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Interactions Between Monetary and Fiscal Policy: How Monetary Conditions Affect Fiscal Consolidation

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ABSTRACT/RÉSUMÉ

Interactions between monetary and fiscal policy: how monetary conditions affect fiscal consolidation

This paper assesses how and in what circumstances, fiscal consolidations are affected by monetary conditions, using data covering 24 OECD countries over the past 25 years, Focusing on fiscal consolidation "episodes", it is found that these tend to occur when large budget deficits threaten sustainability and usually when other macroeconomic indicators -- inflation, the exchange rate and unemployment -- suggest a "crisis" situation. After controlling for these factors, the paper finds strong econometric evidence that consolidation efforts are more likely to be pursued and to succeed if the monetary policy stance is eased in the initial stages of the episode, thus contributing to offsetting the contractionary impact of fiscal tightening. However, the link is far from mechanical and there are also counter-examples where monetary easing was followed by aborted consolidation efforts. Central bank independence explicitly precludes direct responses of monetary policy to fiscal actions. However, the paper also provides evidence that the indirect reaction of monetary policy and financial markets to fiscal consolidation may be influenced by the quality of fiscal adjustment, as short and long-term interest rates are more likely to fall during episodes characterised by greater reliance on current expenditure cuts. While this means that causality runs both ways, the paper provides evidence that, even after controlling for this proxy of fiscal adjustment quality, changes in monetary stance do affect the chances that a fiscal retrenchment plan will be successfully pursued.

JEL classification: E63, E58, G12, H62
Keywords: Fiscal adjustment, fiscal consolidation, fiscal policy, fiscal stance, monetary policy, monetary conditions, central bank, financial markets, interest rate, quality of fiscal adjustment, policy co-ordination

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Interactions entre la politique monétaire et budgétaire : l'effet des conditions monétaires sur les consolidations budgétaires

Cet article, utilisant des données relatives à 24 pays de l'OCDE sur les 25 dernières années, examine comment et dans quelles circonstances des ajustements budgétaires sont affectés par les conditions monétaires. Les ajustements budgétaires interviennent le plus souvent lorsque d'importants déficits menacent la soutenabilité des finances publiques, ou lorsque d'autres indicateurs macroéconomiques -- inflation, taux de change ou niveau de chômage -- sont très dégradés. En contrôlant ces variables, l'article apporte des preuves économétriques robustes suivant lesquelles les efforts de consolidation budgétaire ont davantage de chance d'être mis en œuvre et couronnés de succès si la politique monétaire est accommodante dans la période initiale de l'ajustement, contribuant ainsi à amortir l'effet défavorable pour la croissance du resserrement budgétaire. Le lien n'est cependant pas mécanique, comme l'atteste l'existence d'épisodes de desserrement monétaire suivis d'un abandon des efforts d'ajustement fiscal. Par ailleurs, si l'indépendance des banques centrales fait explicitement obstacle à une réponse directe de la politique monétaire aux opérations budgétaires, l'article montre que la qualité de l'ajustement fiscal peut indirectement influer sur les banques centrales et les marches financiers. Par exemple, les taux d'intérêt à court et long terme semblent se replier davantage si l'ajustement budgétaire prend la forme d'une maîtrise stricte des dépenses courantes. Au total, l'influence entre l'ajustement budgétaire et la conduite de la politique monétaire est réciproque mais l'article montre que, même en contrôlant la qualité d'ajustement budgétaire, la politique monétaire continue à influencer la probabilité d'une consolidation des finances publiques d'être menée à bien.

