CYCLICAL STABILISATION UNDER THE STABILITY AND GROWTH PACT: HOW EFFECTIVE ARE AUTOMATIC STABILISERS?

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It is largely recognised that fiscal policy will have larger responsibilities for cyclical stabilisation in EMU given the loss of the monetary instrument. At the same time, the EMU's budgetary framework emphasises the need to rely on automatic fiscal stabilisers, rather than active policies in cushioning the business cycle. We show that automatic stabilisers are relatively powerful in the event of shocks to private consumption, but less so in the case of shocks to private investment and exports. In the case of supply side shocks, the automatic stabilisers are largely ineffective, but this may actually be a good thing to the extent that supply-side disturbances call for structural adjustment rather than cyclical stabilisation. As to the future, a challenge for policy-makers is how to design tax and welfare reforms which, while improving incentives and market functioning, do not stifle and possibly strengthen the impact of automatic stabilisers.

1. Introduction

The policy assignment and institutional arrangements of EMU are based on a widespread consensus that monetary policy should take care of stabilisation in the event of symmetric shocks while the smoothing of asymmetric shocks and diverging cyclical conditions falls to national fiscal policy as the single monetary policy responds only to area-wide price

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developments. The feasibility of this policy assignment rests of course on the assumption that fiscal policy is an effective stabilisation tool.

Recent academic literature assessing the functioning of the rule-based fiscal framework of EMU draws largely on the presumption that fiscal policy is indeed a useful stabilisation instrument.[1] To some extent this implies a turnaround in the views concerning the potency of fiscal policy interventions in smoothing cyclical fluctuations. Since the collapse of the Keynesian consensus in the second half of the 1970s, fiscal stabilisation has became increasingly unpopular among academics and policymakers. While the real effects of fiscal policy were totally downplayed in Barro's (1974) seminal paper on Ricardian equivalence, Sargent and Wallace (1981) revealed "fiscal roots" of high inflation in the form of debt monetisation in the event of persistent budgetary imbalances.[2] Reflecting these underpinnings, the task of short term stabilisation was left to monetary policy, whereas fiscal policy should be geared to medium term structural issues and long term sustainability of public finances.

While the potential usefulness of fiscal stabilisation is being reconsidered, the "heritage" of the debate in the 1980s casts a strong scepticism over the use of discretionary fiscal action to fine tune the economy. Therefore, the overall set of fiscal rules in EMU relies on the working of automatic stabilisers (i.e. the cyclically induced changes in taxes and expenditures) as the main tool for fiscal stabilisation once member countries have achieved their medium-term fiscal positions of "close to balance or in surplus" according to the Stability and Growth Pact (hereafter, SGP). Adhering to the medium-term budgetary target allows enough breathing space for the automatic stabilisers to work freely without breaching the 3% of GDP deficit threshold.[3] While exceptions to this rule can be envisaged,[4] the underlying policy behaviour is more akin to "tax smoothing" than to active fiscal management. Moreover, this

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1 See, e.g., Beetsma (2001) and Canzoneri and Diba (2001). See also the contributions in Buti, von Hagen and Martinez Mongay (2002).

2 A later, more sophisticated, version of the "unpleasant arithmetic" is provided by the so-called Fiscal Theory of the Price Level according to which monetary authorities would not be able to control the price level if fiscal plans do not satisfy the government budget constraint. For a policy-oriented review, see Canzoneri and Diba (1998).

3 A number of studies show that adhering to the close-to-balance target of the SGP creates enough room for manoeuvre to allow automatic stabilisers to function fully in EMU without risking the 3% of GDP deficit threshold, see Artis and Buti (2001), Barrell and Dury (2001), Dalsgaard and de Serres (2001).

4 In the case of very deep recessions or over-heating, discretionary policy may prove useful.

non-discretionary approach should, at least in principle, guarantee that the behaviour of the actual budget balance is always counter-cyclical and hence, contributes to economic stability.

Considering the criticisms raised against fiscal activism, rule-based fiscal policy relying on the working of automatic stabilisers provides clearly several advantages. State-contingent tax revenues and expenditures (basically unemployment related expenditure) cushion economic fluctuations practically with no information and implementation lags. Moreover, the impact lag of automatic stabilisers is generally considered to be relatively short. In principle, if automatic stabilisers are let to operate symmetrically over the cycle, they do not contribute to structural deterioration in budgetary positions.

Once it is recognised that using discretionary fiscal policy should be the exception rather than the rule in EMU, crucial questions arise from the point of view of stabilisation. Is the size of current automatic stabilisers sufficient? Would the sole working of automatic stabilisers produce an appropriate fiscal stance both at the national and euro area level given the single monetary policy? Are automatic stabilisers always stabilising?

While these questions are very important from a policy-making perspective, the aim of our paper is more modest. We focus on the role and effectiveness of automatic fiscal stabilisers in EMU with a particular emphasis on the issue of national cyclical stabilisation. Section II analyses the working of automatic stabilisers in a simple AD-AS model. Section III reviews recent empirical evidence on the size of automatic stabilisers in EU countries. Sections IV and V present simulations of the effectiveness of automatic stabilisers with the Commission model QUEST under various types of shocks. The final section concludes.

2. The simple economics of automatic stabilisers

2.1 A simple model

In general, automatic stabilisers tend to increase with the size of the government sector, the progressivity of the tax system, the relative share of taxation of cyclically-sensitive tax bases, the generosity of unemployment

benefit systems and the sensitivity of unemployment to fluctuations in output[5]. Among country-specific factors, the openness of the economy and the flexibility of the labour, product and financial markets have a significant impact on the smoothing capacity of automatic stabilisers. The fact that fiscal policy works both through demand and supply channels has a bearing on its role and effectiveness in responding to different types of shocks. This holds not only in the case of automatic stabilisers, but also in the case of discretionary fiscal policy. Of course, in reality it is often difficult to identify the type of shock hitting the economy and whether it is temporary or permanent without a considerable delay and in most cases, shocks have a demand as well as a supply dimension. Conceptually, however, this distinction is useful.

The effect of automatic stabilisers on output and inflation under different types of shocks is explored through a simple aggregate demand/supply model of a country in a monetary union:[6]

$$y^d = \phi_1 d - \phi_2 (i - \pi^e) - \phi_3 \pi - \phi_4 y + \varepsilon_d \tag{1}$$

$$y^s = \omega(\pi - \pi^e) + \varepsilon_s \tag{2}$$

Equation (1) is a IS-type schedule where aggregate demand, y^d, depends on the budget deficit as a share of GDP, d, the real interest rate $(i - \pi^e)$ and a temporary demand shock, ε_d. The external current account also affects output. In order to keep the model simple, we are not modelling explicitly the feedback effect on the domestic economy from the rest of the monetary union. Hence the external account depends only on y (absorption effect) and π (competitiveness effect). Equation (2) is a Lucas-Phillips supply function where aggregate supply, y^s, depends on the inflation expectation error, $\pi - \pi^e$, and a supply shock, ε_s, which can be temporary or permanent. All variables are expressed as changes from baseline.

