

Fiscal Policy Rules for Stabilisation and Growth: A Simulation Analysis of Deficit and Expenditure Targets in a Monetary Union

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Abstract

We analyse the effectiveness of fiscal policy rules for business cycle stabilisation in a monetary union using a quarterly macro-econometric model of Germany. The simulations compare a deficit target and an expenditure target under a range of supply, demand and fiscal shocks. Their effects are evaluated by their impact on prices and output. The analysis demonstrates that in general the deficit target of the stability pact leads to less stabilisation than an expenditure target. The results suggest that the deficit rule of the stability pact should be replaced with an expenditure rule augmented by medium-term debt targets.

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Introduction

The paper compares the effectiveness of two fiscal policy regimes for business cycle stabilisation in a monetary union using simulation methods. This issue has become particularly important with the adoption of the stability and growth pact (SGP) in the eurozone in 1997. What had been intended to safeguard the stability of the core euro economies from time-inconsistent fiscal policies in peripheral member states has ironically become a constraint on the governments and on growth in the large eurozone economies. Most strikingly, Germany is undergoing a prolonged phase of stagnation while the German government is pursuing a pro-cyclical fiscal policy. In the German case, the SGP hence appears to reduce the effectiveness of the automatic stabilisers. We posit that fiscal consolidation using the SGP is feasible but it is achieved at a great cost in terms of foregone output growth.

The main focus of the paper is the analysis of two fiscal policy rules under the SGP. Fiscal policy is defined to encompass the level and composition of government spending. Using a quarterly macro-econometric model of Germany with seasonal unadjusted national accounts data, the simulation compares a deficit target and an expenditure target under a range of macroeconomic scenarios, including temporary and permanent supply, demand and fiscal shocks. The effects of these shocks are evaluated by their impact on prices and output. We thus extend the usual comparison of alternative monetary policy rules to the area of fiscal policies within a monetary union (Taylor 2000, Haber 2001).

The simulation analysis demonstrates that in general the deficit target of the growth and stability pact leads to less stabilisation (that is less variation of output growth) than an

alternative expenditure target. The results are clear for a negative demand shock with a deficit target having pro-cyclical and the expenditure target having anti-cyclical effects. The results are more complicated for a supply shock. Here it is not so obvious whether fiscal policy should stabilise economic development. The results suggest that the stability and growth pact in its current shape should be re-interpreted. Deficit targets should be replaced with expenditure targets and complemented by medium-term debt targets.

As a word of caution, we would like to state explicitly which questions the paper does and does not attempt to answer. First, we compare the effects of two obvious and relevant policy rules but we do not derive from first principles an optimal policy rule for a large, indebted eurozone economy. Second, we focus on an evaluation of two types of policy rules, not on the need for or the effectiveness of fiscal coordination itself. Third, we focus on the level and the composition of government spending, not on the taxation and revenue side of the economy. Fourth, we simulate the medium-term effects of two policy rules but we do not include in our simulation possible long-term behavioural responses of economic agents to each of these policy rules. Finally, we only simulate the effects of each policy rule for the German economy, not for the whole eurozone or the world economy. Having said this, we believe that our paper identifies an important shortcoming of the stability pact, which is often neglected in the policy debate.

The paper is structured as followed. Section 2 reviews key features of the stability and growth pact while section 3 assesses the role of fiscal policy in a monetary union with a special focus on the advantages and disadvantages of deficit and expenditure targets. The empirical methodology and data concerns are presented in section 4 while section 5 analyses the main results. Section 6 concludes with a review of the policy implications

of our findings.

I. The Stability and Growth Pact

The current macroeconomic policy debate in Europe is characterised by the stability and growth pact agreed in June 1997 in Amsterdam (Allsopp 2002, Brunila et al. 2002, Creel 2002, Engwerda et al. 2002, Gatti et al. 2002, Hughes Hallett et al. 2002, Marín 2002, Pisani-Ferry 2002, Uhlig 2002, Brück et al. 2003). The main purpose of the SGP is to coordinate fiscal policy in the eurozone to reduce the ability of individual euro-countries to boost spending while other euro-countries run a tight fiscal policy.

The pact requires each member state to consolidate its public finances (that is minimise its budget deficits) by aiming for a medium-term budget position of „close-to-balance or in surplus” and by adhering to the Maastricht target of public deficits of at most 3% of gross domestic product (GDP). Countries breaking this rule are cautioned by the EC and may have to pay a maximum fine of 0.5% of GDP. Given the recent history of countries striving to adhere to this Maastricht target before full monetary union, this arbitrary target was motivated by reasons of political credibility, thus providing the motivation and the excuse for governments to finally cut significant structural deficits.