Classification JEL : E63, E58, G12, H62
Mots clés : ajustement budgétaire, consolidation budgétaire, politique budgétaire, fiscal stance, politique monétaire, conditions monétaires, banque centrale, marchés financiers, taux d'intérêt, modalités de l'ajustement budgétaire, coordination des politiques économiques

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INTERACTIONS BETWEEN MONETARY AND FISCAL POLICY: HOW MONETARY CONDITIONS AFFECT FISCAL CONSOLIDATION

by
Rudiger Ahrend, Pietro Catte and Robert Price[1]

1. Introduction

1. This paper assesses how and in what circumstances fiscal consolidations are affected by monetary conditions. More specifically, it addresses the question whether favourable monetary conditions make it more likely that fiscal consolidations, once undertaken, will be *continued* or *successful*. Central bank independence explicitly precludes direct responses of monetary policy to fiscal actions, but both monetary and fiscal policy-makers normally respond indirectly to the macroeconomic impact of each other's actions. Fiscal consolidation can be assisted by shifts in monetary stance insofar as lower interest rates contribute to offset the contractionary short-term effects of fiscal tightening on demand. However, monetary expansion can also ease the government's budget constraint, by stimulating (short-term) revenue growth and reducing interest payments on public debt, which may weaken the pressure to consolidate the primary fiscal balance. Experience also shows that cyclical asset price movements, which may be partly related to monetary stance, may generate tax revenue buoyancy which can be misinterpreted as structural, leading to a pro-cyclical discretionary loosening in fiscal stance.

2. Only a few studies of consolidation episodes – perhaps the most important one strand of which derives from the analysis of non-Keynesian effects of fiscal policy[2] -- make an attempt to control for the effects of changes in monetary stance and/or exchange rate variations during the consolidation episodes. Where such an attempt is made, the results are inconclusive. Von Hagen and Strauch (2001) find that, while easier initial monetary conditions (measured by a monetary conditions index, which combines the effect of both the real interest rate and the real exchange rate) increase the likelihood that a fiscal consolidation will be undertaken, they have no impact on the probability of success. Von Hagen *et al.* (2002) and Ardagna (2004a) find no evidence that episodes accompanied by monetary policy easing or exchange rate devaluations were more likely to be "successful", while Giudice *et al.* (2004) and Ardagna (2004a) find that they were not more likely to have expansionary effects. On the other hand, Lambertini and Tavares (2000) find that consolidation episodes preceded by large exchange rate devaluations were more likely to succeed. A frequent finding of the literature is that consolidation programmes that include substantial cuts in current expenditures are more likely to be sustained over time, thus achieving larger

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1. The authors are, respectively, members and head of the Monetary and Fiscal Policy Division of the Economics Department. The views expressed are those of the authors and do not necessarily reflect those of the OECD. They are grateful for helpful comments given by Jean-Philippe Cotis, Mike Feiner, Jørgen Elmeskov and other members of the Economics Department. They have been heavily reliant on statistical assistance given by Catherine Lemoine and Debra Bloch and on secretarial assistance from Paula Simonin, Sandra Raymond and Veronica Humi.

2. This research follows an early finding by Giavazzi and Pagano (1990) that fiscal consolidations can be expansionary in some cases. See for example Alesina and Perotti (1995 and 1997), Alesina and Ardagna (1998) and Ardagna (2004a).

reductions in debt ratios, and are also more likely to have expansionary effects as compared with those that rely mainly on tax increases or cuts in capital expenditure.

3. This paper considers consolidation episodes in 24 OECD countries during the 1980 to 2005 period and is based on the identification of fiscal consolidation "events", distinguishing between those that were *"started"*, even though they may not have been pursued very far and those that were *"continued"*. Episodes are ranked according to their degree of *success*, based *e.g.* on the cumulative adjustment, the effect on the debt dynamics or the extent to which the adjustment of the cyclically-adjusted primary balance was "permanent". Multivariate econometric analysis is used to relate the likelihood of an episode being started or continued, and its degree of success, to initial conditions such the starting fiscal position, the level or the direction of change in the output gap, inflation and the exchange rate, and changes in monetary stance. The main findings of this study are as follows:

- *As a generalisation, periods of fiscal consolidation tend to occur most often during "bad times"*. Large fiscal imbalances, high inflation, currency depreciation and output close to a cyclical trough tend to be good predictors of when a consolidation will be initiated. Some of these variables are also good predictors of the intensity and duration of consolidation efforts. In that sense the most favourable circumstances for undertaking substantial consolidations are periods of crisis.