By positing that fiscal authorities pursue a neutral discretionary policy and simply let automatic stabilisers play freely, the budget deficit is reduced to its cyclical component:

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5 See Galí (1994), Rodrik (1998), Fatas and Mihov (1999).

6 For a more extensive version of the model, see Artis and Buti (2000) and Buti, Roeger and in 't Veld (2001). See also Blanchard (2000).

$$d = -\alpha y \tag{3}$$

where the automatic stabilisers are captured by the sensitivity parameter α. This formulation allows to condense the complex working of automatic stabilisers via both sides of the budget into a single parameter. As we will show below, while convenient for the theoretical analysis, equation (3) does not capture the different impact of various budget items on the deficit which are important in empirical assessment.

It is assumed that monetary authorities set the interest rate i according to a simple Taylor rule:

$$i = \lambda (\pi + \beta y) \tag{4}$$

where β is the relative preference of monetary authorities between output and inflation. The parameter λ indicates the degree of "activism" of monetary policy. In this setting, it captures essentially the degree to which the individual economy in a monetary union affects the average variables of the area. Hence, a larger economy will have a larger effect on the decision making of the single central bank, thereby implying a higher λ. It is assumed that the equilibrium level of the interest rate (not shown here) ensures that inflation is on target in the medium run (i.e. when shocks are zero).

Under these behavioural rules,[7] the model can be solved for y and π:

$$y = \frac{1}{\mu}\left[\omega\varepsilon_d + (\phi_2 + \phi_4)\varepsilon_s\right] \tag{5}$$

$$\pi = \frac{1}{\mu}\left[\varepsilon_d - \omega(1 + \phi_1\alpha + \phi_3 + \beta\phi_2)\varepsilon_s\right] \tag{6}$$

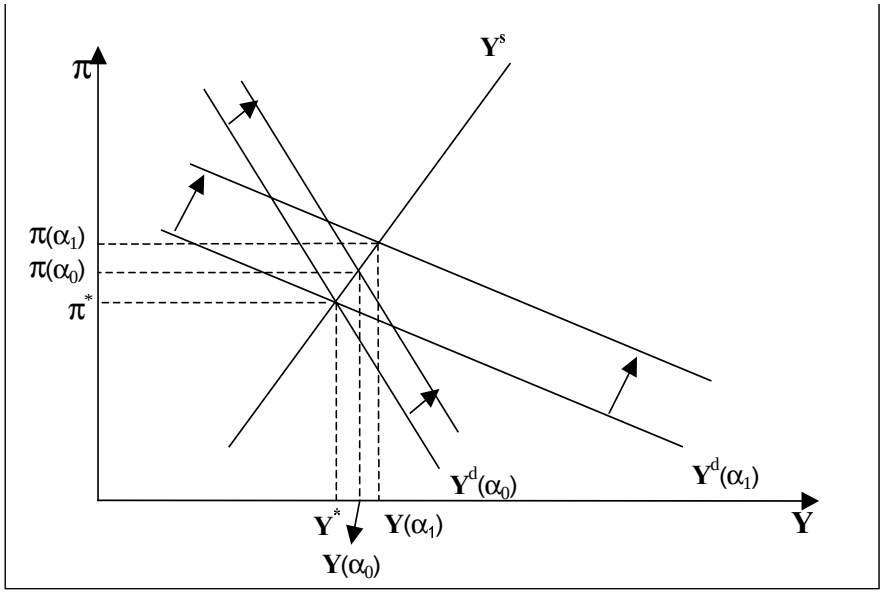
where $\mu = \omega(1 + \alpha\phi_1 + \phi_3) + \phi_2(\lambda + \beta\omega) + \phi_4$

[7] In this simple setting and given the assumed monetary rule, economic agents always expect inflation to be on target before the realisation of shocks.

Clearly, a higher α helps stabilising both output and inflation in the case of a temporary demand shock. Higher openness of the economy (that is higher ϕ_3 and ϕ_4) and a lower ω (that is a steeper supply function) also help to smooth demand shocks.

Graph 1

Demand shock



Graph 1 illustrates the effect on output and inflation of a positive demand shock under high and low automatic stabilisers ($\alpha_0 > \alpha_1$).

A higher α implies a lower (absolute) coefficient of π – that is a higher (negative) slope – and a lower shift to the right of y^d in the event of a positive demand shock. As graph 1 shows, if prior to the shock, output was at its potential level and inflation was on target, higher automatic stabilisers entail a smaller output gap and a smaller deviation of inflation from target after the shock.

In the case of a *temporary* supply shock (that is a shock that does not affect potential output), equations (5) and (6) show that high automatic stabilisers reduce the output variability, but imply a higher deviation of π

from target. The effect of different size of automatic stabilisers in the event of a negative supply shock is illustrated in Graph 2.

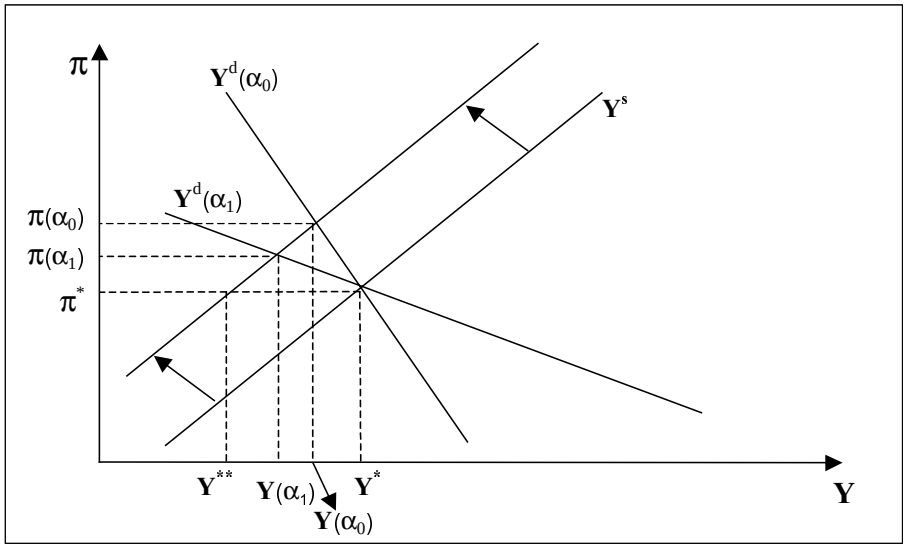
If the supply shock is *permanent* (that is potential output changes by the size of the shock ε_s), the expression of the "new" output gap can be derived from (5) and is the following:

$$y - \varepsilon_s = -\frac{\varepsilon_s}{\mu}\left[\omega(1+\alpha\phi_1+\phi_3)+\phi_2\beta\omega\right] \tag{7}$$

$$\pi = \frac{\varepsilon_s}{\mu\omega}\left[\omega(1+\alpha\phi_1+\phi_3)+\phi_2\beta\omega\right] \tag{8}$$

Graph 2

Supply shock



A higher value of α increases the gap around the new potential output and, as a consequence, is both inflation- and output-destabilising. The above result is illustrated in Graph 2 which shows that, in the case of a

permanent negative supply shock, higher automatic stabilisers are destabilising for both output and inflation. Notice also that, if inflation is the only concern of the central bank, perfect inflation stabilisation ($\pi=\pi^*$ at each point in time) implies also perfect output stabilisation in the event of a permanent supply shock (that is output jumps from the old to the new potential level).