There are several potential benefits in adopting a SGP. A government with a reckless fiscal policy could become insolvent thus suggesting that the European Central Bank (ECB) should bail out that government. While the European monetary union does not envisage a bail out of an insolvent government, such scenario is possible. The stability pact aims to internalise the externalities of a monetary union with decentralised fiscal policy. In a monetary union, a country with a fiscal deficit has to borrow thus raising interest rates. A loose fiscal policy in one country thus has spill over effects for other

countries in the monetary union.

However, the pact also has a number of disadvantages. First, the pact does not address several important aspects of fiscal policy. For instance, the pact does not require the average eurozone fiscal deficit to stay below 3% of GDP, it does not rule on how governments should behave in times of a fiscal surplus, and it does not allow exemptions from the 3% rule if the total debt is below the 60% of GDP barrier also specified by the Maastricht treaty.

The issuing of cautions and fines by the EC does not appear to be as automatic or as predictable as the pact would suggest. Germany evaded its first caution in early 2002. This resulted in part from the size of the German economy, which appears to have afforded the German government a special status, and from possible consideration by the EC for domestic political difficulties before federal elections in September 2002. Finally, the trigger point at which a caution is issued is not simply set at a deficit of 3% of GDP ex post but at a lower yet rising percentage expected ex ante, thus giving further room for manoeuvre by the EC and the national governments.

The quality of the deficit forecasts also plays a critical role in the SGP. This suggests that a fiscal stabilisation policy targeted at a range of countries will also err more severely in its forecasts and thus in its issued cautions than a fiscal stabilisation policy only targeted at the monetary union as a whole. It is thus questionable if the stability pact is right in controlling the decentralised fiscal policy of the euro countries. It is worth considering if a pact aimed at the aggregate eurozone, thus mirroring the ECB's concern with the price stability of the aggregate eurozone, might not have been more effective or at least less prone to mistakes.

The quality of the forecasts even for a single country may be very unreliable even though they play an important role in the SGP. Table 1 shows the forecast error for German budget deficit forecasts for the years 1999 to 2001. The forecasts missed the actual outcome by up to 1.2 percentage points of GDP, with a mean (mean absolute) forecast error across six observations of -0.6% (0.8%) of GDP.

The “close-to-balance-or-in-surplus” position for the public deficit implies that debt as a share of GDP should tend to zero, which is not an analytically convincing economic policy. As we discussed in an earlier paper in more detail, a sustainable debt policy for a country at the margin of the Maastricht debt criterion of 60% of GDP implies that debt should not rise faster than GDP growth (Brück et al. 2003). For countries with a lower share of debt to GDP, higher budget deficits are compatible with debt sustainability.

The SGP does not recognise that the budget deficit and the growth rate of an economy are interdependent. In the spirit of the discussion of “golden rules” (Balassone et al. 2000, Heijdra et al. 2002), it is important to recognise that government spending has strong growth implications through the accumulation of public capital, incentive effects and other channels. Yet the SGP does not consider the quality or the effectiveness of public spending decisions, thus placing fiscal consolidation above output growth.

Most importantly, the SGP creates a stabilisation problem if a member economy stagnates or runs into a recession before having achieved a “close-to-balance-or-in-surplus” position for the public deficit. In other words, the SGP does not include sufficient provisions for guiding countries towards a situation of healthy public finances. It had been assumed incorrectly that countries qualifying for the euro were sufficiently sound in their fiscal policies that they could fulfil the new stability criteria as well. However, for several euro-economies the rules of the SGP enforce tax increases

and expenditure cuts in a situation where an expansionary fiscal policy would be more appropriate. By doing this the automatic stabilisers are abandoned in a downturn and fiscal policy is made to act pro-cyclically.

In sum, the current international economic downturn precipitated a predictable crisis of the European SGP. The pact was never intended as a blueprint for fiscal policy during such turbulent times for the larger euro-economies. In addition, the pact was not intended to provide a new policy objective for the eurozone. We thus ask how the pact can be modified to achieve both fiscal consolidation and output growth in Europe.

