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FISCAL POLICY, AUTOMATIC STABILISERS AND POLICY COORDINATION IN EMU

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ABSTRACT: This paper deals with fiscal policy coordination under the Stability and Growth Pact. In particular, it addresses the question of how fiscal policy can be coordinated within EMU, where countries still differ considerably in terms of country-specific shocks and fiscal policy multipliers. To answer this question, we carry out comparative analyses of both automatic stabilisers and policy effects. We also scrutinise the specification and forecasting uncertainty associated with different indicators of fiscal policy, especially the cyclical and structural components of government deficits. We find relatively large cross-country differences in both the cyclical effects and policy effects, which, together with considerable forecasting uncertainty, suggest that policy coordination is very difficult. On balance, we find that the effect of coordinated policies is much larger than that of uncoordinated policies. This result applies to all countries, but to small countries in particular, and seems quite robust, in terms of the treatment of the sustainability condition. We also find that there is only little evidence of similar fiscal policy patterns in the past, although in this respect the results seem to differ a great deal between the core and non-core countries and also between time periods.

Key words: fiscal policy, forecasts, coordination

JEL Classification E61

1 Introduction

This paper deals with fiscal policy behaviour of EU/EMU countries. Fiscal policy has become increasingly important in economic policy in general and in the case of European Monetary Union, in particular. As far as EMU is concerned, only fiscal policy can be used in offsetting country-specific shocks. On the other hand, fiscal policy is now subject to certain limits that reduce the room for policy manoeuvring. The “excessive deficit” criterion (laid down in the Maastricht treaty and in the Stability and Growth Pact) may have far-reaching influence on policy behaviour because now the policy-makers have to consider very carefully what is the correct and feasible policy stance. Accordingly, there is less room for fiscal policy errors (see Buti, Franco and Ongena (1998) for a more detailed exposition of EMU constraints).

This change obviously has several implications for policy considerations. It means that we have to know much more about the cyclical situation, the role of automatic stabilisers and the effects of policy instruments. Also, the question of whether fiscal policy actions are coordinated across countries becomes much more important in assessing the performance of fiscal policy, and thus decision-maker in a single country have, at the very least, to find out what the other countries do and preferably also what is the effect of the other countries’ policies on their country.

At the theoretical level, it is quite easy to demonstrate that policy coordination pays off and/or that decentralised policy-making is inefficient (see and Gray (1985) and Buiters and Marston (1985) and Hamada (1985); but see also Rogoff (1985) for a counter-example¹).² The problem is that it is a long way from the theoretical level to actual policy³. This can be seen simply by examining the structure of the theoretical models (see Oudiz and Sachs (1984) and Kehoe (1987)). The fact that coordinated (fiscal) policy dominates the autarky solution does not, of course, tell very much of how the coordinated policy should be conducted. There are also problems with the empirical and practical implementation of policy

¹ The models, which show that policy coordination may be an inferior solution typically, make use of the idea of dynamic inconsistency. Thus, in the case of Rogoff (1985), the basic idea is the following: As coordinated policies yield greater output expansions, this will increase the policy authorities’ incentives to use policies and this, in turn, will exacerbate their credibility problems in terms of their private sectors. In the case of monetary policy, the outcome is a higher time-consistent rate of inflation (see also Obstfeld and Rogoff (1996)). See Ganzoneri and Henderson (1988) for a critique of Rogoff’s analysis. See also Kehoe (1988) for an alternative explanation of why coordination may be undesirable. Kehoe demonstrates that with international policy coordination the joint policy must tax away all the return on savings. This would lead to zero investment which is clearly an inferior solution compared with the case of international tax competition (no coordination) that would lead to low taxes on income from savings and high investment. Ganzoneri and Diba (1991), instead, consider the beneficial effects of coordination. They show that under financial integration a rise in government spending generates a smaller increase in the rate of interest compared with financial autarkic situation. Clearly international policy coordination is beneficial since if an individual government makes its spending decisions it internalises the cost to other governments associated with debt servicing.

² It seems even more obvious that fiscal policies in general (in a single country setting) can produce positive welfare gains. The problem is that this assumption can also be challenged (see Lucas and Stokey (1983) and Chari, Christiano and Kehoe (1993)). We cannot really deal with this basic theoretical problem here.

³ The theoretical literature is bypassed here without going in to any details about the models. The main reason for this is that that most policy cooperation models are quite old-fashioned (“obsolete Keynesian models”, as Obstfeld and Rogoff (1996) call them in this connection) and static without any explicit microfoundations.

coordination. Very little work has been done to demonstrate (a) that policy coordination is actually possible and (b) that the benefits are important (see, however, and Minford (1988)). This paper is concerned specifically with the issue of practical implementation. We evaluate the problems that policy-makers face in pursuing coordinated fiscal policies in the EU/EMU countries. Although we focus on the EU countries, some comparative analyses cover all the OECD countries, which also represent an interesting challenge for policy coordination.

In order to find answers to these questions we scrutinise the differences between these countries in terms of the prerequisites for fiscal policy action and in terms of the cyclical behaviour of the whole economy and the public sector, in particular. We analyse the cyclical sensitiveness of government expenditures, revenues and deficits. We compare the effects of fiscal policy in different countries in the case of uncoordinated and coordinated fiscal policies. We also focus on measurement and forecasting problems, especially as regards the behaviour of automatic stabilisers.

In addition, we try to find out whether there is any evidence of fiscal policy coordination during the last four decades and whether there are any explanations for possible deficiencies in policy behaviour. With this aim in mind, we look at the fiscal policy reaction (reaction functions) in these countries.

In the analysis, we abstract from many important practical questions related to policy coordination. Thus, for instance, we do not discuss the questions of (a) how to coordinate policies, (b) which policies should be coordinated, (c) which instruments should be used and, finally, (d) which institutions/organisations should carry out coordination. As far as the first question is concerned, we can only point out that policy coordination can either be based on different rules (the above-mentioned deficit criterion is in fact such a rule) or it may simply apply to discretionary policy actions. It may also be the case that the only form of coordination is related to automatic stabilisers. Whether that can be called coordination or not is really a matter of semantics.

It is rather hard to imagine that discretionary policy coordination could succeed in practice given the institutional system of the European Union. Our empirical analyses cannot shed much light on this issue because they do not draw any distinction between (the effects of) discretionary and rule-based policies.

The paper is structured as follows: First in section 2 we analyse the economic environment in which policy coordination is really possible. In section 3, we discuss how the Stability and Growth Pact affect the need and possibilities of policy coordination. In section 4 we try to identify the cyclical and discretionary components of fiscal policy using alternative measurement procedures. Then, in section 5, we carry out a comparative analysis of the policy effects in the case of coordinated vs. uncoordinated policies, and in section 6 we examine the evidence on policy coordination. Finally, in section 7, we present some concluding remarks.

2 Requirements for fiscal policy coordination

Fiscal policy coordination will not take place unless certain requirements are fulfilled. In particular, the following (partly overlapping) conditions can be considered to be essential:⁴

1. The cyclical behaviour of the economies and the nature of shocks must be similar.
2. Countries must have similar prerequisites for policy actions – thus, we must at least exclude different corner solutions.
3. The tax and transfer systems, as too the budgetary process, must be similar so as to provide reasonably similar automatic stabilisers.
4. Forecasts and the assessment of the current situations must be sufficiently accurate.
5. Effects of fiscal policy actions must be reasonably similar and predictable.
6. The effectiveness of coordinated policy actions must be much larger than un-coordinated actions.
7. Different countries must share the same policy view (in terms of the instruments and objectives of policy).
8. Policy commitments must be enforceable (and, of course, credible) in different countries

Some comments on these points probably merit note here⁵.

If the cyclical movements (of a large set of countries) are completely unrelated, there is obviously no need for policy coordination. In other words, if the output shocks are entirely country-specific, policy measures must also be country-specific. By contrast, if the shocks are common to (a relevant set of) countries, it is easier to make out a case for policy coordination. The empirical magnitude of this problem is illustrated in Figure 1. In this figure, output shocks are classified as common (to the EU) and country-specific.

Clearly, the cyclical movements (output shocks) are far from being highly correlated. In some countries, like Finland, country-specific shocks dominate output fluctuations. Important changes have, however, taken place over time. It seems that the variability of output has decreased considerably over time for most of the sample countries. The EMU-11 countries seem to behave in a similar manner but even among them country-specific shocks represents about one half of the total output variability.

The fact that output shocks are strongly correlated does not, of course, imply that fiscal policy coordination or fiscal policy in general pays off. As pointed out by e.g. Blanchard (2000), the outcome depends very much on the nature of shocks. In the case of demand shocks, there is no problem but in the case of supply shocks fiscal policies, or just automatic stabilisers, may do the wrong thing. While they stabilize (smooth) the output path they do not allow for the adjustment of output that would be desirable.⁶ Thus, output gaps

⁴ The set of requirements is in a sense too strong. Already within a single country (say, at the regional level) there are important differences in terms of shocks and policy effects, for instance, but still we take it granted that fiscal policy is coordinated.

⁵ See also Frenkel and Razin (1992) and Branson et al. (1990) for further discussion (and evaluation) on these conditions.

