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### **Sustainability of the Fiscal Criteria in Stage III of the EMU**

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## **Abstract**

After a review of the theoretical justifications of the fiscal criteria and the different concepts of sustainability the fiscal position of the EU countries selected as members of the EMU is examined. Firstly, the assessment by the Commission and the EMI is critically reported. After identifying countries with successful consolidations and those without success conclusions about the implications for sustainability are drawn. It turns out that the effort towards fiscal consolidation is not yet over for a long time. Here, the Stability and Growth Pact draws the line. In particular in countries with presently very high debt to GDP ratios the next decade in the EMU could become a hard one. Secondly, macromodel simulations shall demonstrate how asymmetric shocks (one supply and one demand shock) may hamper the ambitions towards sustainability. Similarly, a single monetary policy can have detrimental effects when the business cycles are not synchronized in Euroland. This problem is touched upon with model simulations of a change of the common interest rate.

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# **Sustainability of the Fiscal Criteria in Stage III of the EMU**

*Fritz Breuss*

## **I. Introduction**

On May 2, 1998 the European Council, in a meeting in the composition of the Heads of State or Government has decided that 11 EU member states will start with the EMU on January 1, 1999. This decision was based on a recommendation by the Council (ECOFIN) which in turn relied on two convergence reports, one carried out by the Commission and one by the European Monetary Institute (EMI), dating March 25, 1998.

Hence, the EMU starts with a large group of countries, politically not unexpected but counter to all empirical facts gathered in the light of the optimum currency area (OCA) theory. The procedure by the European Council is fully in accordance with the requirements foreseen in Art. 109j of the Maastricht Treaty (later only called „Treaty“). All the necessary legal procedures have been executed: from the evaluation of the fulfilment of the so-called convergence criteria (Art. 109j(1) of the Treaty) (two convergence reports) and the examination of the status of the national central banks (independency) to the consultation of the European Parliament.

Although all legal steps have been executed in line with the Treaty manual, as an economist one still may question some of the results of this exercise. In this article, therefore, I will concentrate on the problem of fiscal sustainability. Before examining this question one should (not for the first time) look behind the scene and ask for the theoretical rationale of the fiscal criteria (chapter II). At the beginning of the EMU debate these criteria were bashed as „sheer nonsense“ (*Krugman*, 1994, p. 191) or assessed as to lead to „unnecessary hardship“ (*Buiter-Corsetti-Roubini*, 1993, p. 87) or as not compatible with the only sound EMU theory, the OCA theory (*DeGrauwe*, 1996, p. 5). More recent theories, however, are much more in favour of the fiscal criteria as a precondition for entering into the EMU but also for the Stability and Growth Pact (S&GP). In chapter III the main concepts of fiscal sustainability are put forward. It turns out that the Treaty has no proper definition of „fiscal sustainability“, although „sustainability of the government financial position“ is mentioned in Article 109j(1) of the Treaty as a prominent part of the convergence criteria. In chapter IV the decision by the Commission and the EMI concerning the fiscal sustainability of the 11 Euro members is reexamined. It turns out that sustainability is interpreted rather flexibly. If taken seriously, the fiscal policy stance of some „ins“ candidates may be qualified as not sustainable.

Some simulations on the lines of the OCA philosophy are carried out in order to study the macro economic effects (in particular concerning the fiscal variables) of asymmetric shocks to the EMU-11, given a common monetary policy (chapter V). Similar problems may arise when the ECB is forced to make an „average“ single monetary policy for the Euroland although it consists of countries with divergent business cycles (chapter VI). Finally, conclusions are drawn.

## II. Which Rationale for Fiscal Criteria?

At the outset of the debate on the EMU project, in the early nineties, many economists questioned the fiscal criteria (limits on budget deficits and the size of government debt) as a necessary condition for the functioning of the EMU. Examples like the de facto monetary union between Belgium and Luxembourg were quoted. Although both countries have a complete different fiscal policy stance their currency union was sustainable since 1922 *Krugman* (1994, p. 191) even qualified the fiscal criteria for a monetary union as „sheer nonsense“. Other authors, like *Buiter-Corsetti-Roubini* (1993, p. 87) lastly assessed the fiscal convergence criteria as „badly motivated, poorly designed and apt to lead to unnecessary hardship if pursued mechanically“. Also *Buiter* (1995, p. 42) finds, that the fiscal criteria make no sense. This relative harsh statements reflected the stance at a time where deficits and debt were extremely high and nobody could believe that it would be possible to bring them down to the benchmarks the Treaty required. But to the great surprise of anybody, at least the budget deficits could be reduced very fast and in some countries (like Italy) also dramatically within a short period of time. Whether this consolidation process really is sustainable is another question.

Many other authors were not able to bring to terms the convergence criteria with the implications of the OCA theory. As a prominent proponent of this view, *DeGrauwe* (1996, p. 5) stipulated that „in the case of fiscal policies, the OCA theory in fact goes one step further. If the monetary union does not at the same time involve some degree of centralization of national budgets (or one should add some sort of fiscal federalism; my remarks!), the imposition of budgetary convergence requirements (which were formulated in the S&GP; my remarks!) is going to make matters worse for the management of the union. When asymmetric shocks occur, the requirement to keep budgetary policies in line with the other members will rob countries of the last instrument to absorb these shocks. As a result, the pressure on the European central bank to change its monetary policy stance will be more pronounced. Thus, according to the traditional OCA theory, the Maastricht convergence requirements not only are unnecessary and insufficient. They are also dangerous for the smooth functioning of a future monetary union in Europe“.

The „official arguments“ for the fiscal convergence criteria were repeatedly mentioned in the annual convergence reports by the Commission or the European Monetary Institute (EMI). In *EMI* (1995, p. 4) it is argued that increasing debt are dangerous because of potential insolvability of the state, if they cannot be financed by taxes. The debt criteria has been used as a convergence criteria in order to reduce the risk of financial market instabilities. In order to exclude insolvability the „no bail-out“ clause has been included in the Treaty (Article 104b). „Excessive government deficits“ could lead - via „crowding-out effects“ - to interferences with the monetary policy. Missing fiscal discipline in one country could easily „spill-over“ to other member countries<sup>1</sup>. The fiscal convergence criteria, therefore, are not to be seen as a limit for economic policy but as a mechanism to avoid developments in the recent years, when ever increasing deficits reduced credibility, which in turn led to increasing risk premia and, hence,

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<sup>1</sup> *Laxton-Isard-Faruquee-Prasad-Turtelboom* (1998, p. 49) demonstrate with the new version of IMF's MULTIMOD Mark III the potential aggregate „crowding-out“ effects of government debt. A 10 percentage point increase in ratios of government debt of GDP of all industrial countries leads to the following steady-state effects: real interest rates +0,3%, output - 1 ½%, capital stock -3 ½% to -4 ½%. Earlier model simulations with MULTIMOD Mark II come to similar results (see *IMF*, 1996, p. 93-97).

endangering the long-run noninflationary growth. Behind this „official“ justifications for fiscal criteria one can identify several aspects of modern macroeconomics. One of the most important one is the principle of „market discipline“ put forward by Lane (1992; see also Rolf, 1996, p. 9). The hypothesis that the (financial) markets are disciplining the fiscal policy starts from the assumption that markets give necessary signals and incentives for potential credit demanders, which is consistent with its „solvency“ (credibility problem). This implies that the intertemporal budget constraint of a state must hold in order to guarantee solvability. The planned present value of future primary surpluses must be at least equal to the actual stock of debts. The intertemporal budget constraint - as will be demonstrated in the next chapter - can be reformulated in order to arrive at conditions for sustainability of a certain level of the debt.

However, one can find at least three strands of justification for the fiscal criteria. The first one is the *Domar-Tobin* formula on the burden of the public debt. The second, more recent insight that fiscal criteria could make sense stems from *Dornbusch* (1997). The third, new theory is based on *Woodford's* (1995) new fiscal theory of price determination.

### *A. Domar-Tobin Formula*

*Domar* (1944) was one of the first to deal with the 'Burden of the Debt' and the National Income. He started from the assumption of a *constant deficit ratio* (total deficit in percent of nominal GDP:  $d$ ) which is defined as:  $B_t - B_{t-1} = dY_{t-1}$  ( $B_t$  is the nominal value of the debt;  $Y_t$  is nominal GDP at time  $t$ ). A further assumption is a constant rate of growth of nominal GDP ( $y = (Y_t - Y_{t-1}) / Y_{t-1}$ ). Defining the government debt-to-GDP ratio as  $b_t = B_t / Y_t$  one arrives at a difference equation describing the evolution of the debt GDP ratio over time ( $t$ ):

$$b_t - b_{t-1} = -\frac{y}{1+y} b_{t-1} + \frac{d}{1+y} \quad (1)$$

with the solution for period  $n$  (see *Pauly*, 1996, p. 47)

$$b_n = \frac{d}{y} + \left[ b_0 - \frac{d}{y} \right] (1+y)^{-n} \quad (2)$$

After infinit many periods ( $n \rightarrow \infty$ ) we arrive at the limit value

$$b_\infty = \frac{d}{y} \quad \text{for } y > 0. \quad (3)$$

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<sup>2</sup> With a pooled regression including 14 EU countries over the sample 1979 to 1995 *Groeneveld-Koedijk-Kool* (1998, p. 15) find that the debt to GDP ratio has a significant influence on the level of long-term nominal and real interest rates. An increase of the debt ratio of one percentage point increases the nominal interest rate by 0,5 percentage points and the real interest rate by 0,4 percentage points. Also a worsening in the current account increases interest rates by 0,5 percentage points. In addition to the debt ratio four other convergence indicators are included in the regressions to explain the interest rates: inflation adds to the interest rate by 2,9 percentage points in the case of nominal interest rates and reduces real interest rates by 1,9 percentage points. An increase of the unemployment rate adds to interest rates by 0,3 percentage points. An increase of real GDP by one percentage point reduces nominal interest rates by 0,2 percentage points and real interest rates by 0,4 percentage points. The coefficients for economic growth, however, are only marginally significant.

In the long-run a debt to GDP ratio  $b_\infty$  is sustainable at a targeted value if the ratio  $d/y$  has the proper value. With Domar's formula we arrive at the fiscal criteria according to the Treaty (Protocol No 5). The reference value for the deficit to GDP ratio is  $3\% = d \leq 0.03$ , the debt to GDP ratio is  $60\% = b \leq 0.60$ . This would imply (or is consistent with) a growth rate of nominal GDP of  $5\% = y = 0.05$ , which can be composed of a growth rate of real GDP of  $3\%$  ( $q = 0.03$ ) and an inflation rate (measured with the GDP deflator) by  $2\%$  ( $p = 0.02$ ). The architects of the Maastricht Treaty have chosen one specific constellation of variables:  $3\%$ ,  $60\%$  and  $5\%$ . However, any other combinations would have fit into the Domar formula. If one had chosen  $70\%$  ( $40\%$ ) as a limit for public debt (or a sustainable debt to GDP ratio), than given a growth rate of nominal GDP of  $5\%$  the deficit criterium would have been  $3.5\%$  ( $2\%$ )!

In the original intention, Domar developed equation (3) for a single country. If via the convergence criteria the limits for the deficit and debt ratio is imposed to be the same for all EU member states this also implies the same GDP growth or the same business cycle performance in all countries! Via the fiscal reference values (and in the stage III of the EMU via the S&GP) a strong pressure is executed towards real convergence, that means convergence primarily of the business cycle.

*Tobin* (1984) comes to the same conclusions as Domar with the assumption of a *constant primary deficit* to GDP ratio. The primary deficit ( $PD$ ) is the difference between public expenditures ( $G$ ) minus taxes ( $T$ ). If all components are divided by nominal GDP ( $Y$ ) we get the ratio of the primary deficit to GDP ( $pd = g - t$ ; where  $g = G/Y =$  expenditure to GDP ratio and  $t = T/Y =$  tax rate). Interest payments for the public debt is defined as:  $R_t = iB_{t-1}$ , where  $i$  is the nominal rate of interest.

Then the deficit is defined as the accumulation of the debt by

$$B_t - B_{t-1} = G_t - T_t + R_t \quad (4)$$

If we substitute for expenditures and taxes its ratios to GDP and do the same for the interest payments on public debt then we get the dynamics of the public debt as

$$B_t - B_{t-1} = (g - t)Y_t + iB_{t-1}. \quad (5)$$

The debt to GDP ratio developed over time by

$$b_t - b_{t-1} = (g - t) + ib_{t-1} \quad (6)$$

For  $y - i > 0$  the solution is (see *Pauly*, 1996, p. 48)

$$b_n = \frac{g-t}{y-i} + \left( b_0 - \frac{g-t}{y-i} \right) \left( \frac{1+i}{1+y} \right)^n \quad (7)$$

The solution for (7) is stable for  $y - i > 0$  and has the same limit value as the Domar formula, namely<sup>3</sup>

$$b_\infty = \frac{d}{y}. \quad (8)$$

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<sup>3</sup> When  $y > i$  the expression in parentheses  $((1+i)/(1+y))^n$  for  $n \rightarrow \infty$  approaches zero. Substituting for  $s_n = (g-t)/(y-i)$  the definition for the total deficit to GDP ratio  $(g-t) = d - ib_{t-1}$  and solving for  $s_n$ , one gets equation (8).

The necessary condition for this result, however, is  $y - i > 0$ , namely that the growth rate of nominal GDP is greater than the nominal interest rate. In the past decade this constellation was rarely met in any of the OECD countries.

### *B. Dornbusch's Commitment Model*

Similarly as the „market discipline“ argument for fiscal stability (see Lane (1992)), *Dornbusch* (1997, p. 221) starts with the observation that „in financial markets there is an instinctive presumption that a precarious fiscal policy is tantamount to bad money. High debts are an invitation to inflation as the experience of the interwar period demonstrates.“ The burden of long-term debts can be lightened by a moderate inflation, because then the real value of the debt decreases. The temptation for politicians to inflate is therefore always present. In order to theoretically find a link between monetary and fiscal policy he applies the Barro-Gordon paradigm for the inflation-unemployment trade-off.

*Dornbusch* (1997, p. 221) defines a government loss function ( $L$ ) including real debt accumulation and inflation. The primary deficit ratio to GDP (in real terms)  $pd^r$  is given, as is the real interest rate,  $r$ . Let  $p$  and  $p^*$  denote actual and expected inflation,  $b^r$  the real debt-to-GDP ratio,  $q$  the growth rate of real GDP, and  $a$  the relative aversion to inflation versus debt accumulation. Then,

$$L = \left[ (r + p^* - p - q)b^r - pd^r \right]^2 + ap^2. \quad (9)$$

The authorities optimize for a given expected rate of inflation. The Nash equilibrium of this static game involves a situation where the presence of debt leads to inflation simply because the public recognizes the policymakers' temptation to reduce the real burden of debt service. The equilibrium inflation rate is proportional to the growth- and inflation adjusted debt to GDP ratio:

$$p_{opt} = (b^r / a) \left[ (r - q)b^r - pd^r \right]. \quad (10)$$

With a real interest rate in excess of the real growth rate ( $r - q$ ), the higher the level of debt ( $b^r$ ), the higher will be the rate of inflation. Inflation aversion on the part of policymakers captured in the term  $a$ , helps dampen inflation, as do primary surpluses ( $pd^r$ )

According to *Dornbusch* (1997, p. 221) „this conceptual framework fully supports the ideas that went into the Maastricht Treaty: debt is a risk factor for sound monetary policy. Therefore limits on debt and deficits are one of the safeguards against inflation temptations.“ In the spirit of commitment models the Dornbusch model emphasizes that the fiscal criteria are an important part of the accession criteria. But limits on deficits and limits on debt ratios are necessary after accession. Thus this model also justifies the „Stability and Growth Pact“ (S&GP).

