OECD Economics Department Working Papers No. 78

Indicators of Fiscal Policy: A Re-Examination

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https://dx.doi.org/10.1787/021121358375

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Monetary and Fiscal Policy Division

April 1990

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Abstract

During the past decade, the formulation of fiscal policy has been increasingly founded on medium-term considerations associated with public debt and economic efficiency. In this regard, this paper, and the ones by Olivier Blanchard and Edward Gramlich in the same Working Paper Series, considers the implications of this development for the overall appraisal of fiscal policy in OECD countries. The paper begins with a review of the existing measure of discretionary change in budget positions and proposes refinements to it. The paper then introduces and illustrates several new indicators designed to help assess the sustainability of policies in the short- and medium-run and their first-round impacts on aggregate demand.

Au cours de la dernière décennie, la formulation des politiques budgétaires a reposé de façon croissante sur des considérations à moyen terme prenant en compte l'endettement du secteur public et le souci d'efficacité économique. A cet égard, cette étude, ainsi que celles d'Olivier Blanchard et d'Edward Gramlich qui paraissent dans cette même série des Documents de Travail de l'OCDE, examine les conséquences qu'une telle évolution implique pour l'appréciation globale des politiques budgétaires menées dans les pays Membres de l'OCDE. L'étude commence par un rappel des méthodes visant à mesurer la part attribuable à l'action des pouvoirs publics dans les variations de soldes budgétaires, et suggère d'y apporter certaines améliorations. Elle présente ensuite un certain nombre d'indicateurs nouveaux permettant d'évaluer, d'une part, le caractère soutenable ou non dans le court et moyen terme des politiques suivies et, d'autre part, les effets immédiats de ces politiques sur la demande globale.

INDICATORS OF FISCAL POLICY: A RE-EXAMINATION

by

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* The preparation of this paper has benefited from substantive contributions made by Professors Olivier Blanchard (Massachusetts Institue of Technology) and Edward Gramlich (University of Michigan) who worked as consultants to the OECD. It has also benefited from comments from many colleagues of the Economics and Statistics Department, notably David Carey, Robert Ford and Peter Sturm. The authors wish to thank Louis Grignon for his help in the design of this project and participation in the implementation of the indicators of discretionary action. Moreover, they are grateful to Debra Riebman-Bloch for her valuable assistance in the preparation of the empirical illustrations. The views expressed are those of the authors, and do not necessarily represent those of the Secretariat of the OECD or its Member governments.

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I. INTRODUCTION

Since the early 1980s, the formulation of fiscal policy has been increasingly dominated by medium-term considerations associated with the sustainability of public debt and economic efficiency. The purpose of this paper is to consider the implications of this evolution for the overall appraisal of government budget positions. This introductory section begins by examining briefly the reasons for which there was a shift in the focus of fiscal policy, with the aim of identifying the aspects of policy for which it would be desirable to have specific indicators. The discussion then turns to some general rules for the construction of such indicators. The remaining sections of the paper review possible indicators for assessing the orientation and effects of fiscal policy: indicators of discretionary action are discussed in Section II; sustainability indicators are considered in Section III; and indicators of economic impact are examined in Section IV. Section V provides some concluding remarks.

A. The new policy focus

Policy-makers in OECD countries generally became unsatisfied during the 1970s with the use of fiscal policy for short-term demand management purposes. Instead, attention increasingly turned towards the medium-term implications of government budgets. This reflected the increasingly held view that fiscal policy has potent influences on the allocation of resources, with possible adverse effects on the composition of output, the growth of the capital stock and, therefore, on the level of *per capita* income in the long run. This reorientation of the focus of fiscal policy can be explained by two main factors:[1]

- First, the failure of budgetary stimuli to offset the negative impact on output of what was, in large part, a supply shock associated with the oil price increases of the early 1970s resulted in widespread scepticism about the efficacy of demand management policies. Unemployment continued to rise and inflation increased rapidly, with serious stagflation experienced for the first time in the post-war era. A consequence of this situation was that budget positions deteriorated to such an extent that, in the presence of high real interest rates in the 1980s, public debt accumulation accelerated sharply. Thus, in many OECD countries fiscal policy appeared to be unsustainable. With peacetime debt-to-GNP ratios comparatively high (Table 1), many governments chose to reduce public indebtedness before debt levels became so high as to compel still larger reductions in spending programmes or increases in taxes. Further reasons for concern were found in the growing recognition that permanent deficits are detrimental to capital formation and future incomes.[2]

- A second reason for the shift in the focus of fiscal policy concerned the need to enhance economic efficiency by removing distortions associated with tax systems and government intervention. For many years, taxation was seen primarily as affecting income distribution and aggregate demand through its impact on current disposable income. However, high and rising and variable marginal rates of taxation increasingly were seen as having adverse effects on incentives to supply labour and capital. Thus, many countries implemented or planned tax reforms, aimed at both lowering tax rates and reducing their dispersion. In addition, measures were taken to reduce the size of government through expenditure reductions and privatisation.

This shift in the focus of fiscal policy had support from theoretical contributions stressing the relative ineffectiveness of discretionary fiscal policy in achieving stabilisation of output and employment. Many of these contributions resulted from the explicit allowance made for the role of expectations in influencing economic outcomes. Work by Lucas (1972, 1976), as well as the formalisation and introduction of rational expectations into macroeconomic models [Sargent and Wallace (1975)], raised serious doubt about the effectiveness of active aggregate demand management policies.[3] These analyses, while focusing predominantly on monetary policy, underscored that systematic government interventions would be ineffective in altering the level and growth rates of output in the medium and long term under most circumstances. They claimed that wage and price setting behaviour would be based on anticipations about likely future policies and the economic effects which these might have on economic variables.

Another way in which the role of expectations in economic decision-making has been seen as stressing the ineffectiveness of discretionary policy is in the context of consumer theory. To the extent that fiscal policy has a greater effect on current than on expected levels of income, it will be less effective in altering aggregate demand if consumption depends on future as well as on current levels of income. When consumers expect to have to pay higher or lower taxes in the future as a result of government deficits or surpluses today, they may reduce or increase current consumption expenditure to such an extent that the fiscal stimulus to aggregate demand will be offset.

Two contributions to consumer theory -- Friedman's (1958) permanent income hypothesis and the life-cycle theory of consumption (Ando and Modigliani, 1963) -- are particularly important in this respect. Friedman argued that welfare-maximising individuals formulate their consumption decisions on the basis of what they expect their permanent income to be. Given such behaviour, a budget deficit caused by tax cuts only stimulates consumption expenditure to the extent that higher taxes are not anticipated in the medium term to service future deficits. Hence, a short-term tax cut made for cyclical demand management purposes would be unlikely to boost consumption expenditure unless liquidity constraints severely affect households. Similarly, a deficit due to an increase in exhaustive government spending, which can be expected to result in higher taxes in the medium term, will also fail to increase significantly aggregate demand, insofar as consumers reduce personal expenditure in line with the expected decline in permanent income.

Consumers are also forward-looking in the life-cycle theory of saving. Here, consumption depends on lifetime wealth expectations. A deficit-financed tax cut will only increase consumption expenditure, and thus aggregate demand, to the extent that the debt is expected still to exist beyond the lifetimes of the current generations. Similarly, a debt-financed increase in government spending will only boost aggregate demand to the extent that consumers do not anticipate that the debt will be repaid within their lifetime. The longer the time horizon on the basis of which life-cycle consumers base their decisions, the less likely it is that short-run demand management policies will be effective. Indeed, if consumers behave dynastically (i.e. if they care explicitly about the utilities of their descendants), the so-called Ricardian Equivalence result is obtained (Barro, 1974), according to which farsighted consumers anticipate tax increases to finance the interest on the accumulating government debt. In this case, fiscal policy has no effect at all on the level of aggregate demand.

The emphasis on expectations in these theoretical developments also highlighted the effects of fiscal policy on national wealth accumulation and the sustainability of the government's debt position. More generally, such theoretical developments can be traced to a reconsideration of the microeconomic foundations of macroeconomic models. The potentially adverse consequences of lax fiscal policies for the long-run welfare of future generations, so clearly demonstrated in models of overlapping generations [Auerbach and Kotlikoff (1987)], provided relatively solid ground on which to shift the focus of macroeconomic management away from short-run preoccupations toward medium-term considerations.

B. Implications for policy indicators

i) The need for several indicators

Given the shift in emphasis of fiscal policy toward more medium-term concerns, a single indicator can clearly not serve to appraise all aspects of policy. The above discussion underscores instead that there are different aspects of fiscal policy for which it is desirable to have summary measures. In particular, fiscal analysis could be enriched by the use of a limited number of indicators, each targeted to the following aspects:

1) the discretionary element in fiscal policy: of the changes in the fiscal position of the government (taxes, transfers, spending), what part is due to changes in the economic environment and what part is due to changes in policy?

2) the sustainability of fiscal policy: can the current course of fiscal policy be sustained without exploding public debt, or will the government have to increase taxes, reduce spending, or even have recourse to monetisation?

3) the aggregate demand impact of fiscal policy: at given income, interest and exchange rates, and ignoring distortions, what is the effect of fiscal policy on aggregate demand? Is fiscal policy acting as a catalyst to, or a restraint on, domestic saving and capital accumulation?

4) the allocational consequences of fiscal policy: what are the microeconomic distortions on investment, saving, labour supply and demand, etc. due to the tax/incentive structure?

The current paper focuses on indicators aimed at the first three of these. The distortionary consequences of taxation have been considered rather extensively in other work by the OECD.[4] Another important aspect of fiscal policy that is not treated here is income redistribution (Musgrave, 1959). This reflects two considerations: first, a desire to limit the scope of the current study and, second, the fact that redistribution has recently figured less prominently in the priorities of governments than in earlier decades. Given the many ways in which public policies influence the private economy, it is evident that sub-indicators could also be designed to focus on even more specific aspects of government policy, such as the effectiveness of achieving stated environmental quality targets, or with regard to the maintenance of conditions that improve the functioning of the marketplace. Extending the analysis to these structural aspects of policy would warrant a separate study.

ii) Some general rules for indicators

Ideally, for any given aspect of fiscal policy, an indicator should be interpretable under as broad a class of economic theories as possible. However, the construction of indicators of fiscal policy inevitably entails a compromise between theoretical purity, on the one hand, and simplicity of production and understanding on the other. In establishing the criteria against which fiscal policy indicators should be assessed, the following are critical:

- An indicator should be constructed as simply as possible in order to facilitate both its implementation and interpretation.

- An indicator should, by construction, be based on positive rather than normative economic principles, leaving to the user judgments about specific aspects of the broader economic situation in a particular country.

- When cross-country comparison is important, it is obviously desirable that that an indicator be based on broadly similar definitions and concepts.

The extent to which each of these requirements can be satisfied will vary depending upon the nature of the question being asked. As a general rule, the greater the dependence of an indicator on uncertain behavioural responses of individuals to policy measures, the more complex will be the construction of this indicator and the more controversial its interpretation. In addition, for purposes of international comparability, the level of the government at which an indicator is constructed can be important. In most cases, the general government level provides the highest degree of cross-country comparability given the availability of data. But it should be borne in mind that the assessment of certain aspects of policy for some countries may warrant consideration of fiscal policy at a different level than general government. For instance, in Japan, where public works expenditures are in large part made through public enterprises and do not appear in the general government account of the United Nations System of National Accounts, assessment of the policy stance may occasionally require that focus be shifted to the public sector (i.e including public corporations). However, international comparison is generally difficult on this basis.

Another important caveat is that summary measures, such as are proposed in this paper, are limited in scope. For instance, the indicators of impact, as will be seen, are conditional on the level of income, interest rates, and exchange rates, etc., and say little about ultimate effects of policy changes. Because of uncertainty about the ultimate economic responses of agents to various fiscal measures, only the more detailed empirical models can allow for the potential sensitivity of economic variables to policy changes. However, even with a large model, such as OECD Interlink, in which many interactions of policy tools and the economy are specified, the quantitative and qualitative inferences which can be drawn from simulations are by definition model-dependent and, hence, subject to the many uncertainties about the specification and parameterisation of the model, the implications of which may not be transparent.

II. ESTIMATING THE DISCRETIONARY CHANGE IN FISCAL POLICY

Since the early 1980s, the OECD has based its analysis of fiscal policy in part on a measure of discretionary changes in government budgets usually called the "cyclically-adjusted budget balance" (CAB). Introduction of the CAB as an analytical tool on a standardised basis reflected the need to evaluate the efforts of governments in respect of budget consolidation.[5] This evaluation was felt to be particularly important at a time when government financial positions were deteriorating markedly (Table 2) as a result of a slowdown in economic growth. Moreover, the then existing approach -- the net real fiscal impulse (which was aimed at translating changes in government financial balances into first-round aggregate demand impacts by weighting the main components of the budget)[6] -- proved ill-suited for tracking the orientation of fiscal policies and was abandoned. After a brief discussion of the scope and measurement of the indicator of discretion currently used, this section will emphasize its main limitations that have become apparent over time.

A. Scope and method

The CAB is by design a measure of the discretionary budgetary changes implemented by fiscal authorities. Indeed, the purpose of the CAB is to distinguish the change in the government's overall actual budget balance that is due to policy actions from the change that is induced by fluctuations in economic activity. As such, it is conceptually simpler than an indicator of impact (see Section IV) in that it is relatively independent of any behavioural model of the economy. There are several reasons for which the CAB as an indicator of discretionary action would seem useful. First, by distinguishing between the cyclical and non-cyclical changes in the government's budget balance, the CAB makes it possible to gauge the orientation of fiscal policy -- that is, it can be suggestive of the contribution to national saving which fiscal authorities are seeking to make. This can be particularly important when there is concern about the claims which the government makes on the limited supply of private sector saving. Second, to the extent that many policy decisions have multi-year (often very long-term) implications for public finances, a discretionary change in the government's budget balance can be a leading indicator of the future course of policy. Lastly, on an *ex post* basis, such a measure can be useful to analyze the reaction of authorities to changes in the economic environment.

As such, however, the CAB necessarily hinges on the ability of analysts either to quantify directly the consequences of spending and tax changes on the government's budget balance, or to derive the policy-driven changes as a residual (i.e. subtracting from the change in the observed budget balance the estimated cyclically-induced variation in the balance). The latter approach has been, and remains, the one adopted for the calculation of this indicator.[7] In effect, the CAB is basically constructed in three steps:

1) the choice of a benchmark economic scenario against which to gauge the impact of changes in economic conditions on the budget balance;

2) the application of elasticities of government revenues and spending to deviations of actual output from the benchmark scenario in order to estimate the alternative budget balance that might have been observed;

3) the calculation of the change in the budget balances estimated under benchmark economic conditions to derive the "discretionary" element in fiscal policy.

This "residual approach" to the calculation of the discretionary component of budget balance in some circumstances over- or understates the true degree of discretionary action, given the fact that the relationship between output fluctuations and changes in a government's budgetary situation is based in part on statistical estimation. Factors other than the operation of automatic stabilisers and "discretionary" action may affect the budget balance, such as, for instance, the price of natural resources in which the government has a financial stake. Thus, it is important to interpret carefully the estimated indicator in some instances.

i) The choice of a benchmark

Since the principal objective of a measure of discretionary action is to suggest the direction in which authorities of fiscal policy are attempting to move the budget, what is needed is essentially an output benchmark against which to gauge the automatic influence of output fluctuations on the budget balance. As currently calculated by the OECD, the CAB is based on a measure of mid-cycle trend output as a benchmark. The estimates of trend output, obtained from a methodology described in the annex, are in turn used to compute deviations of actual output from baseline. The choice of mid-cycle trend output as a benchmark reflects two considerations. First, trend output will smooth both supply and demand shocks to output. Second, while estimation techniques can be more or less sophisticated, they generally are of a rather mechanical nature, yielding a benchmark that is more or less model-free. This avoids the need to make explicit assumptions about such factors as the rate of technical progress or the natural rate of unemployment.

Estimates of the current trend rate of output growth for 18 OECD countries are presented in Table 3. In order to place these estimates in perspective, figures for actual and potential output growth are also shown.[8] Chart 1 shows both actual and trend output from 1979 to 1989. As can be seen, actual output is above its trend level in a majority of countries, particularly in the United Kingdom and Australia, suggesting that capacity constraints may be contributing to the observed rise in inflationary pressures over recent years. In several countries, notably Japan, Germany, and France, actual output is at approximately the same level as trend. Finally, the data shown in Table 3 underscore that while trend and potential output growth rates do not deviate much for some countries, fairly large differences arise in most.

While trend output can serve as a useful benchmark, it is nevertheless unnecessary *per se* to make implicit or explicit assumptions about the underlying or medium-run movement in output. Instead, a less presumptive reference output can be used. One alternative benchmark could simply be the economic environment that prevailed in a particular year. Comparing the actual budget balance in any year with the balance that would have been obtained under similar economic conditions as were present in the reference year would

provide a measure of the portion of the change in the balance that is due to economic developments.[9] The choice of a reference year is somewhat problematic in terms of international comparability, however, since the same calendar year is unlikely to be as appropriate for some countries as for others. For instance, it would seem important that the year of comparison not be taken from a period in which the structure of the economy differs substantially from the current one. Many factors, such as technological innovations, demographic shifts, and changes in regulatory policies, to name but a few, operate to alter significantly the structures of economies -- an element particularly relevant in the context of international comparisons.

A benchmark that is clearly free of normative connotation is simply the previous year's economic environment, which amounts to using a moving benchmark. Specifically, the induced and discretionary components of the change in the government's budget balance can be derived by calculating the budget balance that would be obtained if the unemployment rate, the rate of interest, and inflation were unchanged from one year to another. When conditions remain unchanged, no movement in the budget balance would be anticipated other than those due to a) policy actions and b) unmeasured influences such as structural changes (e.g. changes in the terms of trade). This approach would also allow the user to cumulate the induced and discretionary components over any desired (but preferably short) time period. However, since the effects of a change in the rate of inflation on budget items (apart from interest payments) are relatively minor, only the influence of changes in the rate of unemployment on the budget balance is taken into account in the analysis presented below. (See the Annex for details.)

ii) Derivation of the cyclical component

As currently calculated, the cyclically-induced component of the change in the budget balance is based on the application of very broad aggregate elasticities: one for non-interest spending and one for receipts. However, some categories of receipts are also known to be more cyclically sensitive than others, either because of the differential impacts on each tax base of changes in income, or because of the degree of tax progressivity itself. Thus, it would appear desirable to allow for this variability in cyclical sensitivity by using disaggregated elasticities in the computation of the cyclical component of the indicator.

The methods and data used in the estimation of government spending and revenue elasticities are described in the annex. With respect to outlays, only unemployment compensation is explicitly assumed to have a cyclical behaviour, given the paucity of data and the complexities of modelling the responsiveness of other categories of spending. With respect to revenues, separate elasticities were estimated for personal income taxes, corporate income taxes, indirect taxes and other receipts. The results, shown in Table A.4 in the Annex, highlight the fact that in all countries corporate income taxes are significantly more sensitive to fluctuations in economic activity than are the other components of revenue because of the high sensitivity of corporate profits to cyclical movements in output. Personal income tax elasticities appear to be smaller, but nevertheless greater than one, reflecting mainly, but not only, the progressivity of the personal tax schedules of most countries. Other tax receipts are less cyclically sensitive; indirect taxes have an elasticity which is often below one (mainly among the major seven economies), partly explained by the fact that spending on investment goods (which generally displays greater cyclical variability) is usually not taxed, or is taxed at a lower rate than spending on consumer goods. Finally, social security

receipts, which are obviously linked to the level of employment, have a lower elasticity (below one in all countries), reflecting the prevalence of a ceiling on the tax base. Property income receipts (i.e. for the most part interest receipts) and other current receipts are assumed to be independent of the business cycle.

iii) CAB estimates

Estimates of the discretionary component of budgetary changes using both trend output and a moving benchmark are shown in Tables 4 to 7.[10] Given estimates of the path for trend output along with spending and revenue elasticities, indicators of discretionary actions by authorities can be calculated by measuring the change in the budget balances associated with trend output. These are shown in Table 4. Since interest rates are not generally under the direct control of fiscal authorities, budgetary changes due to movements in debt interest payments can not strictly speaking be regarded as discretionary. A better measure of discretionary fiscal change would then be the changes in primary budget balances (i.e. the balance excluding net interest outlays). These are reported in Table 5. Estimates of discretionary change based on the moving benchmark (hereafter MB) method are shown in Table 6 (total balance) and Table 7 (primary balance). Here, the measure of discretion is obtained by computing the difference between the budget balance that would have been observed if output were at a level consistent with the previous year's rate of unemployment (see the Annex) and the actual balance in the previous year.

Several patterns are notable in these tables and, particularly vividly, in Chart 2. First, the results confirm that in most years in most countries, the choice of benchmark makes little difference to the apparent orientation of fiscal policy. Moreover, exclusion of interest payments (i.e. the measures based on primary balances) does not alter this conclusion; the choice of benchmark still makes little difference in the apparent direction of policy. The only year in which there is an apparent divergence (in terms of direction) in several countries is 1989. This may in part be explained by the fact that OECD projections, which make up most of the "observed" level of output in 1989, embody unusually large deviations from the estimated relationship between the rate of unemployment and output.

Second, the estimates shown in the tables and Chart 2 accord well with general perceptions of the shifts in policy that took place in the different countries over this period. In particular, the indicators reflect the discretionary relaxation in the early part of the decade in several countries, namely the United States, France, Belgium, Denmark, Greece and Ireland. The estimates also underscore that policy actions have been mostly favourable to improvements in the underlying budget situation since 1987; that is, discretionary actions have progressively reduced imbalances in general government budgets. Germany, Greece, Norway and Spain are exceptions, however. The case of Norway, where variations in natural resource revenues distort the picture, provides however a good example of the need to interpret carefully the meaning of discretion in some instances, as previously emphasized.

These results would seem to confirm that assessment of the discretionary element in fiscal policy -- determined by disentangling the endogenous and exogenous contributions to changes in the government's financial balance -- can be appraised as easily with a benchmark which is agnostic about the medium-term path of output as with a more firm view on the latter, such as in the case of trend estimates.

B. Limitations

As with any summary measure, changes in the CAB as an indicator of the discretionary component of fiscal policy must be interpreted with considerable caution and, preferably, in conjunction with auxiliary information. In particular, it must be stressed that variations in the budget balances presented above do not differentiate the nature of the fiscal policy action. Thus, for instance, quantitatively equivalent improvements in the budget balances of two countries may reflect fundamentally different policy actions if in one case the change is due to reduced public investment while in the other it is due to lower public consumption. Another example is the case of a country in which the government increases future social security benefits while leaving unchanged current transfers and social insurance rates.

Moreover, since the CAB is designed to serve limited objectives and, it is important that it not be given an extended interpretation. Two uses have been made of the CAB which can be misleading. First, as one estimate of the underlying or "structural" budget balance (i.e. the deficit or surplus that might be observed, given existing policies, if output were at its normal level), the level of the CAB has been treated in some instances as an indicator of the sustainability of the government's budget policies. Second, the CAB has been used as a measure of the impact of fiscal policy on aggregate demand and output, in spite of the fact that discretionary changes are only one source of government injection. The pitfalls of these applications are discussed below.

i) The CAB as a measure of sustainability

As an indicator of the sustainability of current policies, the CAB is limited in several respects. First, its role as such hinges on the assumption that movements in output can be characterised by a systematic cycle around a deterministic trend. In this perspective, output is expected to return to its secular trend, and the sustainability of fiscal policy is often gauged by whether or not the cyclical variations in the government's deficit cancel each other over the business cycle, so as to leave the absolute level of public debt unchanged. With positive output growth over the cycle, this would lead to a declining ratio of public debt to national output. However, the growing literature on fluctuations in income and output suggests that movements in output and growth can be best characterised as following a random walk with a drift.[11]

This would recommend a degree of agnosticism in choosing the output path against which to appraise the sustainability of fiscal policy. Moreover, since the factors which may determine the debt ratio may change over time (e.g. demographic shifts and technological innovations), little can be said about the superiority (from an economic point of view) of a falling (or at least unchanging) ratio of public debt to GNP over a short period of time without taking other factors into consideration.

A second limitation of the CAB as a sustainability indicator is that it is fundamentally not a "forward-looking" measure. Indeed, the CAB takes no account of the ways in which the future economic environment may diverge from the present. For instance, non-tax revenue sources are in general less permanent than taxes. This would be most vividly exemplified by financing via privatisation proceeds which are finite by definition. Receipts from natural resources, the price of which can vary greatly through time, may also affect the

medium-term sustainability of fiscal policy. This has been of particularly acute importance to Norway, where the declining price of crude oil since the early part of the decade has had a significantly adverse effect on the public sector's underlying revenue stream. Lastly, to the extent that the government adopts policies which imply long term commitments, as for example old age income support or off-budget government guaranteed loans (i.e. contingent liabilities), such policies can have an important bearing on the sustainability of current policies.

Third, and related to the previous point, the CAB fails to take into account the dynamic nature of the government's budget constraint and, therefore, the very source of the potential instability. In effect, it is in the inter-relationship between the government's outstanding debt, interest payment on the latter, and the non-interest budget deficit that elements can emerge for a possible explosion of public debt, all of which depend, among other things, upon the relation between the rates of interest and economic growth.

ii) The CAB as an indicator of economic impact

Perhaps the most frequent abuse of the CAB is its use as an indicator of the effects of fiscal policy on the economy. To the extent that fiscal policy masks a complex network of distortions through taxes and transfer programmes, a summary measure such as the CAB provides little information about the "supply side" effects of policies. Indeed, for this purpose, microeconomic rather than macroeconomic indicators would seem desirable.

The CAB is also often used as an indicator of the aggregate demand impact of fiscal policy, with a view to describing policies as expansionary if the CAB decreases, and restrictive if it increases.[12] This interpretation is clearly misleading. First, the use of the CAB for this purpose ignores completely the contribution of automatic stabilisers to aggregate demand. Second, the CAB does not take account of the potential differences that could arise from spending changes versus tax changes, which have different demand impacts (since the marginal propensity to consume is less than one). Third, even when a more appropriate concept of "permanent" or "life-cycle" income is used in interpreting the CAB, the stimulative or restrictive impact attributed to changes in the CAB is based on the implicit assumption that income at the estimated "trend" level is a better proxy for permanent income than is current income and output. This assumption, however, is a clear over-simplification of the interaction between expectations and fiscal programmes.[13] As is discussed in Section IV, the degree of foresight with which consumers make intertemporal allocation decisions plays a crucial role in determining the demand impact of fiscal policy.

In the light of these limitations, the next sections of the paper are aimed at presenting more appropriate indicators for those concerns of fiscal policy for which the CAB is not well-designed.

III. ASSESSING THE SUSTAINABILITY OF FISCAL POLICY

Fears among policymakers during the early part of the 1980s that public debt could become explosive motivated many governments to give high priority to re-establishing the necessary conditions for the sustainability of fiscal policy.[14] As this section will underscore, the sustainability of fiscal policy depends both on elements under the direct control of fiscal authorities, namely spending and most revenue programmes, and on factors that are less under their control, namely the real rate of interest and the long-run rate of real output growth. Thus, it is desirable to have an indicator of sustainability that can reflect the sensitivity of a particular budget outcome to changes in both these controllable and less controllable factors.

A. Conceptual approach

The sustainability of a government's current budgetary stance is best captured by the following question: given current and anticipated spending and taxation (or, more generally, receipts, including property income), are authorities likely or not to be required to alter policies to prevent a debt crisis? It is therefore important for an indicator of the sustainability of fiscal policy to be forward-looking, taking into account the implications of the possible path of spending and revenues for the choices which the government is likely to have to make. This is particularly critical when policies that have limited near-term effects may instead have substantial long-term implications. Many examples can be cited, as for instance when the government announces a future change in the age of retirement in its public pension scheme, or when it makes heavy use of asset sales as a means of financing current outlays. The use of government guaranteed loans is another, although more subtle, type of fiscal action which can have significant implications for the sustainability of the current fiscal policy.

Indicators of the sustainability of fiscal policy must be derived from the government's intertemporal budget constraint, according to which the present value of taxes must be equal to the present value of spending, including interest on the public debt, plus repayment of the debt itself. This is so for at least two reasons. First, the intertemporal budget constraint highlights explicitly the relationship between the cost of servicing an existing stock of public debt, due to the accumulation of past budget deficits, and the size of future primary surpluses needed to finance these interest charges. Second, the intertemporal budget constraint also emphasizes the relative importance of short-term versus longer-term imbalances in public finances.

The intertemporal budget constraint is derived from the governments' dynamic budget constraint which says that at each point in time the change in the stock of (net) public debt is equal to non-interest spending (including transfers) minus receipts plus interest charges on the debt. This can be formulated as follows:

$$\frac{dB}{ds} = G+H-T+rB = D+rB \qquad (1)$$

where s is time, B is net public debt, G is government spending on goods and services, H is transfers, T is taxes, D is the primary deficit, and r is the real rate of interest.[15] The budget constraint shows that the change in the level of public debt (i.e. the overall deficit or surplus) equals the primary deficit or surplus plus the net interest charges on the existing debt. Equation (1) can be rewritten in terms of ratios to GNP to yield:

$$\frac{db}{ds} = g+h-t+(r-\theta)b = d+(r-\theta)b \qquad (2)$$

where θ is the rate of growth of real GNP. Fiscal policy can be viewed as a sequence of current and expected spending and taxation (i.e. of g, h, and t). If the real interest rate is (asymptotically) below the growth rate of real output, there exists no sustainability problem; the government can issue debt without ever having to reimburse it (Blanchard and Fischer, 1989). Assuming instead that the interest rate exceeds the rate of output growth, fiscal policy can be shown to be sustainable if real debt does not grow faster than the excess of the interest rate over the growth rate. If this is the case, then the intertemporal budget constraint holds and the present value of primary surpluses, discounted at rate r-θ, equals the initial debt-to-GNP ratio[16] -- or, in mathematical terms:

$$\int_0^{\infty} d\, e^{-(r-\theta)s} ds = -b_0 \qquad (3)$$

The "sustainability" condition stresses that debt cannot be serviced indefinitely by issuing new debt. If the intertemporal budget constraint does not hold *ex ante*, then one or another policy measure (or a mix) can be expected to occur; the government will either raise taxes and/or reduce spending at some time in the future. Otherwise, the debt ratio will explode.

