Session 2

FISCAL STABILISATION

THE EFFECTIVENESS OF FISCAL POLICY IN AUSTRALIA SELECTED ISSUES

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1. Introduction

Australian fiscal policy is based on a medium-term framework designed to ensure budget balance over the cycle. This medium-term framework ensures that the Government balance sheet remains in good order. The formulation of the fiscal strategy, with an 'over the cycle' emphasis, also allows the use of fiscal policy as a demand management tool.

The fact that the strategy allows the use of discretionary fiscal policy raises the question of the desirability and effectiveness of discretionary fiscal policy. Australia is a relatively small, open, financially developed economy with a floating exchange rate. Standard economic theory suggests that monetary policy is a relatively more potent demand management tool for such economies. For example, it predicts that fiscal expansion will produce higher interest rates that will reduce investment expenditure. However, it also predicts that the instantaneous inflow of capital will to some extent circumvent any change in interest rates, and produce an appreciation of the currency and a smaller contribution of net exports to growth. In contrast, expansionary monetary policy leads to lower interest rates, capital outflow and a depreciated currency, which increases the net export contribution to growth. Symmetrically, with the first policy case, the capital outflow will mitigate the actual change in domestic interest rates.

From a policy maker's perspective it is important to have some understanding of the effectiveness of fiscal policy to inform the desirability and magnitude of any fiscal package. The paper does not attempt to ascertain the total effectiveness of fiscal policy. This paper focuses on two

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factors — private sector saving offsets and interest rate effects — that may reduce the effectiveness of fiscal policy as an aggregate demand management tool in Australia.

The paper is organised as follows. Section II considers evidence of private sector saving offsets in Australia. Section III considers the potential link between fiscal policy and interest margins. Section IV considers the policy implications of the paper's findings.

2. Fiscal Policy and Savings Offsets in Australia

The following is a stylised description of the conventional view of the effects of a fiscal expansion where, for example, the government reduces taxes, with no planned reduction in current or future expenditures.

In the short run the effect of the government reducing taxes is to stimulate consumption which increases aggregate demand and in turn aggregate supply. This boost to consumption is partly offset in the short run by a range of crowding out effects — notably by higher interest rates reducing the level of investment and/or an appreciation of the exchange rate reducing net exports. In the long run the higher interest rate reduces capital accumulation and adversely affects growth. Notwithstanding these offsets and the long run effect on growth, fiscal policy does stimulate activity in the short-term. As such fiscal policy can be an effective tool for demand management.

However, another strand of literature that deals with Ricardian equivalence challenges this conventional wisdom (see Barro (1974)). Ricardian equivalence, suggests that fiscal policy will not alter consumption, savings or growth.

Ricardian equivalence is based on the insight that lower taxes and a budget deficit today require, in the absence of any change in government spending, higher taxes in the future. If individuals are sufficiently forward-looking they will understand that their total expected tax burden is unchanged. As a result they will not increase consumption, but save the entire tax cut to meet their expected future tax liability. The decrease in government saving will thus be offset by an increase in private saving.

Perfect (or full) Ricardian equivalence relies on a very strict set of assumptions including: individuals' consumption choices fit a life cycle

model of consumption; they are forward looking; and effectively 'infinitely lived' through a bequest motive inspired by each generation's concern about the welfare of the next generation.[1]

The full set of assumptions required for full Ricardian equivalence appears not to accord with reality. However, the key issue for the effectiveness of fiscal policy is not necessarily whether all these assumptions hold, but rather whether there is some offsetting savings behaviour that may reduce the demand impact of fiscal policy. Furthermore, there are a range of other possible reasons that may illicit savings offsets at the appropriate level. For example, individuals may smooth their consumption or suffer from consumption inertia. This is essentially an empirical question. Our investigation of this empirical question is motivated by consideration of all these potential savings offsets.

International evidence suggests that an increase in public saving tends to lower private saving with an offset coefficient of around one half (Masson, Bayoumi and Samiei (1995); Callen and Thimann (1997); and Loyoza, Schmidt-Hebbel and Serven (2000)).

In contrast to these international studies, previous work with Australian data (Edey and Britten Jones (1990); Blundell-Wignall and Stevens (1992); and Lee (1999)) has found little evidence of Ricardian effects.

However, there may be a range of issues with previous Australian studies which may have affected their findings. We now briefly discuss some issues related to these studies.

Blundell-Wignall and Stevens (1992) regressed the change in the private savings ratio on the change in the public savings ratio using annual data from 1964 to 1991, and found no significant offset. We find similar results when this approach is replicated with annual data from 1974-75 to 1999-2000.[2] However, when we have included other potential explanatory variables that may affect private savings (unemployment; income; inflation; and, real interest rate) we find a significant saving offset of around a half.[3] This suggests that the previous study's regression analysis

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1 For a full set of assumptions underpinning Ricardian equivalence see Elmendorf and Mankiw (1998).

2 Annual data for this study was constructed from quarterly series listed in Appendix 1.

3 Full results of this model can be found in Appendix 5.

may have been misspecified due to the omission of other explanatory variables.

Lee (1999), using quarterly data from 1980:1 to 1999:1, found no significant offset between household savings and changes in aggregate general government savings. However, while the evidence for savings offsets is weak at the household level, it is more appropriate to consider a broader measure of saving such as total private sector savings. Private sector savings include the savings of private corporations in addition to household savings.

This distinction is of little consequence if household and private savings are highly correlated, however, there is evidence to suggest this is not the case.[4] Chart 1 indicates that the household savings ratio in Australia is not a good proxy for overall private savings behaviour. The correlation coefficient between the private savings ratio and the household savings ratio over the period 1979-80 to 2000-01 is 0.83.

We adopt a broader measure of private saving in order to investigate the potential offset between private sector and government saving over the period 1981:1 to 2001:2. As a proxy for private sector saving we have used household plus corporate savings. Ideally we would use private sector saving calculated according to a methodology outlined in Treasury (1999, 48-50) however, this measure of net private sector saving is not available on a quarterly basis.[5]

Chart 2 illustrates that the household plus corporate savings ratio tracks the private sector savings ratio well, suggesting it is a good proxy for private savings.[6] The correlation coefficient between the private savings ratio and the household plus corporate savings ratio over the period 1979-80 to 2000-01 is 0.91.

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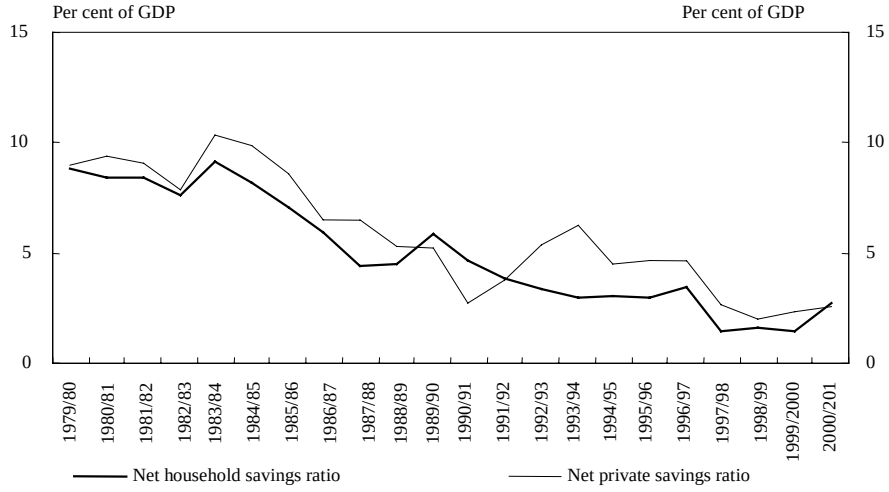
4 One reason for this may be the long-term trend in Australia towards the incorporation of non-incorporated businesses. This has tended to reduce household saving without necessarily producing an underlying change in private sector savings behaviour. Another reason may be potential piercing of the corporate veil by households. Because corporate savings are essentially private savings changes in corporate savings may illicit changes in household savings without there being an underlying shift in private savings behaviour.

5 Quarterly data on the split between public and private corporate savings is not available.

6 An alternate private savings proxy was calculated by extrapolating the annual private/public corporations split into quarterly data. The regression results using this second proxy are substantially similar to those reported in this paper. Results of this regression are available from the authors on request.

Chart 1

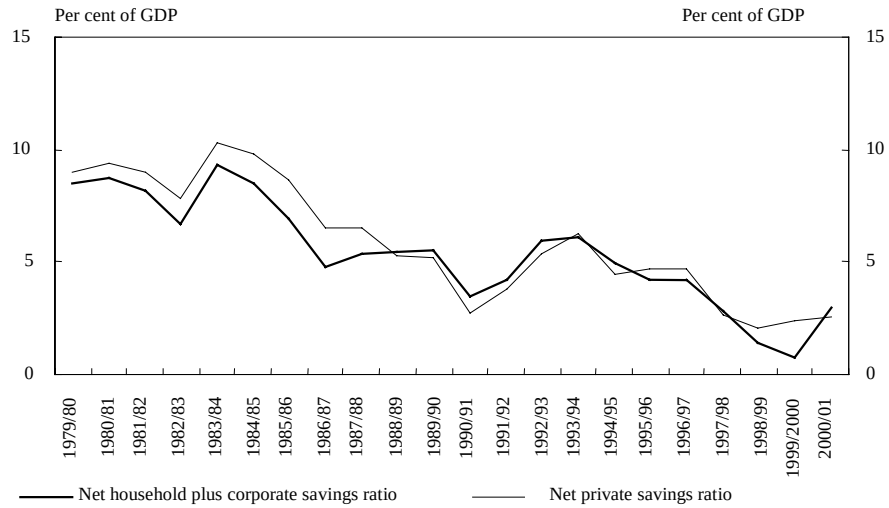
Comparison of net Household and Private Sector Savings Ratios



Source: ABS 5206-61; ABS 5206-56; Treasury Estimates.

Chart 2

Comparison of net Household plus Corporate and Private Sector Savings Ratios



Source: ABS 56206-61; 5206-64; 5206-56; Treasury Estimates (see Spring 1999 Economic Roundup, 'The Measurement of Saving in Australia', pp. 48-50).

Details of all data series used for this study are contained in Appendix 1. All of the data series used in this study were found to be non-stationary in the levels and stationary in first differences, i.e. that the variables are I(1), based on the Augmented Dickey-Fuller and Phillips-Perron Test results presented in Appendix 3.[7] There is evidence of at least one cointegrating relationship between these variables as per Johansen-Julieus procedure in Appendix 3.

The **long-term** 'equilibrium' level of private saving is hypothesised to be a function of general government saving, controlling for the influence of the inflation rate, the unemployment rate, the real interest rate, per capita household disposable income, direct taxes, social assistance paid to households, household wealth, and household debt (a proxy for financial deregulation). In the **short-term**, changes in private saving are hypothesised to be a function of changes in general government saving, controlling for changes in the same 'state' variables.

Private savings are anticipated to be negatively related to general government savings. This supposes that a fall in government saving would lead households to expect increased future tax liabilities and therefore to increase their saving rate in order to offset those expected future tax liabilities. Direct taxes and private wealth should be negatively related, while household disposable income should be positively related to private savings, both in levels and changes. A priori theory provides no unambiguous guide to the sign of the remaining variables.[8]

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[7] All the series in this paper were found to have I(1) characteristics with the exception of national government cyclical savings. Following Hendry (1995), the approach to determining the inclusion of constants and trends in the ADF tests was based on commonsense. As many of the series in question were ratios, only a constant was included. The finding that ratios are unit root processes is inconsistent with theory, however, small sample properties of such series often mimic unit root properties. Under these conditions it can be appropriate to model them as I(1) series. This is the approach adopted here.

[8] *Unemployment*: Increasing unemployment lowers disposable income and, through a greater incidence of liquidity constraints, lowers savings. On the other hand, increases in unemployment may increase the need for precautionary saving.

Inflation: Inflation tends to undermine the value of financial assets and stimulate saving. On the other hand, it may also reduce the return from saving in financial rather than non-financial assets, which tends to lower saving.

Real interest rates: The sign of the effect depends on whether the substitution or income effect dominates.

Deregulation: Financial deregulation may increase the opportunities for, and return to, financial savings, but may also enhance access to credit and thus lower private savings.

The following error correction model was estimated:

$$\Delta PS_t = \alpha_0 + \alpha_1 PS_{t-1} + AX_{t-1} + \beta \Delta X_t + e_t \qquad (1)^9$$

where:

PS_t is the ratio of net household plus net corporate saving to GDP (a proxy for net private sector savings).

Δ represents the one period change operator.

X_t is a vector of I(1) explanatory variables, X={U, Π, R, Y, T, AS, W, D, GS}.

e_t is a random normal error term.

α_1 is the error correction coefficient.

The components of the vector X are defined as follows:

U = Unemployment rate;

Π = Inflation rate;

R = Real interest rate;

Y = Household disposable income per capita;

T = Share of Commonwealth direct taxes to total Commonwealth general government tax revenue;

AS = Ratio of social assistance benefits to household disposable income;

W = Ratio of private wealth to household disposable income;

D = Ratio of household debt to household disposable income (a proxy for financial deregulation); and

GS = Ratio of net general government saving to GDP.[10]

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[9] We tested the robustness of this functional form by estimating the ECM with up to four lags of the difference operator. We did not find evidence of a link between private saving and government saving for any of the lagged difference functional forms. While the formal diagnostics supported the adoption of a longer lag structure in the interest margin study examined later on, for consistency we used the contemporaneous difference operator in both halves of this paper.

[10] The exact definitions and data sources are in Appendix 1.

Equation 1 relates the current change in private savings to lagged values of the explanatory variables (the 'equilibrating error' in the previous period) and current changes in the explanatory variables.[11] We recognise that while there may exist a long run equilibrium relationship between the variables under examination, there may be disequilibrium in the short-term. The framework, therefore, models the change in the dependant variable as a function of changes in the explanatory variables and the error correction mechanism, in which a proportion of the disequilibrium in one period is corrected in the next. Equation 1 was initially estimated and insignificant variables systematically eliminated to produce the following model:

$$\Delta PS_t = \beta_0 + \beta_1 D_{t-1} + \beta_2 GS_{t-1} + \beta_3 PS_{t-1} + \beta_4 \Delta U_t + \beta_5 \Delta D_t + \beta_6 \Delta GS_t + e_t \qquad (2)$$

The results from this model are outlined in Table 1. All estimation and diagnostic procedures undertaken for the purposes of this paper were performed in *EVIEWS 3.1*.

The above model suggests a significant private savings offset of around $^1/_3$ to short-term changes in general government savings. In contrast to the short-term relationship, a long-term statistically significant relationship could not be established between the two variables at the 5 per cent confidence interval.

The model also suggests, that in the short run, the private savings ratio decreases by 1.2 per cent in response to a 1 percentage point increase in the unemployment rate, and falls by 0.03 per cent in response to a 1 per cent increase in household debt to disposable income ratio (the long run proxy for financial deregulation). The model suggests also that in the long run, a 1 per cent increase in the household debt to disposable income ratio elicits a 0.006 per cent decrease in the private savings ratio, so that there is evidence of a long term relationship between private savings and financial deregulation.[12]

Chart 3 illustrates the impulse response for the level of private saving in response to a permanent 1 per cent of GDP increase in government saving. The chart demonstrates that it takes approximately 5

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[11] The 'equilibrating error' is equal to the error term from estimating the 'long-term' level of private savings ratio on the levels of the explanatory variables.

[12] While the coefficients on the financial deregulation terms are low, financial deregulation does seem to have a significant effect on private savings as the household debt to disposable income ratio is a very high value.

Table 1

Results from Error Correction Model 2 (Equation 2)

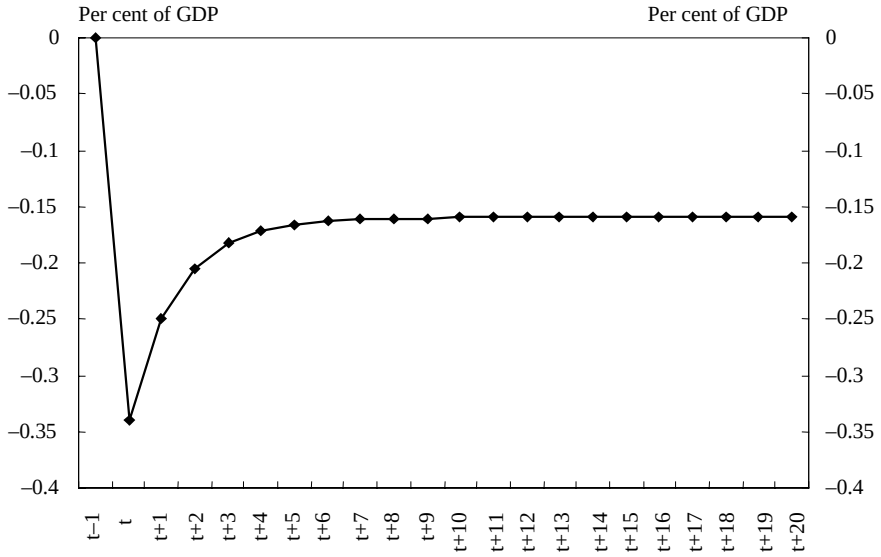
Dependent variable: Δ Private Saving: 1981:1 - 2001:2		
	Coefficient (t statistic)	**L.T. coefficient** [(a)] (t statistic)
Explanatory variables: Short Run		
Constant	6.43 (4.82)	
Δ $Unemployment_t$	-1.19 (-3.83)	
Δ $Deregulation_t$	-0.03 (-4.84)	
Δ $Government\ Saving_t$	-0.34 (-3.36)	
Explanatory variables: Long Run		
$Private\ Saving_{t-1}$	-0.5 (-5.30)	
$Deregulation_{t-1}$	-0.003 (-4.14)	-0.006
$Government\ Saving_{t-1}$	-0.08 (-1.08)[(b)]	-0.16
Major Diagnostics	R-Bar-Squared	0.59
	DW Stat	2.35

(a) The long-term coefficients in the table above are calculated by dividing the coefficients for the relevant variables by the coefficient on the error correction term (lagged value of the dependent variable).

(b) Redundant variable test for the inclusion of GS_{t-1}: F statistic = 1.18 Prob = 0.281, Log Likelihood Ratio = 1.279 Prob = 0.258.

Chart 3

Impulse Response of Private Saving to a 1 per cent of GDP Permanent Increase in Government Saving



periods before the full affect of the shock is unwound and the system returns to its long run equilibrium value of –0.16.

A complete summary of diagnostic tests are reported in Appendix 4. Based on these tests the model seems for the most part to have reliable characteristics. However, there is some evidence of autocorrelation and heterocedasticity. Also, it is likely that the coefficient estimates are unstable over time and as such represent a major caveat on our results.

Another issue is whether private sector savings offsets are more pronounced in the face of 'structural' rather than cyclical changes in government saving. Studies such as Cebula, Hung and Manage (1996) explore this proposition.

Cebula *et al.* break the US federal budget into its structural and cyclical components. The former is hypothesised to be the 'planned deficit', whereas the latter is viewed as the 'unplanned'. They claim that the cyclical deficit can at best be crudely estimated, its determinants are

sufficiently varied and unknown that predicting it is extremely difficult and beyond the capacities of most so called 'rational' individuals. They argue that in a Ricardian world it is reasonable to expect that household saving will depend upon structural deficits, but cyclical deficits are likely to exercise little impact, if any, on household saving.[13] They find for the US there is a private saving offset of around 1/3 on structural deficits, while cyclical deficits do not effect personal saving rates.

We have extended the model developed above by disaggregating general government saving into National general government structural and cyclical savings and State and Local general government savings.[14]

The model was initially run and insignificant variables systematically eliminated to produce the following model:

$$\Delta PS_t = \beta_0 + \beta_1 D_{t-1} + \beta_2 NGSS_{t-1} + \beta_3 NGCS_{t-1} + \beta_4 SLGS_{t-1} + \beta_5 PS_{t-1} + \beta_6 \Delta U_t + \beta_7 \Delta D_t + \beta_8 \Delta NGSS_t + \beta_9 \Delta NGCS_t + \beta_{10} \Delta SLGS_t + e_t \quad (3)$$

where:

NGSS = National Government Structural Savings

NGCS = National Government Cyclical Savings

SLGS = State and Local Government Savings[15]

The results from this model are reported in Table 2.

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13 This point was also made by Barro, (Edey and Britten-Jones, 1990, pp. 120-121), who noted that both public and private savings tend to move cyclically, and in order to determine the effect of public sector deficits on private saving, the exogenous component of the public sector position must first be extracted.

14 The methodology for breaking National general government savings into its structural and cyclical components is provided in Appendix 2. We note that determination of the structural and cyclical components of savings involves a range of complex issues (see Banca D'Italia, 1999). However, while the level of structural savings is particularly difficult to identify it is more straightforward to determine changes in structural savings. The changes in structural savings are of primary importance in generating the results contained in this paper.

15 We have not broken the State and Local Government savings numbers down into structural and cyclical components due to the lack of quarterly data available to conduct the analysis. It is likely that variations in State and Local Government savings positions are primarily structural in nature due to the heavy revenue reliance on the Commonwealth and the fact that State and Local Government outlays are less cyclically sensitive than Commonwealth outlays reflecting the Commonwealth's primary responsibility for income support arrangements. Furthermore, separately identifying the State and Local Government sector is useful as it allows us to focus on the savings behaviour of the Commonwealth Government which in practice is responsible for demand management policy.

Table 2

Results from Error Correction Model 3 (Equation3)

Dependent variable: Δ Private Saving: 1981:1 - 2001:2	**Coefficient** (t statistic)	**L.T. Coefficient**[a] (t statistic)
Explanatory variables: Short Run		
Constant	7.8	
	(5.21)	
Δ Unemployment$_t$	-0.82	
	(-2.10)	
Δ Deregulation$_t$	-0.03	
	(-4.37)	
Δ National Government Stuctural Saving$_t$	-0.35	
	(-3.29)	
Δ National Government Cyclical Saving$_t$	0.92 [b]	
	(1.33)	
D State & Local Government Saving$_t$	-0.33	
	(-2.07)	
Explanatory variables: Long Run		
Private Saving$_{t-1}$	-0.68	
	(-6.18)	
Deregulation$_{t-1}$	-0.004	-0.01
	(-4.48)	
National Government Structural Saving$_{t-1}$	-0.27	-0.40
	(-2.44)	
National Government Cyclical Saving$_{t-1}$	0.73	1.07
	(-2.06)	
State & Local Government Saving$_{t-1}$	-0.19[b]	-0.28
	(-1.01)	
Major Diagnostics	R-Bar-Squared	0.59
	DW Stat	2.14

(a) The long-term coefficients in the table above are calculated by dividing the coefficients for the relevant variables by the coefficient on the error correction term (lagged value of the dependent variable).

(b) Redundant variable test for the inclusion of GS_{t-1}: F statistic = 1.18 Prob = 0.281, Log Likelihood Ratio = 1.279 Prob = 0.258.

The above model suggests that short-term increases in the National general government structural savings ratio of 1 per cent are partly offset by decreases in private sector savings of 0.35 per cent. Furthermore, the coefficient on the short-term changes in National general government cyclical savings term is not significant, suggesting that changes in this term do not elicit private sector savings responses. These results are consistent with the results reported above for the model incorporating an aggregate government saving measure.

However, in contrast to the earlier model, the disaggregated model also suggests a negative long-run relationship between National general government structural savings and private sector savings. A one per cent increase in the government structural savings ratio is associated with a 0.4 per cent decrease in the private savings ratio in the long-term.

While the model suggests a positive long-term relationship between cyclical government savings and private sector savings, we suspect that this relationship is largely due to cyclical factors effecting both terms rather than cyclical government savings provoking private sector responses. The long-term coefficient of 1.07 suggests that this is the case as both government cyclical savings and private savings seem to be effected one-for-one by cyclical factors. That said, we have estimated the equation with a range of cyclically sensitive variables, none of which appear to be statistically significant. We would also note that cyclical government savings in the long-term are equal to zero. Therefore, any long-term affect between the two variables must be negated.

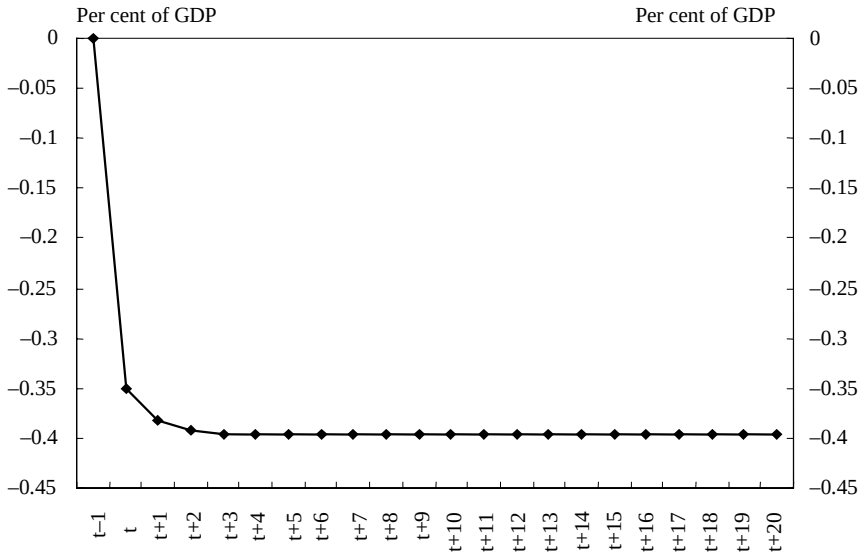
The model also suggests that changes in the unemployment rate and financial deregulation remain significant explanatory factors of private sector savings.

Chart 4 illustrates the impulse response for the level of private saving in response to a permanent 1 per cent of GDP increase in national government structural saving. The chart demonstrates that it takes approximately 3 periods before the full affect of the shock is realised as the system reaches its long-run equilibrium value of –0.40.

A summary of standard diagnostic test statistics is reported in Appendix 4. Based on these the model passes the usual tests at standard significance levels, adjusted for heterocedasticity. However, once again, there is evidence that the coefficient estimates are unstable over time.

Chart 4

Impulse Response of Private Saving to a 1 per cent of GDP Permanent Increase in National Government Structural Saving



However, given the relatively small sample we did not proceed with sub sample estimation.

These results suggest that the structural/cyclical decomposition is significant in terms of explaining private savings offsets. The previous model did not identify a statistically significant long-term equilibrium relationship between fiscal policy and private sector savings due to its focus on aggregate fiscal variables.[16]

The results of this model have interesting policy implications for the usefulness of fiscal policy as a demand management tool. Discretionary fiscal policy changes are (almost by definition) structural changes in government savings. Therefore the results suggest that discretionary policy

[16] This factor may also help to explain the results of Lee (1999), where, in addition to using the household savings ratio as the dependant variable, the study used cointegration analysis on the levels of the household savings and actual general government savings ratios.

changes aimed at influencing aggregate demand are likely to be offset somewhat by private sector savings responses. This implies that any fiscal package needs to be larger than it otherwise would be in the absence of private sector savings offsets to have an effect on output.

However, in contrast to this, the operation of automatic stabilisers is unlikely to provoke private savings offsets as they represent cyclical changes in government savings. As a result automatic stabilisers may be seen as a more reliable option for managing demand than discretionary policy changes. That said, this needs to be qualified by the fact that there is scope to make the magnitude of discretionary policy changes substantially larger than the magnitude of automatic stabilisers. Furthermore, the results reported here necessarily refer to aggregate changes in savings behaviour. In principle certain individual fiscal measures may have much larger demand effects (for example, those that seek to change the timing of capital expenditure).

While the results from the above models have important implications for the effectiveness of fiscal policy, there is an important caveat.

It is possible that private saving is determined simultaneously with some explanatory variables in the regression equation. Explanatory variables that are likely to be endogenous with private savings include, government savings, and income growth. If such an endogeneity problem exists, the coefficient estimates of the model will be biased and inconsistent. While instrumental variables may be used to address this potential problem, finding persuasive instruments is difficult.

3. Fiscal Policy and Interest Rates in Australia

The impact of fiscal policy on interest rates is important as the level of interest rates in Australia has significant short-term and long-term consequences. In general higher interest rates will have adverse consequences for growth.

- If expansionary fiscal policy results in higher real interest rates, then this would operate to undermine short-term demand management by crowding-out to some extent the initial stimulus.
- Higher real interest rates can also lead to a lower long-term capital stock and a lower output level due to reduced investment levels.

Lower capital stock and output level on average lowers living standards, real wages and employment levels (Elmendorf and Mankiw 1998, 28 and 29).

- Higher real interest rates also raise the long-term cost of servicing the stock of net foreign debt and thereby increase the level of transfers to foreign lenders (both public and private). It is possible that higher interest rates on debt also increase the cost of servicing foreign equity holdings. This is a particularly important issue for Australia given our relatively high level of net external liabilities (most of which have been incurred by the private sector).

There is little international evidence of a short-term link between fiscal policy and interest rates (Ford and Laxton, 1999, 80). Elmendorf (1996, 1) states that this may be due to the fact that the true relationship is between interest rates and the expected values of fiscal policy variables. Studies that have considered the link between interest differentials and expected fiscal policy, or 'risk premia' and expected fiscal policy, have found some evidence of a link to fiscal policy.[17]

In contrast, pooled time series studies have established a link between interest differentials and actual fiscal policy. Orr, Edey and Kennedy (1995) show for seventeen developed countries between 1981:2 and 1992:2 that a 1 per cent of GDP fiscal stimulus increases the real interest rate differential on 10-year bonds by 15 basis points. Lane and Milesi-Ferretti (2001) examined the OECD countries for the period 1970-98. Over this period they found a statistically significant relationship between public debt and the real interest differential (at the 10 per cent significance level).

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[17] For example:

Elmendorf (1993) uses **survey data** of expected value of fiscal policy for the USA to show that a 1 per cent increase in the GNP leads to a 50 basis point rise in the real bond yield (for 3-year bonds).

Elmendorf (1996) uses **announcement dates** of fiscal adjustments and could not reject the hypothesis of a statistical relationship between the announcement of fiscal stimulus and long-term interest rate yields.

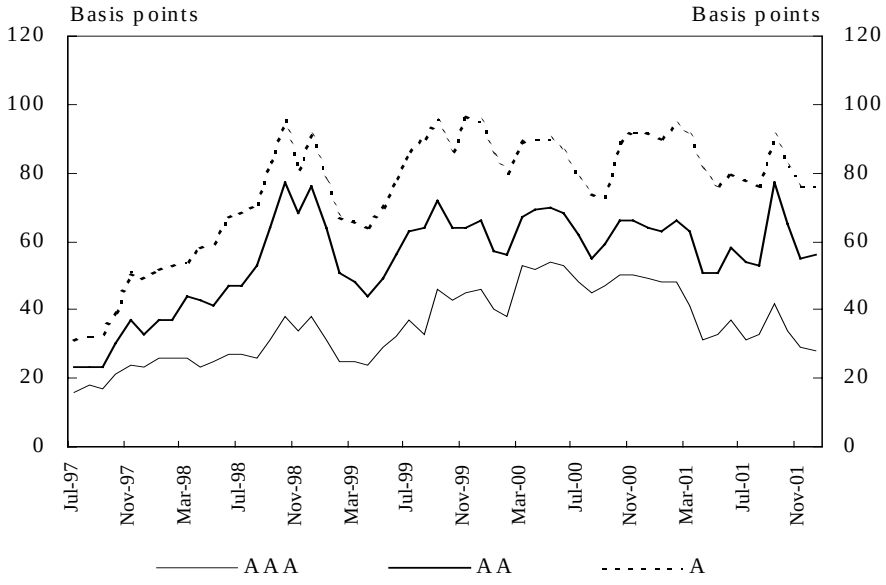
Giorgianni (1997) uses a **VAR model** measure of expected fiscal policy and a **survey data** measure of the exchange risk premia and for Italy 1987-94. He estimated for the period 1987:2 to 1996:7, an anticipated permanent reduction of 1 percent in the Italian deficit-GDP ratio would bring about a reduction of approximately 90 basis points in the lira/Deutsche Mark risk premium. In the period 1987-1994 the average risk premium was about two percent, a zero lira risk premium could have been obtained in the presence of a credible reduction by less than 3 percentage points of the Italian deficit-GDP ratio.

For higher real interest rates to have significant economic affects they must operate at the long end of the yield curve by influencing society's preference (discount rate) for consumption over saving. Therefore, when considering the effect of interest rates on the economy it is important to focus on long-term bond rates which may be closer to the key determinants of long-term saving and investment decisions. This is not to say that short-term rates have no effect on saving and investment decisions. For example, home mortgage rates in Australia are closely tied to short-term interest rates.

In addressing the issue of the level of interest rates in Australia we focus on the return on Australian Commonwealth Government bonds. Of course Australian Government bonds may not be a perfect measure of the interest rate facing economic decision makers. However, we would expect that over reasonable periods of time arbitrage arrangements will result in the Government bond rate being a reasonable proxy for the level of interest rates facing economic agents. Chart 5 shows a relatively stable spread

Chart 5

Spread between Australian Government and Corporate Bonds



Source: RBA Bulletin, Table F.03m: Capital Market Yields and Spreads: Corporate Bonds: Monthly.

relationship between Australian Government and corporate bonds over the time period for which data is available. Analysing the government bond market also has the advantage that the market is highly liquid, reducing the risk of price discovery. Data are also readily available and collected on a consistent basis.

The interest rate on Australian Government bonds can be thought of as comprising of a number of components.

- First, if Australia is considered to be a small open economy there will be an infinitely elastic demand for Australian Government bonds. The interest coupon on these instruments can then be thought of as the base level of Australian interest rates given by the supply and demand for funds on the world market.
- Second, if we relax the assumption of an infinitely elastic demand then the interest rate may need to rise in order to attract additional investors. This effect can be thought of as the impact of the additional supply of bonds on the world market. This effect can be expected to be very small in the Australian context. Of course, if the same question were analysed for a country such as the United States, then this effect could be quite significant.
- Third, the above two possible determinants of Australian interest rates implicitly assume that all bonds are homogeneous. However, Australian bonds are likely to be viewed by investors as imperfect substitutes for other bonds. Investors may not be indifferent to the currency in which the bonds are denominated. Given that investors prefer to hold a balanced portfolio, they may require a higher return to increase the proportion of a particular country's assets in their portfolio, i.e. a portfolio risk premium (Frankel, 1979, 381).
- Fourth, investors may also demand a default premium to compensate for the probability that a country may default on its foreign debt obligations (Lonning, 2000, 262).[18]

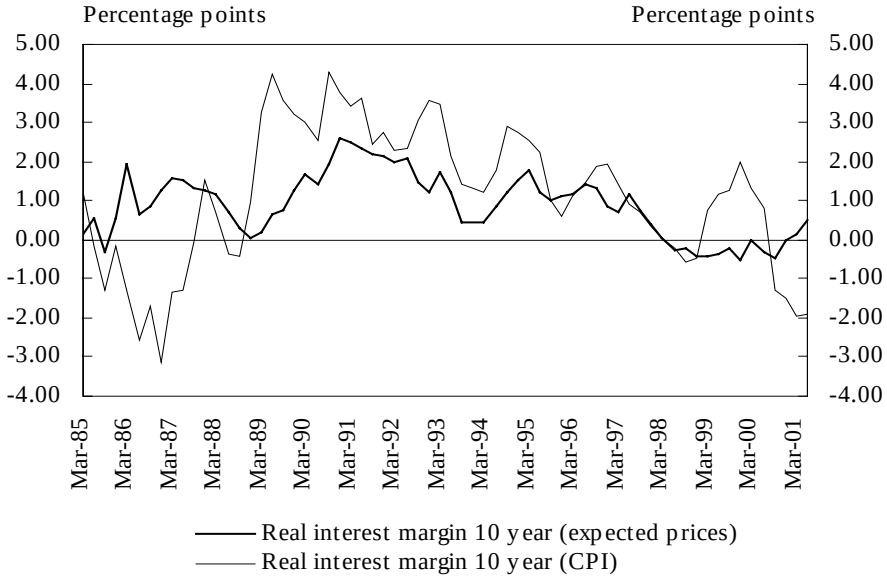
[18] Conceptually the default risk premium is a subset of portfolio risk. It is one of the reasons why investors do not view all government bonds as perfect substitutes. That said, we believe that it is useful to identify it separately as the risk of default is a common focus when sovereign debt issues are considered. Separately identifying default risk highlights the fact that investors may believe that there is a zero default risk, but still demand higher returns to hold a higher proportion of a particular countries' bonds. This is important for a country like Australia where default risk is likely to be perceived by investors as close to zero.

In this paper we focus on the margin on 10-year Treasury Bonds between Australia and the United States adjusted for expected inflation (see Data Appendix). The United States is used here as a proxy for the world market because it has historically been a major provider of capital to Australia and due to its role as a global safe haven. In terms of the taxonomy presented above, this methodology seeks to identify the combined effect of portfolio risk and default risk. The effect of Australian Government bond issuance on world interest rates (proxied here by the United States) will not be identified. Of course, other factors may affect the margin and so the estimates presented below need to be treated with caution.

This measured real interest margin calculated with expected prices is outlined for the period 1985:1 to 2001:2 in Chart 6. For purposes of comparison we have included a real interest margin measure constructed using actual prices as well.

Chart 6

The 10-Year Bond Real Interest Margin Between Australia and the United States



Source: Nominal interest rates and indexed bonds data obtained from RBA Bulletin and calculated as per methodology outlined in Appendix 1.

The high point of the 'expected' margin was 257 basis points in December 1990 and the low point was –47 basis points in September 2000. In general, low values of the margin correspond to periods of fiscal consolidation in Australia (late 1980s and late 1990s) and high values during periods of fiscal expansion (early to mid 1990s).[19] The following analysis seeks to explore this 'observed' relationship more rigorously.

We have investigated the potential link between the interest margin outlined in Chart 6 and actual fiscal policy over the period 1985:1 to 2001:2. Details of all data sources used for this study are contained in Appendix 1.

Again all the data series are non-stationary in levels and stationary in changes with evidence of at least one cointegrating relationship between them from the Johansen-Julieus procedure; as per Appendix 3. We examined an error correction model of the following form:

The model is constructed as follows: [20]

$$\Delta IM_t = \alpha_0 + \alpha_1 IM_{t-1} + AX_{t-1} + \beta \Delta X_t + e_t \qquad (4)$$

where:

IM_t is the real interest margin between Australia and the United States for 10-year government bonds

Δ represents the one period change operator

X_t is a vector of I(1) explanatory variables, X={*BB, PD, Π, RGDPg CA, ND*}

e_t is a random normal error term

α_1 is the error correction coefficient

The components of X are defined as follows:

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[19] Of course there is an issue of observational equivalence here because in times of high growth a government has more capacity to eliminate debt which will assist in driving down yields, and *vice versa* in periods of recession.

[20] To test the robustness of the functional form the ECM was initially estimated with up to 4 lags of the difference operator. Results obtained including as many as 4 lags are qualitatively the same as those reported below.

BB = Budget balance (expressed either as Headline balance or as Structural balance) as a proportion of GDP

PD = Stock of net public debt as a proportion of GDP

Π =Inflation rate

RGDPg = Real GDP growth

CA = Current account expressed as a proportion of GDP

ND = Stock net foreign debt expressed as a proportion of GDP

The model had two components. First, a **long-term** 'equilibrium' component where the level of the interest margin is hypothesised to be a function of the levels of both the flow and stock of fiscal policy, the inflation rate, real GDP growth rate, as well as the flow and stock of net foreign debt. Second, a **short-term** changes component where changes in the interest margin are hypothesised to be a function of changes in the budget balance, stock of public debt, inflation rate, real GDP growth rate, the current account, and net stock of foreign debt.

The interest margin is expected to rise in response to a deterioration in the budget balance or a rise in the stock of public debt. The interest margin is also hypothesised to be positively related to levels and changes in the inflation rate, and the stock of net foreign debt and negatively related to levels and changes in GDP growth and the current account.

The results obtained from estimating the full model (Equation 4) are presented in Table 3, using the headline budget balance or structural budget balance, alternatively, as the fiscal flow variable.

In addition, we examined a 'simple model' resulting from general to specific elimination of insignificant variables. The simple model is outlined in Equation 5:

$$\Delta IM_t = \beta_0 + \beta_1 PD_{t-1} + \beta_2 \Pi_{t-1} + \beta_3 RGDPg_{t-1} + \beta_4 CA_{t-1} + \beta_5 IM_{t-1} + \beta_6 \Delta BB_t + \beta_7 \Delta IM_t + e_t \quad (5)$$

Columns 3 and 4 of Table 3 present the results from estimating the 'simple model', using the headline budget balance or structural budget balance, respectively, as the fiscal flow variable.

Table 3

Full and Simple Model Results (as per Equations 4 and 5)

Dependent variable: Δ 10-Year Bond Real Interest Margin 1985:1 - 2001:2	Full Model (HB) Coefficient (t statistic)	Full Model (SB) Coefficient (t statistic)	Simple Model (HB) Coefficient (t statistic)	Simple Model (SB) Coefficient (t statistic)
Explanatory variables: Short Run				
Constant	0.410	1.249	-0.265	-0.279
	(0.32)	(0.81)	(1.09)	(1.17)
Δ Interest Margin	0.347	0.354	-0.327	0.296
	(1.95)	(1.96)	(2.35)	(2.16)
Δ Structural Balance		-0.258		-0.319
		(2.11)		(2.96)
Δ Headline Balance	-0.222		-0.200	
	(2.38)		(2.64)	
Δ Stock Public Debt	-0.047	0.000		
	(0.62)	(0.00)		
Δ Inflation Rate	0.115	0.108		
	(1.54)	(1.39)		
Δ Real GDP Growth	-0.111	-0.115		
	(1.74)	(1.77)		
Δ Current Account	-0.047	-0.068		
	(0.59)	(0.85)		
Δ Stock Net Foreign Debt	0.012	0.042		
	(0.22)	(0.81)		
Explanatory variables: Long Run				
Interest Margin	-0.446	-0.446	-0.407	-0.395
	(2.80)	(2.84)	(3.68)	(3.63)
Headline Balance	-0.007			
	(0.15)			
	-0.016 [a]			
Structural Balance		-0.036		
		(0.44)		
		0.081		
Public Debt	0.073	0.052	0.059	0.060
	(1.95)	(1.12)	(2.83)	(2.92)
	0.164	0.117	0.145	0.152
Inflation	0.034	0.018	0.041 [b]	0.042 [c]
	(0.85)	(0.44)	(1.81)	(1.85)
	0.076	0.040	0.101	0.106
Real GDP Growth	-0.162	-0.177	-0.125	-0.116
	(2.35)	(2.57)	(2.74)	(2.55)
	-0.363	-0.397	-0.307	-0.294
Current Account	-0.074	-0.048	-0.071 [b]	-0.062 [c]
	(1.16)	(0.73)	(1.67)	(1.48)
	-0.166	-0.108	-0.174	-0.157
Net Stock Foreign Debt	-0.017	-0.028		
	(0.7)	(0.98)		
	-0.038	-0.061		
R-Bar-Squared	0.21	0.19	0.22	0.24
DW Stat	1.99	2.05	1.91	2.21

(a) The long-term coefficients for each equation are shaded grey and calculated by dividing the estimated coefficients for the relevant variables by the coefficient on the error correction term (lagged value of the dependent variable).[21]

(b) Redundant variable test for the inclusion of $Inflation_{t-1}$ and $Current\ Account_{t-1}$: F statistic = 3.83 Prob = 0.028 Log Likelihood Ratio = 8.31 Prob = 0.016.

(c) Redundant variable test for the inclusion of $Inflation_{t-1}$ and $Current\ Account_{t-1}$: F statistic = 3.57 Prob = 0.036 Log Likelihood Ratio = 7.77 Prob = 0.020.