- *After allowing for the preceding* forces majeures, *periods of economic growth propitiated by accommodating monetary policies can help nurture consolidation once it has started.* Consolidation efforts are more likely to be pursued, *ceteris paribus*, if they are assisted by an easier monetary stance in the initial stages of the episode. In particular, they seem to be more likely to succeed if monetary stance is eased more (or tightened less) than would be implied by a Taylor rule.

- *While an easier monetary stance can propitiate fiscal retrenchment, the link is far from mechanical and there are also counter-examples where monetary easing was followed by aborted consolidation efforts.* Moreover, fiscal authorities generally tend to respond to declines in interest payments on public debt - whether resulting from the evolution of debt ratios or from lower interest rates - by easing their efforts to improve the structural primary balance. Such behaviour, which would be justified only if the overall fiscal balance was at a level consistent with long-run fiscal objectives, has occurred also in a number of countries that were still very far from that target.

- *Whether the extra fiscal resources emanating from faster growth are "misused" would seem to depend on the adequacy of the rules or institutions in place to prevent this.* Fiscal stance behaves differently across countries in relation to the business cycle: it has tended to move pro-cyclically in euro-area countries and counter-cyclically in other OECD countries. In euro-area countries, the normal play of automatic stabilisers has been at least partly offset by pro-cyclical discretionary policies, such as large tax cuts during strong economic upswings leading to pro-cyclical corrections during downturns. After controlling for other determinants, consolidation efforts were less likely to be successful in euro-area countries than in other OECD countries, apart from the pre-accession 1992-1997 membership qualification period.[3]

- *The credibility of fiscal consolidation plans is likely to be a key determinant of how monetary policy reacts*. While there are important and necessary institutional constraints preventing central banks from reacting directly to fiscal policy initiatives, monetary policy-makers may respond

3. During the 1980-91 period the future euro-area countries suffered also from more slippage in the wake of adjustment episodes (see Table A8).

indirectly to improving expectations and confidence factors. Financial market reactions could well be important here, although the annual data used in the present exercise do not allow these to be examined. Conversely, there is the possibility of a sub-optimal equilibrium occurring where monetary authorities lack confidence in the fiscal authorities, who are then discouraged from going through with consolidation plans.

- *The nature of the consolidation package may be important for confidence.* There is evidence that both short and long-term interest rates are more likely to fall during episodes characterised by greater reliance on current expenditure cuts as opposed to revenue measures – a feature that both the research presented here and previous literature have found to be associated with successfully pursued consolidations.

4. The paper is structured as follows. The next section illustrates some of the stylised facts pertaining to fiscal and monetary stances among OECD economies. In section 3 econometric analysis is used to assess how fiscal consolidation efforts, viewed through their various phases -- start, continuation and cumulative effect -- may be affected by economic and monetary conditions. Section 4 draws some conclusions about the economic and institutional circumstances in which monetary policy might contribute to fiscal consolidation.

2. Fiscal and monetary stance over the business cycle: some stylised facts

5. Using real short-term interest rates (nominal rates *minus* core inflation) as a proxy for the monetary stance and the cyclically-adjusted primary balance as a measure of fiscal stance[4], simple contemporaneous correlations show that changes in fiscal and monetary stance do not seem to be correlated in a systematic way, either positively or negatively. A partial exception is the United States, where the monetary and the fiscal policy stance seem to have moved mostly in the same direction over the past 25 years. Similar results emerge from simple regressions where a control for changes in the output gap is also included.

6. This is not really surprising. Monetary tightening can be expected to be the norm during cyclical upturns if central banks follow either a Taylor Rule or a forward-looking inflation target. Through that channel, monetary policy would also react to the fiscal stance via fiscal effects on demand.[5] But in practice monetary policies do not respond mechanically to the cycle, as they need to take into account all other factors impinging on the outlook for inflation. Moreover, the sample here includes several countries that during at least part of the period under consideration did not have a fully autonomous monetary policy, as they were either under a fixed exchange rate regimes or members of the euro area.