Given an initial debt to GNP ratio, assumptions about r and θ, and a sequence of current and "anticipated" spending and transfers, an indication of the sustainability of fiscal policy can be derived from equation (3) above by comparing the current tax rate with the hypothetical "permanent" tax rate -- t*-- (i.e. the ratio of receipts to GNP) that ensures that the intertemporal budget constraint holds.[17] To the extent that current receipts are greater or less than those that would be warranted to maintain the current debt ratio over a specified period, given the real interest rate and the real growth rate, this would suggest that some change in policy is likely to occur. The associated indicator of sustainability, then, can be defined as the difference between t* and the current tax rate (i.e. the tax gap, t*-t).[18] Thus, whether or not the government has legislated future tax increases (in the case of a positive tax gap) or decreases (in the case of a negative tax gap), the indicator highlights the fact that the current setting of policy is likely to be adjusted.[19]

The indicator will vary depending upon, among other things, the time horizon over which it is computed. As mentioned above, focus on only the current period may fail to uncover potential sustainability problems or may give spurious reasons for concern. Indeed, special and temporary factors may be influencing the budget constraint: real interest rates may exceed the rate of growth by more than usual, due for instance to abnormally large credit demands; spending may be temporarily different from its normal track as a result of an

atypical lumpy outlay; or receipts may be inordinately affected by, for example, the transitional effects of tax reform or by a tax amnesty. Whether to look forward a few or several years depends, however, on the extent to which one can "project" the future path of fiscal variables. In what follows, three alternative measures of sustainability are presented, varying only with respect to the time horizon over which the government's budget constraint is defined:

1) The "primary gap" -- defined as the change in the primary deficit needed to stabilise the debt ratio at its current level, given current spending and tax policies;

2) The "short-run" tax gap -- the difference between the ratio of current receipts and the level required to keep the general government net debt-to-GNP ratio on a stable path, given current and anticipated (over the next 2 years) non-interest spending, the real interest rate, and the real growth rate.

3) The "medium-term" tax gap -- defined similarly to 3-year gap above but over a 5 year time horizon.

While these indicators look to the future, they clearly ignore some of the longer-term. This is particularly relevant when account is taken of the potential effects of ageing populations on public spending. Work is currently underway on the estimation of long-run sustainability indicators based on possible trends in public pensions and medical care spending.

B. Estimates

The most crucial data needed for the implementation of these indicators are projections of spending and transfers over varying lengths of time, as well as assumptions about the likely levels of the real rate of interest and the real growth rate. In the case of spending and transfers, projections by the OECD have been used for the period to 1994. The other important input needed for the calculation of these indicators is the difference between the real interest rate and the real rate of growth. Since what matters for the sustainability of current and future policies is the rates of interest and growth which will prevail in the relevant future, it is desirable that the tax gaps be based on a reasonable expectation of the likely levels of these rates over the time horizon to which the indicators correspond. The approach taken here is to assume that the future (over the relevant time horizon) rates of real interest and real growth can be anticipated by using a 3-year moving average of real interest and growth rates.

Tables 8 and 9 show the primary, 3-year and 5-year tax gaps for the major and smaller OECD countries, respectively, for the period 1983 to 1989. The tax gaps for the early period are not shown because the implicit real rate of interest on public debt was less than the real rate of output growth, a situation in which the issue of sustainability is not a relevant one. The low *ex post* interest rates reflected at that time in large part the weight of low interest bearing bonds issued in the earlier decade. The 3-year tax gap therefore incorporates projections of fiscal policy variables to 1991, while the 5-year does so to 1993. The estimated tax gaps are also shown in Chart 3, along with the ratio of net public debt to GNP

in each country. Given the tight relationship between estimated tax gaps and trends in net debt, this juxtaposition can be highly revealing. The level of the debt also underscores the potential stock effects of public debt, which can be of considerable importance. In particular, high ratios of public debt to GNP clearly raise the weight of interest in public spending, and, therefore, reduce the flexibility of the government to vary fiscal policy levers for selective purposes. Furthermore, since it is very unlikely that taxes and interest payments are evenly distributed across households, it is probable that tax increases for the financing of large amounts of interest payments would be politically more difficult than for financing additional public goods. Still, since both countries with high and low ratios of public debt to GNP can have apparently sustainable or unsustainable policies based on these indicators, it is therefore important to keep the debt levels in mind.

As can be seen for most countries, policies have moved from apparently unsustainable to sustainable positions. In the first part of the 1980s, there was a clear need to reduce spending or raise revenues in order to reach a sustainable budgetary situation, given existing interest and growth rates and debt to GNP ratios. Comparison of the estimated primary gaps, which by definition include only current year spending and transfers, and the 3-year and 5-year gaps highlights the importance of looking ahead to assess the sustainability of current fiscal policies. (It should nevertheless be kept in mind that the estimates for earlier years are based on the assumption that *ex post* observed policies "could have" been anticipated, which is of course quite optimistic.) Thus, for instance, although unsustainable in terms of the primary tax gap, policies were even less so taking into account the course which spending was taking in France, Italy, Finland and Greece in 1983 and in the United States in 1984. Conversely, toward the end of the 1980s, policies appear to be generally more sustainable on the basis of the 3-year and 5-year gaps than the primary ones, given the generally favourable trends in spending which underlie the estimates (see the Annex).

The impression given by recent developments in most countries also suggests that policies have become increasingly sustainable, in the sense that government receipts appear at present to be sufficient to maintain current levels of public debt when account is taken of the possible stabilisation or decline in non-interest spending envisaged over the next several years. As mentioned above, however, in most cases the gradual ageing of populations will, on unchanged policies, require increases in social insurance contribution rates or benefit reductions at some point in the next 30 to 40 years. In addition to public pension pressures, many governments are faced with explosive medical expenditures as the age distribution of populations change over the next decades. It is thus important to keep in mind that existing policies in a longer term context may be significantly less sustainable than suggested by the estimates shown here.

As noted earlier, the choice of taxes as the policy tool to adjust is somewhat arbitrary; many governments, faced with a latent sustainability "problem", may prefer to seek expenditure reductions. This is most likely to be the case in countries in which the burden of taxation is already relatively high since the marginal welfare costs of higher taxation increase disproportionately with increases in the marginal tax rate. One way of gauging the significance of this is to divide the estimated tax gaps by one minus total receipts as a per cent of GNP. In this way, a given tax gap will be associated with a lower "feasibility" index in the country with the higher overall tax rate. In other words, the country with a large portion of GNP already taken by the government through taxation has little room for

manoeuver on the receipts side. As can be seen in Table 10, this can have a substantial effect of the feasibility of adjustment for sustainability. The estimated 5-year tax gap relative to the untaxed share of GNP is between 75 and 100 per cent higher than the tax gap relative to total GNP in many countries, such as for example in Germany, France, and the Netherlands in 1983.

IV. MEASURING THE IMPACT OF FISCAL POLICY

Abstracting from its redistributional role, fiscal policy can be perceived as having two general economic effects for which indicators are desirable. Fiscal policy obviously has a significant influence on the allocation of resources through distortionary taxation.[20] But fiscal policy will also typically affect the composition and, at least in the short run, the level of aggregate demand. To the extent that the government's spending and financial policies augment national consumption (i.e. reduce national saving), they have implications for the allocation of consumption over time and for the welfare of different generations. At the same time, when government spending is aimed at increasing the national capital stock, the policy can have beneficial effects on the welfare of different cohorts. The purpose of this section is to derive, illustrate and discuss several indicators of the aggregate demand impact of fiscal policy.

A. Conceptual considerations

A crucial element in the construction of an index of the impact of fiscal policy on aggregate demand is the way in which consumers are perceived to respond to changes in the government's budget balance. Both theoretical developments and accumulating empirical evidence suggest that households, to a considerable degree, smooth consumption over time, and that this originates in their expectations of future income.[21] The less liquidity-constrained are consumers, the more feasible is this smoothing, other things being equal. This is in contrast to the Keynesian paradigm which postulates that consumers respond primarily to changes in current disposable income. An implication of such forward-looking behaviour is that the responsiveness of consumers to changes in the government's fiscal policy may differ depending upon whether it reflects a permanent or temporary change. Hence, an appropriate analytical framework for understanding the aggregate demand impact of fiscal policy requires a focus on income over a long period of time,[22] and, accordingly, on the time path or sequence of government policies since these can have implications for the net wealth positions of different generations.

Both the overlapping generations and the "Ricardian" models attribute considerably greater weight to the longer-term consequences of fiscal policy than to the current changes to fiscal variables.[23] However, since these two approaches differ greatly in effective length of planning horizon, the effects of any given policy change are contrasting.

In the overlapping generations approach, the implications of the government's deficit policies derive from three central features of the model: 1) individuals have finite lifetimes and belong to separate but overlapping generations; 2) they base their consumption decisions on an intertemporal optimization approach; and 3) they take full advantage of borrowing and

lending opportunities available in the capital markets.[24] These elements combine to impart great potency to government deficits to the extent that they redistribute taxes away from a portion of current taxpayers to future ones via debt-financed increases in public spending. Because at least some individuals have life expectancies that fall short of the government's debt amortisation period, the lifetime wealth of part of the population is augmented and, as a result, aggregate consumption (saving) is higher (lower) than would otherwise be the case. While temporary deficits can under certain circumstances have some positive effects (Auerbach and Kotlikoff, 1987), permanent deficits as a general rule permanently reduce the domestic capital stock and, therefore, the real incomes of future generations.[25]

In the Ricardian perspective, although forward-looking intertemporal optimization also characterises households' behaviour, the planning horizon of individuals is made effectively infinite through the dynastic linkages that are assumed to exist and operate in the population (Barro, 1974, 1979, 1989); parents care about their children's consumption possibilities, which in turn depend upon the amount of resources effectively "bequeathed" to them. Since budget deficits merely postpone taxes, the response of such households is to increase saving (reduce consumption) by the same amount as a deficit-financed increase in government spending. Similarly, the private consumption of altruistic households will remain unchanged in response to a deficit-financed tax cut.

Thus, as stressed in the Introduction, when full Ricardian equivalence is operative, financial policy is irrelevant with respect to the level of aggregate demand; what matters is the government's direct expenditure (i.e. government absorption), which affects the composition of demand.[26] By contrast, the overlapping generations model suggests that spending, taxes and deficits have implications for the accumulation of capital, since consumers currently alive are net gainers from deficit spending (given the assumption that they do not have infinite planning horizons), and in general will not fully offset the effects of government policy on savings. Accordingly, it is important to have a measure which is indicative of the impact that fiscal policy may be having on aggregate consumption, and therefore on saving (and, through its effects on the domestically-owned capital stock, future *per capita* income).

An appropriate indicator would ideally make allowance for different planning horizons. For deriving such an indicator, a useful analytical framework has been suggested by Blanchard (1985), who derives an aggregate consumption function based on individual maximisation of utility defined over both current and expected future consumption. Consumption is assumed to depend on total wealth, which is equal to the sum of government debt, other forms of financial wealth and the net present value of labour income net of taxes, discounted at a rate which explicitly takes into account the possible degree of foresight of consumers (summarised by what Blanchard calls a myopia index). By incorporating an explicit parameter for the degree of far-sightedness of households, this approach allows for Ricardian equivalence as a special case. As shown in the annex, by collecting terms in the aggregate consumption function which depend on fiscal policy (i.e. government spending, taxes and government debt), an index of fiscal impact (IFI) can be written as:

$$IFI = G + brB - b(r+p)\int_0^{\infty} Te^{-(r+p)s}ds \qquad (4)$$

where G is public expenditure on goods (including net investment)[27] and services, B is the stock of outstanding public debt, the third term is the annuity value of future taxes, b represents the marginal propensity to consume out of income, r is the real rate of interest, and p is the degree of myopia.[28] When current taxes are seen by consumers as not properly reflecting their more permanent level, given non-interest spending and debt service charges, the impact of the government's current budgetary policies on aggregate demand will be less than when consumers' expectations are static. When they are static, future taxes are perceived as likely to be equal to current taxes, and the index of fiscal impact becomes:

$$IFI' = G+rbB-bT \qquad (5)$$

These two indexes -- IFI and IFI' -- show that what matters is current expenditure, inclusive of interest payments (G + brB) and current as well as (depending on the degree of myopia) future taxes. More significantly, the measures underscore the potential importance of the degree of consumer foresight on the one hand and expectations of future budget policy on the other. The higher the degree of myopia, the greater the initial effect of an increase in government spending or a reduction in taxation. Similarly, in the absence of full myopia, the initial impact of a change in fiscal policy will vary according to expectations regarding the duration of the change. For instance, if the government is imposing a one-time levy, a reversal is expected and, therefore, consumers may respond by smoothing the impact of the tax over time. On the other hand, if consumers are instead myopic, the second indicator will approximate the short-run impact reasonably well.

While these indexes do not correspond to any particular deficit, close approximations are available (which will hereafter be referred to as "deficit counterparts" to the true index). The first index, IFI, can be proxied by the actual current deficit adjusted by taking into account potential future taxes (hereafter the "adjusted" deficit), while the second index, IFI', can simply be approximated by the actual deficit, given the underlying assumption of myopia. Moreover, since in neither case is it reasonable to assume that consumers suffer from money illusion, it is preferable to adjust each of these deficits for the effects of inflation.[29]

B. Estimates

Tables 11 to 14 present indexes of fiscal impact, as well as their budget deficit counterparts over the period 1979-89. Chart 4 shows the movements in the indexes and the deficits over the same period. (Although the level of the indicators shown in the tables and in Chart 4 is suggestive of the contribution of fiscal policy to aggregate demand, changes in the degree of impact are more easily detected in the chart.) The estimates presented in Tables 11 and 12 for the larger and smaller economies, respectively, correspond to equation (5) and, as such, assume that consumers are myopic. In other words, these measures are similar to the conventional Keynesian perspective of fiscal policy as having a strong and direct impact on aggregate demand. By contrast, the estimates in Tables 13 and 14 are based on equation (4) and therefore reflect forward-looking behaviour. As such, fiscal policy is seen as having a weaker impact on demand than otherwise. They are based on the somewhat arbitrary assumption that consumers on average look ahead over a period of 5 years and, hence, projections of fiscal variables are required for some years.[30]

Several patterns emerge from an examination of these estimates. First, both the indexes and deficit measures display relatively similar patterns (although of opposite signs) through time; when the index rises, the deficit increases, and *vice versa*. Comparing estimates of the forward-looking index and its deficit counterpart with the myopic measures, it is clear that the impact of budgetary actions may often be overstated if one only looks at current government fiscal policy. In all countries, the path of the forward-looking measure (IFI) is lower than IFI': future taxes can have a dampening effect on current fiscal policy.

A noticeable difference between both impact indexes on the one hand and deficit measures on the other is the frequently (but not always) sharper movements in the latter than in the former, particularly the forward-looking index (IFI). This suggests that weighting (i.e. taking into account the marginal propensity to consume) can occasionally be critical to the view that one forms about the potential impact of fiscal policy on aggregate demand.

Lastly, another key point of the analysis is that the actual inflation-corrected deficit and the deficit adjusted for future taxes also yield similar qualitative results. In some instances, however, these two measures point to a different direction. As a general rule, the adjusted deficit tends to display lower variability than the actual one where budgets reflect major policy shifts, as for instance in Australia and Ireland, or variations through time, as in Finland and Sweden.

In summary, it is quite feasible to derive from theory indicators of the aggregate demand impact of fiscal policy which allow for varying degrees of foresight. These, however, can be controversial depending upon views about the appropriate value of the marginal propensity to consume, and, in particular, about the degree of foresight on which consumers base their decisions. However, straightforward and simple proxies for these indicators are two different measures of the deficit, both corrected for inflation, but one of which is adjusted up or down for likely tax changes warranted by the government's intertemporal budget constraint.

V. SUMMARY AND CONCLUSIONS

Assessment of fiscal policy has become more complicated during the 1980s, due in part to the evolution of objectives assigned to government budgets away from systematic demand management towards more medium-term considerations. A consequence of this shift in focus is that a single budget indicator is unlikely to provide sufficient or relevant information about the implications of fiscal policy changes for different aspects of policy for which there may be concern. The purpose of this paper has therefore been to consider the set of standard indicators that could be used in the analysis of budgetary developments in OECD countries.

Several aspects of fiscal policy were identified in the introduction to the paper as warranting separate indicators, and for three of them a number of alternative measures has been presented. First, because the government's budgetary position is affected both by fluctuations in economic activity and by discrete policy actions, different indexes of the discretionary element in fiscal policy have been discussed. Indicators of discretionary action provide a preliminary assessment of the orientation of fiscal policy, and facilitate description of the evolution of policy, without necessarily implying indications about the potential impact

of budgetary changes on aggregate demand in one or another direction. Inasmuch as interest payments are out of the direct control of budgetary authorities, at least in the short run, it was suggested that focus be on the primary budget balance. Two alternative methods of purging the budget balance of the effects of changes in the macroeconomic environment were discussed. The first, which essentially represents potential refinements of indicators already used by the OECD, is based on estimation of the budget balance that would have been observed had real output been at its estimated trend level in each year. The second is based on the value of the budget balance that would have been observed in one year if the rate of unemployment were unchanged from the previous year. Although the two approaches yield similar results, the second one presents the advantage of avoiding any judgment with respect to the normal level of output.

Second, it is important to assess whether the current course of fiscal policy is sustainable over the medium to long term. The question as to whether or not a given setting of fiscal policy can be sustained is very much like asking whether changes in spending and/or taxes are likely to be required over the relevant time horizon. The paper has emphasized the necessity of deriving summary indicators of the sustainability of fiscal policy from the government's intertemporal budget constraint. The simple logic of doing so is that this approach underscores the importance of three crucial elements in the assessment of sustainability, namely: i) the existing stock of public debt; ii) the real rates of interest and output growth; and iii) the level of spending, transfers and taxes (or, more generally, receipts). Equally significant is the need to adopt a long-run view, since fiscal policy is in effect best characterised as a sequence of government commitments, some of which (e.g. public pensions) have built-in momentum.

The extent to which the indicators proposed here can provide realistic outlooks for OECD countries hinges critically on the acceptability of the underlying spending projections and the assumptions about real interest and growth rates. In the case of a short-run tax gap, such as the primary gap and 3-year gap, or the medium-term tax gap based on a 5-year horizon, it would seem that the economic prospects can provide the required information. In general, these indicators would be most sensitive to conjunctural dimensions of sustainability, in particular the importance of the differences between the real interest rate and the real rate of output growth. Beyond the short and medium term, a greater degree of conjecture is involved, since longer-term indicators (such as are currently being prepared by the authors) are more dominated by built-in spending commitments as well as unforeseeable developments. Looking to the future, in spite of its uncertainties, is a necessary element in proper budgetary planning.

Third, although the final effects of fiscal policy are difficult to identify outside of a model-based framework, a summary measure of the initial impact of fiscal policy on aggregate demand has been discussed. Four impact indexes were derived and illustrated in the paper, two of which are deficit approximations of more theoretically-based indicators, the latter having been derived from consumption functions which differ according to the assumed degree of myopia of households. While the indicators based on consumption functions can differ from simple deficit measures due to the effects of weighting (viz. the marginal propensity to consume), different degrees of myopia result in variations in consumption smoothing during periods of changing tax rates.

TABLES AND CHARTS FOR MAIN TEXT

TABLE 1:

Net public debt of the general government

(as a per cent of GNP/GDP)

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989(a)
United States	19.0	19.0	18.7	21.7	24.3	25.2	27.2	29.4	30.8	30.6	30.2
Japan (b)	14.9	17.3	20.7	23.2	26.2	26.9	26.6	26.4	21.9	19.3	16.4
Germany (b)	11.5	14.3	17.4	19.8	21.3	21.5	21.9	21.5	22.9	23.7	22.1
France (b)	13.8	14.3	14.2	17.8	20.0	21.1	22.9	25.2	25.5	25.2	24.7
Italy	55.3	53.6	57.8	63.4	68.7	74.4	81.3	86.2	90.1	92.3	95.0
United Kingdom	43.6	43.5	42.8	42.1	42.4	43.5	42.3	41.0	38.4	33.7	28.9
Canada	12.0	12.9	10.0	16.5	22.5	26.1	32.8	37.2	37.6	37.1	37.5
Total of above countries (c)	20.7	21.5	22.6	25.5	28.2	29.5	31.1	32.6	32.4	31.7	30.6
Australia	27.9	25.1	22.3	22.1	24.1	25.2	26.4	26.6	23.5	20.5	17.0
Austria	36.0	37.2	39.3	41.6	46.0	47.9	49.6	54.1	57.6	57.3	56.4
Belgium	62.0	69.3	83.5	92.6	103.6	108.6	112.3	116.8	121.8	123.7	122.3
Denmark	1.8	7.3	16.6	26.4	34.2	37.2	35.0	28.6	23.2	21.2	20.6
Finland (b)	-6.8	-6.1	-4.7	-1.9	0.4	0.7	0.9	-0.0	1.1	-0.0	-1.9
Ireland	76.2	78.0	83.5	92.2	104.7	113.3	117.8	133.4	133.1	130.4	123.5
Greece	27.6	27.7	32.8	36.1	41.3	49.5	57.9	60.9	65.2	69.2	76.7
Netherlands (b)	21.8	24.9	27.3	31.3	36.5	39.9	43.0	46.5	52.1	54.8	56.4
Norway (b)	9.8	0.4	-2.2	-4.7	-8.4	-12.5	-16.0	-20.9	-23.6	-25.3	-24.3
Spain	5.9	7.9	11.8	14.6	18.6	23.2	27.9	30.4	30.9	30.9	29.8
Sweden	-19.9	-13.5	-5.2	4.4	10.5	12.6	16.1	16.1	10.8	7.0	3.0
Total of smaller countries (c)(d)	17.0	18.9	22.9	27.1	31.8	34.6	37.1	38.5	38.8	38.3	37.3
Total of European countries (c)(d)	24.6	25.8	28.4	31.8	34.8	37.0	39.0	40.4	41.3	41.1	40.1
Total of above countries (c)(d)	20.2	21.2	22.6	25.7	28.6	30.1	31.8	33.3	33.2	32.5	31.4

(a) Estimates.
(b) Financial assets exclude corporate shares.
(c) 1987 GNP/GDP weights and exchange rates.
(d) Including gross financial liabilities for Australia, Austria, Ireland and Greece.

Source: OECD.

TABLE 2:

General government financial balances

Surplus (+) or deficit (-) as a per cent of GNP/GDP (a)

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989 (b)
United States	0.5	-1.3	-1.1	-3.6	-3.8	-2.9	-3.4	-3.5	-2.6	-2.1	-1.6
Japan	-4.7	-4.4	-3.8	-3.6	-3.7	-2.1	-0.8	-0.9	0.6	1.3	1.8
Germany	-2.6	-2.9	-3.7	-3.3	-2.5	-1.9	-1.1	-1.3	-1.8	-2.1	0.0
France	-0.8	-0.0	-1.9	-2.8	-3.1	-2.8	-2.9	-2.7	-2.0	-1.3	-1.1
Italy	-10.1	-8.5	-11.6	-11.3	-10.7	-11.6	-12.5	-11.7	-11.2	-10.6	-10.4
United Kingdom	-3.2	-3.4	-2.6	-2.4	-3.3	-3.9	-2.7	-2.4	-1.5	0.8	1.9
Canada	-2.0	-2.8	-1.5	-5.9	-6.9	-6.5	-6.8	-5.5	-4.4	-2.6	-3.4
Total of above countries (c)	-2.2	-2.7	-2.9	-4.1	-4.2	-3.4	-3.3	-3.2	-2.4	-1.7	-1.1
Australia	-2.4	-1.6	-1.2	-1.1	-4.5	-4.0	-3.5	-3.1	-1.4	0.4	1.1
Austria	-2.4	-1.7	-1.8	-3.4	-4.0	-2.6	-2.5	-3.7	-4.3	-3.1	-2.8
Belgium	-7.4	-9.2	-13.1	-11.2	-11.4	-9.3	-8.7	-8.8	-7.2	-6.8	-6.2
Denmark	-1.7	-3.3	-6.9	-9.1	-7.2	-4.1	-2.0	3.5	2.0	0.2	-0.5
Finland	0.4	0.3	1.2	-0.6	-1.7	0.4	0.1	0.8	-1.1	1.0	1.8
Greece	-2.5	-2.9	-10.9	-7.6	-8.1	-9.9	-13.5	-12.7	-12.0	-14.5	-17.8
Ireland	-10.9	-12.2	-13.3	-14.1	-12.0	-10.1	-11.8	-11.8	-9.3	-2.7	-2.9
Netherlands	-3.7	-4.0	-5.5	-7.1	-6.4	-6.3	-4.8	-6.0	-6.5	-5.0	-4.6
Norway	1.3	5.7	4.7	4.4	4.2	7.5	10.4	5.8	4.5	2.9	0.9
Spain	-2.2	-2.6	-3.9	-5.6	-4.8	-5.5	-7.0	-6.1	-3.6	-3.1	-2.3
Sweden	-3.0	-3.7	-5.3	-7.0	-5.0	-2.9	-3.8	-1.3	4.1	3.0	3.3
Total of smaller countries(c)(d)	-2.8	-2.9	-4.4	-5.3	-5.2	-4.3	-4.2	-3.8	-2.6	-2.1	-2.0
Total of European countries(c)(d)	-3.6	-3.4	-4.8	-5.1	-4.8	-4.5	-4.4	-4.1	-3.6	-3.0	-2.2
Total of above countries(c)	-2.2	-2.8	-3.0	-4.2	-4.3	-3.5	-3.4	-3.3	-2.4	-1.8	-1.2

(a) On a SNA basis except for the United States, the United Kingdom, Australia and Greece where the data are based on national methods.
(b) Estimates.
(c) 1987 GNP/GDP weights and exchange rates.
(d) For the countries shown in the table.

Source: OECD.

TABLE 3:

Estimated rates of trend and potential output growth (a)

	Trend rate of output growth in 1989	Potential rate of output growth in 1989(b)	Actual growth in 1989
United States	2.9	2.7	3.0
Japan	4.4	4.1	4.8
Germany	2.4	2.5	4.3
France	2.3	2.3	3.4
Italy	2.7	2.9	3.3
United Kingdom	2.6	2.5	2.3
Canada	3.2	3.5	2.9
Australia	3.1	3.7	4.1
Austria	2.4	2.7	4.2
Belgium	2.3	2.7	4.5
Denmark	1.8	1.7	1.4
Finland	3.2	3.0	4.6
Greece	1.8	2.1	2.3
Ireland	2.2	3.5	4.4
Netherlands	2.1	2.5	4.2
Norway	3.4	5.7	5.8
Spain	3.0	3.5	4.9
Sweden	2.0	1.8	2.1

(a) Authors' estimates except as noted.
(b) Torres and Martin (1989).

TABLE 4:

Cyclically-adjusted budget balances based on a trend output benchmark

(Changes as a per cent of trend GNP/GDP) (a)

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
United States	0.46	-0.85	0.65	-0.85	-0.24	-0.22	-0.78	-0.12	0.71	-0.03	0.39
Japan	0.06	-0.06	0.82	0.71	0.38	1.31	1.06	0.58	1.53	0.13	0.42
Germany	-1.14	0.06	0.43	1.98	1.07	0.19	0.96	-0.16	-0.26	-0.77	1.32
France	0.77	0.98	-1.42	-0.86	0.26	0.97	0.09	0.16	0.95	0.17	-0.33
Italy	-0.61	1.02	-2.26	1.11	1.27	-0.94	-0.96	0.93	0.34	0.14	-0.10
United Kingdom	0.55	1.45	2.60	0.73	-1.05	-0.61	0.81	-0.21	0.02	1.49	0.95
Canada	0.67	0.02	1.46	-1.43	-0.73	-0.95	-1.15	1.15	0.58	0.85	-0.59
Australia	-0.72	0.88	0.24	1.28	-2.04	-0.85	-0.50	0.54	1.50	1.46	0.41
Austria	-1.07	0.02	1.22	-0.84	-0.33	1.91	0.16	-0.67	-0.23	0.18	-0.65
Belgium	-2.25	-3.36	-1.93	2.82	1.11	2.47	1.40	0.25	1.72	-0.92	-0.92
Denmark	-2.54	-0.24	-1.43	-2.87	1.23	1.20	0.05	4.61	0.06	-0.02	-0.08
Finland	-3.02	-1.31	1.53	-1.84	-0.98	2.08	-0.30	0.87	-1.99	1.29	0.13
Greece	-0.95	-0.39	-7.50	3.90	0.04	-2.16	-4.14	1.28	1.48	-3.43	-3.56
Ireland	-2.85	-2.61	-1.99	0.81	4.68	2.05	-0.58	1.86	0.69	6.71	-1.37
Netherlands	-1.40	0.52	0.22	1.14	1.53	-0.69	0.92	-1.08	0.03	1.06	-0.99
Norway	0.46	4.47	0.13	1.23	0.11	2.06	1.72	-5.43	-1.36	-1.27	-2.67
Spain	0.19	0.01	-0.32	-1.11	-1.28	-0.21	-1.14	0.90	1.48	-0.22	-0.05
Sweden	-4.51	-0.44	-0.21	-0.95	2.11	0.75	-1.11	2.40	5.02	-1.48	0.22

(a) A positive sign indicates a lower deficit or a higher surplus.

Source: Authors' estimates.

TABLE 5:

Primary budget balances (a) based on a trend output benchmark

(Changes as a per cent of trend GNP/GDP) (b)

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
United States	0.44	-0.58	1.14	-0.39	-0.19	-0.08	-0.67	-0.15	0.59	-0.12	0.57
Japan	0.30	0.17	1.07	0.86	0.57	1.42	1.05	0.44	1.19	0.05	0.30
Germany	-1.19	0.05	0.68	2.35	1.35	0.22	0.95	-0.13	-0.26	-0.82	1.36
France	0.97	0.99	-1.05	-0.87	0.78	1.08	0.27	0.23	0.87	0.13	-0.30
Italy	-0.66	5.81	-1.49	2.15	1.61	-0.43	-1.06	1.37	-0.15	0.37	0.77
United Kingdom	0.81	1.61	2.73	0.61	-1.14	-0.35	0.79	-0.34	-0.17	1.16	0.75
Canada	0.76	0.17	1.92	-1.01	-0.72	-0.28	-0.55	1.21	0.45	1.03	-0.19
Australia	-0.62	1.04	0.18	1.33	-1.70	-0.41	-0.14	0.75	1.30	1.13	0.15
Austria	-0.89	-0.03	1.38	-0.48	-0.31	2.28	0.29	-0.65	0.04	0.18	-0.62
Belgium	-1.66	-2.25	-0.32	4.03	1.19	2.88	1.98	0.77	1.23	-1.15	-0.37
Denmark	-1.58	-0.24	-0.17	-2.09	2.98	2.81	0.52	3.65	-0.61	-0.40	-0.56
Finland	-2.91	-1.24	1.53	-1.68	-0.71	2.19	-0.18	0.75	-2.02	1.27	0.03
Greece	0.91	-0.13	-6.77	3.27	1.07	-1.25	-3.29	1.83	2.80	-2.53	-2.65
Ireland	-2.70	-2.20	-0.81	1.97	4.53	2.65	0.17	1.73	0.87	5.45	-1.13
Netherlands	-1.37	0.97	0.82	1.80	1.99	-0.45	1.21	-1.06	-0.12	0.91	-0.92
Norway	0.79	4.60	-0.27	1.00	0.16	1.25	1.45	-6.11	-0.80	-1.26	-3.49
Spain	0.15	0.03	-0.30	-1.07	1.57	0.45	-0.05	1.46	1.40	-0.42	-0.10
Sweden	-4.42	0.26	0.55	0.28	2.41	1.30	-0.36	1.56	4.11	-2.28	-0.22

(a) Cyclically-adjusted budget balances net of debt interest payments.
(b) A positive sign indicates a lower deficit or a higher surplus.

Source: Authors' estimates.