[21] Importantly, when the long-term levels component of these models is estimated as a separate equation, the Adjusted R^2 is equal to 0.64 (see Appendix 4), indicating that the long-term equation explains around $^2/_3$ of the variation in the interest margin. When the lagged value of the dependent variable is included on the RHS the Adjusted R^2 rises to 0.88.

The simple model results reveal:

For the long-term levels component the fiscal stock variable (e.g. stock of public debt) and real GDP growth were significant. The *t* statistic on the current account and inflation variable were not large enough to indicate a significant statistical relationship at the 5 per cent confidence interval. However they are large enough to suggest there may exist a 'meaningful' relationship between these variables and the interest margin.

For the short-term changes component, only the fiscal flow variables (e.g headline balance or structural balance) were statistically significant.

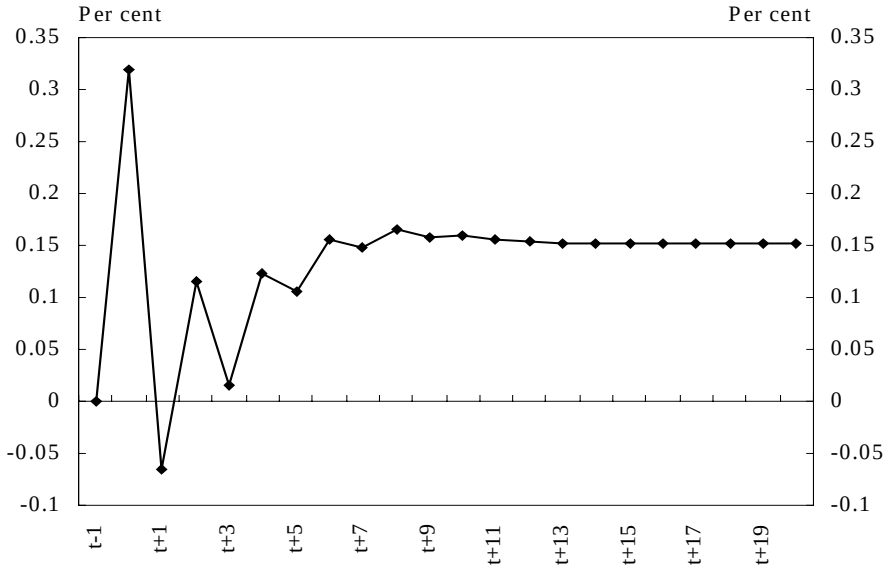
The economic interpretation of the fiscal variables results in Table 3 is as follows. The interest margin increases by approximately 20 basis points in response to a one per cent of GDP deterioration in the headline budget balance. This is approximately the same magnitude of increase in the margin caused by a one percent of GDP increase in the stock of public debt at around 15 basis points. In contrast, a one percent of GDP deterioration in the structural budget increases the margin by approximately 32 basis points.

The economic interpretation of the 'state' economic variables results in Table 3 is as follows. A one per cent of GDP increase in the current account deficit increases the margin by approximately 17 basis points in the long-term. A similar increase in the inflation rate increases the margin by approximately 10 basis points in the long-term. Importantly, a one-percentage point increase in the real GDP growth rate decreases the margin by approximately 31 basis points in the long-term.

Table 3 reveals that the error correction term coefficient is around 0.40 for either version of the simple model and is statistically significant. The economic interpretation of this number is that the system reverts back to its long-term mean by 40 per cent in each quarter. Therefore it takes upwards of five quarters for short-term deviations from the long-term relationship to be unwound. This point is illustrated by examining the impulse response in Chart 7 which illustrates the adjustment path for the level of the interest margin after a temporary 1 per cent of GDP structural deterioration in the Commonwealth budget. The systems reverts to its long-term value implying an increase in the interest margin of around 0.15 percentage points after approximately five quarters.

Chart 7

Impulse Response of the Interest Margin to a 1 per cent of GDP Temporary Deterioration in the Commonwealth Structural Budget



The model passes all the usual diagnostic tests at the standard significance levels.

The fiscal policy implications stemming from these results are quite straightforward. Increases in the interest margin arising from public policy, eg. default/portfolio risk, may reduce the effectiveness of fiscal policy to influence aggregate demand, and may have significant impacts on long-term growth and employment prospects.

Moreover, it seems likely from these results that changes in the structural budget (e.g. discretionary spending) drive short-term changes in the interest margin. This implies that significant discretionary fiscal policy movements may have large associated costs.

Finally we would note that the magnitudes of the fiscal coefficients estimated previously are quite large given that Australia is a small open economy, although they are consistent with the international literature

examined previously. As such we would not want to overplay the significance of the magnitudes presented here.

For completeness we note that there are some important provisos that must be placed on the numbers described previously.

The results may suffer from endogeneity problems given budget deficits, income and interest rates may be determined simultaneously.

There is no role of information and expectations in the simple model which is unorthodox given that we are attempting to explain the interest margin between two financial assets.

4. Conclusion

The paper considers the effectiveness of fiscal policy with respect to two key issues: potential private sector savings offsets; and the link between fiscal policy and interest rates in Australia. These two issues are important when considering the role of fiscal policy in Australia. Evidence of significant private sector savings offsets would indicate that fiscal policy is less effective as a demand management tool than it otherwise would be. Evidence of increasing interest rates in response to higher budget deficits would indicate that fiscal policy is less effective as a demand management tool and that there may be adverse consequences for long-term living standards.

Previous Australian studies have found little evidence of substantial private savings offsets. In contrast, our results indicate the existence of a substantial private savings offset. We investigate the relationship between private and public savings in two ways. First we estimate a model that focuses on aggregate government savings. The results of this model suggest that there is a private savings offset of around one third in the short run. The results from this model do not support the existence of a long run relationship between private and government savings. Second, we estimate a model that disaggregates government savings into structural and cyclical components. The disaggregated model suggests a similar short-term private savings offset of around one third. However the disaggregated model provides two additional insights. First, the disaggregated model suggests that the short run private savings offset is associated with changes in structural government savings, but that there is no statistically significant

relationship between private savings and cyclical government savings. Second, the disaggregated model suggests that there is a long run private savings offset of around a third to changes in structural government saving.

There are two key implications of these results. First, the magnitude of any fiscal stimulus will need to be larger than it would otherwise need to be in the absence of savings offsets to have the same affect on aggregate demand. Second, the operation of automatic stabilisers (which are inherently changes in cyclical government saving) are likely to be relatively more effective than discretionary changes in policy (which are inherently changes in structural government saving). This last observation needs to be qualified by the observation that our results are based on aggregate data and therefore may not capture the demand effects of specific policies that may in practice have more potent demand effects.

The paper also considers the link between fiscal policy and interest rates in Australia. We estimate a model that seeks to explain variations in the 10-year bond real interest margin with the United States with reference to variables including the headline budget balance, and the level of net public debt. The results suggest that a deterioration of the headline balance of one per cent of GDP is associated with an increase in the margin of around 20 basis points in the short run and that an increase in public debt of one per cent of GDP is associated with an increase in the margin of around 15 basis points in the long run. Furthermore, when we re-estimate the model using the structural balance instead of the headline balance, we find that the effect of changes in the structural balance on the margin is even higher at around 30 basis points.

These results suggest that higher budget deficits (or lower surpluses) can have a significant effect on interest rates in Australia. The associated costs of higher interest rates should be borne in mind when setting fiscal policy. That said, the size of the interest rate changes suggested by these results appear very high for a small economy with access to international financial markets such as Australia. Accordingly, we believe that these results should be treated with some caution. These coefficients belong to an era of higher debt. We would be surprised if further debt reduction had as large an incremental effect in this era of low debt.

APPENDIX 1

DATA

Savings Offsets

PS = Ratio of net household plus corporate saving to GDP. Net household savings (ABS 5206-61); Net corporate savings calculated as the residual of net national savings minus net household savings and net general government savings; GDP (ABS 5206-56).

Y = Household disposable income per capita. Nominal Household Disposable Income (ABS 5206-61); CPI (RBA Bulletin Table G.01); Population (ABS 3101-04).

U = Unemployment rate (ABS 6202-04).

Π = Inflation rate (RBA Bulletin Table G.01).

r = Real interest rate. Interest Rate (10 year Treasury bond yield (RBA Bulletin Table F.02)); Inflation (RBA Bulletin Table G.01).

GS = Net General Government Savings to GDP ratio (ABS 5206-64)

NGSS = Net Commonwealth General Government Structural Savings to GDP ratio. For methodology see Appendix 2.

NGCS = Net Commonwealth General Government Cyclical Saving to GDP ratio. For methodology see Appendix 2.

SLGS = Net State and Local General Government Savings to GDP ratio (ABS 5206-66).

T = Share of Commonwealth indirect taxes to total Commonwealth General Government taxation revenue (RBA Bulletin Table E.01m).

Ass = Social assistance benefits to household disposable income ratio (ABS 5206-61).

D = Household debt to household disposable income ratio (RBA Bulletin Table D.02).

W = Private wealth to household disposable income ratio (ABS TRYM Database Table 33).

All components were seasonally adjusted using X11 in EVIEWS.

Interest Margin

10-Year Bond

The 10-year bond yield was taken for the Commonwealth Government Securities (CGS) 10-Year bond yield sourced from the RBA Bulletin (see Table F.02d Capital Market Yields Government Bonds: Daily). Daily data was then converted into monthly and then quarterly averages.

Expected Inflation

From 1985:3 onwards, expected inflation rates were calculated from data obtained from the RBA Bulletin Database as the difference between nominal 10-year bond rates and inflation indexed bond yields (see Table F.02d Capital Market Yields Government Bonds: Daily). The only complication to this calculation is that from 1999:3 an adjustment was made for the impact of the passing of the Goods and Services Tax. This is accomplished by directly reducing inflation expectations by 20 basis points from this period for the next 10 years (this is a simple averaging assumption to distribute the full estimated 10-year 2 percentage point increase in the measured CPI over the whole 10 year period).

For 1985:1 to 1985:2 inflation indexed bond yield data is not available for Australia. We calculated a proxy of inflation expectations for these dates using a weighted average of the lagged values of actual GDP deflator. The expected inflation rate for 1985:1 and 1985:2 was then calculated as explained previously.

Federal General Government Headline Balance

Data was sourced from RBA Bulletin Database (Table E.01m), Commonwealth Headline Balance, Current Prices, and Not Seasonally Adjusted. Data was converted into quarterly averages and seasonally adjusted using the X11 program in EVIEWS. This data was then annualised and divided by annualised level of GDP, seasonally adjusted, quarterly data obtained from OECD Main Economic Indicators (Table Aus.01: Australian National Accounts. June 2001).

Federal General Government Structural Balance

Seasonally adjusted data was obtained from Fiscal Policy Unit of the Australian Treasury – the construction of this data is explained in Attachment 2 and is based on a net lending concept. The data was then divided by annualised level of GDP, seasonally adjusted, quarterly data obtained from OECD Main Economic Indicators (Table Aus.01: Australian National Accounts. June 2001).

Public Net Debt

Public debt numbers are sourced from the ABS (Table 5302.35 total public sector, net public debt total, for all Australian governments). Data for the general government Commonwealth net debt was not available. However, Australian States have historically held only a small proportion of total net debt. There are nine missing data points in the Australian data – 1985:1, 1985:3, 1985:4; 1986:1; 1986:3, 1986:4; 1987:1, 1987:3, 1987:4. No attempt has been made to replace missing data points as we feel this would introduce systematic bias into the error terms of our equation estimates.

The net public debt data was then divided by annualised level of GDP, seasonally adjusted, quarterly data, obtained from OECD Main Economic Indicators (Table Aus.01: Australian National Accounts. June 2001).

Inflation

Inflation rate for Australia was sourced from the ABS (Table 6401.011) as of September 2001. The CPI measure includes all groups excluding housing. The rate was calculated as the log difference.

Real GDP Growth

Real GDP growth rates were calculated from real GDP level data obtained from OECD Main Economic Indicators. (Table Aus.01: Australian National Accounts. June 2001). The rates were calculated as the log difference.

Current Account

The current account (Table 5302-04) and GDP (Table 5206-22) data were obtained from the ABS. Both series were seasonally adjusted.

Net Foreign Debt

Data is sourced from ABS (Table 5302.31F), not seasonally adjusted, in current prices. This data was then divided by annualised level of GDP, seasonally adjusted, quarterly data obtained from OECD Main Economic Indicators (Table Aus.01: Australian National Accounts. June 2001). There are nine missing data points for the net foreign debt data – 1985:1, 1985:3, 1985:4; 1986:1; 1986:3, 1986:4; 1987:1, 1987:3, 1987:4. No attempt has been made to replace missing data points as we feel this would introduce systematic bias into the error terms of our equation estimates.

APPENDIX 2

STRUCTURAL/CYCLICAL METHODOLOGY

Quarterly net National general government structural/cyclical savings were derived using the following methodology:

Output Gap

Quarterly output gaps were produced using a methodology similar to the OECD's output gap methodology.[22] These quarterly output gaps measure the gap between quarterly actual GDP and quarterly trend GDP.

Firstly, using quarterly data from the ABS TRYM Database, a two-factor Cobb-Douglas production function for the private business sector is estimated for given sample average labour shares.

$$\ln Y_t = \alpha \ln(N_t \cdot H_t) + (1-\alpha) \ln K_t + \ln e_t \qquad (1)$$

where Y_t is private business sector output, N_t is private business sector employment, H_t is an index of aggregate hours worked in all industries divided by an index of total employment in all industries, K_t is the private business sector capital stock, α is average labour share of output for the private business sector over the period of consideration, and e_t is a residual series that represents total factor productivity.

The estimated residuals, e_t from the equation are then smoothed using a Hodrick-Prescott (HP) filter to provide a measure of trend total factor productivity, e_t^*.[23]

The trend factor productivity series is then substituted back into the production function along with the actual capital stock, K_t, and trend labour input, $(N_t^* \cdot H_t^*)$, to provide a measure of the log of private business sector trend output Y_t^*.

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[22] C. Giorno *et al.* (1995), pp. 167-209. The main difference between the two methodologies is that the OECD produces a potential employment input based on the NAIRU, while this paper produces a trend employment input using a HP filter.

[23] All HP filters that smooth series in this methodology use a lambda of 1600.

$$\ln Y_t^* = \alpha \ln(N_t^* \cdot H_t^*) + (1-\alpha) \ln K_t + \ln e_t^* \quad (2)$$

Trend labour input, $(N_t^* \cdot H_t^*)$, is calculated by smoothing private business sector employment, N_t, and the hours index, H_t, with a HP filter.

Trend private sector business output, Y_t^*, is then added to actual general government sector output, actual government enterprise sector output, and dwelling output to gain trend GDP.

The output gap is calculated as the difference between actual output and the estimate of trend output, $(Y_t - Y_t^*)$, expressed as a percentage of trend output.

Savings Data

Quarterly net national general government savings was broken into its revenue and expenditure components using data from ABS 5206-65.

National general government net expenditure was calculated as National general government total income payable + National general government final consumption expenditure + National general government consumption of fixed capital. This quarterly series was then seasonally adjusted using X11 in EVIEWS.

National general government revenue was calculated as National general government total gross income. This series was then seasonally adjusted using X11 in EVIEWS.

National general government revenue minus National general government net expenditure equals National general government net saving.

The expenditure component was then further broken down into unemployment benefits and other expenditure components. Unemployment benefits were derived using Commonwealth government unemployment benefits data from ABS 5206-38. This series was then seasonally adjusted using X11 in EVIEWS.

The income component was further broken into taxation and non-taxation revenue components. Taxation revenue was calculated as

National general government total current taxes + National general government taxes on production and imports (ABS 5206-65). This series was then seasonally adjusted using X11 in EVIEWS.

Cyclical Expenditure Adjustment

Commonwealth government unemployment benefits were adjusted for cyclical factors using the formula:

$$UB_t^* = UB_t \,/ U_t \cdot U_t^* \tag{3}$$

where UB_t^* is trend unemployment benefits, UB_t is actual unemployment benefits, U_t is actual unemployed and U_t^* is trend unemployed.

Trend unemployment is equal to:

$$U_t^* = LF_t^* - E_t^* \tag{4}$$

where LF_t^* is equal to labour force at trend, which is calculated as the product of the working age population[24] and trend participation rate,[25] E_t^* is equal to employment at trend, which is calculated as the summation of trend private business sector employment,[26] N_t^* and employment in the general government and government enterprise sectors.[27]

Cyclical Revenue Adjustment

Taxation revenues were adjusted to structural levels by incorporating an elasticity of taxation revenues to GDP with the output gap.

$$Tax_t^* = Tax_t - ((Tax_t \cdot Elast) \cdot Gap_t / 100)) \tag{5}$$

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[24] Working age population data is provided by the TRYM ABS Database.

[25] Trend participation rate is produced by smoothing actual participation rate with a HP filter. The actual participation rate is calculated by working age population and labour force from the TRYM ABS Database.

[26] Calculated from the output gap model.

[27] Information on employment in these sectors is provided by data from the TRYM ABS Database.

where Tax_t^* is structural taxation revenue, Tax_t is actual taxation revenue, $Elast$ is the elasticity of taxation revenues to GDP, and Gap_t is the output gap.

The elasticity of taxation revenue to GDP is assumed to be 1.1.[28]

Calculation of Structural Net Savings

The cyclically-adjusted taxation revenue and unemployment benefits were then added back to the other revenue and expenses items to produce structural net savings.

Structural Net Lending

For the interest margin analysis structural net lending rather than structural net saving was calculated. Structural net lending is calculated using the same methodology, however, National general government gross fixed capital formation (ABS 5206-65) was added to net expenditure to produce net lending.

[28] This elasticity is estimated by taking the average of the OECD Australian tax revenue elasticity estimates (direct tax on households and business and indirect tax) and weighting by the historical share of each component in the tax base. Full details of this calculation are available on request from the authors. C. Giorno *et al.*, (1995) p.192 and Banca D'Italia, 1999, p. 81.

APPENDIX 3

UNIT ROOT AND JOINT TESTS

Savings Offsets Variables and Unit Root Tests

Data Period 1981:1 - 2001:2	(Constant, time trend and lag)	ADF Test Statistic (5 per cent critical value)		(Constant, time trend and truncated lag)	Phillips-Perron Test (5 per cent critical value)	
		Level	1st difference		Level	1st difference
Dependent variable:						
Private Saving	**(0,0,3)**	**-1.13**	**-5.35**	**(0,0,3)**	**-1.85**	**-14.07**
		(-1.95)	(-1.95)		(-1.95)	(-1.95)
Explanatory variables:						
Unemployment	(C,0,2)	-3.71	**rho = 0.92**	(C,0,2)	-2.13	-4.00
		(-2.90)			(-2.90)	(-2.90)
Inflation	(C,0,2)	-2.73	-7.44	(C,0,2)	-4.50	
		(-2.90)	(-2.90)		(-2.90)	
Real interest rates	(0,0,1)	-0.99	-8.24	(0,0,1)	-1.01	-12.48
		(-1.95)	(-1.95)		(-1.95)	(-1.95)
Household income	(0,0,1)	-1.94	-5.86	(0,0,3)	-2.14	
		(-1.95)	(-1.95)		(-1.95)	
Direct Tax	(0,0,1)	-1.09	-7.21	(0,0,1)	-0.84	-14.63
		(-1.95)	(-1.95)		(-1.95)	(-1.95)

Savings Offsets Variables and Unit Root Tests (continued)

Data Period 1981:1 - 2001:2	(Constant, time trend and lag)	ADF Test Statistic (5 per cent critical value)		(Constant, time trend and truncated lag)	Phillips-Perron Test (5 per cent critical value)	
Explanatory variables: (continued)						
Assistance	(0,0,1)	-1.36	-6.16	(0,0,1)	-1.16	-13.79
		(-1.95)	(-1.95)		(-1.94)	(-1.94)
Wealth	(C,T,1)	-2.81	-7.08	(C,T,1)	-3.40	-9.07
(trend in series although ratio)		(-3.47)	(-3.47)		(-3.47)	(-3.47)
Deregulation	(C,0,1)	-1.26	-5.57	(C,0,1)	-0.98	-8.61
(trend in series although ratio)		(-2.90)	(-2.90)		(-2.90)	(-2.90)
Government Saving	(0,0,1)	-1.68	-8.24	(0,0,3)	-1.99	
		(-1.95)	(-1.95)		(-1.95)	
National Government Structural Saving	(0,0,2)	-1.87	-7.64	(0,0,2)	-3.73	
		(-1.95)	(-1.95)		(-1.95)	
National Government Cyclical Saving	(0,0,2)	-3.73		(0,0,2)	-2.77	
		(-1.95)			(-1.95)	
State & Local Government Saving	(C,T,4)	-2.17	-7.73	(C,T,4)	-7.34	
(trend in series although ratio)		(-3.47)	(-3.47)		(-3.47)	

Savings Offsets Variables and Joint Tests

Joint Significant (all variables)			**Johansen Cointegration Test**	
Intercept & no trend				
Variables (PS, U, INF, r, Y, T, AS, W, D, GS)			5 per cent	1 per cent
Trace Statistic	At most 5	68.00	68.52	76.07
Max- Eigen Statistic	At most 3	43.66	45.28	51.57
Variables (PS, U, INF, r, Y, T, AS, W, D, NGSS, SLGS)				
Trace Statistic	At most 7	37.68	47.21	54.46
Max- Eigen Statistic	At most 4	42.81	45.28	51.57

Interest Margin Variables and Unit Root Tests

Data Period 1985:1 - 2001:2	(Constant, time trend and lag)	ADF Test Statistic (5 per cent critical value)		(Constant, time trend and truncated lag)	Phillips-Perron Test (5 per cent critical value)	
		Level	1st difference		Level	1st difference
Dependent variable:						
Interest Margin	**(0,0,2)**	**-1.04**	**-3.95**	**(0,0,2)**	**-1.30**	**-8.49**
		(-1.95)	**(-1.95)**		**(-1.95)**	**(-1.95)**
Explanatory variables:						
Headline balance	(0,0,3)	-2.11		(0,0,3)	-1.95	-6.64
		(-1.95)			(-1.95)	(-1.95)
Structural balance	(0,0,3)	-1.86	-3.00	(0,0,3)	-1.66	-6.84
		(-1.95)	(-1.95)		(-1.95)	(-1.95)
Stock public debt	(0,0,2)	-0.75	-2.92	(0,0,2)	-0.56	-6.70
		(-1.95)	(-1.95)		(-1.95)	(-1.95)
Inflation	(0,0,3)	-1.44	-4.05	(0,0,3)	-0.52	-7.54
		(-1.95)	(-1.95)		(-1.95)	(-1.95)
Real GDP growth	(0,0,4)	-0.84	-4.14	(0,0,1)	-1.32	-7.07
		(-1.95)	(-1.95)		(-1.95)	(-1.95)
Current Account	(C,0,4)	-4.22		(C,0,4)	-2.62	-7.41
		(-2.91)			(-2.91)	(-2.91)
Stock Net Foreign Debt	(0,0,1)	-1.42	-3.96	(C,T,1)	-1.63	-6.03
		(-1.95)	(-1.95)		(-1.95)	(-1.95)

Interest Margin Variables and Joint Tests

Joint Significant (all variables) Intercept & no trend			Johansen Cointegration Test	
Variables (IM, HB PD, INF, RGDPg, CAD, ND)			5 per cent	1 per cent
Trace Statistic	At most 2	68.43	68.52	76.07
Max- Eigen Statistic	None	41.15	45.28	51.57
Variables (IM, HB PD, INF, RGDPg, CAD, ND)				
Trace Statistic	At most 1	92.16	94.15	103.18
Max- Eigen Statistic	None	39.20	45.28	51.57

APPENDIX 4

DIAGNOSTICS

Savings Offsets Parsimonious Models

		Simple Model Results Table 1		Simple Model Results Table 2	
			Probability		Probability
Normality:					
Jarque-Bera statistic	X^2-statistic	1.23	0.539	0.37	0.820
Serial Correlation:					
Breusch-Godfrey Serial (4 lags)	F-statistic	2.28	0.060	0.94	0.443
Correlation LM Test	X^2-statistic	9.35	0.053	4.39	0.355
AR Cond. Heteroskedasticity:					
ARCH LM Test	F-statistic	1.47	0.229	1.91	0.117
	X^2-statistic	5.82	0.213	7.40	0.116
Heteroskedasticity:					
White Heteroskedasticity Test (cross terms)	F-statistic	3.65	0.000	2.61	0.024
	X^2-statistic	49.2	0.000	73.9	0.209
Stability:					
Chow Breakpoint Test (mid sample = 1991:1)	F-statistic	3.64	0.000	3.09	0.002
	L-R statistic	26.2	0.000	36.9	0.000
Specification Error:					
Ramsay RESET Test (with 4 fitted values)	F-statistics	1.54	0.200	0.11	0.980
	L-R statistic	6.84	0.144	0.52	0.971

Interest Margin

		Simple Model Results (SB fiscal flow variable) Table 3	
			Probability
Normality:			
Jarque-Bera statistic	X^2-statistic	0.10	0.942
Serial Correlation:			
Breusch-Godfrey Serial (4 lag terms)	F-statistic	0.71	0.588
Correlation LM Test	X^2-statistic	3.41	0.490
AR Cond. Heteroskedasticity:			
ARCH LM Test (4 lag terms)	F-statistic	0.27	0.898
	X^2-statistic	1.16	0.885
Heteroskedasticity:			
White Heteroskedasticity Test (cross terms)	F-statistic	0.95	0.565
	X^2-statistic	35.01	0.467
Stability:			
Chow Breakpoint Test (mid sample = 1993:1)	F-statistic	0.96	0.477
	L-R statistic	9.93	0.269
Specification Error:			
Ramsay RESET Test (with 4 fitted values)	F-statistics	1.10	0.366
	L-R statistic	5.39	0.250

APPENDIX 5

OTHER REGRESSION RESULTS

SAVINGS OFFSET MODEL

Extension of Blundell, Wignall and Stevens (1992) Model

Dependent variable: Δ Private Saving: 1974-75 - 1999-00	**Coefficient** (t statistic)	
Explanatory variables		
Constant	-0.38 (-1.54)	
Δ Unemployment$_t$	-0.35 (-1.56)	
Δ Income$_t$	0.16 (1.15)	
Δ Inflation$_t$	-0.28 (-2.45)	
Δ Real interest rate$_t$	-0.34 (-2.47)	
Δ Public Saving$_t$	-0.45 (-2.60)	
Major Diagnostics	R-Bar-Squared	0.47
	DW Stat	1.57

INTEREST MARGIN MODELS

Levels Equation

Dependent variable: 10-Year Bond Real Interest Margin 1985:1 - 2001:2		
	Coefficient *(t statistic)*	
Explanatory variables:		
Constant	-0.041 (0.03)	
Headline Balance$_{t-1}$	-0.013 (0.26)	
or		
Structural Balance$_{t-1}$	-0.006 (0.08	
Public Debt$_{t-1}$	0.137 (4.47)	
Inflation$_{t-1}$	0.082 (1.76)	
Real GDP Growth$_{t-1}$	-0.324 (6.76)	
Current Account$_{t-1}$	-0.113 (1.55)	
Net Stock Foreign Debt$_{t-1}$	-0.003 (0.15)	
Major Diagnostics	R-Bar-Squared	0.64
	DW Stat	0.88

Changes Equation

Dependent variable: Δ 10-Year Bond Real Interest Margin 1985:1 - 2001:2		
	Coefficient *(t statistic)*	
Explanatory variables:		
Constant	-0.011 (0.22)	
Δ Structural Balance$_t$	-0.251 (2.05)	
or		
Δ Headline Balance$_t$	-0.179 (2.13)	
Δ Stock Public Debt$_t$	-0.076 (1.21)	
Δ Inflation Rate$_t$	0.113 (1.61)	
Δ Real GDP Growth$_t$	-0.048 (0.95)	
Δ Current Account$_t$	-0.060 (0.91)	
Δ Stock Net Foreign Debt$_t$	0.006 (0.15)	
Major Diagnostics	R-Bar-Squared	0.05
	DW Stat	1.59

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FISCAL TARGETS, AUTOMATIC STABILISERS AND THEIR EFFECTS ON OUTPUT

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1. Introduction

In this paper we wish to investigate the role of the Stability and Growth Pact (SGP), both as part of the European architecture and also as an economic tool for policy co-ordination. The Pact constrains government deficits, and this may affect the ability of governments to undertake discretionary action to offset shocks to individual economies and the European economy as a whole. There may also be a constraint on governments that prevents them from allowing the Automatic Stabilisers to operate. The Pact may also constrain government investment, and this may damage longer term prospects in the European Union. Not all of these considerations impinge immediately on policy makers, but the possibility of Germany and Portugal receiving admonishing letters for excessive deficits from the Commission in the recent past has brought the nature of the Pact to the fore in policy debates. The slowdown in economic activity in 2001 and 2002 is indeed the first true test of the SGP.

We first discuss the European policy environment, and we then discuss the roles of rules and discretion in European fiscal policy frameworks. We discuss the implications of the Pact for government investment in infrastructure, and investigate its potential impact on medium term growth in the economy. We use our model, NiGEM, to undertake this analysis. We go on to discuss Automatic Stabilisers and their role in an economy subject to both supply and demand shocks where financial markets are forward looking and monetary policy makers reactive. We argue that stabilisers generally work but that we should not expect too much from them. We use OECD estimates of stabilisers, which may be regarded as the industry standard, and implement them within our model,

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NiGEM. We also use the model to investigate, using stochastic simulations, what the 'safe' deficit targets may be.

2. The European Policy Framework

The European Union has an unusual governance structure by the standards of other advanced economies, with responsibilities delegated to a wide range of bodies. Whilst the broad frameworks for monetary and fiscal policy are becoming clearer, there are a number of institutions that have responsibility for surveillance and co-ordination of the macroeconomic policy mix. The two parties in the governance structure are the Council of the European Union and the European Commission.[1]

The Council of the European Union is the Community's legislative body. It co-ordinates the general economic policies of the Member States and concludes, on behalf of the Community, international agreements between the latter and one or more States or international organisations. The Council is composed of one representative at ministerial level from each Member State, who is empowered to commit his government. Council members are politically accountable to their national parliaments. Meetings of the finance and economy ministers are known as ECOFIN which plays a central role in macroeconomic management within the EU. It has issued annual Broad Economic Policy Guidelines for Member States since 1993 and is the main forum for undertaking surveillance decisions of national economic policies. Responsibility for exchange rate policy in the Euro Area is divided between the European Central Bank (ECB) and the Council, even though the ECB has sole responsibility for implementing monetary policy.

The European Commission has the right of initiative in legislation, and it submits a proposal to the Council. Each proposal is examined within the Council, which may amend it before adoption. In many cases, including the internal market, Community legislation is adopted jointly by the Parliament and the Council under a 'co-decision' procedure. The European Community's budget is also approved by the European Parliament and by the Council. Voting procedures vary. Depending on the case, the Council acts by a simple majority of its members, by a qualified majority, or

[1] Many of the issues in this section are addressed at length in Barrell and Pain (2002).

unanimously. Matters of taxation and exchange rate arrangements require unanimity.

The European Commission is the executive body of the EU and also has an important role in forming overall macroeconomic policy. In most instances the Council of Ministers is unable to legislate unless there is a proposal from the Commission. The Commission has a central role in the preparation of surveillance decisions regarding the economic policies of Member States, and has primary responsibility for operating competition policy, regulating the internal market and undertaking external trade negotiations. The Commission has little role to play in stabilisation policy at present. There is a small EU budget of just over 1 per cent of GDP, which is primarily spent on assistance to agriculture, via the Common Agricultural Policy, and to less developed regions via the use of structural funds. Deficit financing is prohibited. It remains an open question whether the absence of fiscal federalism of the kind seen in the United States raises the costs from abolishing internal exchange rates within the Euro Area.

The process of institution building in Europe is still under way, and there are clear gaps to be filled. The recognition that short-term, interventionist macroeconomic policies were often unproductive has influenced the construction of the new institutions. In particular, the decision to eschew the existence of a powerful central fiscal authority reflects in part this view. However, it also reflects the need to construct compromises between individual sovereign states. If fiscal policy is needed to deal with a serious problem that affects all Member States, such as a major recession, then it remains available. It would be in the interests of all to use it and the institutions described above could ensure rapid and effective reactions to problems. Problems that hit individual countries should be able to be dealt with within the confines of the SGP, but this may need reform and clarification so that countries do have the ability to deal quickly with their own temporary problems. The European constitution is not yet written, and it may never be so, but the process of constructing it is under way. Significant improvements within the constraints of multiple sovereignty remain possible.

The ECB has an explicit objective of ensuring medium-term price stability in the Euro Area. In contrast to most other central banks it has the freedom to set as well as to implement policy targets. This is a stronger degree of independence than in other Euro Area central banks in the past and than in North America and the UK. Medium-term price stability has been defined by the ECB to be an annual rate of (harmonised) consumer

price inflation of between 0-2 per cent per annum. Price rises of up to 2 per cent may be consistent with price stability given the expected, but difficult to measure, improvements that can be achieved in product quality. The monetary policy strategy currently followed by the ECB has two broad pillars – a reference value for broad money growth and a broadly based assessment of the outlook for price developments. The reference value for annual monetary growth has been 4½ per cent per annum since the inception of the Euro, reflecting the medium-term target for inflation, plus an estimated long-term trend decline in the velocity of circulation of ½-1% per annum and trend GDP growth of 2-2½ % per annum.

Although monetary union has been established in Europe without a full fiscal or political union, there are important constraints on budgetary behaviour arising from the Stability and Growth Pact. The SGP extends the fiscal rules previously embodied in the Maastricht Treaty, although the force of the excessive debt provision has been diminished. It requires all the members of the Euro Area to adopt a medium-term objective of achieving budgets close to balance or in surplus. The Pact is underpinned by an 'excessive deficit procedure' involving surveillance and possible penalties. A general government budget deficit above 3 per cent of GDP is considered excessive unless the European Commission judges it to be temporary (likely to last for only a year) and there are special circumstances. Exemption is granted automatically if there is an annual fall in output of more than 2 per cent, an event experienced only by Finland and two non-participants – the UK and Sweden – in the last forty years. Exemption may also be granted if there is a fall in output between 0.75 and 2 per cent. A failure to take corrective action to deal with a deficit judged to be excessive will lead to the imposition of financial sanctions.[2] The Amsterdam Treaty set out the penalties associated with the SGP, but the overall framework has been evolving since then. The Commission, in its Broad Economic Policy Guidelines (BEPG), has set a target for the deficit as in balance or surplus in order to ensure that there is little chance of countries exceeding the 3 percent limit. This guideline does not have the force of Treaty, unlike the penalties for exceeding the 3 percent of GDP deficit barrier, and it can be interpreted by the Commission in various ways. The Council of Ministers, and especially ECOFIN and its sub groups

[2] These would initially have a fixed component of 0.2 per cent of GDP and a variable component reflecting the size of the excessive deficit, with a ceiling of 0.5 per cent of GDP on the total annual amount. The fines would accumulate each year until the excessive deficit is eliminated. If the deficit is corrected within two years, the fines are refunded.

for the Euro Area and its co-ordination committees that involve central bankers and Finance Ministry officials, could design other fiscal guidelines for the Union and for the EMU members. These committees meet regularly, and they are the forum for 'coarse tuning' of macroeconomic polices within the Union.

There are other parts to the 'Macro-Economic Dialogue' that are more directly associated with the Union's Employment Strategy, and co-ordination of policy comes partly through the desire to implement similar and coherent labour market reforms that are designed to make the Union more flexible. The last few years have seen the design and implementation of National Action Plans (NAPs) to address employment in the European Union. These plans were designed in relation to agreed objectives, and have played a useful role in focussing efforts in areas where individual economies were performing worse than the Community average. The four pillars in the strategy that countries are expected to follow in their NAPs are:

- Attention should be paid to improving the employability of the unemployed;
- Serious consideration should be given to developing entrepreneurship;
- Flexibility in companies and on the part of employees should be encouraged;
- Policies for equal opportunities for men and women should be constructed.

Each NAP has to offer discussion of the effects of spending and taxes on employment and suggest details for the implementation of specific employment oriented initiatives. These features have to be backed up by a sound coverage of relevant labour market statistics. The first three pillars are backed by clear quantitative guidelines from the Commission.

3. The Current Macro Environment and Government Budgets

Government budgets came under considerable strain in 2001 due to the sharp slowdown in growth. The aggregate budget deficit for the Euro Area increased for the first time since serious consolidation efforts began in 1993. The Euro Area budget deficit was around 1¼ per cent of GDP in 2001 compared to the 0.6 per cent projection implied from the Stability and Growth Programmes submitted in 2000.

Table 1

Stability and Growth Programmes Fiscal Targets

	Fiscal targets (% of GDP)			Percentage point difference in 2001 Programme and 2000 Programme targets	
	2001[(a)]	**2002[(b)]**	**2003[(b)]**	**2002**	**2003**
Austria	–0.8	0.0	0.0	-	-
Belgium	0.2	0.0	0.5	–0.3	-
Finland	4.7	2.6	2.1	–1.8	–2.4
France	–1.0	–1.8	–1.5	–1.2	–1.1
Germany	–1.5	–2.5	–1.5	–1.5	–1.0
Greece	0.5	0.8	1.0	–0.7	–1.0
Ireland	4.3	0.7	–0.5	–3.1	–5.1
Italy	–0.8	–0.5	0.0	-	-
Netherlands	0.7	0.4	0.2	–0.2	–0.9
Portugal	–1.1	–1.8	–1.0	–1.1	–0.7
Spain	0.0	0.0	0.0	–0.2	–0.3
Euro Area	–0.6	–1.1	–0.7	–0.8	–0.8

(a) 2000 Stability Programme.
(b) 2001 Stability Programme.

As a consequence of the slowdown in activity several countries made significant revisions to their budget projections in updated Stability Programmes released at the end of 2001. Germany and Portugal have made significant downward revisions to their projections, and as a result their projections were discussed at Council Meetings, although no warning letters were issued. The aggregate budget deficit for the Euro Area may well remain at 1¼ per cent of GDP in 2002, with only a gradual reduction for 2003.

If tax rates and expenditure plans were set to achieve an acceptable budget target before the recent demand shock came along then there is no good reason to change them. It could be that Germany, the potential recipient of a letter, could have stronger automatic stabilisers (i.e. more

progressive taxes, more generous marginal benefits, etc.) than other countries and hence Germans perhaps need to adjust their automatic stabilisers to reduce the probability of a deficit breach. However, this possibility has not been widely discussed, although the evidence in Barrell and Pina (2002) and that given below does suggest that this might be the case.

4. Discretionary Policy, the SGP and Public Sector Investment

The policy framework in Europe has been set up to reduce the scope for discretionary fiscal policy, as this has often been seen as counterproductive when used in the past. Fine tuning of the economy is difficult, and many of the objectives that fine tuning might be designed to achieve can be met with adequately designed automatic stabilisers, though many of the problems that fine tuning faces are also faced by these stabilisers. In particular, fine tuning is not particularly good at coping with supply shocks and in the short term economists and politicians have difficulty discerning the difference between an adverse supply shock and a negative demand shock. However, in extreme circumstances there should be scope for 'rough tuning' to deal with severe recessions. Institutions have to be strong enough to deal with these eventualities, and it is not clear that they presently are, as the deficit targets are perhaps too tight. We analyse one possible piece of rough tuning and investigate the effects of a sustained fiscal expansion with and without a shift in the deficit target.

It can be argued in particular that the administrative guideline that budgets should be in balance or surplus is too tight, and unwise. The current targets have meant that in the recent past public investment in infrastructure has been a prime target for budgetary cuts, despite the wide evidence that such a policy might reduce the potential for medium-term economic growth. Public sector infrastructure investment can be an important source of productivity growth, and there may be periods when it would be wise to raise public investment well above its current levels, for instance in a period of rapid technical change. At these times, it could be optimal to raise borrowing, rather than taxes, so that the costs of the increased investment could be shared by the generations that would benefit from it. The SGP as it stands could prevent this if the extra level of investment pushed national budgets into deficit, and hence it is possible that the SGP and the associated surveillance procedures may inadvertently reduce the level of public investment in Europe if they are implemented to

the letter. The policy debate in Europe should consider whether the fiscal framework should evolve towards a position where public borrowing could, over the cycle, be justified in relation to public investment.

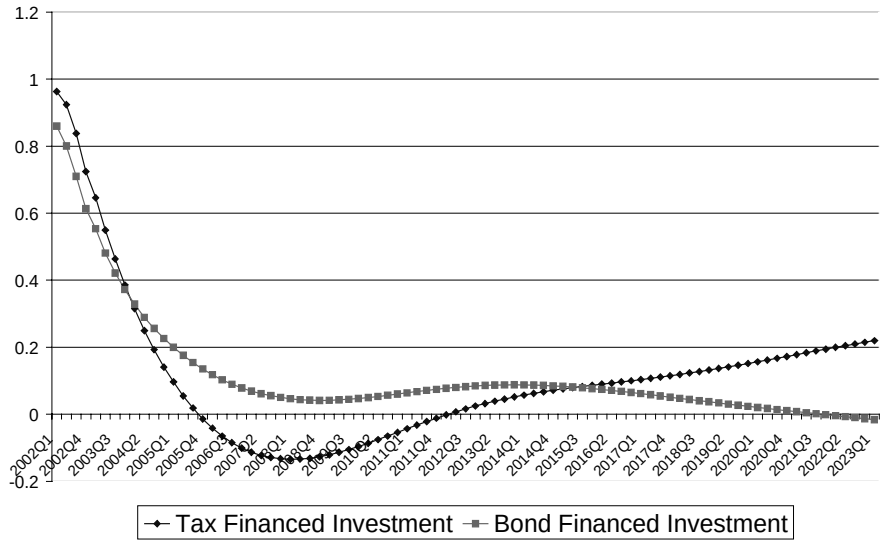
The Maastricht Treaty formulated the goal of a budget deficit of less than 3 percent of GDP, based in part on the golden rule of public finance that allows borrowing to finance productive investment. In the run up to that Treaty the public sector in the Euro Area as a whole had been investing as much as 3 percent of GDP in infrastructure, and the golden rule would allow borrowing up to this amount. However, the 1990s saw a marked reduction in public sector investment as part of the consolidation process to achieve Monetary Union. This is expected to continue as the SGP, with its plan for budgets in balance or surplus over the cycle, is implemented. If there were to be a revision to the guidelines one obvious benefit would be to allow for more investment. Indeed, enshrining a version of the golden rule into European treaties, much as in the German constitution, might be wise.

The decision to put further constraints on the potential for public borrowing was clearly wise in the early period of construction of Monetary Union in Europe. However, it is worth discussing alternatives to the SGP, looking in particular at the sustainability of public finances in the European Union and at the role of the public sector in strengthening the prospects for output growth. It is not clear that the SGP is necessarily the best framework for these objectives. There is a very strong case to be made for allowing the public sector to borrow over the cycle. However, it is clear that moving all the way to the Golden Rule would not be sustainable, and a compromise target could be set, say half way between the two. Looser targets still mean sustainable public finances, and the consolidation process has inevitably meant that productive expenditures have been cut to meet targets.

We can analyse the policy choices facing Europe by undertaking a simple simulation on NiGEM, the National Institute Global Econometric Model (see relevant details in the appendix), where we increase the level of public sector investment by 1% of GDP from 2002q1 onward. We assume that there are no implementation problems, and that public sector investment is productive, and enters the national capital stock. Fiscal policy expansion can either be within the SGP guidelines, and thus tax financed, or we could have a sustained increase in borrowing of 1% of GDP. This latter policy initiative would shift the ‘in balance or surplus’ guideline, but we argue below that it would not be in breach of the Treaty obligations to stay safely within 3% of GDP deficits. As we can see from Chart 1, output

Chart 1

The Effects on Euro Area Output of a 1% of GDP Increase in Government Investment (% difference from baseline)



would be noticeably higher for 4 to 6 years, and initially the gain would be 1% of GDP, and around 0.7 percent in the first year. These multipliers are low because we have monetary policy rules in place that would raise nominal interest rates, and leakages into imports are noticeable, even at a European level.