However, due to the special constellation of the division of the power in the stage III of the EMU, *Dornbusch* (1997, p. 222) makes some restrictions to his conclusions. In the EMU the ECB is responsible for the centralized monetary policy for the Euro area. The national governments are still responsible for their national fiscal policy - although bounded by the S&GP on the one hand and by Article 103(1) of the Treaty which postulated that the „Member States shall regard their economic policies as a matter of common concern and shall coordinate them within the Council...“. These coordination actions are monitored by the process of the „multilateral surveillance“ according to Article 103(3) of the Treaty. Hence, one could argue that the fiscal criteria could be overdone for two reasons (see *Dornbusch*, 1997, p. 222): First, the pro-

visions for the European Central Bank (ECB) assure that the institution is independent with the primary objective to maintain price stability (Art. 105(1) of the Treaty and Protocol No 3, Article 2). Second, the Treaty has an extra provision of no bailouts of public debts (Article 104b of the Treaty). This eliminates an immediate spillover effect of poor public finance to the ECB or countries's budgets. Taking all this safeguards into account, *Dornbusch* (1997, p. 222) concludes that „insistence on debt provisions is overkill, and the dash for fiscal probity that is underway is not justifiable by a concern for sound money“.

In the same direction goes the argument by *Eichengreen-Wyplosz* (1998) who conclude that the S&GP could be more harmful than good for the European economy. Also *Hughes-Hallett-McAdam* (1998) with long-run model simulations with the IMF MULTIMOD conclude that the S&GP could lead to a sharp rise in real interest rates. In the longer term, this would destroy investment, employment and output capacity. These are the more serious costs than short-term losses in output itself. The reason is that the S&GP reveals a more restrictive set of provisions than those laid down by the Maastricht Treaty concerning „excessive deficits“. The *Stability and Growth Pact (S&GP)* - which consists of a package of two regulations<sup>4</sup> and one resolution<sup>5</sup> of the European Council - in the Council Regulation (EC) No 1466/97 of 7 July 1997 in the general considerations No (4) it is said: „Whereas adherence to the medium-term objective of budgetary positions close to balance or in surplus will allow Member States to deal with normal cyclical fluctuations while keeping the government deficit within the 3% of GDP reference value“. The medium-term objective for the budgetary position is - in contrast to the reference value of the Treaty - „close to balance or in surplus“.

### C. Woodford's Fiscal Theory of Price Determination

*Canzoneri-Cumby-Diba* (1998b) find that the new fiscal theory of the price level, proposed originally by *Woodford* (1994, 1995, 1996, 1997) in a series of papers may give the best justification for the type of fiscal policy rules that were written in the Maastricht Treaty, and will continue (and even be strengthened) in the S&GP after EMU has started. And it also could augment existing criteria for an „optimal currency area“.

According to the new theory, the price level can be determined in two very different ways (see *Canzoneri-Cumby-Diba*, 1998b, p. 2); that is, there are two alternative characterizations of monetary and fiscal policy that yield a unique, determinate price level. In *fiscal dominant* (FD) regime, primary surpluses are determined by an exogenous (perhaps political) process, and the central bank targets the nominal interest rate. In this regime, the government's present value budget constraint determines the price level, and the money supply adjusts to maintain equilibrium in the money market. In *money dominant* (MD) regime, the central bank targets the money supply, and fiscal policy has discipline, in the sense that current and/or future pr

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<sup>4</sup> Council Regulation (EC) No 1466/97 of 7 July 1997 on the strengthening of the surveillance of budgetary positions and the surveillance and coordination of economic policies (OJ L 209, 02/08/1997 p.1) and Council Regulation (EC) No 1467/97 of 7 July 1997 on speeding up and clarifying the implementation of the excessive deficit procedure (OJ L 209, 02/08/1997 p. 6-11).

<sup>5</sup> Resolution of the European Council on the Stability and Growth Pact, Amsterdam 17 June 1997 (97/C 236/01; OJ C 236, 02/08/1997 p. 1). In *EC* (1997, p. 83) also the Resolution of the European Council on growth and employment, Amsterdam 16 June 1997 (97/C 236/02; OJ C 236, 02/07/1997 p. 3) is counted as belonging to the S&GP package.

mary surpluses are expected to adjust to satisfy the government's present value budget constraint for any real value of current government liabilities (solvency constraint). The latter regime pretty well describes the future regime of the EMU. In an earlier paper *Canzoneri-Cumy-Diba* (1998a) reject *Sargent-Wallace's* (1981, 1982) conjecture in their celebrated papers on 'Unpleasant Monetarist Arithmetic' that the United States has been operating in an FD regime. With VAR's (vector auto regressions) *Canzoneri-Cumy-Diba* (1998a) show that the liabilities to GDP ratio falls one period after an innovation in the surplus to GDP ratio. This response is consistent with and MD regime, in which a surplus pays off part of the debt.

The new fiscal theory of price determination uses modern dynamic optimising models. It starts with a household maximizing expected utility from its consumption of one consumption good ( $c_t$ ). Each household is endowed with  $y_t$  units of goods at date  $t$ . The total amount of goods ( $y_t$  - real GDP) consists of consumer goods ( $c_t$ ) plus purchases (public expenditures) by the government ( $g_t$ ). The government imposes (lump sum) taxes ( $\mathbf{t}_t$ ) on the representative household, issues money ( $M_t$ ) and borrows by issuing bonds ( $B_t$ ) at a nominal interest rate  $i_t$ .  $P_t$  is the price level. The government is viewed as a consolidated general government and central bank (independence !?).

The flow budget constraint of the government at date  $t$  is:

$$M_{t+1} - M_t + \frac{B_{t+1}}{(1+i_t)} + P_t \mathbf{t}_t = B_t + P_t g_t. \quad (11)$$

By employing a standard cash in advance (CIA) framework, *Canzoneri-Cumby-Diba* (1998b, p. 6) firstly arrive at the household's CIA constraint in equilibrium

$$M_{t+1} = P_t c_t = P_t (y_t - g_t). \quad (12)$$

After iterating the flow budget constraint of the government forward one gets the present value budget constraint (PVBC) - the intertemporal or the solvency constraint - of the government (for a detailed derivation, see *Canzoneri-Cumby-Diba* (1998b, pp. 5-8):

$$\frac{B_t + M_t}{P_t} = pd_t + I_t + E_t \left( \sum_{n=t+1}^{+\infty} \left[ \prod_{k=t}^{n-1} \mathbf{a}_k \right] [pd_n + I_n] \right), \quad (13)$$

where  $I_t = \left( \frac{M_{t+1}}{P_t} \right) \left( \frac{i_t}{1+i_t} \right)$  represents transfers from the central bank to the fiscal authority, or seigniorage. The primary surplus (exclusive of seigniorage) is defined as:  $pd_t = \mathbf{t}_t - g_t$ . The intertemporal rate of substitution between goods, or discount factor  $\mathbf{a}_k$  is independent of the other variables.

The PVBC is the focal point of the new fiscal theory of price determination. It states that the real value of existing public sector liabilities (the debt stock of the consolidated general government and central bank, defined by the left hand side of equation (13)) must be equal to the present value of current and expected future primary surpluses (inclusive of central bank transfers - seigniorage; right hand side of equation (13)). Equation (13) is the intertemporal budget constraint and describes the *solvency constraint* of a government. This constraint must hold for all initial debt stocks, and for all sequences of government spending, nominal money stocks, nominal interest rates and price levels, and not merely for equilibrium sequences. This means that the sequence of lump-sum taxes is residually determined to satisfy the solvency constraint. Abandoning this fundamental requirement for a well-posed general equilibrium produces Woodford's fiscal theory of the price level (*Buiter*, 1998, p. 9). This is exactly what the

new theory of price determination does. It treats this constraint (equation (13)) as an equilibrium condition. Given the right hand side of equation (13), and the predetermined value of nominal public sector liabilities on the left hand side, the equilibrium price level  $P_t$  must satisfy the PVBC. Otherwise, the household's transversality condition would be violated, and the economy would not be in equilibrium (Canzoneri-Cumby-Diba (1998b, p. 9).

In a MD regime the central bank (in the EMU the ECB) sets its money supply,  $M_{t+1}$  exogenously. Since  $y_t$  also evolves exogenously, the CIA constraint (equation (12)) determines the equilibrium price level,  $P_t$ . Given  $P_t$  and the predetermined value of nominal liabilities (debt), the left hand side of the government's PVBC is fixed; the right hand side must adjust to it. That is, in a MD regime, the fiscal policy of the EMU member states via their primary surpluses (inclusive of seigniorage) must be expected to adjust endogenously to satisfy the needs of fiscal solvency. Woodford (1996) considers the role of an upper bound imposed on the debt to GDP ratio - like in the Maastricht Treaty - of 60%. Canzoneri-Diba (1996) show that limiting the government's total deficit (primary deficit plus interest payments) to 3% of GDP will suffice for the working of a MD regime.

In a FD regime, real tax revenues and government purchases evolve exogenously, and the central bank sets the nominal interest rate. In equilibrium, real money balances are determined by the CIA constraint. The central bank's interest rate target pins down seigniorage, and the right hand side of the government's PVBC is determined. On the left hand side, nominal liabilities (debt) are predetermined. The equilibrium price level,  $P_t$  is the only variable that can adjust to satisfy the PVBC. Given  $P_t$  and the realization of  $y_t$  and  $g_t$ , the money stock,  $M_{t+1}$  adjusts to satisfy the CIA constraint.

Buiter (1998, p. 16-17) criticise the basic message of Woodford's (1995) new fiscal theory of the price level. In particular he attacks the proposition that, for certain fiscal rules, the equilibrium price level sequence is independent of the sequences of nominal money stocks. He identifies two errors: The first error is the specification of an overdetermined fiscal-financial programme. For given initial stocks of the government debt instruments: both the sequences of real public spending and the sequence of real taxes are given exogenously. In general, the real public debt sequence then becomes non-stationary, and the government solvency constraint need not be satisfied. The second error is an unwarranted change in the assumption about when the government solvency constraint applies. Woodford does not require that the government solvency constraint hold for all sequences of price levels and interest rates. Instead he requires only that the solvency constraint holds in equilibrium.

### III. Concepts of Fiscal Sustainability

The discussion on „sustainability of fiscal policy“ has a long tradition and goes back to Keynes (1923) and Domar (1944). For Blanchard-Chouraqi-Hagemann-Sartor (1990, p. 8) „Sustainability is basically about good housekeeping. It is essentially about whether, based on the policy currently on the books, a government is headed towards excessive debt accumulation. Thus, a good indicator of sustainability is one which sends clear and easily interpretable signals when current policy appears to be leading to a rapidly growing debt to GDP ratio.“ The theory of public debt knows many arguments for long-run limits to the public debt (see Stobbe, 1998) which we already touched upon when discussing the justification for the convergence criteria:

- Crowding-out of private investments
- Loss of overall efficiency with negative consequences for economic growth
- Intergenerational effects of income distribution
- Temptation to inflate in order to reduce the real burden of the debt
- Danger of insolvency of the state
- Increasing interest rate burdens limit the room for manoeuvre of fiscal policy
- Via spill-overs the lack of fiscal discipline (excessive deficits) may endanger the solvency position of other countries (in particular members of the EMU).

With internationally integrated financial markets, larger budget deficits and higher levels of public debt may have more widespread damaging consequences for investment and economic growth. Many studies show that there is a positive and significant link between industrial countries' public debt levels and global real interest rates. The *IMF* (1996, p. 50) quotes studies suggesting that the run-up in public debt over the last twenty years has increased real interest rates globally by 100 to 250 basis points or more. Higher real interest rates are likely to have led to lower investment spending globally, and over time to lower capital stocks, lower capital-labour-ratios, smaller increase in labour productivity, and hence slower real income growth. These losses can cumulate over time into major reductions in living standards.

Large budget deficits and debt burdens also have negative implications for economic policymaking, which can reduce welfare. If fiscal policy is disabled as a stabilization instrument, because of the priority that has to be given to fiscal consolidation, then monetary policy may become overburdened as an instrument if there is more than one policy objective. This was the case in the run-up to the examination of the convergence criteria in the period 1995 to 1997. Lastly, persistent budget deficits may result in a growth path for public debt that is simply not sustainable in the long run.

Fiscal sustainability or the sustainability of public debt is approached in different ways. I would like to differentiate between the more short-term approach in the Maastricht Treaty („excessive deficit procedure“), the medium-term approach by the OECD („economics of fiscal consolidation“) and the long-term approach („generational accounting“, the effects of „population ageing“).

### *A. Excessive Deficit Procedure*

„Sustainability“ is mentioned in Article 109j(1) of the Treaty, which specifies that the Commission has to examine whether Member States have achieved „a high degree of sustainable convergence“ and that the convergence criterion for the public finances relates to „the sustainability of the government financial position“. However - as is also admitted in the Convergence Report by the Commission (*EC*, 1998, p. 100) - no specific definition of „sustainability“ is given in the Treaty. Article 109j(1) specifies further that budgetary sustainability will be apparent when a Member State is not in a position of excessive deficit as determined in accordance with Article 104c(6). Therefore, if a Member State meets the budgetary convergence criteria and is not the subject of a decision on the existence of an excessive deficit, the Treaty assumes as a matter of principle that its public finances are sustainable. Moreover, Article 104c(3) of the Treaty specifies that for the examination of the government budgetary position „... all other relevant factors, including the medium-term economic and budgetary position of the Member State“ should be taken into account.

The „*excessive deficit procedure*“ set out in Article 104c of the Treaty and the associated Protocol No 5 determines the steps to be followed to reach a decision by the Council that an excessive deficit exists. The Commission is required (in paragraph 2 of Article 104c) to „monitor the development of the budgetary situation and of the stock of government debt in the Member States with a view of identifying gross errors.“ In particular, compliance with budgetary discipline is to be examined by the Commission on the basis of the following two criteria:

- a) „whether the ratio of the planned or actual government deficit to gross domestic product exceeds a reference value (specified in the Protocol 5 as 3 %), unless:
  - either the ratio has declined substantially and continuously and reached a level that comes close to the reference value;
  - or, alternatively, the excess of the reference value is only exceptional and temporary and the ratio remains close to the reference value;
- b) whether the ratio of government debt to gross domestic product exceeds a reference value (specified in the Protocol 5 as 60%), unless the ratio is sufficiently diminishing and approaching the reference value at a satisfactory pace.“

Hence, the excessive deficit procedure applies to the simultaneous examination of deficits and debt positions over a not consistently defined time horizon. The „criterion on the government budgetary position referred to in the second indent of Article 109j(1) of this Treaty shall mean that *at the time of the examination* the Member State is not the subject of a Council decision under Article 104c(6) of this Treaty that an excessive deficit exists.“ (Protocol No 6 on the convergence criteria of Article 109j). Although primarily the past period before the examination date is relevant (at least for the deficits) the debt position is seriously not to be qualified without making forecast into the future. In the 1998 application of the excessive deficit procedure, which was carried out with the overall convergence assessment both the „actual“ year (1997) and the „planned“ year (1998) were taken into consideration to evaluate the government deficit ratios (3% of GDP).