2.2 The optimal degree of automatic stabilisation

For the time being the degree of automatic stabilisation has been taken as given. This is a reasonable assumption since automatic stabilisers are usually the ex post outcome of social preferences over efficiency and equity. However, in EMU, given the higher responsibility of fiscal policy for smoothing country-specific shocks, the degree of cyclical stabilisation the latter may progressively enter as an autonomous concern in the design of tax and welfare systems.

While it is reasonable to assume that fiscal authorities would like to extract the largest possible degree of stabilisation, under EMU's budgetary rules, the cyclical swings in the budget deficit cannot be excessively large without risking to violate the 3% of GDP deficit ceiling. Governments may also dislike very large budgetary surpluses in good times.

On the basis of these considerations, the loss function of fiscal authorities can be written as follows:

$$L = d^2 + \delta y^2 \tag{9}$$

where δ is the relative preference for output versus deficit stabilisation. This formulation of the loss function is very convenient, allowing to derive a simple expression of the optimal α. By minimising L with respect to α gives :

$$\alpha^* = \frac{\delta\omega\phi_1}{\omega(1+\phi_3)+\phi_2(\lambda+\beta\omega)+\phi_4} \tag{10}$$

As one could have expected, the higher the preference for stabilising output, the larger α^*. A small country (being characterised by a small λ), by benefiting less from the stabilisation ensured by monetary authorities,

will choose larger automatic stabilisers. This effect, however, tends to be compensated by the larger stabilisation derived by a more open economy via foreign trade.[8]

Notice also that, somewhat counter-intuitively, the higher the effectiveness of fiscal policy (that is the higher ϕ_1), the larger α^*. The reason is that, via the feedback effect on the budget, the more powerful impact on demand helps to keep down the cyclical component of the budget balance. Hence it reduces the deviation from target, which provides an incentive to choose a higher α.

3. Recent empirical evidence on the degree of fiscal stabilisation

Having discussed the working of automatic stabilisers in theory, this section focuses on the existing empirical evidence on their smoothing power. How effective are automatic stabilisers in EU countries?

In general, the measurement of the stabilising power of fiscal variables involves two channels. The first one is related to the sensitivity of government revenue and expenditure components to economic fluctuations. In an economic downturn, tax receipts will be lower as the respective tax bases are negatively affected, while on the expenditure side unemployment benefits will increase in line with the unemployment. The opposite will occur in an upturn. The second channel is related to the dampening effect of these cyclically-induced changes in budgetary components. Estimating the smoothing power of automatic stabilisers is particularly challenging due to the complex interactions between fiscal variables, types of the shocks and reactions of the private sector.

Most empirical studies investigating the impact of automatic stabilisers on economic activity are based on large macroeconometric model simulations. The appeal of using models is in their ability to account for many of the influences and interactions between the key economic variables. The results obtained are, however, model-specific and depend on the assumptions made on the accompanying monetary and exchange rate policies. As the simulations produce a range of estimates conditional on the

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[8] However, a strand of literature points to the fact that more open economies, being affected by larger external shocks, tend to have larger governments (for a survey of the literature, see Martinez Mongay, 2002).

imposed structure of the model and the underlying assumptions, the measurement of the smoothing capacity of automatic stabilisers is by no means uncontroversial. This is important to acknowledge when assessing the results.

On the basis of recent studies, what cyclical smoothing can be expected from "pure" automatic stabilisation? Table 1 presents the results of analyses with two well-known macroeconometric models: INTERLINK of the OECD (van den Noord, 2000) and NiGEM of the National Institute of Economic and Social Research (Barrell and Pina, 2000).

Table 1

Degree of stabilisation provided by automatic stabilisers

(percent)

	INTERLINK (1)	NiGEM (2)
B	22	5
D	31	18
EL	14	-
E	17	13
F	14	7
IRL	10	7
I	23	5
NL	36	6
A	7	12
P	-	10
FIN	58	7
Euro area	-	11
DK	-	-
S	26	-
UK	30	-

(1) 1-RMSD (Root mean square deviations) of the output gap in the 1990s.
(2) 1-RMSD of GDP growth.

Source: European Commission, 2001.

The OECD finds on average, a smoothing effectiveness between 25 and 30% for the euro area. As to the country-specific results the simulations indicate that Finland and the Netherlands, with their large budgetary automatic stabilisers, obtain the highest degree of output stabilisation, while the degree of stabilisation is significantly lower in Austria, France, Greece and Spain. The countries outside the euro area show a relatively high degree of cyclical smoothing.

The analysis with NiGEM (which only considers euro area countries) points to considerably smaller effects: in the range of 5 to 18%, with the euro area at 11%. Germany shows the highest dampening effects while, surprisingly, Finland features one of the lowest (just 7%). The lower stabilising effect appears to be due to the fact that the simulations do not just focus on demand disturbances, and in particular shocks to private consumption for which automatic stabilisers are most powerful, but consider multiple sources of uncertainty and so arrive at a lower average stabilising effect.[9]

Inspired by the recent empirical literature on monetary policy as well as the new institutional policy framework of EMU, a small but growing body of literature on the effects of fiscal policy based on a framework of vector autoregressions (the VAR estimation techniques) has started to emerge.[10] By estimating the short- and long-term fiscal multipliers[11] these studies seek to extract the impact of various fiscal policy instruments on economic activity. The results are in general in line with the Keynesian thinking as regards to the sign of the multipliers. However, in most cases short-term fiscal multipliers turn out to be significantly lower than predicted by the Keynesian framework or by model simulations. Consequently, even sizeable fiscal expansions may produce only a modest impact on economic activity.

4. Automatic stabilisers in practice: Quest model simulations

4.1 Simulation strategy

This section presents the framework of analysis when estimating the size of automatic stabilisers in EU countries with the Commission's quarterly macroeconomic model QUEST. The analysis distinguishes between three types of demand shocks – a shock to private consumption, private investment and export demand – and a supply shock to labour productivity.

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9 See Barrell and Pina (2000). Mélitz (1997, 2000) and Wyplosz (1999) also find that the cyclical sensitivity of the budget to economic activity may be lower than normally estimated.

10 Among others, Blanchard and Perotti (1999), Perotti (2000), Fatás and Mihov (2001).

11 The term fiscal multiplier is used as a general indicator of the impact of fiscal expansions and contractions on output.