The medium term gains would be more sustained if the expenditure were financed by borrowing, although the initial impact on the economy would be smaller. The more sustained path for gains comes because taxes are not raised and consumers do not therefore react so quickly to the impact of higher spending on the resources they have available over their lifetimes. In both of these experiments we assume that financial markets (and consumers) are forward looking. If there is an increase in the size of the government sector, financed by taxation, incomes and consumption in the future must be lower and hence private sector net saving in Europe will fall and real interest rates will hence rise. As a result, even with tax finance real long term interest rates must rise by 0.2 to 0.3 percent, and with the

ECB's two pillar strategy this means that nominal rates must rise as well. Of course we assume short rates rise immediately in response to the increase in demand.

If the increase in spending were not tax financed the increase in deficits would imply that the debt stock would rise by 20% of GDP in the longer term. This would mean that real (and hence nominal) interest rates would rise by more in future, and hence real long term rates would rise by 0.3 to 0.35 percent now. Hence debt finance would reduce both the immediate impact effects and the longer-term impact on output.

5. Decomposing Stabilisation Gains

Considerable attention has been paid to the scope for the use of fiscal policy as a stabilisation tool under the SGP. Eichengreen and Wyplosz (1998), Dalsgaard and De Serres (1999) and Buti *et al.* (1998) have discussed whether there will still be room for automatic stabilisers. The latter authors argue that a fiscal position close to balance or in surplus means that automatic stabilisers will be restored. However, it is widely accepted that while countries are still close to the 3 per cent threshold a potential incompatibility between built-in stabilisers and the SGP exists (e.g. Eichengreen, 1997). It is also of interest to quantify how effective automatic stabilisers are at smoothing output. Studies like Bayoumi and Eichengreen (1995), European Commission (1997) and Allsopp *et al.* (1997) are based on a very limited number of deterministic simulations, mainly consisting of demand shocks, which excludes many other sources of uncertainty, unlike the stochastic and other simulations reported in Barrell and Pina (2002) and Barrell and Dury (2001).[3] As Blanchard (2000) suggests, concentrating on demand shocks may bias the results towards large stabilisation gains (smaller output gaps). In this section we extend this analysis by analysing the role of automatic stabilisers under different sorts of shocks using NiGEM.

For each of the EMU countries analysed in this paper, fiscal revenues can be disaggregated into personal income taxes plus social security contributions (TAX), corporate taxes (CTAX) and miscellaneous

[3] Another paper on automatic stabilisers is Van den Noord (2000). However, it is not clear what method this author uses to draw shocks and apply them, and hence we feel it is difficult for us to compare our results with his.

taxes (mainly indirect; MTAX). Expenditures comprise government consumption and investment (GC and GI), interest payments (GIP) and transfers (TRAN). The budget balance thus reads:

$$BUD = TAX + MTAX + CTAX - TRAN - GIP - GC - GI \qquad (1)$$

Government interest payments are modelled as the income on a perpetual inventory, the change in the debt stock each period paying the long interest rate in the issue period until it is replaced.[4] Variables GC and GI are not cyclically sensitive, unlike transfers and revenues (see below). Personal taxes and transfers affect disposable income, as do interest payments.[5] Further, all budget items feed into the economic system through their impact on the budget balance, and thus on the economy's asset stocks.

The results in this section follow from those in Barrell and Pina (2002), where a more complete analysis of the role of Automatic Stabilisers can be found along with their implications for deficit breaches under the SGP. Barrell and Pina follow the OECD, and other international organisations that calculate structural fiscal positions, in modelling automatic fiscal stabilisation – both in defining which revenue and expenditure items are assumed to depend on the cycle, and in quantifying such dependence. They assume that tax revenues respond to the economy's cyclical position, whilst on the expenditure side only unemployment benefits do so. Further, each cycle-dependent budget item displays a given, nationally distinct constant elasticity with respect to the output gap.[6] In order to evaluate stabilisers two policy regimes are simulated: one where taxes and unemployment transfers are determined according to OECD elasticities, the other where taxes and spending plans are set at their structural trajectory levels, and there are no fiscal feedback mechanisms operating to stabilise the economy.

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4 The perpetual inventory attempts to take account of countries like Italy and Belgium where there are large proportions of short-term public debt. Our simple model cannot take account of the complexities of debt finance, and there are residuals on these equations, and these are used in stochastics.

5 Variable GIP also influences net property income paid abroad, and thus the current account and asset stocks as well.

6 See Giorno *et al.* (1995, pp. 203-208) for a summary of how such elasticities have been estimated. The analysis in Barrell and Pina (2002) was begun before the publication of new elasticities in Van den Noord (2000). However, these new elasticities make no real difference to results, as we explain below. Further, backtracking to use these elasticities would reduce comparability with previous studies.

Automatic stabilisers alone cannot account for fiscal behaviour over the cycle, since political and bureaucratic factors also play a role (see Melitz, 1997). It is also true that elasticities are endogenous, at least in the medium term. However, it is useful to assess, in the light of the existing elasticity estimates and abstracting from political biases, how effectively European tax and transfer systems smooth output fluctuations. First, even if such systems proved incompatible with SGP rules and a reform of taxation and unemployment benefits ensued, any accompanying increase in output volatility would be a loss in itself, whose quantification provides one possible rationale for our approach. Furthermore, the conventional view of automatic stabilisers continues to be found in recent studies on European fiscal policy (e.g. Buti *et al*. (1998), Artis and Buti (2000)).

An attractive feature of the conventional view of automatic stabilisers is that it can be expressed as a set of 'simple rules' for the relevant budget instruments – thus making it possible to perform a formal analysis of the ensuing policy regime in the dynamic, rational expectations framework of NiGEM. Following the OECD ensures that our results are comparable to previous research by other authors (discussed above). For a given item with (nominal) value T, the OECD determines the corresponding structural (or cyclically adjusted) amount by the formula

$$T^a = T\left(\frac{Y^*}{Y}\right)^{\alpha} \tag{2}$$

where Y^* represents potential output, Y actual output and α is thus an elasticity with respect to the output gap. The OECD cyclically adjusts five budget categories: personal income tax, social security contributions, indirect taxes, corporate taxes and current primary expenditure. The elasticity applied to the latter is typically small, reflecting the circumstance that unemployment benefits are the only expenditure item assumed to vary automatically with the cycle. Our objective in using these values is not the same as the OECD's. They compute the *structural* values of budget items for given *actual* amounts, we aim at obtaining *actual* taxes and expenditure that, although varying across stochastic trials, correspond to a given unchanged *structural* stance. They thus reflect the operation of automatic stabilisers in the wake of a variety of shocks and in the absence of discretionary fiscal policy measures.

Table 2

The Impact of Automatic Stabilisers – A Demand Shock

	Demand Shock in backward mode	**Demand Shock in forward mode**
	1999q1 – 2017q1	1999q1 – 2017q1
Germany	0.796	0.847
France	0.929	0.910
Italy	0.899	0.974
Netherlands	0.893	0.916
Belgium	0.902	0.938
Spain	0.795	0.776
Portugal	0.868	0.915
Austria	0.848	0.899
Ireland	0.925	0.922
Finland	0.881	0.896
Euro Area	0.860	0.890
The backward shock is run with fixed interest rates and exchange rates and no rational expectations. We implement a large shock to US consumption with and without automatic stabilisers.		
The forward shock is run with the two pillar strategy in place and forward looking financial and exchange markets, as well as forward looking labour markets. We implement the same large shock to US consumption with and without automatic stabilisers.		

It is common to evaluate automatic stabilisers in terms of their ability to stabilise the economy in response to a single shock. We can do so for a simple demand shock such as a fall in US demand, starting the simulation in 1999q1 and evaluating the role of policy and expectations in stabilising the economy. We apply the same shock in backward mode and forward mode, as explained in Table 2. Our run in forward-looking mode assumes that individuals form model consistent expectations and that EMU was in place. In each case we also run the model without automatic stabilisers, and calculate the gain in terms of the root-mean-squared deviation (RMSD) of output from baseline with stabilisers and without them. The ratios of these RMSDs ('with' over 'without') are reported in

Table 3

The Impact of Automatic Stabilisers – All Shocks from 1993q1

	1999q1 – 2017q1	1999q1 – 2005q4
Germany	0.822	0.879
France	0.946	0.979
Italy	0.924	0.841
Netherlands	0.993	1.049
Belgium	0.967	0.967
Spain	0.785	0.841
Portugal	0.929	0.954
Austria	0.949	1.004
Ireland	0.985	1.042
Finland	1.004	1.059
Euro Area	0.892	0.912

The full range of shocks to all equations from 1993q1 is applied to the model with and without automatic stabilisers. The model is run with the two pillar strategy in place and forward looking financial and exchange markets, as well as forward looking labour markets.

Table 2 both for the Euro Area as a whole and for individual economies. Clearly, in the face of demand shocks automatic stabilisers produce a more stable outcome. Stabilisation gains appear to be significant, especially if we assume no response by financial markets and the monetary authorities. The Euro Area as a whole has an RMSD of output that is 14% better when there are stabilisers in place than when there are not. Germany and Spain particularly benefit from the presence of these feedbacks. However, if we let the monetary authorities absorb some of the shock[7] then roughly a fifth of the gain is removed. If the shock is negative, as it is here, short-term interest rates will be cut both now and in the future, and as a result forward looking long term rates will go down as well, and both of these will help stabilise the economy.

[7] This has not been common in the other studies discussed above, and hence they have given more weight to the role of fiscal stabilisers than we think is reasonable. Van den Noord (2000) uses a Taylor rule, but has fixed exchange rates, and hence he has only moved half the distance between column 1 and column 2 of Table 2.

The evaluation of the stabilising properties of the feedbacks depends upon the time horizon considered and the complexity of the shocks. We can apply all the shocks that occurred in 1993q1, for instance, to our model. As shown in Table 3 (first column), over the 19 years of our run the automatic regime is stabilising for almost all countries, with it producing no discernible impact for Finland, which was subject to severe supply shocks around 1993. Over the first seven years (equivalent to the results normally published in other studies) the automatic stabilisers regime is stabilising for some countries but not for others (second column of Table 3). Over this period, as we might expect, automatic stabilisers are less effective in the small open economies. The Euro Area as a whole makes a stabilisation gain of 9 percent, marginally below the 11 percent reported in Barrell and Pina (2002) for repeated trials drawn from 1993q1 to 1997q4.

It is useful to compare the elasticities utilised in Barrell and Pina (2002) and other studies with those used in van den Noord (2000). For most economies there is little impact when we change elasticities (see Table 4). The impact on the RMSD of output as compared to the

Table 4

Ratios of new OECD stabilisers to old OECD stabilisers

	First Seven Years	1999q1 – 2017q1
Germany	1.039606	1.040078
France	1.001378	1.001321
Italy	1.055369	1.016994
Netherlands	1.011827	1.011794
Belgium	1.005099	1.005086
Spain	0.999706	1.00003
Portugal	1.00189	1.001333
Austria	0.9836	0.983607
Ireland	0.999625	0.999666
Finland	1.019462	1.011823

Calculated using the NiGEM model from Barrell and Pina (2002), applying the 1993q1 shock, and then repeating the exercise with the Van den Noord (2000) elasticities. Results are ratios of RMSD of output.

no-stabilisers case changes by less than 1 percent for Ireland, Portugal, Spain, Belgium and France, and just above 1 percent for Finland and the Netherlands. These differences will produce very little impact on our conclusions. The slightly larger increase in the value of stabilisers in Austria would not impact greatly on our results. Only in Germany and Italy, at least in the short run, do the stabilisers change noticeably. The major changes in most countries come from a remodelling of the corporate tax regime, removing the lag in payments discussed in Barrell and Pina (2002). However, corporate tax receipts are generally so small that they have little impact on the overall effect of the regime. Changes in personal tax regimes in Germany, and to a lesser extent in Italy, decreased the scale of the stabilisers somewhat.

6. Setting the Deficit Target

Barrell and Dury (2001) present extensive results on fiscal issues and also discuss the recent literature on the appropriate targets for government budget deficits. Some simple descriptive statistical analyses have been undertaken based on retrospective evidence. The work in Buti and Sapir (1998), for instance, broadly suggests that the European economies could operate well within the SGP guidelines if they broadly followed a balanced budget target and if some, such as the Nordic economies, aimed for a surplus. These results depend on the observed volatilities of both the economies in question and their budget deficits and they probably paint too pessimistic a view of the constraints governments face. In particular, the Nordic economies exhibited volatile business cycles in the 1970s and 1980s into the early 1990s because they went through a sequence of devaluation induced booms and downturns. These are no longer possible to generate in quite the same idiosyncratic way given monetary policy commitments in Finland, Denmark and Sweden.

We investigated this issue in a number of papers using stochastic simulations on NiGEM (see Barrell and Dury (2001), Barrell and Pina (2002) and Dury and Pina (2000)).[8] The probabilities of breaching the SGP were calculated and in all three papers the conclusion was that the targets for the government deficit announced in the stability programmes were

[8] Barrell, Dury and Hurst (2002) discuss the basis of the technique used, and readers are referred to that for further discussion of bootstrapping a forward looking model.

Table 5

Target deficit required for a 1% chance of breaching the 3% limit

	Monetary Target	Two Pillar Strategy	Inflation Target
Germany	1.73	1.59	1.53
France	2.28	2.14	2.11
Italy	1.97	1.71	1.72
Netherlands	1.85	1.73	1.59
Belgium	0.47	0.46	–0.03
Spain	1.41	1.48	1.33
Portugal	2.31	2.25	2.25
Austria	1.42	1.44	1.30
Ireland	1.12	0.96	1.05
Finland	1.22	1.10	1.24

broadly compatible with the automatic stabilisers working freely and that the structure in place could cope well in stabilising the economy given a variety of shocks. Clearly, the closer to zero the target deficit, the easier it would be for fiscal stabilisers to work.

In Barrell and Dury (2001) we calculate the target deficit required for there to be only a 1 per cent chance of exceeding the SGP 3 per cent ceiling. The stochastic simulations give us the variability of the government budget ratio and from this we can calculate the required mean target for each country. Table 5 presents these results. We show that the level of the government budget deficit required for a 1 per cent chance of exceeding the 3 per cent limit without constraining the automatic stabilisers built into the model[9] is relatively high compared with most other estimates,

[9] These stabilisers differ in detail from the industry standard as used in Barrell and Pina (2002), but the differences are small and they do not affect the essential message of these results.

as discussed by Buti and Martinot (2000). For example, an econometric analysis by Dalsgaard and de Serres (1999) reports appropriate medium-term target deficits of the order of 1-1.5 per cent of GDP for the majority of the European economies. Finland, UK, Denmark and Sweden are estimated to require moderate surpluses to keep within the SGP criteria. Our results suggest that the main European economies can run looser deficit targets.

Our stochastic simulation results have the advantage of being based on a model of the European economies that we think will exist in the future with a policy environment that is a reasonable idealised description of the current framework. They should therefore be reasonably robust to the criticism of not taking account of structural changes in the economy and in policy regimes, whilst those based on historical outturns are riddled with such problems. Our results in Table 5 suggest that amongst the initial EMU members only Belgium needs to run near balanced budgets to allow the automatic stabilisers on our model to operate without breaching the 3 per cent of GDP deficit limit. We show the results over a number of types of monetary policy rules, and these are discussed further in Barrell and Dury (2001). In that paper it is shown that the core Euro Area economies would require tighter deficit target trajectories if the ECB were targeting an inflation rate as this strategy increases interest rate volatility and hence the volatility of government debt interest payments.

Setting target deficits 'close to balance', as in the Pact, can be seen as aiming for a target range of 0-1 per cent of GDP. This is tighter than the 'safe' budget targets shown in Table 5. There are three possible effects of the economic cycle on the budget, in that tax revenues automatically rise with incomes and expenditures on items such as unemployment insurance automatically fall, and also as revenues improve there are political pressures to lean with the wind and cut taxes and raise spending. The first two are best described as automatic stabilisers. NiGEM has effects of the cycle on unemployment related transfers similar to those in van den Noord (2000), but probably has smaller cycle related tax elasticities. Barrell and Pina (2002) embed the 'industry standard' tax elasticities into the model and show that the volatility of the deficit increases somewhat, but not enough to make target deficits in the range of 0-1 per cent of GDP induce more than the very occasional breach of the SGP. There is clear scope within the current arrangements for the unfettered operation of automatic stabilisers. However, there are good reasons to be cautious and set target deficits closer to zero than those in Table 5. The 'close to balance' rule can

also be seen as being designed to offset some of the potential bias introduced into the budgetary system by bureaucratic offsets discussed, for instance, in Mélitz (1997). We would presume, as in the 1980s and 1990s, governments will find it difficult to run surpluses even when they are appropriate to the cyclical position. We would conclude that deficits around 1 per cent of GDP would be suitable for almost all countries in EMU.

7. Summary and Conclusions

In this paper we have shown that there might be a case for changing the deficit target within the SGP, making it possible to increase public investment. If targets were set at 1 percent of GDP then the 3 percent ceiling would be unlikely to be breached. We have also shown that automatic stabilisers can be expected to work, but in the face of supply shocks we cannot expect too much from them.

APPENDIX

THE STRUCTURE OF NiGEM

NiGEM is an estimated quarterly macroeconometric model using a 'new-Keynesian' approach. Agents are forward-looking in financial and labour markets, but the process of adjustment to shocks is slowed down by nominal rigidities. Demand and supply sides are fully modelled, alongside an extensive monetary and financial sector. The model comprises estimated blocks for the whole world: all OECD countries are modelled separately, and there are 8 non-OECD groups. The major economies have fairly detailed models (60-90 equations, with around 20 key behavioural relations) sharing a similar theoretical structure, so that cross-country variation in simulation properties reflects genuine differences resulting from estimation. National or regional blocks are linked through trade, financial variables and asset stocks.

The core structure of NiGEM can be viewed as Dornbusch-Mundell-Fleming model with forward-looking variables. The short run simulation properties are discussed in Barrell, Dury, Hurst and Pain (2001) and longer term issues in Barrell, Dury and Holland (2001). Consumption on the model can be either forward or backward looking and it depends on income and (forward-looking) wealth, which entails the need to ensure that the assets stocks of the private and public sectors are modelled consistently within and across countries. Solvency constraints are imposed on governments, thus ruling out any long-run explosion in public debt stocks. Financial markets are forward-looking. Exchange rates follow the uncovered interest parity condition, while long term interest rates result from the forward convolution over 10 years of their 3-month counterparts. The latter are assumed to be the monetary authorities' instrument, set according to simple feedback rules. The impact of future events is brought forward onto households by financial markets through variables such as long rates and equity prices.

As regards the supply side, estimated demands for capital and labour form a basis to calibrate aggregate CES production functions with exogenous labour-augmenting technical progress. Capacity utilisation based on the production function feeds into the wage and price system, playing an essential role in the model's self-stabilising properties. Different institutions in the labour and product markets make the estimated speed of adjustment of wages and prices vary across countries. In most countries

evidence supports the existence of forward-looking behaviour in bargaining, and wages depend on expected future inflation. Although there are differences between labour markets, these can be justified on statistical grounds, as Barrell and Dury (2000) show, and there is little difference between the reactions of a world where all are assumed to be the same and one where they are not.

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THE EMU REGIME AND GOVERNMENT PREFERENCES FOR THE PROVISION OF STABILISATION

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In this paper, we attempt at mapping preferences for 'government provision of stabilisation' – which should be understood as action by governments, past and present, that have a stabilising effect on economic activity – at the national level in the EMU on the basis of some indicators of government activity. We find that the EU Member States exhibit differences as regards 'revealed preferences' for government provision of stabilisation, depending both on "need" and "taste" factors. In EMU, with price stability as the nominal anchor, monetary policy dominates fiscal policy and architecture of the Stability and Growth Pact secures balanced budgets at the national level. If it is the case that there exists a 'preference gap', in the sense that the monetary authority is forgiving on unemployment but non-forgiving on inflation and that the reverse is true for the fiscal authorities, this may put stress in the system and result in an inefficient overall regime.

1. Introduction

In EMU, the overall macro-economic policy regime institutionalises price stability as the nominal anchor and sets a straightjacket on fiscal policies; in EMU monetary policy dominates fiscal policy. The rationale behind the monetary and fiscal rules in EMU should be seen against the failures of "Keynesian" activism to deliver stability and full employment in the 1970's and 1980's. By tying the hands of policy makers, the EMU rules work as a commitment mechanism to increase credibility while shifting the main policy focus from short-term stabilisation concerns towards medium-term efficiency concerns.

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The challenge is how to combine the medium- and long-term commitments with short-term flexibility. Indeed, after the room of manoeuvre having been restricted by the market forces in the 1990's, the EMU rules have also been viewed as a way to regain lost room of manoeuvre for short-term budgetary stabilisation initiatives. This may be an indication that there is a gap between the preferences underpinning the EMU institutional framework and the revealed preferences, in terms of outcomes, held by governments. Indeed, while progress in structural reform appears to be relatively slow, short-term stabilisation concerns remain high on the agenda. If such a "preference gap" actually exists there is a risk that the EMU macro-economic regime will under-perform while stress in the system gradually builds up. In the end, if government preferences do not adapt, this type of strain could lead to that the institutional set-up is questioned. Against this background, the purpose of this paper is to have a look at the revealed preferences for government provision of stabilisation across EU Members States and discuss some of the policy implications in EMU. This is done by looking at the supply of, and demand for, government provision of stabilisation at the national level.

The paper is organised as follows. Section 2 outlines the case for stabilisation policies. Section 3 looks at the different channels of government provision of stabilisation with a view to make a mapping of the "revealed preferences" across Member States. Section 4 examines the implications under EMU regime. Finally, Section 5 discusses some policy implications of EMU and Section 6 concludes.

2. The case for stabilisation policies and Government provision of stabilisation in EMU

There are traditionally two rationales for stabilisation policy.[1] Firstly, to the extent that economic fluctuations correspond to excess volatility in the economy explained by different market failures, such as imperfect competition and various adjustment failures, a welfare gain could be realised by successful stabilisation policies. With a real-business cycle approach towards explaining the business cycle, the case for stabilisation policies would be highly questionable. Secondly, a case for stabilisation

[1] According to the Palgrave dictionary, stabilisation policy normally refers to discretionary measures, or "deliberate changes in government policy instruments in response to changing macro-economic instruments, in order to stabilise the economy".

policies can also build on incomplete capital markets where risk averse agents would like to but can not fully diversify away business-cycle risks. This calls for provision of additional social insurance from the government. However, the development of better functioning capital markets weakens this case.

The consensus advice on the use of budgetary demand management is that they should be used, if ever, in case of demand-side shocks rather than supply-side shocks and when shocks are of a temporary rather than permanent nature (see European Commission, 2000). Such guidelines are useful as a benchmark in discussions on what should be the right policy response in different situations. However, in practice, given the inherent uncertainty of business cycle assessments in real-time, when policy decisions are taken, it is very difficult, if not impossible, to tell the true nature of shocks. Under such uncertainty it is reasonable to believe that policy-makers decisions hinges importantly on ideological beliefs and regarding the role of the market and the responsibility and capacity of the government to intervene.

To separate stabilisation policies from welfare and redistribution policies is not clear-cut, especially in an ex-ante/ex-post perspective. This is because policy-makers simultaneously strive for allocation, redistribution and stabilisation objectives. Thus, policies typically target at the same time a low and stable inflation rate, a low and stable unemployment rate and high and stable disposable incomes. In the same vein, the distinction between stabilisation policies in terms of providing social insurance and general redistribution policies is unclear. What ex ante can be seen as social insurance, may ex post look like redistribution (the "Musgrave distinction", see Andersen, 2001).[2]

Indeed, it is possible to argue that the build-up of the large public sectors in European welfare states is a result of the interplay between stabilisation and welfare policies. Expansionary measures introduced for (stabilisation purposes) in downturns have tended to become permanent (welfare policies). As the institutional framework affects the economic structure, the "need" for stabilisation is also affected. This well documented non-reversibility of discretionary measures (see section 3) is

[2] In addition, when evaluating ex post the relative success of different budgetary stabilisation policies, the assessment is usually not made against the primary objectives of stabilisation policies, but against swings in overall economic activity (GDP), a variable that governments, in the short-term, might not be primarily concerned with *per se*.

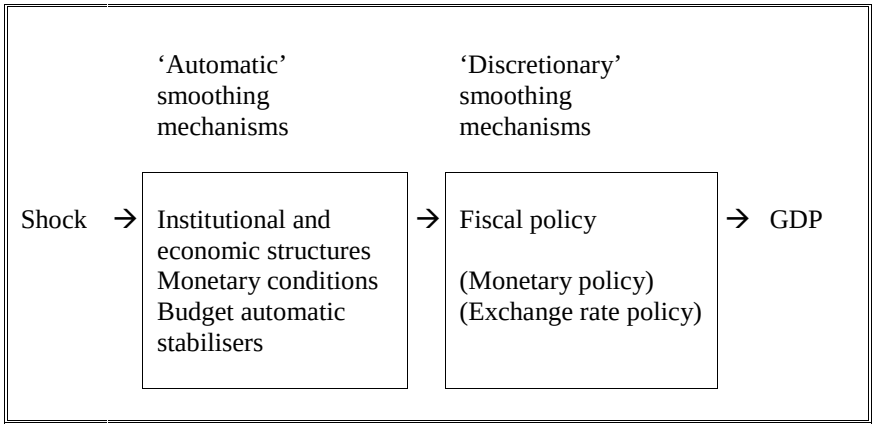
consistent with a general desire to gradually increase the span of the welfare state.[3]

Government provision, or supply, of stabilisation includes all government actions that have a stabilising impact. This encompasses both automatic and discretionary elements, as policy-makers actions are not only decided by their current preferences; they also have to act within an institutional framework that is inherited from previous governments. In the end, the institutional structures today can be seen as the result of incremental discretionary actions in the past. The issue of to what extent, and how fast, a government and/or a parliament is empowered to act may be important in this regard.

The automatic elements are the budgetary automatic stabilisers, the stabilising properties that stem from the size of the public sector (being less cyclically sensitive than the private sector) and the use of regulation in product and labour markets. Figure 1 illustrates the effect of an external

Fig. 1

Smoothing mechanisms



[3] Tanzi and Schuknecht (2000) concludes that 'While initially, the two world wars permitted some significant increases in revenue and expenditure levels, it was the period between 1960 and 1980 that saw the most rapid expansion. Changes in public expenditure levels largely followed changes in attitudes towards the role of the state and changes in the institutions which constrain government intervention in the economies.'

shock at the national level in EMU is decided by national institutional and economic structures, the common monetary policy and the working of the automatic budget stabilisers. In order to further limit the impact on economic activity, the government may decide to provide additional stabilisation through discretionary actions.

The preferences for stabilisation are simultaneously decided by the "need" and "taste" for stabilisation. The "need" for stabilisation depends on how sensitive an economy is to external shocks which in turn depends on industry structure, trade openness, the optimality of monetary conditions etc. In this context, the "need" could be thought of as the provision of stabilisation necessary to reach a certain (minimal) degree of stabilisation. However, even if the government satisfies the "need" for stabilisation, they may still have a "taste" for more. The "taste" for stabilisation depends on ideology, that is, views on the role and responsibilities of the State and the market. By looking at the government provision of stabilisation and indicators of the need for stabilisation it is possible to say something about the "revealed" preferences for stabilisation held by governments. This is done in section 3 below.

3. Government preferences for the provision of stabilisation

There are many ways to capture a government's preferences for the provision of stabilisation. Aggregate measures are often used, such as the level or change of total spending or revenues, either directly for cross-country comparisons or in relation to cyclical developments. Such measures could understate the provision of stabilisation, as e.g. regulation of markets is not directly captured. However, they could also, possibly, overstate the provision of stabilisation, if e.g. there are important elements of tax churning[4] in a country.

In this section, four sources of stabilisation – both discretionary and rule based – are considered. These enables us to tentatively map EU

[4] Fiscal churning measures the extent to which the same households both receive government payments and pay taxes. Tanzi and Schuknecht (2000) find that in 1993-1995, on the basis of the OECDs estimates of tax churning in eleven industrialised countries, government spending could be reduced from 50% of GDP to around 30% of GDP without making anybody worse off. This excludes the welfare gains one could expect from cutting taxes, possibly distortionary, with a proportional amount.

government's preferences for the provision of stabilisation, as revealed by these channels, hence, revealed preferences. These are:

- The use of discretionary fiscal policies. The use of discretionary fiscal measures aimed at stabilising the economy is considered. The use of such measures in the past and their success is discussed, together with some implications for today with respect to the case for 'fine-tuning' the economy within the framework of the EMU.
- The operation of the automatic stabilisers. Part of the government budget expenditures and revenues fluctuate with systematically with economic activity. On the revenue side, tax revenues fluctuate with tax bases. On the expenditure side, unemployment related expenditures correlate with the cycle. In this way the automatic stabilisers help stabilise disposable income over the cycle.
- The size of the public sector. The creation and expansion of the shielded sector work as a stabilising factor in the economy to the extent that it is less cyclically sensitive than the private sector. First, to the extent that the government spending is partly characterised by autonomous spending. Second, to the extent that the public sectors have generally grown almost constantly, until the 1990s consolidation process. Third, the overall size may reflect a government's view on the importance of government intervention in the economy.
- The use of regulatory instruments. Government may use regulation to guide outcomes in product and labour markets with a view to reduce business-cycle risks. For example, government provides protection against unemployment risk for risk averse agents.

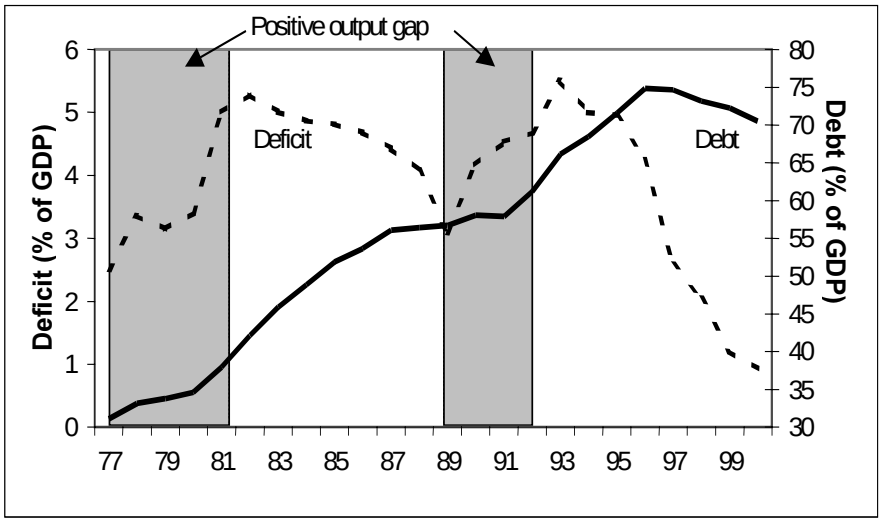
3.1 The use of discretionary fiscal policies

An active use of discretionary fiscal policy measures in general, and for stabilisation purposes in particular, may be taken as an indicator of the preferences of governments to intervene and adjust market outcomes. However, looking at past evidence it must be concluded that the effectiveness of discretionary polices for stabilisation purposes seems to be questionable. This can be related to several factors, political economy related and the well-known implementation difficulties involved due to time lags and specification complexity. Even so, policy-makers may still have a "taste" for using discretionary polices for short-term demand management.

Having said this, the Public Finance Report 2000 (European Commission, 2000) contained an analysis of the use of discretionary fiscal polices across EU Member States over the period 1970-2000. Deficits did not fall as expected during periods of high economic growth, implying that countries offset the working of the automatic stabilisers via discretionary tax cuts or expenditure increases. As a consequence, public debt continued to rise. Such fiscal relaxation in good times in turn necessitated a tightening during economic downturns. Hence, instead of smoothing the business cycle, fiscal policies have contributed to amplifying the output swings. Deficits rose between 1976 and 1981 when there was a positive output gap, but were placed on a downward path afterwards when the economy was in a prolonged period of below trend GDP growth. Pro-cyclical behaviour continued into the 1990s when the inevitable reduction in deficits took place to return budget positions to a sustainable footing: this partly contributed to a period of subdued economic growth. This expansionary stance reflected the developments following German unification and took place in the wake of the strong recession hitting several EU countries at the beginning of the 1990s.

Graph 1

Rising budgetary imbalances in the euro area



Source: PFR 2000.

Also shown in the PFR-2000, individual countries behaved differently as not all countries ran pro-cyclical policies, in particular the split between high debt and low debt countries seems relevant. The former group recorded much higher structural deficits, partly reflecting the higher interest burden. They also tended to pursue a pro-cyclical fiscal policy for all positive output gaps and for strongly negative output gaps leading to an accumulation of public debt over the cycle. Lower debt countries let the automatic stabilisers play more freely.

Table 1

Fiscal stances and output gaps across EU, 1970-95

% of GDP	Average absolute value fiscal stance 1970-1995	Difference to EU average	Average fiscal stance in times of negative OGs	Average fiscal stance in times of positive OGs
B	1.1	–0.1	1.1	–0.6
DK	1.2	0.0	0.0	0.0
D	1.0	–0.2	0.3	–0.4
EL	1.9	0.7	0.6	–0.3
E	0.8	–0.4	0.2	–0.1
F	0.6	–0.6	0.2	–0.2
IRL	1.4	0.2	0.8	–0.6
IT	1.1	–0.1	0.3	0.1
L	1.5	0.3	0.5	–0.6
NL	1.0	–0.2	0.4	–0.2
AT	0.8	–0.4	0.1	0.0
P	1.6	0.4	0.1	–0.2
FIN	1.2	0.0	0.2	–0.2
SW	1.5	0.3	0.5	–0.4
UK	1.3	0.1	–0.1	–0.2

Source: AMECO and own calculations.

Table 1 looks at the average fiscal stance (change in primary cyclically-adjusted balances) over the 1970-1995 period. The average absolute value of the fiscal stance could be taken as an indicator of the degree of fiscal activism and use of discretionary fiscal policy measures. On this basis Greece, Portugal, Luxembourg and Sweden stand out as countries where this indicator would be above EU average and Spain, France and Austria on the opposite side. As indicated by Graph 1 above, fiscal polices appear to have been of a pro-cyclical nature implying loosening policies when gaps are negative and tightening when gaps are positive. This picture is confirmed when looking at the fiscal stance in times of positive and negative output gaps. Clearly, on average the fiscal stance has been tightening in bad times and loosening in good times. Overall, governments appear to have been adapting their expenditures annually to its resources rather than smoothing over the cycle.

3.2 The automatic budget stabilisers

The more the budget reacts automatically and pro-cyclically to economic fluctuations, the more counter-cyclical fiscal impulses it provides to the economy. In bad times, budget revenues weaken while expenditures increase and vice versa in good times. Where to draw the line between what is automatic and not is not straightforward. The standard approach is to focus on budget components which due to the institutional arrangements of the budget, i.e. tax and benefit systems, lead to systematic pro-cyclical movements in the budget. On the revenue side, such a systematic link is found for tax revenues (direct, indirect and corporate taxes) and social security contributions. On the expenditure side, unemployment related expenditures fluctuate with the unemployment rate.[5]

The budget sensitivity to cyclical developments depends both on the sensitivity of government revenues and expenditures to economic fluctuation and on the magnitude of expenditures and revenues of several

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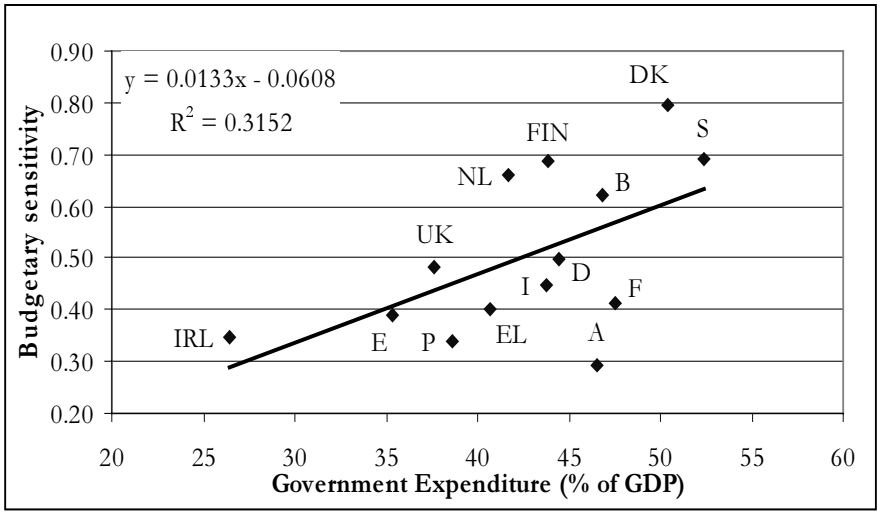
[5] Other expenditure items beside unemployment benefits - for instance, social and health care expenditure - may fluctuate with the cycle. However, it has proven empirically difficult to find a consistent pattern. A related issue is how to deal with the different budgetary rules on expenditures and revenues that have been introduced in several Member States in the last few years. For example, the Dutch budget system includes specific budgetary rules which partially offset the budgetary impact of the automatic stabilisers, making it difficult to distinguish between automatic and discretionary changes. In addition, beyond such institutionalised mechanisms, the question can be raised to what extent discretionary fiscal policy measures, which as seen above have tended to be systematically pro-cyclical, should also be seen as "automatic" (see Melitz, 2000).

variables, such as the size of government, the structure of cyclically sensitive tax bases, the progressivity of tax rates, the cyclical sensitivity of tax bases, the generosity of unemployment benefits and the cyclical sensitivity of unemployment.

Graph 2

Budgetary sensitivities and government size



Source: European Commission (2002).

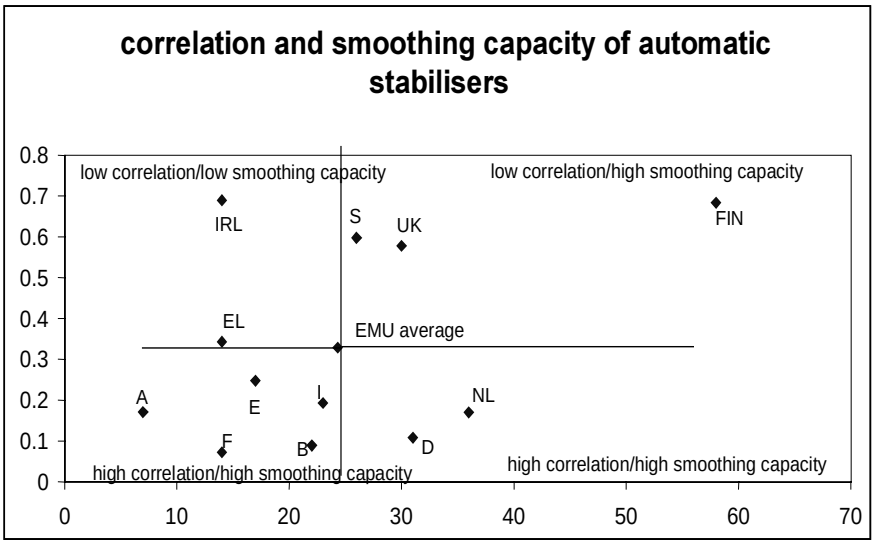
The average budgetary sensitivity to the output gap is around 0.5, implying that if the output gap changes with 1%-point, the average budgetary impact is estimated to be around 0.5% of GDP. Most of the budget sensitivity is on the revenue side (about 0.4) while the expenditure side is less cyclically sensitive (about 0.1). The size of the budgetary sensitivity is closely linked to the share of government revenues and expenditures to GDP. Graph R illustrates the strong linear relationship between budget sensitivity and the share of government expenditures to GDP. However, the relationship is not perfect as the structure of tax bases, the degree of progressivity of the tax system, the generosity of unemployment benefit systems etc. also plays a role. The Nordic countries

typically have above average sensitivities at 0.7-0.8 while countries like Ireland, Portugal and Austria have below average budgetary sensitivities.

However, this does not ensure that automatic stabilisers are generally sufficient to deliver the appropriate macroeconomic stabilisation. Indeed, the measure of the smoothing capacity varies across studies. Other studies arrive at different ranking of countries, reflecting different estimates of the cyclical sensitivity of the budget to economic activity, different typology of shocks underlying the simulations and model differences.[6] For example, according to alternative simulations performed with NiGEM, automatic stabilisers would have a very low smoothing capacity in Finland, which would be a matter of concern given the asynchrony of the economic cycle in this country with the EMU average.

Graph 3

Correlation and smoothing capacity of the automatic stabilisers



Source: European Commission (2002).

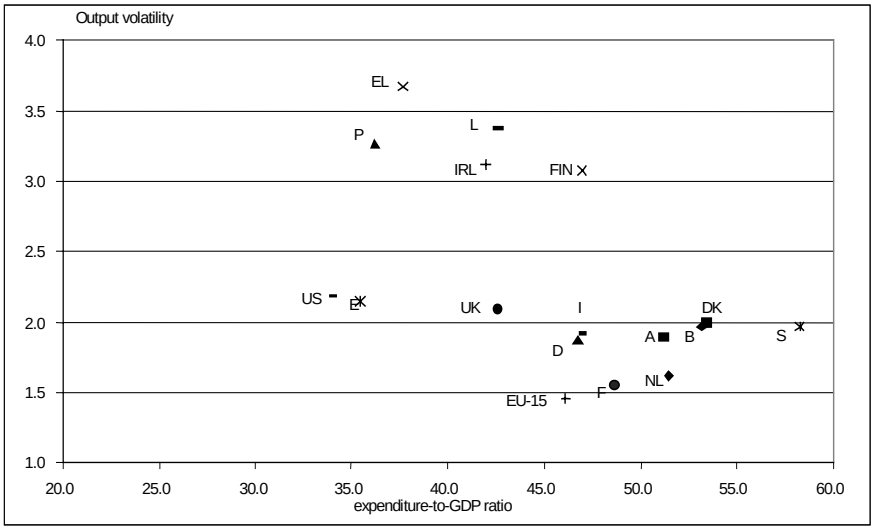
[6] See PFR 2001 for a review of these studies.

3.3 The size of government

In this section, the stabilising effect of the size of government and the components of spending are considered, as well as the composition of government spending in the Member States and related to the EU-average, EU-15.

Graph 4

Output volatility and average size of government, 1970-2000



Source: AMECO.

Graph 4 suggests that there is a negative relationship between output volatility and government size.[7] This is in line with previous empirical work. Gali (1994) find a robust negative relationship between the variation in GDP growth and both the government tax- and purchase-to-GDP ratio.

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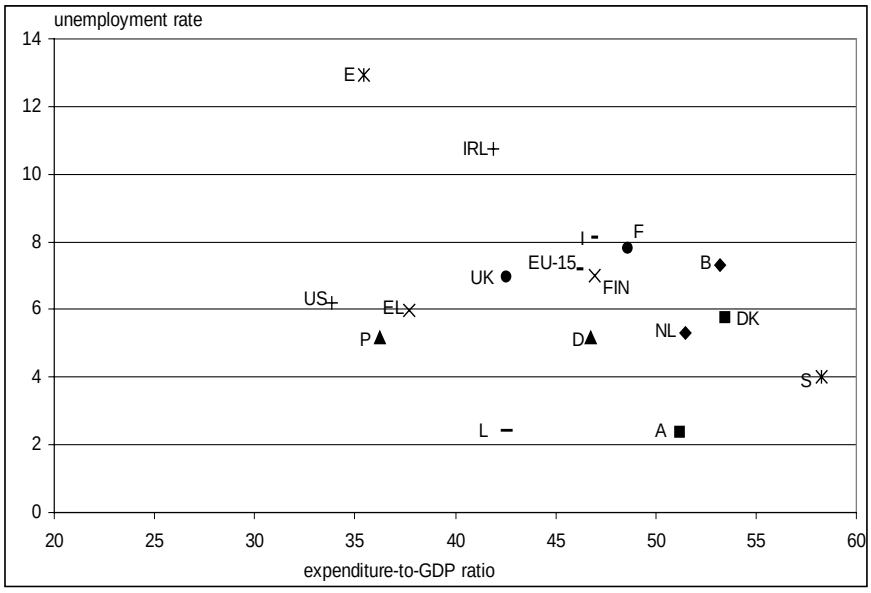
[7] The correlation coefficient across all EU countries between output volatility and total expenditure is -0.63 for the average over the period 1970-2000. Similarly, the correlation between output volatility and i) public consumption and ii) transfers to households are –0.61 and –0.57, respectively. A weaker relationship is found between output volatility and public wages, with a coefficient of –0.32. However, the negative relationships are smaller when output volatility is related to the composition of spending, with coefficients of –0.35 w.r.t public consumption, -0.14 w.r.t. transfers to households and 0.20 w.r.t. public wages.