⁶ In the case of supply shocks, output variability could even increase. Take for instance oil shocks. Higher prices would push up nominal wages, which (with incomplete indexation of the tax system) would lead, to higher real taxes and lower (too low) consumption. The simulations of Cohen and Follette (1999) with the FRB/US model suggest that this might not be the case but even so supply shocks constitute a difficult problem for both discretionary fiscal policy and automatic stabilisers.

would, in fact, increase, not decrease. The problem is that the nature of shocks cannot be judged on the basis on pure output (growth) data and hence it is quite difficult to distinguish which countries have experienced demand and which supply shocks.

As far as policy prerequisites and constraints are concerned, we know that the EU countries differ a great deal for instance in terms of debt and the size of the public sector. Thus, some countries might face a corner solution in which only restrictive policies can be applied. We also know that countries differ in terms of the functioning of the labour market and the inflationary effects of aggregate demand changes. All of these differences obviously make it very difficult to pursue similar policy rules in different countries.⁷

In most of empirical evaluations (and practical applications) of the gains from coordination, the sign and symmetry of inter-country spillover effects of policy is crucial in determining the direction to take in coordinating macroeconomic policies. The nature of the spillover effects is obviously not the only thing which makes policy coordination so difficult. Coordination also requires very good estimates of the policy transmission mechanism. Therefore, we need to know reasonably well both the nature and magnitude of automatic stabilisers and the actual policy effects. In addition, we have to know the effects of coordinated (vis à vis un-coordinated) fiscal policy actions.

As for the automatic stabilisers, it is essential that the tax and transfer systems (progressivity of taxation, indexation of transfers and so on) are quite similar across countries and, of course, that the relevant parameters are known to policy-makers. For instance, if the cyclical behaviour of deficits differs very much across countries, all assessments of the state of government finances become very difficult and optimal policy (in the certainty equivalence sense) cannot be pursued (as already shown by Brainard (1967)).

Obviously, systematic fiscal policy also critically depends on the availability of accurate forecasts. Thus, if forecast values of the cyclical behaviour of output are completely unrelated to actual values and if the forecast errors are uncorrelated between countries, policy coordination may fail, although one could, of course, attempt to coordinate policy actions. The problem not only applies to forecasts of the cyclical situation (i.e. the GDP growth rate) but also to assessment of the current and future fiscal situation. In practice, this means that we must be able to distinguish between the cyclical and structural components of expenditures, revenues and the deficit. It is well known (see Brandner, Diabalek and Schuberth (1998)) that such assessment is very difficult and it may produce a wide range of different results.

A traditional way of analysing the benefits of policy coordination makes use of a Keynesian type model which highlights the importance of fiscal and foreign trade multipliers (see Fair (1979)).⁸ Alternatively, the terms of trade could act as the main channel of transmission (see Corden (1995)). Thus, for instance, the traditional Laursen & Metzler (1950) model predicts that domestic autonomous government expenditures, which raise domestic output, lower the level of output abroad, i.e. domestic spending is transmitted

⁷ See Oudiz and Sachs (1984) for a review of problems in specifying a model for policy coordination and evaluating the gains from coordination. See also Tanzi and Schuknecht (1997) for cross-country comparisons of the role and size of government.

⁸ A classical example of the consequences of policy coordination failures is the experience of Mitterrand's government when it attempted to pursue independent expansionary policies for France in 1981–1983.

negatively to the rest of the world. The Frenkel & Razin (1985) model produces a similar result. Macromodel simulations of Helliwell and Padmore (1985), Bryant et al. (1988) and Taylor provide somewhat different results. Thus, an increase in government expenditures increases both output and prices abroad. With the price effect, some ambiguity exists, however. All in all, one gets an impression that the gains from coordination are likely to be small and quite sensitive to models and basic assumptions (concerning e.g. flexibility of prices, wages and exchange rates).⁹ One has, however, to be careful in interpreting the early findings. As pointed out by Frenkel and Razin (1992), most comparisons have not been made between optimal uncoordinated and coordinated policies but between some suboptimal policies. Moreover, some gains from coordination may be unobservable (showing up in other policies and structural changes). Finally, most comparisons have assumed that government will adhere to agreements also in the light of changed circumstances and that coordination may not affect the incentives to stick to agreements to enhance reputation.

Policy coordination is obviously successful only if fiscal policy has desirable effects on aggregate demand (and other relevant variables). In addition, we have to assume that policy effects are similar. Thus, if, for instance, an increase in public expenditure by, say, one per cent of GDP increases GDP by 0.1 per cent in one country and 2 per cent in another country, it may become difficult to design the contents of the coordinated policy package. Clearly, the problem would be aggravated if some of the relevant relationships were nonlinear. Then, we simply could not aggregate the EMU country numbers and design policy simply on the basis of average values of different macro variables.

Assuming that policy effects are of reasonable magnitude and reasonably similar (and that other coordination problems are not relevant), we have to demonstrate that policy coordination also pays off in practice. If the effect of coordinated actions is only marginally larger than un-coordinated actions we have to question the practical usefulness of coordination. Of course, this is really a question of the practical importance of spillover effects, and given the information that we have we would be surprised to find that the effects of coordinated and un-coordinated actions were the same. Obviously, the fact that coordination pays off for a set of countries may not be enough. One might also be interested in the distribution of the benefits of coordination between countries.

The question of policy goals is rather difficult because there is no agreement between economists and policy-makers on the desirability of policy activism and the direction and magnitude of "the right policy". The problem, in Europe at least, is that opinions as regards policy activism also seem to follow geographical lines to some extent.

Finally, policy coordination is subject to all possible problems of political economy. Commitments should both be accepted and effectively enforced at the national level. It is not hard to imagine which kind of political problems that could arise and in this light it seems that discretionary policy coordination can only succeed in very special cases.

⁹ The benchmark reference in this respect is Oudiz and Sachs (1984) who investigated the quantitative gains from international policy coordination. They estimate that the gain from cooperation among the G3 countries would be about 0.5 per cent (compared with best non-cooperative outcome).

3 Fiscal policy coordination within the stability and growth pact

The Stability and Growth Pact of 1997 does two quite different things.¹⁰ It allows national fiscal policy but it imposes strong constraints to it. The fact that some flexibility in national fiscal policy is allowed has obvious reasons. Monetary policy cannot play any role in off-setting country-specific shocks and given the relatively large differences between member countries (shown in Figure 1) some country specific policy instruments must be available.

At the same time as this need is acknowledged, the “excessive deficits” constraint is imposed to safeguard the European Central Banks independence and credibility.¹¹ Basically the constraint does the right thing even if it can be thought that (large) high debt countries may try to put pressure on ECB for lower interest rates to avoid the penalties and public discrediting.

The Stability and Growth Pact has some direct implications in terms of policy coordination. The most important point is related to the effectiveness of fiscal policy. Because it is obvious that national fiscal policy in a small open country setting is not very powerful because of (increased) imports some cooperation between member countries is required to enhance the effects of fiscal policy. The more effective is fiscal policy the smaller are the deficits, which are required to adjust negative output shocks (and vice versa). Except for imports, we might expect fiscal policy to be effective in individual countries which have fixed exchange rates (as suggested by the conventional Mundell-Fleming model). By contrast, in the whole EMU, which has flexible exchange rates, fiscal policy is ineffective (assuming that the EMU is still “small” in the world perspective; see Marston (1985) for further details). Clearly, this gives individual countries greater incentive to activist fiscal policy and creates a (potential) conflict of interests between member countries and the union. Obviously, this conflict of interest further motivates the Stability and Growth Pact. Notice also that there might be some difference in policy incentives between small and large member countries because small countries (opposite to large countries) may safely assume that a deterioration of their financial balances does not show in the EMU-wide interest rates and exchange rates.

The Stability and Growth pact also means that the consequences of policy (Brainard 1967) uncertainty become crucial. Wrong estimates of the relevant (fiscal policy) parameters may lead to the regime of “excessive deficits” which represents a new penalty for an

¹⁰ The Stability and Growth Pact (SGP) consists of a Resolution adopted by European Council and two Council Regulations. The Pact clarifies the “excessive deficits” procedure and the related penalties which were agreed in the Maastricht Treaty. In short, the SGP commits member countries to medium term budgets which are close to balance or in surplus, requires the EU countries to submit annual programs specifying medium-terms budgetary objectives, determines that the countries which run “excessive deficits” will be subject to financial penalties and specifies concept of the excessive deficit. That will be 3 per cent unless deficits occur under exceptional circumstances which means a annual decline of output or more than 2 per cent (moreover a decline of $\frac{3}{4}$ per cent would also be considered exceptional if there is some additional evidence).

