sector – the structure (seniority, maturity, currency) of assets and liabilities and their links across sectors.[48] This helps to identify both possible weaknesses in specific sectors (e.g. the enterprise sector) and the most likely transmission channels to other sectors. The approach can be enhanced by applying sophisticated risk models. On the basis of past behaviour and structural sectoral assessments, the response of the macroeconomic balance to exogenous shocks can be modelled, capturing all sectoral and inter-sectoral effects.

3.3.2 SOVEREIGN RATINGS

Similar to what academics have done in sovereign crisis literature, rating agencies assess the likelihood of sovereign default for individual countries. Their assessment serves as input for participants in sovereign bond markets.

In view of the long list of factors affecting a country's default probability, rating agencies examine a wide range of quantitative and qualitative information to gauge a sovereign's fiscal stability. The quantitative variables cover a country's economic structure and development, the state of government finances, external performance and developments in the financial sector. Important variables used include GDP per capita, output growth, fiscal deficit and debt ratios, external balances and monetary indicators, such as the size of financial intermediation and the growth of money and credit. To capture a country's vulnerability to changes in investor sentiment, ratings also incorporate information on fiscal flexibility to generate internal funds as well as the currency and maturity structure of external public and private indebtedness. Inclusion of the latter reflects the observation from past financial crises that private sector difficulties can rapidly lead to burdens for the public sector.

The quantitative information is combined with qualitative information on issues such as political stability and the effectiveness of the administration. Given the complexity of the interaction among macroeconomic variables themselves as well as between those and institutional variables, there is generally no fixed weighting of the individual pieces of information in the overall assessment. Instead, expert rating committees strive to ensure consistency of ratings over time and across countries.[49]

In view of the uncertainty regarding the concrete factors driving country ratings, academic studies have identified a number of factors that have significantly affected country ratings in the past. In an early major study on this issue, Cantor and Packer found that per-capita income, inflation, external debt, economic development and default history contribute significantly to explaining ratings levels by both Moody's and Standard & Poor's.[50] Subsequent studies, using alternative data sets and econometric approach, have largely confirmed these findings.[51] The importance of political and institutional variables, which are more difficult to quantify,

46 See Manasse et al. (2003).
47 See Detragiache and Spilimbergo (2001).
48 See Gray et al. (2003).
49 See Bhatia (2002).
50 See Cantor and Packer (1996).
51 See, for example, Afonso (2003) and Afonso et al. (2006).

is shown by Martinez, who found that the World Bank index on government effectiveness contributes significantly to explaining government ratings.[52]

From a fiscal stability perspective, it is noteworthy that variables reflecting short-term vulnerability, such as the maturity and currency structure of debt or the ratio of liquid assets to short-term liabilities, are generally not found to have a significant effect on sovereign ratings. A possible reason is that these variables may be correlated with other explanatory variables. For example, countries with low external debt may generally also exhibit a longer average debt maturity, so that both variables may not be found to be significant in empirical investigations. Furthermore, it has been argued that, due to the objective of rating stability, country ratings may fail to fully capture short-term variations in sovereign default risk that are driven mainly by changes in vulnerability indicators. However, indirect evidence of the importance of vulnerability for sovereign ratings could be inferred from the positive impact of EU membership and aspiration to introduce the euro on the country ratings of Member States that have recently joined the EU. Rother shows that euro area convergence has a significant positive impact on those countries' sovereign ratings, which reflects the additional stability provided by the institutional framework of the EU.[53]

3.3.3 BOND SPREADS

Finally, countries' default risk should be constantly reflected in the risk premia that they have to pay to investors. In theory, the risk premia can be defined as the difference between the bond yield of a country with no default risk and that of a risky country, with all other variables (e.g. the currency and maturity) being equal. In practice, other factors, such as a bond's liquidity, enter as additional factors in the determination of the market price and the interest spread. Of interest is thus the extent to which the aforementioned factors driving fiscal stability can be identified empirically as affecting observed risk premia. Given the importance of risk considerations, the relevant sample of such analyses largely comprises emerging markets. However, it is noteworthy that, for developed market economies, a set of literature is emerging in which the impact of variables reflecting fiscal sustainability, in particular public debt levels, on market risk assessments is discussed.[54]

In a seminal study, Goldstein and Woglom, find that municipal issuers in unfavourable fiscal situations in the United States paid higher risk premia than fiscally sound borrowers.[55] Eichengreen and Mody, find that stability indicators have a significant impact on risk spreads for bonds issued by sovereign, public and private borrowers.[56] In particular, a history of previous defaults raises the risk premium demanded by investors. In addition, a higher ratio of (liquid) foreign currency reserves to GNP reduces the risk premium, suggesting that investors indeed perceive such reserves as a safety buffer that can be used in adverse circumstances. The results regarding the importance of reserves for the risk premium have since been corroborated.[57] Findings of the importance, among other variables, of the level of short-term debt and contagion also point to the importance of short-term stability considerations for the determination of risk premia by the financial market.[58]

4 CONCLUSION

The preservation of the soundness of public finances is a necessary condition for macroeconomic stability and sustainable growth. This makes a continuous and forward-looking assessment of the situation of public finances indispensable for central banks. The importance of sound public finances becomes

52 See Martinez (2003).
53 See Rother (2005).
54 See, for example, Codogno et al. (2003), Afonso and Strauch (2004) and Bernoth et al. (2004).
55 See Goldstein and Woglom (1992).
56 See Eichengreen and Mody (1998).
57 See Zlacki (2002) and Dailami et al. (2005).
58 See Ferrucci (2003) and Dailami et al. (2005).

even more eminent in a monetary union. Not only could disruptions arising from fiscal imbalances harm national economic developments. Given the close integration in the union, such disruptions would also immediately spill over to all participating countries. Moreover, there is a risk that fiscal imbalances could lead to national policies that are not in line with, or even run counter to, the objectives of the union.

This paper has shown that the practical assessment of fiscal soundness needs to combine an analysis of the long-term sustainability of public finances with that of their short-term stability. The former concept refers to the fulfilment of the government's intertemporal budget constraint, requiring that currently outstanding public debt needs to be covered by future primary surpluses. However, the analysis cannot stop here for two reasons: (i) the long-term sustainability assessment is, by necessity, uncertain and (ii) it does not provide a clear policy prescription as corrections of fiscal imbalances can be postponed indefinitely without violating the sustainability condition. The greater the uncertainty about the long-term sustainability of a government's finances, the more important is an assessment of the financial situation in the short term.

The need to combine long-term sustainability and short-term stability criteria in the analysis of fiscal soundness implies that a wide array of variables has to be monitored. These include the conventional indicators for sustainability, in particular fiscal deficit and debt ratios combined with assumptions regarding interest rates and GDP growth rates. Implicit and contingent liabilities have also been shown to play an important role. Over and beyond these, country experience and academic literature point to the importance of further variables, including macroeconomic imbalances (such as high inflation and external imbalances) and balance sheet mismatches in all sectors of the economy. Failure to take these factors into account in the assessment of fiscal soundness could lead to inappropriate complacency on the side of policy-makers as long as (explicit) debt ratios do not rise to excessive levels. The risks of complacency affect emerging as well as developed economies. While challenges to sustainability may appear less immediate for developed economies, risks from the accumulation of implicit liabilities (e.g. those relating to population-ageing) coupled with low GDP growth and the potential burdens arising from the correction of macroeconomic imbalances could well undermine sustainability also in these countries. The continuous comprehensive analysis of all aspects of fiscal soundness helps prevent the need for short-term disruptive policy adjustments and supports the smooth implementation of economic policies that contribute to macroeconomic stability.

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