TABLE 6:

Adjusted budget balances based on a moving benchmark

(Changes as a per cent of GNP/GDP) (a)

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
United States	0.26	-1.01	0.60	-1.31	-0.11	-0.11	-0.87	-0.29	0.49	-0.01	0.27
Japan	0.56	0.19	0.92	0.46	0.51	1.72	1.09	0.14	1.67	0.00	0.06
Germany	-0.57	-0.32	0.55	2.47	2.38	0.72	0.85	-0.47	-0.61	-0.30	1.65
France	1.63	1.08	-1.19	-0.36	-0.19	1.33	0.26	0.27	0.87	0.35	-0.19
Italy	0.41	1.56	-2.40	0.56	1.08	-0.79	-0.96	1.43	0.92	0.69	0.10
United Kingdom	0.94	0.52	2.67	1.38	-0.20	-0.37	1.32	0.41	0.24	0.99	-0.19
Canada	0.68	-0.84	1.36	-2.17	-0.12	0.14	-0.86	0.59	0.60	0.98	-0.97
Australia	-0.25	0.68	0.20	0.93	-1.70	0.36	-0.01	0.22	1.69	1.23	0.10
Austria	0.42	0.48	0.57	-0.44	0.12	1.59	-0.11	-1.84	0.21	0.98	0.10
Belgium	-1.28	-1.59	-2.62	3.00	0.59	2.22	0.11	-0.59	1.40	-0.17	-0.03
Denmark	-2.10	-1.08	-1.60	-1.34	2.60	2.91	1.14	4.23	-1.67	-1.09	0.16
Finland	-1.85	-1.17	0.97	-1.32	-0.98	1.81	-0.37	0.95	-2.14	1.67	-0.20
Greece	-0.84	-0.13	-7.55	4.03	0.30	-1.67	-3.73	0.69	0.71	-2.43	-3.23
Ireland	-2.92	-1.25	0.54	0.35	3.90	3.17	-0.38	0.20	2.55	6.05	-0.67
Netherlands	-0.58	0.27	-1.39	0.14	2.66	0.44	0.78	-1.97	-1.01	1.22	-0.15
Norway	0.90	1.25	-0.86	0.28	0.68	3.42	2.36	-5.22	-1.29	-0.70	-0.29
Spain	0.11	0.57	-0.18	-0.90	1.57	0.14	-0.95	0.77	2.17	0.09	-0.33
Sweden	-2.73	-0.81	-0.65	-0.40	2.64	1.51	-1.47	2.11	4.58	-1.92	-0.40

(a) A positive sign indicates a lower deficit or a higher surplus.

Source: Authors' estimates.

TABLE 7.

Primary budget balances (a) based on a moving benchmark

(Changes as a per cent of GNP/GDP) (b)

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
United States	0.21	-0.72	1.12	-0.82	-0.03	-0.06	-0.79	-0.36	0.29	-0.13	0.43
Japan	0.79	0.40	1.17	0.62	0.72	1.82	1.07	0.03	1.33	-0.10	-0.07
Germany	-0.65	-0.32	0.83	2.90	2.68	0.73	0.84	-0.43	-0.60	-0.37	1.66
France	1.82	1.07	-0.81	-0.38	0.35	1.46	0.45	0.35	0.80	0.28	-0.18
Italy	0.42	6.19	-1.51	1.71	1.52	-0.27	-1.07	1.95	0.46	0.88	0.93
United Kingdom	1.14	0.83	2.91	1.28	-0.31	-0.09	1.27	0.24	-0.01	0.62	-0.37
Canada	0.74	-0.65	1.81	-1.58	-0.11	0.74	-0.31	0.66	0.43	1.09	-0.57
Australia	-0.16	0.85	0.14	1.01	-1.31	0.75	0.32	0.45	1.46	0.89	-0.17
Austria	0.55	0.42	0.78	-0.06	0.14	1.99	0.02	-1.78	0.49	0.93	0.07
Belgium	-0.72	-0.61	-0.85	4.26	0.84	2.65	0.82	-0.01	0.93	-0.57	0.32
Denmark	-1.14	-1.06	-0.28	-0.57	4.36	4.39	1.45	3.23	-2.19	-1.36	-0.30
Finland	-1.73	-1.11	0.98	-1.16	-0.72	1.91	-0.26	0.83	-2.17	1.64	-0.31
Greece	0.98	0.12	-6.78	3.44	1.38	-0.78	-2.94	1.30	2.18	-1.68	-2.36
Ireland	-2.84	-0.92	1.58	1.64	3.98	3.76	0.48	0.31	2.51	4.82	-0.56
Netherlands	-0.57	0.73	-0.72	0.95	3.16	0.63	1.06	-1.95	-1.11	1.03	-0.17
Norway	1.21	4.37	-1.26	0.03	0.73	2.61	2.11	-5.87	-0.74	-0.71	-1.05
Spain	0.08	0.59	-0.16	-0.86	1.88	0.86	0.21	1.35	2.01	-0.16	-0.42
Sweden	-2.60	-0.13	0.10	0.86	2.95	2.03	-0.73	1.26	3.66	-2.71	-0.83

(a) Budget balances net of debt interest payments.
(b) A positive sign indicates a lower deficit or a higher surplus.

Source: Authors' estimates.

TABLE 8:

Short term indicators of sustainability: Major OECD countries

(As a per cent of GNP/GDP) (a)

		1983	1984	1985	1986	1987	1988	1989
United States	Primary gap	2.26	1.10	1.28	1.68	1.03	0.28	-0.64
	Three-year gap	1.67	1.83	1.42	1.20	0.41	0.02	-0.77
	Five-year gap	1.82	1.78	1.02	0.81	0.15	-0.09	-0.85
Japan	Primary gap	2.40	0.79	-0.60	-0.44	-1.62	-2.25	-2.85
	Three-year gap	1.45	0.51	-0.31	-0.40	-1.68	-2.26	-2.90
	Five-year gap	1.31	0.56	-0.26	-0.41	-1.72	-2.30	-2.94
Germany	Primary gap	1.63	0.99	0.18	0.25	0.96	1.24	-1.20
	Three-year gap	1.02	0.44	-0.15	0.21	0.24	0.07	-1.80
	Five-year gap	0.68	0.27	-0.52	-0.46	-0.45	-0.46	-2.05
France	Primary gap	1.99	1.59	1.76	1.47	0.83	0.09	-0.05
	Three-year gap	2.27	1.37	1.25	0.98	-0.00	-0.29	-0.32
	Five-year gap	2.05	0.94	0.66	0.49	-0.38	-0.54	-0.53
Italy	Primary gap	4.76	5.48	6.49	4.96	5.21	3.94	3.31
	Three-year gap	5.29	6.34	6.30	5.13	5.12	3.90	3.12
	Five-year gap	5.60	6.54	6.29	5.12	5.00	3.70	2.86
United Kingdom	Primary gap	1.70	1.99	0.52	0.47	-0.86	-3.21	-4.09
	Three-year gap	1.45	0.81	-0.55	-1.36	-2.88	-3.96	-4.14
	Five-year gap	0.56	-0.62	-2.22	-2.64	-3.53	-4.16	-4.20
Canada	Primary gap	6.36	5.56	4.86	3.74	2.37	-0.11	-0.09
	Three-year gap	5.47	4.99	4.13	2.67	1.35	-0.72	-0.47
	Five-year gap	4.97	4.35	3.33	1.97	0.85	-1.07	-0.86

(a) A positive sign indicates a need for spending decreases and/or tax increases to prevent a debt explosion.

TABLE 9:

Short term indicators of sustainability: smaller OECD countries

(as a per cent of GNP/GDP) (a)

		1983	1984	1985	1986	1987	1988	1989
Australia	Primary gap	3.86	2.92	1.92	1.12	-0.28	-1.95	-2.63
	Three-year gap	3.77	2.89	1.61	-0.44	-1.86	-3.28	-3.00
	Five-year gap	3.56	2.07	0.33	-1.81	-2.73	-3.77	-3.28
Austria	Primary gap	3.07	0.88	0.62	1.91	2.42	0.95	0.27
	Three-year gap	2.84	1.61	1.11	1.11	0.44	-0.66	-0.87
	Five-year gap	3.24	1.46	0.03	-0.39	-0.96	-1.63	-1.47
Belgium	Primary gap	6.11	2.16	1.31	1.30	1.57	1.43	-0.93
	Three-year gap	4.67	0.97	0.27	0.45	0.13	-0.03	-1.99
	Five-year gap	3.61	0.02	-0.82	-0.74	-1.00	-0.94	-2.64
Denmark	Primary gap	3.98	-0.47	-1.74	-6.25	-4.17	-1.87	-0.43
	Three-year gap	1.70	-2.13	-2.53	-3.91	-2.98	-2.17	-0.85
	Five-year gap	0.63	-1.40	-1.30	-2.99	-2.72	-2.29	-1.14
Finland	Primary gap	1.03	-1.10	-0.97	-1.49	0.48	-1.68	-2.38
	Three-year gap	1.23	0.04	-0.62	-1.91	-1.12	-2.44	-1.94
	Five-year gap	1.79	0.09	-1.47	-2.81	-1.43	-2.09	-1.37
Greece	Primary gap	2.61	2.60	6.14	4.76	4.53	6.84	9.92
	Three-year gap	4.89	4.31	5.60	4.00	4.96	7.67	9.87
	Five-year gap	5.66	4.20	5.57	4.40	5.27	7.57	9.24
Ireland	Primary gap	7.01	8.04	10.79	11.40	7.94	1.88	0.22
	Three-year gap	6.67	8.71	9.81	8.56	5.25	0.03	-1.11
	Five-year gap	6.46	7.52	7.88	6.64	3.74	-1.15	-2.12
Netherlands	Primary gap	5.22	5.19	3.47	4.75	6.16	4.39	3.07
	Three-year gap	3.24	4.03	3.63	4.58	3.65	2.75	2.75
	Five-year gap	2.92	3.95	2.80	3.44	2.76	2.17	2.33
Norway	Primary gap	-3.85	-6.44	-9.13	-4.53	-4.23	-3.13	0.29
	Three-year gap	-5.47	-5.81	-6.40	-2.96	-2.94	-2.35	0.74
	Five-year gap	-4.31	-4.11	-4.80	-1.96	-2.35	-2.11	1.02
Spain	Primary gap	2.25	1.96	2.98	1.95	0.12	-0.33	-0.97
	Three-year gap	2.46	2.48	2.02	1.31	-0.22	-0.24	-0.71
	Five-year gap	2.29	2.01	1.50	1.15	-0.11	-0.05	-0.61
Sweden	Primary gap	3.42	0.72	0.96	-0.67	-5.16	-3.39	-3.40
	Three-year gap	1.62	0.75	-0.22	-2.47	-4.02	-3.10	-3.09
	Five-year gap	0.59	-0.32	-0.46	-2.34	-3.53	-2.62	-2.54

(a) A positive sign indicates a need for spending decreases and/or tax increases to

TABLE 10:

Estimated 5-year tax gaps relative to feasibility of tax adjustment (a)

	1983	1984	1985	1986	1987	1988	1989
United States	2.65	2.59	1.49	1.18	0.22	-0.14	-1.26
Japan	1.86	0.81	-0.38	-0.60	-2.57	-3.46	-4.47
Germany	1.24	0.49	-0.95	-0.83	-0.80	-0.81	-3.68
France	3.96	1.85	1.31	0.96	-0.75	-1.05	-1.02
Italy	9.03	10.49	10.18	8.43	8.28	6.19	4.87
United Kingdom	0.95	-1.05	-3.78	-4.43	-5.84	-6.84	-6.86[b]
Canada	8.07	7.07	5.41	3.24	1.40	-1.78	-1.42
Australia	5.21	3.06	0.49	-2.76	-4.15	-5.72	-4.88
Austria	6.03	2.79	0.06	-0.75	-1.83	-3.06	-2.69
Belgium	6.50	0.04	-1.52	-1.35	-1.84	-1.68	-4.69
Denmark	1.39	-3.21	-3.05	-7.35	-6.84	-5.80	-2.80
Finland	2.87	0.14	-2.48	-4.79	-2.38	-3.49	-2.27
Greece	8.47	6.39	8.47	6.81	8.32	11.62	13.94
Ireland	12.38	14.72	15.64	13.07	7.34	-2.38	-4.22
Netherlands	6.24	8.21	5.85	7.03	5.72	4.40	4.57
Norway	-9.02	-8.82	-10.86	-4.40	-5.36	-4.82	2.22
Spain	3.45	3.01	2.29	1.77	-0.18	-0.08	-0.98
Sweden	1.48	-0.79	-1.15	-6.08	-9.41	-6.90	-6.75

(a) 5-year tax gap divided by 1 minus general government receipts as a share of GNP/GDP.
(b) Based on a 4-year moving average for 1989.

Source: Authors' estimates.

TABLE 11:

Index of fiscal impact assuming myopic behaviour of households: major OECD countries

(as a per cent of GNP/GDP)

		1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
United States	(A)	1.18	2.60	2.70	5.43	5.76	4.91	5.50	5.78	4.41	4.08	3.50
	(B)	2.14	0.60	0.45	-2.61	-3.08	-2.12	-2.65	-2.95	-1.35	-1.07	-0.41
Japan	(A)	7.99	7.35	7.12	6.97	6.97	5.67	4.61	5.02	4.07	3.53	2.83
	(B)	-4.47	-3.59	-3.21	-3.14	-3.27	-1.62	-0.29	-0.81	0.57	1.24	2.16
Germany	(A)	6.50	6.65	7.16	6.76	6.12	5.62	5.07	5.59	5.84	5.90	3.68
	(B)	-2.27	-2.31	-2.91	-2.56	-1.96	-1.42	-0.72	-1.40	-1.72	-1.88	0.75
France	(A)	6.48	5.86	7.36	8.24	8.51	8.27	8.47	8.61	7.94	7.42	7.11
	(B)	0.28	1.47	-0.39	-1.41	-1.81	-1.48	-1.81	-2.21	-1.26	-0.67	-0.35
Italy	(A)	7.22	4.56	7.89	7.78	7.43	8.79	10.35	10.75	10.62	10.20	9.05
	(B)	-3.93	-0.34	-4.12	-3.94	-3.34	-5.20	-7.14	-7.78	-7.45	-6.84	-5.53
United Kingdom	(A)	0.90	0.95	1.94	2.50	4.54	4.98	3.81	3.83	3.17	0.78	-0.21
	(B)	2.59	2.75	1.59	0.88	-1.44	-1.96	-0.74	-0.74	-0.08	2.52	3.64
Canada	(A)	6.32	6.77	5.75	9.57	10.39	9.93	10.11	8.95	7.72	6.35	6.55
	(B)	-1.26	-1.79	-0.30	-4.89	-6.15	-5.81	-6.00	-4.53	-3.15	-1.43	-1.77

A) Consumption function with "myopic" behaviour. A positive sign indicates stimulus to aggregate demand.
B) Inflation adjusted budget surplus (+) or deficit (-).

Source: Authors' estimates.

Table 12:

Index of fiscal impact assuming myopic behaviour of households: smaller OECD countries

(as a per cent of GNP/GDP)

		1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Australia	(A)	6.81	6.26	6.26	6.27	8.89	8.89	8.46	8.06	6.68	5.51	4.82
	(B)	-0.11	0.83	0.78	1.03	-2.72	-2.78	-2.02	-1.14	0.42	1.80	2.36
Austria	(A)	4.60	3.41	3.08	4.80	5.99	3.92	4.55	6.08	6.85	5.37	4.55
	(B)	-1.10	0.27	0.76	-1.30	-2.74	-0.32	-1.04	-2.82	-3.83	-2.19	-1.34
Belgium	(A)	9.93	10.29	11.78	10.07	9.94	8.38	7.60	11.27	9.13	8.40	6.53
	(B)	-5.50	-5.91	-7.75	-5.70	-5.78	-3.96	-3.01	-8.35	-5.58	-4.96	-2.60
Denmark	(A)	7.49	8.75	11.34	12.69	10.75	7.62	6.15	1.74	3.07	4.69	5.39
	(B)	-2.00	-3.28	-6.40	-8.09	-5.95	-2.42	-0.67	4.57	3.30	1.44	0.44
Finland	(A)	2.93	3.14	2.43	3.83	4.65	2.71	2.98	2.45	4.16	2.23	1.49
	(B)	-0.18	-0.38	0.55	-1.01	-1.90	0.33	0.16	0.80	-1.12	1.06	1.86
Greece	(A)	3.15	2.19	9.08	6.39	6.90	8.32	10.53	7.35	8.01	10.59	13.03
	(B)	0.69	1.73	-6.10	-2.96	-3.37	-4.76	-7.28	-3.53	-4.48	-7.55	-10.33
Ireland	(A)	5.18	4.48	28.92	6.78	6.90	5.30	8.47	8.55	7.06	1.25	0.45
	(B)	-2.81	-1.47	-30.59	-4.42	-5.05	-3.41	-7.22	-7.56	-6.16	0.50	1.33
Netherlands	(A)	2.46	3.03	4.43	6.06	5.90	5.91	4.29	5.93	6.86	4.87	4.13
	(B)	-2.09	-2.67	-4.11	-5.78	-5.62	-5.65	-4.01	-5.69	-6.63	-4.61	-3.88
Norway	(A)	3.43	-0.71	0.17	0.92	1.18	-1.57	-3.82	0.58	2.04	3.39	4.72
	(B)	1.46	6.38	5.25	4.30	3.96	7.13	9.89	4.81	3.28	1.65	-0.12
Spain	(A)	2.95	3.07	4.13	5.45	4.58	5.06	6.58	5.36	3.67	3.13	2.10
	(B)	-1.94	-1.99	-3.08	-4.43	-3.45	-3.98	-5.55	-4.21	-2.32	-1.72	-0.56
Sweden	(A)	5.29	6.98	7.50	8.29	5.55	2.98	3.66	1.30	-4.25	-3.04	-3.21
	(B)	-4.77	-6.39	-7.02	-7.83	-5.05	-2.45	-3.15	-0.75	4.90	3.66	3.83

A) Consumption function with "myopic" behaviour. A positive sign indicates stimulus to aggregate demand.
B) Inflation adjusted budget surplus (+) or deficit (-).

Source: Authors' estimates.

TABLE 13:

Index of fiscal impact assuming forward-looking behaviour of households: major OECD countries

(as a per cent of GNP/GDP)

		1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
United States	(A)	-0.64	0.40	1.51	2.73	2.29	2.40	3.09	2.77	1.62	1.06	0.82
	(B)	1.03	0.08	-0.49	-2.30	-1.84	-1.45	-2.20	-2.13	-0.94	-0.29	0.00
Japan	(A)	6.30	5.77	5.87	5.48	4.87	3.91	3.12	3.14	2.52	2.13	1.62
	(B)	-3.58	-2.65	-2.64	-2.28	-1.71	-0.51	0.52	0.33	0.84	1.22	1.81
Germany	(A)	4.98	5.43	5.38	4.66	4.20	4.04	3.81	4.37	4.03	3.52	2.63
	(B)	-2.12	-2.31	-2.31	-1.89	-1.46	-1.28	-1.17	-1.87	-1.83	-1.44	-0.31
France	(A)	2.31	2.75	4.11	5.53	6.11	6.24	6.49	6.45	5.83	5.44	5.26
	(B)	0.59	0.52	-0.59	-1.31	-1.64	-1.53	-1.74	-1.71	-1.17	-0.70	-0.31
Italy	(A)	-1.67	-0.19	3.19	4.22	5.05	6.25	6.86	7.28	6.95	6.95	6.43
	(B)	1.60	0.38	-2.81	-3.62	-4.05	-5.11	-5.66	-6.46	-6.06	-5.93	-5.19
United Kingdom	(A)	-5.36	-2.92	-0.71	-0.06	1.63	1.13	-0.24	-0.70	-1.36	-2.62	-2.51
	(B)	4.24	3.08	0.77	0.27	-1.47	-1.42	-0.02	-0.06	0.65	2.49	2.78
Canada	(A)	3.54	4.24	5.60	8.09	7.97	7.33	7.20	5.92	4.50	3.95	3.69
	(B)	-1.48	-1.96	-2.64	-5.49	-5.30	-4.55	-4.61	-3.61	-1.95	-1.21	-0.77

A) Consumption function with forward-looking behaviour. A positive sign indicates stimulus to aggregate demand.
B) Inflation-corrected budget surplus (+) or deficit (-), adjusted for future taxes.

Source: Authors' estimates.

TABLE 14:

Index of fiscal impact assuming forward-looking behaviour of households: smaller OECD countries

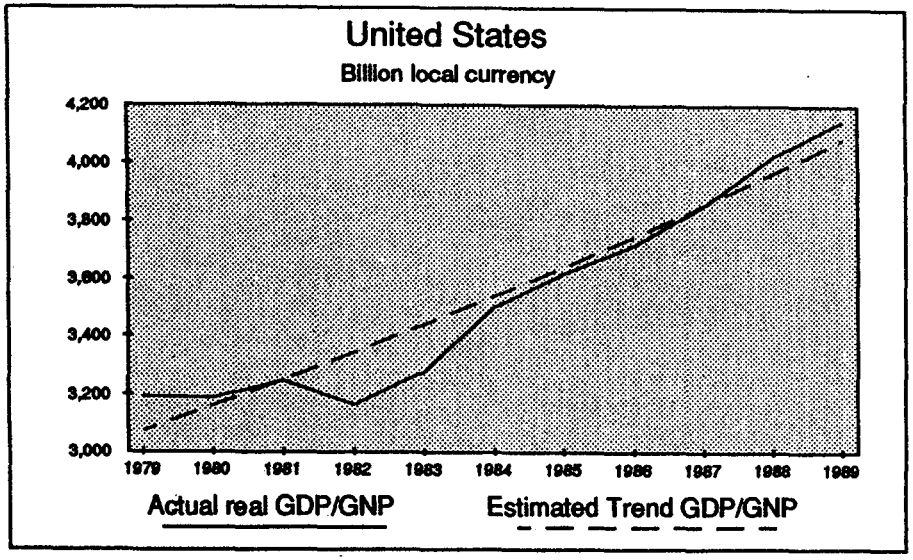
(as a per cent of GNP/GDP)

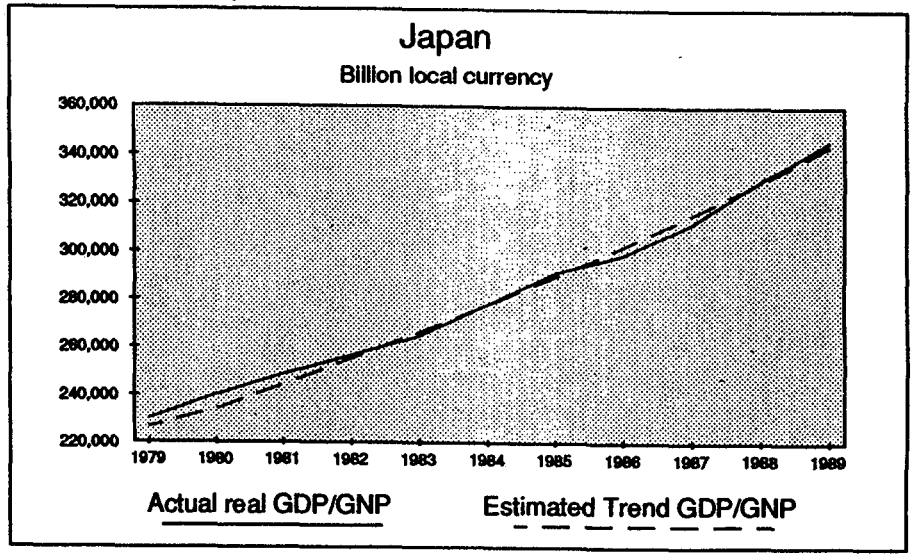
		1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Australia	(A)	3.60	3.76	4.15	4.50	5.24	5.39	5.13	4.83	3.60	3.03	2.54
	(B)	0.58	0.70	0.44	0.20	-1.00	-1.07	-0.78	-0.56	0.85	1.72	2.70
Austria	(A)	2.15	1.40	1.46	2.59	3.37	2.44	3.63	4.47	4.35	3.01	1.98
	(B)	-1.09	0.07	0.09	-0.93	-1.80	-0.67	-2.05	-3.12	-3.38	-1.92	-0.54
Belgium	(A)	8.65	8.59	8.28	7.81	6.82	6.28	6.22	9.64	7.57	6.19	4.76
	(B)	-6.03	-5.60	-5.45	-4.89	-3.81	-3.23	-3.14	-8.23	-6.01	-4.44	-2.29
Denmark	(A)	7.84	8.72	11.34	4.75	3.37	2.08	2.28	0.87	2.39	3.50	3.52
	(B)	-3.39	-3.88	-4.43	-2.90	-1.18	0.64	0.78	2.76	1.15	-0.09	0.15
Finland	(A)	-2.52	-2.04	-1.70	-1.25	-0.65	-1.23	-0.90	-1.71	-1.73	-2.08	-1.78
	(B)	0.36	0.30	0.32	0.31	0.07	1.08	0.50	0.81	0.55	1.43	1.92
Greece	(A)	-1.18	-2.82	0.93	-0.09	1.11	3.72	5.34	2.85	4.37	6.64	8.18
	(B)	-1.38	0.23	-3.77	-2.05	-3.44	-5.44	-6.44	-3.38	-6.02	-8.38	-9.99
Ireland	(A)	-1.98	-1.90	-0.67	2.43	3.53	2.84	5.14	4.62	2.73	-1.13	-3.01
	(B)	0.32	1.29	1.68	-0.94	-2.29	-1.23	-4.06	-3.66	-1.73	1.78	4.03
Netherlands	(A)	2.29	2.79	3.46	4.32	5.02	4.92	4.69	5.09	5.06	3.63	2.78
	(B)	-3.78	-3.93	-4.45	-5.21	-6.02	-5.65	-5.29	-5.78	-6.36	-5.02	-3.99
Norway	(A)	-4.52	-4.93	-4.75	-4.13	-3.74	-4.38	-3.18	-0.78	2.59	3.94	4.17
	(B)	3.09	5.01	5.67	5.26	5.21	6.82	6.11	2.90	-0.34	-1.99	-1.80
Spain	(A)	-0.20	0.39	0.63	0.79	-0.15	-0.72	-0.07	-0.78	-1.06	-1.85	-2.23
	(B)	-1.73	-2.21	-2.69	-2.78	-1.98	-1.47	-2.40	-1.31	-1.07	-0.32	0.35
Sweden	(A)	-0.49	1.89	1.38	0.52	-1.87	-3.08	-3.43	-5.28	-7.40	-7.19	-6.24
	(B)	-4.97	-6.56	-6.22	-5.65	-2.86	-1.07	-0.81	0.90	2.61	2.61	2.18

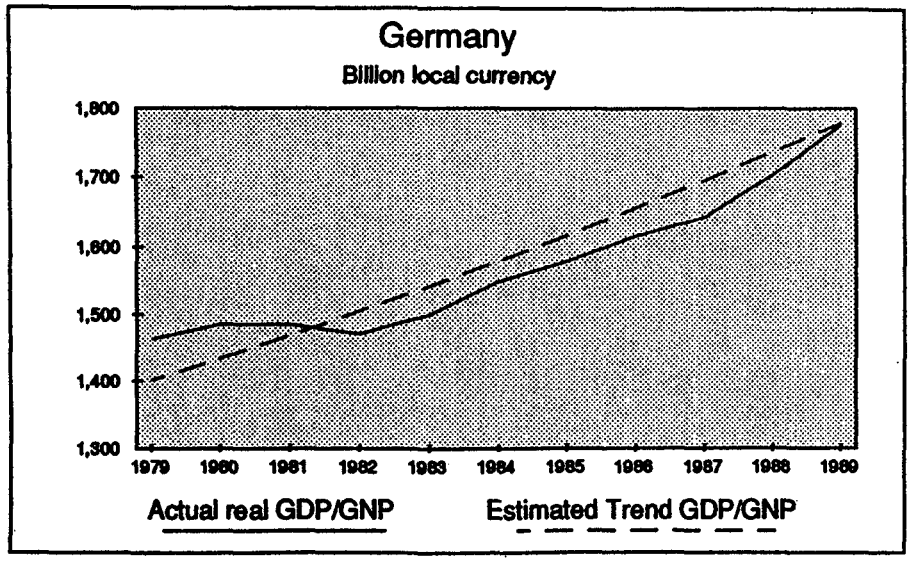
A) Consumption function with forward-looking behaviour. A positive sign indicates stimulus to aggregate demand.
B) Inflation-corrected budget surplus (+) or deficit (-), adjusted for future taxes.

Source: Authors' estimates.