7. At the same time, the discretionary component of fiscal policy does not always move consistently in relation to the cycle. There is evidence that while in Nordic countries and other non-euro-area OECD countries discretionary fiscal policy has tended to move counter-cyclically, in euro-area countries -- with the exception of Finland -- it acted mainly in a pro-cyclical way (Box). The observed cyclical behaviour of the fiscal stance may result from different patterns of behaviour. In some cases it reflects intentional

4. Cyclical adjustment is calculated using the revised revenue and expenditure elasticities presented in Girouard and Andre (2005). Cyclically adjusted fiscal variables are now available for 28 OECD countries. However, data for the Czech Republic, Hungary, Poland and the Slovak Republic have been excluded because the presence of large one-offs and reclassifications makes it particularly difficult to interpret CAPBs as indicators of fiscal stance.

5. That would not be the case if there are substantial offsetting ("Ricardian") responses to budget deficits by private sector saving. Existing studies (see de Mello *et al.*, 2004, and Cotis *et al.*, forthcoming) suggest that saving responses are not fully "Ricardian", although with relevant differences across countries.

reactions to the cycle, although discretionary fiscal policy is generally acknowledged to be an unwieldy stabilisation instrument, both because of implementation lags and because political pressures often stand in the way of it being moved symmetrically over the course of the cycle. However, the pro-cyclical behaviour observed in euro-area countries may reflect an excessive focus by the fiscal authorities on stabilising the unadjusted fiscal balance over the cycle. Alternatively, it could be due to implementation lags causing measures intended to be counter-cyclical to end up being pro-cyclical. Or it could also mean that one-off increases in the cyclically-adjusted revenue base are sometimes misinterpreted as structural, leading to offsetting adjustments in tax rates and (sometimes) expenditures. Expansionary fiscal policies during a cyclical upswing increase the likelihood that corrective measures will need to be taken in more difficult times, with pro-cyclical effects. Some of these patterns of behaviour may be present in most countries, but their weight probably differs across country groups.

Box. **The cyclical behaviour of fiscal policies**

It is possible to identify some basic stylised facts about the behaviour of the discretionary component of fiscal policy by looking at simple contemporaneous correlations, calculated on annual data since 1980.[1] On this basis, the fiscal stance (measured by the cyclically-adjusted primary balance) seems to move pro-cyclically in euro-area countries, while it acts counter-cyclically in Nordic countries and in other non-euro-area OECD economies (Table 1).[2] As a result, while in the latter two groups of countries the discretionary component tends to reinforce the effects of automatic stabilisers, in euro-area countries it tends to offset them, at least in part, resulting in a much weaker overall stabilisation effect (as measured by the unadjusted primary balance).

Table 1. **The stance of fiscal policy over the cycle**

	Euro area countries[1]		**Nordic countries[2]**		**Other OECD countries[3]**	
	Pro- or counter-cyclical	Correlation coefficient[4]	Pro- or counter-cyclical	Correlation coefficient[4]	Pro- or counter-cyclical	Correlation coefficient[4]
Cyclically-adjusted primary balance	pro	-0.22 **	counter	0.40 **	counter	0.14 *
Unadjusted primary balance	counter	0.18 **	counter	0.59 **	counter	0.49 **