In the first application of the excessive deficit procedure in 1994 the Council concluded that in 10 of then 12 Member States an excessive deficit prevailed. Only Ireland and Luxembourg were not the subject of such a decision. In 1995 after the enlargement by Austria, Finland and Sweden the Commission only recommended to abrogate the decision on an excessive deficit on Germany. In 1996 Germany again had an excessive deficit, but it was decided to abrogate the decision on Denmark. In 1997 the Council decided to abrogate the decisions on the Netherlands and Finland. Up to the year 1997 only five Member States (Denmark, Ireland, Luxembourg, the Netherlands and Finland) were not the subject of a decision on the existence of an excessive deficit. In the latest examination on 25 March 1998 the Commission recommended to the Council to abrogate the decisions on the existence of an excessive deficit in a further nine Member States (Belgium, Germany, Spain, France, Italy, Austria, Portugal, Sweden and the United Kingdom; see Table 1). These recommendations were accepted by the Council with the decision of 2 May 1998. Hence, 14 Member States (all except Greece) are not the subject of an excessive deficit decision and are considered as fulfilling the criterion on the government budgetary position (see *EC*, 1998, pp. 85-89). In 1997 all Member States (with the exception of Greece) had budget deficits below 3% of GDP. Among those Member States with debt ratios higher than the reference value, the debt ratio declined in 1997 in all of them except Germany. So, literally spoken Germany did not fulfil all fiscal criteria. But taking into account the high burden of the German unification since 1990 (which - over the whole

period 1990 to 1997 - added to the stock of public debt roughly 10% of GDP, of which the biggest jump occurred in 1995 when the government had to take over the debt of the Treuhand agency - around 6% of GDP; see *EC*, 1998, p. 119 and *EMI*, 1998, p. 45) the Commission concluded that an excessive deficit no longer exists in Germany.

Although never defined explicitly what is meant by „sustainability“ the „excessive deficit procedure“ gives enough flexibility to interpret the fiscal position of the Member States in the way the literature defines sustainability in this respect. On several occasions the Commission in its Convergence Report 1998 (e.g. *EC*, 1998, p. 90) addresses the necessity of continuing with the fiscal consolidation process in the future. It is pointed out that the commitment concerning fiscal sustainability was strengthened with the adoption of the S&GP at the Amsterdam Council in June 1997. Under the pact, Member States will have to respect the medium-term budgetary objective of positions „close to balance or in surplus“. This requirement is much stronger as the fiscal criteria of Article 109j of the Treaty. By continuing the efforts in the coming years, Member States participating in the Euroland will put their public finances in a more favourable position to face the budgetary consequences of potential adverse economic developments (*EC*, 1998, p. 90).

Table 1: Current performance of the Member States in relation to convergence										
	Inflation		Government budgetary position					Exchange rates	Long-term interest rates	
	HICP (a)	Existence of an excessive deficit (b)	Deficit (% of GDP) (c)	Debt (% of GDP)			ERM participation	(d)		
	January 1998		1997	1997	Change from previous year			March 1998	January 1998	
					1997	1996	1995			
Reference value	2.7 (e)		3	60					7.8 (f)	
B	1.4	yes (g)	2.1	122.	-4.7	-4.3	-2.2	yes	5.7	
DK	1.9	no	-0.7	65.	-5.5	-2.7	-4.9	yes	6.2	
D	1.4	yes (g)	2.7	61.	0.8	2.4	7.8	yes	5.6	
EL	5.2	yes	4.0	108.	-2.9	1.5	0.7	yes (h)	9.8 (i)	
E	1.8	yes (g)	2.6	68.	-1.3	4.6	2.9	yes	6.3	
F	1.2	yes (g)	3.0	58.	2.4	2.9	4.2	yes	5.5	
IRL	1.2	no	-0.9	66.	-6.4	-9.6	-6.8	yes	6.2	
I	1.8	yes (g)	2.7	121.	-2.4	-0.2	-0.7	yes (j)	6.7	
L	1.4	no	-1.7	6.	0.1	0.7	0.2	yes	5.6	
NL	1.8	no	1.4	72.	-5.0	-1.9	1.2	yes	5.5	
A	1.1	yes (g)	2.5	66.	-3.4	0.3	3.8	yes	5.6	
P	1.8	yes (g)	2.5	62.	-3.0	-0.9	2.1	yes	6.2	
FIN	1.3	no	0.9	55.	-1.8	-0.4	-1.5	yes (k)	5.9	
S	1.9	yes (g)	0.8	76.	-0.1	-0.9	-1.4	no	6.5	
UK	1.8	yes (g)	1.9	53.	-1.3	0.8	3.5	no	7.0	
EUR	1.6		2.4	72.	-0.9	2.0	3.0		6.1	

(a) Percentage change in arithmetic average of the latest 12 monthly harmonized indices of consumer prices (HICP) relative to the arithmetic average of the 12 HICP of the previous period.  
(b) Council decisions of 26.09.94, 10.07.95, 27.06.96 and 30.06.97  
(c) A negative sign for the government deficit indicates a surplus.  
(d) Average maturity 10 years; average of the last 12 months.  
(e) Definition adopted in this report: simple arithmetic average of the inflation rates of the three best performing Member States in terms of price stability plus 1.5 percentage points.  
(f) Definition adopted in this report: simple arithmetic average of the 12-month average of interest rates of the three best performing Member States in terms of price stability plus 2 percentage points.  
(g) Commission is recommending abrogation.  
(h) Since March 1998.  
(i) Average of available data during the past 12 months.  
(j) Since November 1996.  
(k) Since October 1996.

Source: Convergence Report 1998, European Commission, Brussels, 25 March 1998, p. 16

## 1. Debt Dynamics

The debt (to GDP ratio) evolves over time  $t$  according to the simple book-keeping relation

$$b_t = \frac{(1+i)}{(1+y)} b_{t-1} + pd_t + sf_t - I_t, \quad (14)$$

where  $b_t = B_t / Y_t$  is nominal public debt to nominal GDP ratio (gross debt<sup>6</sup>),  $i$  is the (constant) nominal interest rate (on public debt),  $y$  is the (constant) rate of growth of nominal GDP,  $pd_t = (G_t - T_t) / Y_t$  is nominal primary deficit to nominal GDP ratio,  $sf_t$  are stock-flow adjustments to GDP ratio (changes in net holdings of financial assets, changes in the value of debt denominated in foreign currency and revenues from privatisation),  $I_t = (iM_{t-1}) / Y_t$  is seigniorage<sup>7</sup> (according to the opportunity cost concept; see *Hochreiter*, 1997, p. 4-5; this is slightly different to the definition in our equation (13)).

Starting from equation (14), debt dynamics (the change of the debt to GDP ratio between period  $t$  and  $t - 1$  - within one year) are described by the equation

$$\Delta b_t = b_t - b_{t-1} = \frac{(i-y)}{(1+y)} b_{t-1} + pd_t + sf_t - \frac{I_t}{(1+y)}. \quad (15)$$

This equation represents the dynamic government budget constraint. The first term („interest rate-growth differential“ or the interest rate adjusted for economic growth  $((i-y)/(1+y))$ ) can be decomposed in a „nominal interest rate effect“  $(i/(1+y)b_{t-1})$ , in a „real growth effect“  $(y/(1+y)b_{t-1})$  and in a „GDP deflator effect“  $(p/(1+y)b_{t-1})$ , where  $q$  is the rate of growth of real GDP and  $p$  is the GDP deflator (see *Deutsche Bundesbank*, 1997a, p. 24). The term „interest rate-growth differential“  $(i-y)/(1+y)$  can easily be expressed in real terms as  $(r-q)/(1+q)$  with  $r$  the real interest rate (on public debt; see *EC*, 1996, p. 13).

The debt dynamics (change of debt to GDP ratio) expressed in equation (15) consists of the following *components* (see the Convergence Reports 1998 of *EC* (1998) and *EMI* (1998)):

1. Interest/growth differential (first term)
2. Primary balance (second term: if positive a deficit, if negative a surplus)
3. Stock-flow adjustment (third term)
4. Seigniorage (fourth term).

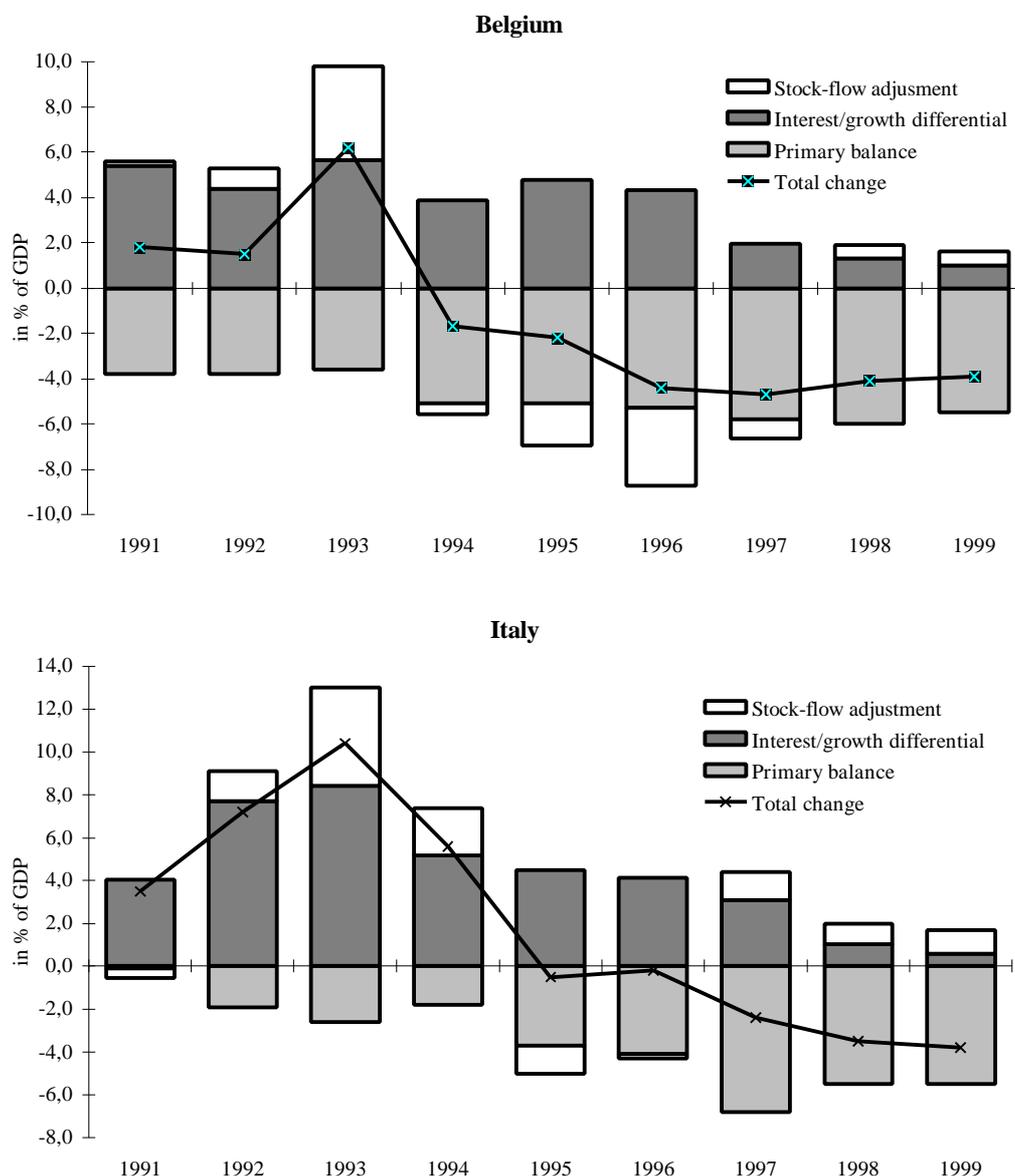
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<sup>6</sup> There are two conventional measures of public debt; general government gross liabilities (gross debt) and the corresponding net liabilities (net debt). Net debt is the measure used to calculate the fiscal adjustment required to meet specific debt objectives since it comes closest to the correct measure of government net worth that should be used in sustainability calculations (see *IMF*, 1996, p. 50). The Maastricht Treaty (Protocol 5) defines debt as total gross debt at nominal value. Therefore elsewhere in this paper gross debt is used.

<sup>7</sup> For estimations of possible Eurowinners and Eurolosers due to the socialization of existing seigniorage, see *Sinn-Feist* (1997). In contrast to the above flow definition of seigniorage the authors use a wealth concept. Seigniorage wealth is measured by monetary base minus those private bank reserves on which central banks pay interest. An Eurowinner would be France (with a relative low monetary base), Eurolosers might be Germany, Spain, the Netherlands and Austria.

Taking just two of the highest indebted EU Member States, Belgium and Italy as examples, Figure 1 demonstrates the decomposition of the absolute change in the debt to GDP ratio into three components (excluding seigniorage implies that the respective revenues are included in the primary balance).

**Figure 1: General Government Gross Debt: Annual Changes and Underlying Factors:  
Belgium and Italy**



Source: Data from *EMI* (1998).

## 2. Debt Sustainability

Debt sustainability depends on the interest rate, the growth rate of the economy, and the ratio of the primary balance - the budget balance excluding interest payments for the public debt - to GDP. „A sustainable fiscal policy can be defined as a policy such that the debt to GDP ratio eventually converges back to its initial level“ (*Blanchard-Chouraqui-Hagemann-Sartor*, 1990, p. 11). In order to fulfil the condition of debt sustainability a primary surplus is necessary

to „finance“ a certain level of debt (given that the additional income sources, stock-flow adjustments and seigniorage are negligible).

If one sets  $\Delta b_t = 0$  in equation (15) one can derive the debt stabilising primary balance in % of GDP  $pd_t^*$  which is necessary in order to stabilize the debt to GDP ratio on a certain level. From equation (15) one arrives at this result by assuming that  $sf_t = 0$  (no stock-flow adjustments) and  $I_t / (1 + y) = 0$  (no seigniorage income for the government):

$$pd_t^* = - \frac{(i - y)}{(1 + y)} b_{t-1}. \quad (16)$$

Equation (16) defines *sustainability* in each period of time  $t$ . If one looks to infinite periods in the future, one can define sustainability as a fiscal policy for which the present discounted value of the primary surplus to GDP ratio is equal to the current level of debt to GDP ratio (see *Blanchard-Chouraqi-Hagemann-Sartor*, 1990, p. 12).

As long as the rate of interest on the public debt exceeds the economy's nominal growth rate, public debt will tend to grow faster than GDP unless a country runs a primary surplus. The larger the wedge between the interest rate and the nominal growth rate, the larger the primary surplus needed to stabilize the debt to GDP ratio.