Fatas and Mihov (1999) takes Gali's empirical work as their starting point. Their results for the OECD countries support the findings of Gali, i.e. the size of a government is negatively correlated with output volatility. This relationship is robust when controlling for several variables and also if private sector output is used. They extend their analysis to US states and their analysis confirms the results arrived at when analysing the OECD countries.

Graph 5

Average unemployment rate and size of government, 1970-2000



Source: AMECO.

However, as noted in section 2 above, it is not obvious that governments are primarily concerned with output volatility per se when formulating policy in real-time. One could imagine that the key variable of interest is the unemployment rate, in particular, i) low unemployment and ii) stable unemployment. In Graph 5 above, the average unemployment rate is plotted against the size of governments in the Member States for the

period 1970-2000.[8] This suggests a negative relationship between government size and the unemployment rate.These stylised facts suggest that the degree of government provision of stabilisation, as proxied here by the size of government spending, has a stabilising effect on the economy. Member States with big governments have on average experienced less output volatility. Moreover, they have on average had a relatively low and stable unemployment rate.

In Table 2 the average total expenditure and its sub-components over the period 1970-2000 are given. As this sample covers more than 30 years, and therefore includes several cycles, one could argue that these ratios represent steady-state proportions, with an average expenditure-to-GDP ratio of 46.1% for the EU. Public consumption and household transfers accounted for three-quarters of total expenditure in the EU. Other components of expenditure are interest payments of almost 4% of GDP, and investment, subsidies and other expenditure, which accounted for 2-3% of GDP.

The biggest component of spending in most countries is public consumption and the wage bill make up more than half of this in all countries (up to almost three-quarters). Transfer payments to households is the other main expenditure post and, to a varying degree, interest payments are important due to the debt situation, ranging from 0.7% of GDP (low-debt Luxembourg) and 7.9% of GDP (high-debt Belgium). Expenditure on investment, subsidies and others are smaller in relation to GDP.

As the EU public finances were in balance in 2000 (for the first time in 30 years), it is interesting to look at the situation on the expenditure side in the Member States in relation to the EU average. In Table 3 below the deviation in percentage points from the EU-average is given for i) the period 1970-2000 and ii) in 2000.

Among the big Member States with medium-sized governments, Germany, France and Italy increased the positive deviation to the EU-average in 2000 compared with the long-term average. By contrast, the United Kingdom increased the negative deviation. Among the Member States with a big government, Belgium, Austria and Sweden decreased the

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[8] The correlation coefficient across all EU countries between output volatility and the unemployment rate is -0.41 for the average over the period 1970-2000. Moreover, the correlation between output volatility and the standard deviation of the unemployment rate is –0.32.

Table 2

Average government expenditure in Member States, 1970-2000

% of GDP	Total expenditure	Interest	Final consumption expenditure	*Compensation of employees*	Social transfers other than in kind	Subsidies	Gross fixed capital formation	Other
B	53.2	7.9	21.3	11.9	16.2	2.2	3.1	2.5
DK	53.5	5.0	25.4	17.2	16.1	2.1	2.5	2.3
D	46.7	2.5	19.4	10.0	16.9	2.1	2.9	2.9
EL	37.7	5.4	13.9	10.2	12.4	2.7	3.0	0.2
E	35.5	2.3	13.9	9.6	11.9	1.8	3.1	2.5
F	48.6	2.3	21.0	12.8	16.9	2.0	3.4	3.1
IRL	41.9	5.8	15.9	10.6	11.8	4.3	3.5	0.6
I	46.8	7.2	17.3	11.3	14.9	2.2	2.9	2.3
L	42.5	0.7	14.5	9.1	17.6	2.6	4.7	2.4
NL	51.5	4.7	19.4	11.3	20.0	2.3	3.1	2.1
A	51.2	3.0	18.5	11.6	17.5	2.9	3.8	5.6
P	36.2	4.2	14.8	10.9	10.1	2.7	3.4	1.0
FIN	46.9	1.9	20.0	13.8	14.5	2.9	3.5	4.2
S	58.3	4.7	26.1	17.7	17.8	3.7	3.6	2.4
UK	42.5	4.1	20.1	11.3	12.7	1.5	2.7	1.4
EU-15	46.1	3.8	18.5	11.6	16.4	2.3	3.0	2.2
US	33.9	3.9	16.8	10.6	9.9	0.5	2.6	0.2

Source: AMECO.

Table 3 (top)

Government expenditure in Member States in relation to EU-15, average over 1970-2000 and in 2000

EXPENDITURE OF GENERAL GOVERNMENT, DEVIATION FROM EU-15 AVERAGE 1970-2000 AND 2000 (*percent of GDP*)															
	Total expenditure			Interest		Final consumption expenditure		*Compensation of employees*		Social transfers other than in kind		Subsidies		Gross fixed capital formation	
			UMTS excluded												
	1970-2000	2000	2000	1970-2000	2000	1970-2000	2000	*1970-2000*	*2000*	1970-2000	2000	1970-2000	2000	1970-2000	2000
B	7.1	3.7	2.7	4.1	2.9	2.8	1.3	*0.4*	*1.2*	–0.1	–0.8	–0.1	0.2	0.1	–0.5
DK	7.3	8.3	7.3	1.3	0.3	6.9	5.2	*5.6*	*6.5*	–0.3	1.0	–0.2	0.9	–0.5	–0.6
D	0.6	0.2	1.7	–1.3	–0.5	0.8	–0.9	*–1.6*	*–2.1*	0.6	2.7	–0.2	0.4	–0.1	–0.4
EL	–8.4	3.0	2.1	1.6	3.2	–4.6	–4.4	*–1.4*	*1.5*	–3.9	0.2	0.4	–1.1	0.0	1.8
E	–10.7	–5.9	–6.7	–1.5	–0.6	–4.6	–2.5	*–2.0*	*0.2*	–4.4	–3.8	–0.5	–0.2	0.1	0.9
F	2.5	7.1	6.1	–1.4	–0.6	2.5	3.4	*1.2*	*3.3*	0.5	1.9	–0.3	0.0	0.3	0.7
IRL	–4.2	–13.7	–14.7	2.0	–1.8	–2.6	–6.5	*–1.0*	*–2.3*	–4.5	–7.9	1.9	–0.6	0.5	1.5
I	0.7	0.8	1.0	3.5	2.6	–1.2	–1.9	*–0.3*	*0.3*	–1.4	0.6	–0.1	–0.1	–0.1	0.1
L	–3.6	–5.7	–6.7	–3.0	–3.6	–4.0	–3.6	*–2.5*	*–2.2*	1.2	–2.0	0.3	0.3	1.7	1.8

Table 3 (bottom)

Government expenditure in Member States in relation to EU-15, average over 1970-2000 and in 2000

EXPENDITURE OF GENERAL GOVERNMENT, DEVIATION FROM EU-15 AVERAGE 1970-2000 AND 2000 (*percent of GDP*)															
	Total expenditure			Interest		Final consumption expenditure		*Compensation of employees*		Social transfers other than in kind		Subsidies		Gross fixed capital formation	
			UMTS excluded												
	1970-2000	2000	2000	1970-2000	2000	1970-2000	2000	*1970-2000*	*2000*	1970-2000	2000	1970-2000	2000	1970-2000	2000
NL	5.4	–0.3	–0.7	0.9	0.0	0.9	2.8	*–0.3*	*–0.2*	3.6	–4.2	0.0	0.2	0.0	0.9
A	5.1	6.5	5.9	–0.8	–0.4	0.0	–0.5	*0.1*	*1.2*	1.1	2.7	0.5	1.3	0.8	–0.6
P	–9.9	–1.5	–2.2	0.4	–0.8	–3.7	0.2	*–0.7*	*4.6*	–6.3	–4.0	0.4	–0.4	0.4	1.5
FIN	0.8	3.2	2.2	–1.9	–1.1	1.5	0.9	*2.2*	*2.9*	–1.9	0.5	0.5	0.2	0.5	0.3
S	12.2	12.0	11.0	1.0	0.3	7.6	6.2	*6.1*	*6.4*	1.4	2.2	1.4	0.6	0.6	0.2
UK	–3.6	–8.5	–7.1	0.3	–1.0	1.6	–1.4	*–0.3*	*–3.0*	–3.7	–2.9	–0.8	–0.8	–0.3	–1.1
EU-15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*0.0*	*0.0*	0.0	0.0	0.0	0.0	0.0	0.0
US	–12.3	–13.7	–14.6	0.1	–0.2	–1.8	–5.5	*–1.0*	*–1.1*	–6.5	–5.5	–1.9	–0.9	–0.4	0.4

Source: AMECO.

BOX: Why is there such a big difference in government size?

Three main factors are typically found that explains the size of governments. Trade openness, demographic situation and GDP per capita. The first two are related to the insurance argument; insurance against foreign risk and income insurance over the lifetime. The latter is a wealth factor; 'because it can be afforded'. Martinez-Mongay (2002:1) finds that these three variables robustly explain government size.

Rodrik (1998) finds that there is a robust relation between the openness of an economy and the size of its government. The rationale for this empirical result put forward by Rodrik is that government spending acts as an insurance against external risk. This thus suggests that a large government have a stabilising effect on income for very open economies.

This perspective implies that the insurance element of government activity is important. As noted above, the insurance argument for government size makes it difficult to distinguish from welfare policy.

However, the literature also points to other explanations. Even after controlling for the above-mentioned variables, substantial differences in terms of government size persist.

The expansion of the public sector observed in most European countries since the 1960s suggest that there is a case for inertia in public activities. Once a reform has been introduced, it appears to be very difficult to remove it, or even to contract it. This public choice approach to explaining persistent differences in government size between countries has recently prompted increased interest.

Persson and Tabellini (1998) address the issue of government size and its relation to the political system. They find that a presidential regime

– as opposed to a parliamentary – leads to smaller governments. The rationale behind this result is that such a regime increases competition between politicians and voters. They also find for parliamentary regimes, majoritarian – as opposed to a proportional – elections leads to less public goods. They find strong and robust support for these predictions, also when controlling for several other variables. Persson (2001) elaborates the ideas in Persson and Tabellini. He finds that presidential regimes display smaller and less persistent government spending responses to income shocks, compared with parliamentary regimes. He also finds that in parliamentary regimes, majoritarian elections have less broad spending programs and also smaller and less persistent government spending responses to income shocks, compared with proportional elections.

This supports the view that size of public activities as well as the degree of inertia can be explained by the political system in a country. As Persson and Tabellini points out, more competition (in the election process) always brings about a lower supply of public goods as the benefits of fewer voters are internalised. Another source for inertia is proposed by Becker and Mulligan (1998), who finds that tax efficiency is related to the size of the government and that the causality is from tax and spending efficiency to the size of government.

Following these approaches, it appears reasonable to assume that the expansionary element of government activities in particularly proportional parliamentary systems has contributed to the creation of formal and rule based budgetary processes in recent years. This enables politicians to limit demands of increases of the government from the electorate with reference to spending limits being out of control (ruling by tying one's hands). A severe economic crisis can also serve the purpose of a politician being able to 'sell' a policy of downsizing the government, if there is a perception among the electorate that the government is 'big'.

positive deviation, as did the Netherlands and fell below the EU average whereas Denmark retained an unchanged positive deviation. Of the Member States with a small government, Spain and Portugal decreased the negative deviation in 2000. Greece also decreased the negative deviation and rose above the EU-average.

The composition of expenditure in relation to the EU-average over the entire period compared with 2000 provides an indication as to governments preferences at present.

- A majority of Member States was below their relative long-term average in 2000 regarding interest payments and public consumption. However, a majority was above their relative long-term average in 2000 regarding public wages.
- A majority of Member States was above their relative long-term average in 2000 regarding transfer payment to households and subsidies.
- About half of the Member States was above/below their relative long-term average in 2000 regarding investment.

The persistence in having a big or a small government and being above or below the EU-average appears to be quite strong. Only two Member States changed their relative position – one big government was below and one small government was above the EU-average in 2000. This persistence of government size is addressed in the box below 'Why is there such a big difference in government size?'.

In this section we have looked at government spending and not on government revenue. If one looks at a long enough period, a similar conclusion as regards the size of government would be reached, as the NPG condition should ultimately bite. Indeed, Martinez-Mongay (2002) arrives at similar conclusions concerning the stabilising effect of government size regardless of using overall spending or revenue using long-term averages. However, more detailed analysis of the effects of the structure of spending and revenue on output volatility could challenge the consensus result of the stabilising effect of a big government. Martinez-Mongay (2002:2) finds that when studying the structure of taxes, it appears as if labour taxation, in relation to total labour costs, is positively correlated with output volatility. This has some interesting implications, which are addressed section 5.

3.4 The use of regulation

This section looks at the use of employment protection legislation (EPL) and product market regulation (PMR) across Member States, primarily on the basis of the discussion presented by the OECD in the report "EMU – One year on" (OECD, 2000). Government use regulation in order address production externalities (for example pollution) or to affect the strength of competition on product and labour markets. They also use regulation to reduce job insecurity, or provide social insurance against unemployment risk, both by providing income insurance through unemployment benefits (UB) and by making it difficulty to dismiss workers through EPL. There seems to be a trade-off in the use of these two instruments, where countries that have generous UB make less use of EPL and vice-versa (see Boeri *et al.*). Of course, here UB is part of the automatic stabilisers analysed above.

A high degree of PMR leading to lower competitive pressures and a slower price adjustment may also have a smoothing impact on employment over the business cycle as labour hoarding increases. However, as argued in the OECD report, there could be a trade-off against higher output volatility here as adjustment in quantities increase. The OECD indeed finds that output volatility in real output is higher than in employment but that the ratio between the two has been reduced over time, an indication of higher competitive pressures.[9] However, when it comes to EPL and PMR there is also possibly a trade-off between any positive stabilisation impact and the impact on the level of economic growth and structural employment. Clearly, a high degree of EPL and PMR may make markets inflexible, reduce adjustment mechanisms to shocks and weaken rather than strengthen competitive pressures, all with negative welfare effects. Indeed, a high degree of correlation exists between the relative rigidity of product and labour market regimes. PMR and EPL tend to be mutually supportive implying that lack of competition in product markets compounds the misfunctioning of labour markets created by job-security provisions (Buti and Sapir, 2000)

Table 4 shows relative indexes across EU Member States for EPL and PMR (and the sum of the two). The indexes for EPL and PMR are taken from the OECD (tables 9 and 10 in OECD, 2000) but have been

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[9] See Annex 5 in OECD, 2000.

normalised against the euro area average for comparison (euro area =100, > 100 implies a more stringent degree of regulation).

Looking at EPL there is a clear divide between Latin speaking and Germanic speaking Member States. EPL seems more stringent in the south (EL, E, F, I, P all above average), while Ireland and the UK are outliers on the other side of the spectra (but still with a higher index than the US). However, the trade-off between EPL and UB mentioned above should be remembered. Even so, a similar pattern and ranking emerges when looking at PMR and ultimately the overall index. Government in southern Member States seems somewhat more "dirigiste" than other continental or Nordic states with the Anglo-Saxon duo clearly as the least regulated economies.

3.5 A tentative mapping of the revealed preferences for government provision of stabilisation

On the basis of the discussion above, a tentative, very preliminary, mapping of the Member States revealed preferences for government provision of stabilisation is given in Table 5. For reasons of simplicity and lack of obvious alternatives, all indicators are given equal weight. Obviously, this is only a very tentative mapping which could be developed further. Nevertheless, some observations can be made from this.

Firstly, there seems to be a difference as to *how much* stabilisation is provided by government outside monetary policy. On the one hand Ireland, Spain and the UK appear to be the least concerned with provision of government stabilisation. This could of course partially also reflect a more active use of monetary policy in the past. On the other hand, Finland, Sweden and Denmark appear most concerned with provision of government stabilisation, something that also could be a reflection of their higher "need". Looking at the larger Member States, it is interesting to note that Germany, France and Italy are clustered together in the middle.

Secondly, there seems to be a difference between Member States *as to how* stabilisation is provided. Looking at the correlation between indicators there seems to be i) a trade-off between the use of discretionary fiscal policy and the size of governments/ size automatic stabilisers and ii) a trade-off between automatic stabilisers and regulations, in line with the observed trade-off between the use of unemployment benefits and unemployment security legislation and iii) as expected, there is a relatively close relationship between government size and automatic stabilisers.

Table 4

Index of employment protection legislation (EPL) and product market (PMR) regulation (1998, euro area =100)

	EPL	Rank	PMR	Rank	Overall	Rank
B	72	8	106	4	89	5
DK	52	9	78	8	65	8
D	97	6	78	8	87	6
El	121	2	122	2	121	1
E	110	4	89	7	100	4
F	107	5	117	3	112	2
IRL	34	10	44	10	39	9
I	114	3	128	1	121	1
NL	83	7	78	8	80	7
A	83	7	78	8	80	7
P	128	1	94	5	111	3
FIN	72	8	94	5	83	6
S	83	7	78	8	80	7
UK	17	11	28	11	23	10
Euro area	100		100		100	
US	7	12	56	9	31	11

Source: OECD, 2000 (tables 9 and 10), Buti and Sapir (1998) and own calculations.

Table 5

Overview table on revealed preferences for government provision of stabilisation

	Use of discretionary fiscal policies	Automatic stabilisers	Size of government sector	Use of labour and product market regulation	Total points	Overall ranking
B	4	6	7	5	23	3
DK	5	9	8	4	25	2
D	4	5	5	5	19	6
EL	9	4	3	7	23	3
E	3	4	2	6	14	10
F	2	4	6	7	18	7
IRL	6	4	3	2	14	10
I	4	4	5	7	20	5
NL	4	8	6	5	22	4
A	3	2	7	5	16	8
P	7	2	3	7	19	6
FIN	5	8	5	5	23	3
S	7	8	9	5	28	1
UK	6	5	3	1	15	9

Note[10]: 1 (low) 5 (average) 9 (high).

[10] Normalised for each category so that the highest (or lowest) ranking country exactly equals 9 (or 1).

Overall, countries with high preferences for government provision of stabilisation (Sweden, Finland and Denmark) have big governments and large automatic stabilisers. By contrast, countries with low preferences for government provision of stabilisation (Ireland, Spain and the United Kingdom) appear to have used discretionary fiscal policy (Ireland and the United Kingdom), and market regulations (Spain) more actively. Indeed, this points to the close relationship between the provision of stabilisation and the build-up of the welfare state.

The tentative results in Table 5 above must however be considered in the light of different needs across Member States. As outlined in section 2, the demand for more stabilisation will depend on 1) to what extent the common monetary stance is suitable for the individual country ("need") and 2) government views on the role and responsibility of government in the provision of stabilisation ("taste").

In EMU, monetary policy is conducted with a view of the euro area as a whole. This implies that depending on the country-specific situation as compared to the average, the common monetary stance may not be fully optimal on the country level. Countries with possible overheating pressures (i.e. positive output gaps and high inflation) may face the lowest real interest rates, thus possibly contributing to increase imbalances rather than reducing them.[11] Cyclical patterns across economies are also influenced by the trade structure and openness and the industry structure. Overall, the small open economies in the EU appear more vulnerable to external shock and are also more likely to experience an asymmetric impact of common shocks as compared to the average. Hence, these countries would appear to have a higher "need" for stabilisation polices than larger countries in order to reach the same degree of overall stabilisation.

4. Preferences for stabilisation and the EMU regime

What does the analysis above imply for stability and growth polices under the EMU regime? The key issue is the relationship, and possible trade-offs, between the size of government, provision of stabilisation and

[11] In short, this is the national stabilisation challenge in EMU. However, this existed also before EMU. For example, the situation was similar over the adjustment period leading up to EMU given the different cyclical conditions in Germany and the rest of the EU. If anything, one of the arguments for EMU has been to reduce this one-country country bias in EU the monetary policy framework.

increasing demands on a better growth performance. This has been pointed out by Jonung (2001) who discusses several scenarios, which could challenge the policy paradigm of the EMU. He points out that if the euro area would display price stability for a sustained period, but economic growth would be relatively poor compared with the rest of the world – for example in the absence of structural reform – the price stability regime would come under stress, which could lead to the abandoning of the same.

To ensure efficiency, a macro-economic stabilisation regime requires that government preferences regarding the provision of stabilisation must be compatible with the choice of anchor driving the regime. If not, the overall regime will work inefficiently and gradually suffer from increased strain. In the end, either policy maker's preferences must adapt or the institutional set-up must change. These preferences should be understood in terms of outcomes, that is, what governments actually do, not what they would like to do had they the free choice starting from scratch.

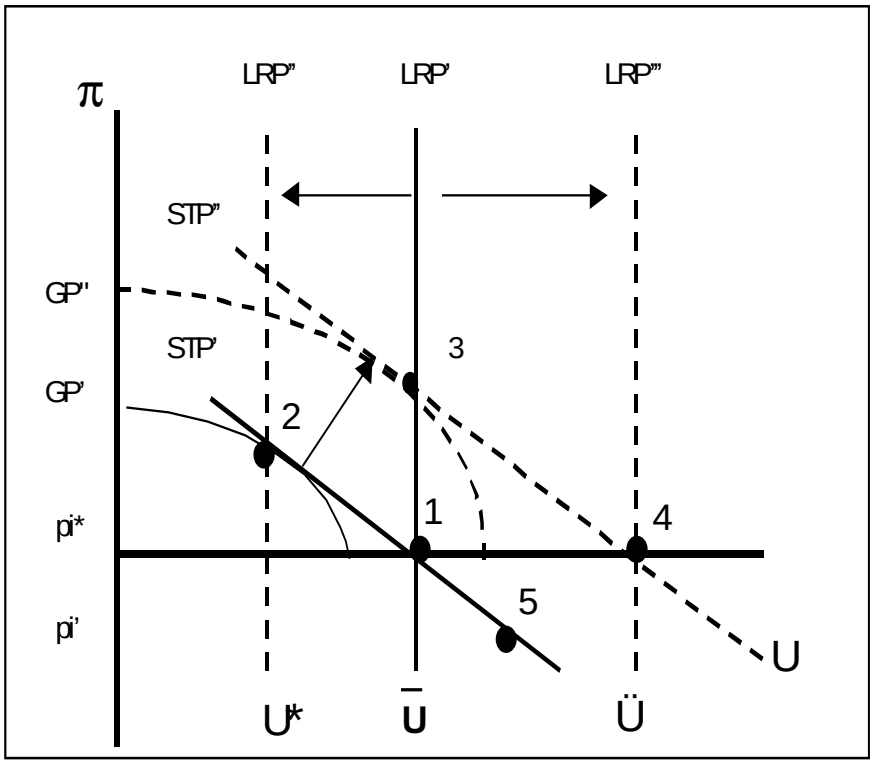
Following the discussion in Bordo and Jonung (2001), a regime is the set of arrangements, including institutions and expectations within which policy makers decide their actions. The monetary and fiscal policy regime jointly determines the prevailing stabilisation policy regime. In this context, two types of monetary policy regimes and fiscal policy regimes can be identified. On the monetary side, the "convertibility" principle follows the rule of a fixed price of a metal (gold). This translates into fixed exchange rates across countries following the same convertibility principle. The "paper" standard on the other hand allows for a choice between fixed and floating exchange rates. On the fiscal side, regimes based on inflationary finance (monetization of debt) and non-inflationary finance (no borrowing from central bank) can be distinguished. The choice of an anchor is key in the design of the stabilisation regime and determines the relationship between the monetary and the fiscal regime. A monetary regime based on the convertibility principle requires a non-inflationary fiscal regime to remain credible. Here, monetary policy dominates fiscal policy. A "paper money" regime with fixed exchange rates or price stability as an anchor also dominates the fiscal regime as it requires a non-inflationary fiscal regime. However, an inflationary fiscal policy regime dominates monetary policy and the policy anchor would typically be the unemployment rate.

This mechanism is shown in Graph 6 opposite. The EMU institutional framework is represented by the nominal anchor, π^*, and the

long-run Phillips curve (LRP'). If EMU governments hold the same preferences as the ones underpinning the EMU institutional framework, unemployment will be at Ū. If governments aim for a more ambitious unemployment target, say U*, this can only be achieved through structural reforms improving the working of the economy, thus lowering the NAIRU and shifting the LRP to LRP". If governments have different preferences on the trade-off between inflation and unemployment (as represented by GP') they may want to exploit the short-term Phillips curve (STP') in order to reach U*. However, if so, the monetary authorities would raise interest rates to defend the inflation target and STP would shift to STP'', implying higher real interest rates and higher unemployment at Ü (point 4). Facing STP", the government would aim for additional discretionary measures to lower the unemployment rate which in turn would shift the STP outwards

Graph 6

Long- and short-run Phillips curve



again. Over time, such an unbalanced policy-mix would make the NAIRU increase and the LTP shift to LTP'''. In aggregate terms, the macro-economic regime would thus under-perform and put stress in the system, calling for a change in government preferences or the nominal anchor.

Graph 6 can also be read from the viewpoint of an individual country in EMU. Then there is a case for exploiting the STP to the extent that the common monetary policy is sub-optimal at country level. For example, if the common interest rate is too high for the country specific viewpoint, the country may be at point 5 with below target inflation, high real interest rates and high unemployment. In this case, the country could provide more national stabilisation policy to reduce unemployment from Ü to Ū (ideally then by allowing the automatic stabilisers to play freely) without any counter reaction from the monetary authorities, in particular if the impact on euro area inflation is limited. Therefore, to the extent that the STP is only exploited to neutralise the additional need for stabilisation provided by the common monetary policy, this should pose no real problem for the overall framework. However, the government could be more ambitious regarding unemployment and strive for U*. From an economic point of view, in the case of a single country acting in this way, externalities would be small and of little concern on aggregate level. However, in a club based on equal treatment of its members, allowing this type of "free-riding" behaviour for one member is a concern due to the precedence it sets and the incentives it gives to other members and, in the end according to this interpretation, the risk of an overall under-performing macro-economic regime. Hence, the importance of applying the EMU rules in an equal way across countries.

5. Discussion

If indeed governments would find that it should provide more stabilisation it is not easy to see how it could be increased, even with a more lenient budgetary framework. There appears to be limited possibilities for extending, or even maintaining a status quo of the scope of the public sector, particularly for countries that already provide a relatively high degree of stabilisation. First, higher automatic stabilisers would typically require higher or more progressive taxes, which would raise efficiency concerns. Second, the expected demographic effects point to an increase in age-related expenditure which would, if taxes can not be

increased, have to be partially financed by lower of non-age related expenditure.

At the same time, while being a controversial issue, there seems to be some trade-off between government size and economic growth. For example, Henreksson and Fölster (2000) find evidence of a robust negative correlation between the size of the public sector and economic growth. This suggests that, in the longer term, there may be pressures for growth-enhancing policies at the expense of the size of government and therefore also the provision of stabilisation.

In a recent paper Martinez-Mongay (2002:2) studies the government revenue side and finds that the level of labour taxation is positively correlated with output volatility. This result could challenge the traditional view of the stabilising effect of a big government. That is, the stabilising effect critically depends on the composition of taxes. In Buti *et al.* (2002) a model is developed in which high (distortionary) taxes have a destabilising effect on output if a supply shock occurs, as it affects the slope of aggregate supply. If it is the case that there is no trade-off between stability and efficiency, the policy implications appear straightforward: lower distortionary taxes, achieve greater output stability as well as higher output.

Overall, the rationale of the EMU framework is very much guided by an assumption that there is no real trade-off between stabilisation and efficiency, making structural reform the key instrument both to achieve more stabilisation and higher growth rates. Indeed, as indicated in section 2, in a regime implicitly built on the "convertibility" principle, there is an intrinsic need to have flexible markets. More flexible labour markets would help smoothing shocks. This should be complemented by more complete and flexible capital markets, allowing risk averse agents to better diversify cyclical risks privately, thus possibly limiting the need for government intervention. To the extent that such structural reform provides for better growth prospects, any "preference" gap regarding stabilisation should decline. It should also be noted that the policy advice that the European Commission and the Council has been delivering in the context of the Stability and Growth Pact, the Lisbon targets, the Cardiff processes and the Broad Economic Policy Guidelines clearly appear to be in full compliance with this approach.

Even so, given the empirical evidence on the difficulties with pursuing stabilisation polices, especially on the budgetary side, the increased perception that the EU growth performance must be improved,

that negative externalities from high tax burdens should be decreased, the acknowledged role of structural reform to achieve both growth and stabilisation, it is somewhat surprising that the room of manoeuvre for stabilisation policies in EMU is such a prime concern. In the framework of this paper this could signal different beliefs, basically on the shape of the long-term Philips-curve. However, it could also mask another concern, more linked to political-economy aspects, namely that governments, rather than being concerned by stabilisation per se would like to maintain some leeway as regards welfare and redistribution policies, especially so in downturns when resources become scarce and they find themselves bound by the strict budgetary rules in place made necessary by applying the "convertibility" principle.

Finally, if preferences do differ between the institutional framework and governments, why is this? Following the literature by Persson and Tabellelini (2001) it could be argued that electoral rules and political regimes would be central. A country like the UK, with a lower "preference" for government provision of stabilisation, indeed has a majoritarian regime which typically would lead to smaller welfare programs, while the Nordic countries, with a higher "preference" for stabilisation, have proportional elections typically associated with bigger governments. In the end, the question here becomes whether voters' preferences drive the electoral regime or vice versa.

6. Conclusions

The current economic policy debate in the EMU is focused on the case for stabilisation policies by means of national fiscal policy, as monetary policy is being conducted with respect to the EMU average. These aspects are important in the new regime the EMU represents, with price stability as the nominal anchor. In EMU, monetary policy dominates fiscal policy and the architecture of the Stability and Growth Pact secures balanced budgets at the national level.

On the basis of some indicators of government activity, we attempt at mapping preferences for 'government provision of stabilisation' – which should be understood as action by governments, past and present, that have a stabilising effect on economic activity – at the national level in the EMU. For the purposes of this paper, we define 'revealed preferences' as government provision of stabilisation. The analysis indicate that the EU

Member States exhibit differences as regards their 'revealed preferences' for stabilisation which is explained both by their 'need' and 'taste" for stabilisation.

If it is the case that there exists a 'preference gap', in the sense that the monetary authority is forgiving on unemployment but non-forgiving on inflation and that the reverse is true for the fiscal authorities, this may put stress in the system and result in an inefficient overall regime. At present, there is a firm commitment, at the EU-level, to the successful implementation of EMU and its arrangements, most notably the Stability and Growth Pact. However, in a longer-term perspective, the EMU is on uncharted territory. As noted by Bordo and Jonung (2001), history cannot offer much in the way of guidance, as such a grand scale and far-reaching macro-economic regime as the EMU does not have any comparable precedence.

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U. S. FISCAL POLICY AND CONSUMER SPENDING

Charles Steindel [*]

The interaction of the tax and transfer programs of the United States and consumer spending has attracted increased attention over the past year, as a result of simultaneity of the 2001 tax cut and the first U.S. recession in a decade. This paper reviews the evidence on this interaction. The discussion is informed by the life cycle-permanent income theory of consumption. The theory assumes that households are rational forward-looking planners, and implies that policies with comparable impacts on after-tax income may have very different effects on spending. The U.S. experience supports some of the major implications of the theory; however, some of the evidence conflicts with the theory as set out in its most simple form and even as it has been commonly modified. Thus, theory and evidence remain somewhat misaligned. There is still a great deal to learn on this topic. Predictions and calculations of tax effects on spending remain subject to substantive error, though some broad qualitative conclusions seem to be valid.

The next section of the paper reviews the evolution of some of the thought on fiscal policy and spending in the U.S. A description of some major policy changes, and an assessment of their effects on spending, then follow.

1. American Thinking on Fiscal Policy and Consumer Spending

The last 40 years have seen numerous periods of discussion, both in academic and in policy circles, of the interaction between U.S. fiscal policy and consumer spending. In the early 1960s, a significant argument in favor of the Kennedy tax cut was that reductions in tax rates would lessen the tendency for personal tax revenues to rise much more rapidly than incomes during

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[*] Federal Reserve Bank of New York. Sylvia Ellis provided research assistance. My colleagues at the Federal Reserve Bank of New York gave helpful comments.

economic expansions, due to the highly progressive structure the tax system then had. This "fiscal drag," it was argued, hampered consumer spending and limited growth (see Heller, 1966). That same era saw arguments advanced that changes in personal income tax rates were a desirable tool for stabilization policy. Indeed, given the likely delays in the legislative process of changing tax law, in the 1965 Economic Report President Johnson proposed granting the executive limited authority to change rates.

These proposals clearly stemmed from a view that changes in consumer spending are very closely tied to changes in after-tax income – at the extreme, perhaps a view that there is a constant marginal propensity to consume. However, developments in economics began to cast doubt on the efficacy of such proposals. In the late 1960s and early 1970s a line of academic work in the U.S. focused on the policy implications of the emerging life cycle-permanent income model of consumer spending; most importantly its assumption that consumers are rational forward-looking planners. Specifically, the life cycle-permanent income theory asserts that consumer spending, C_t, is a function of total resources (factor income, Y, plus government benefits, B, less taxes, T) available to the household over a planning horizon:

$$C_t = f(\Sigma \gamma_{t+i} E(Y_{t+i} + B_{t+i} - T_{t+i})), \quad i=0 \ldots H \tag{1}$$

where E is the expectations operator, γ is the discount factor applied to future income streams, and H is the length of the planning horizon (which may be infinite). In the usual permanent income formulation of the model *(1)* may be restated as:

$$C_t = \alpha(YP_t + BP_t - TP_t) \tag{2}$$

where YP, BP, and TP are the "permanent" components of Y, B, and T. In the purest form of the model, movements in Y, B, and T that do not affect their permanent components do not affect spending.[1]

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[1] In the life cycle formulation, changes in the distribution of permanent income across age cohorts will affect spending.

For fiscal policy analysis a key issue is identifying the permanent components of benefits and taxes, and relating them to actual policy changes. In the 1960s, during the discussion of what became the 1968 tax increase, Robert Eisner noted that a tax levied primarily to finance the Vietnam conflict was inherently temporary and would have less effect restraining the growth of consumer spending than would a "permanent" tax increase with the same immediate impact on revenues.

This line of thought has had a major effect on American analysis of fiscal policy. Studies of the temporary tax changes of 1968 and 1975 found that they did not affect spending as much as changes in permanent income (Okun, 1971; Springer, 1975; Modigliani and Steindel, 1977; Blinder, 1981). These results were occasionally referenced in 2001; an important part of last year's tax cut was a substantial payment made to taxpayers during the third quarter. These payments were called "rebates," though, as will be discussed later, they were not precisely analogous to those made in 1975.

The life cycle-permanent income model has had further effects on U.S. thinking about fiscal policy, outside of countercyclical issues, most importantly in the area of the long-term consequences of the Social Security retirement system. In the early 1970s Alicia Munnell (1974) and Martin Feldstein (1974) noted that for most American workers, the present value of the retirement benefits expected from the Social Security system exceeded the present value of the payroll taxes they would pay into the system, even including the employer's matching taxes in the computation. In effect, permanent benefits exceeded permanent payroll taxes, conceivably biasing aggregate consumption up and aggregate saving down. An enormous volume of research has followed on the longer-term consequences of the Social Security system. More recent work has focused on the distribution of all government benefits and tax burdens across generations (Notably, the generational accounts literature of Jagadeesh Gokhale and his collaborators, as in Auerbach, Gokhale, and Kotlikoff, 1994. Also see Banca D'Italia, 2000), as opposed to the estimation of the amount of consumer spending currently generated by the Social Security system.

Computations of the permanent components of government benefits and taxes depend on expectations over the length of the consumer's planning horizon. In the early 1970s, Robert Barro (1974) argued that an *infinite* horizon

was plausible (on the grounds that a consumer would take into account the welfare of her heirs). Given discounting of future income in the consumption decision, there would seemingly be rather little difference between the *lifetime* planning horizon of the standard life-cycle version of the model (used, for instance, by Munnell and Feldstein) and this infinite horizon, but such is not the case. Given an infinite horizon, and the plausible further assumption that government debt is ultimately redeemed, Barro showed that tax and benefit changes would not affect permanent income, and thus have no effect on spending. While this "Ricardian equivalence" view may not be widely accepted, it shows that the logic of the life cycle-permanent income model can leave very limited scope for government policies to influence consumer spending.

Perhaps surprisingly, consideration in the late 1970s and early 1980s of the proposed and then enacted Reagan tax cuts did not center on their effects on permanent income, possibly because they were clearly discussed as "permanent" changes in the tax law. Instead, much of the focus was on the implications of changed marginal tax rates on the after-tax rate of return and, in turn, the implications of the change in the rate of return upon U.S. saving. Some empirical (Boskin, 1978) and theoretical (Summers, 1981) work of the time had suggested that, contrary to long-standing belief, there was a rather strong response of U.S. saving to changes in the real after-tax rate of interest, and hence to reductions in the marginal tax rate.[2] The sustained decline in personal saving rates in the U.S. during the expansion of the 1980s, following the enactment of the Reagan tax cuts (and the Tax Reform Act of 1986, which further cut top marginal rates) has probably helped to reduce academic interest in using changes in the tax code as a way to increase personal saving.

Over the last 20 years there has been considerable work modifying the basic life cycle-permanent income model to address some unexplained

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[2] Howrey and Hymans (1978) challenged Boskin's results. Summers' major theoretical point was that increases in the real rate reduce the discount factor for the expected stream of labor income for a consumer whose decisions are governed by an equation similar to ***(1)***. This reduction reduces consumer spending and raises saving. Steindel (1981) also noted this point, but put less stress on it, given the ambiguity of changes in the expected stream of property income to changes in the rate of return (Summers constructed his simulations assuming that the elasticity of property income to changes in the rate of return is .5).

anomalies. In a pioneering study, Robert Hall (1978) found that the time series behavior of consumer spending is not in accord with the predictions of the model—consumption responds to new information on wealth with a lag.[3] Angus Deaton (1992) noted that consumer responses to movements in income are surprisingly mild given the persistence of income changes in the U.S. Taxes are another matter; from the point of view of the theory the surprise seems to be that consumers show as much response to temporary tax changes as the data suggest. In contrast, some of the older literature (for instance, Modigliani-Steindel and Blinder) found that the existence of smaller response to temporary than to permanent tax changes supported the theory!

Modifications to the canonical theory to deal with these anomalies have generally emphasized liquidity constraints. The standard life cycle-permanent income theory assumes that consumers may costlessly lend or borrow at market interest rates to smooth out spending. This assumption is clearly unrealistic. Credit constrained households may be unable to spend their permanent income when their cash receipts fall short. To make up for the spending shortfall, they may consume a large portion of transitory increments to income. Furthermore, these consumers will be forced to reduce spending sharply when income drops, since they are spending such a high fraction of their income and find it quite costly to borrow. Such reasoning led John Campbell and N. Gregory Mankiw (1990) to argue that the addition of current income to an empirical version of the life cycle-permanent income model was justified.

At this time, the life cycle-permanent income model, modified to acknowledge liquidity constraints (and, perhaps, the costs of adjusting consumption to changes in income), is widely accepted as explaining aggregate U.S. consumption reasonably well. This modified model suggests that:

1. Consumers will respond more strongly to “permanent” changes in taxes or benefits than to transitory or temporary changes.

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[3] Parker (2001) has recently focused on the lag of spending to wealth changes as a potential key to understanding the equity premium puzzle. Ludvigson and Steindel (1999), though, argue that there is no significant lag of spending to changes in permanent wealth.

2. There will, however, be some nontrivial response to transitory changes in policy.

The next section of the paper uses the logic of this model to explore some historic changes in U.S. fiscal policy and their effects on consumer spending. Even with the modifications, some anomalies remain. After that discussion, more recent changes in policy will be described.

2. Observing the Effects of Fiscal Policy

There are significant issues involved in assessing the impact of past fiscal policy changes on spending. A traditional way to do so is in the context of an empirical consumption function. In this approach, the impact of a fiscal policy change is deduced by observing the fit of the equation in the wake of a fiscal policy change. A close fit, when a policy change variable is included, allows the analyst to estimate the impact of the policy from the size of the move and its estimated coefficient. Alternately, if a policy change variable is excluded from the equation, the policy impact may be estimated from the errors of the equation.

The traditional approach was used in the early literature assessing the 1968 and 1975 tax changes. It has fallen out of favor in the last generation. Traditional consumption functions are vulnerable to the Lucas critique—household decision rules, and hence the parameters of the consumption function, are partly dependent upon consumers' assessment of the rules governing policy changes. Any fiscal policy change may well imply a change in the basic rules governing the formulation of fiscal policy (of course, in the most extreme formulation of the critique, changes in policy corresponding to previously determined rules would have no effects on real variables).[4]

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[4] Indeed, in his seminal paper Robert Lucas discussed the issue of consumer responses to policy changes before bringing up monetary policy (Lucas, 1976). Clearly, the early 1960s discussion of fiscal drag and counter-cyclical tax changes (whether implemented by the President or legislated) was not greatly informed by these issues. In principle, consumer behavior should incorporate the tendency to legislate tax cuts to reduce fiscal drag (the 1964 tax cut is the most notable example, but there were others) and

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It has proven to be quite difficult to construct consumption functions immune to the Lucas critique, at least short of building large-scale econometric models of the entire economy.[5] Since Hall's work, aggregate consumer research has focused on "Euler equations"—examinations of how the time-series behavior of consumer spending changes in the context of changes in the economic environment. The advantage of this approach is that fewer structural identifying assumptions are needed to test hypotheses on consumer behavior. The disadvantage is that the lack of structure means that it is quite difficult to measure parameters of interest, such as the precise amount spending changes in the wake of a tax change.

Our examination of past fiscal policy changes in the U.S. will be informed by the more modern approach. In some instances, reference will be made to more recent studies of spending changes, either in the aggregate or in selected cross-sections, at the time policy events occur. In other instances, no formal statistical tests will be done, but the approach will be to examine and draw inferences from changes in the growth of consumer spending and in the personal saving rate around the time policy changes were implemented.

Observation of changes in the growth of spending in the wake of policy changes is an obvious thing to do, but is not likely to be terribly informative about drawing interesting conclusions about policy effects. This is because of the reasonable argument that large segments of the U.S. population are credit-constrained, and will have spending governed by immediate changes in cash income. Any fiscal policy change should show up as a change in the growth of spending, which is not very illuminating. Changes in the personal saving rate may allow for some inference about the nature of the response in spending and of household perceptions of the nature of the policy change.[6] To do this though, we need to overlook some of the flaws in the U.S. personal saving rate.

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the likelihood of countercyclical tax policy. If so, the actual change in tax collections following a change in the law may be viewed as a change in transitory income and have little effect on spending.

[5] The FRB/US model represents one such effort, but it primarily deals with the implications of monetary, not fiscal, policy changes. Reifschneider and Williams (2000) describe the model.