II. Fiscal Policy in a Monetary Union

In the analysis of economic policy outcomes in Europe, it is important to distinguish between the policies objectives, policy instruments and the policy targets. The primary policy objectives in the European Union are to achieve steady economic growth and to maintain internal price stability. They do not include a commitment to achieve a sustainable level of debt (Wyplosz 2002). A specific objective of fiscal policy is output stabilisation, that is the minimisation of deviations from output growth as a consequence of exogenous shocks.

The instruments of economic policy in Europe are interest rates as set by the ECB, the fiscal, regulatory and social policies of the member states and, to a lesser extent, those of the European Commission (EC). Clearly, some of these instruments can be employed independently by national governments while others require or imply varying degrees of policy coordination especially in a monetary union (Beetsma et al. 2001, Buti et al. 2001, Dixit et al. 2001, Hughes Hallett et al. 2001, Belke 2002, Gatti et al. 2002, Pisani-Ferry 2002, Brück et al. 2003). The term „coordination” in this article implies an inter-

governmental agreement on the limitation of fiscal sovereignty supervised by the EC, not an explicit agreement between the fiscal and monetary authorities of the eurozone. The stability pact can thus be seen as an attempt to increase the degree of European policy coordination through the use of a certain type of policy rule.

The policy targets employed in Europe are varied and include the Maastricht criteria budget deficits and public debt. Considering that monetary policy focuses on achieving price stability and other economic policies on maximising long-term output growth, fiscal policy holds the main responsibility for output stabilisation under the presence of shocks. Following unification, Germany ran significant budget deficits throughout the 1990s, building up significant public debt up to and beyond the Maastricht level of 60% of GDP (Table 1). This development hence counteracted some of the reduction of final government consumption expenditure as a share of GDP achieved in the 1980s. The significant government spending induced by unification was partly financed through debt accumulation hence reduced the remaining fiscal policy choices in the 1990s.

If monetary union implies the need for greater policy coordination, then policy makers have to choose from among several policy regimes. On the one extreme, policy makers could agree on completely coordinated but discretionary policies while at the other extreme they could adopt permanently and perfectly binding rules. The SGP in its initial shape, as was shown above, lies between these extremes, as it sets a lower bound for the deficit target only. Recent amendments to the SGP for the case of Germany have forced its government to commit to a cyclically-invariable path of diminishing deficit targets until 2006 thus further tightening the fiscal policy regime in Germany and reducing the scope for automatic stabilisers. This enhances some of the arguments against the SGP outlined above, especially concerning the reduced potential for stabilisation. Given this

more restrictive scenario for Germany, we will use the terms deficit target and deficit target path interchangeably in the discussion below.

The fiscal policy alternative to a deficit target is an expenditure target or an expenditure path (Beetsma et al. 2001, Brunila 2002, Brunila et al. 2002). Such policy rule could be defined to allow annual government expenditure including interest payments to rise by the long-term increase in productivity and the target rate of inflation as defined by the ECB. For Germany that implies values of 1.5% each, thus setting the annual rise of nominal government expenditure at 3%. Because the budgetary planning process is in nominal terms, budgetary targets should also be formulated at current prices. Furthermore, the expenditure target could be fixed below the long-term annual rise in productivity to ensure a slight decline in government spending as a share of output.

One key advantage of an expenditure target is that it enables the automatic stabilisers to work freely (Hairault et al. 1997, Auerbach et al. 2000). As many tax revenues and as some expenditure items vary with the business cycle, the composition of spending must be adjusted cyclically for the government to stick to the planned expenditure path. The automatic stabilisers on the revenue side of the public budget then lead to increasing deficits in downturns and surpluses in upturns. This effect is enhanced by the fact that, in Germany, expenditure is much less volatile than revenue (Table 1). This is true to a lesser extent for other European countries as well (Brück et al. 2003).

An expenditure target also enhances the accountability and credibility of governments. They imply fewer measurement and surveillance problems and a more transparent administration of fiscal policy by budgetary planners. Expenditure rules also tackle the asymmetric bias of the present deficit target of the SGP. There exists always a political and institutional temptation to raise expenditures in good times, which could be avoided

by adopting an explicit expenditure rule.

One disadvantage of rigid expenditure targets is that they can have mild pro-cyclical effects that act against the counter-cyclical effects of the automatic stabilisers on the revenue side. But as the cyclical variations on the expenditure side of public budgets are much smaller than on the revenues side, this effect merely reduces the strength of the automatic stabilisers without neutralising them entirely.