¹¹ If the SGP is interpreted from the viewpoint of new fiscal theory of inflation, one could say that the Pact effectively guarantees (by imposing the solvency conditions) that the “money dominant” regime dominates the “fiscal regime”. See Ganzoneri and Diba (1999) for more about this perspective of Maastricht Treaty and the Stability and Growth pact.

excessively ambitious policy stance and which, *ceteris paribus*, leads to more cautious policy. The basic reason is the nonlinearity that the “excessive deficits” procedure produces: a 2.9 per cent deficit is completely different from a 3.1 per cent deficit (see and Diba (1999) for further elaboration of this point). The possibility of a policy error obviously forces the member governments to closer cooperation (a) to increase policy effectiveness by coordinated efforts, (b) to acquire more information of other member governments’ policy aims and (c) the propagation mechanisms of both policy and automatic stabilisers. In this respect the Stability and Growth Pact can be important because it inevitably increases fiscal policy dialogue, information exchange, peer pressure and monitoring fiscal policy in the EMU. If the tax and transfer systems in the member countries become more similar (due to various harmonisation plans) that might also alleviate the policy uncertainty problem.

Although policy coordination would lead to more effective fiscal policy that would not help very much if the output shocks are country specific. Then automatic stabilisers might not do the right thing but one had to pursue discretionary policy coordination (say, Germany had to pursue more expansionary policy to help Italy out of a recession). This would obviously be quite difficult (impossible) because of all political economy problems.

An idea of discretionary policy coordination probably makes sense only in the case of extreme economic crises. Otherwise, coordination has to be built in some accepted rules. It is only that currently there are no such rules (except for the Stability and Growth pact and, in a sense, automatic stabilisers) and it is not all clear what kind of rules should be developed. Perhaps the most obvious candidates for such rules would be such that fiscal tightness would be tied to the relative sizes of the output gaps (higher-than-average-growth countries would exercise some extra tightening in fiscal policy).

It is, of course, much easier to work with automatic stabilisers and, in fact, it is generally thought that fiscal policy in the EMU are should be primarily based on automatic stabilisers. Although they have some convenient properties they also have some problems. First, there seems to be important differences between different member countries (as can be seen in the next section). Second, the automatic stabilisers often reflect the most distortionary elements of public finance. The most important element is typically progressive taxation. Another element is the unemployment compensation system. From the supply point of view, it is obviously no point in increasing the role of automatic stabilisers by making taxes more progressive and the replacement rate of the unemployment compensation closer to unity.

4 Distinguishing between cyclical and structural deficits

Automatic stabilisers constitute an essential ingredient of fiscal policy. In order to be able to pursue correct cyclical policy, it is necessary to know what is the nature and magnitude of cyclical elements in both expenditures and revenues. In addition, one should know the type of shocks: whether they demand or supply shocks and whether they are temporary or permanent shocks (see again Blanchard (2000)). If cyclical sensitiveness is very pronounced, discretionary policy measures may not be needed. Overly sensitive cyclical deficits may, however, create problems in satisfying the “excessive deficits” criterion. Thus, already in a modest recession the deficit may fall below the three-per cent level (see Dalsgaard and De Serres (1999) and Kiander and Viren (2000) for analysis on the importance of this problem for EU countries). The seriousness of the problem obviously depends on initial state of deficits and debt. The main implication is that there is less scope for high debt.

Therefore, it is very important to be able to distinguish between the cyclical and structural components of expenditures, revenues and the deficit. Although the basic idea as regards distinction is quite simple, empirical applications are not that easy. Assume, for instance, that the government pursues systematic (counter)cyclical fiscal policies. How can the effect of such policies be distinguished from pure cyclical effects (automatic stabilisers), if we used only unrestricted time series models in deriving the cyclical effects, as is customarily done? With current adjustment procedures (see Banca D’Italia (1999)) this seems impossible. If the policies were totally discretionary, the task would be a little easier but by no means trivial even then.¹²

Not surprisingly, there are several competing ways of making the structural corrections, and there is really no consensus on how to make the decompositions. International organisations like the IMF, OECD and European Union make their own adjustments and, in addition, several other (national) adjustment procedures are applied.¹³

The most important differences are not, however, related to the cyclical adjustment methods, but the actual cyclical behaviour of government expenditures and revenues. The GDP elasticities are not only different in terms of magnitude but even different in terms of sign. It is therefore very difficult to forecast developments in government expenditures and revenues and it is clear that even if output increased (decreased) in a similar way in all countries, government deficits would behave in a completely different way. The differences in other policy environment variables (debt and unemployment) are, however, even larger. The most surprising fact, however, is that the GDP elasticities of government revenues and expenditures differ enormously between countries suggesting that the systems are very different indeed (the elasticities are reported in some depth in Mäki and Virén (1998)).

¹² In this connection, it is perhaps worth citing analogous problems that may arise when we try to distinguish the policy effects on, say, output growth. As pointed out by Blinder and Solow (1973), it can be shown that if we pursued systematic counter-cyclical policies and if we were completely successful in eliminating the cycles, it would look like the policies were completely impotent.

¹³ See Blanchard (1990), Barrell, Margan, Sefton, Veld (1994) Brandner, Diabalek and Schuberth (1998), Giorno et al. (1995) and Cohen and Follette (1999) for overviews of these procedures.

Here we report only the aggregate elasticities of government expenditures, revenues and the deficit/GDP ratio (more precisely the net lending/GDP ratio) with respect to output growth (see Figure 2).¹⁴

In the case of deficits, the estimating equation simply takes the form:

$$\frac{\text{def}}{y^*} = \alpha_0 + \alpha_1 \text{trend} + \alpha_2 \Delta y + u, \quad (4.1)$$

where def is the government deficit (positive values represent a surplus), trend the time trend, y is GDP, Δy the growth rate of real GDP, Δy^* the corresponding trend value and u the error term. Here y^* is used instead of y to alleviate the simultaneity problem between output growth and the dependent variable. Obviously, the problem remains also in (4.1) because y depends on the determinants of def, like on the tax rates (see section 4.1).

The elasticity estimates from (4.1) clearly show that there are striking differences between the EU countries in terms of the cyclical behaviour of expenditures, revenues and deficits. The elasticities range from about 0.2 to 1.2. Not surprisingly, the elasticities for revenues are highest (being close to one) while the elasticities for expenditure are somewhat lower. The deficit elasticities, in turn, are noticeably lower, ranging from 0.1 (UK) to 0.8 (Sweden).

Simple elasticities can be misleading because the estimating equation (4.1) may be (and probably is) misspecified. Therefore, it is worthwhile analysing results obtained with more sophisticated model specifications.

This is done here using three alternative model structures:

1. A single equation model for the determination of deficits
2. A four-variable VAR model
3. A multicountry macromodel (NiGEM).

These three models are used to ensure the robustness of results in terms of (a) the simultaneity bias, (b) dynamic specification and (c) the type of output shocks.

4.1 Single-equation models

The analysis is mainly based on a simple reduced-form specification for the deficit/output ratio. This equation could be seen as some sort of data description equation rather than a strict behavioural equation (reaction function of the fiscal authority). Thus, the estimating equation is simply of the form:

$$\frac{\text{def}}{y^*} = \alpha_0 + \alpha_1 \text{trend} + \alpha_2 \left(\frac{\text{def}}{y^*} \right)_{-1} + \alpha_3 \Delta y + \alpha_4 r + \alpha_5 \left(\frac{\text{debt}}{y} \right)_{-1} + u, \quad (4.2)$$

¹⁴ In estimating elasticity equations of this kind we face obvious problems concerning (at least) simultaneity bias between deficits and output growth. This problem is briefly discussed in section 3.1 below.

where def denotes the general government deficit (positive values correspond to a surplus), y is output (GDP), y^* trend output, trend is the time trend, r is either the nominal or real (long-term) interest rate, debt is general government debt and u is the error term. In addition to this linear specification, we estimate a nonlinear threshold model specification of the following form:

$$\begin{aligned} \frac{\text{def}}{y^*} = & \alpha_0 + \alpha_1 \text{trend} + \alpha_2 \left(\frac{\text{def}}{y^*} \right)_{-1} + \alpha_{31} \Delta y | \Delta y < 0 + \alpha_{32} \Delta y | \Delta y > 0 \\ & + \alpha_4 r + \alpha_5 \left(\frac{\text{debt}}{y} \right)_{-1} + u, \end{aligned} \quad (4.3)$$

where $\Delta y | \Delta y < 0$ ($\Delta y | \Delta y > 0$) denotes negative (positive) values of GDP growth.^{15,16}

The data, which cover the period 1960–1999, are from the EUROSTAT data bank. Here we only report the coefficient estimates of Δy . The values of a linear specification ($\alpha_3 = \alpha_{31} = \alpha_{32}$) are reported in Table 1 while the nonlinear output growth terms α_{31} and α_{32} are illustrated in Figure 3. As can be seen from Figure 3, empirical evidence does provide strong support for the hypothesis that the relationship between public sector deficits and output is nonlinear. Thus, the sensitivity is much larger in recession than in growth periods. This is clearly due to the nonlinearities in the determination of revenues and expenditures (see Virén (2000b) for further details).