[6] Steindel (2001) also makes major use of changes in the personal saving rate to examine the spending effect of income tax changes.

The personal saving rate is a very poor indicator of household thrift and U.S. capital accumulation (Peach and Steindel, 2000. Also Perozek and Reinsdorff, 2002). Personal saving consists, essentially, of the purchase of financial assets by households, less borrowing, plus investment (net of depreciation) in housing.[7] This measure is a dubious proxy for increases in household wealth, since it excludes capital gains—the major source of changes in U.S. household wealth over any but the longest time period (Ludvigson and Steindel, 1999). One peculiar oddity this exclusion leads to is that the payment of income taxes resulting from the realization of capital gains reduces saving (since, perforce, households must reduce financial assets or borrow to pay the tax), even though the liquid assets accumulated by the seller exceeds the tax.[8] Yet another problem is that purchases of long-lived consumer durable goods are considered spending, not asset accumulation.[9] Another problem is that sponsors' contributions to defined-benefit pension plans are included in personal saving; these contributions are directly controlled (within parameters set by federal government rules) by the sponsors and will fluctuate with interest rates and the value of the stock market. However, these fluctuations have no direct effect on the pensions beneficiaries receive or those current workers anticipate. Other limitations of personal saving is that it omits saving done by corporations and governments; furthermore, in recent years the bulk of new capital in the U.S. has originated from government and external sources; etc, etc.

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7 Personal saving also includes saving by noncorporate business and nonprofit institutions, including their acquisition of nonresidential capital.

8 The realization of a capital gain generally involves the sale of an asset from one household to another, and will not affect the aggregate amount of financial assets owned by the household sector. Of course, the household paying capital gains tax will typically have the cash available to pay the tax as a result of the sale. At the time of the sale, the purchasing household must have found the transaction to be satisfactory. The payment of the capital gains tax is the only direct substantial effect on the aggregate saving and income data resulting from the transaction. The current treatment would suggest that these transactions are a "burden" on the household sector.

9 This problem has been compounded by the growing popularity among U.S. households for leasing, rather than purchasing, motor vehicles. A new car obtained through a lease is included in business capital spending; a new car purchased by a household is included in consumer spending. There can be erratic, offsetting changes in the U.S. personal and capital spending series resulting from the marketing efforts of motor vehicle producers, which can shift the relative attractiveness of leasing and purchase.

These criticisms all apply to the level of the personal saving rate. It's almost meaningless to make any inferences about consumer behavior by comparing two widely separated observations of the saving rate; since the distortions in the measure differ greatly in their magnitude over longer time intervals. However, it's unlikely that these distortions change much over very short periods, so changes in the posted saving rate may give a good idea of changes in consumer behavior in response to changes in income.

Hence, a simple way to observe the impact of tax changes on spending is to look at the behavior of the personal saving rate around the time of a tax change. On the flow side, personal saving is defined as personal income less personal tax payments less spending. If a tax cut is regarded as permanent, it will likely have little effect on the measured saving rate — there will be increases in permanent income, realized income, and spending.[10] If a tax cut is regarded as transitory (which simply means not permanent), the saving rate should increase at the time of the cut, since after-tax income will increase, but spending will be little changed. Again, the focus of the observation is on changes in the personal saving rate, not its level. The next section will look at the major federal income tax changes of 1968, 1975, and 1982, using the conceptual framework of the life cycle-permanent income model, and paying close attention to the behavior of the saving rate.

Another issue is determining the timing of household responses to a fiscal policy change. The broad outlines of a change in taxes and benefits may become apparent months before the change is legislated. Moreover, the legislation of tax and spending law may well occur long before its "effective date". In the United States, the effective date of a change in benefits or the payment of a tax rebate (like those of 1975 and 2001) might be considered the date the checks start to be mailed. The issue is much subtler for changes in the income tax structure. For most components of income, taxes are computed on a calendar year basis.[11] Discussion of tax policy often refers to changes in law

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[10] Of course, this assumes that the propensity to consume out of permanent income is reasonably close to one and the measured saving rate is reasonably close to the true propensity to save from permanent income.

[11] Capital gains taxes have generally varied according to the specific length of time an asset was owned, and can, in principle, vary according to the specific date of sale. In the U.S. it has not been the practice to vary federal calendar year tax liabilities on other types of income according to the specific time of the

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taking place on some date such as July 1. As will be discussed below, American analysts talk about the "10% surcharge starting on July 1, 1968" or the "10% cut in income tax rates effective July 1, 1982." These changes are somewhat fictitious. A 5% surcharge was levied on income taxes liabilities for calendar year 1968; the rate structure for income taxes in 1982 was 5% less than that for 1981. The full 10% changes took effect for the following calendar years. What happened on those July 1sts were changes in tax withholding. The vast majority of U.S. income taxes are collected by employers withholding from paychecks. A worker gives her employer certain guidelines (for instance, the number of dependents in the household), and, given these instructions, and schedules set by the Internal Revenue Service (which has considerable administrative discretion in these matters), the employer computes the amount to be withheld. The 10% amounts and the midyear dates are really rough (and as will be seen in discussing the 1982 event, the word "rough" is quite appropriate) guidelines to the change in withholding that took place at those times.

Given these complexities, when should an analyst expect to observe a consumer response to a change in fiscal policy? In the purest form of the forward-looking life cycle-permanent income model spending may well change considerably in advance of the "effective date," or even in advance of the enactment of the legislation. If such extreme forward-looking behavior was widely prevalent, we might observe no change in consumer spending around the effective date! Observation of the personal saving rate around the time of a fiscal policy change can help determine whether households behave in this fashion. If, say, a tax cut looms on the horizon, consumers may start to increase spending, and the saving rate will fall. At the "effective date," when actual tax payments decline, the saving rate might rise. If the tax cut is viewed as temporary, primarily effecting transitory income, this effective date rise in the saving rate should take it back above its earlier norm. If the tax cut is

year they were earned. However, Americans who change state residency during a year will need to file income tax returns to both states (if, like most, they have a state personal income tax) and "split" their income, exemptions, and deductions across the jurisdictions.

viewed as augmenting permanent income, the saving rate should rebound to about its earlier level.[12]

2.1 Three Income Tax Changes

2.1.1 The 1968 Surcharge

Starting in the middle of 1968 a 10% surcharge was levied on personal and corporate taxes. At its early-1968 enactment, the surcharge had no expiration date, but in public discussion it was clearly associated with the financing of the Vietnam War. A war tax would appear to be a prima facie temporary tax. In 1969 the surcharge was reduced to 5% and given an explicit 1971 expiration date.[13]

Around the time of the enactment of the surcharge, Robert Eisner predicted that it would have limited effect on consumer spending, precisely because it was so clearly temporary (Eisner, 1971). The behavior of the personal saving rate after the mid-1968 enactment of the surcharge suggests that he was correct. As can be seen in Chart 1, the saving rate fell sharply in the second half of 1968, which is consistent with the tax having a limited restraining effect. It is generally believed that a one-dollar change in permanent income in the U.S. will change spending by about 70 cents. Several studies suggest that the effect of the surcharge was perhaps ½ the effect of permanent 10% tax increase—in other words, a reduction in spending of roughly 35 cents for each dollar of revenue the federal government gained.[14]

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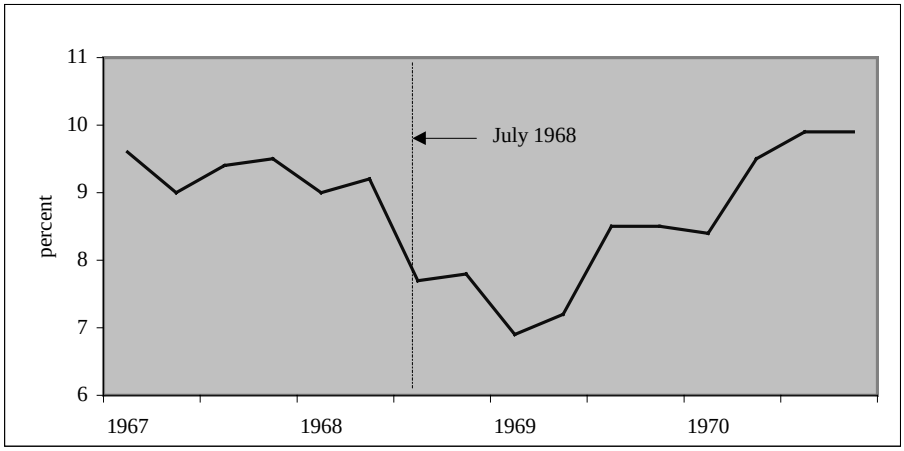
[12] Yet another complication is the freedom American taxpayers have to change their withholding (subject to potential penalty for underpayment of tax during the course of a year). Hypersophisticated consumers may well increase their spending, and reduce their tax withholding, well in advance of the effective date of a tax cut. For these individuals, the effective date of a tax cut will produce no change in either their spending or their saving.

[13] The tax increase was under consideration for many months before its enactment, and during this period its connection to the war was made quite clear. For descriptions of the contentious debate over this tax see Stein (1996) and Steindel (1973).

[14] Okun (1971), Modigliani and Steindel (1977), and Blinder (1981) found that the surcharge had about ½ the effect of a permanent tax increase; Springer (1975) found that the evidence was more consistent with the surcharge having no effect on spending than its having the effect of a permanent tax increase.

Chart 1

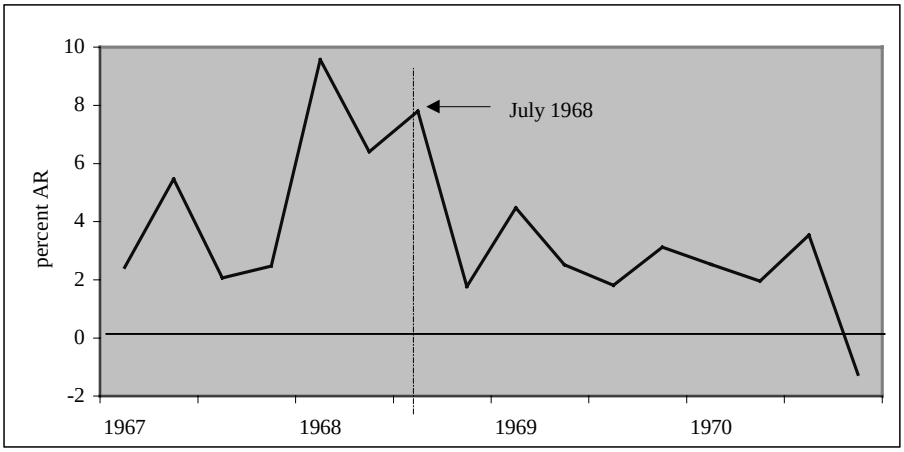
Personal Saving Rate



Source: Bureau of Economic Analysis.

Chart 2

Real Personal Consumption Growth



Source: Bureau of Economic Analysis.

Chart 2 does show, nonetheless, that there was a substantive slowing in spending in the wake of the tax increase, with the growth of real consumption considerably lower in late 1968 and thereafter than during the first three quarters of the year.[15] The very rapid growth of spending in early 1968 suggests that consumers did not cut back in anticipation of the tax increase.

2.1.2 The 1975 Rebate

In the spring of 1975 a package of temporary changes in the income tax was enacted with the more or less specific aim to spur spending.[16] The major element of the package was a "rebate" check of $50 mailed to every individual income taxpayer in May 1975.[17]

The second quarter of 1975 saw a remarkable surge in the personal saving rate concomitant with the receipt of the rebate checks (see Chart 3). The saving rate in the second half of 1975 fell back to approximately its first quarter level. If consumers were simply waiting a short while to spend their checks, the saving rate might have fallen well below its first quarter level in the third or fourth quarters. The surge in the saving rate in the second quarter of 1975, and its continued high level in the second half of the year, suggests that little of the rebate was spent in 1975 (one study suggests as little as ¼).[18] Consumers appear to have viewed the rebate as a one-time windfall rather than as an increment to permanent income and spent little of it at the time it was received. The data on the growth of real spending, Chart 4, show a spurt in the second quarter of 1975 and then somewhat faster growth than at the start of 1975. This may be consistent with a lagged response to the rebate, but forces such as the emergence of the cyclical recovery spurring faster growth of pretax

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15 Monthly data suggest that the slowdown started in August 1968, not long after the effective date of the tax increase.

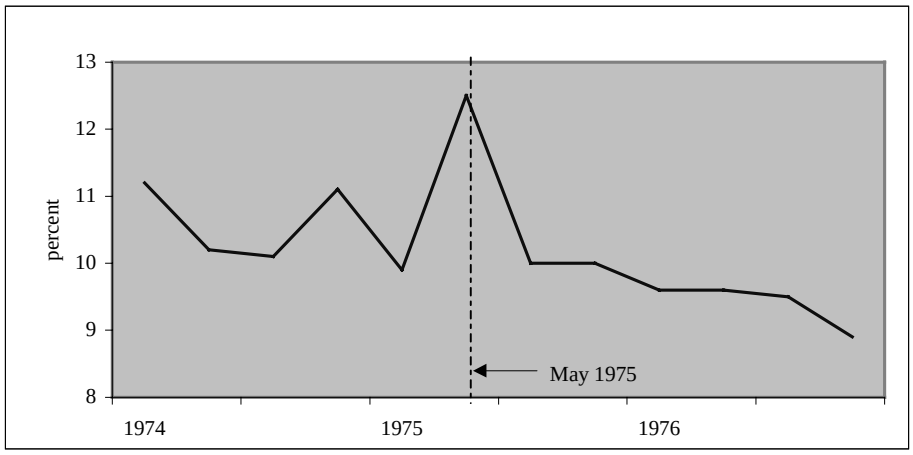
16 The 1973-75 recession is now dated to have ended in March 1975, but the economy continued to operate with wide margins of unused capacity and high unemployment well after the formal trough.

17 The other elements of the package were increases in the standard deduction and personal exemptions. Originally enacted to apply only to 1975, these changes were made permanent by legislation later in that year.

18 Modigliani and Steindel (1977). Blinder (1981) also found that the rebate had little effect on spending.

Chart 3

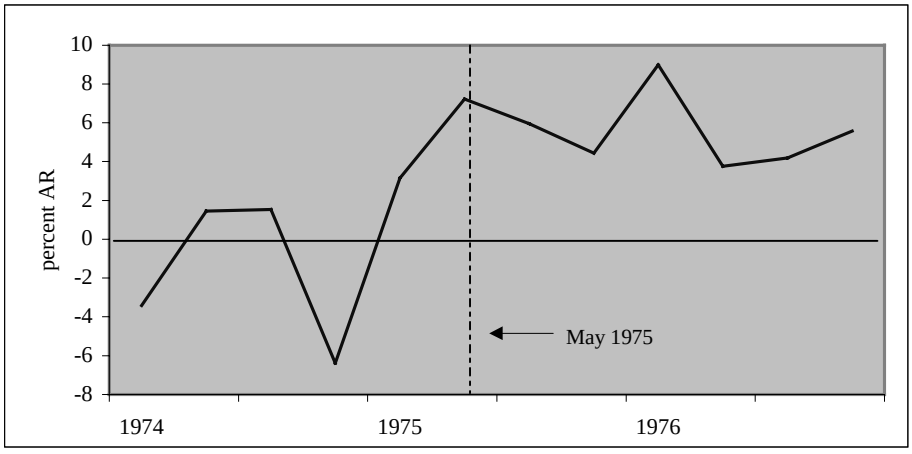
Personal Saving Rate



Source: Bureau of Economic Analysis.

Chart 4

Real Personal Consumption Growth



Source: Bureau of Economic Analysis.

income and boosting confidence should have also contributed to the pickup in consumption.

2.1.3 The 1982 Tax Cut

The Economic Recovery Tax Act of 1981 (ERTA) included 3 staged permanent cuts in Federal income tax rates: a 5% cut, effective October 1, 1981, a 10% cut, effective July 1, 1982, and a final 10% cut effective July 1, 1983.

The 5% cut of 1981 was accompanied by other changes in taxes. Some of these other changes could have more than offset the stimulative impact of this cut on spending, so it is not clear that the rise in saving in 1981 Q4 (see Chart 5), or the fall in consumer spending at that time (Chart 6), can tell us anything about the impact of this tax cut.[19]

The 1982 cut took place without other tax changes taking effect. The initial stability of the saving rate following the July 1 effective date and its decline late in the year would suggest that the permanent tax cut was regarded as an increase in permanent income and, perhaps, that households began to take into account the pending 1983 reduction. Given the large size of the tax cut, the stimulus to spending provided by it could well be given significant credit for helping to end the very deep 1981-82 recession (the growth rate of real consumption in the fourth quarter of 1982 was the fastest since early 1978).

Nevertheless, the 1982 experience raises some puzzles for the life cycle-permanent income theory. First of all, of course, the tax cut was enacted very far in advance of its effective date. The long period of weakness in spending leading up to the middle of 1982 suggests that there was little if any anticipatory effect. Some curious puzzles are also raised by the mechanics of

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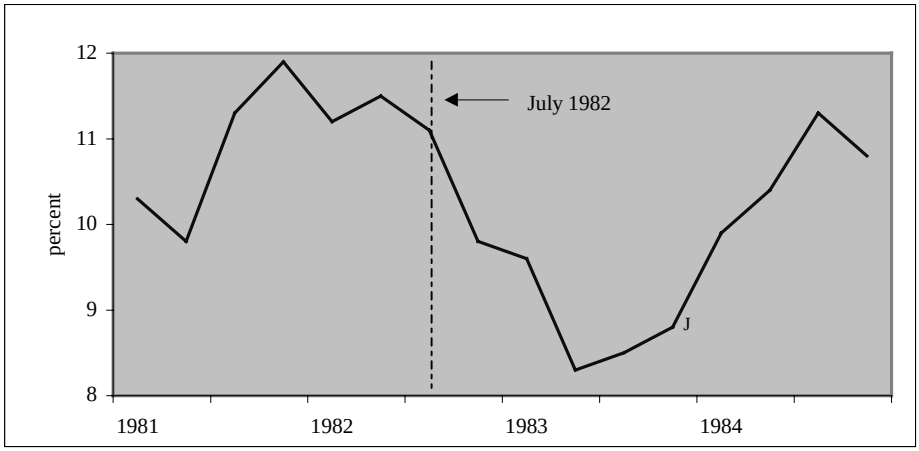
[19] Two of the other changes included expanded access to tax-favored Individual Retirement Accounts and a brief window of opportunity in the fall of 1981 for individuals to purchase tax-free "All-Saver" certificates of deposits from depository institutions. Both of these changes may have encouraged some people to save more out of current income in order to take advantage of these tax-privileged investments.

Chart 5

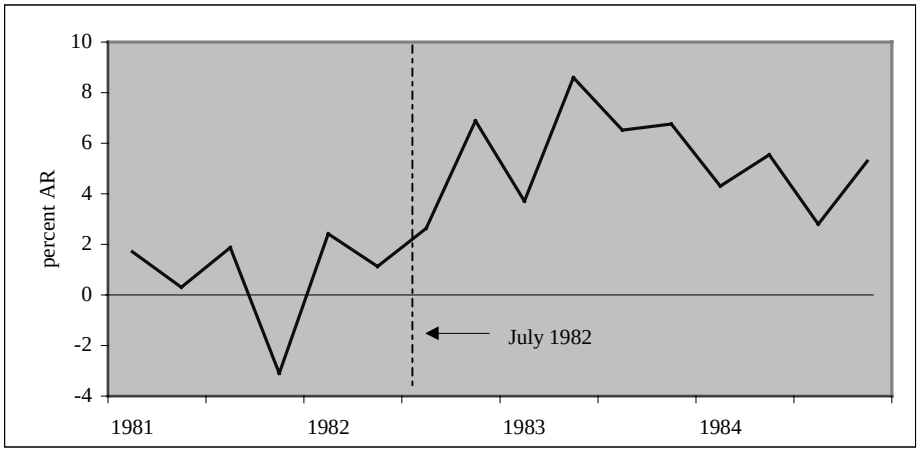
Personal Saving Rate



Source: Bureau of Economic Analysis.

Chart 6

Real Personal Consumption Growth



Source: Bureau of Economic Analysis.

the 1982 cut. The withholding schedules prepared for employers by the Internal Revenue Service in connection with the July 1, 1982 tax change allowed for a reduction in tax payments of less than 10% (apparently, there had been a tendency for taxpayers to underwithhold over the course of a year and to make large final payments at the filing deadline in April of the next year). Nonetheless, in line with the law, there was certainly a 10% reduction in the schedule of personal tax liabilities on July 1, 1982, meaning in reality a 5% reduction for calendar year 1982. If consumers strictly followed the life cycle-permanent income model, the discrepancy between the change in payments and the change in liabilities should have been an unimportant detail.[20] In principle, an increase in spending might have been observable in early 1982 (from a tax year standpoint, the time at which the cut became effective). Alternately, the increase in spending in the second half of 1982 could have been consistent with a 10% cut in tax liabilities starting then. In either instance, the saving rate should have been depressed at some point during 1982 (the first half, if consumers were responding to a 5% reduction in tax liabilities starting in January 1982 but experienced no change in tax payments at that point; the second half, if consumer were responding to a 10% reduction in tax liabilities starting in July 1982 but were experiencing a smaller reduction in tax payments) and rebounded in the spring of 1983, as final payments were reduced. Saving did decline toward the end of 1982, but continued to drop through the first half of 1983.

2.1.4 Summary of the Effects of the Three Income Tax Changes

The behavior of the personal saving rate around the effective dates of the 1968 surcharge, the 1975 rebate, and the 1982 tax cut suggest that households do distinguish between "permanent" and "temporary" income tax changes. However, the response to the 1982 cut suggests that households do not appear to distinguish between changes in tax liabilities and changes in tax payments, which is somewhat in contradiction of the strict life cycle-permanent income theory. Moreover, it's arguable that the responses to the 1968 surcharge and

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[20] To indicate how unimportant, recall that taxpayers are free to change withholding as they wish, though with some risk of penalty.

the 1982 tax cut should have begun to take place well before their effective dates. The surcharge went through a lengthy legislative process, and the 1982 tax cut was legislated a year in advance. Studies of some other changes in federal tax and spending programs have specifically examined whether consumers respond to changes in payments, instead of liabilities, and whether consumers anticipate changes in the law in their spending.

2.2 Other Fiscal Changes

Changes in the Social Security system provide good benchmarks for examining whether consumers anticipate changes in taxes and spending. Increases in U.S. old-age benefits have always been announced at least six weeks in ahead of time. Increases in old-age benefits are the epitome of permanent income increases, and are for all practical purposes the equivalent of permanent tax cuts. Forward-looking beneficiaries might therefore boost their spending in advance of the actual increase. In fact, research shows that there has been consistently a noticeable increase in retail sales the month that an increase in benefits takes effect, not before (Wilcox, 1987).

Changes in social security payroll taxes are also known well in advance. Most notably, a series of rate increases were legislated for future years in 1983. Additionally, every year many high wage-earners experience a temporary cut in tax payments when their earnings exceed the annual ceiling for the old-age tax. This cut would surely be well anticipated, since the wage ceiling for the old-age tax is announced in the fall of the prior year. Research has found a depressing effect on spending by a sample of households around the time payroll tax rate hikes take effect. In addition, it has been found that spending by high-wage households increase at the time the wage ceiling is passed (Parker, 1999).

Returning to the income tax, a study has found that households boost their spending around the time that income tax refunds are received (Souleles, 1999). An income tax refund is the epitome of a (temporary) tax cut known well in advance, since (barring filing errors) its amount is known in advance of receipt.

2.3 Lessons Drawn from Past Changes

The differing consumer responses to the 1968, 1975, and 1982 income tax changes suggest that households do indeed differentiate permanent changes in taxes from temporary ones. Consumers are forward-looking. However, the apparent failure of spending to change in anticipation of the 1968 and 1982 effective dates, the apparent failure of consumers to distinguish between the 1982 change in liabilities and withholding, as well as the reaction of spending to preannounced changes in social security benefits and taxes, suggest there are limits to this forward-looking behavior. Consumers do not appear to allow tax or benefit changes to affect spending until they observe changes in their cash income, and they seem to gauge the size of a permanent change in taxes by looking at its immediate effect on cash income (judging from the 1982 experience).

The standard explanation for the limitations to forward-looking behavior is "liquidity constraints" (e.g., Wilcox, 1987). The spending of many consumers is limited to their cash on hand. Liquidity constraints may help explain the patterns of response to tax refunds and social security benefit increases, as well as the pattern of response to the 1982 tax cut. However, the sluggish response to the 1975 rebate—much of which must have gone to liquidity-constrained households—and the responsiveness of spending by upper-income households to the annual end of payroll tax payments suggest that other forces are at work as well. Before discussing some of these forces, it is worthwhile to explore the 2001 experience.

2.4 The Tax Cut of 2001

The 2001 tax cut was signed into law in June. The bill seemed to have both "permanent" and "temporary" aspects.[21] On the permanent side, phased reductions in the basic schedule of rates were enacted, somewhat reminiscent of the 1982 law. The first changes in withholding took effect on July 1, 2001. However, unlike the 1982 act, the impact of the reduction in the basic tax rate structure on permanent income could be muted by the rather complex

[21] Viard (2002) discusses the law in some detail.

provisions regarding the Alternative Minimum Tax,[22] and the scheduled roll-back of all the reductions in 2011.

The supposedly temporary feature of the tax bill was the "rebate" checks mailed to taxpayers in the summer of 2001. These rebate checks were not strictly analogous to those of 1975. The 2001 rebates were payments reflecting the reduction in 2001 tax liability resulting from the partial replacement, effective for all of 2001, of the 15% tax bracket by a new 10% bracket. If taxpayers did not receive these checks in 2001, and did not change their withholding or estimated tax payments, they would be receiving unusually large refunds (or make unusually small final settlements) in early 2002.[23] Thus, the checks were actually accelerated refunds, rather than a pure rebate with no effect on future tax payments. Receipt of the 1975 rebate had no repercussions for future tax payments. This difference suggests that the 1975 experience is not entirely valid for estimating the impact of the 2001 rebate.[24]

The personal saving rate rose sharply in the third quarter of 2001 as the rebate checks were mailed (Chart 7). The saving rate fell back to a level slightly below its first half pace in the fourth quarter of 2001. The growth of real consumer spending picked up sharply in the fourth quarter, after faltering in the third quarter (Chart 8)). At this time it is quite difficult to decide how much of the improvement in spending toward the end of the year may be attributable to the tax cut. The September 11 terrorist attacks prompted an

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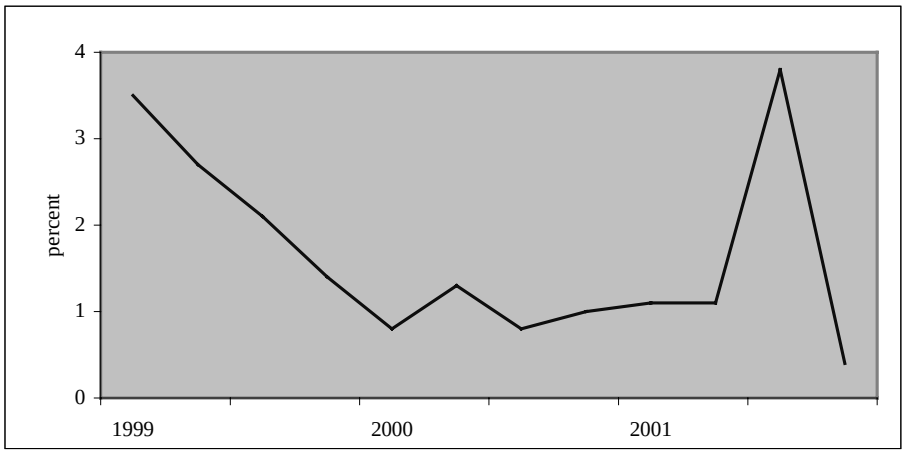
[22] The Alternative Minimum Tax (AMT) is a method of computing personal income tax liability for high income individuals and households which involves adding back certain deductions and tax-exempt income categories to taxable income, and then computing a tax liability according to a special schedule. The taxpayer owes the higher of the AMT or ordinary income tax. Reductions in the AMT were legislated in the recent tax bill, but these reductions end after 2004.

[23] The 2001 individual income tax return (Form 1040) referred to the rebate as "an advance payment." Households who did not receive the full amount were eligible for a "rate reduction credit."

[24] Another analogy to the 2001 episode may be the March 1992 reduction in personal income tax withholding rates (with no change in liabilities). This change boosted disposable income in that year by approximately $15 billion. The personal saving rate was basically unchanged from February to June 1992. The stable saving rate may suggest that the withholding change was viewed as similar to a permanent tax change. However, the withholding change amounted to less than 1/3 of one percent of 1992 personal income (the 2001 rebate was about ½ percent of income for the year and a much higher portion of income earned in the third quarter, when it was distributed to taxpayers), and its effects could have been swamped by other developments affecting household spending. Shapiro and Slemrod (1995) examined the 1992 adjustment in withholding.

Chart 7

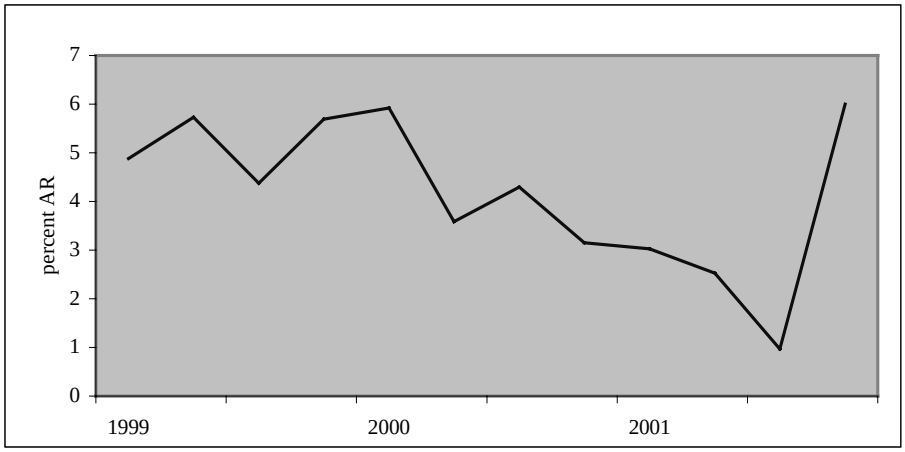
Personal Saving Rate



Source: Bureau of Economic Analysis.

Chart 8

Real Personal Consumption Growth



Source: Bureau of Economic Analysis.

abrupt but short-lived cessation of many types of discretionary spending, with somewhat more lasting effects on travel-related expenditures. Consumer attitudes clearly improved in the fall, resulting in a rebound in spending-heavily aided by major financing incentives by the motor vehicle industry. Nonetheless, the rebound in spending appears to be continuing into the early part of 2002, and it is certainly arguable that the tax cut may be having some lagged impact.

3. Why the Anomaly?

U.S. taxpayers do appear to distinguish between "permanent" and "temporary" tax changes, and thus behave somewhat in accord with the life cycle-permanent income theory. However, consumers do not appear to react to tax or transfer changes until they actual affect cash income. Aside from liquidity constraints, what limits the forward-looking behavior of U.S. households?

Consumers may be responding to the extraordinary complexity of both the U.S. tax system and the tax policy process. U.S. personal taxes are, as has been noted, levied, according to a progressive schedule, on the basis of calendar year income (defined in a complex fashion; among other things, long-term capital gains are taxed on a separate schedule) less certain expenses. It is not a simple matter to determine how a legislated tax change will affect one's tax liability for that calendar year. In the face of that complexity, a reasonable strategy may be to wait to see how the tax change affects cash income before adjusting consumption.

The tax policy process may add further complexity. Tax changes in the United States require the concurrence of both houses of Congress and the President.[25] Important components of tax bills have been the result of last-moment agreements, and may be influenced by procedural

[25] Congress has the Constitutional power to override a presidential veto of a tax law or any other bill with a two-thirds margin in favor in both Houses. There have been no recent vetos of tax legislation, but in 1944 President Roosevelt's veto of a wartime tax bill was overridden.

considerations.[26] A further complication is the frequency of major tax bills in the United States; most years see tax changes of some consequence. All these factors suggest that it is extremely difficult to predict the elements of a tax bill before its final passage by Congress and approval by the President; moreover the frequency of changes in the law should mute any formal distinctions between "permanent" and "temporary" changes.

4. Conclusion

In accord with the life cycle-permanent income model, the response of U.S. consumers to explicitly temporary fiscal policy moves is smaller than to others. However, in contrast to the predictions of the pure form of the model, households do not anticipate policy changes until there is an actual effect on their cash flow, and they even seem to gauge the size of "permanent" policy by its short-term cash flow impact. Some of these conflicts with the model may reflect the existence of liquidity constraints hampering the ability of many households to borrow against their permanent income. However, it is also possible that the surprising sluggishness of the response reflects the complexity of the U.S. tax system and the policy process. Since the tax law often changes, tax changes that are not explicitly "temporary" may not necessarily be viewed as "permanent".[27]

A possibly promising line of future research on fiscal policy effects would appear to lie in explicit modeling of household expectations of fiscal policy changes.[28] For instance, it is conceivable that systematic policy changes – those in accord with expectations formed on the basis of historic experience – have different impacts than nonsystematic changes. Of course, such a line of research parallels the very long-standing work in monetary

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[26] For instance, the 2011 expiration date on the provisions of the 2001 law was apparently influenced by Senate rules distinguishing the consideration of spending and tax bills having effects for more or less than ten years.

[27] And vice versa. A phased repeal of the federal tax on telephone bills was legislated to start in 1966. The repeal was delayed because of revenue needs arising from the Vietnam conflict. The tax is still in place.

[28] Bütler (1999) examined the long-term impact of public pensions when expectations of policies are explicitly modeled.

policy coming on the heels of the Lucas critique. There may be an inherently greater degree of difficulty in modeling fiscal policy in such a fashion than there is in the monetary area, since elections and other political considerations probably complicate the fiscal decision-making process relative to that of monetary policy.

Despite the very real difficulties of this line of research, there may be a need to get a better sense of the potency of fiscal policy. In a low-inflation environment, the zero bound on nominal interest rates complicates the ability of monetary policy to cope with negative shocks (Reifshneider and Williams, 2000). Expansionary fiscal policy may be more needed than in earlier years to stabilize the economy. Greater understanding of the sources and size of fiscal effects on consumer demand will aid the design of such policies, whether in the form of "automatic stabilizers" or discretionary changes in taxes and transfers.

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FISCAL POLICY AND ECONOMIC ACTIVITY DURING RECESSIONS IN ADVANCED ECONOMIES

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1. Introduction

This paper is concerned with the effectiveness of fiscal policy in responding to downturns in economic activity and in particular to recessions.[1] Macroeconomic thinking is still largely dominated by the Keynesian view that a fiscal expansion is an appropriate policy response to downturns and recessions. However, the fact that fiscal multipliers are generally found to be quite small raises doubts about the payoff to fiscal expansions.[2] Furthermore, the experience in Europe during the 1990s, which points to the possibility that fiscal contractions can be expansionary, or in other words that fiscal multipliers can be negative, has challenged the Keynesian view.

Uncertainty about the impact of fiscal policy on growth is reflected in debates about the role of fiscal policy during the Asian crisis and in helping to turn around the stagnant Japanese economy and about the fiscal policy response to the downturn in the United States, especially post-September 11, 2001, and to the weakening in the euro area. To inform the issues involved, it would clearly be helpful to know whether fiscal expansions have been relatively effective or relatively ineffective in stimulating economic activity during recessions, and in particular to be aware of the circumstances under which fiscal contractions may have been expansionary. This paper begins by describing what in theory influences fiscal multipliers and by summarizing the available empirical evidence. Attention then turns to some new empirical work on the relationship

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The opinions expressed in this paper are those of the authors and do not necessarily reflect the views of the IMF or of the Ministère des Finances.

[1] Throughout this paper, the terms economic activity and growth are used interchangeably, in each case with a focus on the short-term impact of fiscal policy. Recessions are defined below.

[2] References in this paper to fiscal multipliers are intended to convey the general impact of fiscal expansions and fiscal contractions on economic activity.

between fiscal policy and growth during recessions in advanced economies.[3]

2. Review of Theory and Evidence

The theoretical literature spans the simple Keynesian model, closed and open economy IS-LM models, demand-side models incorporating rational expectations, Ricardian equivalence, interest rate premiums and credibility, uncertainty and supply-side (including new classical) models. This literature, which is reviewed in detail in Hemming, Kell and Mahfouz (2000), suggests that fiscal multipliers will tend to be positive and possibly quite large when:

- there is excess capacity, the economy is either closed or it is open and the exchange rate is fixed, and households have limited time horizons or are liquidity constrained;
- increased government spending does not substitute for private spending, it enhances the productivity of labor and capital, and lower taxes increase labor supply and/or investment;
- government debt is low and the government does not face financing constraints; and
- there is an accompanying monetary expansion with limited inflationary consequences.

Fiscal multipliers are likely to be smaller, and could turn negative, when:

- there is crowding out either directly as government provision substitutes for private provision and through imports, or as interest rates rise and a flexible exchange rate appreciates in response to a fiscal expansion;
- households are Ricardian, in which case a permanent fiscal expansion can reduce consumption;

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[3] Advanced economies is an IMF World Economic Outlook country grouping. The 29 advanced economies overlap significantly with the 30 OECD member countries; the former include the newly industrialized Asian economies (Hong Kong SAR, Singapore, and Taiwan Province of China), Cyprus, and Israel, but exclude the EU accession countries (the Czech Republic, Hungary, Poland, and the Slovak Republic), Mexico, and Turkey.

- there is a debt sustainability problem and risk premia on interest rates are large, in which case a credible fiscal contraction can result in a significant fall in interest rates; and
- expansionary fiscal policy increases uncertainty which leads to more cautious saving and investment decisions by households and firms.

The empirical literature has three substantive components. First, there are estimates of fiscal multipliers derived from macroeconomic model simulations and reduced-form equations. Second, there are studies that draw lessons by looking across episodes of fiscal adjustment, with a special emphasis on identifying expansionary fiscal contractions. Third, some studies look at factors that influence fiscal multipliers, focusing on the evidence to support crowding out and Ricardian equivalence. Nearly all the available empirical literature relates to OECD countries, indeed much of it concentrates on the United States, Japan and major European countries. The main conclusions are as follows.

- Estimates of fiscal multipliers are overwhelmingly positive but small. Short-term multipliers average around a half for taxes and one for spending, with only modest variation across countries and models (albeit with some outliers). There are hardly any instances of negative fiscal multipliers, the exception being that they can be generated in some macroeconomic models with strong credibility effects.
- There is nevertheless evidence of non-Keynesian expansionary fiscal contractions. The most frequently cited examples, first by Giavazzi and Pagano (1990) and subsequently by others, are Denmark (1983-86) and Ireland (1987-89). Expansionary fiscal contractions appear to be more likely where a fiscal contraction: is large and focuses on cuts in unproductive spending; occurs against a background of high debt which leads to sizable risk premia on interest rates; is accompanied by a significant depreciation and wage restraint; and increases the credibility of fiscal policy.

There is little evidence of direct crowding out or crowding out through interest rates and the exchange rate. Nor does full Ricardian equivalence or a significant partial Ricardian offset get much support from the evidence.

3. New Empirical Work

Following the approach of Giavazzi and Pagano (1996), Alesina and Perotti (1997) and others, this paper analyses specific episodes. However, instead of episodes of fiscal adjustment and their growth consequences, the focus is on recession episodes, the fiscal response to these episodes and the impact of fiscal policy on growth during recessions.

The rationale for concentrating on recession episodes is that fiscal policy is more likely to be guided by the stabilization objective during recessions, and its effectiveness in this regard is obviously crucial for policymakers and should therefore be more apparent. Analyzing fiscal policy in good times as well as bad times would also require that careful attention is paid to the broader objectives of fiscal policy and to political and institutional influences on fiscal policy (Fatás and Mihov, 2002). Only political constraints are touched on below.

3.1 Definitions and Data

The following definitions are used in the paper.

- A recession episode is a single year or consecutive years in which real GDP growth falls more than one standard deviation below trend growth.
- The depth of a recession is the difference between average annual real GDP growth during a recession episode and trend growth. A larger difference indicates a deeper recession.[4]
- The fiscal response to a recession is the difference between the fiscal balance in percent of GDP for the year before the episode and the average annual fiscal balance during the episode. When this difference is positive (negative), there is a fiscal expansion (contraction).[5] The fiscal balance refers to the overall balance of the general government.[6]

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[4] The correction for trend growth in defining depth of recession is based on an assumption that differences in trend growth across countries reflect structural factors unrelated to short-term fiscal policy. If real GDP growth was –1 percent and –2 percent respectively in two years of recession, while trend growth was 2 percent, the depth of recession would be 3½ percent.

[5] If the fiscal deficit was 1 percent of GDP before the recession, and increased first to 3 percent of GDP then to 4 percent of GDP over two years of recession, the fiscal response would be 2½ percent of GDP.

[6] Alternative fiscal balance indicators are discussed in Section 3.5.

It should be noted that the definition of a recession used in the paper is not standard (i.e., two consecutive quarters of negative growth). It accords more with the view that a recession involves a significant and widespread decline in economic activity which lasts for more than a few months. This view is reflected in the work of the Business Cycle Dating Committee of the National Bureau of Economic Research. It should also be noted that prolonged recessions need not show up in the data in their entirety if, despite there being a sizable negative output gap, growth climbs to within one standard deviation of trend (which explains why 1981 is not shown as a recession year in the United States, contrary to the consensus view that it was). However, a definition based on output gaps would not capture periods of negative growth that fail to eliminate a large positive output gap.

Annual data for the 29 advanced economies over the period 1970-99 are derived from a number of IMF databases, but mainly that maintained for the World Economic Outlook, complemented by World Bank debt data.

3.2 Recession Episodes and Fiscal Response

Using the preceding definition, and after excluding recession observations where data on growth or the fiscal balance are either incomplete or significant outliers, there were 61 recession episodes in 27 of the 29 advanced economies over the period 1971-98.[7] These episodes are listed in Table 1.[8] It should be noted that, because the focus is on episodes of recession rather than fiscal adjustment, the Denmark and Ireland fiscal adjustments mentioned above are not included. But of the ten fiscal adjustments discussed in Alesina and Ardagna (1998), three are covered – Greece (1987), Ireland (1983) and Italy (1993).

As Figure 1 shows, recession episodes were more numerous (i.e., there were three or more recessions a year) at certain times, most notably 1974-75, 1980-83, 1991 and 1993, and 1998, in turn reflecting

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[7] There are no episodes in Cyprus or Switzerland.

[8] Recessions are not identified in the beginning and end years of the data period (1970 and 1999) because reference is made to pre-recession and post-recession values of certain variables. Of 82 initial recession observations, 18 are excluded because of missing data for the pre-recession, recession, or post-recession period and there are three outliers where either growth is more than 15 percent or the fiscal balance shows a deficit of more than 15 percent of GDP in the pre-recession, recession, or post-recession period.

primarily the impact of the two oil shocks, the global recession of the early 1990s and the Asian crisis.

Recessions are generally quite deep. Average growth is about 4½ percent below trend, as reported in Table 2, and negative growth is a feature of all recession episodes. However, with an average length of slightly less than 1½ years, the typical recession is quite short; most last a year, while only a few are longer than two years.[9]

Table 1

Recession Episodes by Country, 1971-98 (1)

Australia	***1982-83, 1990-91***	Japan	*1974,* ***1993-94***
Austria	***1978, 1981, 1984, 1993***	Korea	*1980, 1998*
Belgium	***1983, 1993***	Luxembourg	1975, 1977, 1981-83
Canada	***1982, 1990-92***	Netherlands	***1993***
Denmark	***1974-75, 1980-81, 1989, 1993***	New Zealand	***1991***
Finland	***1991-93***	Norway	1978, ***1982, 1988***
France	1975, ***1991, 1993***	Portugal	**1983-84, 1993**
Germany	***1981-1982, 1993***	Singapore	1975, 1985-86, 1998
Greece	*1982, 1987,* ***1993***	Spain	***1981, 1992-93***
Hong Kong SAR	1985, 1998	Sweden	***1991-93***
Iceland	*1983, 1988-89, 1992*	Taiwan ROC	1982, 1998
Ireland	***1983***	United Kingdom	1974-75, ***1980-81, 1991-92***
Israel	*1989*	United States	**1974-75,** ***1980, 1982, 1991***
Italy	***1982, 1993***		

(1) See footnotes 11 and 13 for an explanation of the italicized and bold-faced episodes.