Finally, the ability by the European Commission to enforce expenditure targets is similar to the enforcement problem with deficit targets. The simplicity of an expenditure rule may help its enforcement but we will return to this issue in our conclusions below.

III. Simulation Methodology and Data Issues

In this section, we will describe the simulation model we use to compare the growth effects of the deficit and expenditure targets. The simulation is based on the macroeconometric European Business Cycle (EBC) model of the DIW Berlin for Germany for the period 1998 to 2004 (Zwiener 2003). Trade in the model is disaggregated into trade with EMU-countries and with non-EMU-countries. The model uses backward looking adaptive expectations and an error correction framework to distinguish between short-term dynamics and the long run solution. Feedback rules for a variety of variables stabilise the model. These variables include unemployment, capacity utilisation, long-term interest rates, unit labour costs, real effective exchange rates, and wealth.

The theoretical base of the model allows the existence of nominal rigidities. Economic policy may thus have real effects on the economy. Market spill-overs are explicitly

included in the model and the possibility of unemployment in the long run is allowed. In the model for Germany the public sector is disaggregated and completely endogenous using stochastic equations. The public expenditure equations are estimated as reaction functions, in which public revenues play an important role. In the revenue equations the appropriate tax bases are used. The public deficit augments the debt stock and the debt stock in turn affects interest payments.

Raw and seasonally unadjusted quarterly time series data is used whenever available. The estimation period is from 1980:1 to 2001:4 for most equations while the public sector is estimated for the period 1991:1 to 2001:4. The model uses national account data from DIW Berlin and Eurostat.

To integrate the deficit target into the macroeconometric model, the budget deficit had to be made exogenous. In turn, public investments were set to fulfil the deficit target, as this budget item can be adjusted most readily though at some cost to macroeconomic growth (Balassone et al. 2000). Nevertheless the sensitivity of public investment to exogenous events weakens growth and undermines the main policy objectives (Haber 2001). This modelling strategy thus assumes a flexibility and accuracy of budget planning not usually feasible in practice.

The deficit target and the expenditure target are evaluated by their ability to absorb different types of shocks. This is measured by the average deviation of the real GDP development influenced by shocks from a baseline GDP development (without shocks). The same is measured for the shock-induced price development. For the set of simulations examining the impact of the deficit target the budget deficit to GDP ratio was set close to the level actually realised in Germany in the years 1998 to 2002 and the level forecasted for the years 2003 and 2004. In the simulation, this exogenous

determined level of deficit-to-GDP ratio is not allowed to change in the presence of shocks. Shock-induced increases in public revenues are automatically spent for additional public investment while in the case of induced revenue losses public investment is cut accordingly. This rule-based reaction of public expenditure will either dampen or increase the original impact of the shock. Germany at present is in exactly this fiscal policy situation, as discussed above.

The simulation design for the evaluation of the expenditure target is built up in a similar way. The absolute level of overall public expenditures is fixed close to its actual level in the years 1998 to 2002 and to its forecasted level for the years 2003 and 2004. In the presence of shocks the overall level of public spending does not change but adjustments inside the expenditure ceiling are allowed.

For these deficit or expenditure targets, four different shocks were then simulated in the model (Table 2). First, a permanent external demand shock assumes a decline in German exports to the USA. This implies that the level of German exports to the US is set at ten percentage points below the baseline value for all years of the simulation. Second, a temporary external supply shock involves a one year rise of import prices by 10%, as might arise after an oil price shock. Third, a permanent internal supply shock is set by an initial additional 2% wage increase in Germany. Fourth, a fiscal shock results from an exogenously agreed and implemented reduction of the direct tax for employees by 10%. This last scenario is not strictly a shock but represents the experience of Germany and other countries where strong political pressure led to lower direct tax rates and where governments subsequently had to deal with the implications for spending priorities and the fiscal deficit.

The first two shocks are external shocks which affect all countries of the European

Monetary Union (EMU) in a similar way. Therefore we call them symmetric shocks. We assume that the ECB will directly react to these symmetric shocks following a Taylor rule. In this Taylor rule the nominal short-term interest rate in the EMU is changed – compared with the baseline – according to the shock-induced change in the inflation rate weighted with a coefficient of 1.1 and according to the shock-induced change in the output gap weighted with a coefficient of 0.2 such that:

$$\text{dev. Nominal Interest rate} = 1.1 \text{ dev. Inflation rate} + 0.2 \text{ dev. Output gap} \quad (1)$$

The simulation results of the German macro model for the shock-induced changes in the inflation rate and the capacity utilisation are used as proxies in equation (1) for the effects on the European inflation rate and the European output gap. This assumes perfectly symmetric shock effects in Europe.