Comparing the actual primary balance with the debt stabilising one results in the *debt stability gap* ( $pd_\Delta$ ):

$$pd_\Delta = pd_t - pd_t^* \quad \text{or} \quad pd_\Delta = pd_t + \frac{(i - y)}{(1 + y)} b_{t-1} \quad (17)$$

If one starts from the present debt to GDP ratio of  $b_0$  one can calculate the primary balance which is necessary in order to target a certain reference value (e.g. the reference value of the Maastricht Treaty of 60% of GDP:  $b_n^M$ ) within a time period of  $n$  years with the following formula (see *Deutsche Bundesbank*, 1997a, p. 31):

$$pd_n^* = - \left[ \frac{(i - y)}{(1 + y)} b_0 + \frac{1}{q_n} (b_0 - b_n^M) \right], \quad (18)$$

with  $q_n = \frac{x^n - 1}{x - 1}$  and  $x = \frac{1 + i}{1 + y}$

Starting from the initial debt to GDP ratio and assumptions on the growth rate of nominal GDP and on the nominal interest rate, equation (18) allows to calculate the value of the primary balance which is necessary in order to reach the level of the target debt GDP ratio (60%) in  $n$  years. As one can imagine the primary balance depends heavily on the assumptions made concerning the growth rate of GDP and its relation to the interest rate as well as the time span a country wishes to reach the target level. A hypothetical calculation for the two most indebted EU Member States Belgium and Italy is made in Table 2. The initial debt to GDP ratio starts with the values of the year 1997.

Table 2: Necessary primary balances in order to reach the Maastricht reference value for the debt to GDP ratio in Belgium and Italy under alternative assumptions:

		Necessary primary balance ( $pd_n^*$ ) in order to target the debt to GDP ratio of 60%			
Countries	Debt to GDP ratio in 1997 (% of GDP)	after 7 years	after 14 years	after 7 years	after 14 years
		$y = 5\%, i = 6\%$		$y = 3\%, i = 7\%$	
Belgium	114,2	18,1	5,3	12,7	8,2
Italy	121,6	9,7	5,3	12,6	8,1

Belgium recorded primary surpluses of 5% to 6% during the period 1994 to 1997 (see *EMI*, 1998, Table 6: Belgium). So it may be plausible - under the very optimistic assumptions of a growth rate of nominal GDP of annually 5% and long-term interest rates of only 6% during the whole period - to assume that Belgium could reach the Maastricht reference debt to GDP level in around 14 years. Italy, on the other hand is lagging behind a sound budgetary stabilisation path. Only in 1997 Italy had a primary surplus of 6,8%. In the years before the respective values were 2% to 4% (see *EMI*, 1998, Table 6: Italy). So one must be sceptical whether Italy can reach the Maastricht reference value for the debt GDP ratio within 14 years.

### B. Economics of Fiscal Consolidation

The economist's definition of sustainability according to the intertemporal budget constraint of equation (16) is a forward-looking concept and is somewhat abstract and therefore of little practical use. Although it defines exactly under which conditions a fiscal policy (represented by the overall primary balance) leads to a sustainable debt level, this concept says little which concrete measures must be taken in order to consolidate the budget.

A look into past episodes of fiscal consolidations and the analysis of their successes or failures might give concrete hints which fiscal policy strategy leads to lasting successes and which is only shortlived without sustainability. The *IMF* (1996) as well as studies by other authors (e.g. *Alesina-Perotti*, 1997; *Perotti-Strauch-von Hagen*, 1997) march along this way. These studies develop a concept of sustainability focusing on the controllability of public finances. This approach requires a disaggregate view of the government budget. Not only the (primary) budget balance is scrutinized but also the detailed structure of (tax) revenues and expenditure categories. *Perotti-Strauch-von Hagen* (1997, p. 51) base their practical approach to assessing the sustainability of a country's public finances on four principles: (a) a focus on controllability of fiscal flows and the deficit; (b) a disaggregate view of the composition of government spending and revenues to detect the symptoms of non-sustainability; (c) attention to institutional failures causing non-sustainability; (d) the use of measures and constraints that are relatively easy and uncontroversial in the implementation.

*Perotti-Strauch-von Hagen* (1997, pp. 22 ff.) rest their analysis on case studies of fiscal stabilizations, of which they classify failures (Ireland, 1982-84; Sweden, 1983-90) and successes (United Kingdom, 1979-80; Ireland, 1987-89; Denmark, 1983-86) and three adjustments about their success the authors are undecided (France, 1994-96; Germany, 1994-96; Sweden, 1994-96).

*Alesina-Perotti* (1997) make a similar approach to assess practically sustainability of fiscal consolidations. At the outset of any consolidation critical questions about the correct approach of consolidations can be asked: (a) How large should the fiscal adjustment be?, (b) Should one cut expenditures or raise revenues, and, more specifically, which component of spending and revenues should one adjust?, (c) Will the fiscal consolidation last, or will it be reversed and will larger deficits soon reappear? (sustainability?), and (d) Will the fiscal adjustment cause a recession?

All these questions are deeply interconnected. *Alesina-Perotti* (1997, p. 211) identify two different types of fiscal consolidations.

- „Type 1“ adjustments rely primarily on expenditure cuts, in particular, cuts in transfers, social security, government wages, and employment. Tax increases are a small fraction of the total adjustment, and, in particular, taxes on households are not raised at all or are even reduced.
- „Type 2“ adjustments rely mostly on broad-based tax increases, and often the largest increases are in taxes on households and social security contributions. On the expenditure side, almost all the cuts are in public investment, while government wages, employment, and transfers are completely untouched or only slightly affected.

The authors find that Type 1 adjustments induce a more lasting (sustainable) consolidation of the budget and are expansionary, while Type 2 adjustments are soon reversed by further deterioration of the budget and have contractionary consequences for the economy.

In theory fiscal consolidations can have either, contractionary or expansionary effects (see the survey by *Alesina-Perotti*, 1997, pp. 212-218).

- *Contractionary effects* of the budget consolidation:
  1. Keynesian multiplier effect: a fiscal contraction has a temporary contractionary effect through an aggregate demand channel in a model with sticky prices and wages. A standard multiplier effect implies that spending cuts are more recessionary than tax increases.
  2. Neoclassical labour supply effects: the standard substitution effect suggests that tax increases should reduce work effort and labour supply. Higher labour income taxes reduce labour supply. Thus, a permanent spending cut financed by a tax cut has two opposite effects on labour supply: the wealth effect reduces it while the substitution effect increases it.
- *Expansionary effects* of the budget consolidation:
  3. Wealth effects on consumption: a cut in government spending, if perceived as long lasting, implies a permanent reduction in the future tax burden of consumers, generating a positive wealth effect (Ricardian equivalence).
  4. Credibility effects: a fiscal consolidation, particularly a strong one in a high-debt country, may have important credibility effects on interest rates by reducing risk premiums.

*Alesina-Perotti* (1997, p. 216-218) stress very much the point that „*composition matters*“. That means that the composition of spending cuts may have important consequences on how permanent the fiscal consolidation is (how sustainable) and on its macroeconomic consequences. They identify three reasons why the composition of cuts may matter:

1. *Expectation effect*: different types of spending cuts are more or less permanent. Comparing cuts of the same magnitude the effects are different. A reduction in public investment, for instance in maintenance of public infrastructure has less lasting effects than cuts in welfare (transfers, government employment, pensions).
2. *Political credibility effect*: governments which are tackling the politically more delicate components of the budgets, such as public employment, social security, and welfare programs, may signal that they are really „serious“ about the fiscal consolidation.
3. *Labour market effect*: cuts in the government wage bill may have different effects than cuts in nonwage government consumption.

*Alesina-Perotti* (1997, pp. 220 ff) consider a sample of 20 OECD countries for the period 1960-94. They focus upon periods of very tight fiscal policy, in particular, relatively large budget adjustments. A period of tight fiscal policy is defined (definition 1: tight fiscal policy) as a year in which the cyclically adjusted primary deficit falls by more than 1.5 percent of GDP or a period of two consecutive years in which the cyclically adjustment primary deficit falls by at least 1.25 percent a year in both years. A more important definition (definition 2: successful consolidation) is used to identify successes of fiscal consolidations. A period of tight fiscal policy is successful if (1) in the three years after the tight period the ratio of the cyclically adjusted primary deficit to GDP is on average at least 2 percent of GDP below the last year of the tight period or (2) three years after the last year of the tight period the ratio of debt to GDP is 5 percent of GDP below the level of the last year of the tight period.

That the composition of cuts matters, show the impressive results of the analysis of fiscal consolidations in the past by *Alesina-Perotti* (1997, p. 222-223). In successful cases (16 observation years), about 73 percent of the adjustment is on the spending side; in unsuccessful cases (46 observation years), about 44 percent of the adjustment is on the expenditure side. In unsuccessful cases, more than two-thirds of the cuts are in capital spending (public investment) while everything else, particularly government wages, is virtually untouched. In successful cases, cuts in capital expenditures are actually much lower in terms of GDP shares than in unsuccessful cases, despite the larger amount of total spending cuts. Only one-fifth of total spending cuts in successful cases are in public investment. In successful adjustments the largest cuts are in transfers and government wages, which together account for about 50 percent of total spending cuts. In successful adjustments, transfers and government wages are reduced by 1.1 percent of GDP a year while in unsuccessful cases the sum of these two components is less than 0.2 percent of GDP a year.

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<sup>8</sup> International organizations use different methods for cyclical corrections of the budget and its components. OECD and IMF as well as the European Commissions use the method of estimating potential output which is then used to estimate the structural (or trend) behaviour of revenues and expenditures. *Alesina-Perotti* (1997, p. 219) use a measure, based on *Blanchard* (1990) which regresses public expenditures and taxes on the unemployment rate, given that it did not change from the previous year. This methods eliminates from the budget changes in taxes and transfers associated with changes in the unemployment rate (representing the business cycle fluctuations). *Brandner-Diebalek-Schuberth* (1998) attack this problem directly by estimating structural balances by means of a times series technique (Hodrick-Prescott filter). They decompose the total budget balance into five categories of revenues and five expenditure categories for 14 EU countries.

Similar results are reported by the *IMF* (1996, pp. 57 ff) which studied 74 episodes of fiscal consolidation over a period of 25 years (1970-95) in 20 industrial countries. The IMF uses changes in the primary structural balance scaled by potential GDP as a fiscal impulse measure. *Fiscal consolidation* is defined as a situation in which the fiscal impulse measure showed a tightening in two successive years, amounting to at least 1.5 percentage points of GDP in total. *Successful cases* of fiscal consolidation were defined as those that resulted in a reduction of at least 3 percentage points in the ratio to gross public debt of GDP by the second year after the end of the two-year fiscal tightening. Using this yardstick, there were 14 episodes of successful fiscal consolidation and 48 unsuccessful cases out of the 62 episodes for which debt data were available. For all 62 episodes of fiscal consolidation, real GDP growth on average outpaced average industrial country GDP growth slightly in the year before the fiscal contraction (by 0,05%) was undertaken but fell somewhat below average growth over the two-year fiscal consolidation phase (by -0,39%) and the year after (by -0,11%). Employment growth also tended to drop and the unemployment rate increased, again relative to what was happening in the industrial countries as a whole. But in the 14 episodes in which countries were successful in reducing their ratios of public debt to GDP, economic growth and job creation increased in the adjustment phase and in the following year, the unemployment rate declined, and the currency appreciated in real terms. Thus, successful fiscal consolidation tended to be associated with successful economic performance (see *IMF*, 1996, p. 57 and p. 60).

### *C. Long-term Challenges for Sustainability*

By definition, sustainability is a forward-looking concept. A proper evaluation whether a country's fiscal policy may be sustainable is only possible by forecasting future trends of the components of equation (15), namely the interest rate, the rate of growth of GDP, the primary balance as well as stock-flow adjustments and seigniorage. Accurate forecasts of the future behaviour of government debt and deficits are therefore an important ingredient for assessing sustainability (see e.g. *Artis-Marcellino*, 1998). Most of the studies analysing sustainability rely on past behaviour of debt to GDP levels. *Brandner-Diebalek-Schuberth* (1998, p. 25) using the Hodrick-Prescott filter technique to calculate structural (cyclically adjusted) fiscal indicators conclude that by 1997 almost all EU countries have managed to turn the structural primary gap (which shows to what extent current primary balances deviate from those primary balances necessary to stabilize the debt to GDP ratio; see our equation (17)) from negative to positive. In addition, in 1997, all EU countries except Germany and France had primary surpluses sufficiently high to stabilize the gross debt to GDP ratio. Considering OECD forecasts for the year 1999 the fiscal stance in both countries is assessed as sustainable.

In the development of the primary balance, however, there may be hidden „time bombs“ like long-term burdens of the pension system due to ageing of population. Therefore, a simple assessment of sustainability just by looking at past developments of fiscal indicators (debt and deficits) might be premature. *Blanchard-Chouraqui-Hagemann-Sartor* (1990) were the first authors who tried to use the concept of sustainability not only for past - and therefore short-term analysis - but also for medium-term and long-term applications. In a special approach „generational accounting“ tries to assess the distributional implications across generations or age cohorts of changes in fiscal policies. In several analyses international organizations (IMF, OECD) have tried to study the long-run consequences of „population ageing“.

## 1. OECD Concept for Short-, Medium- and Long-term Sustainability

*Blanchard-Chouraqui-Hagemann-Sartor* (1990, pp. 16 ff) derive three indicators for sustainability, each with a different time horizon,  $n$ , and each of which is equal to the gap between the sustainable tax rate over the horizon - the tax rate which would leave the debt to GDP ratio unchanged - and the current tax rate. Three such indicators, corresponding to  $n$  equal to 1 (short-term gap), 5 (medium-term gap) and 40 years (long-term gap), are constructed and interpreted for a number of OECD countries. The choice of  $n$  equal one year is easily justified, as it leads to an indicator which does not require forecasts. The choice of  $n$  equal to 5 years is motivated by the desire to take into account predictable cyclical movements in the ratios of spending and transfers to GDP and by data limitations. Five-year projections are made regularly by the OECD. The choice of  $n$  equal to a much larger value, namely 40 years, is an attempt to quantify the implications for sustainability of slower but steady changes in spending and transfers. One can think of many such changes, from the need to overhaul public infrastructure, to additional spending on environmental projects, to a decreased defence budget, or pension problems due to the ageing of population.

In our equation (16) the present ratio of primary deficits to GDP is equal to the negative of the past level of debt to GDP, adjusted for the interest-growth differential. Deriving the intertemporal budget constraint to reach the present value, *Blanchard-Chouraqui-Hagemann-Sartor* (1990, pp. 12) derive the relation for fiscal policy sustainability. It says that the present discounted value of the ratio of primary deficits to GDP is equal to the negative of the current level of debt to GDP. Put a simpler way, for a fiscal policy to be sustainable, a government which has debt outstanding must anticipate sooner or later to run primary budget surpluses. Instead of deriving the debt stability gap we have done in equation (17) *Blanchard-Chouraqui-Hagemann-Sartor* (1990, pp. 12-16) derive an indicator of sustainability by computing the gap between the sustainable tax rate  $t^*$  and the current tax rate ( $t$ ). The sustainable tax rate is equal to the annuity value of future expected spending and transfers, plus the difference between the ex ante interest rate and the growth rate times the ratio of debt to GDP:

$$t_0^* - t = g + h - t + (r - q)b = pd + (r - q)b, \quad (19)$$

where  $t_0^*$  is the sustainable tax rate in time 0,  $t$  is the actual tax rate,  $g$  is the nominal government spending to GDP ratio,  $h$  is the nominal transfers to GDP ratio,  $r$  is the real interest rate,  $q$  is the real rate of growth of GDP,  $pd$  is primary deficit,  $b$  is the debt to GDP ratio.