Chart 1
Actual and estimated trend output







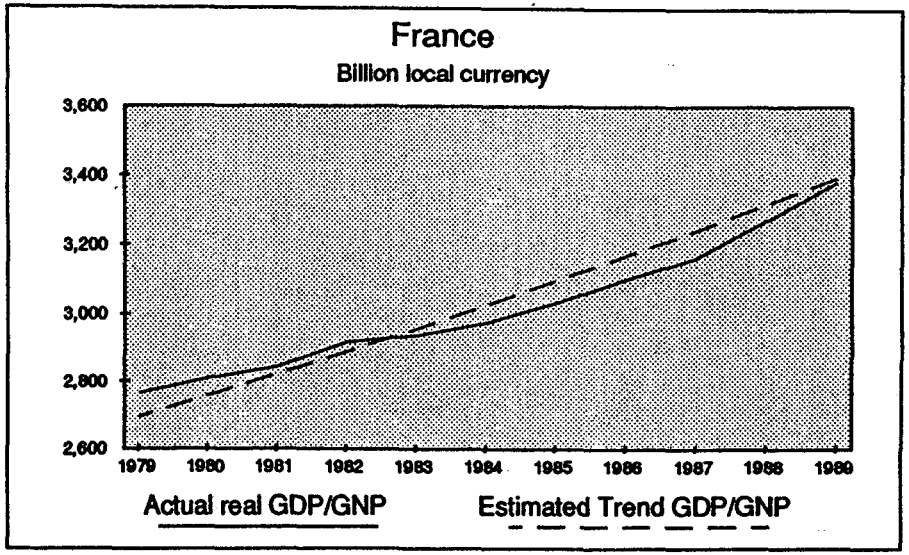
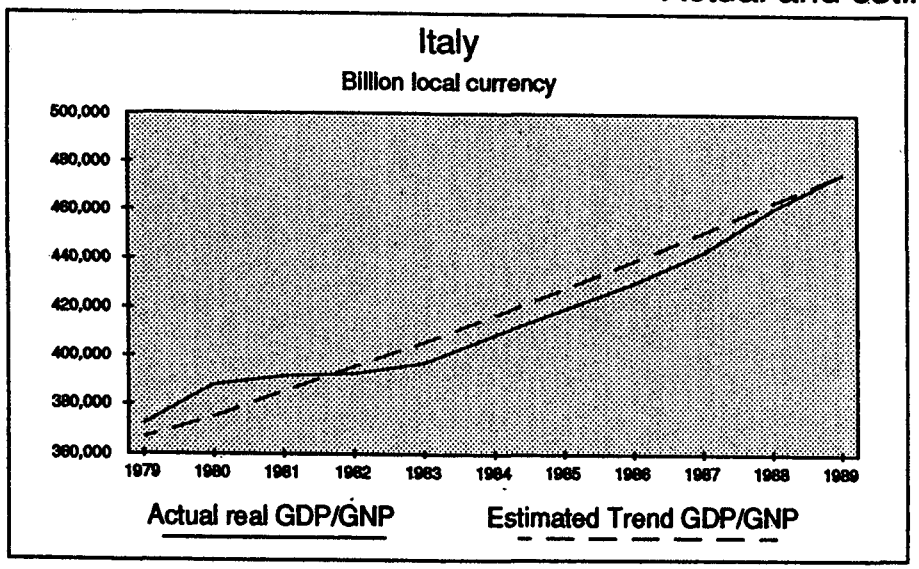
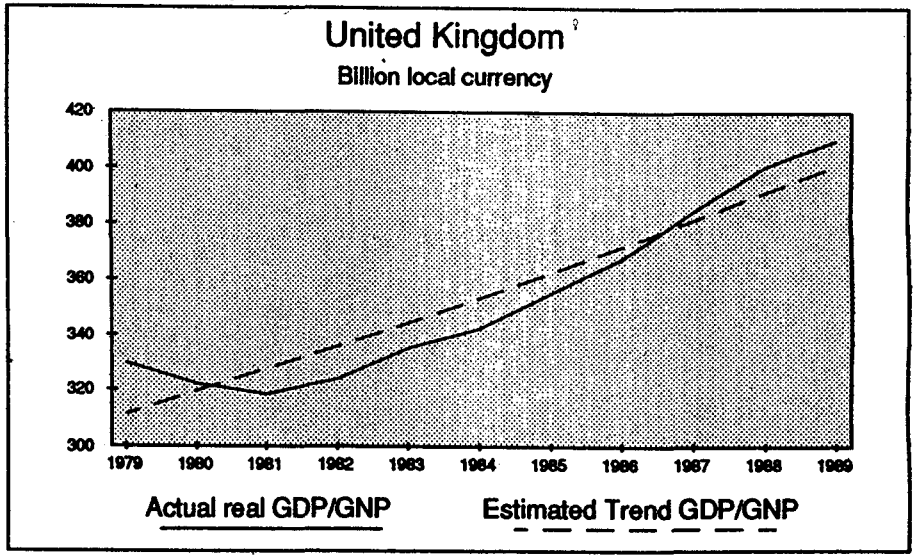


Chart 1
Actual and estimated trend output





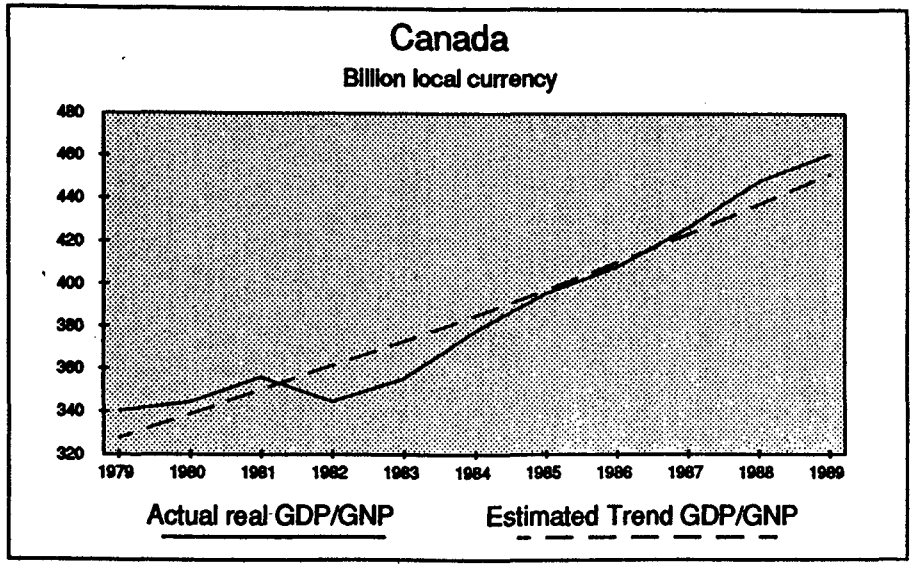
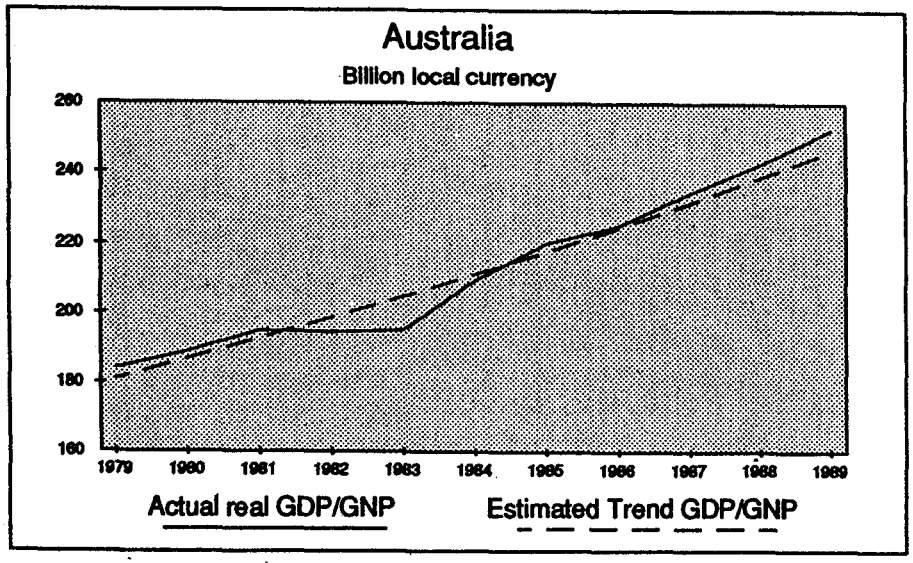
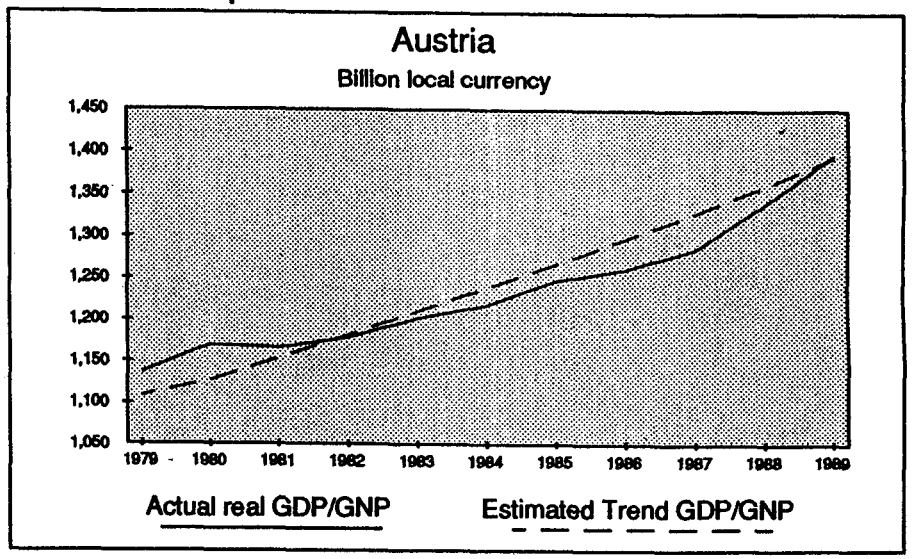
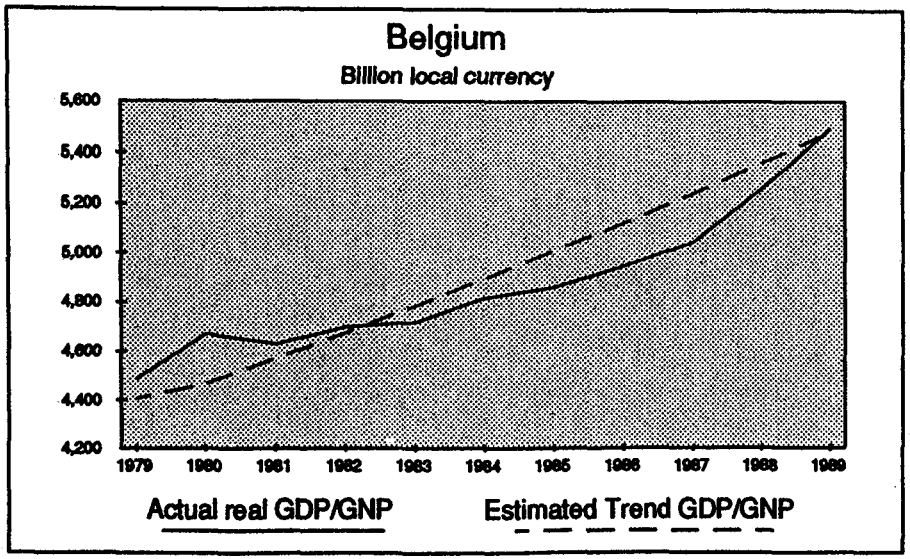


Chart 1
Actual and estimated trend output







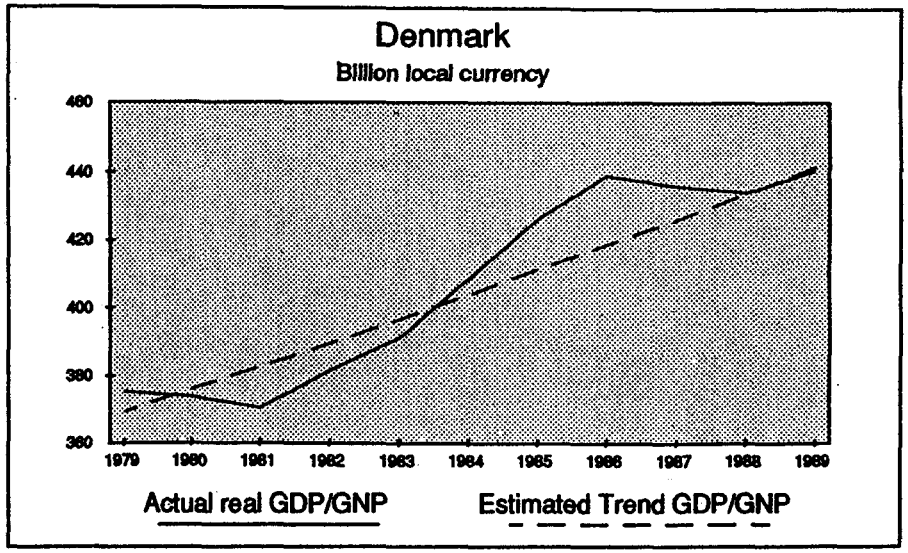
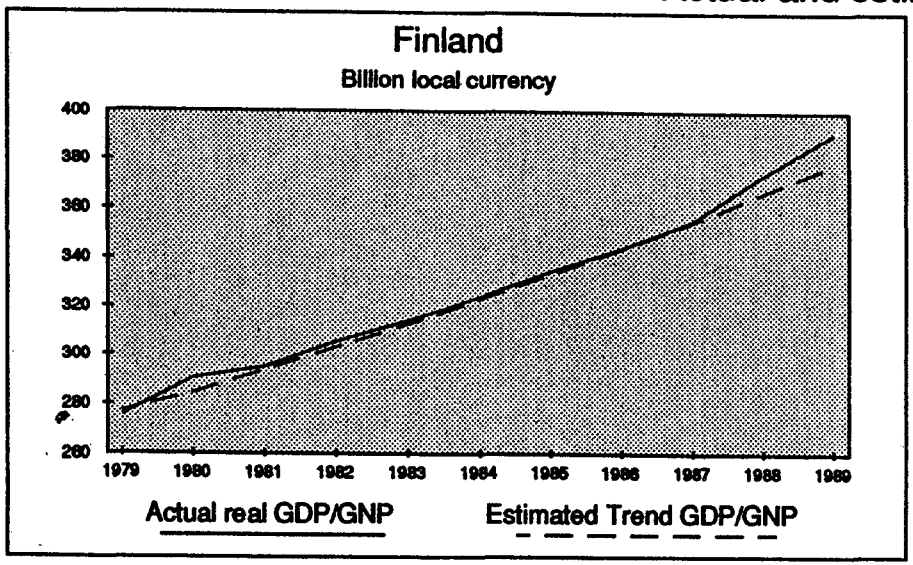
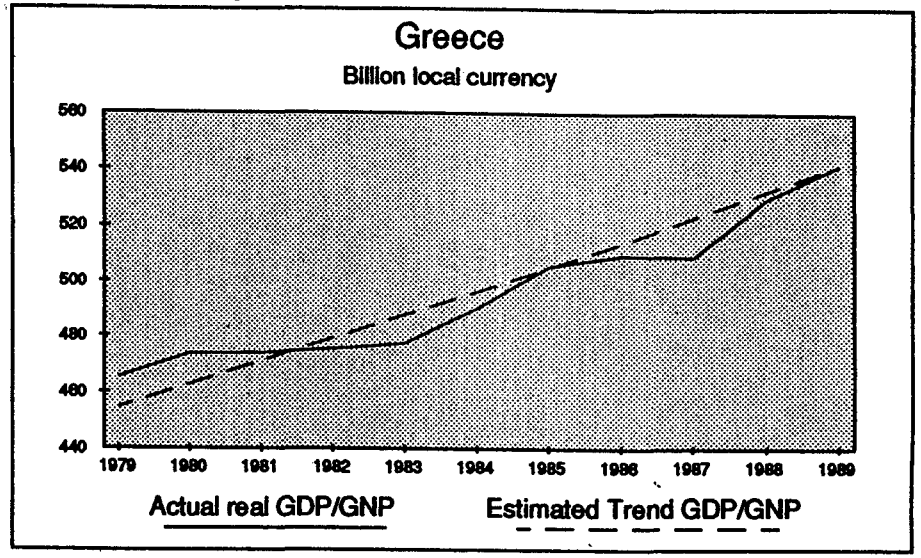
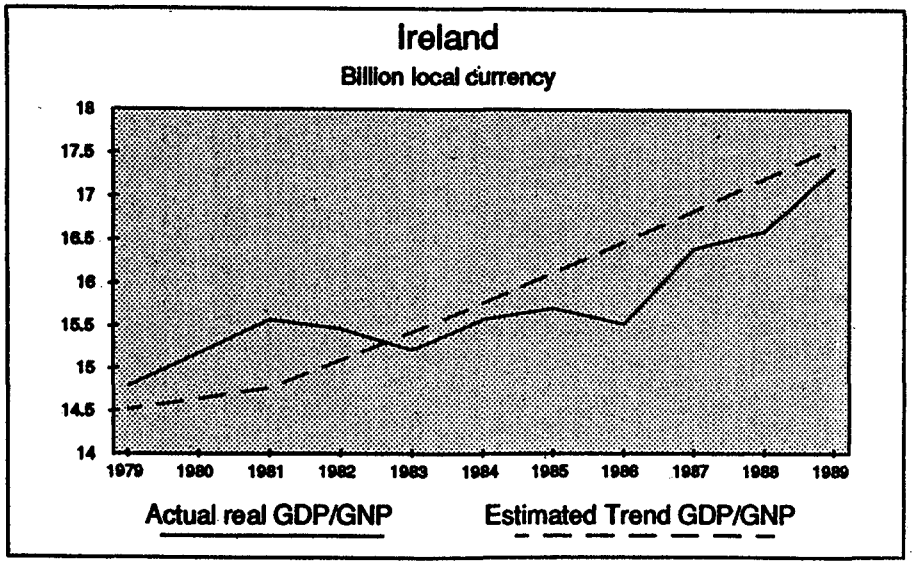


Chart 1
Actual and estimated trend output







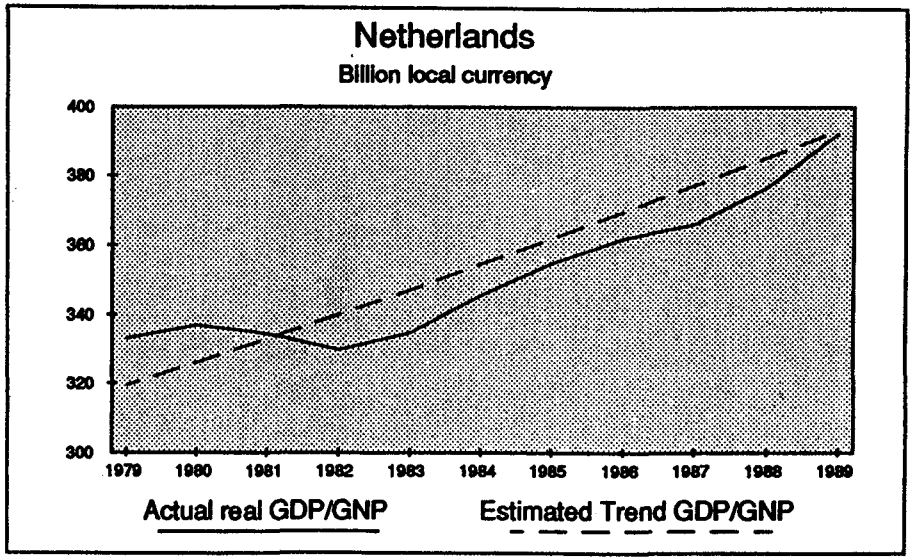
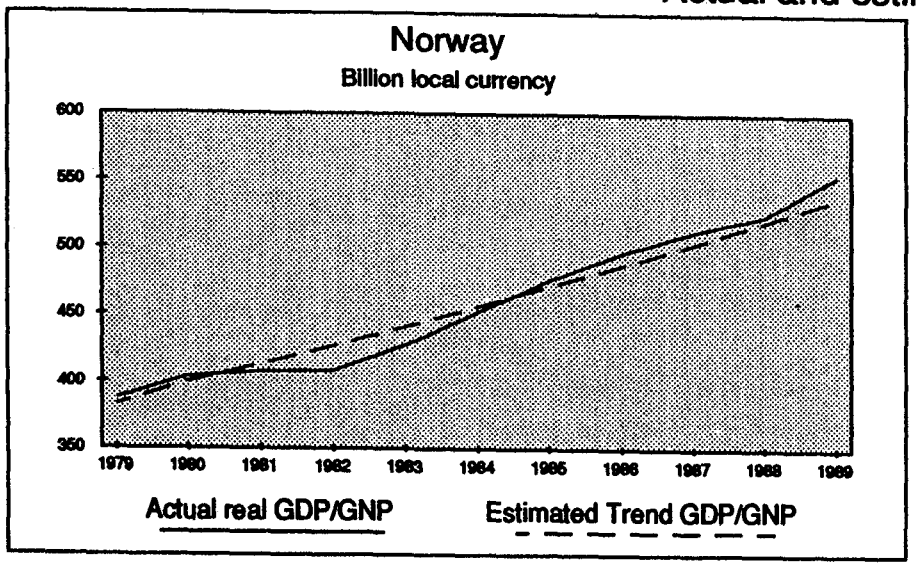
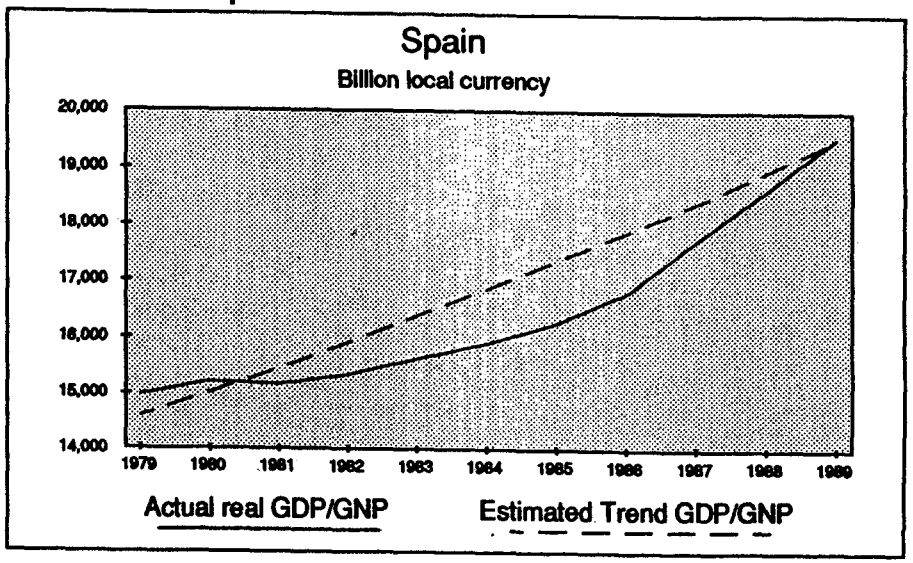


Chart 1
Actual and estimated trend output





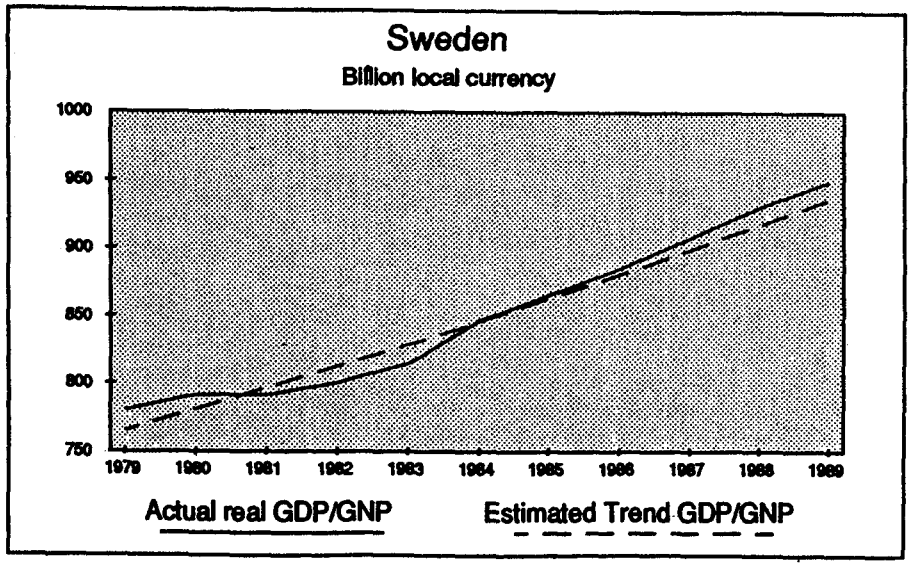
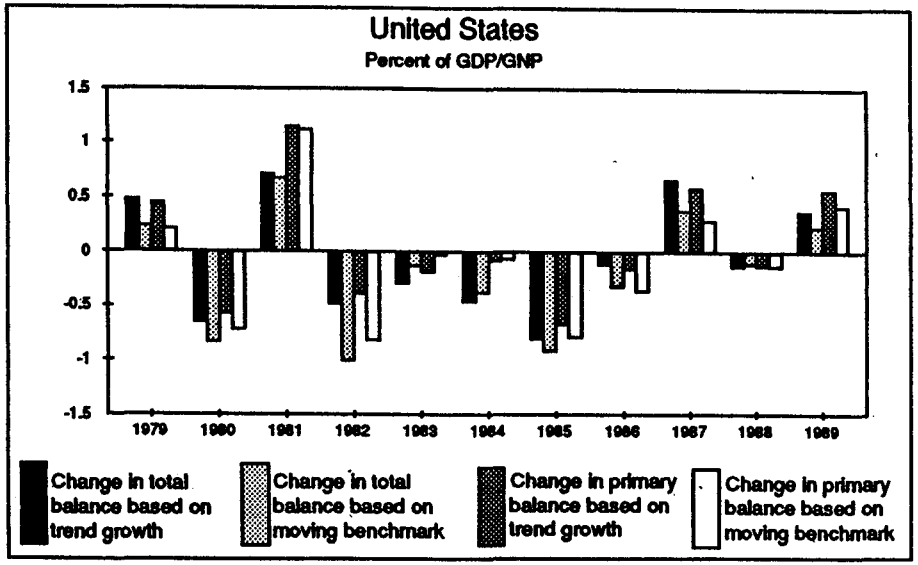
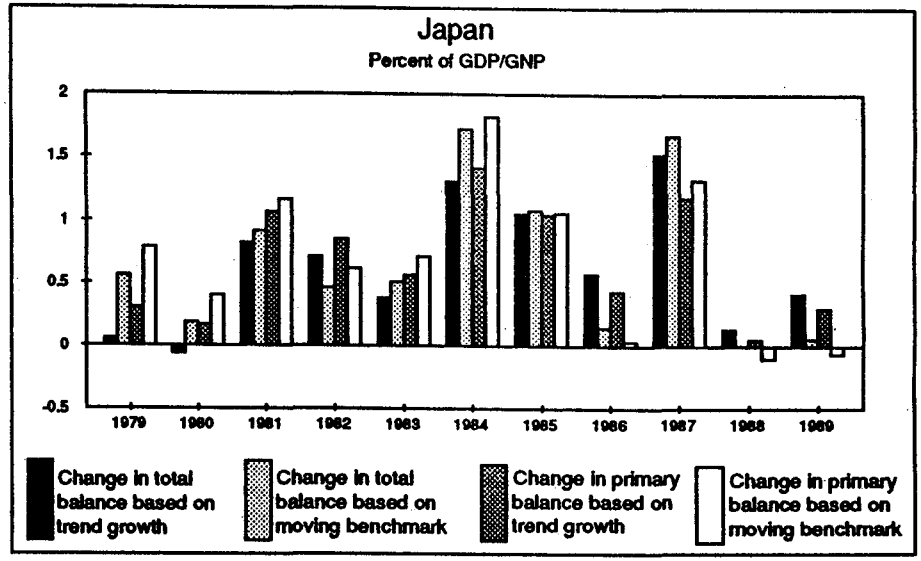
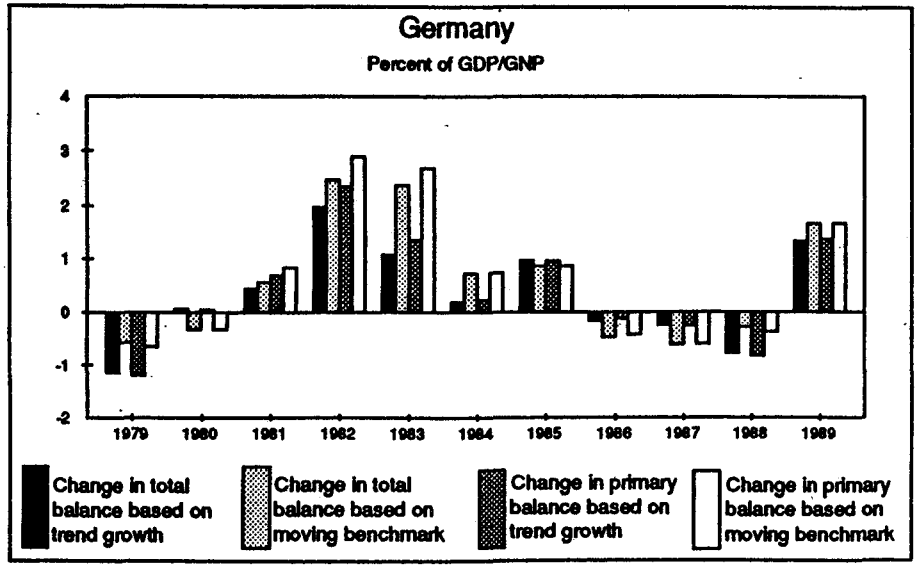