For any quantitative assessment of the smoothing capacity of automatic fiscal stabilisers, a benchmark regime has to be defined in which the budgetary impact of economic fluctuations is exactly offset by changes in other components of the budget and with which a comparison can be made. But results are sensitive to which budget items adjust to keep the overall fiscal balance fixed. Some studies define the benchmark regime as one in which tax revenues for some selected categories (and sometimes also selected expenditure items) are kept constant and the impact of economic fluctuations is implicitly offset by changes in tax rates. Here a more general approach is considered in which the impact of economic fluctuations on the budget is offset by across-the-board changes in all other budget items, such that the overall fiscal balance is kept constant. Hence, the quantitative assessment of automatic stabilisers in this paper involves two steps: first the impact of economic fluctuations on the budget is estimated, and this is then combined with the average effect of fiscal policy changes on economic activity in the model to provide an estimate of the smoothing capacity of automatic stabilisers.[12]

The QUEST model can be characterised as a modern version of the neoclassical-Keynesian synthesis. Behavioural equations in the model are based on intertemporal optimisation of households and firms with forward-looking expectations. Prices adjust sluggishly and the nominal wage response is delayed because of overlapping wage contracts. The model has Keynesian features in the short run, but the effectiveness of fiscal policy is more limited than in the textbook Keynesian model because of intertemporal budget constraints imposed in the model.[13]

As already pointed out above, fiscal multipliers associated with various policy actions are not independent of the assumptions underlying the simulations. Both the size and sign of the output effects of the budgetary measures depend *inter alia* on the assumptions made on the monetary policy response, formation of private sector expectations, price and wage flexibility, functioning of labour market institutions and the response of other fiscal variables to simulated budgetary policy changes.

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[12] In European Commission (2001) an alternative method is also reported, in which the damping provided by a proportional tax system is directly calculated by comparing it to a system without proportional taxes (and where they are effectively replaced by lump-sum taxes). This gives generally much smaller estimates of smoothing of shocks, on average around 5% in the model (see European Commission (2001), p. 186-7).

[13] See Roeger and in 't Veld (1997).

Fiscal policy in the QUEST model operates basically through two standard channels in the short run: via the direct aggregate demand channel and through interest and exchange rate channel. The extent of crowding out through induced changes in interest rates and the exchange rate affects the size of fiscal multipliers but in general, does not change their sign. In response to fiscal expansions interest rates tend to rise and with flexible exchange rates, higher domestic interest rates by attracting capital inflows tend to appreciate the exchange rate.

More specifically, it is assumed that the ECB follows a targeting rule which puts a high weight on (expected) inflation and a low weight on output, and hence interest rates increase in response to fiscal shocks that raise inflationary pressures in the euro area. Denmark with a narrow fluctuation band *vis-à-vis* the euro, is assumed to follow the ECB interest rate policy, while Sweden and the UK are assumed to follow an independent monetary policy. Therefore, in the case of a negative demand shock, this implies that the central bank increases money supply as output contracts in order to closely meet a baseline inflation target. The fact that monetary policy is allowed to function as another stabilising mechanism in the simulations and interacts with the operation of the automatic fiscal stabilisers has an important bearing for the results.[14]

Consumption and saving in the model are based on a forward-looking optimising model of life-cycle behaviour. The main variables determining consumption are lifetime income (i.e., human wealth, consisting of the current income and the expected discounted future net income stream) and financial wealth. In addition, it is assumed that a fraction of households are liquidity constrained and in consequence their consumption is determined by current disposable income.[15]

Furthermore, when interpreting the results of the simulations, it is important to note that the model contains a tax policy rule that stabilises

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[14] As the single monetary policy reacts only to the area-wide inflation, country-specific shocks in the euro area trigger monetary policy response only to the extent they affect area-wide inflation. Consequently, as was shown in the theoretical analysis in section 2, the role of monetary policy in stabilising inflation and output is relatively modest in small euro area member countries compared to the large ones. The monetary policy assumption for countries not participating EMU implies a somewhat tighter monetary stance, at least in the UK and Sweden, than in the euro area as in these countries the monetary policy reaction and the ensuing appreciation of the exchange rate offset more of the initial fiscal boost and as a result the GDP effect remains smaller than on average in the euro area.

[15] The allowance of liquidity constrained consumers implies that Ricardian equivalence does not hold fully and thus, fiscal policy can have an impact on private consumption and aggregate demand.

the debt to GDP ratio in the medium term. In the simulations this reaction function is turned off during the first years (the deficit and debt to GDP ratios rise in the first years). As it is assumed that fiscal stabilisers operate symmetrically over the cycle, the temporary shocks are reversed in following years such that there is no structural deterioration in budgetary positions, but the tax policy rule is turned on in the medium term so that lump-sum taxes are increased gradually to stabilise the debt to GDP ratio.

Simulations involve three-steps as follows:

(a) The sensitivity of the budget balance to the cycle is obtained by simulating the impact of a shock of 1 per cent of real GDP on government revenues and expenditures. Simulations are run separately for the three types of demand shocks and one supply shock, each scaled to equal 1 per cent of real GDP. All shocks are asymmetric individual country shocks, i.e. one country at the time is affected by a negative disturbance that reduces GDP in the first year by 1 per cent relative to baseline.

(b) The impact of an expansionary fiscal shock of 1 per cent of real GDP on economic activity is derived to calculate the short-term fiscal multipliers associated with temporary changes in government expenditures and revenues.

(c) The smoothing capacity of automatic stabilisers are computed by using the estimated budgetary sensitivities and fiscal multipliers. It should be noted that the results are sensitive to the type of assumptions made regarding the hypothetical benchmark scenario where automatic fiscal stabilisers are not allowed to operate.

The first two steps are discussed in IV.2 and IV.3 while the final one is presented in the next section.

4.2 Sensitivity of the budget to economic fluctuations

The modelling of tax revenues is crucial for the assessment of the operation of the automatic budget stabilisers. The QUEST model distinguishes between labour income tax (inclusive of social security contributions), corporate profit tax and consumption tax (VAT). These taxes are modelled proportionally, i.e. for each category the tax revenue

has a unitary elasticity with respect to its respective tax base[16]. For instance, for corporate profit tax, this implies that tax revenues are proportional to profits, and the cyclical sensitivity of corporate tax revenues depends on the sensitivity of profits to output fluctuations. This in turn depends on the origin of the shock.

The sensitivity of income tax revenues (including social security contributions) to output fluctuations reflects the sensitivity of employment and wages to output shocks. Indirect tax revenues depend on fluctuations in consumption. A consumption shock has a direct impact on VAT revenue, while investment and export shocks only have an indirect effect. As will become clear, the origin of the shock has very important implications for the magnitude of the cyclical sensitivity of the tax revenues.

Concerning government expenditure, it is common practice to focus on unemployment-related expenditure as an automatic stabiliser. As different types of shocks to output have different effects on unemployment, transfers related to unemployment benefits will fluctuate in proportion to the impact on unemployment. While other expenditure categories also tend to fluctuate with the cycle, often in a pro-cyclical fashion, this is considered here as non-automatic and discretionary, although the distinction may be somewhat artificial and controversial.[17] For this exercise, it is assumed that these other expenditure categories do not react to cyclical swings, and they are thus kept fixed at their base levels. Although this may not be a good description of the real behaviour of fiscal authorities, it allows one to concentrate on the operation of 'pure' automatic stabilisers.