- The short-term gap is given by:

$$t_0^* - t = pd + (r - q)b. \quad (20)$$

- The medium-term gap is approximated by:

$$t_n^* - t = g + h - t + (r - q)b_0, \quad (21)$$

where for the variables are used expected averages of the next 5 years.

- The long-term gaps are constructed by using the discrete time equivalent of the equations deriving the sustainable tax rate for an infinite horizon for the case of  $n$  equals 40.

The most obvious and generally acknowledged source of future threat to the sustainability of fiscal policies is associated with the ageing of populations in OECD countries *Blanchard-Chouraqui-Hagemann-Sartor*, 1990, p. 26). We will come back to this point later.

## 2. Generational Accounting

Generational accounting - originated by *Auerbach-Gokhale-Kotlikoff* (1994) - is used to assess the distributional implications across generations or age cohorts of changes in fiscal policies. They often highlight the fact that policy changes can shift resources among generations without affecting the present fiscal deficit at all. The definition of generational accounting is straightforward (see *IMF*, 1996, p. 52)<sup>9</sup>. Using present-value calculations and imposing the intertemporal zero-sum constraint that future generations must pay with interest for government purchases for which past and current generations have not paid, generational accounts seek to answer the question of how much each generation would pay in net taxes - that is, taxes and contributions paid minus transfers received - if fiscal policies were to remain unchanged. The difference between the lifetime net tax rates of new-born and future generations provides an indicator of the sustainability of present fiscal policies, because it provides estimates of the adjustment in taxes or benefits, or that the intertemporal zero-sum constraint is satisfied.

For example, for the United States *Sturrock* (1995, p. 30; see also *IMF*, 1996, p. 52) has estimated that assuming annual labour productivity growth of 0.75 percent and a real discount factor of 6 percent, lifetime net tax rates of newborn and future generations would amount to 37 and 78 percent of labour income, respectively, clearly indicating that under the assumptions made, present fiscal policies in the United States are unsustainable. However, the results are highly sensitive to the specific assumptions about the discount factor, future demographic changes, the rate of technical progress, and hence the future growth of GDP and of income.

For Germany the *Deutsche Bundesbank* (1997b) has made similar calculations in order to derive the burden of present fiscal policy for future generations in Germany. For the generation, born in 1996 it is calculated that the lifetime net tax rates would be 67 percent for men and 38 percent for women.

Although generational accounting has several draw-backs it is an instrument to check future trends of present fiscal policy and its distributional aspects. These are questions never touched upon in the fiscal convergence criteria of the Maastricht Treaty. Nevertheless it could have implications for sustainability of fiscal policy.

## 3. Population Ageing

One of the most challenging long-term problems for fiscal policy is „population ageing“. Therefore, the weak budget positions of most countries today are not the end of the fiscal story. Governments also have explicit and implicit liabilities that will shape their future budget positions, such as promises to pay public pensions and health care benefits to retirees. With the expected ageing of industrial countries' populations, there will be more elderly people to support, a smaller share of the population to work and pay taxes on labour income, and much higher medical care bills that most governments have promised to fund. When these liabilities, together with likely future tax revenues, are taken into account, the budget prospects of industrial countries look dramatically worse. This is sometimes referred to as the „invisible debt problem“ (*IMF*, 1996, p. 53). Overall then, the whole welfare state is at stake in the long run.

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<sup>9</sup> For a survey of the merits and limitations of generational accounting, see *Sturrock* (1995); and the *Journal of Economic Perspectives*, Vol. 8 (Winter 1994), which devotes the volume to generational accounting.

Several international organizations (IMF, OECD) and many scholars have studied the economic implications. The IMF (1996, pp. 58-59) made some impressive model simulations over the period 1995 to 2050 and so trying to find paths to sustainable budgets and pension schemes in industrial countries. The magnitude of the problem is illustrated in a „baseline scenario“ where general government revenues and nonpension expenditures maintain constant ratios to GDP, and pension benefits per retiree, based on the country-specific pension rule, generally rise in line with per capita nominal GDP. Starting with an initial net-debt to GDP ratio of 45 percent for the industrial countries on average in 1995 and a general government deficit of 4 percent of GDP, the deficit and debt levels start to explode in the first few decades of the next century, and by 2050 they are in excess of 20 percent and 400 percent of GDP, respectively. This is obviously not sustainable. Even a „scenario of balanced budgets“ by 2002 is not solving the long-run problem associated with adverse demographic and debt dynamics. By 2020 the debt to GDP ratio is again on an explosive path, approaching 60 percent of GDP by 2050. The „scenario of fiscal sustainability through taxes“ where in addition to the increase in contribution rates, other taxes are raised so as to stabilize the public debt ratio leads to a tax rate which would be too high a burden to be politically sustainable. The solution to the joint fiscal problem needs to involve expenditure reductions, including reductions in the generosity of pension benefits. Additionally, measures including increasing retirement ages and declines in replacement ratios are necessary. In short, a „pension reform scenario“ would solve the long-term problem. The path includes a gradual increase in retirement ages from 63 to 67 and reductions in replacement ratios by 8 ¼ percentage points. The net public debt stock falls below 30 percent of GDP and remains at this lower level through 2050, and the increase in tax revenues is only about 1 percentage point of GDP. The general government deficit will slightly increase to 1 ½ percent of GDP by 2050, after a period of zero deficits around 2010.

Similar, although much more sophisticated exercises were recently undertaken by the OECD (*Turner-Giorno-De Serres-Vourc'h-Richardson*, 1998). The OECD study presents a number of long-term scenarios illustrating the likely domestic and international macroeconomic effects of ageing across the OECD and policies which might ameliorate or reverse underlying tensions. The scenarios are constructed within the broad framework of an international dynamic general equilibrium macroeconomic model of the world economy, MINILINK. The model distinguishes five regions: the United States, Japan, EU, and „fast-ageing“ (OECD countries other than USA and EU, Japan, that means Turkey; Mexico, Eastern European countries plus Russia, China, Hong-Kong, Korea, Singapore, Thailand) and „slow-ageing“ 'rest of the world' regions (Africa, Latin America, Asia, other than China etc.). A detailed reference scenario is modeled to 2050 inclusive demographic trends and economic growth for a situation of „business-as-usual“. For example, in the European Union the dependency ratio („dependency ratio“ is defined as the ratio of the population who are not of working age (below 15 and over 64) to those who are (15 and 64); the „old age dependency ratio“ or „elderly dependency ratio“ refers to the ratio of the number of elderly - aged 65 and over - to the population of working age - 15 to 64) does not rise much above its current level of 49 percent before 2010, but thereafter the projections imply a fairly sustained increase to 78 percent by 2050. In the absence of major reforms or increases in contribution rates to the pension systems, a substantial financing requirement will arise as the number of workers per pensioner falls. This would progressively increase government deficits over time. General government deficit would increase to around 4 percent of GDP by 2050 in the EU. Increasing budget deficits would result in unsustainable levels of public debt. In the EU the debt to GDP level would jump from 60 percent to 110 percent by 2050. A key feature of the reference scenario is that the projected slowdown in the growth rate of the

working-age population and, thereby, a shrinking labour force contributes to a general decline in potential economic growth rates in all regions. The growth rate of the EU falls from around 2 percent per annum to less than 1 percent per annum by 2020, and averages less than ½ percent per annum between 2030 and 2040. Similar trends are to be found in the USA and in Japan.

Similarly as in the IMF simulations the best remedy to overcome these budgetary problems in the long-run (*Turner-Giorno-De Serres-Vourc'h-Richardson*, 1998, pp. 31-32) are combined reforms with a package of measures. These measures comprise a reduction of the net public debt in the EU by around 40 percent of GDP by 2020; progressive raising of the retirement age by 5 years in the main OECD countries as from 2005; a reduction of structural unemployment in Europe to 5 ½ percent by 2010; regulatory reforms which increase the level of labour efficiency above its underlying trend. Then real GDP could increase (by over 40 percent by 2050), real interest rates (rising up to 2030) would fall thereafter (by around 1 ½ percentage points) and the debt to GDP ratio would be sustainable at the initial levels.

The message of all these long-run exercises is that sustainability cannot be evaluated - as proposed by the fiscal convergence criteria - only on the basis of short- and medium-term developments alone. The „invisible debt problem“ must be considered carefully in order to draw conclusions about the long-run sustainability of fiscal policies in EU countries. However, the S&GP having more ambitious aims than the Maastricht Treaty would be fully consistent with solvency under the conditions for long-run sustainability.

## **IV. Are the 11 EMU Members Fiscally Sustainable?**

### **1. The Assessment by the EMI and the Commission**

In the light of the „excessive deficit procedure“ the European Commission *EC*, 1998, p. 89) comes to the conclusion, that 14 EU Member State are not the subject of an excessive deficit decision and hence, are to be considered as fulfilling the criteria on the government budgetary position according to Article 109j(1) of the Treaty (see Table 1). This recommendation has been accepted by the European Council on 2 May 1998. As the preceding discussion has shown, this procedure is only one concept in order to analyse the „sustainability“ of the fiscal policy. Although the 14 Member States fulfil the short-term convergence criteria of the Treaty both, the Commission and the EMI stress the necessity of further consolidation of the budget position in many countries. Implicitly, therefore, it is admitted that sustainability is not guaranteed in all EU Member States which have formally fulfilled the fiscal convergence criteria.

In particular, the *European Monetary Institute* in its Convergence Report 1998 (*EMI*, 1998, p. 7-8)<sup>10</sup> stressed that „notwithstanding recent achievements, further substantial consolidation is warranted in most Member States in order to achieve lasting compliance with the fiscal criteria and the medium-term objective of having a budgetary position that is close to balance or in surplus, as required by the Stability and Growth Pact, effective from 1999 onwards. This applies in particular to Belgium, Germany, Greece, Spain, France, Italy, the Netherlands, Austria and Portugal, where deficits in 1998 are forecast to be between 1.6 and 2.9% of GDP.“ And further „Taking a broader view on the sustainability of fiscal developments, the case for sta-

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<sup>10</sup> In assessing the budgetary positions of EU Member States, the impact on national budgets of transfers to and from the EC budget is not taken into account by the *EMI* (1998, p. 8).

tained consolidation over an extended period of time, requiring substantial fiscal surpluses, is particularly strong for those countries with debt ratios above 100% (Belgium, Greece and Italy). This compares with significant overall deficits in 1997 and the years before. In countries with debt ratios of significantly above 60% but below 80% of GDP, keeping the deficit ratio at current levels would not bring down the debt ratio to below 60% within an appropriate period of time, which indicates the need for further, in some cases substantial, consolidation.“ „In order to ensure sustainable fiscal consolidation, it is not sufficient to have recourse to measures with a temporary effect. In 1997 such measures were used to varying degrees in a number of Member States, which has complicated the assessment of the structural stance of fiscal policy.“ (EMI, 1998, p. 5).

Using forecasts by the Commission the EMI (1998, p. 8) concludes that maintaining a balanced budget from 1999 onwards would reduce the debt ratio to below 60% over appropriate periods (Spain by 2003, the Netherlands by 2002 and Austria by 2004; see also Table 3). Sweden could achieve the same result in the year 2001 by realising the surplus position forecast for 1998 and maintaining it for several years thereafter. In Germany the debt ratio is forecast to be just above 60% of GDP in 1998, which could allow it to be reduced to below the reference value as early as 1999 (the Commission by 2001; see Table 3) if balanced budgets were achieved in that year. In Denmark, Ireland and Portugal current and forecast fiscal balances would allow the debt ratio to be reduced to a level equal to or just below 60% as early as 1998. Finally, in France, where the debt ratio is just below 60% of GDP, complying with the Stability and Growth Pact from 1999 onwards would also ensure that the debt ratio does not exceed the reference value. Similarly, in Luxembourg, Finland and in the United Kingdom the debt ratio is already below 60%. In Belgium, Greece and Italy only with high efforts in producing primary surpluses over 14 years, 10 years and 19 years respectively, these countries can expect to bring down their debt to GDP ratio to below 60% (see Table 3).

Table 3: Sustainability of debt trends							
	Government debt ratio in 1997 (as % of GDP)	Change in debt ratio 1996-97 (as % of GDP)	Actual primary balance in 1997 (as % of GDP)	Debt stabilising primary balance in 1997 (as % of GDP)	Debt stability gap <sup>a)</sup> in 1997 (as % of GDP)	Number of years needed to bring the debt ratio below 60 % of GDP <sup>b)</sup>	Year when the debt ratio falls below 60 % of GDP <sup>b)</sup>
			(1)	(2)	(3)=(2)-(1)		
B	122.2	-4.7	5.8	2.7	-3.1	14	2011
DK	65.1	-5.5	6.5	1.9	-4.6	1	1998
D	61.3	0.8	1.1	2.1	1.0	4	2001
EL	108.7	-2.9	5.6	-1.0	-6.6	10	2007
E	68.8	-1.3	1.9	0.7	-1.2	6	2003
F	58.0	2.4	0.6	1.8	1.2	Debt < 60 %	Debt < 60 %
IRL	66.3	-6.4	5.2	-2.4	-7.6	1	1998
I	121.6	-2.4	6.8	4.5	-2.3	19	2016
L	6.7	0.1	2.1	-0.1	-2.2	Debt < 60 %	Debt < 60 %
NL	72.1	-5.0	3.9	1.3	-2.6	5	2002
A	66.1	-3.4	1.6	1.5	-0.1	7	2004
P	62.0	-3.0	1.9	0.8	-1.1	1	1998
FIN	55.8	-1.8	4.5	1.6	-2.9	Debt < 60 %	Debt < 60 %
S	76.6	-0.1	5.4	4.2	-1.2	4	2001
UK	53.4	-1.3	1.6	0.3	-1.3	Debt < 60 %	Debt < 60 %
EUR	72.1	-0.9	2.6	1.3	-1.3	7	2004

a) A negative sign means that the actual primary balance is sufficiently large to bring down the debt ratio in 1997. The stock-flow adjustment is not taken into account for these calculations.

b) The calculations have been made as follows: Spring 1998 economic forecasts for the debt ratio until 1999 and projections thereafter, fixing interest rates on government debt at a common level of 6 %, inflation rates at 2 %, stock-flow adjustments at zero and keeping real GDP trend growth rates and primary balances constant at the levels forecast for each Member State in 1999.

Source: Convergence Report 1998, European Commission, Brussels, 25 March 1998, p. 111

The *European Commission* in its *Convergence Report 1998* (EC, 1998, pp. 100-112) besides evaluating the Member States concerning their compliance with the fiscal criteria according to the Treaty, makes a long digression on „sustainability of the government financial position“. The major point is the same as made in our discussion of the different concepts of sustainability. „In assessing convergence achievements and readiness for participation in the single currency, it is of utmost importance that sound government budgetary positions shall be

achieved durably and that Member States shall be in a position to ensure on a continuing basis that they 'avoid excessive government deficits' in the third stage of EMU." (EC, 1998, p. 100).