The last two shocks are internal shocks which will not affect other European countries directly. However, we expect an indirect reaction of the ECB to a change in the inflation rate in Germany. For these two internal shocks we adjust the nominal short-term interest rate in the EMU by the shock-induced change in the inflation rate in Germany weighted by a coefficient of 0.3, which is the weight of German private consumption expenditure in the overall private consumption expenditure in the EMU such that:

$$\text{dev. Nominal Interest rate} = 0.3 \text{ dev. Inflation rate} \quad (2)$$

At the same time only non-symmetric shocks have an influence on the relative competitiveness of German companies inside the EMU. Note that we call the wage shock and the fiscal shock non-symmetric shocks because they only affect Germany directly while asymmetric shocks would affect the other EMU countries in the opposite

direction. This is taken into account in the simulated scenarios of non-symmetric shocks by recalculating the real effective exchange rate for Germany using the shock-induced price effects.

IV. Results

In this section, we explain how an exogenous shock affects the simulation model using the example of a negative permanent external demand shock under a deficit target. Later we will present a summary of the effects of all four shocks under both policy rules (Table 3). The effects of the shocks are evaluated by their impact on the growth path of output, price stability and stabilisation.

Column 1 of Table 3 summarises the case of the export shock under a deficit rule. Real exports to the USA are assumed to decline by 10% compared to the baseline from 1998 onwards. As a result, overall German exports fall around 2.4% below the baseline case. There are small negative price effects (-0.3%) in the long-term. According to the Taylor rule of equation (1) the ECB reduces nominal short-term interest rate on average by 0.3 percentage points. Lower exports lead to lower real (-1.2%) and nominal (-1.4%) GDP which in turn reduces public revenue by 1.3% against the baseline. This in turn reduces public investment spending by about 11.5% below the baseline scenario within seven years, respecting the deficit target. As a consequence of the deficit rule, fiscal policy has to be restrictive in the presence of a negative demand shock. Therefore, the deficit target, and hence the SGP, has pro-cyclical effects in the case of a demand shock.

A temporary price shock with a deficit target dampens growth only slightly, as summarised in column 2. At the same time, higher prices lead to an expansion of the tax base and thus to higher tax revenues. Following the deficit rule, these higher revenues

are spend on additional public investment. The deficit target has hence counter-cyclical effects on growth. At the same time, fiscal policy is in conflict with monetary policy, which increases interest rates to fight inflation (Artis et al. 1999).

Column 3 shows the effects of the internal wage shock. Higher wages raise prices and public revenues. This boosts government revenues and hence government spending under the deficit target. Overall, wage and price increases are larger than the scale of the original wage shock. Therefore the stabilisation effect of the deficit rule is pro-cyclical and contrary to the European monetary policy (equation (2) above) which fights inflation. This outcome is indicative of the problems associated with fiscal policy attempting to counteract permanent supply shocks. Instead, the economy should adjust to the new equilibrium level, rather than fiscal policy slowing down the inevitable structural adjustment (Brunila et al. 2002).

Column 4 sums up the effects of a tax cut. To fulfil the deficit target, public investment spending has to be cut, thus more than offsetting the growth effects of the tax cut. Therefore, the effects of tax cuts depend crucially on the nature of the fiscal policy rule. With a deficit target and high initial debt, a tax cut, quite contrary to intuition, can have strong dampening effects for growth (Mountford et al. 2002).

For the expenditure target, lower exports do not automatically lead to a decline in public spending as it is the case for the deficit target (column 5). Lower nominal expenditures in some categories are compensated by higher public investment spending. The decline in public revenues increases public deficits. This fiscal regime thus has clear counter-cyclical effects on growth, in strong contrast to the case of a deficit target.

In the case of an external price shock (column 6), the expenditure target has similar

effects on growth as does the deficit target and it is more or less neutral for the purpose of stabilising the economy. The key difference is the change in public investment, which rises with the deficit target and falls with the expenditure target.