Table 2 reports the estimated budgetary sensitivities under various shocks to the economy, all scaled to equal 1 per cent of GDP. The budget sensitivity is particularly large under private consumption shocks. The deficit to GDP ratio rises by between 0.5 and 0.9 percentage points (in Ireland and Greece, respectively), as tax revenues, and in particular indirect taxes, are directly affected by this shock. Shocks to private investment and

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[16] While this is the default assumption and applied in the simulations underlying the calculations reported here, this assumption can of course easily be relaxed in the model, for instance to analyse the effects of a more progressive income tax system.

[17] While an expansion raises tax revenues, it also tends to raise government expenditure. According to Mélitz (2000) this pro-cyclical discretionary policy had become systematic and in a sense quasi-automatic. Hence, the distinction between "pure" automatic stabilisation and discretionary policy reactions may not be as clear-cut as often assumed.

Table 2

Sensitivity of the budget under various shocks

	Consumption shock	Investment shock	Export shock	Productivity shock
B	0,57	0,17	0,27	0,07
D	0,65	0,19	0,27	0,16
EL	0,87	0,20	0,27	0,1
E	0,77	0,18	0,25	0,09
F	0,80	0,21	0,30	0,12
IRL	0,50	0,10	0,17	0,03
I	0,68	0,22	0,30	0,23
NL	0,59	0,15	0,23	0,08
A	0,61	0,17	0,26	0,09
P	0,82	0,17	0,26	0,13
FIN	0,77	0,16	0,25	0,03
Euro area average	0,70	0,19	0,28	0,14
Standard deviation	0,12	0,03	0,04	0,06
DK	0,67	0,18	0,28	0,06
S	0,77	0,16	0,25	0,29
UK	0,60	0,18	0,27	0,28

export demand have a smaller impact on the budget than consumption shocks, less than half the size, as no tax category is directly affected by this type of disturbance. Also technology shocks have a lower impact on the budget deficit.

The widely used OECD estimates for budget sensitivity to cyclical fluctuations (see van den Noord, 2000) produce an overall responsiveness of the budget deficit to the changes in the output gap that averages around 0.5 for the EU and varies between 0.3 for Austria and 0.8 for Denmark.[18] While such estimates have the advantage that the elasticity of the budget to the cycle can be summarised into a single statistic, the drawback is that they hide some very crucial differences in the impact of various shocks on the budgetary position. The results are also sensitive to the period chosen.

The simulations presented here clearly show that the cyclical sensitivity of the budget depends crucially on the origin of the shock. If variations in GDP are primarily driven by consumption shocks then the cyclical sensitivity of the budget is much higher than when they are primarily driven by investment or export shocks. Not surprisingly, a foreign demand shock, like the Asian crisis in 1997-98, has a much smaller effect on the deficit than a shock to domestic consumption, as the latter affects directly VAT returns.[19]

While direct comparison of these shock-specific elasticity estimates with the average elasticities reported by the OECD is not straightforward, the overall size of the cyclical sensitivity of the budget balance is broadly similar.[20] However, the country-specific ranking is different and varies between the shocks. Under consumption shocks the cyclical sensitivity of the budget varies considerably more across euro area countries than under the other shocks. This is partly a reflection of differences in effective tax rates on consumption in the model, which is low in Spain and much higher in nordic countries (Martinez-Mongay, 2000). Countries with higher overall tax rates display a higher budget sensitivity but what is particularly important for the consumption shock is the share of indirect tax in total tax revenues, which is high in e.g. Portugal.

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[18] The OECD approach relies heavily on estimation of reduced form equations to derive the elasticities of various budget categories with respect to economic fluctuations. While this approach may provide some valuable insights into the size of the effects of past disturbances on the budget, such reduced form regressions suffer from several econometric shortcomings and these estimates are subject to wide margins of uncertainty. Moreover, the OECD elasticities do not make any distinction between various types of shocks.

[19] See European Commission (2000).

[20] Differences in the average OECD elasticities are to a large extent driven by the different estimates of the output elasticity of primary current expenditure (high for the Netherlands and Denmark, low for most other countries, see Van den Noord (2000).

4.3 Short-term fiscal multipliers

As budgetary components have different effects on aggregate demand and supply, in order to obtain a measure of the short-term impact of budgetary changes on real GDP (i.e., the short-term fiscal multipliers), various categories of government revenue and expenditure were shocked separately. Short-term expenditure multipliers are derived from a shock in which government expenditures are increased by one per cent of (baseline) GDP. On the expenditure side, a distinction is made between government purchases of goods and services, government investment, transfers to households and government employment. Short-term revenue multipliers are produced by reducing labour tax, corporate profit tax and value-added tax by one per cent of (baseline) GDP. As the focus is on cyclical stabilisation, assumed to operate symmetrically over the cycle, the fiscal shocks are all temporary shocks lasting two years, but reversed in the following year.[21] The effectiveness to stimulate economic activity by higher government expenditure is relatively modest, because a large part of the fiscal expansion is crowded out or leaks abroad through higher imports. This outcome is due to several effects. First of all, private consumption falls in response to higher government expenditure. Higher real interest rates triggered by expansionary fiscal policy makes saving more attractive and induces forward-looking consumers to reduce consumption. A rise in interest rates has also negative wealth effects, as it increases the rate at which expected future income is discounted. Moreover, although liquidity constrained consumers increase their consumption as they see their disposable income rise, permanent income consumers anticipate the temporary nature of the fiscal expansion (which is later reversed), and permanent income is not much affected.

The second channel through which a fiscal expansion crowds out private spending is private investment. While profitability is boosted by the fiscal expansion in the short run, the rise in real interest rates offsets this positive effect and net effect on private investment is generally small (positive or negative).

As to the specific simulation results, the short-term fiscal multipliers associated with various expenditure categories for each EU Member State are reported in Graph 3.