9 The average is biased upwards because by definition no recession can be less than a year in length. In fact, the average postwar recession in industrial countries has lasted about a year, which means they can reasonably be analyzed using annual data.

Fig. 1

Recession Episodes in Advanced Economies, 1971-98

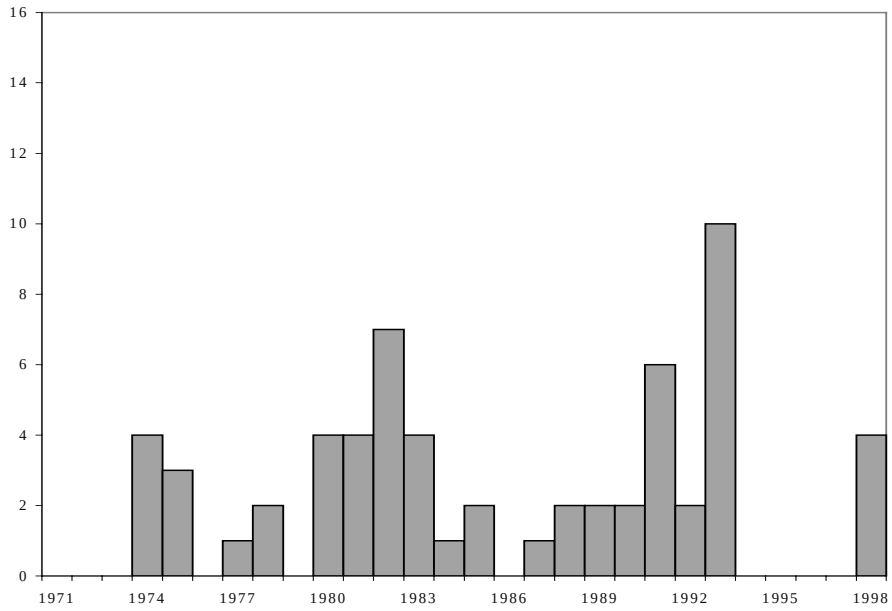

Table 2

Summary Description of Recession Episodes [1]

Number of episodes	61
Depth of recession [2]	4.4
	(2.3)
Average length of recession (years)	1.4
	(0.6)
Fiscal response [2]	1.9
	(2.5)

[1] Standard deviations in parentheses.
[2] As defined in the text.

The fiscal response to a recession is on average expansionary, with the fiscal balance deteriorating by slightly less than 2 percent of GDP. Of the 61 recession episodes, Table 3 indicates that 49 (i.e., 80 percent) were responded to with fiscal expansions, the fiscal balance deteriorating by 2½ percent of GDP on average. For the 12 recession episodes that were responded to with fiscal contractions, the fiscal balance improves by about ¾ percent of GDP on average. Fiscal deficits are the norm before, during, and after recession episodes.

A number of factors could explain why the fiscal response to recessions is in some cases expansionary and in other cases contractionary. The initial fiscal position could clearly be important, and on average fiscal deficits and debt are indeed much lower before fiscal expansions, which is to be expected given that this provides more room for fiscal policy manoeuvre. Government size is also slightly bigger, which probably reflects a correlation between government size, and in particular the size of the welfare state, and the strength of automatic stabilizers (van den Noord, 2000, Fatás and Mihov, 2001).

Macroeconomic conditions could also matter. Fiscal expansions typically occur against the background of initially higher growth and a stronger reserve position, both of which are unsurprising. They also accompany negative terms of trade changes, possibly because there is a greater readiness to let fiscal policy accommodate an exogenous deterioration in the external environment. That larger current account deficits and higher inflation precede fiscal expansions is distinctly counterintuitive, although the latter could reflect the fact that inflation was higher and fiscal policy looser in many advanced economies during the 1970s and 1980s.

Governments may also face political constraints in implementing the desired fiscal policy. An index of political constraints, based on the number of veto points in the executive, legislative, and judicial branches of government and on the ideological alignment of each branch, has been constructed by Henisz (2000). Fiscal expansions are associated with there being more political constraints, possibly reflecting the fact that the ability to offset automatic stabilizers with discretionary measures is limited. However, the difference in the index is not large.

Table 3

Characteristics of Fiscal Expansions and Fiscal Contractions

	Fiscal expansions	Fiscal contractions
Number of episodes	49	12
Fiscal response [1]	2.5	–0.7
Initial fiscal position [2]		
Fiscal balance (percent of GDP)	–0.3	–5.3
Debt (percent of GDP)	24.2	55.9
Government size (revenue in percent of GDP)	39.8	35.4
Macroeconomic conditions [2]		
Growth (relative to trend, in percent)	–0.4	–1.3
Current account balance (percent of GDP)	–2.3	–1.2
Reserves (percent of imports)	19.1	15.9
Terms of trade (percentage change) [3]	–2.1	4.0
Inflation (percent)	10.0	8.8
Political constraints (index) [4]	0.7	0.6

[1] As defined in the text.
[2] Before a recession episode.
[3] During a recession episode.
[4] A larger number indicates more constrained government.

3.3 Descriptive Analysis of Depth of Recession

One way to gauge the effectiveness of fiscal policy is to compare the depth of recessions accompanied by fiscal expansions and fiscal contractions. Such an approach provides a straightforward indication of whether fiscal multipliers are positive or negative, and an indication as to whether they are large or small.[10]

Table 4 indicates that average depth of recession for episodes accompanied by fiscal expansions and fiscal contractions is little different at 4¼ percent and 4½ percent respectively, and the fiscal multiplier therefore can be no more than marginally positive. However, the theoretical and empirical literature summarized above suggests that a number of factors can influence the effectiveness of fiscal policy, and sharper differences in average growth rates may emerge once these factors are taken into account.

Table 4 reports results based on thresholds that control for differences in the following factors: capacity utilization; openness and exchange rate regime; initial fiscal position; composition of fiscal response; and accompanying macroeconomic policies. This is not an exhaustive list of relevant factors, since some (and especially the underlying determinants of household and firm behavior) are difficult to quantify.

Some care is needed in comparing fiscal expansions and fiscal contractions in Table 4, in particular to distinguish between the effectiveness of fiscal expansions *relative to* fiscal contractions under the same circumstances, and between the effectiveness of fiscal expansions *and* fiscal contractions under different circumstances. Moreover, data relevant to the various factors are not available for all 61 countries in the sample of recession episodes, and so the sample size, and its composition in terms of the number of fiscal expansions and fiscal contractions, varies with the comparison being made.

Table 4 suggests the following:

Capacity utilization. As expected, fiscal expansions are generally more effective (i.e., they are more effective in both the senses just noted)

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[10] However, differences in average growth rates relative to trend cannot be translated into precise multiplier estimates.

when there is excess capacity as reflected in GDP in the year before recessions being below its trend level.

Openness and exchange rate regime. Fiscal expansions are generally more effective in open economies with a fixed exchange rate. This is the standard prediction, because monetary policy is directed towards preserving the fixed exchange rate and fiscal policy is therefore not significantly crowded out by interest rates or the exchange rate. Also as expected, fiscal expansions are more effective in closed economies than in open economies with a flexible exchange rate.

Initial fiscal position. Fiscal expansions are more effective when debt is in the first instance low, but not when the fiscal deficit is initially low. The latter is unexpected. Fiscal contractions are generally more effective when the fiscal deficit is in the first instance high, but not when debt is initially high. The latter is especially surprising given that high debt is a well-established feature of expansionary fiscal contractions. That fiscal expansions are generally more effective when government is big is probably because larger automatic stabilizers provide a more timely and effective response to recessions.

Composition of fiscal response. Expenditure-based fiscal expansions are more effective, reflecting the fact that fiscal multipliers are larger for expenditure increases than tax cuts. Fiscal contractions are more effective when they are expenditure based, which is an established characteristic of expansionary fiscal contractions.

Accompanying macroeconomic policies. Fiscal expansions are more effective when accompanied by expansionary monetary policy, as expected, while fiscal contractions are more effective when accompanied by a depreciation, which is again consistent with the characteristics of expansionary fiscal contractions.

The various comparisons in Table 4 suggest that the sign and size of fiscal multipliers are sensitive to circumstances, and that differences in this regard are to some extent consistent with expectations. However, the comparisons have to be viewed cautiously. Standard deviations, which have only been reported in Table 2, are generally large, and differences between averages for fiscal expansions and fiscal contractions are in many cases not statistically significant (which is why the comments above are based only on larger differences). Moreover, comparing averages fails to

Table 4

Factors Influencing the Depth of Recession

		Fiscal Expansions	Fiscal Contractions
		Depth of recession [1] *(percent)*	
Overall		4.3	4.5
Capacity utilization			
Excess capacity [2]	Yes	3.9	5.3
	No	4.5	4.2
Openness and exchange rate regime			
Closed economy [3]		3.6	3.5
Open economy/flexible exchange rate		6.5	3.7
Open economy/fixed exchange rate		3.4	4.3
Initial fiscal position			
Large fiscal deficit [4]	Yes	4.3	3.8
	No	4.4	5.3
High debt [5]	Yes	4.5	4.7
	No	4.1	4.1
Big government [6]	Yes	3.8	4.1
	No	6.2	5.9
Composition of fiscal response			
Expenditure based [7]	Yes	4.3	3.5
	No	4.5	4.6
Accompanying macroeconomic policies			
Monetary expansion [8]	Yes	3.7	5.3
	No	5.0	3.6
Depreciation [9]	Yes	4.5	4.0
	No	4.1	5.5

(1) As defined in the text.
(2) GDP below trend level before a recession.
(3) Imports less than 20 percent of GDP before a recession.
(4) Fiscal deficit more than 5 percent of GDP before a recession.
(5) Debt more than 50 percent of GDP before a recession.
(6) Revenue more than 30 percent of GDP before a recession.
(7) Expenditure change larger than revenue change (in absolute terms).
(8) Interest rate declines.
(9) During a recession.

exploit the information content of the differences within the grouped fiscal expansions and fiscal contractions which give rise to the large standard deviations. Consequently, descriptive analysis is at best capable of picking out certain empirical regularities across recession episodes.

3.4 Regression Analysis of Fiscal Response and Depth of Recession

Regression analysis may reveal more about fiscal multipliers. The econometric approach chosen involves estimating a system of two equations for the fiscal response and the depth of recession. The fiscal response is initially specified to be a function of the depth of recession, together with the initial fiscal position, macroeconomic conditions, and political constraints variables indicated in Table 3. The depth of recession is initially specified to be a function of the fiscal response, together with the capacity utilization, openness and exchange rate regime, initial fiscal position, composition of fiscal response, and accompanying macroeconomic policy variables indicated in Table 4 and growth (before a recession); a number of variables are interacted with the fiscal response. Complete information is available for 43 recession episodes.[11] Most variables are included in continuous form; however, dummy variables are used for the exchange rate regime (which is not continuous) and for expenditure-based fiscal policy (for which the corresponding continuous variable would be the fiscal response).

Estimation then proceeds as follows:

- Each equation is identified so that structural parameters can be estimated by two-stage least squares.
- General specifications are estimated for each equation, and then variables with insignificant coefficients are dropped in stages to yield a final specification in which all remaining variables are significant at the 10 percent level. This is specification 1 in Tables 5 and 6.
- The fiscal response equation is reestimated to exclude the current account balance because its coefficient has a counterintuitive sign which may reflect spurious correlation. This is specification 2 in Table 5.

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[11] These episodes are italicized in Table 1.

- Each equation is then reestimated using as instruments only those variables that remain significant in the final specification of the other equation. This yields final specification 3 in Table 5 and final specification 2 in Table 6.
- Lastly, these final specifications are estimated as a system using three-stage least squares. Since the results indicate that the depth of recession (and other variables) are no longer significant in the fiscal response equation, this system is reestimated excluding these variables as seemingly unrelated regression (SUR) equations. The results are given in Table 7.

The final specification in Table 7 is the preferred model.

In this model, the fiscal response is determined by the fiscal balance before a recession and government size. Governments that pursue sound fiscal policy in good times take advantage of their additional room to manoeuvre in bad times, and bigger governments undertake more stabilization, for reasons given above. At the mean government size (about 40 percent of GDP), a fiscal deficit of 3 percent of GDP or lower on average yields a fiscal expansion. While the depth of recession does not influence the size of the fiscal response in the preferred model, it should be noted that the regression results are conditional on there being a recession. This being the case, while the depth of recession does not influence the size of the fiscal response, a recession episode can still trigger a fiscal response.

The depth of recession is determined by the fiscal response, and in a closed economy the marginal effect of fiscal policy is Keynesian. A one percentage point of GDP larger fiscal expansion increases growth during a recession by 0.7 percent. However, there is an offset in an open economy which leads to an overall reduction in growth by 0.8 percent when the exchange rate is flexible and by 0.4 percent when it is fixed. In other words, fiscal policy becomes non Keynesian. While such an offset, and the fact that it is larger with a flexible exchange rate, is consistent with expectations, it is too big; crowding out through imports and the exchange rate should not reverse the effects of fiscal policy.

Countries with bigger governments also have less deep recessions, but this effect is independent of the size of the fiscal response and therefore not necessarily indicative of the relative effectiveness of automatic stabilizers (as suggested by the descriptive analysis). Nor is it inconsistent with the possibility that more open economies have bigger governments

Table 5

Regression Results for Fiscal Response [1]

	General Specification 1		Final Specification 1		General Specification 2		Final Specification 2		Final Specification 3	
Observations		43		43		43		43		43
F-test for overall significance	F(10,32)	3.05	F(3,40)	12.28	F(9,33)	3.65	F(4,38)	5.44	F(4,38)	6.29
R-squared		0.55		0.66		0.51		0.47		0.49
Adjusted R-squared		0.41		0.64		0.38		0.41		0.44
Wald test: Final vs. general specification			F(8,32)	0.93			F(5,33)	0.50		
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Depth of recession	0.23	0.88			0.36	1.17	0.54	1.70	0.37	0.66
Fiscal Balance	0.32	2.98	0.33	3.98	0.23	1.86	0.26	3.60	0.27	3.89
Debt	–0.00	–0.15			–0.01	–0.75				
Government size	0.08	1.62	0.05	5.01	0.10	1.84	0.10	2.19	0.09	1.34
Growth	0.01	0.02			0.01	0.03				
Current account balance	–0.24	–1.64	–0.23	–2.23						
Reserves	–0.03	–1.32			–0.01	–0.79				
Terms of trade	0.03	0.60			0.02	0.48				
Inflation	–0.00	–0.02			0.03	0.98				
Political constraints	1.36	1.08			1.98	1.54	2.39	1.69	1.85	0.96
Constant	–2.64	–0.87			–4.22	–1.21	–5.58	–1.67	–3.84	–0.66

[1] Estimated by two-stage least squares, except final specification 1 which is estimated by ordinary least squares. Excess capacity, monetary policy, and depreciation are used as instruments, except for final specification 3 which uses growth.

Table 6

Regression Results for Depth of Recession

	General Specification 1		Final Specification 1		Final Specification 2	
Observations		43		43		43
F-test for overall significance	F(15,27)	3.65	F(5,37)	4.75	F(5,37)	3.20
R-squared		0.66		0.55		0.54
Adjusted R-squared		0.47		0.49		0.48
Wald test: Final vs. general specification			F(10, 27)	1.75		
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
Fiscal response	–1.10	–1.49	–0.85	–1.98	–1.02	–2.72
* Excess capacity	–0.07	–1.58				
* Open economy/flexible exchange rate	1.34	2.71	1.56	3.18	1.81	3.31
* Open economy/fixed exchange rate	1.10	2.04	1.27	2.97	1.49	3.15
* Fiscal balance	–0.00	–0.09				
* Debt	0.00	0.39				
* Government size	–0.00	–0.18				
* Expenditure based	0.15	0.44				
Excess capacity	0.06	0.60				
Fiscal balance	0.21	1.66				
Debt	0.02	1.55				
Government size	–0.16	–3.23	–0.17	–4.22	–0.18	–3.75
Growth	–0.24	–1.02	–0.29	–2.53	–0.30	–2.26
Monetary Policy	–0.04	–0.16				
Depreciation	0.01	0.51				
Constant	9.98	4.16	10.23	6.14	10.64	5.57

(1) Estimated by two-stage least squares. The current account balance, reserves, terms of trade, inflation and political constraints are used as instruments, except for final specification 2 which uses political constraints alone.

Table 7

Regression Results for Fiscal Response and Depth of Recession

	General Specification (1)		Final Specification (2)	
	Fiscal Response			
Observations		43		43
R-squared		0.47		0.62
	Coefficient	z-value	Cofficient	z-value
Depth of recession	0.18	0.79		
Fiscal balance	0.30	4.61	0.31	5.04
Government size	0.07	1.91	0.06	8.22
Political constraints	0.81	0.43		
Constant	–1.53	–0.53		
	Depth of Recession			
Observations		43		43
R-squared		0.54		0.56
	Coefficient	z-value	Coefficient	z-value
Fiscal response	–0.93	–2.56	–0.68	–2.23
* Open economy/ flexible exchange rate	1.80	4.62	1.52	4.60
* Open economy/ fixed exchange rate	1.40	3.39	1.05	3.24
Government size	–0.18	–5.21	–0.16	–5.96
Growth	–0.31	–2.33	–0.29	–2.19
Constant	10.45	7.89	9.70	8.79

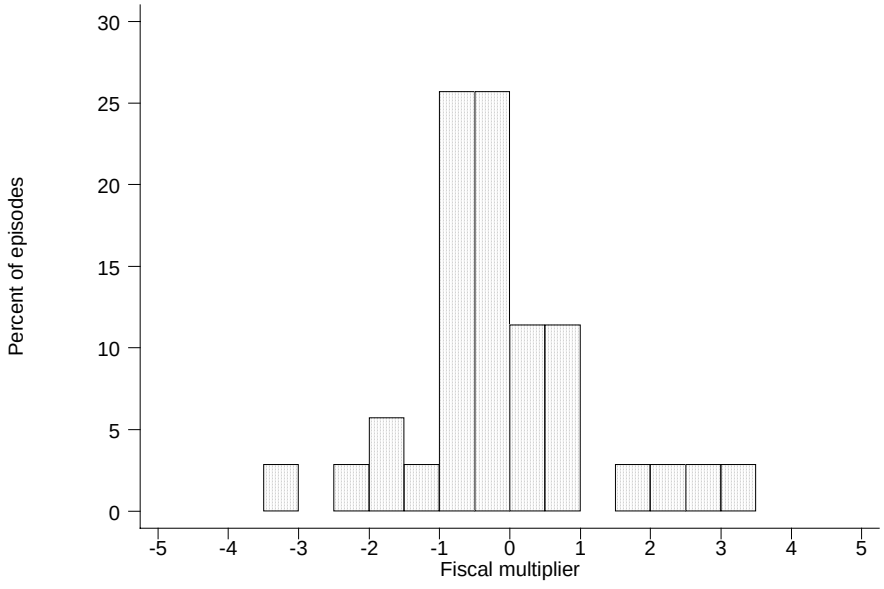
(1) Estimated by three-stage least squares.
(2) Estimated as seemingly unrelated regression (SUR) equations.

(Rodrik, 1998), although it does imply that these characteristics have an offsetting influence on the depth of recession. Lower growth before a recession is associated with deeper recessions, which is to be expected given that growth is usually serially correlated.

While the government size and growth variables do not affect the impact of the fiscal response on the depth of recession at the margin, they do affect the average relationship between the two, and the average fiscal multiplier (since the latter is the average relationship between the fiscal response and growth during recessions). The average fiscal multiplier across all 43 recession episodes is –1.5. However, this is due to some implausibly large and mainly negative multiplier estimates which reflect the fact that the depth of recession equation represents an incomplete characterization of growth during recessions. Excluding 8 episodes with fiscal multipliers lying outside the range +/– 5, the average multiplier is only marginally negative. Moreover, as Figure 2 indicates, more than two-thirds of the remaining episode specific multipliers lie in the range +/–1, with open economies tending to be in negative territory.

Fig. 2

Frequency Distribution for Fiscal Multiplier



3.5 Measuring Fiscal Policy

Fiscal policy has so far been measured using the overall fiscal balance. This contrasts with the literature on fiscal adjustments, which focuses on the primary structural balance, the argument being that fiscal adjustment should be represented by the discretionary component of fiscal policy alone. The overall balance should therefore be purged of the impact of automatic stabilizers and changes in interest payments. However, when attention turns instead to the effectiveness of fiscal policy, automatic stabilizers should clearly be taken into account because they are part of fiscal policy (i.e., 'letting automatic stabilizers work' is a policy decision). And anyway, distinguishing the automatic and discretionary components of fiscal policy can be quite problematic.[12] Changes in interest payments also have an effect on aggregate demand (via changes in income from capital).

Because data on structural and primary balances are available for many advanced economies, the impact of using alternative fiscal indicators can be investigated. However, the number of recession episodes is reduced to 39.[13] For this smaller sample, the impact of using alternative fiscal balance indicators is shown in Figure 3 and Table 8. The dispersion of recession episodes in Figure 3 looks similar for each fiscal balance indicator, but Table 8 reveals that a number of fiscal expansions are transformed into fiscal contractions. This is because on average part of the widening overall deficit during a recession is accounted for by higher interest payments, while the bulk of it reflects the operation of automatic stabilizers. The primary structural balance in fact indicates that there is on average a small discretionary fiscal tightening during recessions, which partly offsets the operation of automatic stabilizers.

Regression analysis is possible for the alternative fiscal balance indicators using data for 33 recession episodes.[14] While the results for the fiscal response are not much affected, the results for the depth of recession are not very informative; statistically satisfactory models do not make

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[12] This is not only because of the usual technical issues that have to be addressed (related to calculating output gaps and the output responsiveness of taxes and spending in the usual gap+elasticity approach), but also because the distinction between discretionary and nondiscretionary measures (especially where policy inaction, such as a failure to index government wages, has to be interpreted) can become quite blurred (IMF, 1998).

[13] These episodes are bold-faced in Table 1.

[14] The episodes which are italicized and bold in Table 1, but excluding Finland (1991-93) which is an outlier (see Figure 2) that prevents reasonable results being achieved for any fiscal balance indicator.

Table 8

Impact of Alternative Fiscal Balance Indicators

	Overall Balance	Primary Balance	Structural Balance	Primary Structural Balance
Number of episodes	39	39	39	39
Fiscal expansions	33	31	19	16
Fiscal contractions	6	8	20	23
Fiscal response [1]	2.0	1.8	0.1	–0.1
Fiscal expansions	2.5	2.5	1.9	2.2
Fiscal contractions	–0.7	–0.9	–1.6	–1.8
Depth of recession	3.5	3.5	3.5	3.5
Fiscal expansions	3.5	3.4	3.6	3.5
Fiscal contractions	3.6	3.6	3.4	3.5

[1] Overall and primary balances are in percent of GDP and structural and primary structural balances are in percent of potential GDP.

Table 9

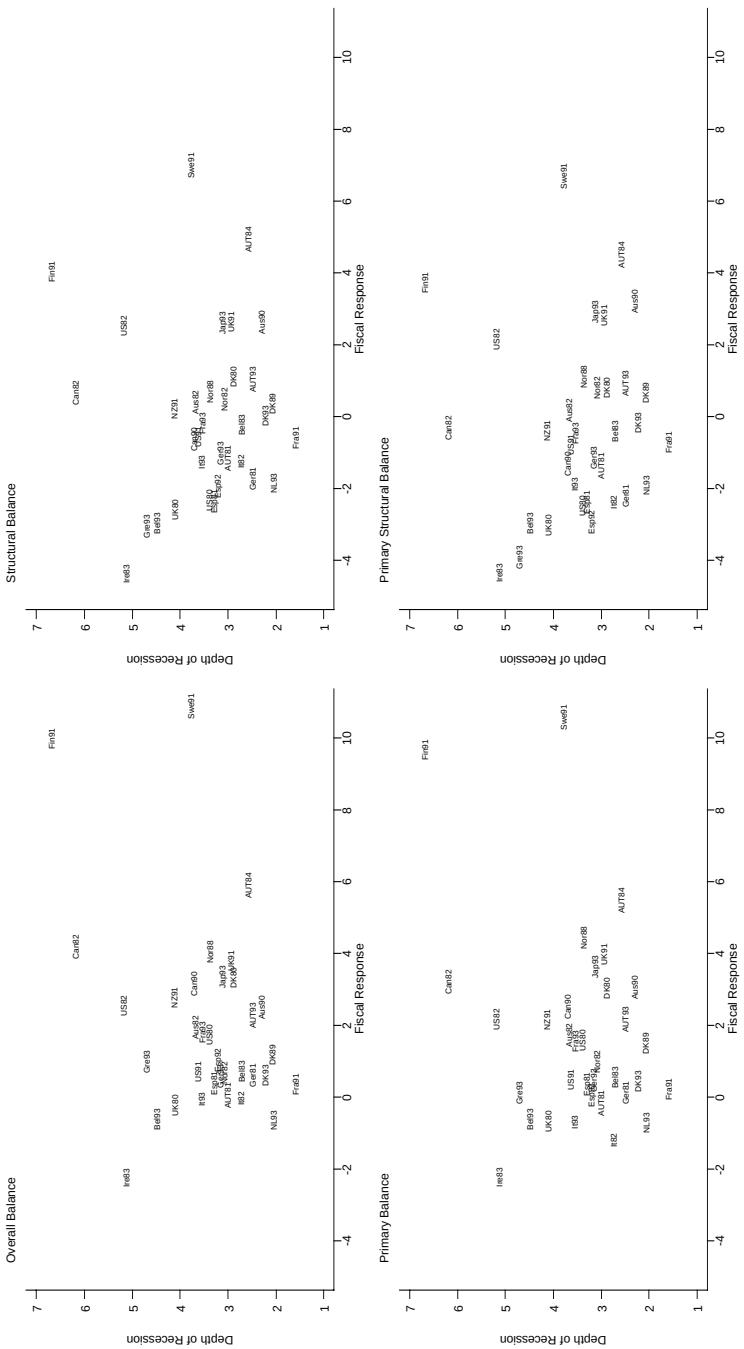
Regression Results for Fiscal Response (Measured by Structural Balance) and Depth of Recession

	General Specification [1]		Final Specification [1]	
	Fiscal Response			
Observations		33		33
R-squared		0.51		0.51
	Coefficient	z-value	Cofficient	z-value
Structural balance	0.34	5.78	0.34	5.94
Government size	0.03	3.84	0.03	3.87
	Depth of Recession			
Observations		33		33
R-squared		0.39		0.20
	Coefficient	z-value	Coefficient	z-value
Fiscal response	–0.47	–2.06	–0.38	–1.47
* Government size	0.01	1.56	0.01	1.28
Government size	–0.28	–1.77	–0.43	–2.46
Monetary policy	–0.27	–3.03		
Constant	4.20	5.77	5.05	6.76

[1] Estimated as seemingly unrelated regression (SUR) equations.

Fig. 3

Fiscal Response, Depth of Recessions, and Alternative Fiscal Balance Indicators (1)



(1) The fiscal response is measured using the corresponding fiscal balance indicator.

much economic sense. Table 9, which is based on the structural balance, reports typical results for the preferred model.[15]

4. Concluding Comments

This paper is fairly informative about the fiscal response during recessions, that is whether there are fiscal expansions or fiscal contractions, and what determines which is chosen. The initial fiscal balance and government size are important in this regard, but the depth of recession is not. The importance of establishing sound fiscal positions in good times to provide room for fiscal policy manoeuvre in bad times is a clear lesson from the results. As regards the effectiveness of fiscal policy in responding to recessions and the factors that influence it, the results in the paper are more mixed. While descriptive analysis points to fiscal policy having effects that are to some extent consistent with economic analysis, regression analysis is much less clear. On balance, it would appear that:

- Fiscal policy is Keynesian during recessions in closed economies, but the fiscal multiplier is quite small (i.e., it is unlikely to exceed unity).
- While fiscal policy during recessions seems to be non-Keynesian in open economies, this does not reflect factors suggested by the expansionary fiscal contraction literature. Rather, it is an implausibly large effect of crowding out. It is probably more appropriate to conclude that the fiscal multiplier is very small in open economies (and probably close to zero with a flexible exchange rate).
- However, these conclusions do not preclude the possibility that, where the circumstances are right, fiscal expansions can be an effective response to a recession. The right circumstances would feature some or all of: excess capacity; a closed economy or an open economy with a fixed exchange rate; big government; expenditure-based fiscal policy; and an accompanying monetary expansion.

One question that remains is whether fiscal policy has stronger effects that the empirical work described in the paper is not picking up. A number of considerations could bear upon the answer to this question.

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[15] The regression analysis was also repeated focusing not on the depth of recession but on the severity of recession, that is the depth of recession multiplied by episode length, and on growth relative to trend in the year following a recession. Neither approach yields better final models for any fiscal balance indicator.

First, the paper does not present a full-fledged analysis of the determinants of growth during recessions, and key factors that could influence the way short-term growth reacts to fiscal policy may not be properly taken into account. For example, it is widely accepted that fiscal policy in Japan will have limited impact on the economy as long as structural impediments on the supply side remain.[16]

Second, fiscal policy implementation is tricky. There are the usual lags in recognizing the need for a fiscal response, designing measures, and then approving them, which can mean that fiscal policy kicks in too late, and may indeed end up being procyclical. This problem is compounded where politicians cannot agree on the required measures. The fiscal stimulus package in the United States was affected in this way. The consequence may be that, in terms of their demand impact, fiscal responses are generally weaker than intended or needed to elicit a significant growth response.

Third, fiscal systems may have institutional weaknesses that make it difficult to implement fiscal policy as intended. Thus attempts to shift from the fiscal contractions initially called for by external financing constraints and the need to finance bank restructuring during the Asian crisis to fiscal expansions to support collapsing demand faltered because budgetary systems proved incapable of delivering the required boost to spending.[17] Again, fiscal responses may be weaker than intended or needed.

And fourth, it may be necessary to pay more careful attention to the distinction between automatic stabilizers and discretionary measures. As noted, the former may be able to deliver a more timely and effective fiscal response to a recession. Whether they can do so is certainly of some interest in the euro area, where the emphasis is on using automatic stabilizers that tend to be larger than in other advanced economies to respond to slower growth. However, discretionary measures can be tailored more specifically to the need to get out of a recession, and the ineffectiveness of fiscal policy may in part be due to badly designed measures.

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[16] Looking at growth rates relative to trend accounts for influences on long-term growth, but does not account for the different ways in which short-term and long-term growth can be affected by structural weaknesses.

[17] Although Korea (1998) is the only core Asian crisis recession episode covered in this paper.

The search for a more satisfactory explanation of the way fiscal policy works in a recession may have to take account of each of these considerations, which probably means that a more episode-specific (case study or event study) approach would be most revealing.

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AUTOMATIC FISCAL STABILISERS IN THE EURO AREA SIMULATIONS WITH THE NIME MODEL

Eric Meyermans[*]

1. Introduction

In this paper, we investigate how automatic fiscal stabilisers affect economic activity in the euro area. For this purpose we apply several shocks to the NIME model, and we compare the adjustment path of the main macroeconomic variables under a regime that allows the automatic fiscal stabilisers to operate fully, with the adjustment path under a regime that tempers the working of the automatic fiscal stabilisers. We also compare the results for the euro area with results for the United States and Japan.

The empirical literature on automatic fiscal stabilisers has increased considerably since the Maastricht Treaty came into force in 1993 and the Stability and Growth Pact was adopted in 1997. See, for example, Buti and Sapir (1998), Leeftink (2000), OECD (1993), Roeger and in 't Veld (1997), and van den Noord (2000). Most of these studies find that output fluctuations are reduced significantly when automatic stabilisers are allowed to operate. Our paper provides some additional evidence based on a macro-econometric world model that has a well-defined steady state and a set of behavioural equations, allowing for a careful analysis of the dynamics towards the steady state.

In the second section of this paper, we briefly describe the NIME model. From the third until the sixth section, we present simulation results for diverse shocks under two different fiscal regimes. Under the first regime, the automatic fiscal stabilisers are allowed to operate fully. Under the alternative regime, the working of the automatic fiscal stabilisers is tempered, without compromising the long run sustainability of fiscal policies. The shocks we investigate are a temporary real demand shock, a permanent monetary shock, and a permanent supply shock. In the last section, we draw some conclusions.

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The views expressed in this paper are not necessarily those of the Belgian Federal Planning Bureau and are the personal responsibility of the author.

2. The NIME model

The NIME model is a macro-econometric world model developed at the Belgian Federal Planning Bureau. This model is built to make medium-term forecasts of the Belgian international economic environment and to study the transmission of the effects of economic policies and exogenous shocks on the Belgian and European economy.[1]

The current version of the NIME model divides the world into six separate country blocks: Belgium (BE), the EU block consisting of the countries that adopted the euro in 1999 minus Belgium, the NE block consisting of the countries of the European Union that did not adopt the euro in 1999, the United States (US), Japan (JP) and the "rest of the world" (RW).[2] These country blocks are linked to each other through trade and financial flows. The EU, NE, US and JP block have the same structure. In each of these country blocks, we distinguish a household sector, an enterprise sector, a public sector, and a monetary sector. For each sector we postulate the existence of a single representative agent, so that we do not consider issues of heterogeneity. A similar set of behavioural equations and accounting identities is specified for each sector across blocks, while the parameter values of the equations are obtained using econometric techniques applied to the aggregated data of the different blocks.

The NIME model makes an analytical distinction between three different time horizons: the short run that is demand driven and during which the plans of the agents are not fully realised due to the existence of adjustment costs; the medium run where the plans are realised but still changing due to lagging adjustment of the other endogenous variables and a steady state long run. In the steady state, productivity, the natural rate of unemployment, secular inflation, the real interest rate, the participation rate, and population growth are exogenous, while the steady state values of the other variables, such as potential output, are determined by these exogenous variables and the structural equations of the model.

The NIME model distinguishes four sectors per country block. First, the household sector allocates its total available means over goods and

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1 A more detailed discussion of the NIME model can be found in Meyermans and Van Brusselen (2001). This paper is available on the world wide web at www.plan.be click Language, click Working Papers, or at www.plan.be/nl/pub/wp/detail_wp.stm?pub=WP0103.

2 A new version of the model that captures the recent changes in the composition of the euro area is under preparation.

services, money balances, residential buildings, and other assets as a function of the nominal interest rate, the real interest rate, the user cost of residential buildings, and a scale variable. This scale variable consists of the assets inherited from the past, plus asset income, plus current and expected future labour income. In the short run, the household sector is liquidity constrained so that a fraction of total private consumption is financed by disposable income. Error correction mechanisms and partial adjustment schemes are used to capture sluggish adjustment in the expenditure plans of the household sector. Second, the enterprise sector maximizes its profits by hiring production factors and selling goods and services to the final users. There are three production factors, i.e., labour, capital and intermediary imports. The production technology is a Cobb-Douglas production function with constant returns to scale. Error correction mechanisms and partial adjustment schemes are used to model short run factor demand. Price adjustment occurs sluggishly because of menu costs and incomplete information. Third, the monetary authorities set the short-term interest rate in such a way that it deviates from the steady state interest rate to the extent that the policy variables deviate from their target value. These policy variables are inflation and output (or unemployment). The long-term interest rate is determined by the short-term interest rate and the steady state interest rate. The equilibrium exchange rate equilibrates the current account. Fourth, public sector receipts are determined by endogenous tax bases and predetermined tax rates,[3] while the public expenditures are to a large extent determined by the business cycle and trend growth.

In the NIME model, the automatic fiscal stabilisers are determined on the expenditure side by the unemployment benefits and interest payments on public debt, and on the revenue side by direct labour income taxes, profit taxes, social security contributions, and indirect taxes. For convenience, we summarise in Appendix A the major features of the fiscal sector. A summary of the other sectors can be found in Meyermans and Van Brusselen (2001) (MVB, henceforth).[4]

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[3] In the default version of the NIME model, the public debt to GDP ratio stabilises at a rate determined outside the model. It is the direct labour income tax rate which adjusts to reach this target.

[4] The "rest of the world" block consists of a limited number of equations describing overall economic activity in the rest of the world. For the block describing the Belgian economy, one of the existing BFPB models can be used. These models have been developed independently from the

(continues)

Finally, it should be noted that the expectations of the agents are partly forward looking, and partly backward looking. The forward looking expectations are quasi-rational in the sense that agents have model consistent expectations about the steady state but the speed of convergence towards this steady state is determined by a reduced form function rather than by the underlying structural parameters of the model.

3. Automatic fiscal stabilisers under diverse shocks

In the following three sections, we use the NIME model to examine the effects of automatic fiscal stabilisers on the main macroeconomic variables of the euro area, and we compare them with the effects of a sustainable alternative regime that tempers the working of the automatic fiscal stabilisers. Three shocks are applied to the model, i.e., a temporary drop in private consumption, a permanent increase in the nominal money supply, and a permanent decline in trend productivity. A sustainable alternative scenario is defined as a scenario in which in the long run the target debt to GDP ratio and the target deficit to GDP ratio are reached, but which tempers the working of the automatic fiscal stabilisers during the adjustment process.

We start from a baseline,[5] to which we apply a shock, and we simulate the model until it reaches a steady state. Depending on the nature of the shock, the new steady state may deviate from the old one. The temporary real demand shock does not affect the steady state of the economy. The monetary shock increases the nominal variables permanently, while it leaves the real variables unaffected. The permanent supply shock changes the steady state values of the real variables, leaving the general price level unchanged. As we will see, these long run effects are not without implications for the sustainability of the automatic stabilisers and for the choice of the alternative fiscal regime.

NIME project, and they have their own specific structure, (see, for example, Bossier *et al.* (2000)). For this exercise the BE block is kept exogenous.

[5] We perform the shocks on a technical baseline that has been obtained simulating the model for a prolonged time until it has reached a steady state. The year in which the shock is introduced is the first year of the steady state. This implies, for example, that the equilibrium direct income tax rate is set at the level which is compatible with the fiscal targets, in particular, the debt to GDP ratio. The latter is determined outside the model at 0.60. See Chapter VI of MVB.

Apart from the automatic fiscal stabilisers, there are several other mechanisms that influence adjustment in the NIME model. First, there are the prices. The real factor prices adjust to reflect changes in factor productivity, while the relative prices of supply for final demand change to induce a reallocation between the components of final demand (see Chapter II and III of MVB). Second, there are the scale variables. The total available means of the household sector change in response to changes in the (expected) non-asset income, so that household demand decreases if there is an expected decrease in future productivity. Also, the consumer price deflates the nominal scale variable in the demand equations of the household sector, so that a change in the price level affects household demand via its wealth effect (see Chapter II of MVB). Moreover, to the extent that the households are liquidity constrained, changes in disposable income may have an important impact on household expenditures. We also note that imports accommodate changes in total domestic demand, while savings are used to adjust the capital stocks to their equilibrium level. Third, the monetary authorities set the short-term interest rates to reach their targets[6] (see Chapter III of MVB).

4. A temporary real demand shock

In a first exercise, we assume that the household sector of the euro area expects a drop in its future income.[7] As a result, the household sector reallocates its expenditures, inducing in the first year a drop in private consumption by 1 percent *vis-à-vis* the baseline. In the second year, the household sector revises its expectations and the expected future income is again equal to its baseline level.

We will now discuss two policy responses to this temporary drop in private demand. In the first variant, the authorities let the automatic fiscal stabilisers operate. In the second variant, the fiscal authorities stabilise the fiscal *deficit* to GDP ratio in *every* period, and they adjust the direct labour income tax rate to reach this objective.

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6 By default, these targets are inflation and unemployment. Under a strict monetary targeting regime there is only one target, i.e., the money supply. See section 3.2.

7 We calculated this drop in future income in such a way that it induces a 1 percent drop in private consumption in the first year.

4.1 Automatic fiscal stabilisers operating

The simulation results of the first variant are shown in Table 1. The first 5 columns show the first 5 years of the adjustment process as percentage deviations from the baseline. The sixth column, labelled ss, shows the new steady state which is obtained simulating the model for a prolonged period. The seventh column gives an indication of the persistence of the shock.[8] The last two columns show the impact responses to a similar temporary demand shock in the U.S. and Japan.

Since we are dealing here with a temporary shock, the steady state does not change, as is shown in column 6 of Table 1. Let us now have a closer look at the adjustment path of the main macroeconomic variables.

In the first year, future household labour income is expected to drop by 2.89 percent in the euro area. As a result, the household sector reduces its consumption of goods and services by 1 percent, while gross fixed capital formation falls by 0.32 percent. This drop in domestic activity triggers a 1.71 percent drop in imports. Exports are only modestly affected, primarily because there is not a similar shock in the other blocks. As a result, total private output declines by 0.76 percent, while GDP in constant prices falls by 0.50 percent. Private sector employment falls by 0.12 percent, while real wages fall by about 0.08 percent.[9]

The spill-over effects of this shock to the other country blocks are summarised in the last rows of the Table 1.[10] Here, we see, for example, that in the first year private output falls, on average, by about 0.07 percent in the other country blocks, while prices remain almost unchanged.

The last two columns of Table 1 show the impact responses to a similar shock in the U.S. and Japan. We note that the largest responses are in the U.S., where private output falls by 1 percent. Of particular interest are the responses in the U.S. labour market where we see that employment in the private sector drops by 0.5 percent, compared with about 0.1 percent in the other country blocks. This reflects to a large extent the high short run

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8 Persistence is measured by the regression coefficient of the contemporaneous deviation from the baseline on the lagged deviation from the baseline, for the period ranging from t+1 till the end of the simulation, with t the period in which the shock occurs. The smaller the parameter value (in absolute terms), the lower the persistence.

9 See MVB for the equations and elasticities underlying these results.

10 The effective foreign variables are a weighted average of the corresponding variables in the other country blocks. The weights are shares in export markets.

output elasticity of labour demand in the U.S..[11] In all country blocks, the initial response of prices is small.

In the euro area, public revenues in constant prices fall initially by 0.21 percent, mainly because indirect tax receipts in constant prices decline by 0.64 percent. This drop is proportional to the drop in total output. Real direct labour income tax receipts decline by 0.02 percent, reflecting the modest change in the tax base. Public expenditures in constant prices remain almost unchanged in the first year. The modest increase in unemployment benefits is compensated by a decrease in subsidies to enterprises and other outlays. The fiscal deficit as a ratio to GDP increases by 0.10 percent, while the debt to GDP ratio increases by 0.46 percent.[12] We note a similar increase in the fiscal deficit to GDP ratio in Japan. For the U.S., the deficit to GDP ratio increases by 0.25 percent, reflecting the strong increase in outlays for unemployment benefits.

In the second year, the shock reverses and the economy starts to converge gradually to the baseline. During this adjustment process, prices change to accommodate, with a one year lag, the changes in the output gap. In the same way, the interest rates are set to accommodate the economy to its steady state. The coefficient of autocorrelation in the seventh column suggests that the adjustment towards the steady state is primarily slowed down by the sluggish adjustment of the prices and the stock of assets. The speed of price adjustment is determined by menu costs and information costs,[13] while the stock of assets is rebuilt through savings.

4.2 Automatic fiscal stabilisers tempered

Here, the same shock is applied as in the previous variant, however, in this variant we also assume that the direct labour income tax rate is adjusted to stabilise the fiscal *deficit* to GDP ratio *in every* period. The results of this variant are shown in Table 2.