The Commission, in assessing sustainability stresses the following issues:

- The *influence of the cycle* (EC, 1998, pp. 101-103): Due to the automatic stabilizers during a recession, the cycle exerts a negative influence on the government budget and widens the deficit by depressing revenues and pushing up social expenditures (higher payments for unemployment benefits). This influence is reversed and even becomes positive during phases of economic expansion. For most Member States, the largest part of the progress in reducing budget deficits which has been achieved over the period 1993-97 results from discretionary tightening while only a minor part can be ascribed to the cyclical upturn since 1993. Only in Ireland the improvement in the government deficit comes primarily from the beneficial cyclical developments (high economic growth). In Denmark and Finland their improvement in cyclical conditions also attributed to a large extent to the reduction in the government deficit. In order to assess the influence of the cycle versus structural trends the European Commission uses the potential output method to adjust the actual budget balances for cyclical components. The Commission mentions in EC (1998, p. 101, footnote 12) that the cyclically adjusted deficit figures published by the IMF and the OECD are generally lower than those calculated by the Commission services and present therefore a more favourable picture.<sup>11</sup>
- *One-off measures* (EC, 1998, pp. 103-104): The Commission criticizes very openly the attitude of some EU Member States, in order to fulfil the fiscal convergence criteria in the year 1997, to rely on measures which are only „one-off“ or temporary in nature. Sustainability is in such countries in danger. The Commission puts into pillory explicitly some Member States. One-off operation on the revenue side include the collection in one year (1997) of receipts from the sale of buildings and intangible assets, such as for example the sale of mobile phone licences in Belgium and Austria. Similarly of temporary nature are fiscal measures, such as the euro-tax package in Italy. On the expenditure side, such temporary measures include the postponement of government investment spending or delays in payments. The exceptional payments made by *TeleDanmark* in Denmark, *France Télécom* in France, the *Postsparkasse* in Austria and the *Banco Nacional Ultramarino* in Portugal.
- The *size and composition of budgetary adjustment* (EC, 1998, pp. 105-107): As was mentioned earlier, „composition matters“ (see *Alesina-Perotti*, 1997). Looking at the cyclically adjusted primary balance which is more directly controlled by the budgetary authorities, the Commission comes to the following conclusion: During the second stage (1993-97), five Member States - Greece, Spain, Italy, Sweden and the United Kingdom - have implemented a major budgetary adjustment and achieved an improvement in their cyclically adjusted primary balance of more than 3 percentage points of trend GDP (see Table 4). In most other Member States, the size of the retrenchment was situated between 1.5 and 3 percentage points. Some budgetary loosening took place in Denmark and Ireland, while the Netherlands only implemented a relatively minor retrenchment, but large budgetary adjustments had already been carried out in these countries during preceding years. The size of the con-

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<sup>11</sup> For a comparison of the different methods used to calculate cyclically adjusted (or structural) balances, see *Brandner-Diebalek-Schuberth* (1998). The authors use a different approach by directly estimating the structural balances by applying the Hodrick-Prescott filter technique.

solidation depended on the initial conditions at the start of Stage Two of EMU. Some Member States relied on revenue increases to achieve correction of their budgetary imbalances but only in Belgium, Greece, France and the United Kingdom did the increase in revenue outweigh cuts in primary expenditure. There was a decline in the revenue share in Denmark, Germany, Spain, Ireland and the Netherlands. Cuts in current primary expenditure made a significant contribution to the deficit reduction in most Member States. Unfortunately, several Member States also relied on cuts in capital expenditures (public investments) to bring down their deficits. In Denmark, Greece, France and the United Kingdom, reductions of public investment were the major source of adjustment on the primary expenditure side and they were also important in Germany, Italy and Sweden. Reduced interest payments more than outweighed improvements in the primary balance in Belgium and the Netherlands.

Table 4: Composition and Success of Fiscal Consolidations in EU Countries: 1993-1997  
(Cyclically adjusted, as % of trend GDP)

	Conso- lidation  *)	Succ- ess- ful  **)	Change:						
			Overall balance  (1)  =(3)-(2)	Interest pay- ments  (2)	Primary balance  (3)  =(4)-(5)	Reve- nue  (4)	Primary expendi- ture  (5)  =(5a)+(5b)	of which:	
								Current primary exp.  (5a)	capital expend.  (5b)
B	yes	yes	4.6	-2.6	2.0	1.2	-0.8	-0.6	-0.2
DK	no	yes	1.5	-1.8	-0.3	-0.5	-0.2	0.2	-0.4
D	yes	no <sup>++</sup> )	1.1	0.4	1.5	-1.3	-3.0	-1.6	-1.4
EL	yes	no	9.2	-2.9	6.3	3.2	-3.0	0.6	-3.6
E	yes	yes	4.3	-0.7	3.6	-1.6	-5.2	-3.5	-1.7
F	yes	no <sup>+</sup> )	2.4	0.3	2.7	1.4	-1.3	-0.5	-0.8
IRL	no	yes	-0.1	-1.8	-1.9	-2.1	-0.2	-0.7	0.5
I	yes	no	6.4	-2.6	3.8	0.5	-3.3	-1.7	-1.6
L	-	<sup>+</sup> )	-	-	-	-	-	-	-
NL	no	yes	1.6	-1.0	0.6	-4.2	-4.7	-4.2	-0.5
A	yes	no	2.3	-0.3	2.0	0.0	-2.1	-1.3	-0.8
P	yes	no	4.3	-1.9	2.4	4.6	2.2	2.8	-0.6
FIN	yes	yes <sup>+</sup> )	0.6	1.3	1.9	0.1	-1.8	-1.6	-0.2
S	yes	yes	7.7	0.3	8.0	2.4	-5.5	-2.9	-2.6
UK	yes	no <sup>+</sup> )	3.4	0.8	4.2	2.3	-1.8	-0.4	-1.4
EU-15			3.2	-0.4	2.8	0.0	-2.8	-1.5	-1.3

\*) A period of budget consolidation is defined as a situation where the primary balance ratio to GDP (cyclically adjusted) over the period 1993-1997 has increased at least by 1 percent of GDP.

\*\*\*) A budget consolidation is called successful if the debt to GDP ratio has declined at least by 5 percentage points between 1993 and 1997.

+) In these Member States the debt to GDP ratio in 1997 was already below 60%.

++) In Germany the debt to GDP ratio is already close to 60% (however, it increased from 1996 to 1997 from 60,4% to 61,3%).

Source: Convergence Report 1998, European Commission, Brussels, 25 March 1998, p. 106.

- *Medium-term prospects* (EC, 1998, pp. 108-109): Since 1993 Member States of the EU have been presenting at Community level „convergence programmes“, setting out their medium-term strategies for achieving and maintaining respect of the convergence criteria. The submission was not compulsory but took place at the own initiative of Member States. They were assessed by the Commission and discussed in the Council. The most recently submitted versions of convergence programmes include objectives for the government budget balance projected for future years (in most cases up to the year 2000 or beyond). These programmes were submitted during December 1996 or December 1997 (see EC, 1998, p. 108 for a compilation). Only Luxembourg has never submitted a convergence programme. The programmes aim for a continuing improvement in budgetary positions in 1998 and future years based on underlying projections of vigorous economic growth and further falls in interest costs. By the year 2000, deficits less than 2% of GDP are aimed for by all Member States that give projections that far.

In a declaration at the ECOFIN Council meeting on May 1, 1998 it was agreed upon that „each of the ministers undertakes to submit, at the latest by the end of 1998, national stability or convergence programmes which will reflect these important elements“. It is referred to further strong budget consolidation.

- *Sustainable debt trends* (EC, 1998, pp. 109-112): Widespread progress in reducing budget deficits has allowed government debt ratios to come down in almost all Member States in 1997. As was discussed earlier the change in the debt to GDP ratio can be attributed to the factors: interest-growth differential, primary balance, stock-flow adjustments and seigniorage (this component is in most cases already included in the primary deficits; see Figure 1 for the case of Belgium and Italy). The driving force behind the debt reduction for most Member States came from the combined contribution of GDP growth and the reduction of the primary deficit and only in a few countries - Austria and Portugal - can the debt reduction in 1997 be attributed to a large extent to „stock-flow adjustment“ measures (receipts from privatisation). Whereas over the period 1990-93, the „stock-flow adjustment“ factors added more than 3 percentage points on average in the EU each year to the government debt ratio, their annual average effect over the period 1994-97 has become negligible or even negative in most Member States, except for Germany (where the large unification-related debt of the Treuhand was taken over by the government), Greece and Luxembourg (see EC, 1998, p. 110). The major task for the EU countries, however, is to produce primary surpluses in the future to put their debt ratio on a downward path (see the necessary conditions of the „debt stability gap“ of equation (17)). Primary surpluses were sufficiently large in 1997 for the debt ratio to come down in most Member States (see Table 3). Especially Belgium, Denmark, Greece and Italy achieved large primary surpluses while in Denmark, Greece and Ireland the primary surplus was much larger than that needed to st-

bilise the debt ratio. In Germany and France the primary surplus was not sufficiently large in 1997 to put the debt ratio on a declining parth; the debt ratio remained below the 60% of GDP threshold in France. Based on the Commission forecasts for the debt ratio until 1999 and on mechanical projections thereafter - fixing interest rates on the government debt at a common level of 6%, inflation rates at 2%, the stock-flow adjustment at zero and keeping real GDP trend growth rates and primary balances constant at their levels forecast for 1999 - the debt trajectory for each Member State was calculated according to the equation (18) and the year when the debt ratio is projected to fall below the 60% of GDP reference value can be determined (see Table 3). As already mentioned the highest indebted countries Belgium (14 years), Greece (10 years) and Italy (19 years) have - even under very optimistic assumptions about their primary surpluses - a long time to go to reach sustainability.

## **2. Successful Consolidations or Not?**

An assessment of sustainability along the lines of the „economics of fiscal consolidation“ comes to somewhat different conclusions as the Commission. Applying similar criteria for the success of budget consolidations as in the studies by *Alesina-Perotti* (1997) and in *IMF* (1996) one can group the EU countries in the following manner. For this purpose the preparation phase before examining the convergence criteria (1993-97) is analysed.

Firstly, one has to ask whether a budget *consolidation* has taken place during the period 1993-97. A period of fiscal consolidation is defined as a situation where the primary balance ratio to GDP (cyclically adjusted) has increased at least by 1 percent of GDP. According to this criteria Denmark, Ireland and the Netherlands did not have a consolidation in this period (see Table 4). The long-run development of total budget balances can be seen from Figure 2.

Secondly, a *successful consolidation* is defined as a situation where the debt to GDP ratio between 1993 and 1997 declined by at least 5 percentage points. The data on the evolution of the debt to GDP ratio can be found in the Convergence Report by *EMI* (1998). The long-run picture of the debt dynamics in EU countries are plotted in Figure 3. Accordingly, only 5 EU countries made a successful consolidation: Belgium, Spain, (partly the Netherlands), Finland and Sweden. In Finland the debt ratio already was below 60% in 1997. The consolidation of the following countries must be classified as unsuccessful: Germany (the debt ratio is already close to 60%; however, it increased slightly from 1996 to 1997 and is forecast to decline in 1998), Greece, France (the debt ratio was already below 60% in 1997), Italy, Austria, Portugal, Sweden and the United Kingdom (the debt ratio was already below 60% in 1997; see Table 3). The major reason for classifying countries as unsuccessful was that these countries relied highly on one-off measures to fulfil the fiscal criteria in 1997.