If the relationship between public expenditures and revenues, on the one hand, and output, on the other hand, is indeed nonlinear, it is very difficult to predict the effects of output growth. From the policy coordination point of view, nonlinearities are a difficult problem in other respects as well because it is essentially an aggregation problem. One can no longer assume that there is stable relationship between the average cyclical situation in the EU and the average fiscal position in the EU. On the basis of Figure 3, it can be argued that the EU-wide fiscal situation is crucially affected by the distribution of output growth rates and other cyclical indicators.¹⁷

¹⁵ In both equations we have an obvious simultaneity problem as fiscal policy will affect output growth and causality does not run from output growth to deficits only. Thus, we face an identification problem, which seems particularly difficult because it is not all clear how the identification restrictions should be imposed. Typically (for instance, in setting the restrictions in a VAR model) it is assumed that deficits (policy) react to contemporaneous output whereas the fiscal policy effect shows up in output growth with a lag. In this panel data setting it is rather difficult to take this problem into account. However, we also estimated the system using the Instrumental Variable estimator (see Virén (2000b)). The results turned out to be quite similar to the OLS estimates. In fact, the GDP growth rate coefficients increased somewhat when the IV estimator was used. Thus, the results are may not perhaps be affected so much by the simultaneity bias. We may also point out that in the three sets of models which we use here simultaneity bias is (probably) quite different but still the results are pretty similar which suggests that the problem is not absolutely crucial. See Schinasi and Lutz (1992) for a nice summary of simultaneity problem.

¹⁶ Threshold models are perhaps the most widely used nonlinear specification (see Granger and Teräsvirta (1993)). They are relatively easy to estimate and the results are also easy to interpret. Testing for the existence of the threshold is, however, rather tricky. It is also a difficult to accept the crude nature of the regime shifts in models of this kind.

¹⁷ The importance of the aggregation problem stems from the relatively large differences which seem to persist between EU countries. In 1999, for instance, the maximum GDP growth rate was 8.3 per cent and the minimum 1.3 per cent. At the quarterly level, the differences are even more striking.

4.2 VAR-models

The single-equation models (4.1) and (4.2) are obviously based on several restrictive assumptions (particularly in terms of the dynamic specification) which may crucially affect the estimation results. One may ask whether a more general, say a VAR-model type, specification would produce similar results. To explore this possibility we carried out an analysis using the following unconstrained VAR model:

The set of endogenous variables: Δy , rr , def/y^* (where rr is the real long-term interest rate)
 The set of exogenous variables: Δy^{OECD} (which is the growth rate of GDP in the OECD area)
 The ordering of variables: Δy , rr , def/y
 The number of lags: 4
 Impulse responses: Computed for 40 lags using the Cholesky decomposition. Standard deviations are computed by Monte Carlo simulation with 500 replications.

In the analysis, we used individual country data so that the time series typically consist of 36 annual observations for 1964–1999. For space reasons, we report here only a set of impulse responses of def/y^* to (standardised one per cent) shocks in the GDP growth rate Δy (cf. Table 1). For a full exposition, see Virén (2000).

4.3 NiGEM simulations

The final step in our analysis is to use the multi-country NiGEM model to derive the estimates of the cyclical deficit effect (see NiGEM (1999)). Basically, we examine how a one per cent increase in GDP affects the level of the deficit/GDP ratio. Although the basic idea of the analysis is quite simple, it is not easy to perform this kind of analysis because there are numerous ways of generating the GDP growth effect.¹⁸

Here we introduced a temporary one per cent shock in GDP so that the duration of the shock was four quarters. This was done by shocking GDP directly and controlling that the GDP growth effect was actually one per cent.¹⁹ We also performed the simulation so that an (exogenous) exports was shocked by one per cent of GDP. The results in terms of deficits were qualitatively very similar to the first simulation (and therefore they not displayed here). A short summary of the simulation results is reported in Table 1. The reported values are differences between the alternative and base solutions of the deficit/GDP ratio.

¹⁸ The reported simulations were made so that the nominal interest rate were fixed. All countries were assumed to be insolvent (that is, no automatic tax reaction to changed deficit and debt was allowed).

¹⁹ A one per cent shock in GDP did not produce exactly a one per cent change in GDP. Therefore, the simulated values were rescaled so that the GDP effect was indeed one per cent.

4.4 Comparison of results

When scrutinising the results in Table 1 one has to remember that the three models are quite different in terms of construction and their results have different interpretations. The coefficient α_3 (in 4.2) reflects the short-run effect of a permanent change in the output growth rate on deficits. In the case of the VAR model, the impulse response reflects the impact of a (temporary) GDP innovation on deficits while the NiGEM model results reflect the effect of an (temporary) increase in (the level of) GDP on deficits.

Table 1. Comparison of cyclical behaviour of deficits

	Linear model	NiGEM (t-4Q)	VAR (t-2Y)
Austria	.25	.42	.37
Belgium	.25	.15	.66
Denmark	.36	.61	.33
Finland	.25	.34	.35
France	.28	.38	.26
Germany	.19	.12	.31
Ireland	.05	.09	.18
Italy	.10	.32	.41
Netherlands	.28	.42	.36
Portugal	.48	.20	.30
Spain	.27	.41	.42
Sweden	.78	1.21	.22
UK	.10	.02	.25
Average	.30	.36	.34

The second column corresponds to the coefficients of the GDP growth rate in a linear model (4.2) estimated from EU data, the third column the NiGEM model effects of a one per cent GDP shock and, finally, the fourth column the impulse responses of def/y^* to a one per cent GDP growth rate shock from a four-variable VAR model (explained in the text).

Against this background it is somewhat surprising that there are still similarities in the results (in Table 1) for different countries and different models (to the extent that the three models and their output can be compared). Thus, in the short run, acceleration in GDP growth by one per cent will reduce deficits (the deficit/GDP ratio) by one third of a per cent. The medium-run (and long-run) effects are obviously much larger.²⁰ Altogether, the size of automatic stabilisers is clearly nontrivial and their impact should be known in evaluating the need for “additional” fiscal policy actions.²¹

But how then can the cyclical and noncyclical components be distinguished in practice? The answer is that there are several (quite different) ways of doing this. All of them are based in one way or another on the estimated elasticities but there are big differences in terms of the reference variables (output growth, or output gap or unemployment rate and so

²⁰ In the case of equation (3.2), the average estimate of α_1 is 0.81, which implies that the long-run effect of Δy on def/y^* is 1.4.

²¹ Ideally, of course, the size of automatic stabilisers should be estimated at the same time as the effectiveness of fiscal policy is evaluated. See Blanchard and Perotti (1999) for an attempt to do that in a SVAR framework.

on). Here we do not review the different procedures but instead briefly present the outcome of these procedures (see Banca D'Italia for a thorough review of this issue).

Because there is no consensus on the correct way of distinguishing the cyclical and structural components we can only illustrate the differences between different procedures. Essentially, this boils down to showing the time series of structural deficits computed by the EU, IMF and OECD. In addition, we report three alternative indicators: the Blanchard Fiscal Impulse (BFI) values (see Blanchard (1990) and Mäki and Virén (1998)); the Bräconier and Holden (1999) values for the Nordic countries; and the Bank of Finland indicators (Brunila, Tujula and Hukkinen (1999)) for Finland. Thus altogether we have seven alternative indicators of the stance of fiscal policy. These indicators are presented in Figure 4 for Finland; the data for the other EU countries are reported in Mäki and Virén (1999).

Clearly, the seven series differ a great deal so that we may well have a four per cent corridor for alternative structural deficit measures (with different signs).

The problem is that the uncertainty associated with choosing the proper measure is not the only difficulty we have to contend with in evaluating the fiscal situation. As is shown in Figure 5, we also have the problem of knowing the correct way of updating and computing the corresponding indicator. The fact that the forecast values of cyclical/structural deficit vary a lot is no surprise – the problem is that the values computed for the current and past periods seem to be overly sensitive, reflecting both new data and new computational solutions (disaggregation, detrending methods, and so on).

In the case of the OECD, the “updating” error seems to be of the magnitude of 2–4 per cent, which is obviously too much when we take into account the error that is related to different organisations assessments.

The OECD numbers are by no means extraordinary in the sense that other cyclical adjustments would produce clearly smaller errors. This becomes evident when we scrutinise the IMF values for the structural deficit (again in the case of Finland; see Figure 6). The difference between historical values is really striking: one does not always know whether the policy stance has been restrictive or expansionary. All in all, we can say that the Stability and Growth Pact can be useful by setting in motion the improvements and harmonisation of the indicators of automatic stabilisers and structural deficits.

5 A comparison of policy effects in different countries

In this section we try to assess the importance of policy coordination for policy effectiveness. For that purpose, we use the multicountry NiGEM model to compare the effects of different fiscal policy actions in the single country setting and in the case of collective policy action.²² The NiGEM model simulations were carried out by increasing either public consumption or direct taxes. Simulations were carried out so that in the first case public consumption was increased in all EU countries in an un-coordinated way (i.e. the model simulations were carried out in a country-by-country manner). In the second case, public consumption was increased in all EMU countries at the same time and by the same amount (i.e. 1 per cent).²³

The results from these simulations are reported in Figures 7–8. Figure 7 contains a summary of the short-run effects and Figure 8 a summary of the maximum effects (which could, of course, also be short-run effects). Basically, the comparison is very easy. In all cases the coordinated fiscal expansion produces almost twice as much an increase in output as an uncoordinated fiscal expansion.