Column 7 represents the effects of an internal wage shock. The induced increase in public revenues is used to reduce public deficits. At the same time higher nominal expenditures - for example rising wages of civil servants - have to be compensated by a decline in public investment spending. The expenditure rule hence dampens real GDP and prices if there is a wage increase. This can be classified as a counter-cyclical effect. Fiscal policy is in line with monetary policy, with both allowing the economy to adjust to the permanent supply shock and the necessary structural changes.

The final shock to be examined is a tax cut under an expenditure target (column 8). Growth is strengthened but the deficit rises significantly. Following an exogenous expenditure path after a tax cut could be interpreted as following a broadly neutral policy rule. The effects of the tax cuts are neither strengthened nor dampened by public expenditures. Nevertheless the tax cut itself is an expansionary fiscal policy measure. The nature of the effects of such a policy hence depends on the prevailing conditions. In times of growth tax cuts have pro-cyclical effects while in a recession tax cuts have counter-cyclical effects. It thus depends on the position of the business cycle if adopting an expansionary fiscal policy might help to achieve the overall policy objectives. The expenditure target enables reforms on the revenue and expenditure sides of the public budget.

The range of simulations revealed that the nature of the shocks affects the nature of the optimal policy response (Buti et al. 2001). The shocks can affect quantities, prices, technology or the government revenues directly. They may be positive or negative.

They can affect single eurozone countries (non-symmetric shocks), the whole eurozone (symmetric shocks) or the whole world. They may be temporary or permanent. Both the deficit rule of the SGP and the expenditure rule are incapable of accounting for all of these differences. However, in most cases the expenditure target is better suited than the deficit target to achieving the European policy objectives. Even if we do not derive from our findings the need for an explicit coordination of monetary and fiscal policies (Alesina et al. 2001), we emphasise that the chosen fiscal rule must not be in conflict with the monetary rule of the ECB.

In summary, the aim of stabilisation in a large and indebted eurozone economy in the face of a variety of shocks cannot be achieved with a deficit target. We are thus sceptical of the benefits of the SGP for the purpose of stabilisation (Artis et al. 2000, Brunila 2002, Buti et al. 2002, Wyplosz 2002). On balance, the expenditure target leads to more stabilisation than the deficit target. The expenditure target provokes less conflict with monetary policy and it supports the necessary structural adjustments after permanent supply shocks.

Conclusion

In this paper, we assess the costs of the stability and growth pact for output growth and stabilisation. We do so for the case of Germany, the largest member of the eurozone and a country close to the Maastricht criteria for debt consolidation. We simulate the effects of various exogenous shocks under the deficit rule of the SGP and under an alternative fiscal rule, an expenditure target. In effect, we ask what the costs of the stability pact for growth and stabilisation are. Furthermore, we assess if the expenditure rule represents a superior way of organising fiscal stabilisation through the SGP.

We demonstrate that the European policy objective of supporting economic growth while maintaining price stability in the monetary union requires a degree of fiscal coordination and probably self-binding mechanisms previously unpractised in Europe. In addition, we show that the SGP, with its reliance on deficit targets, is not sufficient to achieve fiscal discipline without negatively affecting growth.

However, a modified version of the SGP may be more successful. The modifications concern both the choice of a primary policy rule and the introduction of a medium-term debt ceiling. Both modifications would help to focus the attention of the policy debate on using revenues wisely in times of strong growth, on letting the automatic stabilisers work effectively in times of low growth, and on reducing debt to more sustainable levels in Europe in the long-term.

More weight has to be given to European growth prospects than it is currently the case, thus freeing fiscal policy to focus on letting the automatic stabilisers take effect. Fiscal policy must not be subordinated to short-term political objectives. Instead, the credibility of European fiscal policy must rise to allow the ECB to relax its monetary policy without risking inflation. In addition, fiscal consolidation should have a more medium-term perspective while its negative growth effects should and could be reduced significantly.

We therefore propose that the deficit target be replaced by an expenditure target. In addition, the sustainability of debt can be achieved by augmenting the expenditure target with a long-term debt target. Such a combination of rules is simple, transparent, practical and easy to monitor.