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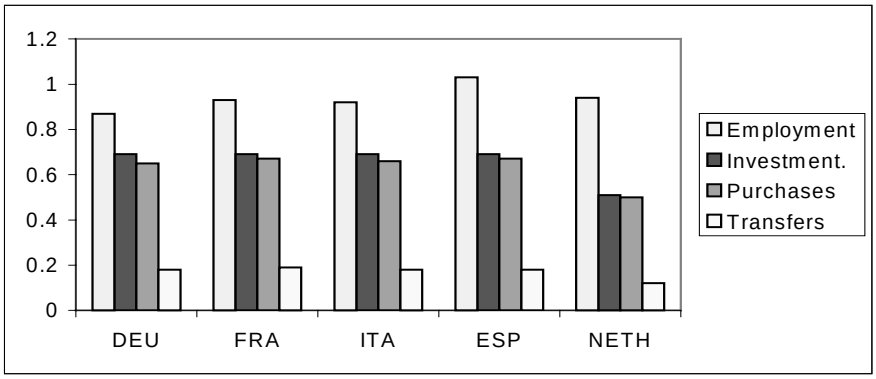
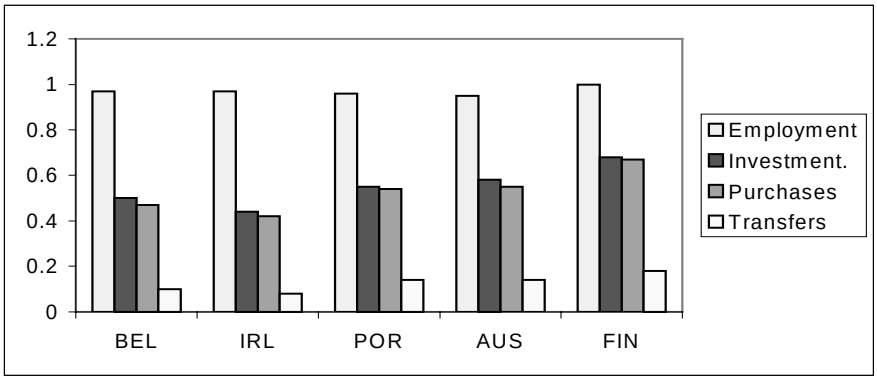
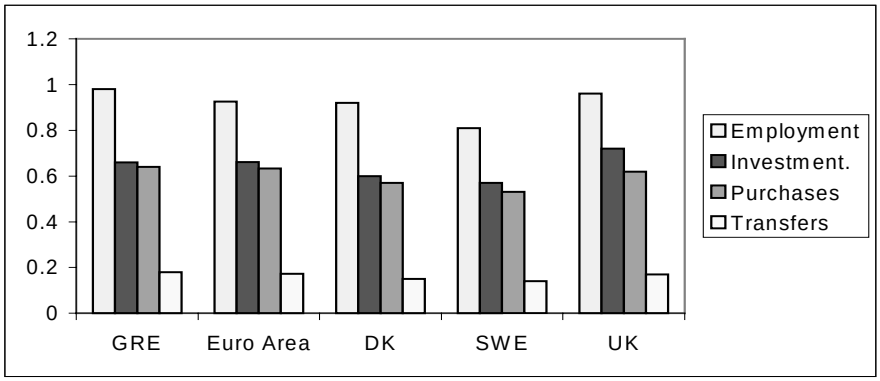
[21] In fact, it is assumed that the fiscal expansion is followed in the medium term by a fiscal contraction, such that there is no autonomous increase in government indebtedness (and no increase in future tax liabilities).

Graph 3

Short term expenditure multipliers: the impact on GDP of an increase in government expenditures by 1% of GDP







According to the simulations the impact of a 1 per cent of GDP increase in government outlays varies significantly across spending categories and over time, but the pattern is roughly the same in all countries. The first-year impact of all spending categories is positive, although in most cases small. The notable exception is government employment, which has a multiplier close to unity in all countries.[22] However, the strong positive impact of higher government employment is only temporary and in case of more persistent or even permanent shocks, it would be crowded out in the medium term through its effect on private sector wages (higher public employment reduces overall unemployment and leads to higher wage demands, which have a negative effect on private sector employment and output).

The short-term impact of government purchases of goods and services as well as government investment is somewhat smaller than that for employment, the multipliers being in the range of 0.5-0.7. In case of more persistent shocks, the expansionary effect of higher government purchases would fade away rapidly over the medium term, whereas that of government investment would have a more lasting impact by raising public capital stock and potential output. The smallest expansionary effect in all countries is achieved through a temporary increase in higher government transfer payments, most of which is saved.

Graph 4 reports the short term multipliers associated to reductions in labour income tax, corporate profit tax and value added tax by 1 per cent of (baseline) GDP. In general, the simulations suggest that the impact of temporary labour and corporate income tax cuts on output is small because the intertemporal optimising behaviour of economic agents smooths away most of it.[23] Over the medium-term the impact of a tax cut would gain strength as distortionary effects of taxation are reduced.

A reduction in labour income taxes has a direct demand effect through its impact on disposable income and a positive supply side effect by increased employment.. The principal reason why the short-term impact of lower labour income taxes remains very small is that consumers smooth

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[22] This is partly due to the way GDP is measured, with GDP defined as the sum of private GDP and the government wage bill. An increase in the latter raises potential GDP automatically.

[23] In a pure optimising model, temporary tax changes that are later reversed should not have any effect on spending. The reason temporary income tax multipliers are positive in the model is because some consumers and firms are assumed to finance their spending out of current disposable income and profits respectively, due to liquidity constraints.

the temporary tax cut over a large number of periods, while supply-side effects by fostering labour demand would only start to feed in only with a lag. This positive supply-side effect is also associated with a depreciation of the real exchange rate which boosts demand further, especially in small open economies in EMU.

The employment response to a change in labour taxation differs per country, but tends to be higher in the continental European countries than in the Scandinavian and 'Anglo-Saxon' countries. These country-specific differences arise inter alia from varying lags in the labour demand and different labour market institutions.[24] It should also be noted that to some extent monetary policy with independent inflation targeting in Sweden and the UK has an important bearing on the simulation results. In these two countries a larger part of fiscal expansion is crowded out through higher interest rates because monetary policy reacts more to domestic inflationary pressures than is the case in the euro area countries, where monetary policy reacts only to area-wide inflation.

A reduction in corporate taxes has a direct demand impact through its effect on current profits, but as the tax cut is reversed in the medium term the positive impact remains small. A reduction in the value added tax boosts consumer spending in the short term, as forward looking consumers frontload their spending to the current year in anticipation of higher indirect taxes again in following years. However, a large proportion of the positive impact is crowded out through higher interest rates or, for the smaller more open economies leaks abroad via higher imports. As interest rates rise to contain inflationary pressures stemming from higher consumer spending, private investment is also crowded out.

As a very broad characterisation, the results therefore indicate that in the short run, the impact of fiscal policy is larger on the expenditure side and than on the tax side. However, it should be borne in mind that this conclusion holds for temporary fiscal policy. In case of longer lasting more persistent fiscal policy actions, the impact from the expenditure side would fade out in the medium term (due to crowding out effects) while on the tax side the impact increases over time as supply side effects become more important.