Table 2. A summary of public consumption simulation

	y4	y8	yc4	yc8	ymax	ycmax	def	Defc	ym	ymc
Austria	0.059	0.042	0.162	0.143	0.107	0.279	-0.154	-0.075	0.574	1.489
Belgium	0.099	0.074	0.233	0.208	0.113	0.239	-0.220	-0.107	0.536	1.131
Finland	0.124	0.151	0.175	0.228	0.159	0.268	-0.117	-0.050	0.741	1.251
France	0.273	0.261	0.333	0.332	0.274	0.339	-0.168	-0.144	1.130	1.398
Germany	0.224	0.156	0.304	0.224	0.299	0.374	-0.167	-0.130	1.574	1.967
Ireland	0.065	0.054	0.232	0.189	0.066	0.233	-0.127	-0.079	0.488	1.740
Italy	0.147	0.128	0.208	0.189	0.156	0.212	-0.146	-0.102	0.829	1.128
Netherlands	0.107	0.090	0.211	0.195	0.121	0.219	-0.230	-0.144	0.891	1.612
Portugal	0.092	0.076	0.156	0.157	0.116	0.241	-0.185	-0.144	0.574	1.193
Spain	0.166	0.159	0.246	0.274	0.175	0.274	-0.157	-0.109	1.109	1.732
Average	0.136	0.119	0.226	0.214	0.159	0.268	-0.167	-0.108	0.845	1.464

Y4 (y8) denotes the output effect of an uncoordinated increase in public consumption (by one per cent) after four (eight) quarters, yc4 and yc8 denote the corresponding values in a case where all countries increase public consumption by the same amount, ymax and ycmax denote the maximum values of y over 20 quarters and ym and ymc the corresponding multiplier values for an increase in public consumption by one per cent of GDP. Def and defc denote the deficit effects of an increase in public consumption computed after 20 quarters.

The multiplier values reveal that in an uncoordinated case fiscal policy effects remain relatively small for the small countries, which many of the multiplier values of the magnitude of 0.5 only. The reason for these low values is simply (increased) imports. For large countries, the values exceed one but not by very much. The average value for all countries is 0.72 (with four lags) and 0.63 (with eight lags) 0.85 being the average maximum value. In the case of coordinated policies, there is not much difference between small and large

²² In evaluating the effects of fiscal policy, an obvious analytical framework is provided by (structural) VAR models (see Blanchard and Perotti (1999), Dalsgaard and De Serres (1999) and Virén (2000a)). Because we concentrate here on the policy coordination problem, structural multicountry models are, however, more convenient.

²³ The share of public consumption in GDP differs somewhat across EU countries, and so the corresponding GDP effects also differ. The differences in the public consumption/GDP ratio are after all not so large as the following 1998 values indicate: Austria 18.7 %, Belgium 21.1 %, Denmark 25.5 %, Finland 21.4 %, France 24.2 %, Germany 19.0 %, Greece 14.8 %, Ireland 13.4 %, Italy 18.8 %, Luxembourg 14.0 %, Netherlands 13.6 %, Portugal 20.2 %, Spain 15.8 %, Sweden 25.9 % and UK 18.2 %.

countries. Thus, the average value is 1.25 (with four lags) and 1.17 (with eight lags) 1.46 being again the average maximum value. The multiplier values (in the coordination case) are, in fact, quite close to the values obtained by Cohen and Follette (1999) with the US FRB/US macroeconomic model.²⁴ On the other hand, they are a bit higher than the SVAR values obtained by Blanchard and Perotti (1999) which are about one. The multiplier values in the uncoordinated case are, of course very low (suggesting that the marginal propensity to spend out of income is very low and the income elasticity of imports is very high) but also in the case of coordinated fiscal policies the multipliers are not terribly high although they obviously still facilitate fiscal policies. Note also that in the case of uncoordinated policies, the output effect diminishes more rapidly than in the case of coordinated policies.

The effect of an increase in public consumption on government deficits is almost equally clear (see Figure 9). Deficits increase but because output also increases the effect on the deficit/GDP ratio differs from the pure deficit effect. The values for various countries are surprisingly different, reflecting the differences in the output effects. In other respects, it is rather difficult to say why the country results are so different (the size of the country and the size of the public sector do not seem to explain the size of the output and deficit effects).

When examining the long-run effects, we obviously have to pay attention to developments in government debt and the sustainability of fiscal expansion. With this aim in mind, we analysed developments in output and deficits (deficit/GDP) in the case of no solvency requirements (denoted by insolvency) and with solvency requirements (in the latter case, direct taxes were increased to offset increased indebtedness). The results for the whole EU area (in the case of a coordinated policy action) are presented in Figure 10.

Not surprisingly, imposing the solvency condition makes a lot of difference, particularly in the long run (when the additional taxes start to have an effect). Thus, the GDP effect almost completely vanishes and the effect on deficits is also quite marginal.

To illustrate the time paths of the above-mentioned effects, we use Finland and Italy as examples. Figure 11 reports the GDP effects of a coordinated and uncoordinated fiscal policy action (i.e. increase in public consumption) with and without the solvency condition. Clearly, the results are quite different in these cases. If countries increase public consumption and balance the budget in the long run by raising taxes, the long-run output effect is simply zero or even negative. If the whole of the EU/EMU does the same and ignores the solvency condition, some output gains are achieved even in the long run.²⁵ As pointed out already earlier, gains from coordination seem to be much larger for small coun-

²⁴ The Cohen and Follette (1999) value with US data (with four lags) was 1.23 which may be compared with our average EMU10 value of 1.25. When the tax rates were set to zero in the FRB/US model the multiplier increased to 1.35 which indicates how much (or, in fact, little) automatic stabilisers will affect on the multiplier. An interesting thing is that the multiplier value of 1.25 implies a relatively low value of the marginal propensity to consume. Assuming the average tax rate to be 0.4 we end up with a marginal propensity to consume to be about 0.3 only (or, 0.4 if we account for imports).

²⁵ The importance of the solvency condition obviously depends on the level of debt in the country concerned. Given the fact that indebtedness still varies a great deal among the EU countries, we again face an aggregation problem in pursuing EU fiscal policies (see Mayes and Virén (2000) for more about this problem in terms of monetary policy).

tries while the impact of the solvency requirement depends mainly on the size and nature of the fiscal policy effect.

So far, we have considered public consumption only. The story as regards direct taxes is very similar, as can be seen from Figure 12 (which for space reasons deals with Finland only). Coordination makes a lot of difference in terms of output effects but the results are less clear as regards the deficit/GDP ratio. The problem stems from the output effects. When taxes are increased, output and income decrease, which eliminates part of tax revenues and – *ceteris paribus* – increases the deficit/GDP ratio because of lower output. If taxes are increased (by one per cent) in all EMU member countries at the same time, Finland's GDP would fall by almost half a per cent and that would also lead to a smaller surplus/GDP ratio.

The long-run effect of direct taxes (on output) is noticeably larger than the effect of public consumption. This mainly reflects the larger GDP share of taxes compared with public consumption.²⁶ The dynamics of the effects are, however, quite different, as can be seen from Figure 13, which illustrates the effects for the whole EMU area. The effect of public consumption diminishes over time while the tax effect shows no signs of a diminished impact.

When dealing with fiscal policy simulation, an obvious question is what happens to interest rates. The answer provided by the NiGEM model is that not very much. Thus, imposing the inflation targeting assumption for monetary policy produces only a five basis point increase in long rates in the case of coordinated policies. In the case of uncoordinated policies, the result is practically zero (for instance, in the case of Finland, just one tenth of a basis point). The NiGEM model, like most other models, generates the somewhat odd result that interest rates have a strong impact on deficits while deficits have only a very marginal effect on interest rates. This latter result is obviously in sharp contrast with all theorizing on credibility and peso effects (but not necessarily with empirical evidence; see eg Alessina et al. (1992)). The model result only reflects the direct crowding out effect and does not account for direct expectations and portfolio effects (nor the possibility that monetary policy would directly react to deficits). That is clearly a weakness of the model (and of all similar models). The weakness may also be quite crucial with regard to the assessment of policy coordination effects within EU.

²⁶ In Finland, for instance, the share of public consumption in GDP was 20.7 per cent in the first quarter of 2000 while the share of direct taxes was 27.1 per cent.

6 Evidence on policy coordination

At this point, there is good reason to ask to what extent there has been coordination – albeit imperfect – in fiscal policy when policies have been so different.

In trying to find out whether policy actions have actually been coordinated, we simply scrutinise the cross-country correlations between fiscal policy indicators (i.e. structural deficits). Some summary statistics of these correlations are presented in Table 3. We also used the variance decomposition procedure (which we applied above in the context of the output growth relationships reported in Figure 1). Thus, we run regressions between deficits in country i and EU aggregate deficits in the following way:

$$\frac{\text{def}_i}{y_i} = \beta_0 + \beta_1 \frac{\text{def}_{\text{eu}}}{y_{\text{eu}}} + u \quad (6.1)$$

Equation (6.1) is estimated for both actual deficits (deficits/GDP) and cyclically adjusted (structural) deficits (in relation to trend GDP) using the EU data for 1960–1999. The results are presented below in Figure 14 (variances) and Table 3 (explanatory power).