**Figure 2: General Government Budget Balances to GDP Ratios in EU Countries:  
1970-1999**

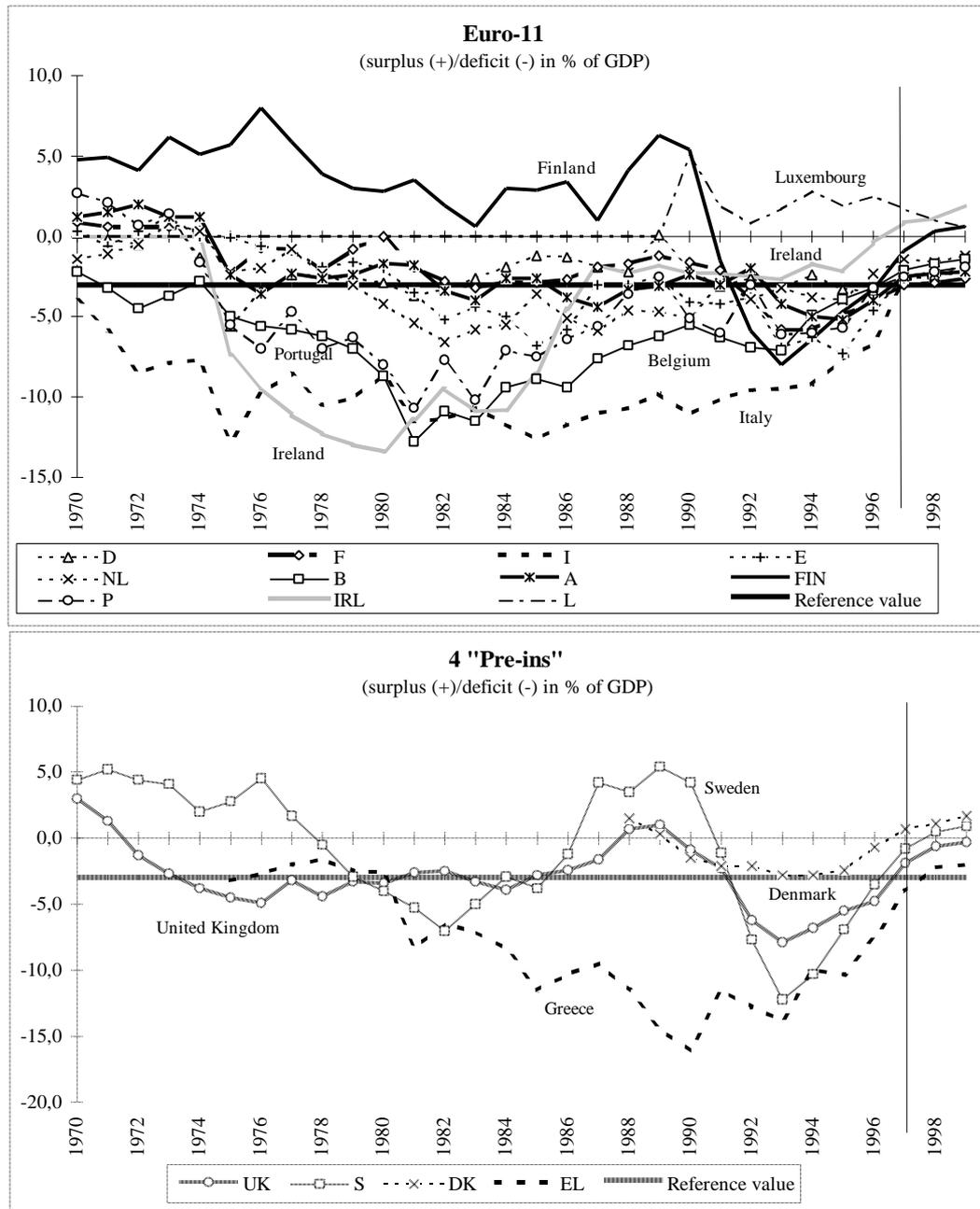
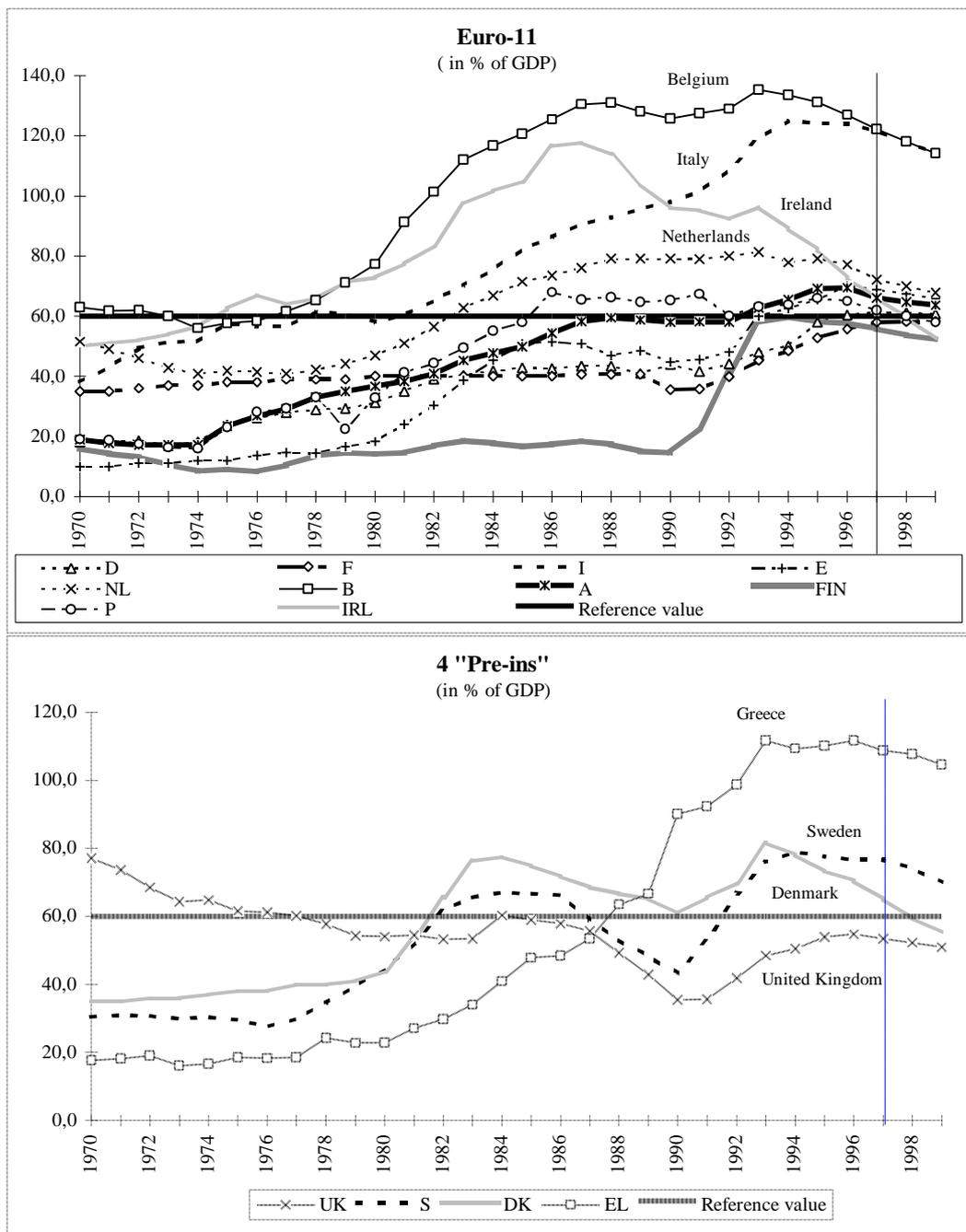


Figure 3: Gross Public Debt to GDP Ratio in EU countries: 1970-1999



Similar to the exercise made by the IMF (1996) one can look on the *macroeconomic consequences of the budget consolidations* (see Table 5). First of all one must note that - although the Maastricht Treaty with the aim of the EMU was signed already in 1992 - in most countries the consolidation efforts only set in 1995/96 (with the exception of Belgium in 1994 and Finland in 1993 - although at that time not a member of EU). Similar to the results in the IMF study (1996), one finds that fiscal consolidation was not harmful for GDP growth. In the six successful countries real GDP before and after the consolidation was higher than on EU average, whereas in the unsuccessful countries the economic growth was lower. Of course, there are exceptions from the rule. Belgium performed worse than the EU average. The average of

the successful countries, however is also dominated by the exceptional growth performance by Ireland.

Table 5: Macroeconomic effects of fiscal consolidations in EU countries: 1993-97

	Start of consolidation*)	Consolidation successful**)	1 year before	1 year after start of fiscal consolidation	2 years after	cumulative 2 years after
Effects on real GDP (deviations from EU-15 average in %)						
B	1994	yes	-1.0	-0.5	-0.4	-0.9
DK	1996	yes	0.1	0.9	0.2	1.1
D		none	-	-	-	-
EL	1996	no	-0.7	0.8	0.8	1.9
E	1996	yes	0.3	0.5	0.7	1.2
F	1995	no	-0.1	-0.4	-0.3	-0.7
IRL	1996	yes	8.6	6.8	7.3	14.1
I	1995	no	-0.7	0.4	-1.1	-0.7
L		none	-	-	-	-
NL	1996	yes	-0.2	1.5	0.6	2.1
A	1996	no	-0.4	-0.2	-0.2	-0.4
P	1995	no	-2.2	-0.6	1.8	1.2
FIN	1993	yes	-4.6	-0.7	1.6	0.9
S	1994	no	-1.7	0.4	1.4	1.8
UK	1994	no	2.6	1.4	0.3	1.7
All 13 cases <sup>+) </sup>			0.22	0.50	0.07	0.57
6 successful cases <sup>+) </sup>			0.01	0.81	0.83	1.64
7 unsuccessful cases <sup>+) </sup>			0.29	0.39	-0.19	0.21

\*) A consolidation starts, when during 1993-97 for the first time the primary surplus increases or the primary deficit declines.

\*\*\*) A fiscal consolidation is given when there is an improvement in the primary balance by at least 1 ½ percent of GDP two years after the consolidation started.

This definition diverges slightly from those chosen in Table 4; this time we look at each year during the period 1993-97 and use the primary balances (not cyclically adjusted) reported by the EMI.

A budget consolidation is called successful if the debt to GDP ratio has declined at least by 5 percentage points between 1993 and 1997.

+) GDP weighted averages.

Source: Own calculations based on data by the Convergence Report 1998 by EMI (1998).

## **V. Simulated Asymmetric Shocks and Fiscal Sustainability?**

The oldest theory economists use to evaluate whether a monetary union forms an „optimum currency area“ is those by *Mundell* (1961). The basic message is that the loss of the instrument of nominal exchange rates must be compensated with more flexibility on the labour market or more international labour mobility in order to absorb asymmetric (country-specific) shocks. After several refinements the theory of optimum currency area (OCA theory) is at the heart of any economic evaluation about the adjustment mechanism in a community consisting of several countries with one money. There is a long debate how to operationalize the OCA theory (see e.g. *Bayoumi-Eichengreen*, 1996). Interestingly, the empirics of the OCA theory leads primarily to a mini-EMU. Recent work on the question how countries will handle idiosyncratic macroeconomic shocks under the single currency includes the study by *Obstfeld-Perio* (1998). Instead of pleading for more fiscal federalism in the EMU<sup>2</sup> (a transfer union à la USA) they propose an alternative strategy based on a relaxed Stability Pact, further strictures against central EU borrowing, labour market and fiscal reform, and the issuance by individual member states of debt indexed to nominal GDP.

All these questions are not touched upon in the following exercise. Instead, two simulations are carried out with the Oxford Economic Forecasting (OEF) World Model (*OEF*, 1996). In its latest release of OEF the Euroland is already modeled insofar as the 11 EU countries participating in the EMU have fixed bilateral exchange rates starting with 1Q1999. In addition, the ECB is emulated by assuming the same interest rate levels in Euroland. And the Euro is already anticipated and calculated against third country currencies, like the US-Dollar (USD) or the British Pound (Euro). So when simulating shocks one already anticipates the monetary behaviour of the European Central Bank (ECB). Its monetary policy reaction function follows something like a Taylor rule: the short-term interest rate adjusts in response both to the gap between a target for the stock of money and its actual value and to the gap between potential output and actual output.

Two external shocks to the European economies are simulated over a period of nine years, starting with 1999. The first is a classical supply shock (oil price increase), the second is a demand shock (cut in Eastern Europe's imports). The primary interest in simulating the shocks is their implications on fiscal sustainability.

### **1. Supply Shock**

At present, there is an oversupply on the world market for oil and therefore the prices stay at record low levels of around 11 to 12 USD per barrel. Nevertheless, it may be interesting to look at a doubling (100% increase) of the oil prices. The two oil price shocks in the past (OPEC I by 1972/73; OPEC II by 1980/81) had drastic effects in the industrial countries: a surge of inflation, a decline of economic activity, an increase in unemployment, a deterioration of the government budget positions.

In the following the results of the simulation of an 100% increase of oil prices are reported only for a few countries (three „ins“ in EMU: Austria, Germany, Italy; the United Kingdom as representative of the „outs“; and the USA as a prominent third country) and the macroeco-

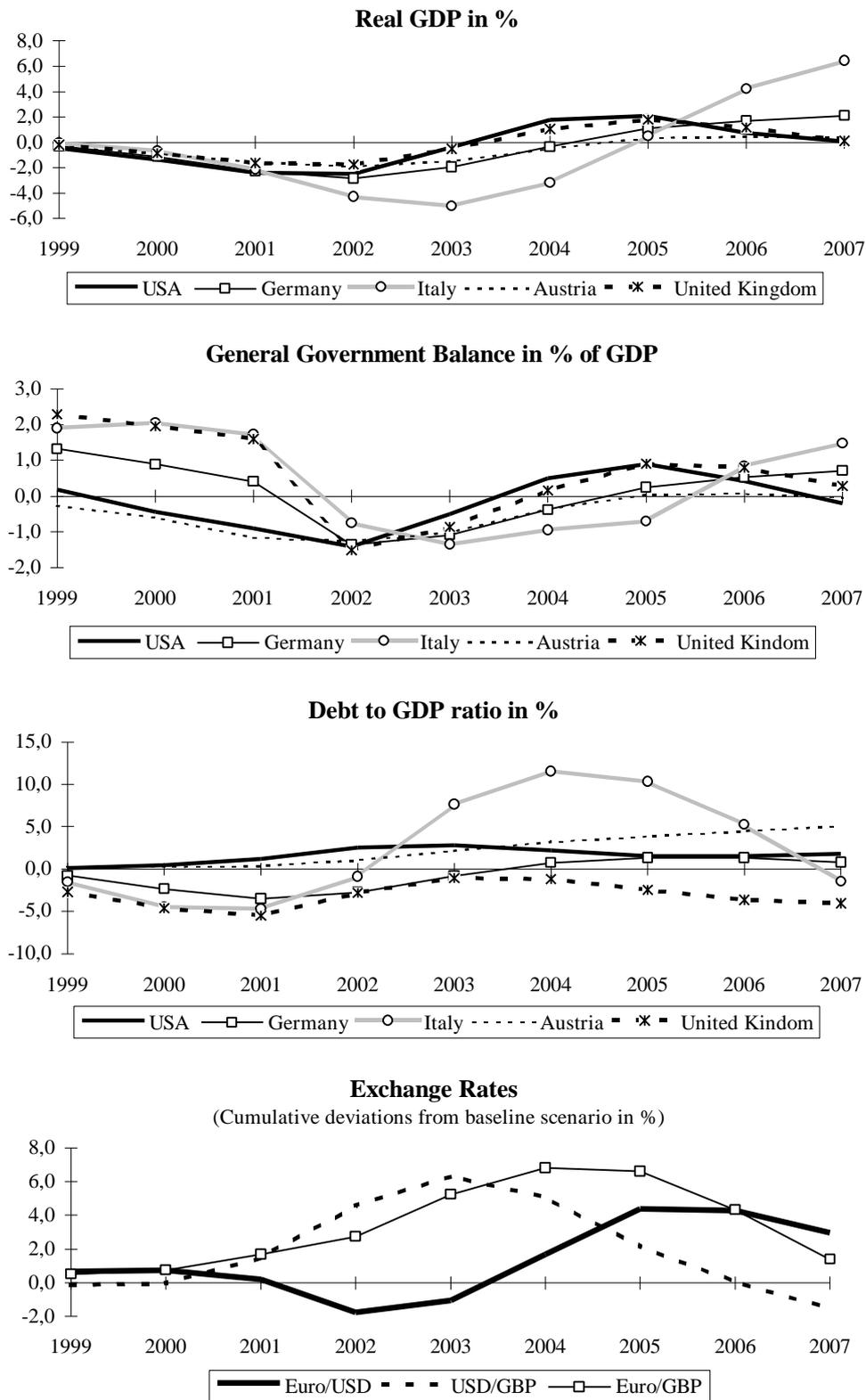
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<sup>12</sup> In the declaration by the ECOFIN Council of May 1, 1998 (point 6.) „specific financial transfers“ (transfer union; fiscal federalism) were explicitly excluded.

conomic variables: real GDP, general government balance, debt to GDP ratio, exchange rates. The oil price shock has the following timing: 100% increase of oil prices during the period 1999-2001, thereafter a decline to the baseline price level. Although the oil price shock is common to all industrial countries, its impact is, however, idiosyncratic depending on the country-specific dependency of oil imports (for example, the United Kingdom is less dependent on oil imports than Germany).

All five countries will experience a decline in real GDP and an increase of inflation (not reported in Figure 4). Up to the year 2002 the cumulative loss of real GDP will be about 2 percent in all countries alike. Then, after the oil price returns to base levels, in Italy the lagged effect will drive real GDP down even further to around 4 percent, whereas the other countries already improved their position. Later, Italy will improve more than the other countries. The deterioration in the general government balance is not as dramatic as expected and has a quite similar pattern in all reported countries. However, again Italy will experience a rather strong increase in its debt to GDP ratio by 2004 (by around 10 percent of GDP), which will question sustainability. The oil price shock leads to a slight depreciation (increase) of the Euro against the USD at the beginning. After the fall of the oil prices an appreciation sets in and is followed by an depreciation path later. A somewhat inverse pattern can be detected in the Euro/GBP exchange rate, implying an insulation effect of the monetary policy in United Kingdom.