Table 1: Summary Data

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Budget Deficit p.a. ¹	-2.55	-3.11	-2.40	-9.96	-3.42	-2.73	-2.22	-1.51	-1.40	-2.77	-3.70
Public Debt ¹	43.10	47.10	49.40	57.10	59.80	61.00	60.90	61.20	60.20	59.50	
GDP ²	2.2	-1.1	2.3	1.7	0.8	1.4	2.0	2.0	2.9	0.6	0.2
GDP	7.4	2.5	4.9	3.8	1.8	2.1	3.1	2.6	2.6	2.0	2.0
	1972-74	1975-77	1978-80	1981-83	1984-86	1987-89	1990-92	1993-95	1996-98	1999-2002	
Current Revenue, excl. Grants ³	22.52	23.34	24.02	25.65	25.91	25.41	28.10	31.87	31.41		
Final Consumption Expenditure ⁴	18.26	20.18	20.09	20.65	20.11	19.78	19.35	19.80	19.52	19.11	
	1999	1999	2000	2000	2001	2001					
	1. Forecast	2. Forecast	1. Forecast	2. Forecast	1. Forecast	2. Forecast					
Quality of Budget Deficit Forecasts ⁵	-1.20	0.80	0.80	-0.10	-1.10	-1.00					

1 Based on Maastricht excl. UMTS in % of GDP

2 At constant 1995 prices

3 Includes all revenue to the central government from taxes and nonrepayable receipts (other than grants) in % of GDP

4 General government in % of GDP

5 Difference between end values and forecast values in % of GDP

Sources: Bundesbank, Eurostat, World Bank and authors' calculations.

Table 2: The Nature of the Simulated Shocks

Nature of the Shock	Variables to be Shocked			
	Exports to USA ¹	Import Prices ²	Wages ³	Taxes ⁴
Supply-/Demand-Shock	D	S	S	S/D
Permanent/Temporary	P	T	P	P
Internal/External	E	E	I	I
Symmetric/Non-Symmetric	S	S	N	N
Direct Monetary Policy Reaction	Yes	Yes	No	No
Negative/Positive	N	N	N	P
Average Growth Rate ⁵ (%)	12.3	1.0	2.9	3.0
Minimum Growth Rate (%)	-1.1	-1.9	1.9	-2.2
Maximum Growth Rate (%)	25.9	7.4	6.1	11.5
Simulated Shocks (%)	-10.0	10.0	2.0	-10.0

1 Exports to United States permanent 10 % below baseline

2 Temporary (1 year) import price index 10 % above baseline

3 Permanent hourly wage increase by 2 % above baseline

4 Reduction of direct taxes of employees by 10 % below baseline

5 Between 1992 and 2001

Sources: EBC Model of the DIW Berlin and authors' calculations.

Table 3: Summary of Simulation Results

Column	Deficit Target ¹				Expenditure Target ²			
	Demand Shock	Price Shock	Wage Shock	Fiscal Shock	Demand Shock	Price Shock	Wage Shock	Fiscal Shock
Column	1	2	3	4	5	6	7	8
Average 7 year deviation from baseline in %								
Shocks³								
Exports, constant prices	-2.4				-2.4			
Import Price Index		1.4				1.4		
Compensation of Employees			3.5				2.2	
Direct Taxes of Employees				-11.3				-9.5
Growth, Prices and Interest Rates								
GDP, constant prices	-1.2	-0.1	0.7	-0.5	-0.6	-0.2	-0.7	0.5
GDP, current prices	-1.4	0.0	2.5	-0.7	-0.7	-0.1	0.7	0.6
CPI	-0.3	0.4	1.6	-0.2	-0.2	0.4	1.2	0.2
Short Term Interest Rate ⁴	-0.3	0.1	0.1	0.0	-0.1	0.0	0.1	0.0
Public Budget								
Revenue, current prices	-1.3	0.1	3.1	-2.3	-0.7	0.0	1.4	-1.1
Expenditure, current prices	-1.3	0.1	3.1	-2.2	0.0	0.0	0.0	0.0
Public Investment, current prices	-11.5	3.1	32.0	-49.5	24.0	-1.1	-37.1	-14.3
Public Deficit/GDP Ratio ⁵	0.0	0.0	0.0	0.0	-0.3	0.2	0.7	-0.5
Effects on stabilisation	pro cyclical	counter cyclical	pro cyclical	counter cyclical	counter cyclical	neutral	counter cyclical	neutral

1 Public deficit ratio is kept at historical and forecasted level

2 Overall public expenditures are kept at historical and forecasted level

3 Variables directly affected shocks by assumption, including in some cases endogenous shocks (see Table 2 for further details)

4 Average 7-year deviation from baseline in percentage points

5 -: Reduction of public deficit/GDP-ratio in percentage points (average baseline deficit/GDP-ratio: -1,7)

Sources: EBC Model of the DIW Berlin and authors' calculations.

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