Turn first to the correlation coefficients between different structural deficit measures. The coefficients have been computed between all countries (assuming zero lags and leads). Thus, for each measure, we have 91 (off-diagonal) coefficients (corresponding to 14 countries). As can be seen from Table 3, the coefficients are not very high. For the EU, IMF and OECD measures, about half of the coefficients are different from zero (at the five per cent significance level). In the case of the Blanchard Fiscal Impulse (BFI) measure, only a few coefficients exceed the conventional critical values. The low values of the BFI indicator are presumably due to the fact that this measure really focuses on the difference in primary deficit, not the level of deficit as do the other three measures.

On the basis of correlations one can conclude that fiscal policies have had some features in common but one cannot really speak about common policy or a common policy rule.

Table 3. Correlation coefficients between countries' structural deficits

Structural Deficit	Average Correlation	Observations	5 per cent critical value
EU	.385	30	.361
IMF	.340	27	.381
OECD	.339	31	.355
BFI	.073	39	.320

As for the variance decompositions, which are illustrated in Figure 14, it can be seen that the cross-country differences are considerable. Ireland, Greece and Finland represent some kind of outliers while Austria, Germany, France and the Netherlands seem to form a set of core countries also in terms of fiscal policy behaviour. One way of assessing the cross-country differences is to examine the explanatory power of equation (6.1). To do this we report the R2s in Table 4 below:

Table 4. Multiple correlation coefficients of equation 6.1

	Deficits/GDP	Cyclically adjusted deficits/trend GDP
Austria	.63	.60
Belgium	.41	.31
Denmark	.60	.32
Finland	.33	.15
France	.64	.49
Germany	.47	.35
Greece	.51	.61
Ireland	.08*	.01*
Italy	.51	.53
Luxembourg	.05*	.00*
Netherlands	.52	.44
Portugal	.63	.47
Spain	.70	.70
Sweden	.62	.51
UK	.54	.39
Average	.48	.39

* Not significant at the 5 per cent level.

Not surprisingly, the indicators for structural deficits are more loosely related suggesting that (discretionary?) policies have indeed been quite different. If we eliminate Ireland, Luxembourg and Finland from the sample, the situation looks a little different.

Correlation analysis is not, of course, a very powerful tool in analysing the performance of policy coordination. To obtain more affirmative results, one should try to identify the relevant policy reaction functions. The problem with this kind of analysis is the identification of the cross-country spillover effects, which would require at least a large amount of data. There have been some analyses in which the fiscal policy reaction functions have been estimated (see e.g. Virén (1998)) but very little success has been achieved in identifying and estimating the spillover effects.

Given the differences between EU countries, it would have been surprising to find that they have pursued similar policies in the past. As it turns out, the findings are not completely negative in terms of policy coordination. The “core” countries have actually pursued quite similar policies and because these countries’ economies seem to be becoming increasingly integrated over time (cf. Figure 1), one might expect that coherence of fiscal policies will also increase in the future.

7 Concluding remarks

Policy coordination within EMU will be very much a new departure. Up till now, the EMU countries – like all the OECD countries – have pursued predominantly nationally oriented policies. Given the policy environment this is not surprising. Large differences between countries – both in terms of institutions and values of various macroeconomic indicators – create formidable obstacles to coordinated policy actions. The need for such policies also varies from country to country and time to time. Also, the effectiveness of various policy instruments appears to be different. To achieve better coordination it is necessary to harmonise the key elements of the fiscal policy process so that, at least, the basic prerequisites for policy actions and automatic stabilisers are reasonably similar. It is also necessary that the role of automatic stabilisers be better known than it is at present. Great uncertainty concerning key policy parameters hinders policies even if policies would otherwise pay off as it probably is in the case of coordinated fiscal policies. In this respect, the Stability and Growth Pact can make a major contribution in focussing on the problem, increasing dialogue and exchange of information. Whether or not it depends on the Pact, we have already now seen an huge increase in research on fiscal policy in Europe.

As for the pay-off from policy coordination, there seem to be quite marked differences between large and small countries regarding their position on (coordinated) fiscal policies. It is interesting to see whether these differences also show up in the decision-making process within the EU. This question may become more relevant given the fact that, to some extent at least, policy views also seem to follow country-size (and North-South) lines.

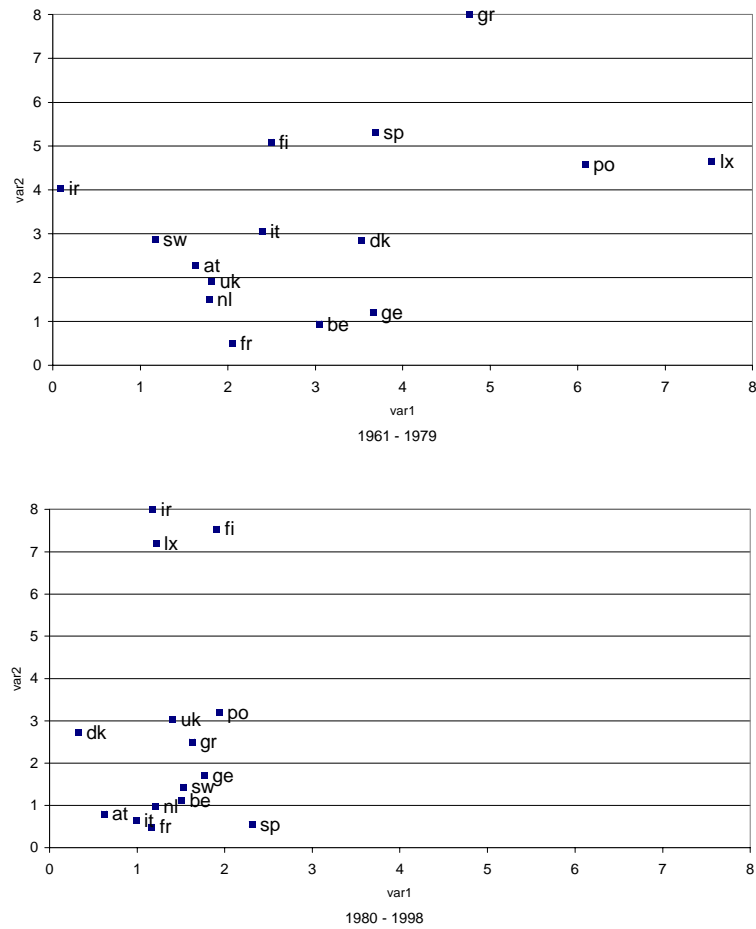
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Figure 1. Common and country-specific variances of GDP for EU countries, 1960–1998



Var1 = common variance for the EU and Var2 = country-specific variance. The values are obtained by running a regression $\Delta y_{it} = \alpha + \beta \Delta y_{EU,t}$, where Δy_{it} is the GDP growth rate for country i while y_{EU} denotes the corresponding value for the EU aggregate. In this sense $\text{Var}(u_i)$ and $(\text{Var}(\Delta y_{it}) - \text{Var}(u_i))$ represent the common and country-specific variance components

Figure 2. Expenditure and revenue estimates for the EU countries

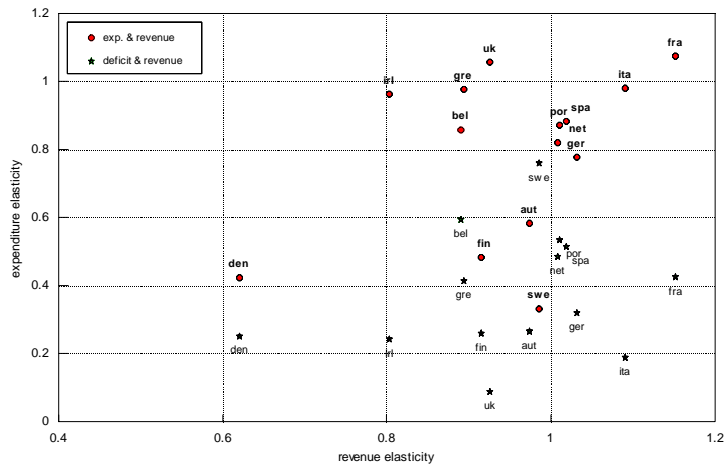
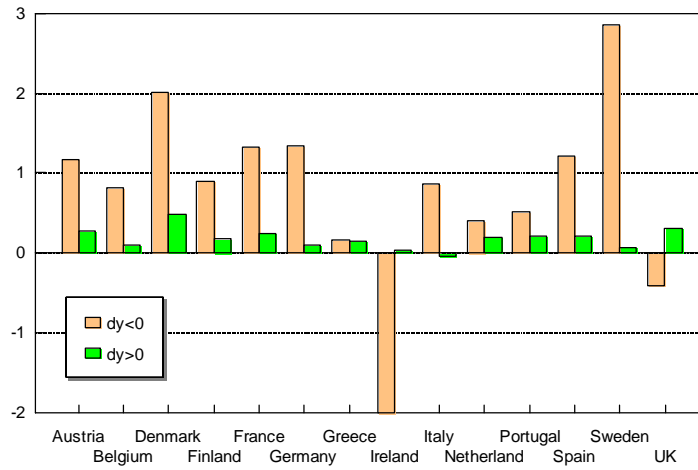