**Figure 4: Oil Price Shock: Increase by 100% during 1999-2001**  
(Deviations from baseline scenario in %)



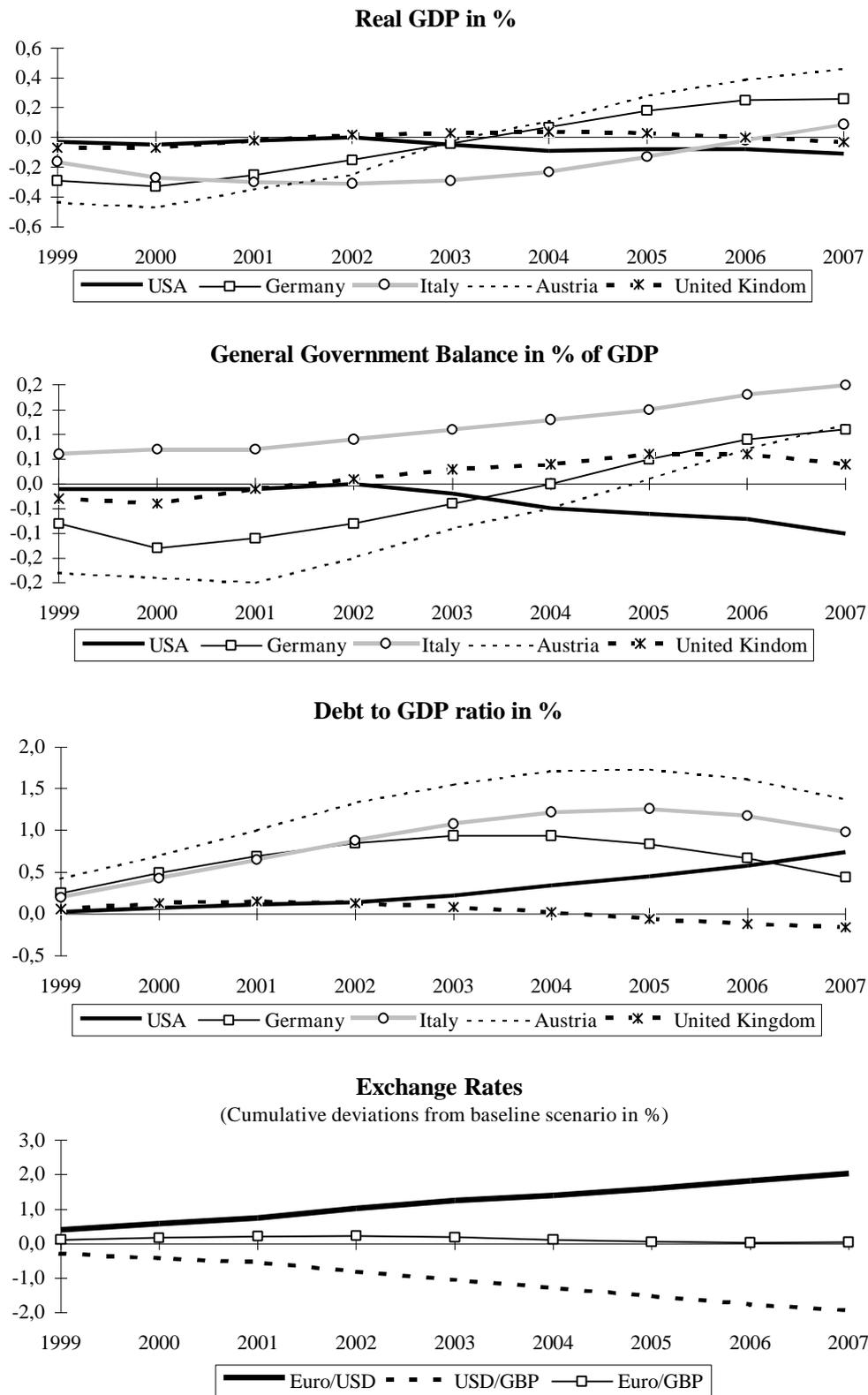
Source: Own Simulations with the OEF World Model.

## **2. Demand Shock**

As an external demand shock a 20% cut of imports of Eastern Europe (sustained) is simulated over the whole period (1999-2007). Such demand reduction could happen in Eastern Europe when this region will catch the currency crises virus of Asia via Russia! Again, this shock is common to all western industrial countries, however, its impact depends on the trade intensity of western countries with eastern countries (Austria has a higher share than the United Kingdom or the USA).

The import cut of Eastern Europe would - in the short-run - cause the biggest losses in real GDP in Austria (around 0.4 percentage points), followed by Germany and Italy (see Figure 5). Similarly, the worsening of the fiscal position (deficit, debt) is stronger in Austria than in other countries. Although this shock is not as large as the oil price shock, the deterioration in the debt position is obvious in all EMU „ins“ countries. The Euro would devalue against the USD in case of such a demand shock.

**Figure 5: Reduction of Imports of Eastern Europe by 20%**  
(Deviations from baseline scenario in %)



Source: Own Simulations with the OEF World Model.

These simulation exercises should demonstrate that not unrealistic shocks to the economies of the EMU may endanger the ambitions towards fiscal sustainability in the near future.

## VI. A Single Monetary Policy for Nonconvergent EMU Countries

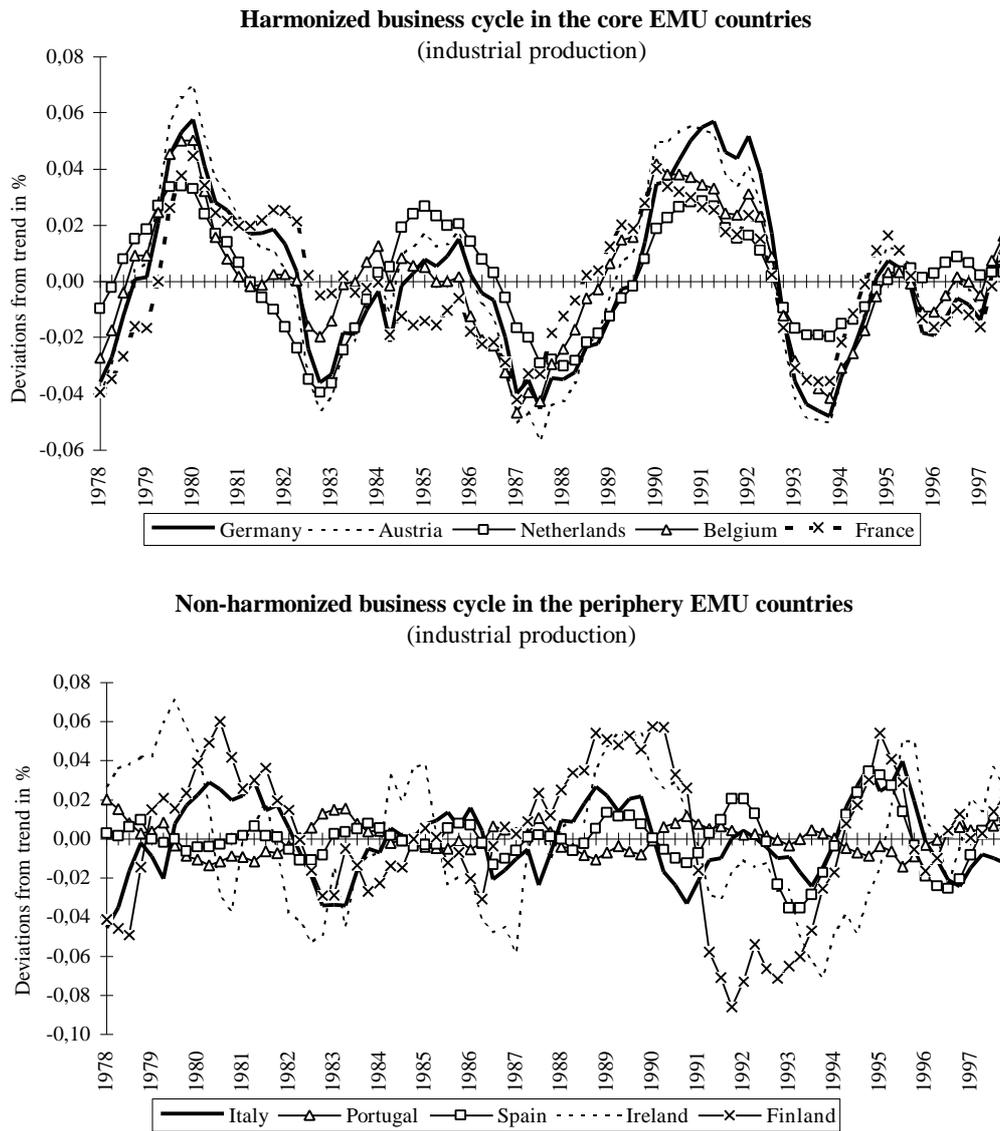
One of the great challenges of the ECB is the formulation of a proper single monetary policy for countries not really converging, in particular when they exhibit different business cycle positions. *Dornbusch-Favero-Giavazzi* (1998a, 1998b) touched upon these problems in recent papers. The question is how a single monetary policy - a common change in the interest rate controlled by the ECB - is transmitted to the economy of the member countries.

As long as the business cycle of Euroland is not synchronized (see Figure 6) the economic impact in the „ins“ countries will be rather different. Exactly this situation is simulated by assuming an increase of the common short-term interest rate in Euroland by 1% over the period 1999-2007 (see Figure 7).

The impact on real GDP is different between the three „ins“ and the United Kingdom as the „out“ country and the third country USA. Whereas the latter countries do not change their interest rates interest rate differentials will be built up. In the „ins“ countries real GDP declines by nearly 1 ½ percentage points by 2003, afterwards the loss decreases (with the exception of Austria). In the „outs“ countries there is no real impact on the economy. The implications for the fiscal policy stance are quite dramatic. General government balances deteriorate permanently. The debt to GDP ratios increase steadily - in particular in Italy (by 15 percentage points of GDP). The Euro - due to the interest rate differential vis-à-vis the USA and the United Kingdom - appreciates against the Dollar and the Pound.

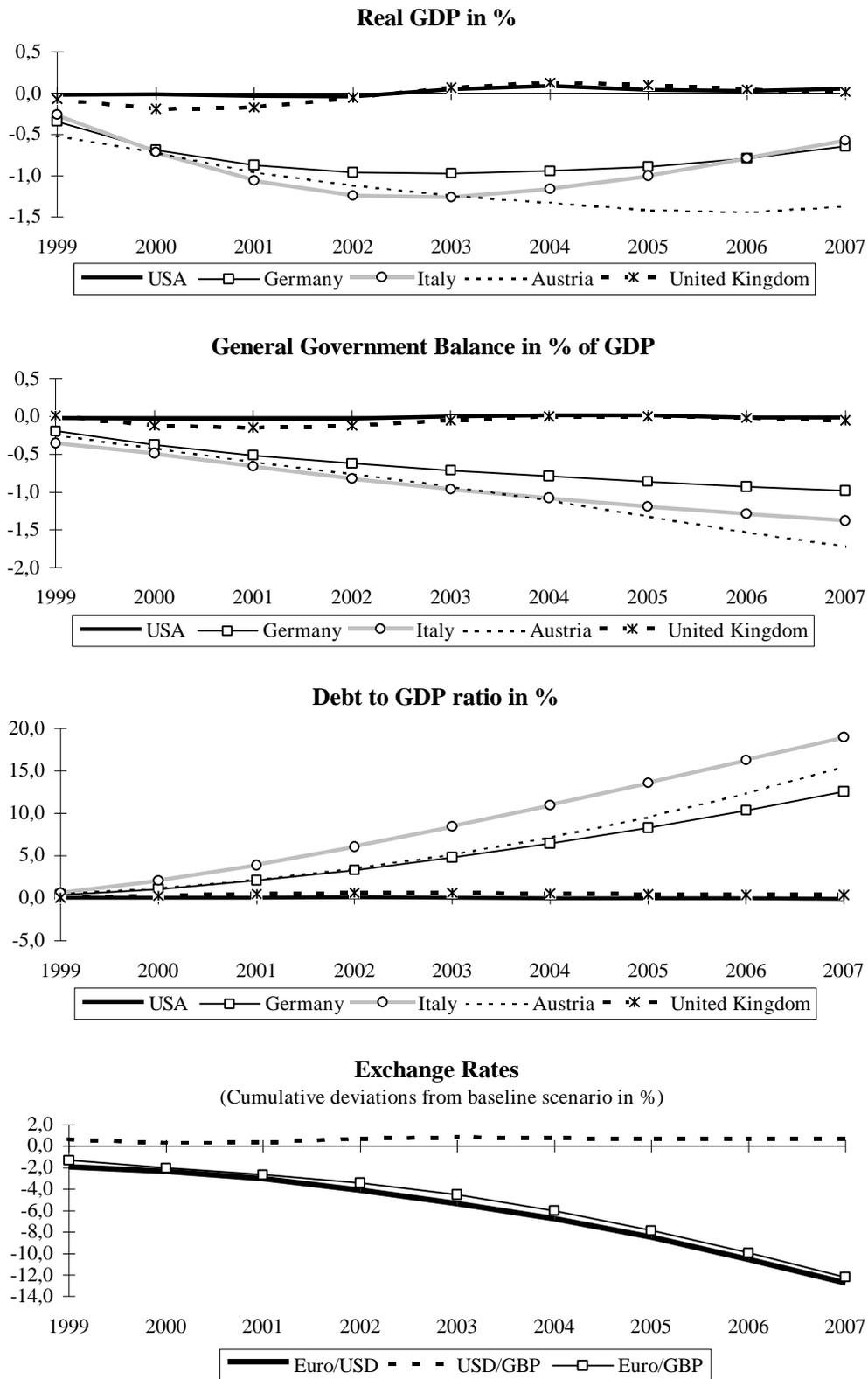
In reality, the macroeconomic effects of unexpected shocks can depend importantly on how policymakers react. A single monetary policy reaction function for the Euroland as a whole is, however, much less adequate in case when the Euroland business cycle is not synchronized. When this problem cannot be solved by a single monetary policy for all countries the members of the EMU must converge their economies and their business cycle. One way in this direction is the S&GP, which forces all Member States at least to conduct a virtually single fiscal policy. Together with a real single monetary policy, this might lead to real convergence, as was the case in the countries which formed voluntarily a bilateral „monetary“ union with Germany, as in the case of the Netherlands and Austria.

Figure 6: Business Cycles in Euroland



Source: WIFO, Vienna

**Figure 7: Increase of Short-term Interest Rates in Euroland by 1%**  
(Deviations from baseline scenario in %)



Source: Own Simulations with the OEF World Model.

## **VII. Conclusions**

Many new arguments can be put forward for sticking to the fiscal convergence criteria in the EMU of the European Union. If not only the monetary policy had been centralized but also the fiscal policy, many things would have been easier. So the Union needs instruments to at least harmonize the fiscal policy of the EMU members. The Stability and Growth Pact is even more binding than the fiscal criteria of the Maastricht Treaty, as it aims at budget balances close to zero or even in surplus. Whether this straitjacket is good or bad is an open question. It is probably good if the objective is debt sustainability. If one thinks of asymmetric shocks it could be bad, because then - having not a comparable fiscal federalism system as in the USA - not many policy instruments are left for adjusting to such shocks. The simulations of two shocks (one supply shock and one demand shock) and the change of the common interest rate in  $\text{E}$ -roland cause different economic effects in the Euroland members. In particular, a supply shock could endanger the ambitions towards long-run sustainability.

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