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[11] Short run output elasticity for US and EU are 0.50 and 0.16, respectively. See MVB, Table III.5 in Chapter III. Note that due to the Cobb-Douglas nature of the production function the long run output elasticity is equal to 1.

[12] Comparing the change in the deficit to GDP ratio with the debt to GDP ratio, the following is of some interest. Let NBG be net public borrowing, GBOND the public debt, and GDPU nominal GDP, so that NBG = d GBOND. We have that d (GBOND/GDPU) = d GBOND/GDPU – GBOND/GDPU d GDPU/GDPU, so that d (GBOND/GDPU) = NBG/GDPU – (GBOND/GDPU) (d GDPU/GDPU).

[13] See section III.B of MVB.

Table 1

A temporary demand shock
Automatic fiscal stabilisers operating

	euro area							US	JP
	01	02	03	04	05	SS	SA	01	01
total private output	–0.76	–0.09	0.08	0.09	0.07	0.00	0.17	–0.98	–0.74
real GDP	–0.50	–0.08	0.04	0.05	0.04	0.00	0.19	–0.72	–0.66
nominal GDP	–0.59	–0.36	–0.22	–0.18	–0.16	–0.00	0.73	–0.76	–0.70
Demand (in constant prices)									
private consumption	–1.00	–0.17	0.05	0.09	0.09	0.00	0.22	–1.00	–1.00
public consumption	–0.07	–0.10	0.00	0.04	0.03	0.00	0.50	0.03	–0.04
gross capital formation	–0.32	–0.05	0.07	0.07	0.06	0.00	0.30	–0.81	–0.37
exports	0.00	0.02	0.07	0.04	–0.00	0.00	0.78	–0.13	0.05
imports	–1.71	–0.19	0.24	0.27	0.23	0.00	0.18	–2.08	–0.92
Prices									
GDP deflator (PGDP)	–0.09	–0.28	–0.26	–0.23	–0.20	–0.00	0.95	–0.03	–0.04
consumption price/PGDP	0.08	–0.03	–0.08	–0.08	–0.08	0.00	0.83	0.03	0.04
export price/PGDP	0.09	0.29	0.27	0.25	0.22	–0.00	0.95	0.06	0.14
import price/producer price	0.03	0.13	0.04	–0.01	–0.03	–0.00	0.51	0.00	0.02
Labour market									
total employment	–0.09	–0.01	0.03	0.04	0.03	0.00	0.37	–0.43	–0.06
private sector employment	–0.12	–0.02	0.04	0.05	0.03	0.00	0.29	–0.49	–0.06
take home real wage	–0.08	0.03	0.09	0.09	0.08	–0.00	0.81	–0.07	–0.11
producer real wage	–0.03	–0.01	0.00	0.01	0.00	0.00	0.30	–0.07	–0.07
Financial sector									
short–term interest rate *	–0.09	–0.23	–0.09	–0.00	0.04	–0.00	0.65	–0.28	–0.17
long–term interest rate *	–0.09	–0.21	–0.03	0.02	0.03	–0.00	0.52	–0.10	–0.08
nominal effective exchange rate	0.03	0.09	0.08	0.04	0.00	0.00	0.80	0.10	0.29
real effective exchange rate	0.03	0.08	0.06	0.01	–0.03	0.00	0.80	0.08	0.19
nominal money stock	–0.09	–0.79	–0.34	–0.19	–0.16	–0.00	0.69	0.55	0.50
Public sector									
nominal public revenues	–0.30	–0.28	–0.21	–0.18	–0.16	–0.00	0.90	–0.38	–0.24
real public revenues	–0.21	0.00	0.05	0.05	0.04	0.00	0.21	–0.34	–0.20
real labour income tax receipts	–0.02	–0.02	–0.01	–0.00	–0.01	0.00	0.89	–0.18	–0.05
real social sec. contributions	–0.02	–0.02	–0.01	–0.00	–0.01	0.00	0.89	–0.18	–0.05
real indirect tax receipts	–0.64	–0.07	0.07	0.08	0.06	0.00	0.16	–0.84	–0.68
real profit tax receipts	–0.73	–0.08	0.08	0.09	0.07	–0.00	0.16	–0.95	–0.73
nominal public expenditures	–0.07	–0.31	–0.36	–0.27	–0.23	–0.00	0.94	0.36	–0.02
real public expenditures	0.01	–0.03	–0.10	–0.04	–0.02	0.00	0.69	0.40	0.03
real transfers to households	0.18	–0.02	–0.12	–0.12	–0.11	0.00	0.64	1.05	0.33
real interest payments	0.09	–0.36	–1.09	0.17	0.30	0.00	0.22	0.03	0.04
direct labour income tax rate *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
deficit to GDP ratio *	0.10	–0.01	–0.07	–0.04	–0.03	0.00	0.35	0.25	0.09
debt to GDP ratio *	0.46	0.30	0.15	0.08	0.04	–0.00	0.94	0.70	0.51
Household sector									
total available means	–1.79	0.13	0.15	0.13	0.12	–0.00	–0.02	–1.86	–1.15
disposable income	–0.08	–0.03	0.09	0.09	0.09	0.00	0.86	–0.16	–0.04
savings as % of disp. Inc *	0.91	0.14	0.04	0.00	–0.00	0.00	0.18	0.81	0.88
Memo items									
current account to GDP *	0.25	0.05	0.01	0.00	0.00	–0.00	0.23	0.19	0.11
total stock of real assets	–0.01	–0.01	–0.01	–0.01	–0.00	0.00	0.98	–0.03	–0.01
effec. foreign output	–0.07	0.05	0.01	–0.00	–0.01	0.00	–0.42	–0.09	–0.02
effec. foreign price level	–0.00	–0.01	–0.01	–0.01	–0.02	–0.00	0.97	0.00	0.00
effect. foreign interest rate *	–0.03	–0.07	–0.03	–0.01	0.01	0.00	0.69	–0.07	–0.01

Variables without *: deviation from baseline, in percent. Variables with *: deviation from baseline, in differences. SS is steady state. SA is measure of persistence.

Table 2

A temporary demand shock
Automatic fiscal stabilisers tempered

	euro area							US	JP
	01	02	03	04	05	SS	SA	01	01
total private output	–0.86	–0.03	0.18	0.10	0.05	0.00	0.09	–1.27	–0.77
real GDP	–0.56	–0.04	0.10	0.06	0.03	0.00	0.12	–0.90	–0.69
nominal GDP	–0.66	–0.35	–0.16	–0.15	–0.15	–0.00	0.66	–0.95	–0.73
Demand (in constant prices)									
private consumption	–1.12	–0.10	0.17	0.11	0.07	–0.00	0.13	–1.26	–1.03
public consumption	–0.07	–0.11	0.01	0.06	0.03	0.00	0.43	0.12	–0.03
gross capital formation	–0.44	–0.00	0.16	0.09	0.06	0.00	0.18	–1.24	–0.47
exports	0.00	0.02	0.08	0.04	–0.01	0.00	0.73	–0.18	0.05
imports	–1.96	–0.05	0.49	0.32	0.20	0.00	0.10	–2.89	–0.99
Prices									
GDP deflator (PGDP)	–0.10	–0.31	–0.26	–0.21	–0.18	–0.00	0.94	–0.05	–0.04
consumption price/PGDP	0.09	–0.04	–0.10	–0.08	–0.07	0.00	0.78	0.05	0.04
export price/PGDP	0.10	0.32	0.27	0.22	0.20	–0.00	0.94	0.08	0.15
import price/producer price	0.03	0.14	0.04	–0.03	–0.04	–0.00	0.44	0.00	0.02
Labour market									
total employment	–0.10	–0.00	0.05	0.04	0.02	0.00	0.31	–0.63	–0.07
private sector employment	–0.13	–0.01	0.06	0.05	0.03	0.00	0.22	–0.71	–0.07
take home real wage	–0.24	0.08	0.22	0.14	0.09	–0.00	0.52	–0.42	–0.21
producer real wage	–0.02	–0.01	–0.00	0.00	–0.00	0.00	0.65	0.06	–0.05
Financial sector									
short–term interest rate *	–0.11	–0.25	–0.07	0.03	0.05	–0.00	0.58	–0.41	–0.18
long–term interest rate *	–0.10	–0.23	–0.01	0.04	0.04	–0.00	0.44	–0.15	–0.09
nominal effective exchange rate	0.03	0.10	0.08	0.03	–0.01	0.00	0.77	0.15	0.31
real effective exchange rate	0.03	0.09	0.06	–0.00	–0.04	0.00	0.76	0.12	0.20
nominal money stock	–0.26	–0.66	–0.19	–0.19	–0.20	–0.00	0.77	0.64	0.43
Public sector									
nominal public revenues	–0.08	–0.36	–0.38	–0.24	–0.19	–0.00	0.92	0.57	–0.02
real public revenues	0.02	–0.04	–0.12	–0.03	–0.01	0.00	0.55	0.62	0.03
real labour income tax receipts	1.36	–0.39	–1.10	–0.47	–0.23	0.00	0.25	4.66	1.09
real social sec. contributions	–0.02	–0.03	–0.01	–0.00	–0.01	0.00	0.91	–0.13	–0.03
real indirect tax receipts	–0.72	–0.02	0.15	0.09	0.04	0.00	0.09	–1.07	–0.72
real profit tax receipts	–0.82	–0.02	0.18	0.10	0.05	–0.00	0.08	–1.23	–0.77
nominal public expenditures	–0.08	–0.36	–0.38	–0.24	–0.19	–0.00	0.92	0.57	–0.01
real public expenditures	0.02	–0.04	–0.12	–0.03	–0.01	0.00	0.55	0.62	0.04
real transfers to households	0.21	–0.04	–0.16	–0.13	–0.09	0.00	0.54	1.53	0.35
real interest payments	0.10	–0.60	–1.27	0.46	0.57	0.00	0.24	0.05	0.04
direct labour income tax rate *	0.15	–0.04	–0.12	–0.05	–0.02	0.00	0.23	0.43	0.11
deficit to GDP ratio *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	–0.00	0.00
debt to GDP ratio *	0.39	0.21	0.10	0.09	0.09	0.01	0.70	0.57	0.44
Household sector									
total available means	–1.80	0.15	0.16	0.13	0.11	–0.00	–0.02	–1.88	–1.16
disposable income	–0.25	0.03	0.23	0.14	0.10	0.00	0.60	–0.65	–0.19
savings as % of disp. inc *	0.87	0.13	0.05	0.03	0.03	0.00	0.20	0.61	0.80
Memo items									
current account to GDP *	0.28	0.03	–0.02	–0.00	0.00	–0.00	0.13	0.27	0.12
total stock of real assets	–0.01	–0.01	–0.01	–0.00	–0.00	0.00	0.97	–0.05	–0.02
effec. foreign output	–0.07	0.06	0.01	–0.01	–0.01	0.00	–0.42	–0.12	–0.02
effec. foreign price level	–0.00	–0.01	–0.01	–0.01	–0.01	–0.00	0.97	0.00	0.00
effec. foreign interest rate *	–0.04	–0.08	–0.02	0.01	0.01	0.00	0.62	–0.11	–0.01

Variables without *: deviation from baseline, in percent. Variables with *: deviation from baseline, in differences. SS is steady state. SA is measure of persistence.

In the first year, the direct labour income tax rate increases in the euro area. This tax increase has a direct impact on real disposable income which falls by 0.25 percent in the first year, compared with 0.08 percent in the previous variant. As a result, private consumption drops by 1.12 percent, compared with 1 percent in the previous variant. Imports fall by 1.96 percent, while gross fixed capital formation falls by 0.44 percent. Once again, exports remain almost unchanged. As a net result, private output drops by 0.86 percent, compared with 0.76 percent in the previous variant. The spill-over effects to the other country blocks do not differ much from the one we found for the first variant.

Examining the results for a similar temporary demand shock in the other country blocks, we see that the responses are strongest in the U.S.. In Japan, the alternative fiscal regime does not seem to have a big impact on total output. This is primarily because private consumption remains almost unaffected. Here it should be remembered that a (temporary) direct labour income tax increase affects private consumption primarily via disposable income, and that the impact of disposable income on private consumption is determined by the extent to which the household sector is liquidity constrained. Apparently, the latter is rather low in Japan.[14]

In the second year, the shock reverses and people hold the same expectations regarding their future income as they did in the baseline. This implies that private consumption gets a boost, thereby increasing economic activity so that indirect tax revenues rise and outlays for unemployment benefits fall. In order to meet the target deficit to GDP ratio, the direct labour income tax rate will be reduced, thereby giving an additional stimulus to private consumption. The net effect is that in the second year private consumption is 0.10 percent below its baseline value, compared with 0.17 percent in the previous variant, while private output is 0.03 percent below its baseline, compared to 0.09 percent in the previous variant. This interaction between changes in the direct labour income tax rate and output will continue until the equilibrium is reached. All in all, comparing the evidence in column 7 of Table 1 with the evidence in column 7 of Table 2 suggests that adjustment in output is faster in the second variant than in the first variant. This is because in the second

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[14] See Table II.3 of MVB. Parameter 1-cp_sb2, which is 0.19 for Japan, and about 0.55 for the U.S. and the euro area. 1-cp_sb2 is the proportion of private consumption that is financed out of disposable income.

variant the direct labour income tax rate is used to speed up adjustment of the fiscal accounts.

Table 3 shows the degree of stabilisation by automatic stabilisers in the first year by comparing the results of Table 1 with the results of Table 2.[15] We find for the euro area that output fluctuations under a regime with the automatic fiscal stabilisers operating, are reduced by 11.5 percent if compared with the fluctuations under a sustainable alternative regime that tempers the working of the automatic stabilisers. The highest reduction is found in the U.S., where the fluctuations reduce by more than 20 percent. Clearly, not all components of total demand are affected in the same way. In all country blocks, the reduction is the strongest for gross fixed capital formation.

Table 3

Degree of stabilisation by automatic stabilisers
Impact effects of a temporary real shock

	euro area 01	US 01	JP 01
total private output	11.47	21.88	4.64
real GDP	10.78	19.48	4.20
Components of aggregate demand (in constant prices)			
private consumption	10.75	20.66	2.79
gross capital formation	25.83	34.51	22.46
exports	11.97	28.01	6.35
imports	12.62	27.73	6.97

5. A permanent monetary shock

In this section, we discuss the results for the case that the monetary authorities increase the nominal money stock by 1 percent.[16] In the first

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[15] Degree of stabilisation is defined as:
(deviation from baseline in Table 2 – deviation from baseline in Table 1)/deviation from baseline in Table 2.

[16] Technically speaking, in this scenario the short-term interest rate drops by the amount that is necessary to induce the household sector to hold an additional one percent of nominal money balances. Such an interest rate reaction function is obtained solving the short run money demand

(continues)

variant, the fiscal authorities let the automatic fiscal stabilisers operate. In the second variant, the fiscal authorities stabilise the public *debt* to GDP ratio in *every* period, and they adjust the direct labour income tax rate to reach this objective.[17]

5.1 Automatic fiscal stabilisers operating

The results for the variant with automatic stabilisation are shown in Table 4. The steady state results are shown in the sixth column, labelled ss. Here we see that in the long run the nominal variables increase by 1 percent, while the real variables remain unchanged. Let us now have a look at the adjustment path towards this new steady state.

Roughly speaking, the adjustment process in the euro area runs as follows. The monetary expansion reduces the short-term interest rate, which stimulates demand. When total demand exceeds the natural output level, inflation rises. Inflation erodes the real value of the nominal money balances, and the resulting excess demand for real money balances triggers an interest rate hike. However, an interest rate hike reduces also demand, so that the output gap starts to fall and the inflationary pressures reduce. This feedback between interest rates, money balances, demand for goods, and inflation continues until the economy is back in equilibrium.[18]

In the first year, the money stock increases by 1 percent, while the real money balances increase by 0.75 percent.[19] In order to induce the household sector to absorb this additional amount of real money balances the short-term interest rate has to fall by 0.5 percent point. This interest rate drop stimulates demand. Private consumption increases by 0.13 percent, while gross fixed capital formation and imports increase by 0.17 percent and 0.55 percent, respectively. At the same time the real exchange rate

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function, i.e., equation (II.8) of MVB, for the short-term interest rate, and evaluating this function for the target money supply. It should also be noted that this shock implies that in the steady state the general price level will increase by one percent, and that price expectations adjust accordingly. Here, we assume that the agents gradually learn about the monetary shock.

[17] If compared with the alternative scenario of the previous section, we changed the fiscal objective under the alternative scenario. Indeed, the nominal shock implies that nominal GDP will increase by 1 percent in the long run. If no fiscal deficit is allowed at any time, the nominal stock of public debt will remain unchanged. In that case, the target public debt to GDP ratio will not be reached in the long run.

[18] This process is also influenced by the changes in the exchange rate and the inflation expectations.

[19] The nominal money stock is deflated by the consumer price.

depreciates by 0.73 percent, stimulating exports by 0.49 percent. As a result, GDP in constant prices increases by 0.14 percent, while GDP in current prices increases by 0.36 percent. Private output increases by 0.21 percent.

The spill-over effects to the other country blocks are modest. As a result of the monetary expansion in the euro area, private output in the other country blocks increases, on average, by 0.03 percent, compared with 0.21 percent in the euro area. See the last rows of Table 4.

The last two columns of Table 4 show the impact responses to a similar permanent monetary shock in the U.S. and Japan. Real GDP in the U.S. and Japan increases by 0.13 and 0.05 percent, respectively, while nominal GDP increases by 0.24 percent and 0.43 percent, respectively.

Let us now have a look at the fiscal stance in the euro zone. The monetary expansion stimulates economic activity, so that public revenues measured in constant prices increase by 0.17 percent. At the same time public expenditures in constant prices remain more or less unchanged in the euro area. The net result is that the government runs a fiscal surplus equal to 0.06 percent of GDP, while the debt to GDP ratio drops by 0.28 percent. In the other areas, we see that the fiscal surplus as percent of GDP is somewhat higher, e.g., 0.11 percent in the U.S., this is partly due to the smaller rise in US nominal GDP.

For most variables of the euro area, the largest deviation (in absolute terms) from the baseline is reached in the first year. However, once the shock has occurred, the variables do not converge with the same speed to their equilibrium value. The prices and the stock variables have the highest persistence. Menu costs and incomplete information prevent immediate adjustment of the prices, while the household sector has to rebuild its stock of assets through its savings.

5.2 Automatic fiscal stabilisers tempered

In this variant, we investigate the adjustment process for the case that in addition to the monetary shock the fiscal authorities also stabilise the debt to GDP ratio in every period. Note that the 1 percent increase in nominal GDP implies that if one wants to stabilise (in the long run) the debt

Table 4

A permanent monetary shock
Automatic fiscal stabilisers operating

	euro area							US	JP
	01	02	03	04	05	SS	SA	01	01
total private output	0.21	0.16	0.09	0.05	0.02	–0.00	0.86	0.18	0.06
real GDP	0.14	0.12	0.05	0.02	0.01	–0.00	0.87	0.13	0.05
nominal GDP	0.36	0.58	0.74	0.86	0.94	1.00	1.00	0.24	0.43
Demand (in constant prices)									
private consumption	0.13	0.05	–0.05	–0.12	–0.16	–0.00	0.96	0.15	–0.02
public consumption	0.07	0.08	0.04	0.00	–0.01	–0.00	0.76	0.04	0.07
gross capital formation	0.17	0.12	0.08	0.07	0.06	–0.00	0.94	0.27	0.09
exports	0.49	0.58	0.64	0.68	0.68	0.00	0.96	0.14	0.41
imports	0.55	0.34	0.29	0.18	0.08	–0.00	0.84	0.43	0.13
Prices									
GDP deflator (PGDP)	0.22	0.47	0.69	0.84	0.93	1.00	1.00	0.10	0.38
consumption price/PGDP	0.03	0.11	0.16	0.20	0.23	0.00	0.98	–0.01	–0.04
export price/PGDP	–0.19	–0.39	–0.55	–0.62	–0.63	–0.00	0.98	0.03	0.31
import price/producer price	–0.10	–0.05	–0.18	–0.16	–0.11	–0.00	0.82	–0.06	–0.19
Labour market									
total employment	0.02	0.02	0.00	–0.01	–0.01	0.00	0.88	0.08	0.00
private sector employment	0.03	0.02	–0.00	–0.01	–0.01	0.00	0.80	0.09	0.01
take home real wage	–0.03	–0.10	–0.17	–0.21	–0.24	–0.00	0.98	0.01	0.03
producer real wage	0.01	0.02	0.02	0.02	0.02	–0.00	0.96	0.01	0.00
Financial sector									
short–term interest rate *	–0.49	–0.25	–0.22	–0.20	–0.19	0.00	0.84	–0.40	–0.49
long–term interest rate *	–0.01	0.16	0.18	0.15	0.11	0.00	0.97	0.12	0.27
nominal effective exchange rate	0.77	0.84	0.92	0.98	1.02	0.99	1.00	0.63	1.98
real effective exchange rate	0.73	0.75	0.75	0.73	0.68	0.00	0.92	0.50	1.29
nominal money stock	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99
Public sector									
nominal public revenues	0.39	0.61	0.77	0.89	0.97	1.00	1.00	0.39	0.54
real public revenues	0.17	0.15	0.08	0.05	0.04	0.00	0.82	0.29	0.16
real labour income tax receipts	0.02	0.06	0.04	0.05	0.06	0.00	0.97	0.03	–0.01
real social sec. contributions	0.02	0.06	0.04	0.05	0.06	0.00	0.97	0.03	–0.01
real indirect tax receipts	0.17	0.14	0.05	0.02	–0.00	–0.00	0.85	0.15	0.04
real profit tax receipts	0.20	0.16	0.06	0.02	0.00	–0.00	0.85	0.18	0.05
nominal public expenditures	0.25	0.56	0.85	1.05	1.19	1.00	1.00	0.05	0.37
real public expenditures	0.03	0.09	0.16	0.22	0.25	0.00	0.98	–0.05	–0.01
real transfers to households	0.01	0.10	0.16	0.21	0.24	0.00	0.98	–0.20	–0.06
real interest payments	–0.22	0.19	1.56	2.38	2.90	–0.00	0.98	–0.10	–0.38
direct labour income tax rate *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
deficit to GDP ratio *	–0.06	–0.03	0.04	0.08	0.10	–0.00	0.97	–0.11	–0.07
debt to GDP ratio *	–0.28	–0.44	–0.49	–0.49	–0.44	0.00	0.98	–0.25	–0.33
Household sector									
total available means	–0.07	–0.16	–0.23	–0.26	–0.27	0.00	0.98	0.00	–0.08
disposable income	0.14	0.09	0.07	0.08	0.09	–0.00	0.98	0.04	0.01
savings as % of disp. Inc *	0.00	0.04	0.12	0.19	0.25	–0.00	0.99	–0.10	0.07
Memo items									
current account to GDP *	–0.02	–0.02	–0.00	0.01	0.01	–0.00	0.99	–0.02	0.08
total stock of real assets	0.00	0.01	0.01	0.01	0.01	–0.00	0.99	0.01	0.00
effec. foreign output	0.03	–0.01	–0.01	–0.01	–0.00	0.00	0.43	–0.00	–0.00
effec. foreign price level	–0.01	–0.02	–0.02	–0.03	–0.03	0.00	1.00	–0.01	–0.00
effec. foreign interest rate *	–0.15	–0.09	–0.10	–0.10	–0.09	0.00	0.90	–0.08	–0.03

Variables without *: deviation from baseline, in percent. Variables with *: deviation from baseline, in differences. SS is steady state. SA is measure of persistence.

Table 5

A permanent monetary shock
Automatic fiscal stabilisers tempered

	euro area							US	JP
	01	02	03	04	05	SS	SA	01	01
total private output	0.55	–0.06	0.05	–0.16	–0.03	–0.00	–0.03	0.92	0.18
real GDP	0.34	–0.01	0.02	–0.11	–0.03	0.00	0.08	0.59	0.15
nominal GDP	0.60	0.55	0.79	0.76	0.87	1.00	1.00	0.73	0.51
Demand (in constant prices)									
private consumption	0.57	–0.21	–0.10	–0.39	–0.23	–0.00	0.39	0.83	0.08
public consumption	0.07	0.12	0.02	–0.02	–0.05	–0.00	0.55	–0.15	0.04
gross capital formation	0.58	–0.01	0.08	–0.15	–0.04	–0.00	0.09	1.33	0.48
exports	0.38	0.59	0.59	0.70	0.67	0.00	0.96	0.27	0.32
imports	1.42	–0.16	0.17	–0.35	–0.07	–0.00	–0.08	2.44	0.35
Prices									
GDP deflator (PGDP)	0.26	0.56	0.76	0.87	0.90	1.00	1.00	0.14	0.36
consumption price/PGDP	–0.01	0.15	0.20	0.25	0.25	0.00	0.96	–0.04	–0.02
export price/PGDP	–0.24	–0.50	–0.64	–0.67	–0.61	–0.00	0.97	–0.04	0.17
import price/producer price	–0.12	–0.12	–0.15	–0.15	–0.06	–0.00	0.85	–0.06	–0.18
Labour market									
total employment	0.07	–0.01	–0.02	–0.04	–0.02	–0.00	0.53	0.58	0.02
private sector employment	0.10	–0.02	–0.02	–0.06	–0.03	–0.00	0.16	0.65	0.02
take home real wage	0.61	–0.22	–0.06	–0.40	–0.24	–0.00	0.43	0.83	0.40
producer real wage	–0.04	0.02	0.00	0.03	0.02	–0.00	0.50	–0.28	–0.07
Financial sector									
short–term interest rate *	0.07	–0.53	–0.04	–0.34	–0.08	0.00	0.46	–0.02	–0.23
long–term interest rate *	0.17	–0.10	0.08	–0.11	–0.02	0.00	0.35	0.10	0.18
nominal effective exchange rate	0.57	0.84	0.86	1.01	1.00	0.99	1.00	0.49	1.54
real effective exchange rate	0.55	0.77	0.73	0.79	0.69	0.00	0.94	0.38	1.00
nominal money stock	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Public sector									
nominal public revenues	–0.52	0.78	0.58	1.11	0.92	1.00	1.00	–1.84	–0.38
real public revenues	–0.78	0.21	–0.18	0.23	0.01	0.00	–0.13	–1.98	–0.74
real labour income tax receipts	–5.82	0.81	–1.30	1.37	–0.03	0.00	–0.11	–12.29	–4.60
real social sec. contributions	–0.01	0.06	0.04	0.05	0.06	0.00	0.90	–0.07	–0.08
real indirect tax receipts	0.45	–0.05	0.02	–0.16	–0.04	–0.00	0.01	0.75	0.15
real profit tax receipts	0.52	–0.06	0.02	–0.18	–0.05	–0.00	0.10	0.88	0.17
nominal public expenditures	0.26	0.71	0.89	1.07	1.06	1.00	1.00	–0.51	0.33
real public expenditures	–0.00	0.15	0.12	0.20	0.16	0.00	0.93	–0.65	–0.04
real transfers to households	–0.09	0.17	0.22	0.30	0.27	0.00	0.91	–1.51	–0.14
real interest payments	–0.26	1.19	0.32	1.53	0.79	–0.00	0.82	–0.14	–0.36
direct labour income tax rate *	–0.60	0.08	–0.14	0.14	–0.01	0.00	–0.12	–1.01	–0.42
deficit to GDP ratio *	0.36	–0.03	0.14	–0.02	0.07	0.00	0.00	0.44	0.27
debt to GDP ratio *	–0.00	–0.00	–0.00	–0.00	–0.00	–0.00	0.99	–0.00	–0.04
Household sector									
total available means	–0.03	–0.20	–0.24	–0.28	–0.26	0.00	0.97	0.15	–0.05
disposable income	0.81	–0.08	0.11	–0.23	–0.06	–0.00	0.13	1.07	0.44
savings as % of disp. inc *	0.24	0.13	0.21	0.15	0.17	–0.00	0.88	0.29	0.37
Memo items									
current account to GDP *	–0.16	0.05	–0.01	0.08	0.02	–0.00	0.48	–0.21	0.03
total stock of real assets	0.02	0.02	0.02	0.01	0.01	–0.00	0.99	0.06	0.02
effec. foreign output	0.07	–0.05	0.01	–0.02	0.01	0.00	–0.39	0.09	0.00
effec. foreign price level	–0.00	–0.00	–0.01	–0.02	–0.02	–0.00	1.00	–0.00	–0.00
effec. foreign interest rate *	0.03	–0.17	–0.03	–0.13	–0.05	0.00	0.61	–0.01	–0.01

Variables without *: deviation from baseline, in percent. Variables with *: deviation from baseline, in differences. SS is steady state. SA is measure of persistence.

to GDP ratio, the economy has to run at some time a fiscal deficit.[20] The results of this variant are shown in Table 5.

In Table 5, we get for the first year the same qualitative results as in the previous variant. However, the order of magnitude of the responses is now much larger. In the euro area, real GDP increases by 0.34 percent, compared with 0.14 percent in the previous variant. Private consumption increases by 0.57 percent compared with 0.13 percent in the previous variant. Nominal GDP increases by 0.60 percent. As discussed in the previous section, a monetary expansion will temporarily induce a drop in the debt to GDP ratio if no further action is taken. Hence to stabilise the debt to GDP ratio at its predetermined level in every period, the fiscal authorities will reduce the direct labour income tax rates. However, this tax cut is not unambiguous. It will not only reduce direct tax revenues, but it will also stimulate domestic activity, thereby raising indirect tax revenues and reducing public expenditures on unemployment benefits. Taking these feedbacks into account, the tax rate has to drop by 0.6 percent points in the euro area. Similar qualitative results are found for the other country blocks. Nevertheless, for Japan the responses remain modest in absolute terms.[21]

In the second year, the prices continue to rise as the economy is producing above its long run equilibrium. Note also that because of different menu costs in price setting not all prices increase by the same amount. In the second year, the GDP deflator is 0.56 percent above the baseline, while the consumer price is 0.71 percent above the baseline. These price developments reduce the real value of the nominal assets and the real take home wage, thereby reducing private consumption and overall economic activity. As a consequence, the direct labour income tax rate has to be raised to counteract increased public expenditures and falling revenues. This tax increase triggers a drop in domestic activity, which in turn requires a higher tax rate to compensate for the additional loss of revenue and increased outlays on unemployment benefits. As a net result, overall spending and private output will drop below their equilibrium level. The following years, this feedback between prices, taxes, and demand will continue, causing oscillating behaviour until the new steady state is reached.

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[20] The alternative fiscal regime of the previous section keeps the fiscal deficit equal to zero in every period. As a result, the predetermined target debt to GDP ratio will not be reached.

[21] But not in relative terms as will be seen in Table 6.

Table 6 summarises the previous results showing the degree of stabilisation by automatic stabilisers for the different blocks.[22] Here, we see, for example, that output fluctuations in the euro area are reduced by 60 percent when the automatic stabilisers are working, compared with a situation in which the debt to GDP ratio is stabilised in every period.

Table 6

Degree of stabilisation by automatic stabilisers
Impact effects of a monetary shock

	euro area	US	JP
	01	01	01
total private output	60.22	79.35	63.58
real GDP	59.38	77.54	63.45
Components of aggregate demand			
private consumption	76.47	82.38	127.64
gross capital formation	69.76	79.75	80.87
exports	–29.24	48.79	–27.62
imports	61.36	82.73	64.01

Finally, we also simulated the adjustment path for a temporary demand shock for the case that one assumes that the fiscal authorities stabilise the debt to GDP ratio in every period.[23] These results are shown in Appendix B. In Table 7 we show the corresponding degree of stabilisation by automatic stabilisers.[24] Comparing the results of Table 6 with the results of Table 7, we note that stabilisation in the first year is more effective in the case of the nominal shock than in the case of the real demand shock. This is due to the fact that in the case of the money supply shock, the economy is deprived from one adjustment mechanism, i.e., the short-term interest rate, so that the automatic stabilisers carry a larger part of the adjustment burden.[25]

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[22] Degree of stabilisation is defined as (deviation from baseline in Table 5 – deviation from baseline in Table 4)/deviation from baseline in Table 5.

[23] Remember in section 3.1, the *deficit* to GDP ratio was stabilised in every period.

[24] I.e., the results of Table 1 compared with the results of Appendix B.

[25] Note that this would not be the case if we were dealing with a money *demand* shock.

Table 7

Degree of stabilisation by automatic stabilisers
Impact effects of a temporary real shock

	euro area	US	JP
	01	01	01
total private output	49.47	59.65	28.01
real GDP	47.84	56.24	26.02
Components of aggregate demand (in constant prices)			
private consumption	47.66	57.86	18.76
gross capital formation	72.47	73.60	69.92
exports	51.35	67.51	35.81
imports	52.04	66.71	37.42

Alternative fiscal regime stabilises the public debt to GDP ratio in every period.

6. A permanent supply shock

In this section, we assume that trend productivity drops by 1 percent in the euro area, and we simulate the model until it reaches a new steady state. We start with a discussion of the variant in which the authorities take discretionary actions to stabilise the debt to GDP ratio in *every* period. The results of this variant are shown in Table 8. A closer investigation of the steady state is of particular interest since it illustrates that in the long run the target debt to GDP ratio can only be maintained if the direct labour income tax rate is increased.

6.1 Automatic fiscal stabilisers tempered

The steady state results can be found in the sixth column of Table 8. If trend productivity in the euro area decreases by 1 percent, then total supply and real GDP of the euro area also decrease by 1 percent[26]. Let us now investigate how this decreased supply is absorbed in the long run.

[26] Since a similar shock does not occur in the other blocks, the steady state output in the other blocks remains unchanged.

First, when labour productivity decreases permanently by 1 percent, the (future) real wage must also decrease by 1 percent, and the household sector will feel poorer. This wealth effect will lower private consumption and demand for residential buildings by 1 percent. Next, a permanent decrease in total supply requires a proportional permanent decrease in the capital stock of the enterprise sector. This will lower gross fixed capital formation by 1 percent. Third, while the domestic components of demand decrease, the export volume does not decrease because, in the steady state, total domestic demand and supply in the other blocks remain unchanged, so that they need the same volume of intermediary imports. Finally, taking the previous effects into account, the remaining excess demand is eliminated by a 0.27 percent increase in the relative price of private consumption.[27] As a consequence, private consumption decreases by 1.27 percent, and long run equilibrium between demand and supply is restored.

Looking at the public sector, we see that in the steady state the target public debt to GDP ratio is reached, while the direct labour income tax rate is increased by 0.05 percentage points. This increase is caused by the fact that the fall in public expenditures is smaller than the fall in public revenues – at least, if the direct income tax rate does not change. Public expenditures tend to fall by less because the nominal transfers to the household sector are linked to the consumer price (see equation (A.7) of Appendix A), while most of the tax bases move in line with the GDP deflator (or an other price which follows the GDP deflator), and the GDP deflator decreases by 0.27 percent more than the consumer price.

The short run responses are shown in the first 5 columns of Table 8. Here we see a strong fall in economic activity in the first year. Real GDP falls by 1.18 percent, while nominal GDP falls by 1.25 percent. This short run overshooting of GDP is to a large extent caused by the increase in the direct labour income tax rate. This tax increase is necessary to counteract the deteriorating debt to GDP ratio, following the drop in nominal GDP. Comparing the components of demand, we see that the drop in private consumption and imports is strongest, i.e., 1.55 percent and 2.10 percent, respectively.

The evidence in Table 8 shows that a similar supply shock in the U.S. reduces private output by 1.58 percent in the first year, and in Japan

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[27] The price of private consumption adjusts to clear the goods market. See equation (III.24) of MVB.

Table 8

A permanent supply shock
Automatic stabilisers tempered

	euro area						US	JP
	01	02	03	04	05	SS	01	01
total private output	–1.40	0.25	–1.01	–0.87	–0.76	–1.00	–1.58	–0.72
real GDP	–1.18	–0.22	–0.93	–0.88	–0.81	–1.00	–1.19	–0.75
nominal GDP	–1.25	–0.28	–0.66	–0.67	–0.54	–1.02	–1.23	–0.81
Demand (in constant prices)								
private consumption	–1.55	0.40	–1.07	–0.91	–0.81	–1.27	–1.48	–0.61
public consumption	–0.53	–0.89	–0.70	–0.88	–0.90	–1.00	0.00	–0.25
gross capital formation	–1.52	0.18	–1.03	–0.86	–0.76	–1.04	–2.23	–1.53
exports	–0.50	–0.28	–0.39	–0.54	–0.44	–0.00	–0.16	–0.31
imports	–2.10	2.13	–1.10	–0.72	–0.45	–1.00	–3.20	–0.35
Prices								
GDP deflator (PGDP)	–0.07	–0.05	0.26	0.21	0.27	–0.02	–0.05	–0.06
consumption price/PGDP	0.07	–0.12	0.08	0.12	0.11	0.28	0.05	0.06
export price/PGDP	0.05	–0.01	–0.36	–0.37	–0.48	–1.00	0.12	–0.44
import price/producer price	0.03	–0.07	–0.08	–0.05	–0.03	0.00	0.00	0.04
Labour market								
total employment	–0.04	0.20	0.04	0.01	0.02	0.00	–0.64	–0.01
private sector employment	–0.06	0.24	0.05	0.01	0.02	0.00	–0.73	–0.01
take home real wage	–2.23	0.24	–1.25	–1.09	–0.94	–1.33	–1.88	–1.55
producer real wage	–0.76	–0.96	–0.86	–0.90	–0.92	–1.00	–0.21	–0.58
Financial sector								
short–term interest rate *	–0.06	0.05	0.33	0.13	0.11	–0.00	–0.42	–0.08
long–term interest rate *	–0.07	0.03	0.32	0.04	0.08	–0.00	–0.14	–0.07
nominal effective exchange rate	–0.75	–0.33	–0.63	–0.71	–0.65	–1.02	0.35	–1.44
real effective exchange rate	–0.73	–0.28	–0.52	–0.54	–0.41	–0.00	0.28	–0.94
nominal money stock	–2.04	1.07	–1.21	–0.70	–0.55	–1.03	–0.29	–1.04
Public sector								
nominal public revenues	1.22	–2.44	–0.18	–0.63	–0.81	–0.89	2.62	1.02
real public revenues	1.30	–2.39	–0.44	–0.84	–1.08	–0.87	2.66	1.08
real labour income tax receipts	10.69	–11.18	1.81	–0.43	–1.85	–0.45	15.38	7.70
real social sec. Contributions	–0.53	–0.96	–0.82	–0.88	–0.90	–0.92	–0.35	–0.47
real indirect tax receipts	–1.29	0.05	–0.96	–0.87	–0.77	–1.00	–1.36	–0.71
real profit tax receipts	–1.38	0.17	–1.00	–0.89	–0.77	–1.00	–1.54	–0.72
nominal public expenditures	–0.40	–1.16	–0.68	–0.63	–0.65	–0.89	0.46	–0.33
real public expenditures	–0.32	–1.10	–0.95	–0.85	–0.92	–0.87	0.51	–0.27
real transfers to households	0.12	–1.34	–0.94	–0.88	–0.90	–0.72	1.54	0.11
real interest payments	0.07	–1.62	–0.48	0.92	–0.49	–1.00	0.05	0.06
direct labour income tax rate *	1.27	–1.04	0.28	0.05	–0.10	0.05	1.50	0.81
deficit to GDP ratio *	–0.76	0.58	–0.23	–0.00	0.07	–0.00	–0.74	–0.52
debt to GDP ratio *	–0.00	–0.00	–0.00	–0.00	–0.00	0.00	0.00	–0.03
Household sector								
total available means	–0.41	–0.43	–0.75	–0.77	–0.80	–1.26	–0.52	–0.41
disposable income	–2.07	0.33	–1.32	–1.06	–0.93	–1.27	–2.04	–1.41
savings as % of disp. inc *	–0.51	–0.07	–0.25	–0.15	–0.12	0.00	–0.61	–0.82
Memo items								
current account to GDP *	0.23	–0.33	0.06	–0.02	–0.06	–0.00	0.31	–0.04
total stock of real assets	–0.04	–0.04	–0.06	–0.09	–0.10	–1.11	–0.10	–0.06
effec. foreign output	–0.10	0.15	–0.12	0.02	0.01	–0.00	–0.13	–0.01
effec. foreign price level	0.00	–0.00	0.01	0.02	0.02	0.01	0.00	0.00
effec. foreign interest rate *	–0.04	0.02	0.09	0.05	0.06	0.00	–0.11	–0.01

Variables without *: deviation from baseline, in percent. Variables with *: deviation from baseline, in differences. SS is steady state.

by 0.72 percent. In all country blocks the changes in prices are modest, since in the steady state the absolute price level does not change. It is only the relative price of private consumption that changes.

6.2 Summary of section six

From the results in this section, we learn that, after a drop in trend productivity, the relative price of private consumption has to rise to eliminate the excess demand in the long run. We also learn that nominal public expenditures tend to fall by less than nominal public revenues because expenditures and revenues are linked to different price indices. As a consequence, an increase in the direct income tax rate is necessary to reach the target debt to GDP ratio in the long run. However, this will not happen if one only lets the automatic stabilisers operate. In that case, the fall in public expenditures is smaller than the fall in public revenues, putting the economy on an unsustainable path of public debt accumulation.

It should be pointed out that the results presented in this section are partly due to the detailed modelling of the prices, and the links between the prices and public sector expenditures and receipts. In the NIME model, the transfers to households are linked to the evolution of the consumer price index, while the other public expenditure items – together with revenues – move in line with the GDP deflator. However, other models could have more expenditure items linked to the consumer price index, or they could have all public expenditure and revenue items linked to the same price index. In the latter case, one could get as a result that there is no need to adjust the direct income tax rate, and that automatic fiscal stabilisers are sustainable in the face of a supply shock.

It should also be noted that in the current version of the NIME model, the natural rate of unemployment is exogenous. To the extent that the natural rate of unemployment is a function of the direct labour income tax rate, the tax increase will increase the natural unemployment rate, inducing an additional drop in total output in the steady state.

For the sake of completeness, we also show in Appendix C the impact responses for the variant in which the automatic stabilisers are working and no further discretionary measures are taken. Initially, the responses are much smaller than the responses reported in Table 8. However, this policy is unsustainable, and sooner or later some discretionary measure is needed to correct the imbalances.

7. Conclusion

In this paper, we used the NIME model to examine the effects of automatic fiscal stabilisers on the fluctuations of output in the euro area. In the NIME model, the automatic fiscal stabilisers are determined on the expenditure side by the unemployment benefits and the interest payments, and on the revenue side by direct labour income taxes, profit taxes, social security contributions, and indirect taxes.

First, we investigated the effects of two shocks which do not have permanent real effects, i.e., a temporary decline in private consumption and a permanent increase in the money supply. The simulations showed that the impact effects on output are smallest if one let the fiscal stabilisers operate. However, the evidence also suggested that the automatic stabilisers may delay full adjustment, if compared with an alternative regime under which the direct income tax rate is manipulated to keep fiscal balance, especially if it concerns a temporary shock.

Next, we studied the case of a permanent decline in productivity. We noted that such a shock induces in the long run a change in the relative prices, and that a change in the direct labour income tax rate – or another discretionary measure – is necessary to reach, in the long run, the target debt to GDP ratio. Therefore, we concluded that automatic stabilisers are not sustainable in the face of real shocks, and additional discretionary measures are required.

Finally, we would like to point out that our analysis has some limitations. First, we treated the euro area as having one single fiscal authority. Although with EMU and the Stability and Growth Pact the prospects for closer coordination and cooperation of fiscal policies in the euro area may have improved, it may still be worthwhile to investigate the empirical implications of the heterogeneity of the area with a more disaggregated model. Second, we did not take into account the effects of tax increases on trend productivity or on the natural rate of unemployment, nor did we consider the existence of perception and implementation lags in the design of discretionary tax policies. Last, but not least, we assumed a well-disciplined government that allows the automatic stabilisers to operate in a downturn and uses the gains in the upturn to reduce the debt.