Figure 3. Nonlinear effects of GDP on deficits in the EU countries



The bars indicate the coefficient estimates α_{31} and α_{32} in (3.3)

Figure 4. Different structural deficit estimates for Finland

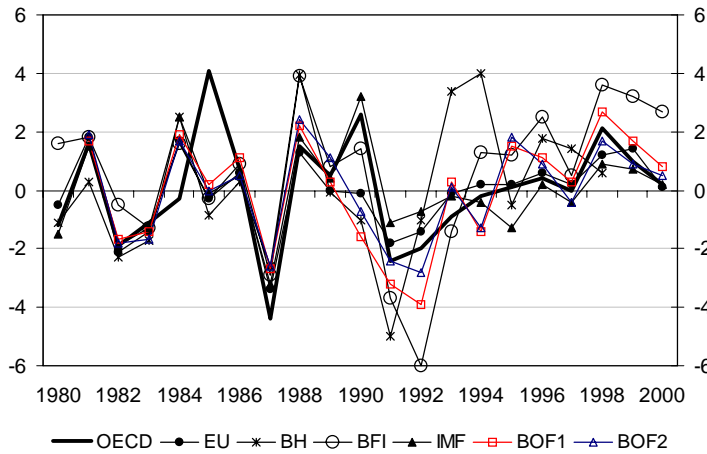


Figure 5. Different OECD structural deficit estimates for Finland

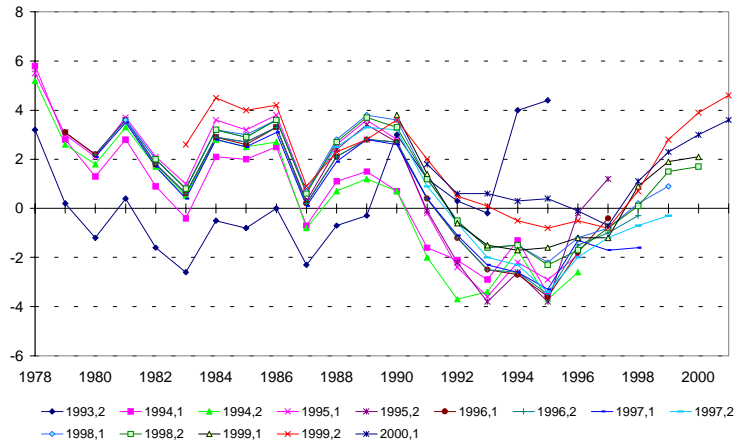


Figure 6. Different IMF structural deficit estimates for Finland

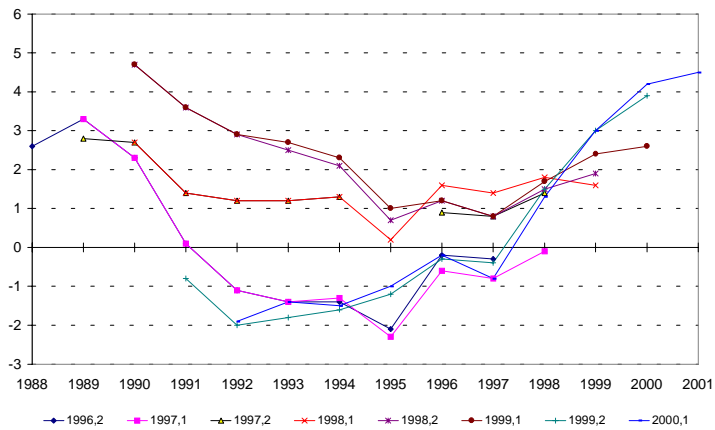


Figure 7. Short-run effects of a one per cent increase in public consumption on GDP with and without policy coordination

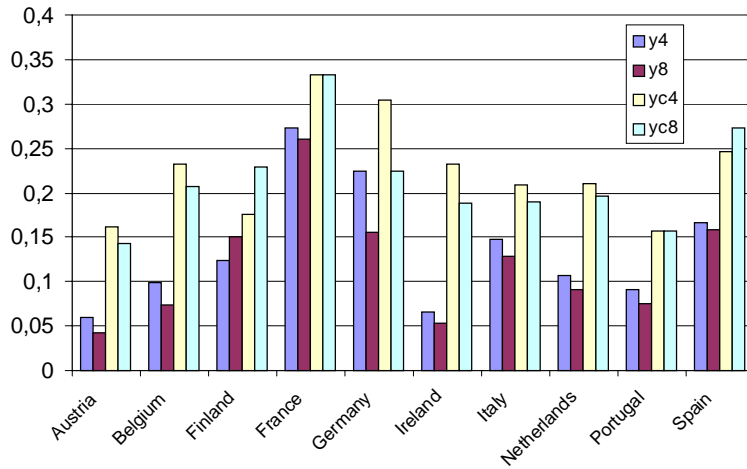


Figure 8. Maximum effects of a one per cent increase in public consumption on GDP with and without policy coordination

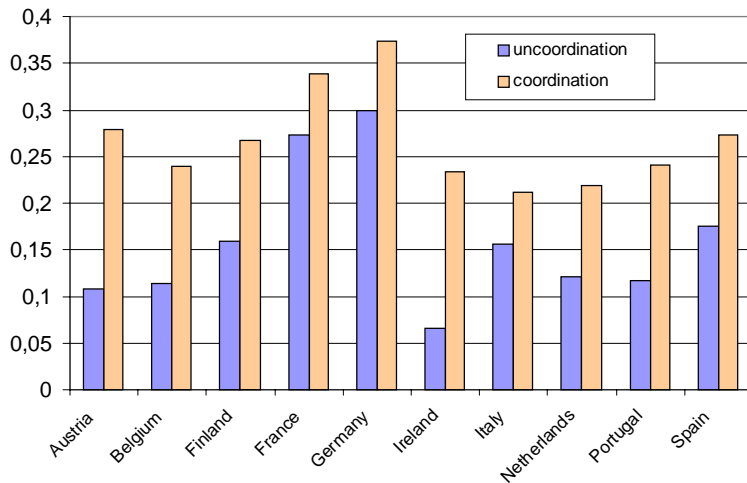


Figure 9. Long-run effect of a one per cent increase in public consumption on government surplus/GDP with and without policy coordination

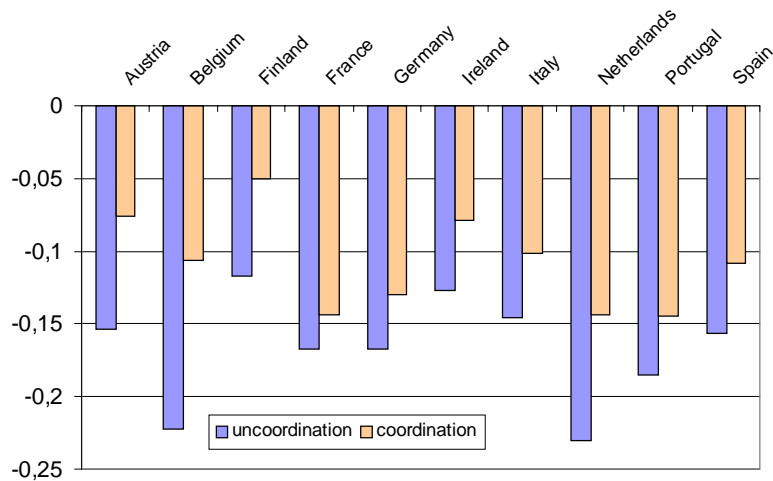


Figure 10. Effect of the solvency requirement on the impact of public consumption on GDP (upper panel) and government surplus/GDP (lower panel)