Chart 2

Changes in the cyclically-adjusted budget balance







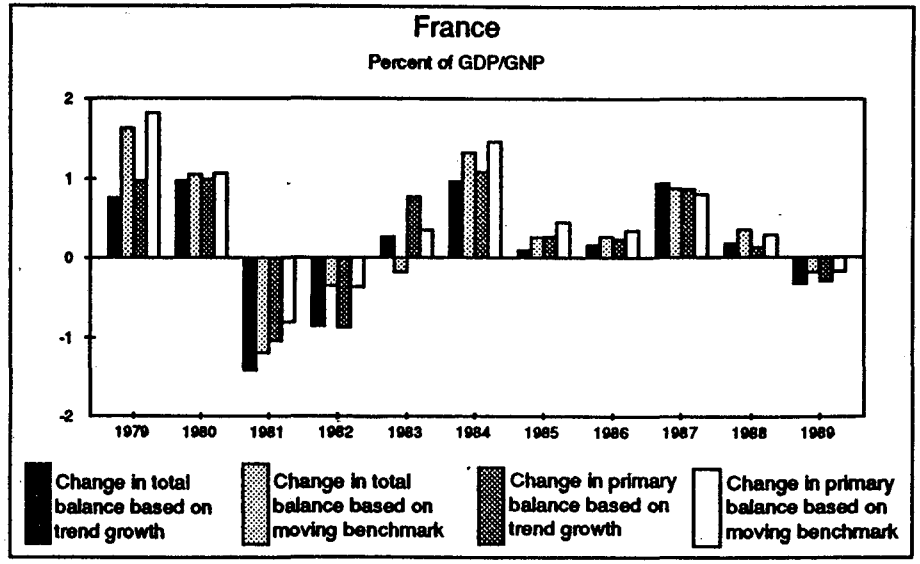


Chart 2

Changes in the cyclically-adjusted budget balance

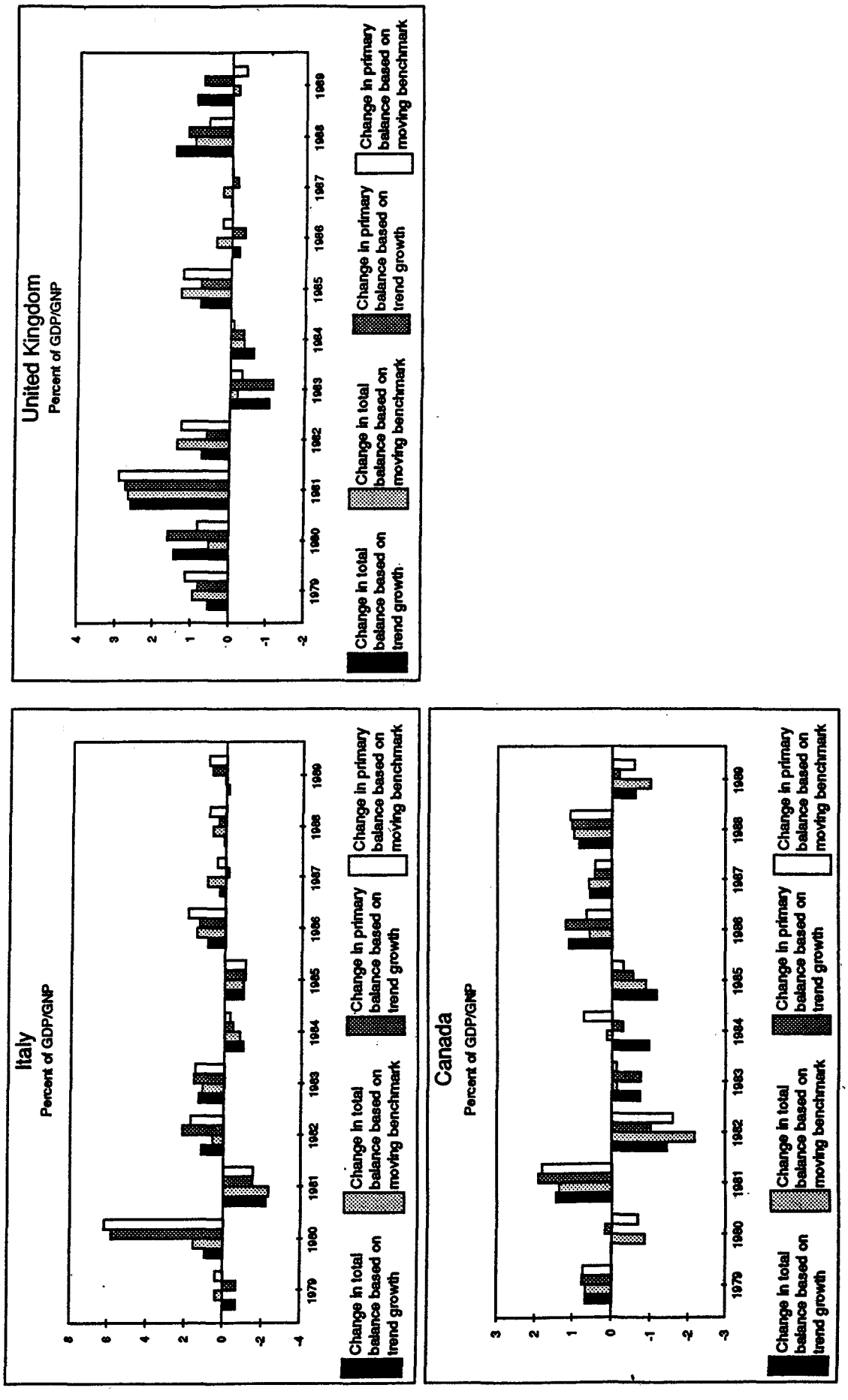


Chart 2

Changes in the cyclically-adjusted budget balance

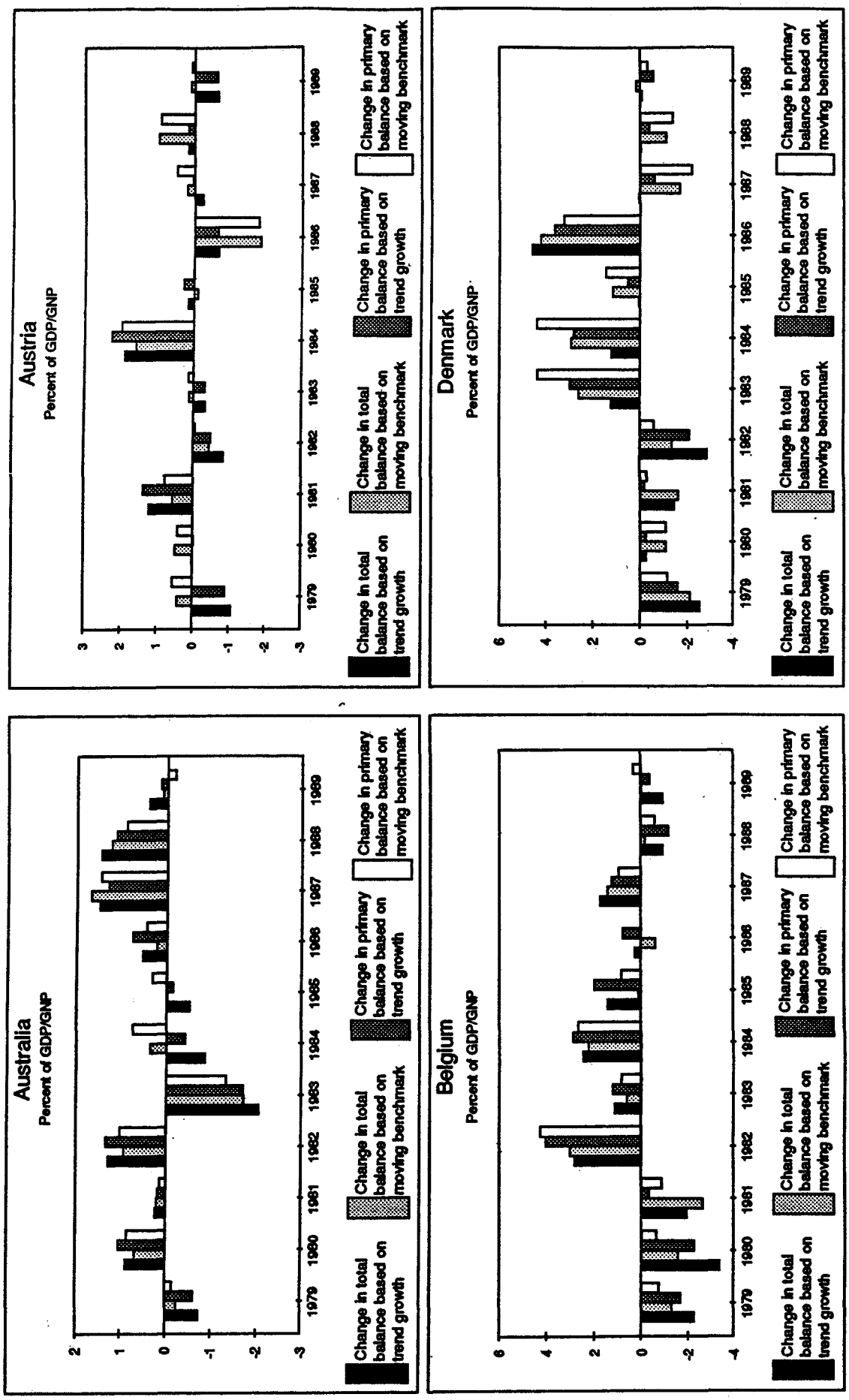
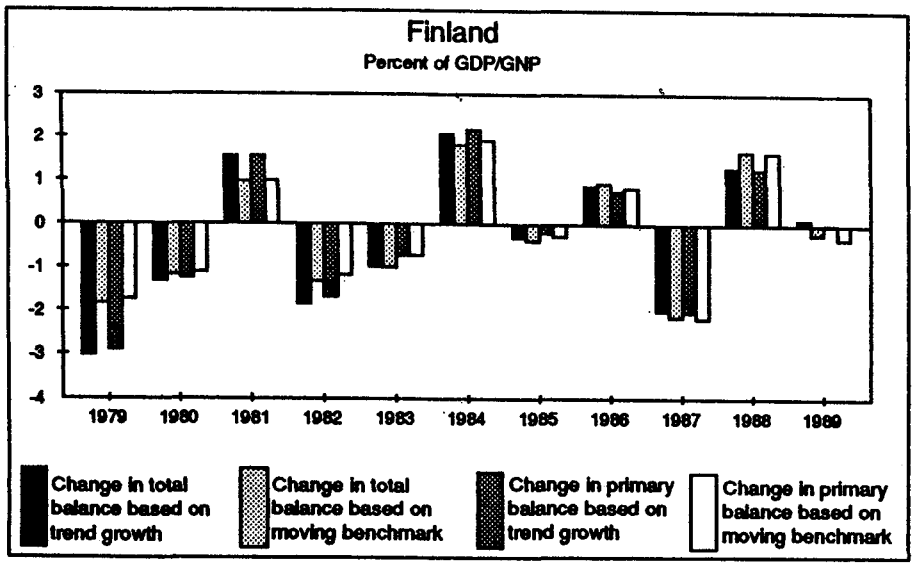
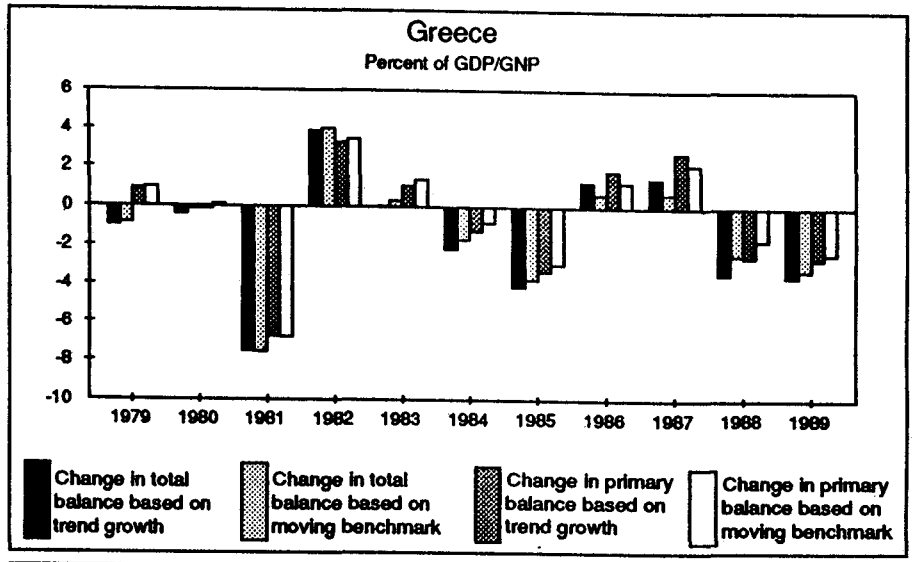
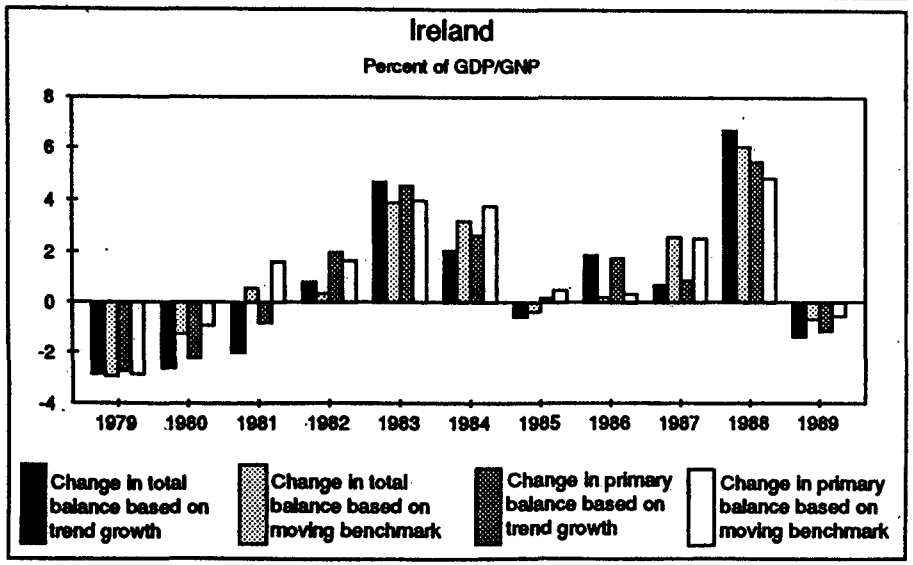


Chart 2

Changes in the cyclically-adjusted budget balance







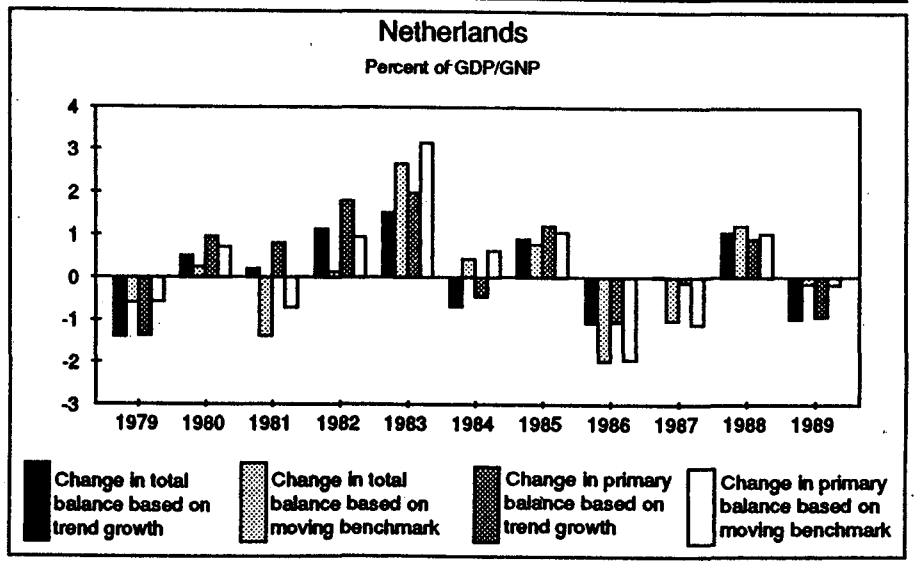
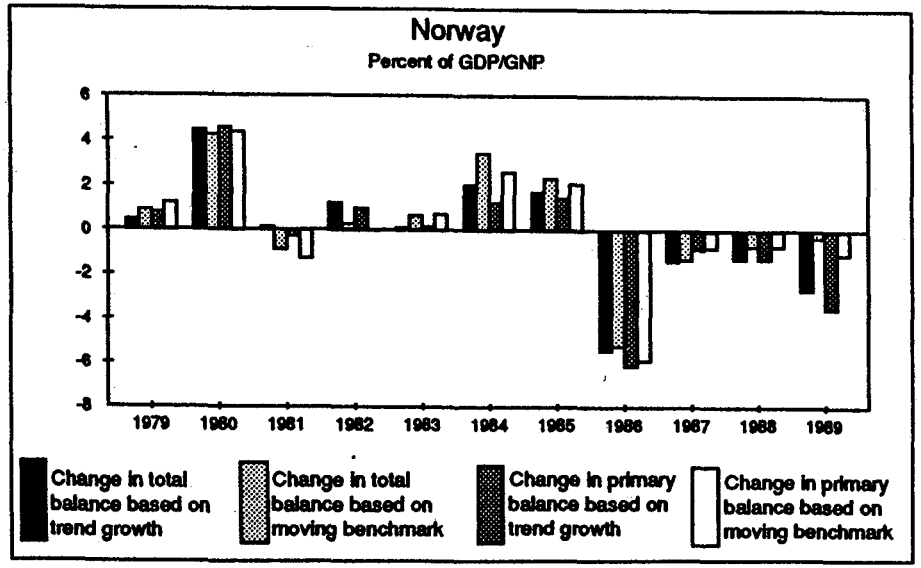
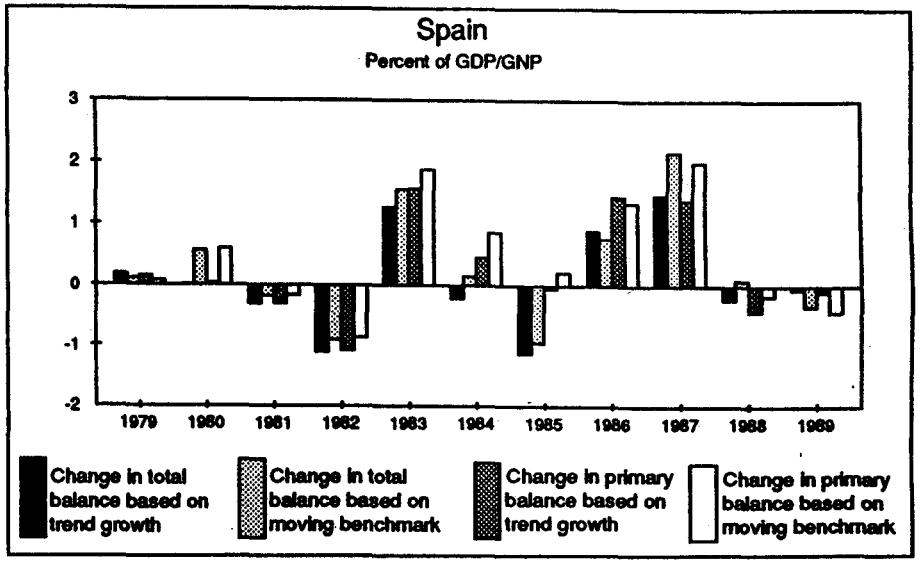


Chart 2

Changes in the cyclically-adjusted budget balance





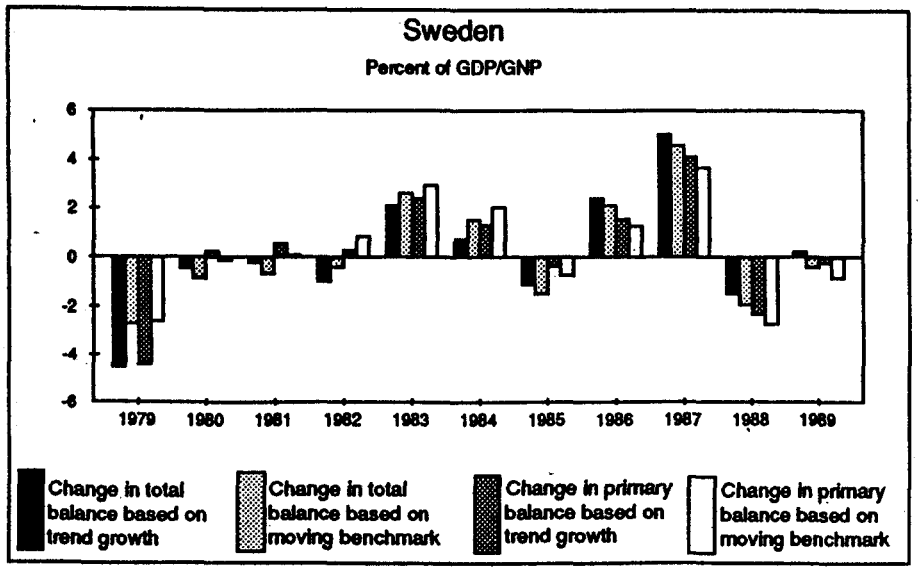
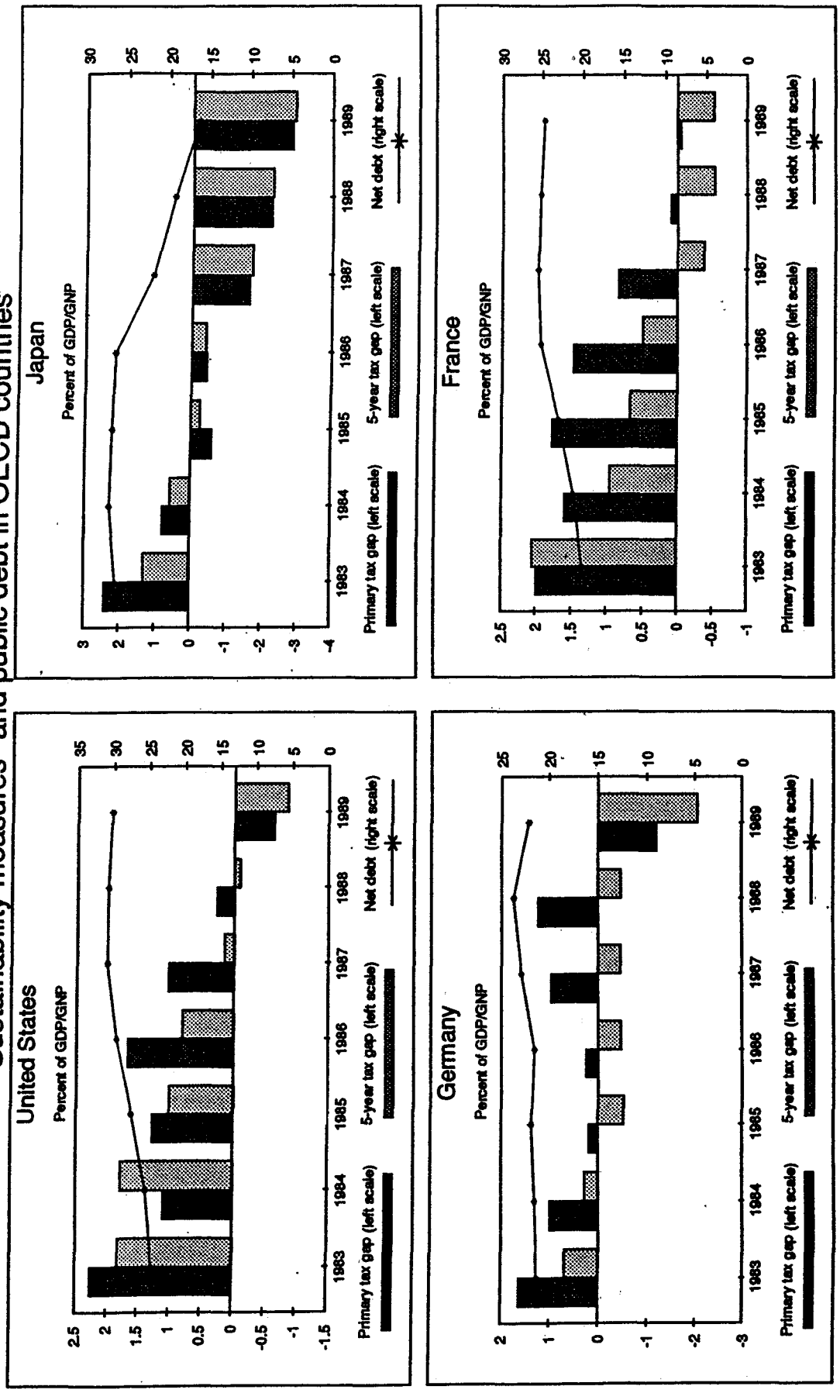


Chart 3

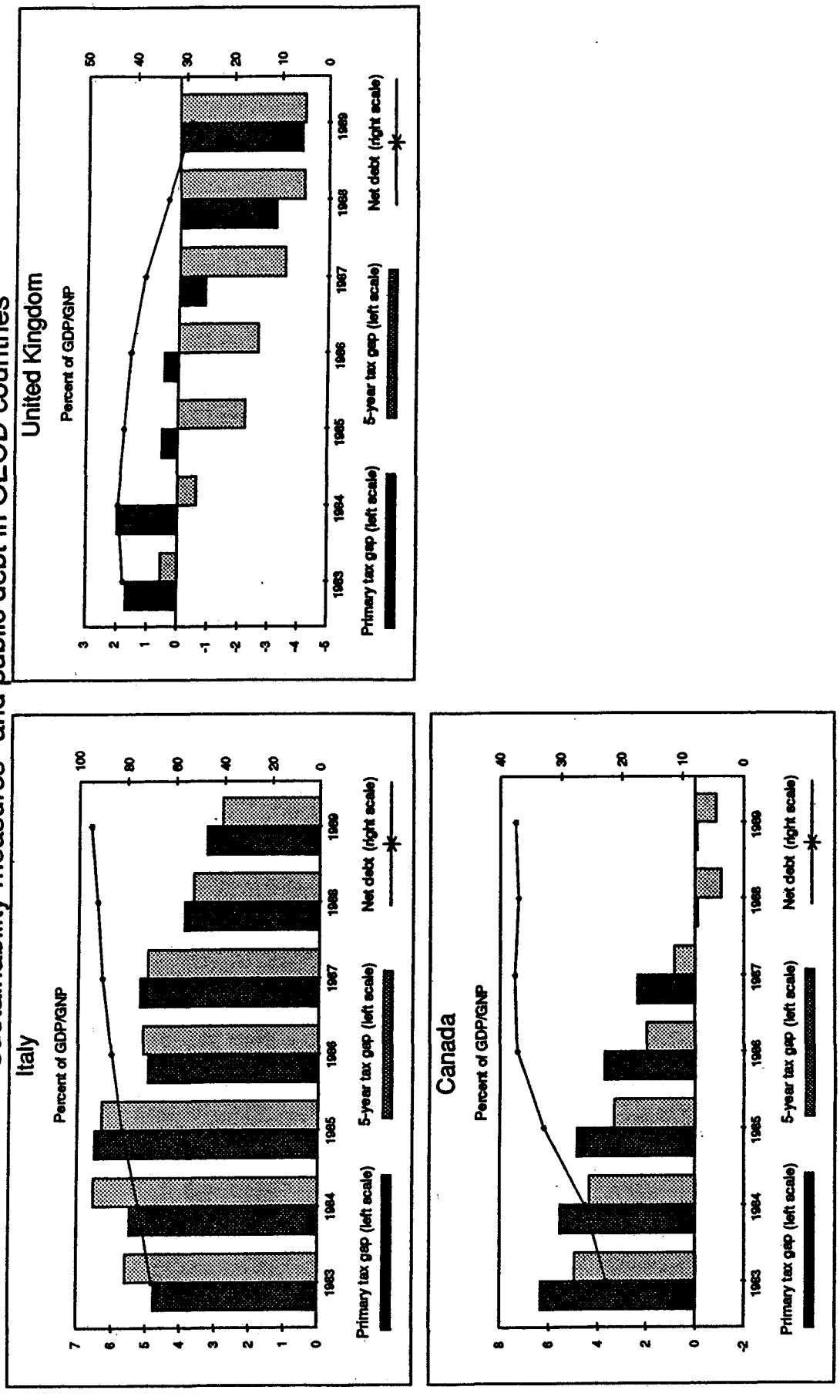
Sustainability measures* and public debt in OECD countries



* For method of calculation, see text.

Chart 3

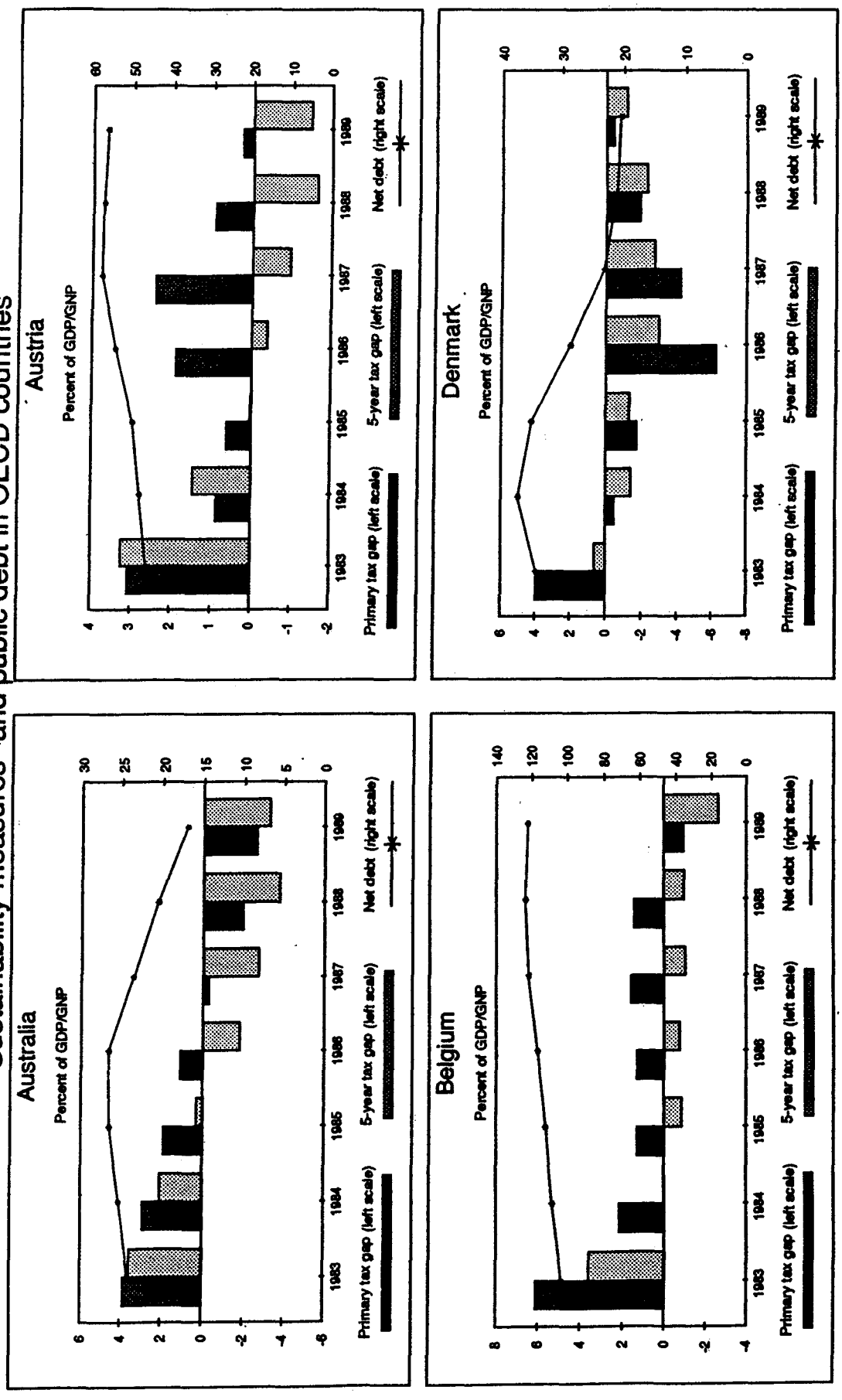
Sustainability measures* and public debt in OECD countries



* For method of calculation, see text.

Chart 3

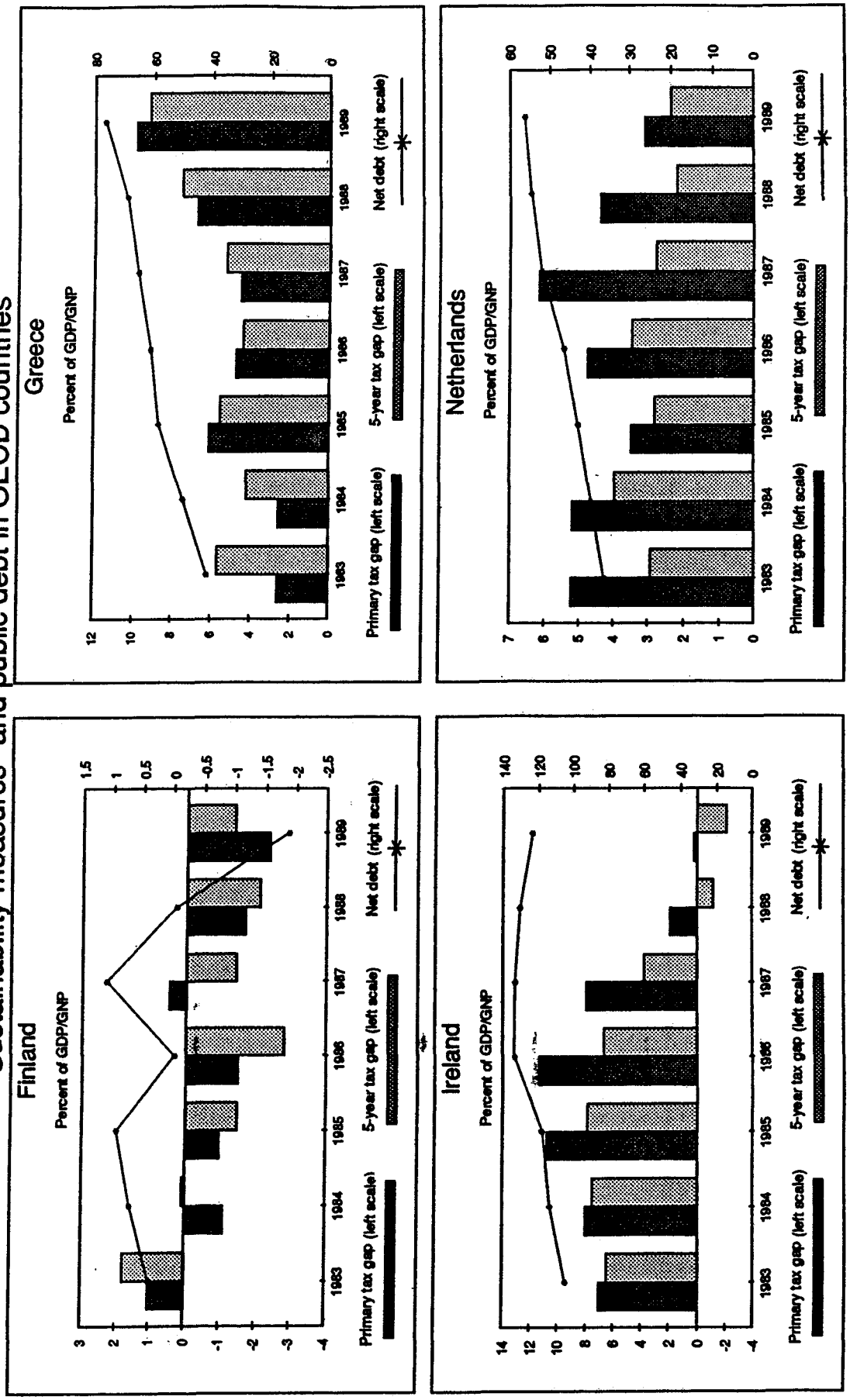
Sustainability measures* and public debt in OECD countries



* For method of calculation, see text.