APPENDIX A

THE FISCAL SECTOR OF THE NIME MODEL

The NIME model is described in Meyermans and Van Brusselen (2000a, 2000b, and 2001). These papers are available on the world wide web at www.plan.be, click Language, click Working Papers.

The NIME model distinguishes 6 country blocks. In each of these country blocks, there are 4 sectors: the household sector, the enterprise sector, the monetary sector, and the public sector. Since this paper deals with automatic fiscal stabilisation, we will summarise here the main features of the public sector. Details of the other sectors can be found in Meyermans and Van Brusselen (2000a, 2000b, and 2001).

On the revenue side of the public sector we note the following equations.

First, direct taxes on labour income are levied according to:

$$DTH_t = DTHR_t \, (WBU_t + TRANSH_t) \qquad (A.1)$$

with DTH the direct tax revenues from labour income, DTHR the direct income tax rate, WBU the total wage bill, in current prices, and TRANSH the public sector transfers to the household sector, in current prices. The default version of the NIME model sets the direct labour income tax rate in such a way that the fiscal targets are reached in the long run.

Second, social security contributions are levied according to:

$$SSRH_t = SSRHR_t \, (WBU_t + TRANSH_t) \qquad (A.2)$$

with SSRH the social security contributions, and SSRHR the social security contributions rate. The social security contribution rate is determined outside the model.

Third, direct taxes on capital income, DTCP, accrue according to:

$$d \ln(DTCP_t) = d \ln(GDPU_t) \qquad (A.3)$$

with DTCP the direct tax revenues from income on capital, in current prices, and GDPU the gross domestic product, in current prices.

Fourth, net indirect taxes are defined as indirect taxes minus subsidies to the enterprise sector. Net indirect taxes are generated by the following equation:

$$NITP_t = NITPR_t\ (ASU_t - NITP_t) \qquad (A.4)$$

with NITP the net indirect tax revenues in current prices, NITPR the net indirect tax rate, and ASU total supply for final demand, in current prices. The net indirect tax rate is determined outside the model.

Fifth, the net other tax revenues, OT, accrues according to:

$$OT_t = OT_{t-1}\ (1+G\_YNP_t)\ (1+G\_NPO_t)\ (1+G\_PCH_t) \qquad (A.5)$$

with OT net other tax revenues, in current prices, G_YNP the steady state growth of productivity, G_NPO the steady state growth of population, and G_PCH the steady state growth of the general price level.

On the expenditure side we note the following equations.

First, interest payments on the public debt is equal to:

$$CGINT_t = GBOND_{t-1}\ LIG_{t-1} \qquad (A.6)$$

with GBOND the stock of public debt, in current prices, and LIG the interest rate of public debt.

Second, the public transfers to the household sector grow in line with the increase in the number of unemployed and unemployment benefits[28]:

d ln(TRANSH/PCH) =

= trh_s4 d ln(UR LS)+d trend productivity+d demographic variables

(A.7)

with TRANSH the public sector transfers to the household sector, in current prices, PCH the price of private consumption, UR the unemployment rate, LS the total labour supply, and with trh_s4 taking the values 0.15, 0.12, 0.18, and 0.15 for the euro area, non-euro EU countries,

[28] Changes in real unemployment benefits are linked to changes in trend productivity. The other determinants of the growth of transfers to the household sector are the growth of the population (pensioners, children) and (one period lagged) trend productivity growth. For the present analysis these determinants are not relevant. For more details see Meyermans and Van Brusselen (2001).

the U.S., and Japan, respectively. It is important to note that we deflate the transfers to the household by the consumer price index, and not by the GDP deflator. This will be of particular interest when we discuss a permanent supply shock in section 3.3.

APPENDIX B

A temporary demand shock. Automatic fiscal stabilisers prevented through stabilisation of debt to GDP ratio

	euro area							US	JP
	01	02	03	04	05	SS	SA	01	01
total private output	–1.52	1.03	–0.14	–0.03	0.16	0.00	–0.49	–2.52	–1.04
real GDP	–0.96	0.58	–0.07	–0.03	0.08	–0.00	–0.46	–1.65	–0.90
nominal GDP	–1.13	0.14	–0.20	–0.24	–0.10	–0.00	0.07	–1.77	–0.94
Demand (in constant prices)									
private consumption	–1.92	1.15	–0.19	–0.04	0.19	–0.00	–0.46	–2.39	–1.24
public consumption	–0.06	–0.19	0.15	0.02	–0.00	0.00	–0.20	0.47	0.03
gross capital formation	–1.18	1.05	–0.14	–0.02	0.17	0.00	–0.53	–3.10	–1.23
exports	0.00	0.04	0.12	–0.03	–0.02	0.00	0.38	–0.41	0.07
imports	–3.61	2.55	–0.25	–0.02	0.45	0.00	–0.49	–6.38	–1.48
Prices									
GDP deflator (PGDP)	–0.16	–0.44	–0.13	–0.22	–0.19	–0.00	0.82	–0.11	–0.05
consumption price/PGDP	0.16	–0.18	–0.08	–0.05	–0.09	0.00	0.31	0.11	0.05
export price/PGDP	0.17	0.45	0.14	0.23	0.20	–0.00	0.82	0.18	0.20
import price/producer price	0.05	0.22	–0.10	–0.02	–0.01	–0.00	–0.12	0.00	0.02
Labour market									
total employment	–0.20	0.14	0.03	0.01	0.03	0.00	–0.08	–1.50	–0.10
private sector employment	–0.26	0.18	0.04	0.01	0.04	0.00	–0.37	–1.66	–0.11
take home real wage	–1.30	1.42	–0.11	–0.02	0.25	–0.00	–0.50	–1.92	–0.91
producer real wage	0.06	–0.11	0.03	0.01	–0.02	0.00	–0.55	0.60	0.08
Financial sector									
short–term interest rate *	–0.19	–0.31	0.13	0.01	0.03	–0.00	0.18	–0.93	–0.26
long–term interest rate *	–0.18	–0.29	0.23	–0.04	0.03	–0.00	–0.10	–0.33	–0.11
nominal effective exchange rate	0.06	0.14	0.02	0.01	–0.01	0.00	0.57	0.33	0.45
real effective exchange rate	0.06	0.12	–0.00	–0.02	–0.04	0.00	0.58	0.26	0.29
nominal money stock	–1.36	1.25	–0.95	–0.35	–0.04	–0.00	–0.43	1.03	–0.09
Public sector									
nominal public revenues	1.35	–2.30	0.21	–0.08	–0.42	–0.00	–0.42	4.48	1.60
real public revenues	1.51	–1.86	0.34	0.13	–0.24	0.00	–0.58	4.59	1.64
real labour income tax receipts	10.05	–12.64	1.92	0.64	–1.65	–0.00	–0.56	22.83	8.77
real social sec. contributions	0.03	–0.10	0.02	–0.00	–0.03	0.00	–0.12	0.04	0.09
real indirect tax receipts	–1.27	0.85	–0.11	–0.03	0.13	0.00	–0.49	–2.06	–0.95
real profit tax receipts	–1.46	0.99	–0.12	–0.03	0.15	0.00	–0.49	–2.41	–1.03
nominal public expenditures	–0.10	–0.63	–0.23	–0.14	–0.24	–0.00	0.71	1.43	0.05
real public expenditures	0.06	–0.19	–0.10	0.08	–0.05	0.00	–0.02	1.55	0.10
real transfers to households	0.38	–0.35	–0.11	–0.05	–0.12	–0.00	–0.12	3.44	0.53
real interest payments	0.16	–2.27	–0.81	2.12	–0.34	0.00	–0.09	0.11	0.05
direct labour income tax rate *	1.12	–1.26	0.20	0.07	–0.17	–0.00	–0.56	2.26	0.86
deficit to GDP ratio *	–0.68	0.76	–0.21	–0.03	0.09	0.00	0.00	–1.07	–0.60
debt to GDP ratio *	–0.00	–0.00	–0.00	–0.00	–0.00	–0.00	1.00	0.00	–0.03
Household sector									
total available means	–1.85	0.28	0.08	0.10	0.12	–0.00	–0.10	–1.99	–1.21
disposable income	–1.35	1.47	–0.18	0.01	0.27	0.00	–0.51	–2.52	–0.92
savings as % of disp. inc *	0.56	0.32	0.01	0.04	0.08	0.00	0.49	–0.24	0.26
Memo items									
current account to GDP *	0.52	–0.32	0.08	0.03	–0.03	–0.00	–0.50	0.59	0.17
total stock of real assets	–0.03	–0.00	–0.01	–0.01	–0.00	0.00	0.81	–0.13	–0.05
effec. foreign output	–0.14	0.22	–0.12	0.01	0.01	0.00	–0.71	–0.27	–0.02
effec. foreign price level	–0.00	–0.01	–0.01	–0.01	–0.02	–0.00	0.96	0.00	0.00
effec. foreign interest rate *	–0.07	–0.09	0.04	–0.01	0.01	0.00	0.24	–0.26	–0.02

APPENDIX C

A permanent supply shock. Automatic stabilisers operating. Impact responses

	Euro area 01	US 01	JP 01
total private output	–0.43	–0.45	–0.35
real GDP	–0.59	–0.48	–0.46
nominal GDP	–0.58	–0.47	–0.48
Demand (in constant prices)			
private consumption	–0.47	–0.44	–0.34
public consumption	–0.53	–0.29	–0.31
gross capital formation	–0.49	–0.54	–0.63
exports	–0.14	0.03	–0.10
import	0.28	–0.11	0.32
Prices			
GDP deflator (PGDP)	0.01	0.01	–0.01
consumption price/PGDP	–0.01	–0.01	0.01
export price/PGDP	–0.01	0.01	–0.16
import price/producer price	0.01	0.00	0.02
Labour market			
total employment	0.10	0.13	0.04
private sector employment	0.11	0.11	0.03
take home real wage	–0.87	–0.65	–0.76
producer real wage	–0.86	–0.65	–0.73
Financial sector			
short–term interest rate *	–0.14	–0.02	–0.22
long–term interest rate *	–0.25	–0.22	–0.32
nominal effective exchange rate	–0.22	0.10	–0.50
real effective exchange rate	–0.21	0.08	–0.33
nominal money stock	–0.08	0.26	0.90
Public sector			
nominal public revenue	–0.60	–0.60	–0.66
real public revenue	–0.61	–0.61	–0.64
real labour income tax receipts	–0.59	–0.50	–0.61
real social sec. contributions	–0.59	–0.50	–0.61
real indirect tax receipts	–0.48	–0.45	–0.39
real profit tax receipts	–0.45	–0.46	–0.37
nominal public expenditures	–0.37	–0.35	–0.38
real public expenditures	–0.37	–0.36	–0.37
real transfers to households	–0.12	–0.32	–0.16
real interest payments	–0.01	–0.01	0.01
direct labour income tax rate *	0.00	0.00	0.00
deficit to GDP ratio *	0.11	0.08	0.11
debt to GDP ratio *	0.46	0.37	0.39
Household sector			
total available means	–0.34	–0.43	–0.35
disposable income	–0.63	–0.47	–0.60
savings as % of disp. inc *	–0.16	–0.02	–0.26
Memo items			
current account to GDP *	–0.06	0.02	–0.06
total stock of real assets	–0.01	–0.02	–0.02
effec. foreign output	0.00	0.00	0.00
effec. foreign price level	–0.00	0.00	–0.00
effec. foreign interest rate *	–0.05	–0.05	–0.01

Variables without *: deviation from baseline, in percent. Variables with *: deviation from baseline, in differences. No steady state.

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

Anne Brunila[*]*, Marco Buti*[**] *and Jan in't Veld* [***]

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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The opinions expressed in the present paper are the authors' only and should not be attributed to the European Commission or the Bank of Finland.

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:

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

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

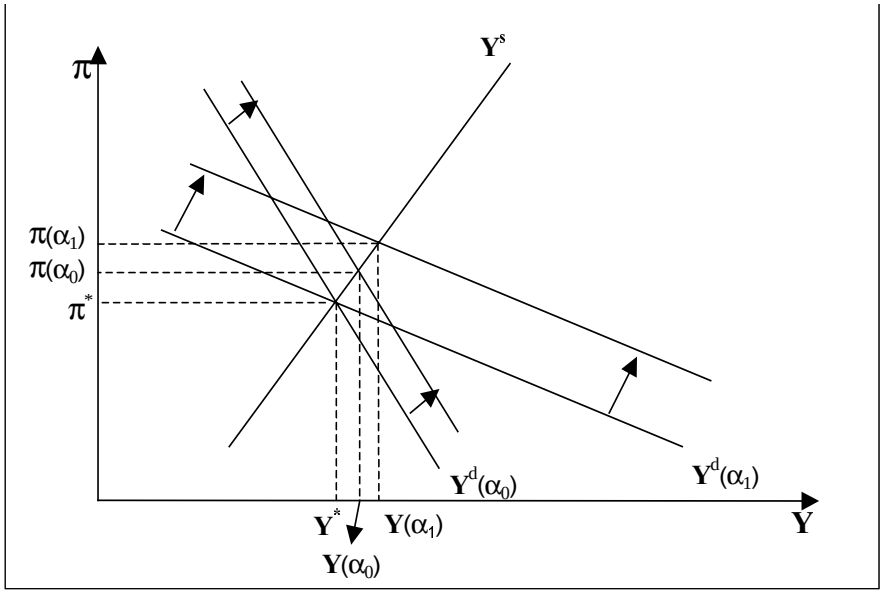
where $\mu = \omega(1 + \alpha\phi_1 + \phi_3) + \phi_2(\lambda + \beta\omega) + \phi_4$

[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.

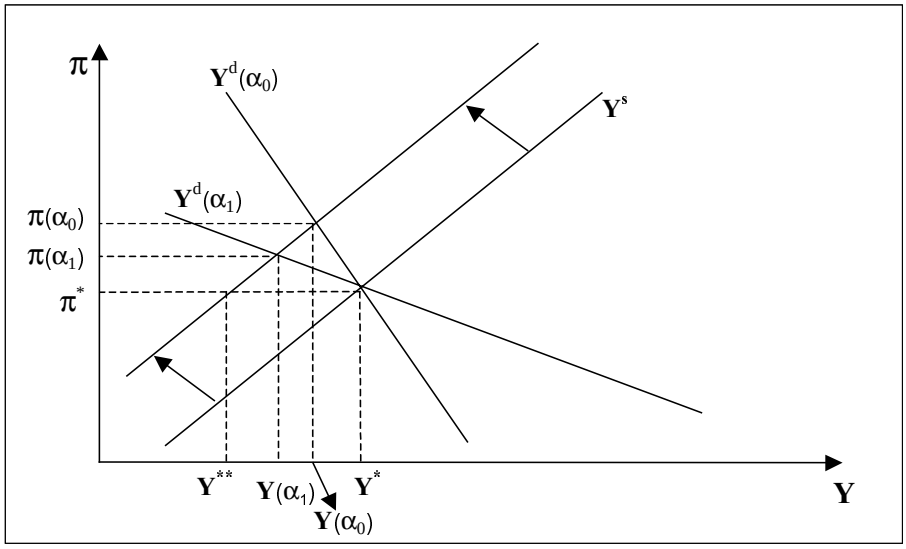
If the supply shock is *permanent* (that is potential output changes by the size of the shock ε_s), the expression of the "new" output gap can be derived from (5) and is the following:

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

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

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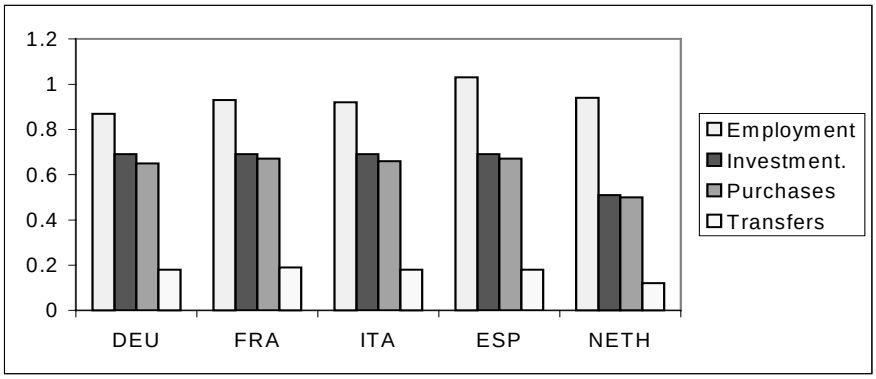
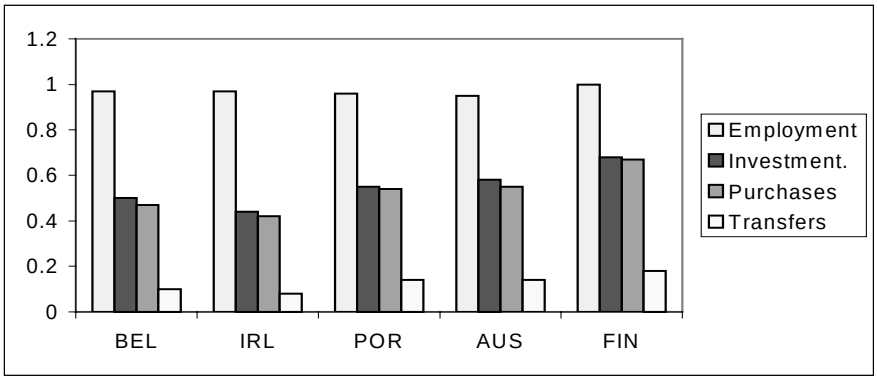
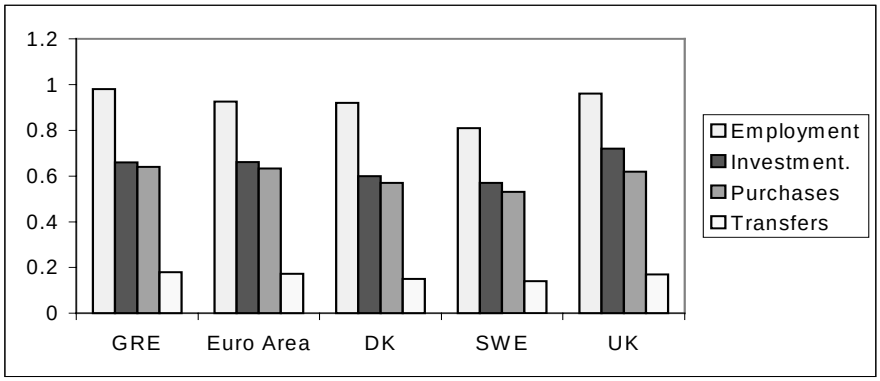
[21] In fact, it is assumed that the fiscal expansion is followed in the medium term by a fiscal contraction, such that there is no autonomous increase in government indebtedness (and no increase in future tax liabilities).

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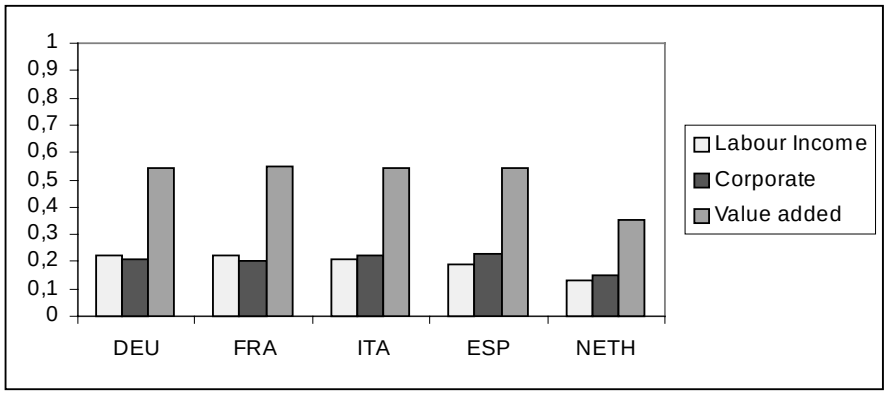
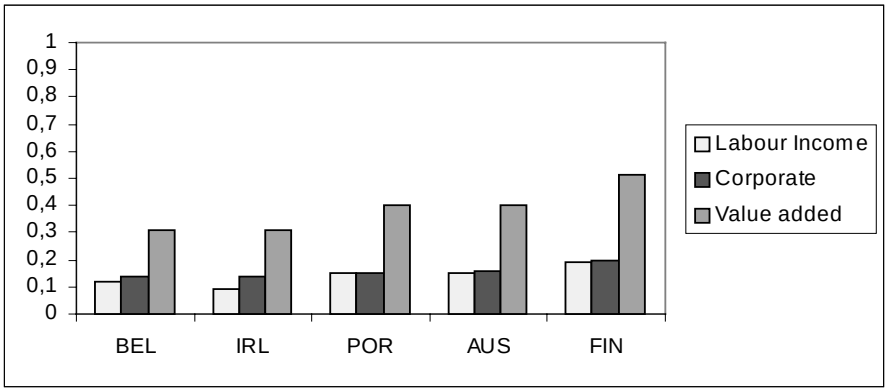
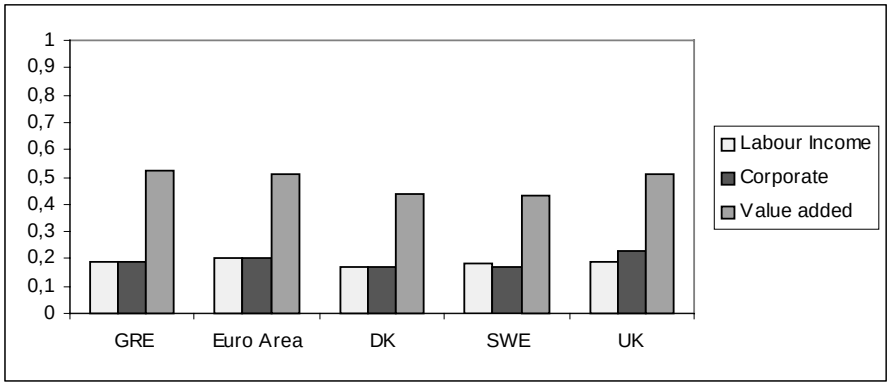
[24] In the model these differences are reflected in the indexation of unemployment benefits to gross/net wages.

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

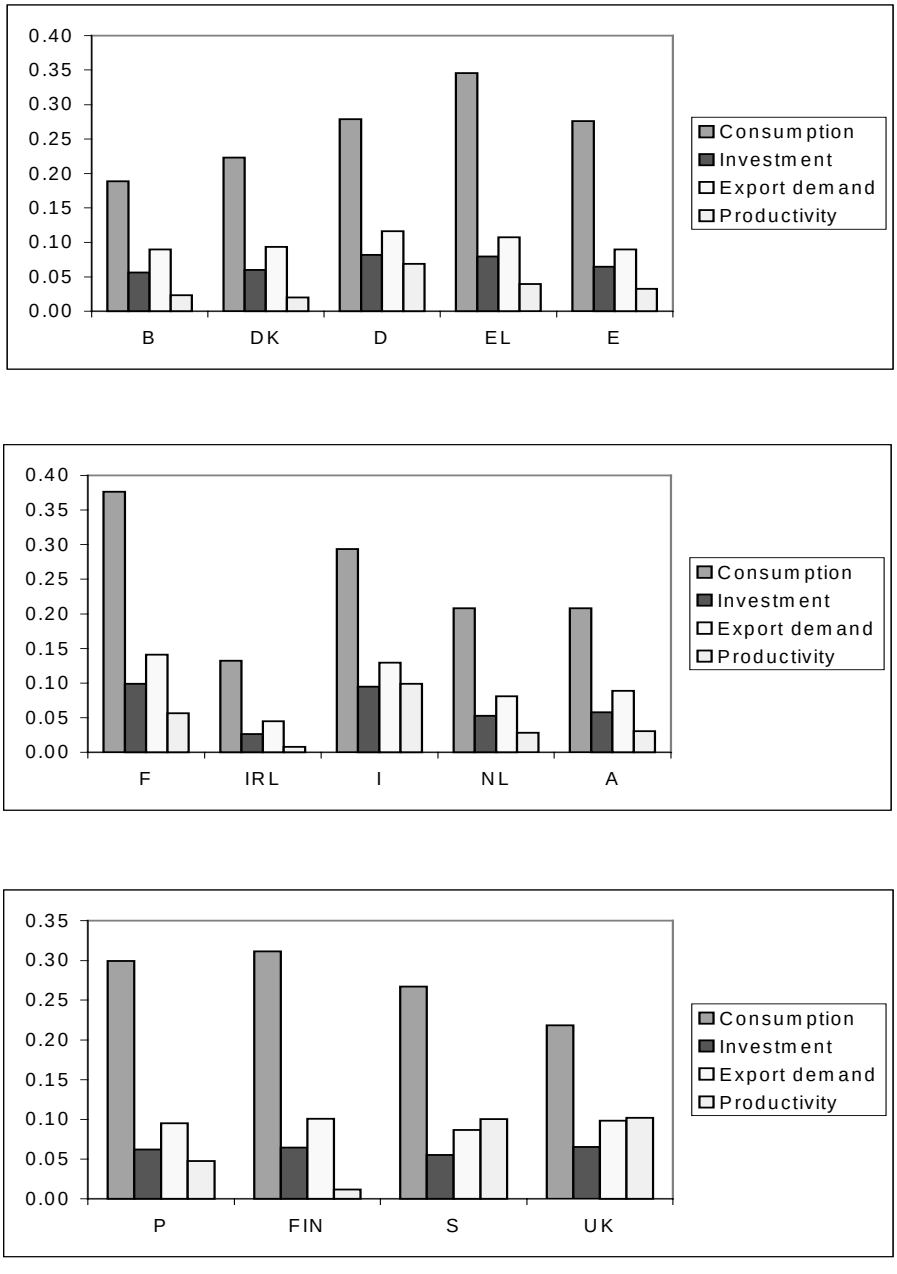
reflect differences in the sensitivity of the budget to this shock but the variation is small. The same holds for an *export demand shock*. The highest stabilisation is derived in France (10 and 14 per cent respectively), and the lowest is in Ireland (3 and 5 per cent). The more open economies have a 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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COMMENTS ON SESSION II: FISCAL STABILISATION

John Janssen[*]

Together the papers in this session provide a useful base for thinking about fiscal stabilisation. I would like to thank the authors for providing useful insights and some stimulating ideas. To place structure around my comments I have sorted the six papers into three broad groups:

1. Empirical analysis of the effects of fiscal policy. Comley, Anthony and Ferguson investigate the effects of fiscal policy on private saving and interest rates in Australia. Steindel looks at US fiscal policy and consumer spending. In a cross-country exercise, Hemming, Mahfouz and Schimmelpfennig look at the link between fiscal policy and activity during recessions.
2. Sitting somewhat on its own, but nonetheless providing useful context for the third grouping is the paper by Eckefeldt and Fischer on government preferences for the provision of stabilisation in the EMU.
3. Macroeconomic modelling approaches to stabilisation in the EU. Meyermans uses simulations with the NIME model to examine automatic stabilisers in the euro area. Barrell, Pina and Hurst consider fiscal target, automatic stabilisers and their effect on output under the stability and growth pact.

The coverage of the papers encompasses individual countries (Australia and the US), a currency union (the EU) and a wider cross-country sample of advanced economies. There is also a mix of techniques, from the event study approach applied to the US, macroeconomic models in the case of the EU, time series error correction models for Australia and cross-country regression analysis for the advanced economies.

Comley, Anthony and Ferguson view the offset to private sector saving as a key variable in considering both the effectiveness of short-term fiscal stabilisation as well as long-term structural budget changes. In the

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The views expressed are those of the author and do not necessarily reflect the views of the New Zealand Treasury.

New Zealand context there has been a reasonable degree of casual empiricism surrounding the possible link between sustained government fiscal surpluses (since 1994) and household saving rates (which have declined). What is clear from the New Zealand case, and a focus of the Australian paper, is that a number of other factors can be playing a part (e.g., financial liberalisation). In terms of long-term budget changes, the reaction of private saving is an important consideration in the assessment of New Zealand's approach to partially pre-funding future public pension costs. (Issues surrounding the desirability of "conserving and investing" fiscal surpluses are usefully summarised in the Session IV paper by Jagadeesh Gokhale).

The paper by Steindel takes us back to one of the key thoughts in Blanchard's often quoted piece on fiscal indicators (Blanchard, 1993, p. 317) – that to consider fiscal impact requires the use of theory and the relevant theory is the theory of consumption. Early on the paper contains a reference to President Johnson's proposal to grant the executive limited authority to change tax rates for stabilisation purposes. I will briefly return to this thought in the context of institutional arrangements. I found the detailed descriptive event study approach in the Steindel paper refreshing and a useful complement to some of the techniques covered in Session I. Steindel's analysis presents some interesting puzzles and consistently highlights the importance of distinguishing between temporary and permanent policy changes.

Hemming, Mahfouz and Schimmelpfennig also employ episode analysis, although this time in the context of fiscal policy and recessions across a sample of advanced economies. They conclude that the results from their descriptive and regression analysis are not particularly informative in terms of establishing a clear understanding about the role of fiscal policy during recessions. Nonetheless, the four points they raise in the conclusion seem like the right questions to asking in terms of further research.

Finally, the last three papers share a common theme in terms of their focus on the EU and the Stability and Growth Pact (SGP). In the Eckefeldt and Fischer paper the supply aspect of fiscal stabilisation includes automatic stabilisers and discretionary policy. To the extent that automatic stabilisers are a function of the tax system, benefit design and the overall size of government, then supply may be problematic. Recent papers on automatic stabilisers are relevant here (van den Noord, 2000; Auerbach and Feenburg, 2000). Eckefeldt and Fischer argue that the EU framework is in

"uncharted territory" in regards to the short-term macroeconomic regime and also in terms of longer-term budgetary challenges posed by population ageing. They note that there may be limited scope to increase the role of automatic stabilisers without trade-offs in terms of increasing the tax burden. This again highlights the discussion in Session I about the relationship between structural policy and automatic stabilisers.

The papers by Meyermans, and Barrell, Pina and Hurst, approach the issue of automatic stabilisers and fiscal stabilisation through the use of macroeconomic models. The Barrell, Pina and Hurst paper raises questions about the role of public investment in the SGP. Questions about public investment, often motivated by possible links to long-term growth rates, seem to feature in most fiscal frameworks (including the UK and New Zealand). The paper may have benefited by setting out some of the hypothesised links between public investment and growth.

The two modelling papers, as well as Eckefeldt and Fischer, consider the effect of aggregate demand and aggregate supply shocks on automatic fiscal stabilisers. What does not come through in the papers is a sense of decision making under uncertainty and how this might influence the degree to which authorities allow the "unqualified" operation of automatic stabilisers. In his comments on Session I, Nicola Sartor emphasised the large confidence intervals around estimates of potential output and hence the underlying structural fiscal position. This raises the policy question as to whether it is possible to put in place institutional or budget setting processes that generate a robust fiscal policy reaction function – one that minimises the chance of misjudging structural changes and so locking in structurally higher policy changes that will need subsequent reversal. The institutional design around active fiscal stabilisation policy raises questions about the relevance of so-called Independent Fiscal Authorities (IFAs).

In New Zealand, co-ordination between monetary and fiscal authorities does not take the form of the authorities acting to pursue joint policy objectives. Rather, fiscal policy and monetary policy are co-ordinated by putting each within medium-term oriented framework that emphasises well-defined objectives and transparency. Fiscal policy needs to take account of the likely monetary policy reaction and vice versa.[1]

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[1] See the Reserve Bank of New Zealand submission to the Independent Review of the Operation of Monetary Policy, supporting document on "Fiscal and monetary coordination" (www.rbnz.govt.nz/monpol/review). The monetary policy review contains a useful summary on

(continues)

There is also active consultation between New Zealand's monetary and fiscal authorities on major policy changes, as was the case during the tax reductions of the mid-1990s. Although this type of arrangement seems reasonably well suited to New Zealand (and given obvious institutional similarities, the UK), the advantages and disadvantages of an IFA may differ within arrangements such as the EU. This is acknowledged in the Lindh and Ohlsson paper in Session IV, where the role of fiscal policy institutions is considered for Sweden.

the co-ordination of monetary and fiscal policy given the transparency and medium-term orientation of New Zealand's macroeconomic policy frameworks (Svensson, 2001).

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COMMENTS ON SESSION II: FISCAL STABILISATION

Andrew Kilpatrick[*]

I am pleased to be in Perugia once again at a conference which deals with important issues from a policy-maker's perspective. It is rare to have the opportunity to compare notes on fiscal problems in such a broad international context. We have just heard six very good papers, each one rich with relevant and useful insights and based on thorough research. I congratulate the authors on their achievements.

In the UK policy context there is now greater emphasis on the need for evidence-based policy-making, with the idea that policy-makers should carefully examine the evidence before making – possibly otherwise faulty – judgements. The history of fiscal policy around the world is littered with rash and hasty judgements, so it is particularly important that the valuable work we have been listening to this afternoon (and this morning) percolates into policy-thinking.

All too often the role of the discussant, not just in academic circles, is to find fault with the papers discussed. That is not my intention. The papers do not in any way seem flawed. They offer important, but different, perspectives on our theme this afternoon: fiscal stabilisation. Two of the papers (Barrell *et al.* and Meyermans) use full model simulations to look at, among other things, automatic stabilisers; two others (Comley and Steindel) touch on Ricardian Equivalence issues to assess whether and how far fiscal effects are long-lasting and effective; another paper (Hemming *et al.*) focuses on recession experience and whether fiscal policy can help; and a further paper (Fischer and Eckefeldt) goes beyond the issue of stabilisation to look at the wider role of Government and EU Member States' preferences for the manner of that stabilisation – whether through automatic stabilisers, discretionary policy or big Government or regulation. Let me start by making some broad observations on fiscal policy.

First, the general context. Reappraising the impact of fiscal policy seems particularly relevant today. The recovery from recession in the US

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and the potential impact of the recent tax stimulus package is of particular interest.

In the UK the Government has embarked on an expansionary spending programme, traditionally thought to have strong demand effects, though so far taxes and growth have been adequate to maintain the good fiscal position. In Japan, where fiscal policy is one of the few remaining policy instruments, given zero interest rates, successive fiscal stimuli have been applied, seemingly without the desired results. And in Europe, the constraints of the Stability and Growth Pact (SGP) have begun to bite, raising questions both about stabilisation but also longer-term growth.

A further general observation on the role of Governments is worth considering – while output in the euro area has been somewhat more stable than in the US, euro area growth has on average been much slower. Do EU Member States prefer a quieter, more stable but less productive life than their US counterparts or, as Jonas Fischer asks us, are big Governments and, specifically, policy-makers to blame for this relative lack of performance?

Second, the EMU context. Member States in the euro area now have only an indirect influence on the monetary policy that is relevant for their individual circumstances. The interest rate is set by the European Central Bank to ensure euro area price stability and exchange rates are fixed, other than the euro rate. For fiscal authorities, however, this should be advantageous. Not only do they have more individual responsibility, they also have an instrument, i.e. fiscal policy, which should be more powerful than before, at least in theory. In this context, empirical results for individual Member States based on data from earlier policy regimes may be biased when looking forward. Moreover, although fiscal authorities may wish to act to counter idiosyncratic shocks they are constrained in what they may do by the Stability and Growth Pact. If fiscal policy turns out to be powerless in affecting the economy it would not matter. But if it does have some impact then this is an important issue, as Ray Barrell notes.

Third, the wider policy context. In many countries there is a formal separation of the roles of fiscal and monetary policy. Nonetheless, the authorities respond to the same information and may not have completely separate goals *vis-à-vis* demand management and stabilisation. A demand shock may thus prompt both a monetary and fiscal (discretionary and non-discretionary) response. For example, exchange rate and financial market changes affect wealth, incomes and thus taxes and budget balances

as well as inflation prospects. Often fiscal and monetary policy responses go together, but not always in a co-ordinated way, with fiscal and monetary responses sometimes competing against one another. Disentangling the pure fiscal impact from other influences, particularly monetary policy responses (and of course the general problem of lagged effects) is not easy. Macro models have the upper hand in this context, though against that the richness of detail in relation to specific policy impacts can be lost. The implication is that we should always be asking "what else is going on" beyond the immediate change in the budget deficit and I am encouraged that the papers generally do this.

A closely related matter concerns financial deregulation and wealth effects. The last twenty years have seen dramatic changes in financial markets and increases in household wealth. In looking at, say, consumer behaviour following a fiscal policy change it is also necessary to look at the behaviour of wealth. Blair Comley's paper for example looks at this aspect of wealth's impact on savers. A small tax cut, say, may dominate subsequent consumer behaviour via housing and equity market impacts, as compared with a small spending increase of equivalent size not favoured by markets or noticed by the public. The enhanced opportunity for forward-looking behaviour by consumers in deregulated financial markets impinges on the effectiveness of tax and spending policies. A key question is the role of markets as a stabilising force. I was struck by Jonas Fischer's result that with big Government, output tends to be more stable. But I suspect that countries which are particularly market-oriented, flexible or with rich financial markets can also be stable. I think Jonas Fischer's view might be that countries can get there by this route if they pursue suitable economic reforms.

Fourth – but slightly tongue-in-cheek – what do we see fiscal policy encompassing? For those politicians who actually operate fiscal policy, it is much more than stabilisation. Indeed, it is increasingly seen as part of a wider efficiency and growth agenda as Jonas Fischer's paper indicated. The quality of public finances, i.e. the way taxes are raised or the type of public spending that is conducted is as important as the balance between the two aggregates. Here Ray Barrell's remarks about public investment are important and the connected question of what is an appropriate medium-term fiscal objective, once sustainability is no longer a pressing issue.

Another dimension raised in these papers is more practical. How do we measure fiscal policy and calibrate its impact? It was very useful that a

number of authors looked at several options here. For example, Richard Hemming considers actual balances, primary balances and structural versions of both. Which we choose colours whether we think the context is a fiscal expansion or a contraction; for example, 33 expansion v 6 contraction episodes on an overall balance basis, but 16 expansion v 23 contraction episodes on a primary structural balance basis. And the primary balance results compared with overall balance are intriguingly more Keynesian in nature, so the choice of measure is important.

A structural measure of the movement in fiscal balance is certainly a good first approximation in identifying fiscal change. But it is also clear that composition counts (ref. Banca d'Italia paper). It is also important to consider what is already in the pipeline from earlier discretionary policies but which has taken time to come through into the fiscal numbers; and how the fiscal path is evolving relative to what was previously anticipated. And a fiscal adjustment – say, a move into deficit – that has been long advertised may have less impact than one that comes out of the blue or in a crisis.

This brings me to Charles Steindel's paper which I found fascinating in its charting of household responses to specific tax events in the US. The issue of what is taken to be temporary and what is seen as permanent is clearly vital in the fiscal policy context. It is encouraging to hear that US consumers' reaction to temporary changes is smaller than permanent ones. And interesting to see that, despite pre-announcements, they wait for the cash before making their decisions – cash truly is king! The latter partly reflects liquidity-constrained households and I wondered whether this effect might have moderated over the period as financial markets have become deregulated and wealth has accumulated. The result seems likely to translate to the UK context and perhaps other EU Member States.

I did wonder where the media and all those sophisticated pundits fitted into Charles Steindel's story. In the UK, for example, tabloid newspapers have pages of "what the Budget means for you" and related tax tables to read off how many pounds per week better or worse off individuals are following major fiscal events. But I very much agree with this point that the complexity of the US tax system and its process hampers even an intelligent guess as to what the implications of tax changes might be. And the Budget process in the US leaves some uncertainty as to whether a stimulus package will or will not run, quite apart from whether it will stimulate anything!

Let me return to the main themes of this session on fiscal stabilisation and the issues that have been raised:

- what is the Government's role in stabilisation?
- how far should it go?
- will it work?

In short, the answers seem to be:

- Governments do have a role, mostly through automatic stabilisers and in keeping to a steady fiscal path;
- but they should use their influence wisely and only occasionally, and certainly not at every opportunity;
- fiscal stabilisation can work and is worth trying, but don't expect too much and perhaps it is as important to focus on getting quality right as much as quantity.

The issue on which it is probably easiest to find consensus, looking through the papers and hearing the presentations, is automatic stabilisers. One of their great advantages is precisely that they are automatic, i.e. fast and pretty much out of Government hands. But, as Eric Meyermans' paper shows, for example, automatic stabilisers are not without downsides. They are very useful for demand shocks but not so helpful when faced with supply shocks. That raises two questions:

(i) should we try to identify the nature of shocks more precisely and react differently? Or is that more trouble than it's worth? My sense is that it is too much trouble on the whole.

(ii) Governments can alter the strength of automatic stabilisers, or create fiscal instruments to do so. EMU implies fiscal policy is both more necessary and more powerful. And there is no cross-border transfer system. Should this power be used and strengthened? It was noticeable that Eric Meyermans' results suggested a weaker stabilisation effect for the euro area (11½%) relative to the US (22%). This may be worth considering further. But there is a trade-off: stronger stabilisers may mean smoother output but it means more volatility in the budget balance. This could alter the currently fairly reassuring probabilities of breaching the 3% limit of SGP set out in Ray Barrell's paper. But on automatic stabilisers at least, Ray Barrell and Eric Meyermans offer some reassurance that they are helpful.

Turning to discretionary policy life becomes more difficult. Jonas Fischer's first chart on pro-cyclicality suggests history is against successful discretionary policy. There are certain situations where we know discretionary action will not be appropriate. For example, loosening policy when:

- debt ratios are high or unstable; or where
- the population is ageing and surpluses perhaps need to be built up;
- at a peak of a boom (obvious in theory but often trend growth gets raised blurring the structural position);
- where a Government lacks credibility;
- where the fiscal path is already off track;
- where the nature of the loosening involves poor value-for-money spending, and so on.

In these circumstances a discretionary tightening, however, might be appropriate even if only a portion works through because of Ricardian effects. But this does not mean loosening should always be ruled out. For example, where the debt ratio is low and the fiscal position is sustainable and in:

- a severe but temporary downturn; or perhaps when
- policy can be well targeted and the effects on incentives or capital can be reasonably certain. Note, too, Ray Barrell's suggestion that higher public investment could be welfare enhancing.

But will it work? Here the papers clearly give us pause for thought:

- for most fiscal policy-makers administrative, legal, parliamentary, and regional constraints are very real and imply long and variable lags. Charles Steindel's paper rightly adds another to the list – tax complexities. It is not clear we even start at the first tee with the right club;
- circumstances count. Richard Hemming's paper usefully catalogues the key features here and investigates the practical implications of when fiscal policy might be Keynesian in nature;
- excess capacity helps;
- so too does a more closed economy or fixed exchange rate;
- liquidity-constrained households increase the chances of success;
- monetary and other policies matter too;

- and myopia may help.

The evidence broadly supports the theoretical points, which I regard as an encouraging start. I was interested to know whether the results extend beyond the advanced countries in Richard Hemming's paper to a wider group where the variations of experience may be richer.

But even in the best of circumstances:

- Will fiscal changes be seen as temporary or permanent and what will households actually do? Blair Comley's paper shows some significant offsets to fiscal changes, particularly when the structural side is looked at. This is bad news for Finance Ministers. I think few of them realise this is a possibility, let alone perhaps a reality. Charles Steindel's paper at a more micro level makes clear that households do indeed look carefully to try to discern the permanent effects of fiscal changes.
- And what about other offsets, such as interest rates or exchange rates? Blair Comley's result for Australia showing a noticeable (32 basis point) impact of structural fiscal policy on interest rates, and Ray Barrell's simulations, make clear this is an important consideration to factor into fiscal policy decision-making.

To sum up

None of these results is wholly inconsistent with some impact of fiscal policy in a Keynesian sense. They do especially lend support to the view that automatic stabilisers have a moderate and useful effect, at least for demand shocks. More work needs to be done, but these six papers have provided a very good basis on which to move forward.