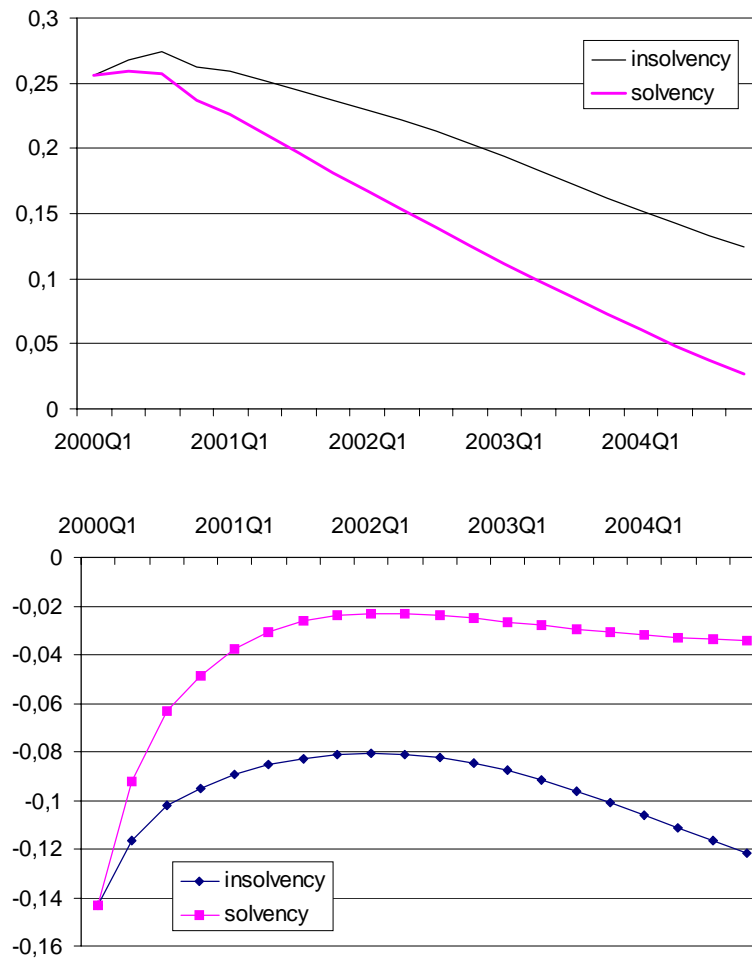
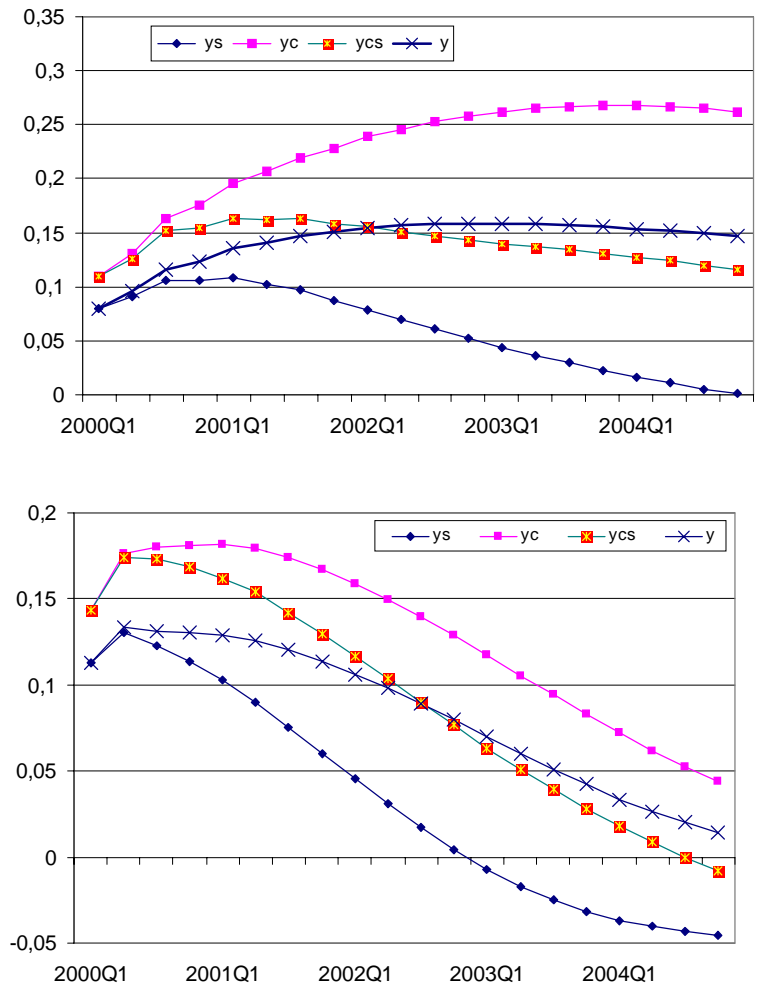
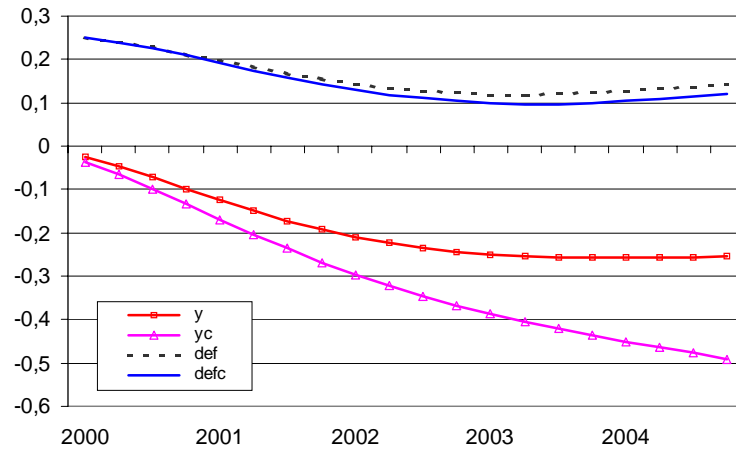


Figure 11. Effect of an increase in public consumption on GDP with and without policy coordination and the solvency requirement



y denotes the output effect with no coordination and solvency requirements. The coordinated solution is marked by *yc* and solution with the solvency requirement by *ys*. The values for Finland are in the upper panel and the values for and Italy in the lower panel.

Figure 12. Effect of an increase in direct taxes on GDP and government surplus/GDP with and without policy coordination



Notation is the same as in Figure 11. The values are for Finland only.

Figure 13. Comparison of expansive fiscal policy effects in the euro area

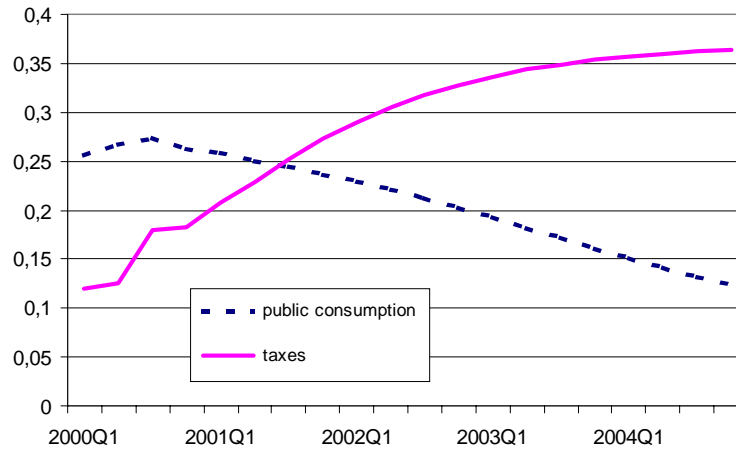
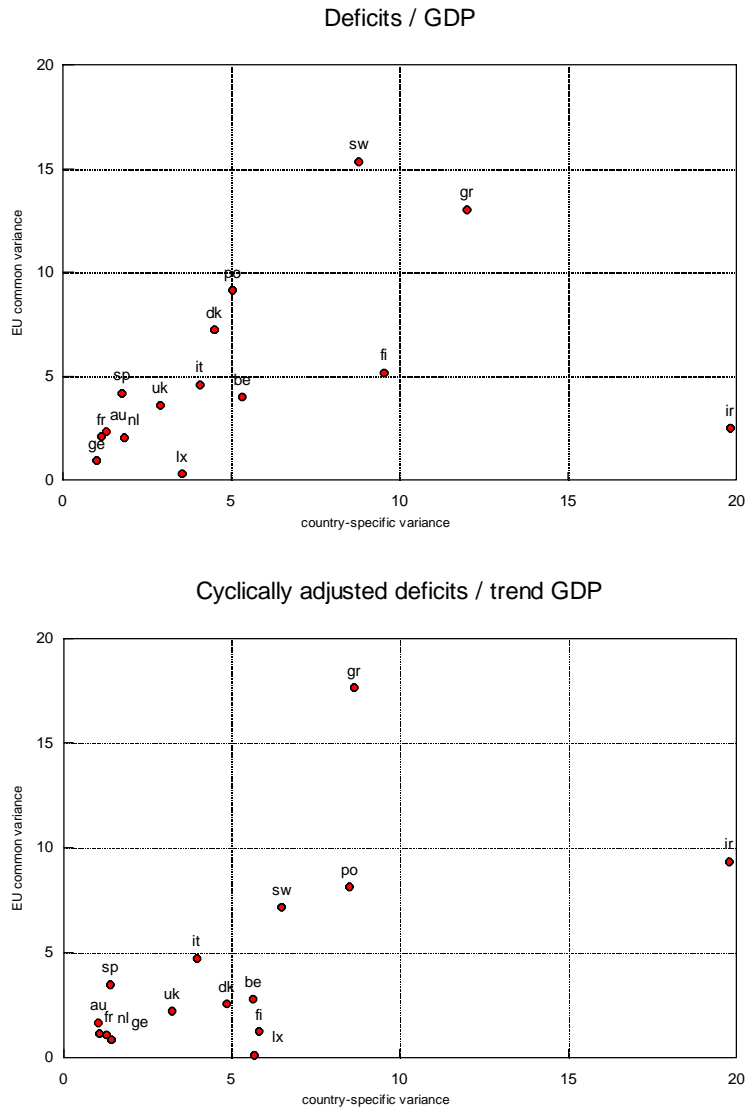


Figure 14. Common and country-specific variances of government deficits



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