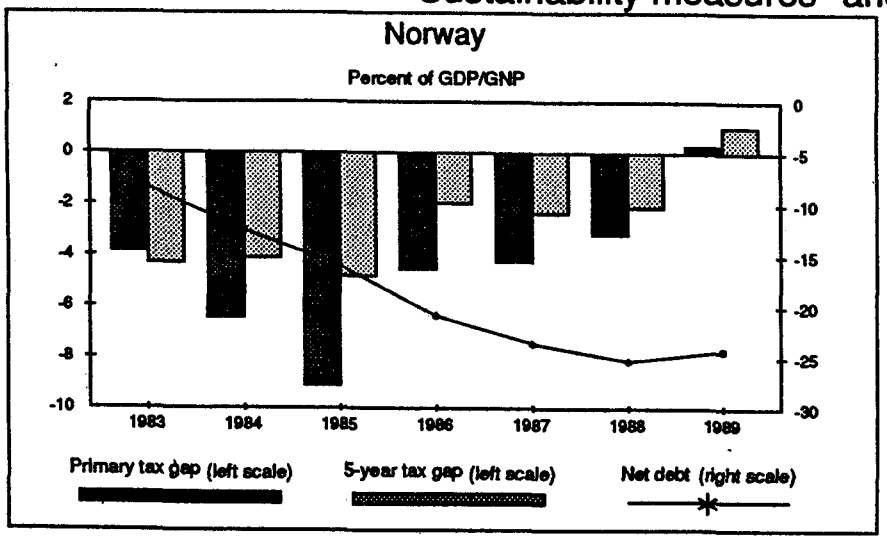
Chart 3

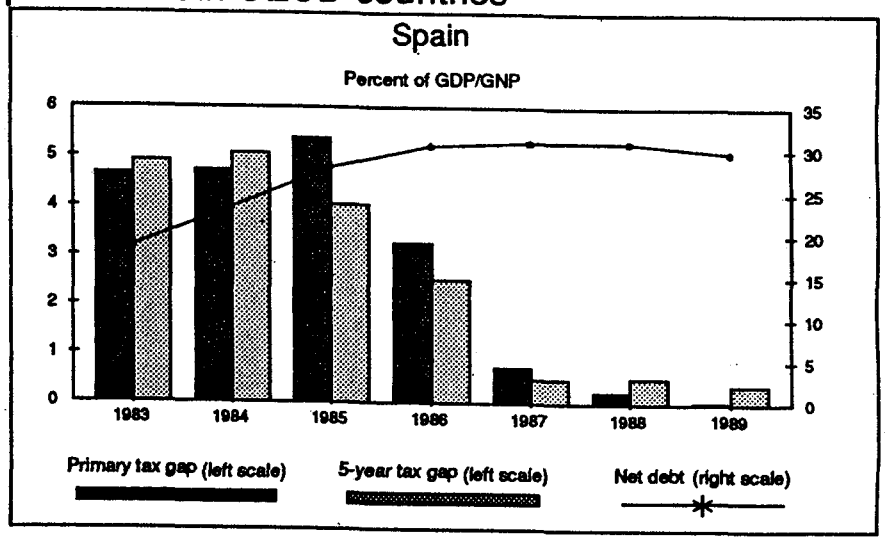
Sustainability measures* and public debt in OECD countries

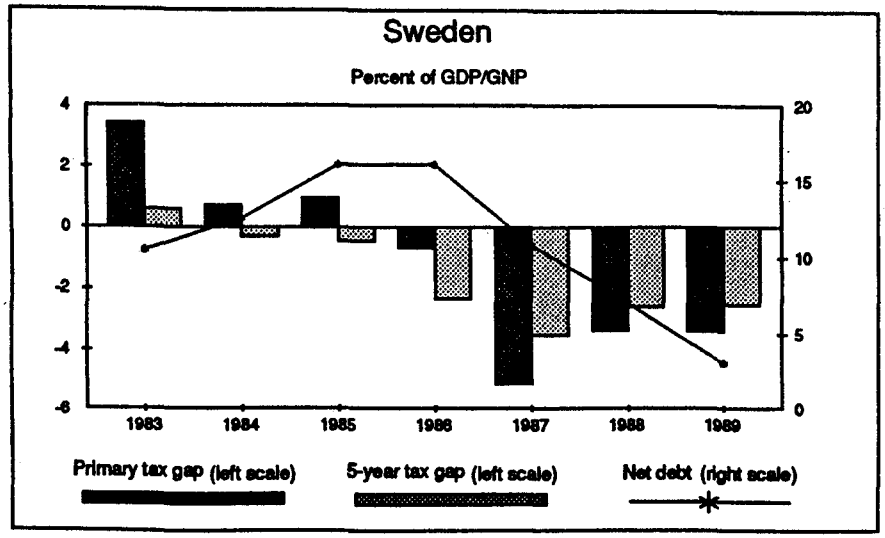


* For method of calculation, see text.

Chart 3
Sustainability measures* and public debt in OECD countries

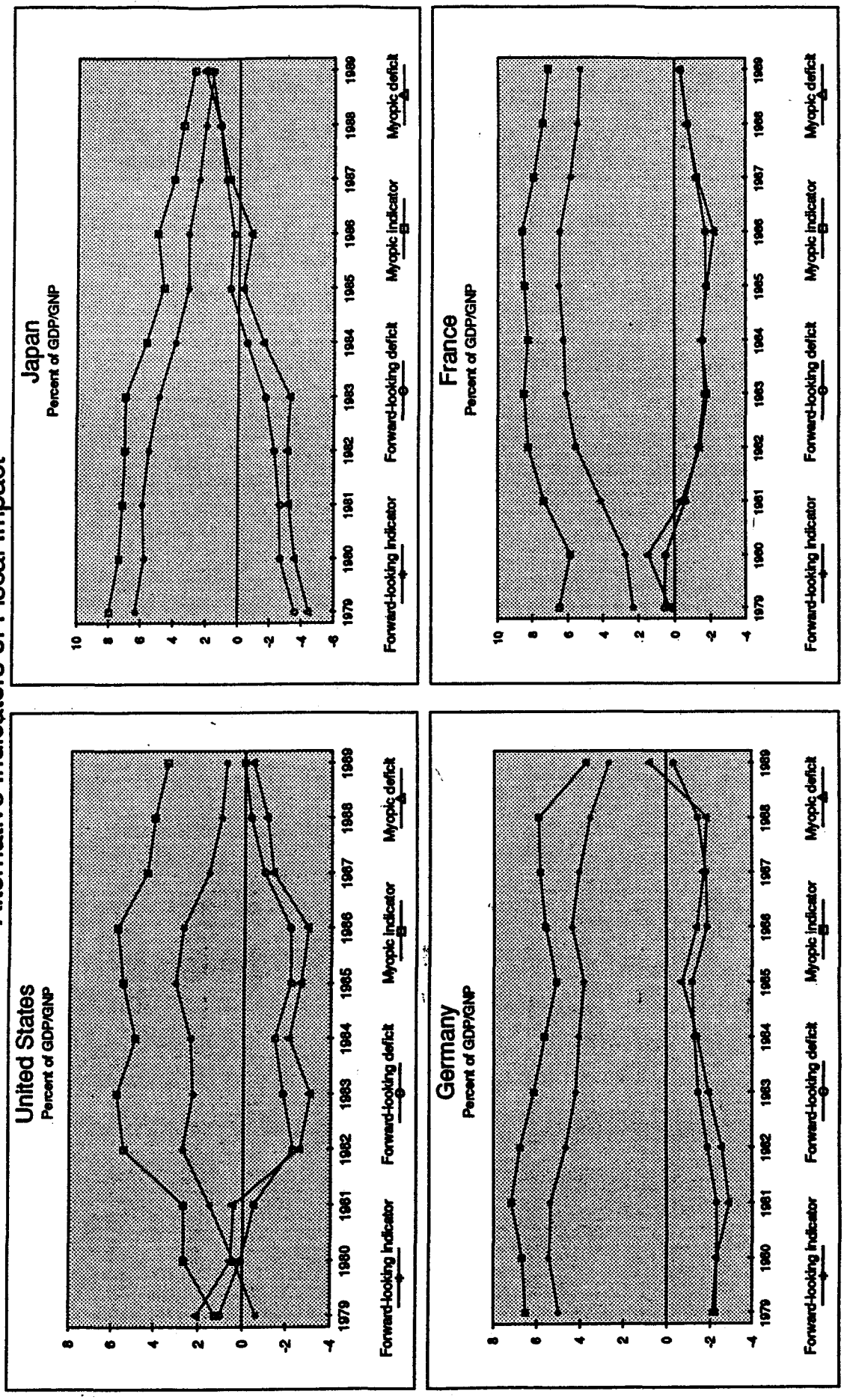






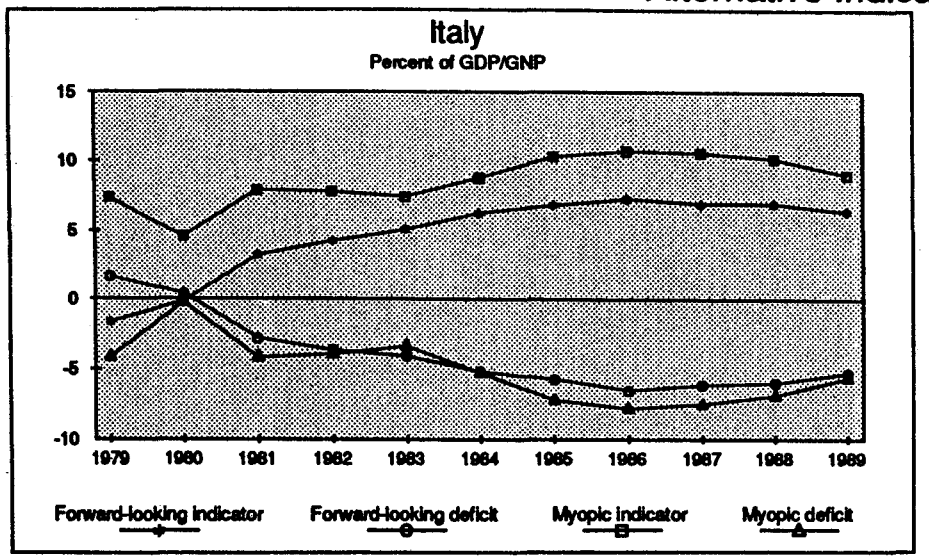
* For method of calculation, see text.

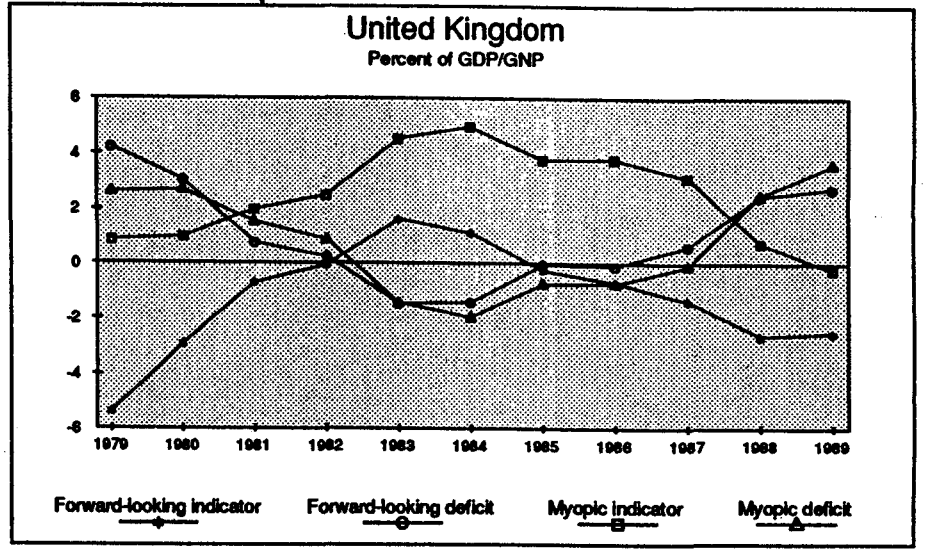
Chart 4
Alternative Indicators of Fiscal Impact *



* For definitions, see text.

Chart 4
Alternative Indicators of Fiscal Impact *





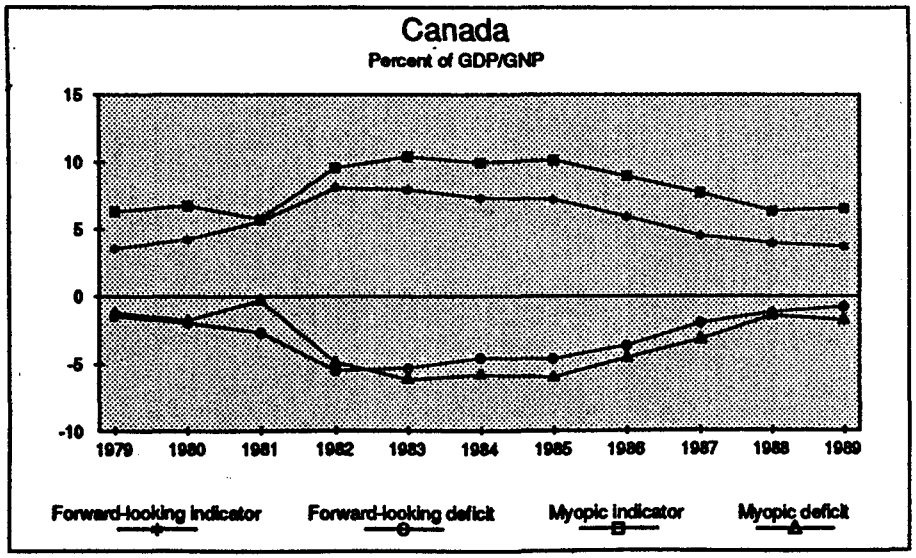


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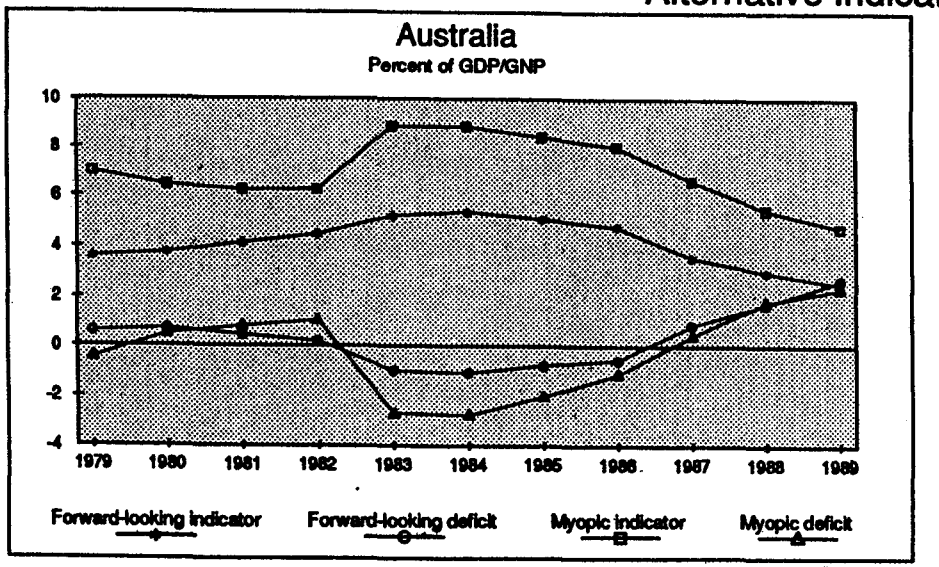
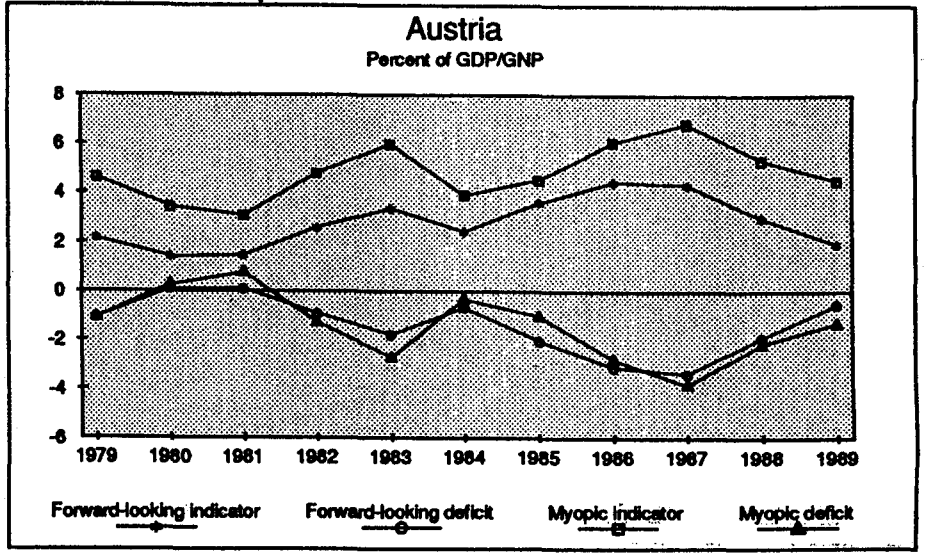
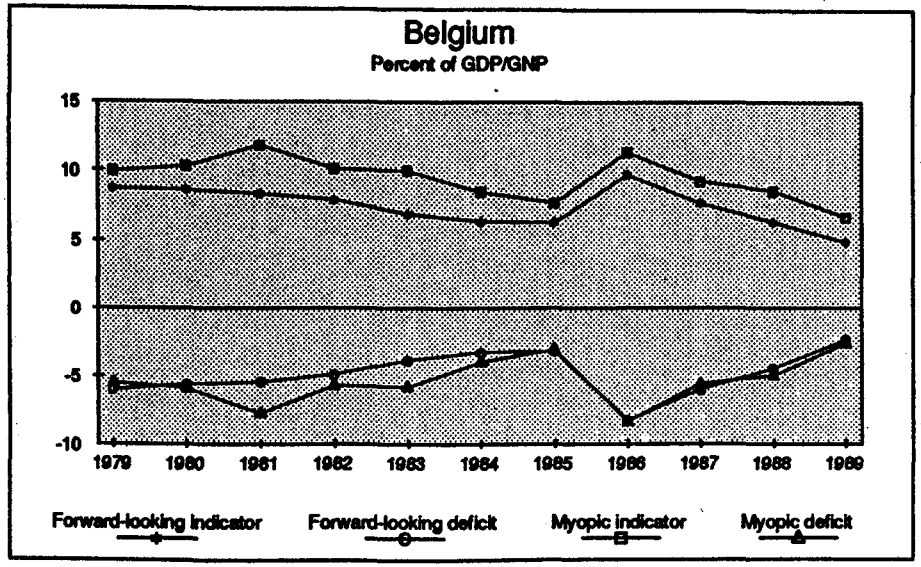
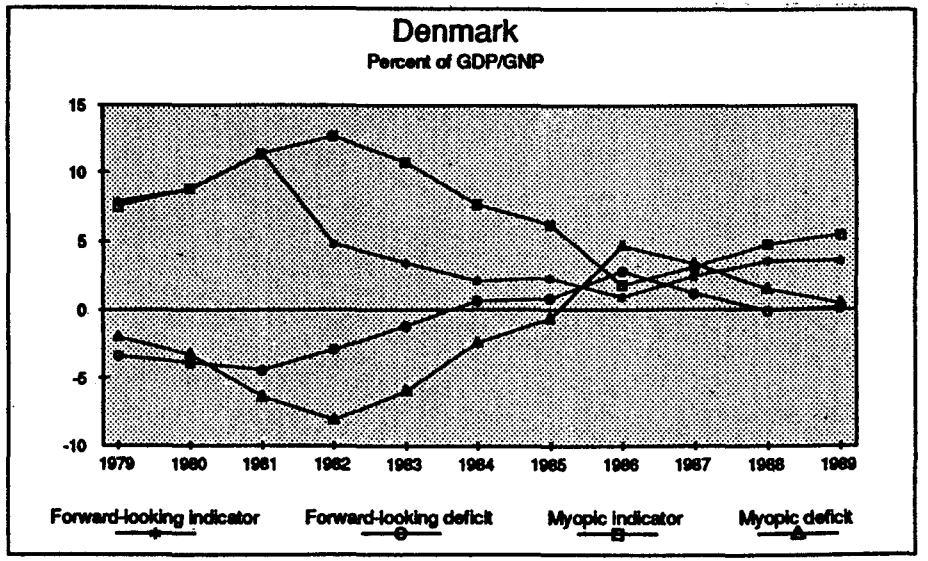
Chart 4
Alternative Indicators of Fiscal Impact *









* For definitions, see text.

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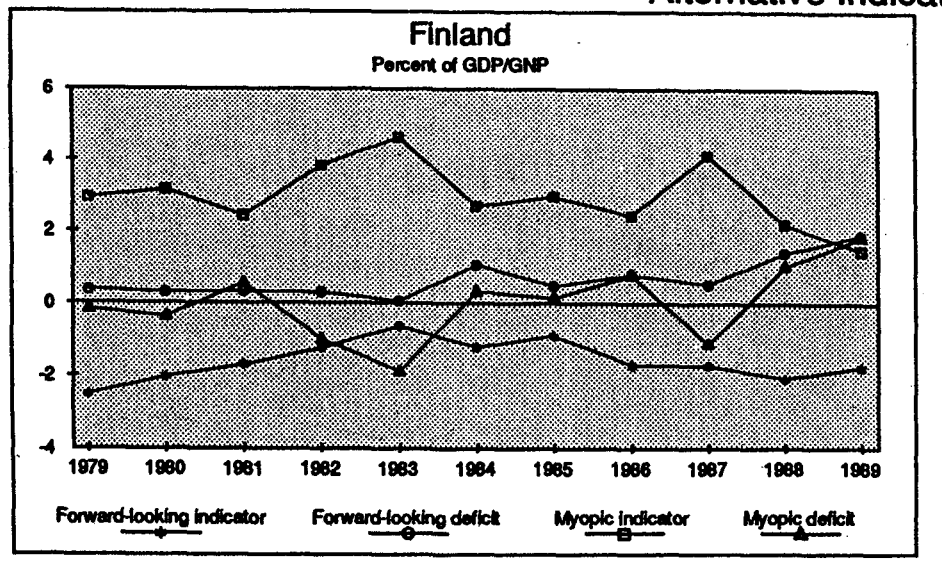
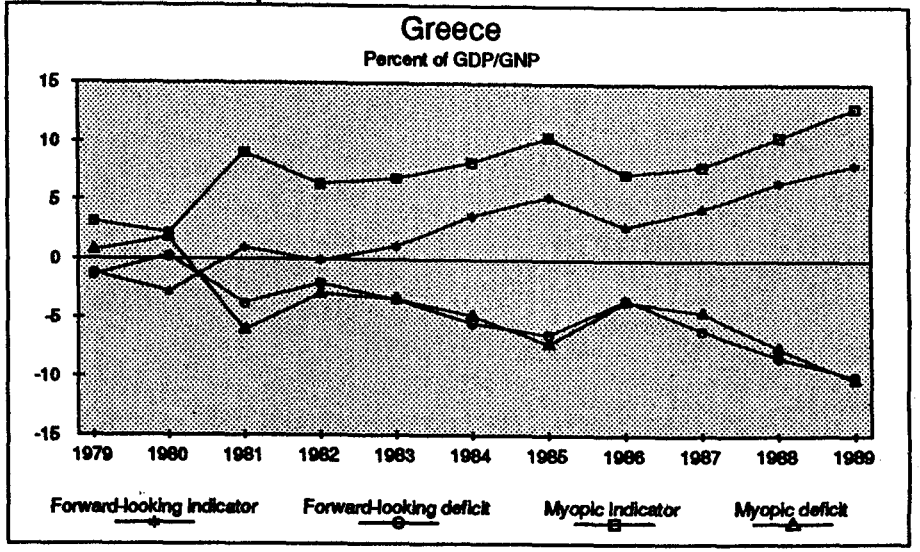
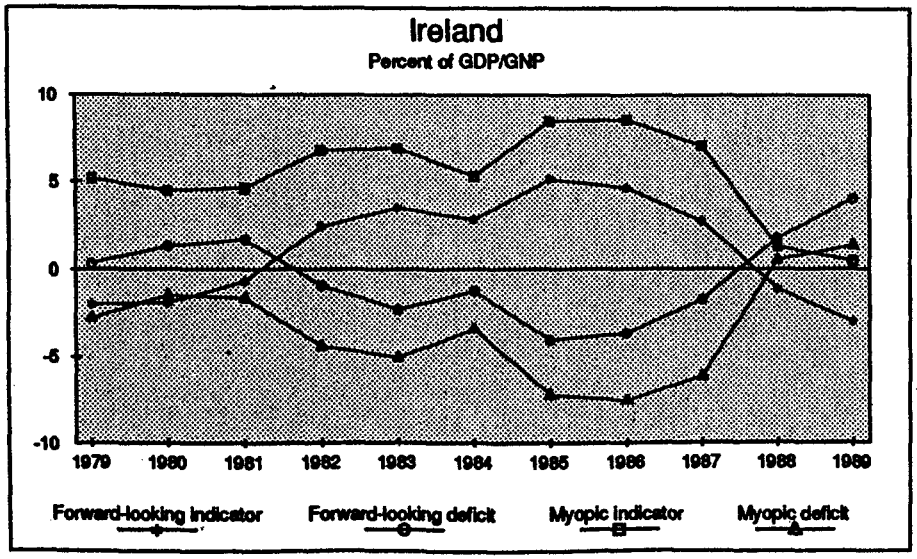
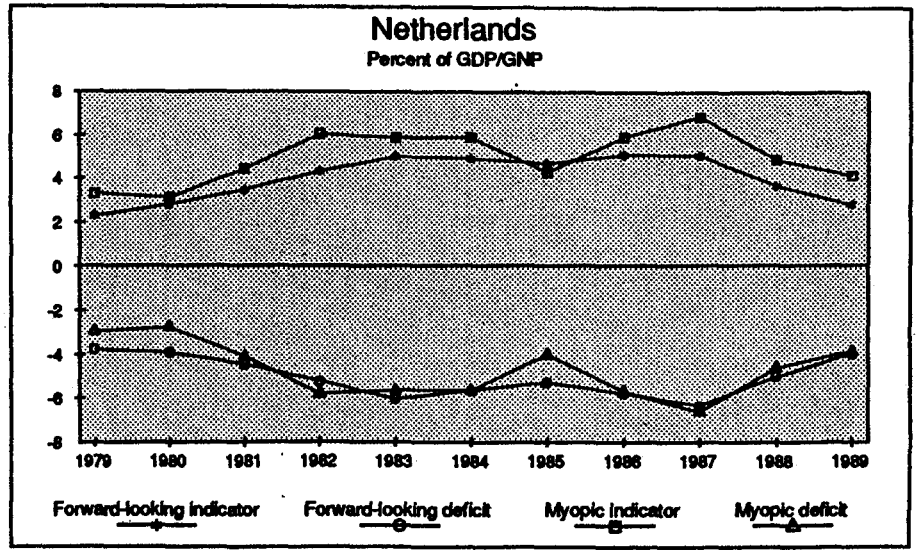
Alternative Indicators of Fiscal Impact *



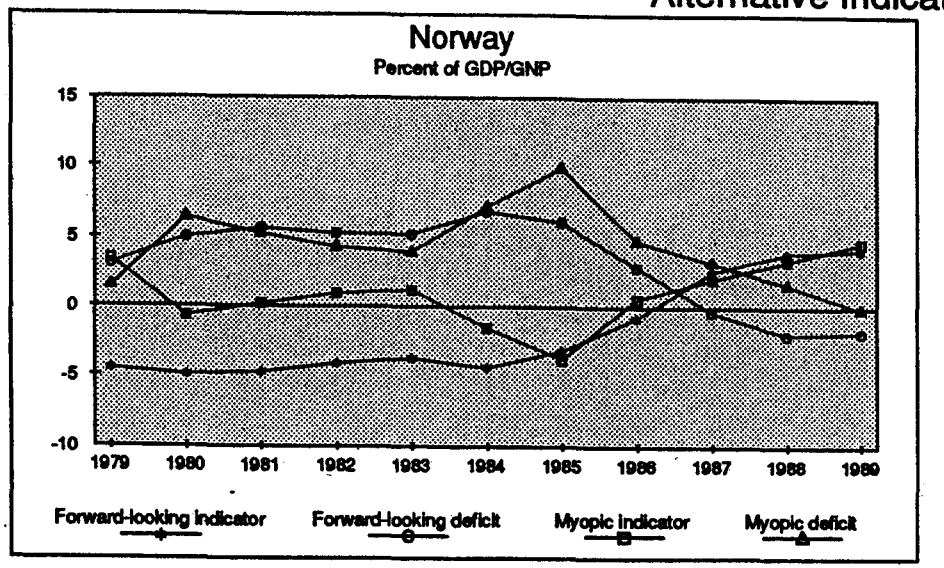


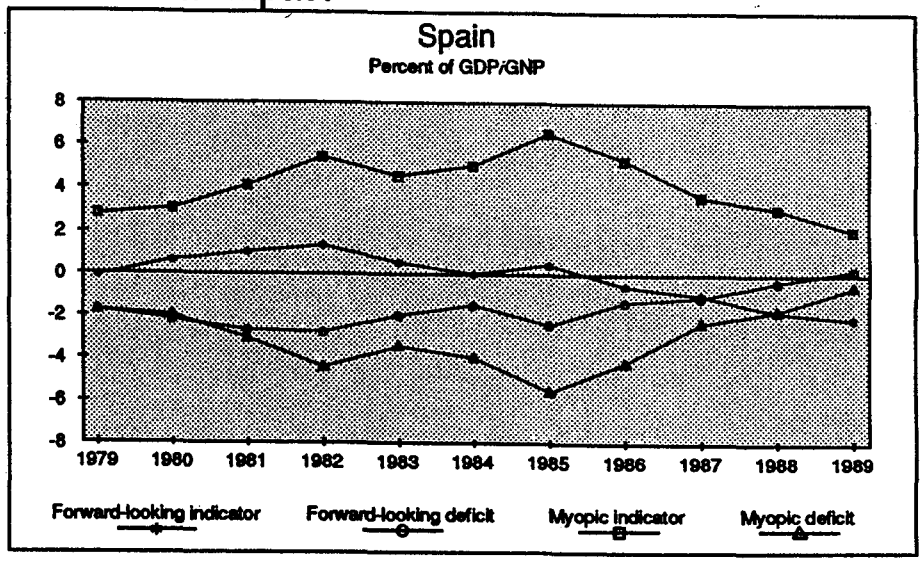


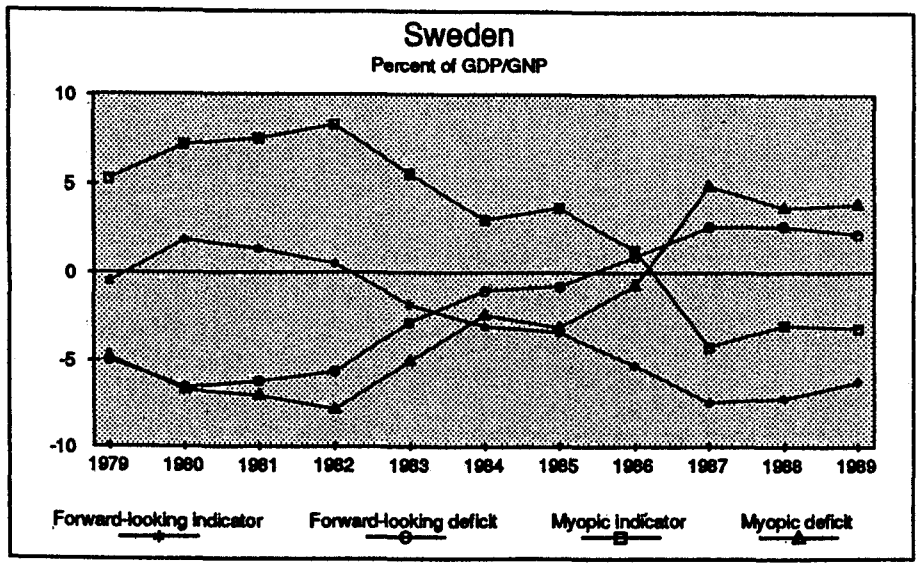


* For definitions, see text.