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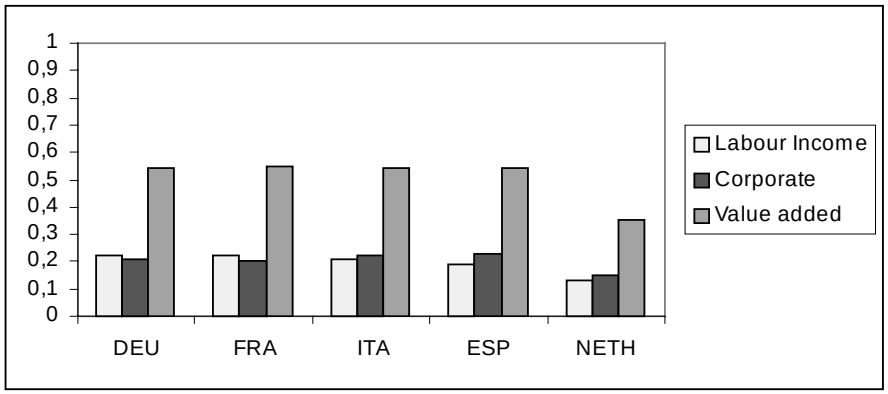
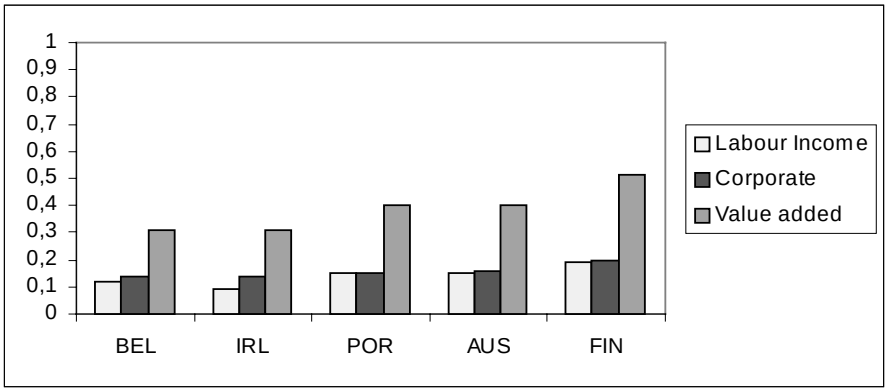
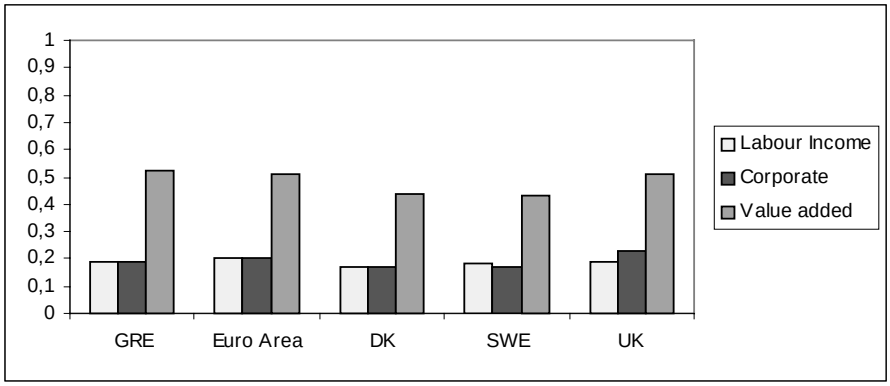
[24] In the model these differences are reflected in the indexation of unemployment benefits to gross/net wages.

Graph 4

Short-term tax multipliers:
the impact on GDP of a decrease in taxes by 1% of GDP







5. Smoothing power of automatic stabilisers under various shocks

To obtain an estimate for the smoothing power of automatic stabilisers, the cyclically-induced change in the budget balance is multiplied by the weighted average of the short-term revenue and expenditure multipliers. Following the differences in the estimated sensitivity of the budget to cyclical fluctuation, the average stabilisation impact of automatic stabilisers shows a significant variance under various shocks to the economy.

The simulations suggest that the degree of smoothing provided by automatic stabilisers vary significantly under various types of shocks and across countries. What matters is not only government size as such, but the relative size of cyclically-sensitive budget items. The highest degree of stabilisation is provided under a shock to private consumption – which is very "tax-rich" – and the lowest under an investment shock. The results for export demand shocks are generally close to those under private investment shocks. Under supply shocks the smoothing effectiveness is relatively low.

The estimations of the smoothing impact of automatic stabilisers for individual EU countries are presented in Graph 5. The results indicate that, in the case of a *private consumption shock*, automatic stabilisers smooth over 30 per cent of GDP fluctuations in France, Finland and Greece, while in Belgium and Ireland the smoothing impact of automatic stabilisers is less than 20 per cent.

As pointed out above, the smoothing impact of automatic stabilisers depends to a large extent on the cyclical sensitivity of the budget: the larger the cyclical sensitivity of the budget the higher the stabilisation provided by automatic stabilisers. In the case of a consumption shock, an important factor behind the differences across countries is the structure of taxes: automatic stabilisation is larger in countries with relatively high share of tax revenues coming from indirect taxes as they are directly affected by a consumption shock. However, the "efficiency" of automatic stabilisers – that is the smoothing impact of a given change in the budget balance – is not the same across the countries. For instance, under a negative consumption shock, a worsening of the budget deficit by 0.77 percentage points of GDP in Finland and Spain gives a higher degree of stabilisation in Finland.

In the case of a *private investment shock*, the power of automatic stabilisers is considerably lower. Differences across countries largely

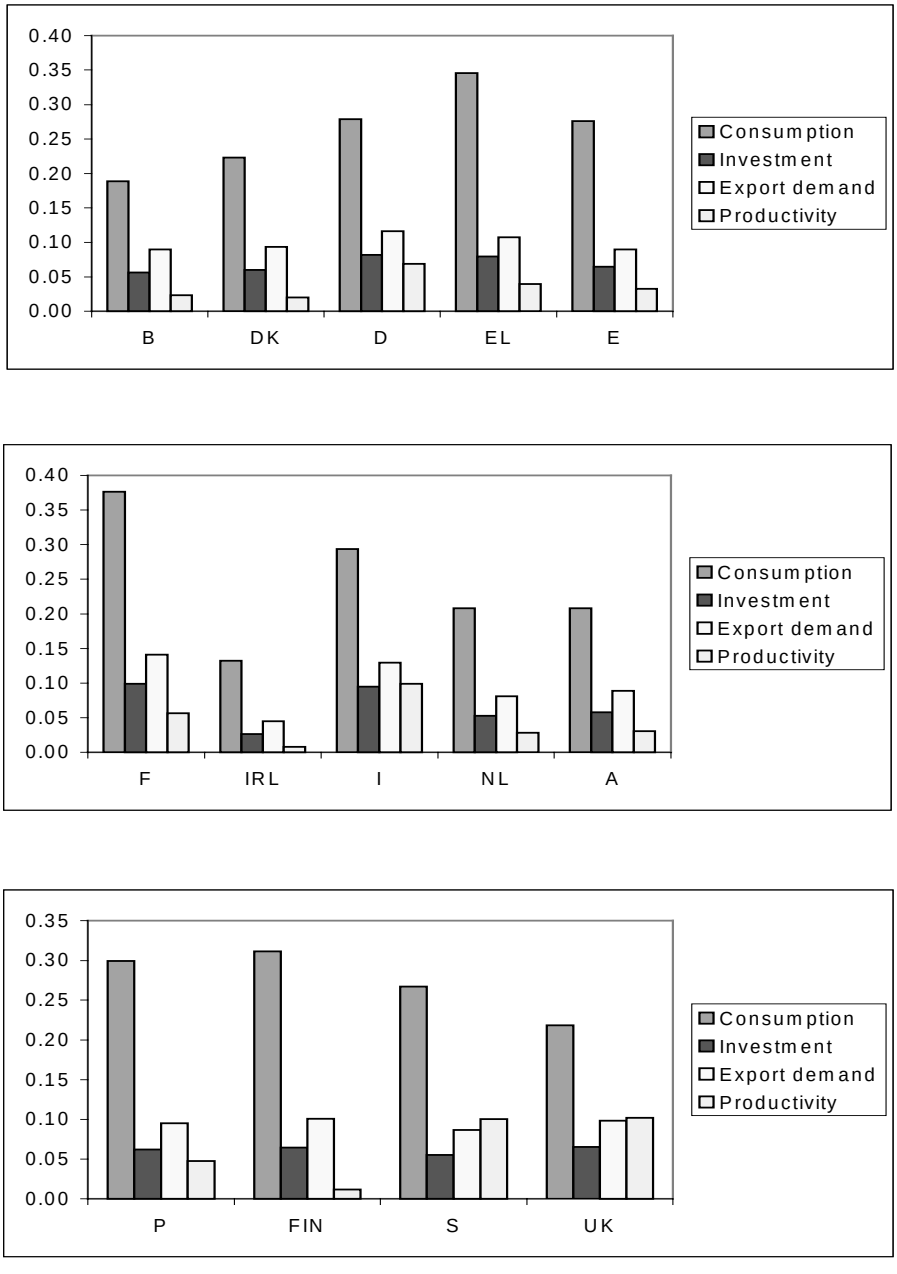
reflect differences in the sensitivity of the budget to this shock but the variation is small. The same holds for an *export demand shock*. The highest stabilisation is derived in France (10 and 14 per cent respectively), and the lowest is in Ireland (3 and 5 per cent). The more open economies have a relatively low impact multiplier for expenditure shocks in the model and this implies a lower smoothing capacity of the stabilisers. Ireland also displays a lower budget sensitivity to this particular shock, reflecting a higher reliance on indirect taxation, and achieves a lower degree of smoothing.