Chart 4
Alternative Indicators of Fiscal Impact *







* For definitions, see text.

METHODOLOGICAL ANNEX

The paragraphs below describe in greater detail the methodology followed for constructing the indicators presented in the text to assess: i) the discretionary changes in government budgets; ii) the sustainability of fiscal policy and iii) its impact on aggregate demand.

I. INDICATORS OF DISCRETIONARY ACTION

The discretionary component of the change in the budget balance is derived residually by correcting the actual balance for the effects of the changes in economic activity. For this purpose, two alternative macroeconomic scenarios are used as a benchmark, namely the level of output which would be observed had output grown at a constant rate over the cycle and the level which would be observed had the rate of unemployment remained unchanged from the previous year.

A. The construction of the reference scenarios

The level of trend output (TY) is derived from the identification of business cycles and the estimation of a constant rate of trend growth during each cycle. Business cycles are assumed here to start on the first year following a peak and to end in the year of the next observed peak. Peaks correspond to years in which the annual rate of growth of output displays a local minimum (see Table A.1). For the most recent period, the cycle extends to 1994 by making use of medium-term projections of real GNP/GDP prepared by the OECD for internal use. These are scenarios which assume unchanged policies other than those adopted at the time of the simulation. For purposes of this paper, policies in place as of late 1989 have been incorporated in the analysis.

Estimation of the level of trend output is based on the following semi-log model:

$$\ln(y_{js}) = \alpha_{0j} + \sum_{i=1}^{n} \alpha_{ij} T_{ij} + e_{js} \qquad \text{(1A)}$$

where $\ln(y_{js})$ is the natural logarithm of country j's real GNP/GNP in year s, α_{ij} the ith trend growth coefficient, T_{ij} is the corresponding segment of the broken time trend and e_{js} is the error term. By constraining the trend segments to be linked together in the estimation process, the procedure allows a direct estimation of the level of normal output capturing medium-term shifts in the growth of output. (See regression results in Table A.2 as well as Chart A.1).

However, as argued in Section II of the main text, the estimation of a mid-cycle level of output poses important conceptual difficulties, mainly related to the nature of output fluctuations. The recent literature on this issue has raised doubts about the basic assumption

underlying the business cycle hypothesis and has found little evidence that output follows a deterministic trend.[31] Hence, a second and alternative output benchmark (referred to in the main text as "Moving Benchmark", or MB) has been constructed by calculating what real output would have been in each year had the rate of unemployment been equal to the one prevailing in the previous year. The adjustment of the level of output has been made on the basis of the "Okun coefficient", which provides for each country a measure of the relationship between changes in the rate of unemployment and the percentage change of output.

The estimation of "Okun coefficients" has been carried out for 19 countries using annual data for the period 1961-1988. The formulation below, on which the empirical results presented in Table A.3 are based, links output changes to changes in the rate of unemployment (U) allowing for differential trend growth of output (α_i) during the 1961-74 and the 1974-88 periods:

$$\Delta y_s/y_s = \alpha_i + \beta (U_{s-1} - U_s) + e_s \qquad (2A)$$

The estimated "Okun coefficients" (β) all have the anticipated sign and are significantly different from zero at the usual 5 per cent confidence level, with the exception of Greece for which the estimate of 1.2 appears relatively imprecise. Estimates of ß vary widely, ranging from a low of 0.9 in Belgium, where the unemployment rate has risen dramatically in the 1980s, to highs of 4.9 and 9.5 in Japan and Switzerland respectively where institutional arrangements make the unemployment less sensitive to output fluctuations than elsewhere. Chow tests were performed to determine whether the "Okun coefficients" might have shifted over time. Results of such tests gave support to the hypothesis of temporal stability of structural coefficients between the pre-1974 and the post 1974 periods. For no country can the hypothesis that β is the same in both subperiods be rejected.

B. The adjustment of the budget balance to the reference scenarios

In order to take account of the effects of a change in the macroeconomic environment, the budget has been disaggregated into the following items, since each displays a different sensitivity to changes in the level of output: i) direct taxes paid by households; ii) direct taxes paid by the business sector; iii) indirect taxes; iv) other revenues; v) social security benefits; vi) interest payments; vii) other outlays. The sensitivity of each of these to changes in economic activity is measured by the elasticity (ε_i) of the item i with respect to changes in output, so that the adjusted value of each item B_i at time s is given by the following relationship:

$$B^*_{i,s} = B_{i,s} \cdot (1 + \varepsilon_i \cdot GAP_s) \qquad (3A)$$

where the asterisk denotes the adjusted value, and

$$GAP_s = (y_s^* - y_s)/y_s^* \tag{4A}$$

y denoting the level of output.

Items vi) (interest payments) and vii) (other outlays) are assumed to be independent of the level of output, while item iv) (other revenues) is assumed to display a unitary elasticity. The values of the elasticities of the remaining items for each country are reported in Table A.4. The elasticity of direct taxes paid by households is derived from the estimates of the elasticity of the central government personal income tax presented in OECD (1984). As the personal income tax paid to the central government is only a fraction of the total tax due by households, the derivation of the final value of the elasticity also takes into account local taxes, which in many countries are levied at a flat rate. For the remaining taxes, elasticities were derived from sensitivity analysis of the econometric model INTERLINK[32] based on the comparison of historical data of the examined variable with the values obtained after the tax base was allowed to change. The value of the elasticity of direct taxes paid by the business sector is greater than one because of the high sensitivity of business income to changes in economic conditions. Given the existence of tax collection lags[33], the adjusted value of business direct taxes (Tb) is obtained by modifying equation (5A) into:

$$Tb_s^* = Tb_s \cdot [\lambda \cdot (1 + \epsilon_{Tb} \cdot GAP_s) + (1 - \lambda) \cdot (1 + \epsilon_{Tb} \cdot GAP_{s-1})] \tag{5A}$$

where λ represents the fraction of tax receipts in any given year which results from income earned over the same year.

Adjusted values of social security expenditures are obtained on the basis of the deviation of the unemployment rate (u) from its trend level (u*). The corrected level of social security benefits (S*) is calculated in two steps. First, a cyclically-adjusted unemployment rate is derived using the output gap and the "Okun coefficient" (β) presented above:

$$u^* = \sum_{k=-1}^{1} [u - (\frac{1}{\beta}) \cdot GAP)]_{s+k} \tag{6A}$$

Second, S* is obtained by correcting the level of unemployment compensation outlays (UI), under the assumption that in any given year unemployment compensation is proportional to the rate of unemployment:

$$S_s^* = S_s + UI_s \cdot [(u_s^*/u_s) - 1] \tag{7A}$$

Finally, depending on the benchmark output, the change in the adjusted budget balances as a percentage of GNP/GDP shown in Tables 4 to 7 of the main text are calculated in the following way:

$$\Delta b^{*}_{MB,s} = [(\sum_{i} B^{*}_{i,s}/Y_{s}) - (\sum_{i} B_{i,s-1}/Y_{s-1})] \cdot 100 \qquad (8A)$$

$$\Delta b^{*}_{TY,s} = [(\sum B^{*}_{i,s}/Y^{*}_{s}) - (\sum_{i} B^{*}_{i,s-1}/Y^{*}_{s-1})] \cdot 100 \qquad (9A)$$

where Δb represents the change in the adjusted balance in year s, MB stands for the moving benchmark and TY for the trend level of output.

II. INDICATORS OF SUSTAINABILITY

The indicators of sustainability follow closely the approach developed in Blanchard (1990). The approach is based on the identification of the conditions which ensure that the government budget constraint holds intertemporally for a given fiscal policy -- as defined by the sequence of tax (t) and spending (g+h) policies, as well as the initial debt to GNP ratio (b_0) -- and a macroeconomic scenario defined by the sequence of interest rates (i_s) and output growth (θ_s). These conditions state that the debt-to-GDP ratio cannot grow faster than the difference between the interest rate and the rate of growth of GDP whenever the former exceeds the latter. In this case, a primary deficit (i.e. the deficit net of debt interest payments) has to turn into a surplus at some time in the future in order to provide sufficient funds to pay at least a fraction of interest payments.

Given the sequence of spending policies and the macroeconomic scenario expected to prevail in the future, the intertemporal budget constraint allows to derive the value of the tax rate (t*) which ensures sustainability:

$$t^{*} = (i-\theta) \cdot [\int_{0}^{\infty} (g_{s}+h_{s}) e^{-(i-\theta)s} ds + b_{0}] \qquad (10A)$$

Equation [10A] states that the sustainable tax rate is equal to the annuity value of spending (g) and transfers (h) plus the interest rate net of growth times the initial level of debt.

An indicator of sustainability can then be obtained from the above framework by comparing the value of the current tax rate with the hypothetical value t* derived from the intertemporal budget constraint. Three separate indicators have been calculated, each characterised by a different time horizon: the very short term (the "primary gap" based on the current year), the 3-year tax gap, and a medium term (5-year) tax gap. For the purpose of calculating the above indicators, equation [10A] has been modified as follows, in order to allow for a finite, instead of an infinite, horizon:

$$t^* = \left[\frac{(i-\theta)}{1-e^{-(i-\theta)n}} \cdot \int_0^n (g+h)e^{-(i-\theta)}ds + b_0\right] \qquad \textbf{(11A)}$$

where n is the number of years. It can be easily seen that as n tends to infinity equation [10] collapses into equation [11A]. For n=1, equation [10A] can be approximated by:

$$t_1^* = g+h+(i-\theta)b_0 \qquad \textbf{(12A)}$$

Equation [12A] shows the tax rate which stabilizes the debt-to-GNP ratio at its current level. For n > 1, calculations are based on the following discrete-time version of equation [11A]:

$$t_n^* = \left(\frac{i-\theta}{1+i-\theta}\right) \cdot \left\{\left[1-\left(\frac{1}{1+i-\theta}\right)^n\right]^{-1} \cdot \left[\sum_{s=1}^{n}\left(\frac{1}{1+i-\theta}\right)^{s-1}(g_s+h_s)\right]+b_0\right\} \qquad \textbf{(13A)}$$

where n indexes the time horizon.

Since these indicators require forecasts of future values of g, h, i and θ, medium-term projections made by the Secretariat were used up to year 1994. The interest rate and the rate of output growth are represented by three-year moving averages of the actual rates.

III. INDICATORS OF IMPACT ON AGGREGATE DEMAND

The assessment of the impact of tax and spending policies on aggregate demand has traditionally raised both considerable interest and debate, as it requires the knowledge of the determinants of households' consumption and, in particular, the role played by fiscal variables. Currently, theories range from those based on the assumption of a full perception

by households of the path of future taxes to some which assume myopic behaviour. Under the first assumption, referred to as the "Ricardian equivalence" of debt and taxes, households are supposed to fully offset the effect on national saving of government dissaving, so that fiscal policy affects aggregate demand only through direct expenditure. At the other extreme fully myopic behaviour leads to the standard Keynesian result whereby the government can affect national saving by setting an appropriate level of the deficit.

The approach used for constructing the indexes presented in the main text follows closely the work recently done by Blanchard (1985 and 1990) and Blanchard and Summers (1984), which mainly consists of developing a fairly general consumption function encompassing both Ricardian equivalence and the fully myopic behaviour as special cases. In Blanchard's approach, the household sector is assumed to be represented by a large number of cohorts, each made by individuals facing a constant probability of death. Individuals are assumed to have access to life insurance and to maximise the utility defined over the current and future stream of consumption, subject to the available amount of resources, represented by non-human wealth and the expected stream of labour income. Under these circumstances, the aggregate consumption function (C) can be written as:

$$C_s = a[B_s + K_s] + b(r+p)\int_0^{\infty}(Y_s - T_s)e^{-(r+p)s}ds \qquad \textbf{(14A)}$$

where a and b denote, respectively, the propensity to consume out of wealth and income, r is the real rate of interest, and p represents the instant probability of dying, also referred to as the degree of myopia. Finally, B and K denote, respectively, the stocks of outstanding government bonds and private capital, while income and taxes are denoted by Y and T.

An index of the impact of fiscal policy on aggregate demand (IFI) can be easily obtained by collecting terms in equation [14A] which depend on fiscal variables and adding government direct expenditure on goods and services (G):

$$IFI_s = G_s + aB_s - b(r+p)\int_0^{\infty}T_s e^{-(r+p)s}ds \qquad \textbf{(15A)}$$

Equation [15A] states that the impact of fiscal policy depends positively on government direct expenditure, the amount of outstanding public sector debt and negatively by the expected stream of future taxes. Under Ricardian equivalence, the degree of myopia p would be equal to zero and the rate of time preference would be equal to the rate of interest. In this case, the length of the planning horizon and the discount rate both coincide for governments and individuals. This condition allows the substitution of the stream of future taxes required by the government's intertemporal budget constraint for the expected stream in equation [15A], leading to the following index of fiscal impact:

$$IFI_s = G_s - a\int_0^{\infty} G_s e^{-rs}\,ds \qquad \text{(16A)}$$

This equation states that, under full "Ricardian Equivalence", the fiscal impact depends only on the current and future stream of government direct expenditure (rather than on the manner in which this expenditure is financed); it stresses the fact that unusually large amounts of spending today are likely to increase aggregate demand.

For the purpose of implementing the index of fiscal impact, it has been assumed that the planning horizon by households spans five years and that the propensity to consume is the same for all sources of income, which allows equation [15A] to be written as:

$$IFI_s = G_s + b[rB_s - (\frac{r+p}{1+r+p}) \cdot [1 - (\frac{1}{1+r+p})^5]^{-1} \cdot [\sum_{i=0}^{4} (\frac{1}{1+r+p})^i T_{s+i})] \qquad \text{(17A)}$$

The values of the marginal propensity to consume out of income, presented in Table A.6, are derived from the INTERLINK simulations described in the previous section, while r, the real rate of interest, is measured by a three year moving average of the implicit yield on government debt corrected for inflation. It must be noted that the choice of the discount factor, as noted by Blanchard and Summers (1984), affects the level of the index but does not alter its time path. For this reason, p, the degree of myopia, has been set arbitrarily to 3 per cent for all countries.

While equation [17A] represents the "true" index of fiscal impact, an approximation which avoids the use of propensities to consume as well as discount factors is given by the "adjusted deficit" (ADE):

$$ADE_s = G_s - rB_s - \overline{T_s} \qquad \text{(18A)}$$

where T denotes the average annual value of taxes over the current and, in the specific case presented in this paper, the next four years.

Finally, the above indexes have also been calculated assuming fully myopic behaviour by households. In this case, future taxes are assumed to be equal to current taxes and equation [17A] collapses to the index which can be derived from a simple IS model:

$$IFI'_s = G_s + b(rB_s - T_s) \qquad \text{(19A)}$$

while its deficit counterpart is represented by the "inflation-adjusted" deficit (DE):

$$DE_s = G_s + rB_s - T_s \qquad \textbf{(20A)}$$

Indexes derived from equations [17A]-[20A] are presented in Tables 12-14 and Chart 4 of the main text, and are expressed as a percentage of GNP/GDP.

TABLES AND CHART FOR ANNEX

Table A.1

TREND OUTPUT CALCULATIONS

	Output peaks	Business cycles	Historical average growth(a)	Predicted trend growth(b)
United States	1968,1973,1978	1969-1973	3.02	2.84
		1974-1978	2.57	2.33
		1979-1994	2.59	2.82
Japan	1960,1973,1980	1961-1973	9.61	9.41
		1974-1980	3.71	3.36
		1981-1994	4.19	4.30
Germany	1962,1966,1973, 1979	1963-1966	4.39	4.21
		1967-1973	4.28	4.24
		1974-1979	2.34	1.87
		1980-1994	2.22	2.23
France	1960,1974,1979	1961-1973	5.25	5.15
		1974-1979	2.74	2.05
		1980-1994	2.31	2.25
Italy	1963,1970,1974 1980	1964-1970	5.30	5.86
		1971-1974	3.98	3.46
		1975-1980	2.56	2.29
		1981-1994	2.54	2.68
United Kingdom	1961, 1965, 1973 1979	1962-1965	3.30	3.65
		1966-1973	3.03	2.72
		1974-1979	1.44	1.01
		1980-1994	2.19	2.57
Canada	1966,1974,1981	1967-1974	4.97	5.53
		1975-1981	3.70	3.33
		1982-1994	3.07	3.23
Australia	1965,1973,1976 1979	1966-1973	5.45	5.74
		1974-1976	2.29	1.80
		1977-1979	2.38	2.18
		1980-1994	2.91	3.05
Austria	1961,1966,1974 1977,1980	1962-1966	4.21	4.18
		1967-1974	4.86	4.98
		1975-1977	2.79	2.63
		1978-1980	2.75	2.04
		1981-1994	2.20	2.23

a) From OECD medium-term projections.
b) Derived from econometric estimation of equation (1A); see Table A.2 for detailed results.

Continued

Table A.1 (continued)

	Output peaks	Business cycles	Historical average growth	Predicted trend growth
Belgium	1960,1974,1976 1980	1961-1974	4.89	4.80
		1975-1976	1.92	2.12
		1977-1980	2.50	1.50
		1981-1994	2.03	2.16
Denmark	1962,1973,1979	1963-1973	4.03	3.86
		1974-1979	1.89	1.78
		1980-1994	1.69	1.74
Finland	1961,1965,1970, 1974,1980	1962-1965	4.20	3.69
		1966-1970	4.74	4.79
		1971-1974	4.81	4.93
		1975-1980	2.70	2.71
		1981-1994	2.90	3.13
Greece	1962,1973,1979	1963-1973	7.92	7.34
		1974-1979	3.70	3.62
		1980-1994	1.66	1.96
Ireland	1964,1975,1978 1981	1965-1975	4.37	4.76
		1976-1978	5.23	5.06
		1979-1981	2.18	0.40
		1982-1994	2.08	1.92
Netherlands	1965,1974,1979	1966-1974	4.96	5.24
		1975-1979	2.18	1.14
		1980-1994	1.92	1.97
New Zealand	1966,1974,1981	1967-1974	4.05	4.50
		1975-1981	-0.37	0.21
		1982-1994	2.07	1.84
Norway	1961,1967,1969, 1980	1962-1967	4.49	4.80
		1968-1969	3.37	2.90
		1970-1980	4.49	4.56
		1981-1994	3.02	3.28
Spain	1960,1974,1977	1961-1974	7.14	6.60
		1975-1977	2.45	0.10
		1978-1994	2.88	2.95
Sweden	1965,1970,1975 1979	1966-1970	4.10	4.45
		1971-1975	2.59	2.78
		1976-1979	1.25	0.99
		1980-1994	1.74	1.86
Switzerland	1960,1973,1977 1980	1961-1973	4.42	4.11
		1974-1977	-1.29	-1.92
		1978-1980	2.49	2.04
		1981-1994	2.08	2.30

Table A.2

TREND OUTPUT ECONOMETRIC RESULTS*

	R^2	α_o	T_1	T_2	T_3	T_4	T_5
United States (1969-1994)	0.987	285.0 (1619.8)	0.028 (4.4)	0.0230 (6.2)	0.0278 (25.9)	-	
Japan (1961-1994)	0.998	317.8 (2436.8)	0.0899 (53.6)	0.0330 (13.7)	0.0421 (30.8)	-	
Germany (1963-1994)	0.993	274.5 (1677.6)	0.0412 (5.7)	0.0415 (16.5)	0.0185 (7.7)	0.0220 (22.2)	
France (1961-1994)	0.998	278.7 (4014.4)	0.0502 (59.0)	0.0202 (10.9)	0.0223 (31.7)	-	
Italy (1964-1994)	0.996	329.4 (2774.3)	0.0570 (18.7)	0.0340 (8.6)	0.0227 (9.7)	0.0265 (27.3)	
United Kingdom (1962-1994)	0.990	260.8 (1519.4)	0.0358 (4.8)	0.0268 (11.9)	0.0101 (4.1)	0.0253 (24.4)	
Canada (1967-1994)	0.995	259.7 (2013.9)	0.0538 (19.9)	0.0328 (15.2)	0.0318 (26.0)	-	
Australia (1966-1994)	0.996	254.1 (2397.5)	0.0558 (23.1)	0.0179 (3.2)	0.0216 (4.4)	0.0301 (34.6)	-
Austria (1962-1994)	0.998	267.1 (2518.2)	0.0410 (11.3)	0.0486 (30.4)	0.0259 (5.7)	0.0202 (4.8)	0.0220 (27.2)
Belgium (1961-1994)	0.997	281.4 (3160.5)	0.0469 (40.9)	0.0210 (2.7)	0.0149 (3.7)	0.0214 (21.4)	-
Denmark (1963-1994)	0.990	261.5 (2248.1)	0.0378 (21.1)	0.0176 (7.3)	0.0172 (16.4)	-	-
Finland (1962-1994)	0.995	256.8 (1327.8)	0.0363 (4.0)	0.0468 (9.,9)	0.0481 (9.0)	0.0267 (8.7)	0.0308 (24.0)
Greece (1963-1994)	0.997	259.2 (2383.1)	0.0708 (42.3)	0.0356 (15.7)	0.0194 (19.8)	-	-
Ireland (1965-1994)	0.989	222.7 (1437.0)	0.0465 (18.4)	0.0493 (5.6)	0.0040 (0.5)	0.0190 (10.7)	-

Continued

Table A.2 (continued)

TREND OUTPUT ECONOMETRIC RESULTS*

	$\bar{R}^2$	α_o	T_1	T_2	T_3	T_4	T_5
Netherlands		260.3	0.0510	0.0114	0.0195	-	-
(1966-1994)	0.990	(2029.5)	(20.7)	(3.7)	(18.1)		
New Zealand		229.8	0.0440	0.0211	0.0182	-	-
(1967-1994)	0.962	(1262.1)	(11.6)	(0.70)	(10.6)		
Norway		259.3	0.0469	0.0286	0.0446	0.0323	-
(1962-1994)	0.998	(2075.1)	(11.7)	(3.7)	(38.7)	(36.3)	
Spain		294.2	0.0639	0.0010	0.0291	-	-
(1961-1994)	0.992	(1739.7)	(29.9)	(0.1)	(19.7)		
Sweden		266.0	0.0435	0.0274	0.0098	0.0184	-
(1966-1994)	0.996	(3306.4)	(15.0)	(13.3)	(4.6)	(33.8)	
Switzerland		248.5	0.0403	-0.0194	0.0202	0.0227	-
(1961-1994)	0.994	(2833.0)	(34.0)	(-5.1)	(4.2)	(23.2)	

* See equation (1A); Student's t-statistics in parentheses.
For the 1990-94 period, data are from OECD medium-term projections, July 1989.

Table A.3

OKUN COEFFICIENT ESTIMATION, 1961-1988 (a)

	α Pre-1974	α Post-1974	β	$\bar{R}^2$	DW	SEE
United States	3.83 (16.3)	2.65 (12.1)	2.01 (12.8)	0.87	1.88	0.85
Japan	9.51 (16.3)	4.33 (7.5)	4.91 (2.0)	0.67	1.80	2.08
Germany (1963-1988)	4.43 (11.6)	2.90 (8.0)	2.16 (6.0)	0.69	1.81	1.27
France	5.53 (22.6)	3.01 (9.9)	1.53 (3.7)	0.79	2.13	0.88
Italy (1961-1987)	5.41 (9.6)	2.96 (4.8)	1.73 (2.2)	0.40	2.15	2.03
United Kingdom (1962-1988)	3.21 (6.9)	2.41 (5.5)	1.35 (4.1)	0.42	1.99	1.61
Canada	5.28 (14.3)	3.76 (10.9)	1.53 (5.9)	0.64	1.36	1.33
Australia	5.35 (13.4)	3.36 (8.7)	1.63 (5.2)	0.62	1.90	1.44
Austria (1961-1987)	4.52 (11.6)	2.66 (6.6)	2.29 (2.8)	0.53	2.52	1.37
Belgium (1961-1987)	4.89 (11.2)	2.38 (4.9)	0.88 (2.1)	0.53	2.69	1.57
Denmark (1971-1988)	3.76 (3.5)	2.33 (4.6)	1.25 (3.0)	0.38	1.16	1.84
Finland (1966-1987)	5.25 (9.7)	3.37 (8.1)	1.93 (5.5)	0.65	2.01	1.52
Greece (1963-1987)	7.60 (10.4)	2.73 (4.0)	1.18 (1.7)	0.61	1.77	2.32
Ireland (1961-1987)	4.43 (6.9)	3.12 (4.1)	0.87 (1.8)	0.20	1.70	2.34
Netherlands	5.13 (10.5)	2.27 (4.6)	1.14 (2.6)	0.51	2.23	1.75
New Zealand (1963-1987)	3.88 (4.0)	2.26 (2.4)	3.51 (2.8)	0.29	1.92	3.24
Norway	4.26 (10.9)	4.24 (11.4)	1.70 (2.6)	0.16	1.94	1.41
Spain	7.41 (16.4)	4.02 (6.9)	1.32 (3.8)	0.73	1.49	1.62
Sweden (1961-1987)	4.27 (12.4)	1.77 (5.3)	3.34 (4.4)	0.61	1.63	1.24
Switzerland (1963-1987)	4.40 (8.1)	1.47 (2.6)	9.52 (3.8)	0.57	1.49	1.95

a) The estimates shown in the table are derived from the following equation:

$$[y_t = \alpha + \beta(u_{t-1} - u_t)]$$

Figures in parentheses represent t-statistics.

Table A.4

MAIN ASSUMPTIONS UNDERLYING THE CALCULATIONS
OF THE CYCLICALLY-ADJUSTED BUDGET BALANCES

	Tax elasticities				Okun coef-ficient	Corporate tax collection lag
	Corporate	Personal	Indirect	Social security		
United States	2.5	0.9	1.0	0.3	2.0	0.4
Japan	3.7	1.2	0.5	0.5	4.9	1.0
Germany	2.5	1.4	0.8	0.5	2.2	1.0
France	3.0	1.2	0.9	0.5	1.5	0.7
Italy	2.9	0.8	0.8	0.4	1.7	1.0
United Kingdom	3.4	1.0	0.7	0.5	1.4	0.3
Canada	2.4	1.4	0.8	0.6	1.5	0.7
Australia	2.5	1.5	0.5	0.7	1.6	0.1
Austria	2.5	1.2	1.0	0.5	2.3	1.0
Belgium	2.5	1.2	1.0	0.5	0.9	1.0
Denmark	2.2	1.0	1.1	0.6	1.3	0.0
Finland	2.5	1.2	1.2	0.5	1.9	1.0
Greece	2.5	1.2	1.0	0.5	1.2	0.6
Ireland	2.5	1.3	1.0	0.5	1.2	1.0
Netherlands	2.5	1.3	1.0	0.5	1.1	0.6
New Zealand	2.5	1.2	1.0	0.5	3.5	1.0
Norway	2.5	1.2	1.0	0.5	1.7	0.0
Spain	2.1	1.2	1.4	0.5	1.3	1.0
Sweden	2.4	1.3	1.6	0.5	3.3	0.7
Switzerland	2.5	1.2	1.0	0.5	9.5	1.0

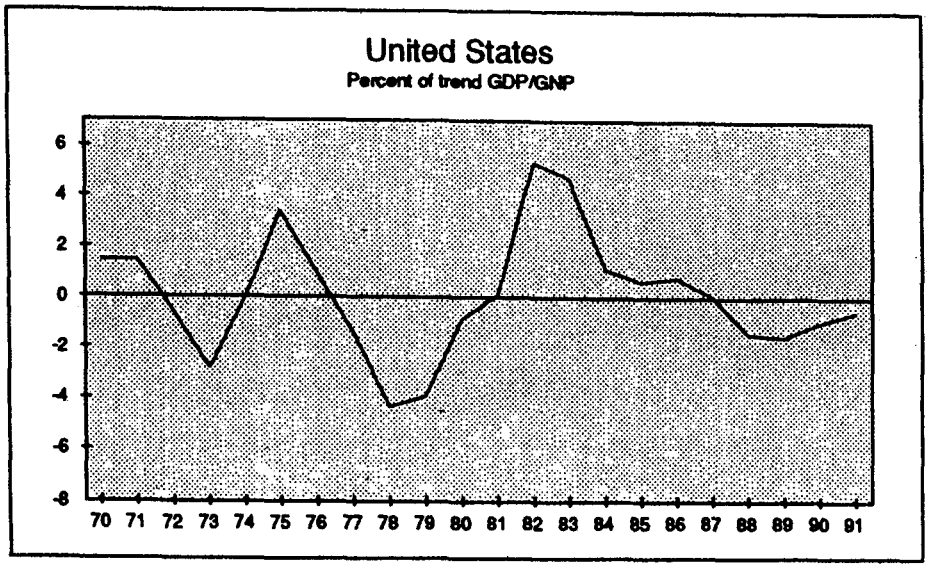
Table A.5

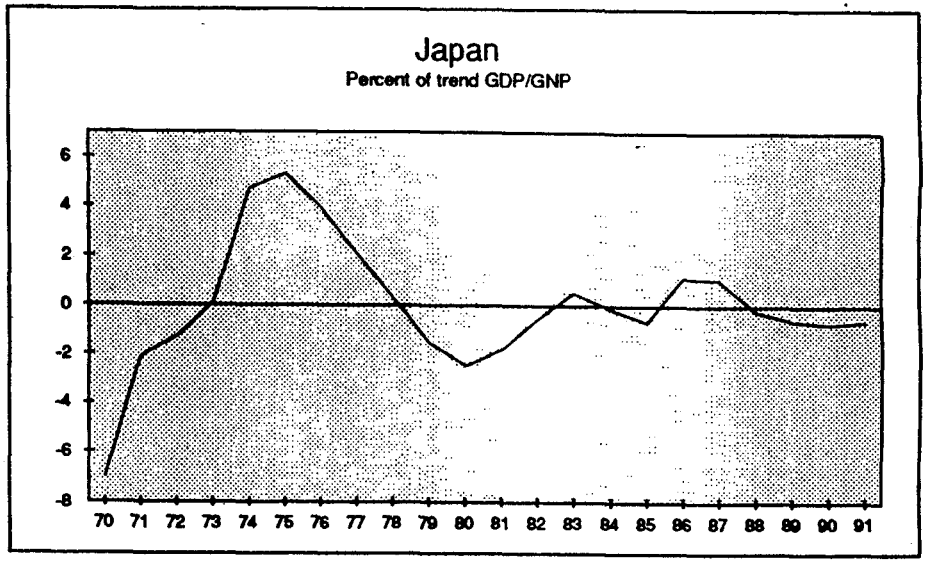
MARGINAL PROPENSITIES TO CONSUME OUT OF HOUSEHOLDS' DISPOSABLE INCOME

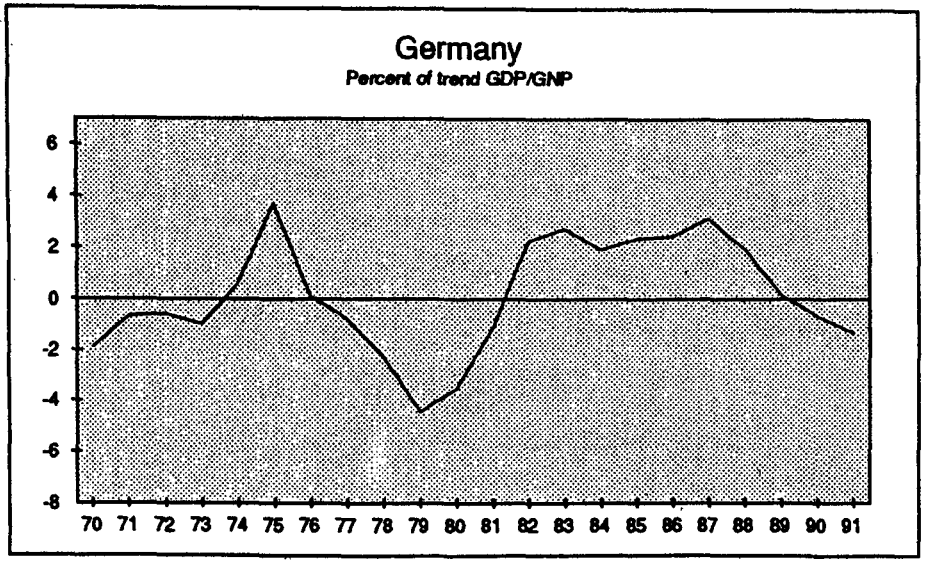
United States	0.84	Belgium	0.72
Japan	0.68	Denmark	0.79
Germany	0.79	Finland	0.86
France	0.69	Greece	0.81
Italy	0.86	Ireland	0.84
United Kingdom	0.77	Netherlands	0.98
Canada	0.73	Norway	0.80
Australia	0.63	Spain	0.91
Austria	0.83	Sweden	0.98

Source: Simulations of OECD INTERLINK econometric model.

Chart A.1
Output gap estimates







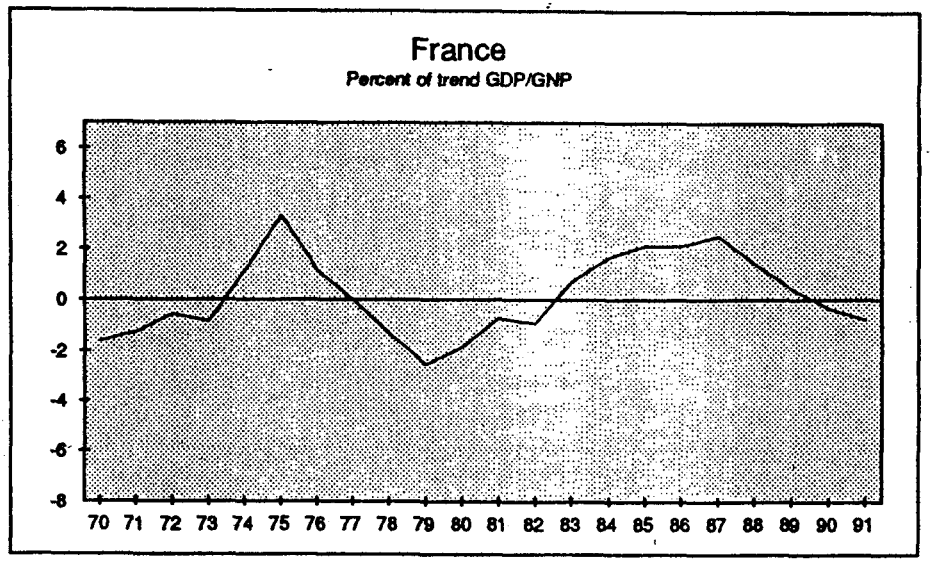
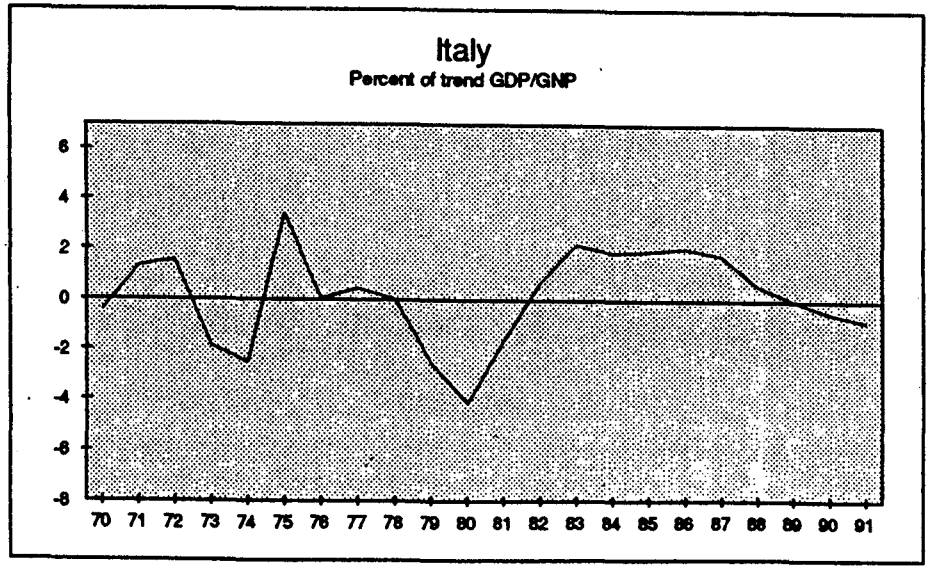
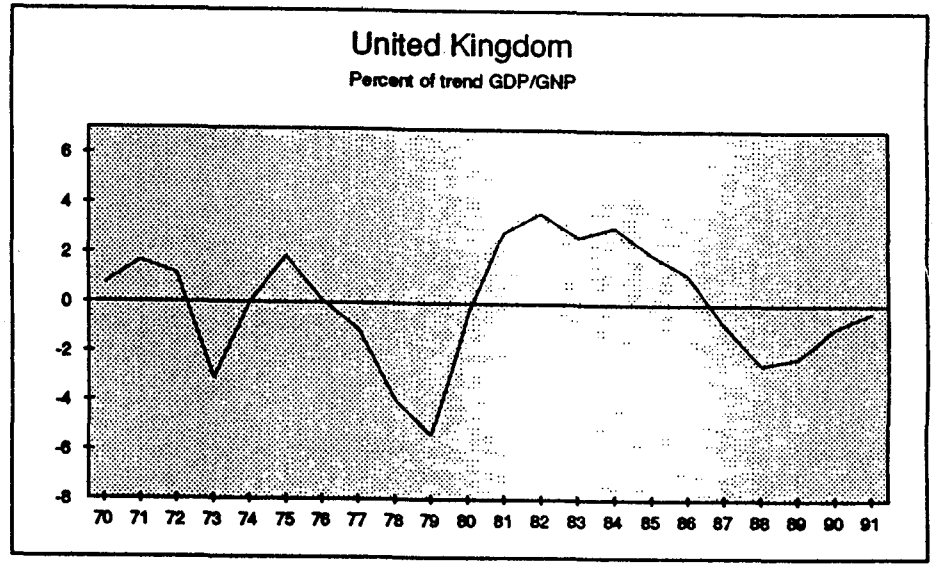


Chart A.1
Output gap estimates





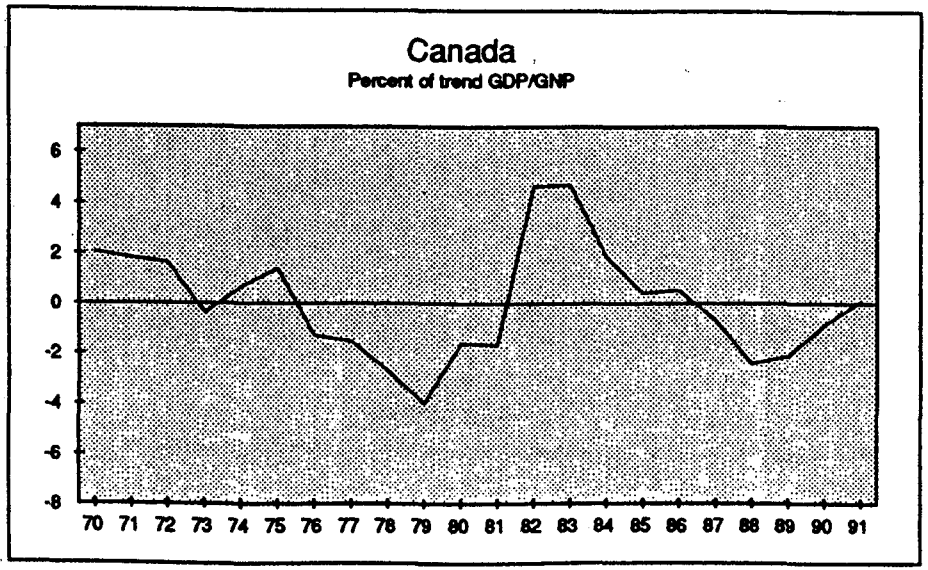
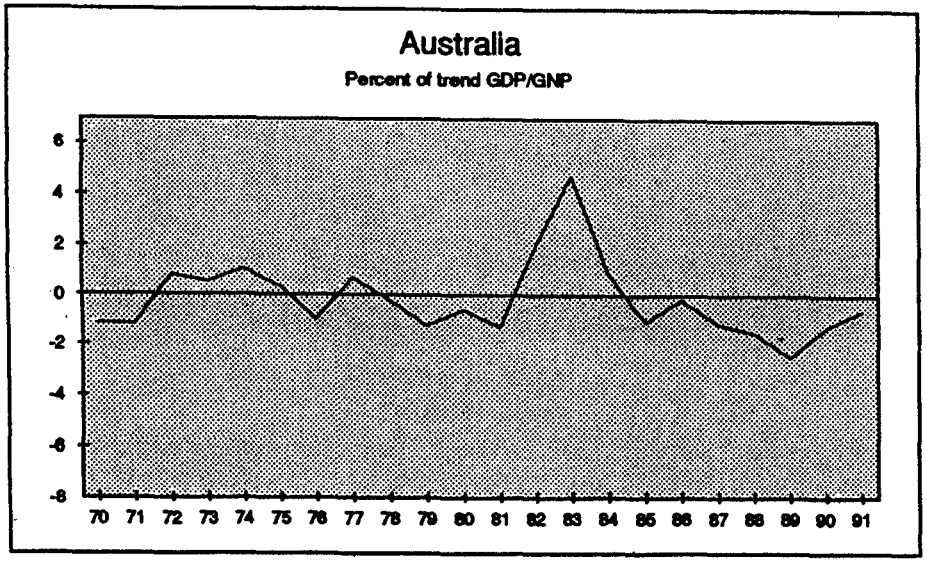
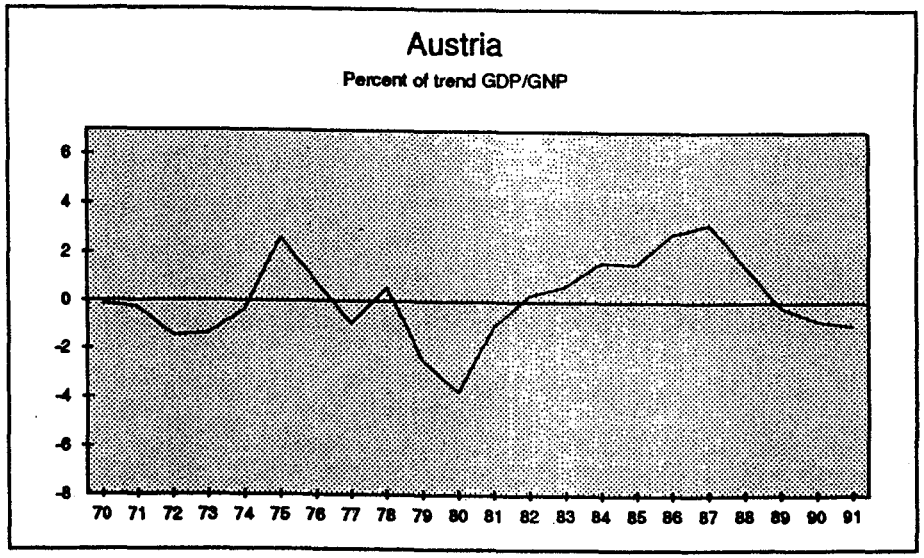
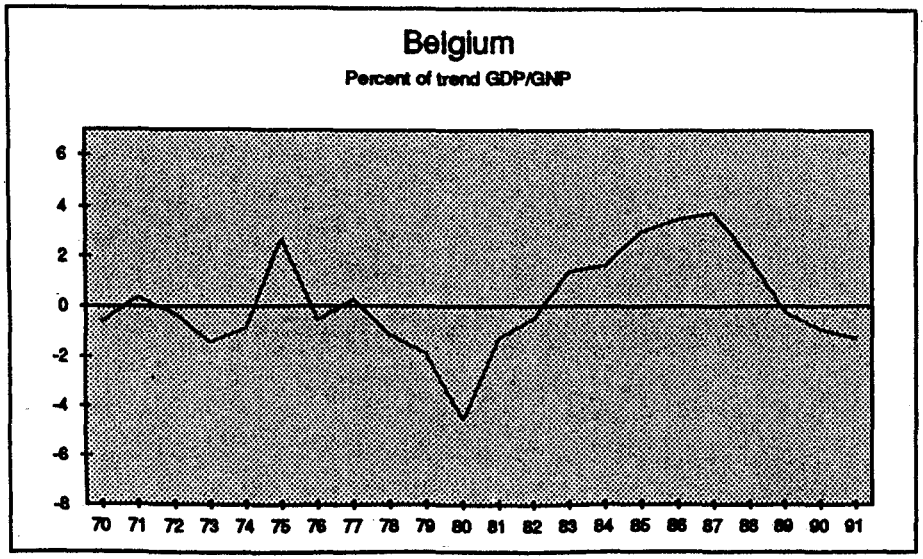


Chart A.1
Output gap estimates







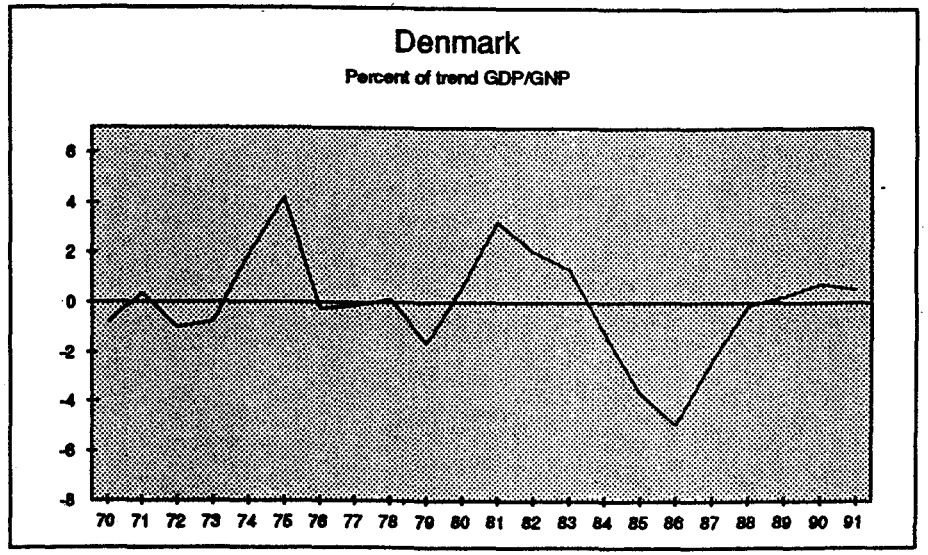


Chart A.1
Output gap estimates

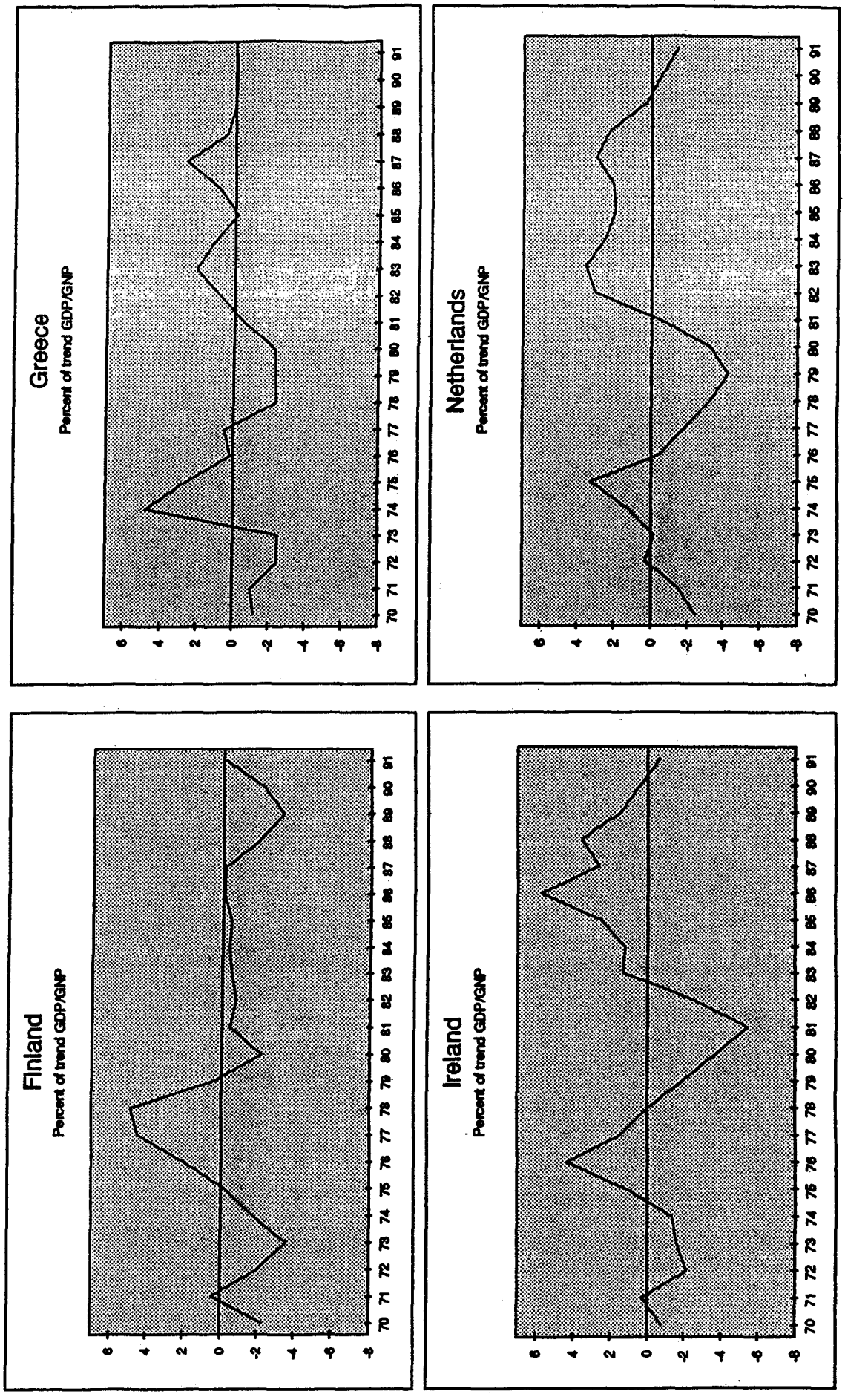
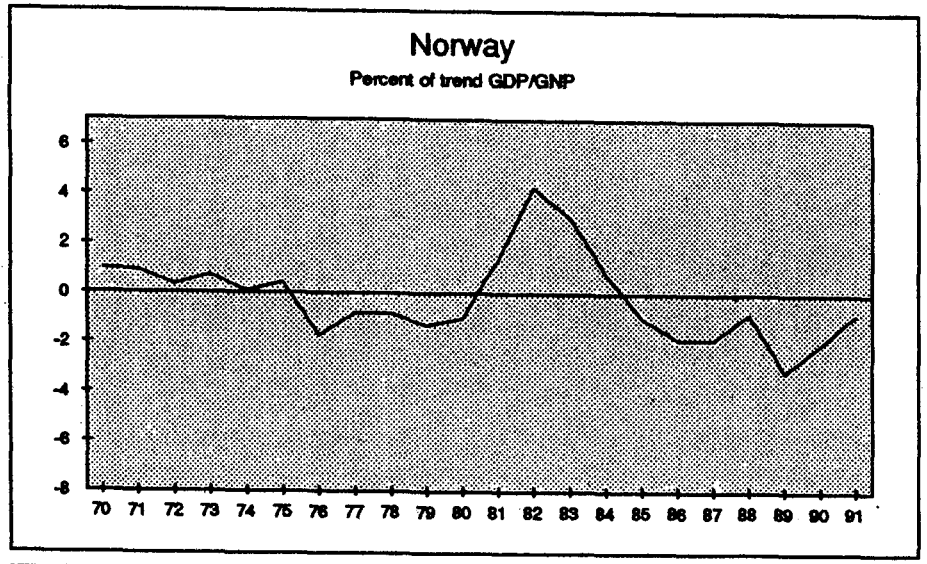
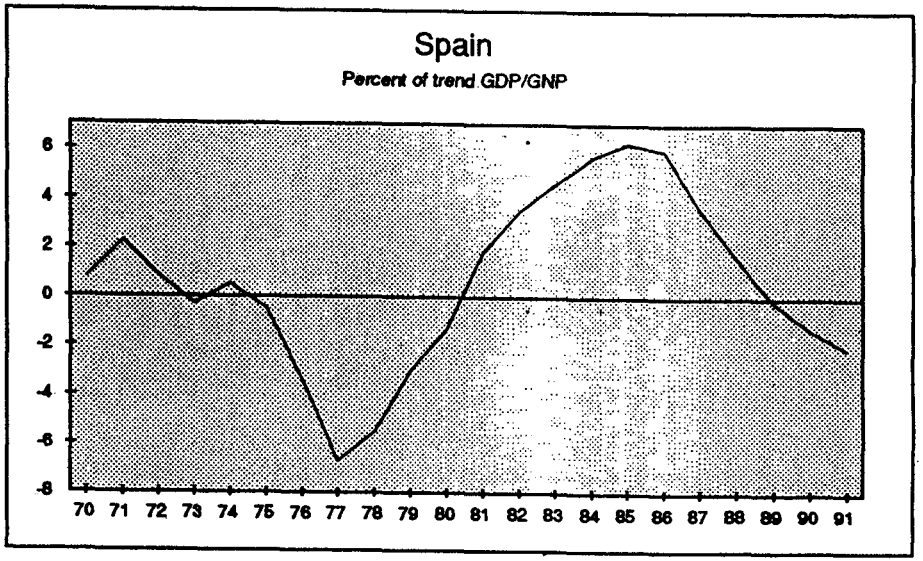
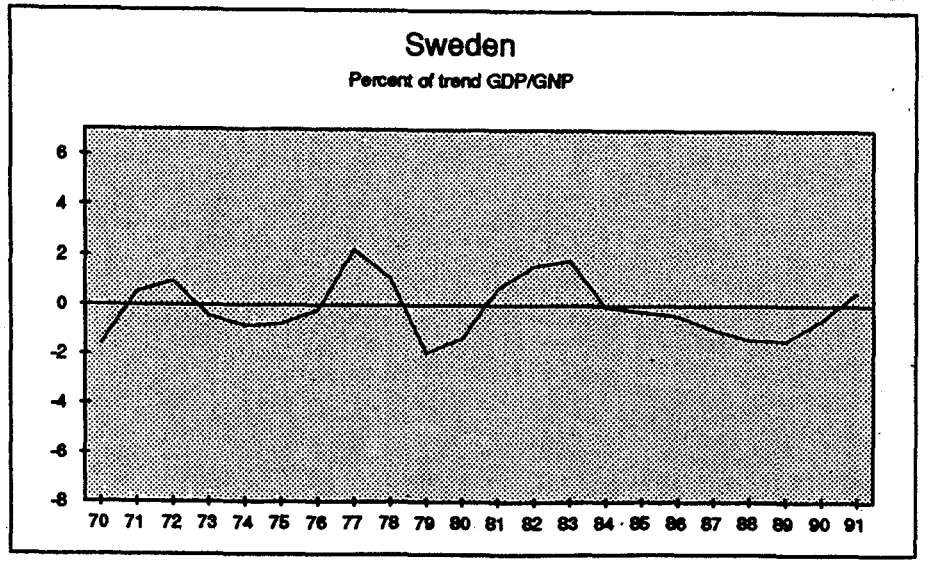


Chart A.1
Output gap estimates







NOTES

1. The shift in focus of fiscal policy is but one element of a broader policy framework widely agreed as desirable in the early 1980s in the OECD. This policy framework is often referred to as the medium-term financial strategy, and has been the subject of several previous OECD studies. See Chouraqui and Price (1984) and Chouraqui, Clinton and Montador (1987).

2. The distinction between temporary and permanent deficits is emphasised by Bernheim (1989).

3. Expectations had previously been heavily emphasised by Muth (1961).

4. See Hagemann, Jones and Montador (1987).

5. See Chouraqui and Price (1984).

6. This indicator was a variant of the conventional weighted budget balance methodology adopted in the early 1970s. See Hansen and Snyder (1969), Lotz (1971), Blinder and Solow (1974) and OECD (1978).

7. See Muller and Price (1984).

8. See Torres and Martin (1989) for a description of the methodology underlying the estimates of potential output.

9. This would resemble to some extent the method use by the International Monetary Fund (Heller *et al.*, 1986), although in the IMF's framework the reference year is not chosen arbitrarily, but instead is one which reflects as much as possible a full-employment economy in each country.

10. Estimates of policy indicators in this paper are based on OECD Economic Outlook 46, released in December 1989.

11. As noted by Nelson and Plosser (1982) and Plosser (1989), a basic property of a random walk process is that there is no inherent assurance for a return to any particular level or trend following displacement by a shock. If output follows a random walk, there exists no tendency toward any particular mean. To quote Plosser (1989): "Random walks are also referred to as stochastic trends because while they may exhibit growth, *they do not fluctuate about any particular deterministic path.*" (emphasis added).

12. See, for instance, Eisner and Peiper (1984), Eisner (1986) and Eisner (1989).

13. Indeed, the complexity of these interactions has led many analysts [Buiter (1985), Auerbach and Kotlikoff (1987) and Kotlikoff (1989)] to recommend that all deficit measures are meaningless as indicators of fiscal impact.

14. See Chouraqui, Jones, and Montador (1986).

15. Of course, this overlooks the composition of the government's debt, which can have an important bearing on the feedback effects of an increase in the public sector's indebtedness.

16. This is obtained by integrating the budget constraint given in equation (2). See Blanchard and Fischer (1989), ch. 2.

17. See Blanchard (1990) for a full derivation of this measure.

18. This is similar to net worth approaches to fiscal policy analysis. See Buiter (1985).

19. Conceptually, this is somewhat equivalent to the approach taken in earlier work by the OECD [see Chouraqui, Jones, and Montador (1986)], albeit from a different perspective. There, the future path of the stock of public debt is simulated under certain assumptions about real output growth, real interest rates, and a presumed constancy of the primary deficit at its initial level.

20. See, for instance, Rosen (1985) or Stiglitz (1986).

21. See Campbell and Mankiw (1987).

22. Both the life cycle [Ando and Modigliani (1963)] and the permanent income [Friedman (1958)] theories of consumption assume that consumers are rational and forward-looking.

23. See Bernheim (1989) for an overview of different perspectives on the effects of fiscal policy.

24. An additional feature which mainly distinguishes the neoclassical from the Keynesian model is that all markets are assumed to clear in each period. See Bernheim (1989).

25. In simulations of fiscal policies of different durations, Auerbach and Kotlikoff show that temporary deficits can have potentially odd effects in that the substitution effects -- -increased labour supply motivated by higher interest rates (i.e. an intertemporal substitution of current for future leisure) and, therefore, higher saving -- can offset or possibly dominate the wealth effects (i.e. lower saving induced by increased bond wealth).

26. Aggregate supply is generally not affected in the pure Ricardian Equivalence model, to the extent that taxes are assumed to be lump sum and, therefore, non-distortionary.

27. It is important to note that G here includes government investment as well as consumption. Thus, the measure would come somewhat closer to an indicator of the initial impact of fiscal policy on national saving if investment were excluded. The *ceteris paribus* assumption on which this indicator is based, however, limits its interpretation.

28. It is implicitly assumed that the marginal propensity to consume out of income is the same across all sources, so that the propensity to consume out of wealth can be written as the product between the interest rate and b.

29. It is useful to note that the inflation-adjustment made in the past to estimates of the cyclically-adjusted budget balance was in recognition that the apparent stance of fiscal policy can be highly distorted by high and, more significantly, variable rates of inflation.

30. In other words, whenever the index or its deficit counterpart requires future values of taxes (i.e. "anticipated" taxes), actual observed values are used in the calculations to the extent that the years over which the foresight is assumed to operate have elapsed. When years which fall within the foresight horizon extend beyond 1989, projections are utilised.

31. See Campbell and Mankiw (1987) and Blanchard (1989) for some empirical evidence for the United States.

32. The structure and properties of INTERLINK are discussed in Richardson (1988).

33. See, on this issue, OECD (1983).

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