While automatic stabilisers have a desirable impact under demand shocks, the dampening effect provided by tax and welfare systems may be less desirable under supply shocks if the shock is permanent, as it delays the adjustment of output to its new potential. As pointed out in section 2.2, in case of a negative supply shock, there also arises the issue of a potential conflict between fiscal and monetary authorities as output goes down while inflation accelerates. In the case of large countries within the euro area, monetary authorities will respond by raising interest rates to offset the inflationary impact of the shock, and this will have a negative effect on GDP. Clearly, the larger the stabilisers, the stronger the reaction of the central bank. In the case of small euro area countries, the monetary response will be very limited and, as a result, inflation will rise in the country concerned. Again, large automatic stabilisation will entail further negative consequences on competitiveness.

The empirical relevance of these theoretical concerns is still under-researched as, more generally, is the role of automatic stabilisers in the event of supply shocks. In order to explore this issue, we have simulated a negative shock to labour productivity which last for two years. As shown in Graph 5, the average degree of stabilisation provided by automatic stabilisers is modest in all EU countries. Again, Ireland appears to have the smallest smoothing capacity for this particular shock, as it is a small open economy and relies more on indirect taxes, which are not directly affected by this type of shock. Overall the differences across countries are small, ranging from 1 per cent in Ireland, and Finland to 10 per cent in Italy, Sweden and the UK. Shocks in the larger countries are accompanied by a larger monetary tightening, given their weight in the ECB reaction function, which increases the negative impact on their budgetary positions. The highest sensitivity of the budget is found in Sweden and the UK, which have an independent monetary policy.

Graph 5

Smoothing power of automatic stabilisers
(percent)



These results are comforting as "too much" stabilisation may be harmful in the event of a long-lasting shock as they could lead to potential conflicts with monetary authorities, negative competitiveness effects and a slowdown of structural change: in other terms the low smoothing effect shown by the simulations may actually be a good thing.[25]

6. Conclusions

This paper has addressed the issue of the role and effectiveness of automatic stabilisers in EMU. Fiscal stabilisation is desirable in the case of a demand shock because it allows to smooth both output and inflation. Our results show that automatic stabilisers are quite effective in the case of shocks to private consumption, whilst they are less effective in the case of shocks to investment or external demand.[26] In the latter case, within-EMU real exchange rate adjustment via inflation differentials may supplement fiscal stabilisation.

In the case of a temporary supply shocks such as a short-term surge in the oil price affecting the whole euro area or a large country, a conflict may arise between monetary and fiscal policy as inflation and output move in opposite directions. Interest rates may have to be raised to keep inflation in check while automatic stabilisers tend to limit the output loss. Nevertheless, some degree of output smoothing via automatic stabilisers may be desirable since the adverse effect on inflation is necessarily short-lived. If the supply shock only hits a small economy in the euro area, the common monetary policy does not react and fiscal stabilisation helps smooth output, but aggravates inflationary pressures at the national level thereby leading to a loss of competitiveness.

In the event of a permanent supply shocks which change the output potential of the economy (e.g. a lasting change in productivity due to

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[25] However, the focus on impact effects may mask deeper imbalances building up over the longer run in case of permanent shocks. In a dynamic perspective, the "direct" adverse implications of income smoothing have to be weighted against the possibly favorable effect of income support in fostering real wage flexibility and labour mobility. On the other hand, welfare systems which give rise to benefit dependency may harm structural flexibility. The interplay between replacement rates and benefit duration is crucial in delivering the appropriate balance between stabilisation and flexibility.

[26] Note that no quantitative assessment is given of the likelihood of different shocks occurring.

technological innovation, long-lasting real wage gap, evolving degree of competition on the product markets, permanent shift in the terms of trade), output smoothing may not be the optimal response. Ideally, in the event of a permanent shock, the economy should adjust to a new equilibrium level, and fiscal stabilisation may slow down the inevitable structural adjustment. In contrast, public finances (that is tax and welfare systems) that are conducive to real labour market flexibility and resource re-allocation are paramount in adapting to the new structural conditions of the economy.

In sum, automatic stabilisers are useful to stabilise output in the case of temporary shocks, although in the case of supply shocks output stabilisation may come at the cost of temporarily higher inflation. However, in the case of permanent (mainly supply) shocks, high automatic stabilisers may delay the inevitable structural adjustment and, if they are symmetric, imply a stronger response by the monetary authorities.

Our analysis does not pretend to provide definite answers to the issue of cyclical stabilisation in EMU. First of all, the degree of smoothing provided by automatic stabilisation may change over time. EMU as such may increase the stabilisation efficiency of fiscal policy by dampening interest and exchange rate responses to changes in fiscal policy in individual member countries. Also structural reforms may lead to lower fiscal stabilisation if they entail a reduction in progressivity of tax systems and less generous unemployment benefits. This trade-off is however not self-evident in terms of overall adjustment capacity of the economy, since tax and spending reforms should also increase flexibility in factor markets and thereby reduce the need for traditional fiscal stabilisation.

A related issue is whether the degree of stabilisation provided by the current set of automatic stabilisers is sufficient or appropriate with respect to national and area-wide needs in the euro area. Automatic stabilisers have not in general been designed with cyclical considerations in mind and certainly not in view of the monetary union, but rather are the outcome of the working of tax and welfare systems, themselves the expression of social and political preferences regarding income redistribution and social insurance.

As pointed out in a number of papers (see, e.g. European Commission, 2001, and Buti *et al.*, 2002), there is a potential trade-off between cyclical stabilisation and structural flexibility, that is the responsiveness of labour and product markets to supply-drive shocks: reforms that improve the former may actually hinder the latter. In order to

overcome this trade off, consideration could be given to designing structural public finance reforms which pursue economic efficiency and at the same time do not hamper (and possibly improve) the working of automatic stabilisers.

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