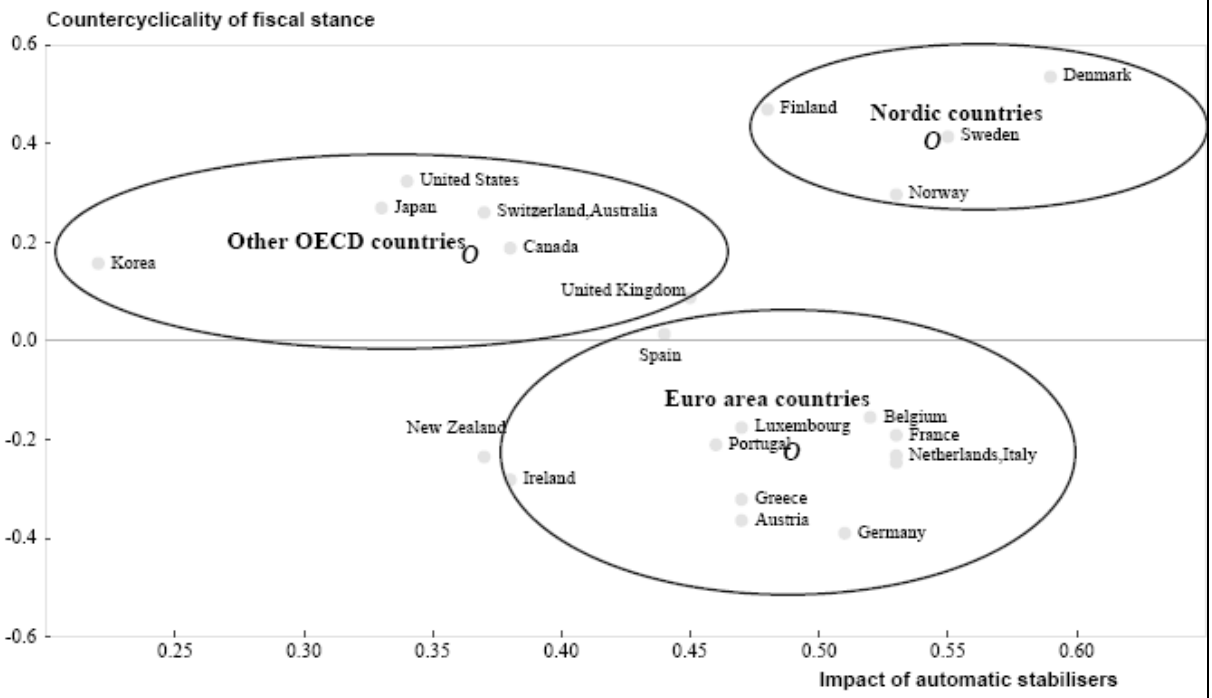
1. Excluding Finland.
2. Denmark, Finland, Norway and Sweden.
3. United States, Japan, United Kingdom, Canada, Australia, Korea, New Zealand and Switzerland.
4. Contemporaneous correlation of changes in the fiscal balances with changes in the output gap over the period 1981-2005. Two asterisks indicate significance at the 5% confidence level, one asterisk indicates significance at the 10% level

Whatever their explanation, the stylised facts seem to belie the *a priori* reasonable view that large public sectors, which allow strong automatic stabilisers, are normally associated with a reduced need for discretionary fiscal impulses. In practice, it appears that countries with large public sectors have supplemented automatic stabilisers with sizeable discretionary actions. These were on balance stabilising in Nordic countries, destabilising in many euro-area countries (Figure 1). In countries with smaller public sectors but more agile discretionary policies, such as a number of English-speaking and Asian countries, the overall contribution of discretionary budgetary policies seems at least to have contributed to short-run economic stabilisation.

The contrast between the performance of Nordic and euro-area countries with regard to the capacity to use fiscal policy for economic stabilisation purposes may seem puzzling, given the fact that both have large public sectors. A few tentative explanations may be nonetheless put forward. First, Nordic countries, being small open economies subject to more volatile output shocks, may need both large automatic stabilisers and a more active discretionary fiscal policy. Second, one should not exclude the possibility that differences in the perceived quality of public spending give rise to different tax policy patterns over the cycle. In the Nordic countries where the quality of public spending is held in higher regard and the tax burden may be better accepted by the public because the associated benefits are recognised, the temptation to venture into unsustainable tax cuts during the good times may be less prevalent, with less of a need for subsequent policy reversals in bad times.

Box. **The cyclical behaviour of fiscal policies** (cont.)

Figure 1. Automatic stabilisers and countercyclicality of discretionary fiscal policy



Note : The impact of automatic stabilisers is measured by the semi-elasticity of the unadjusted fiscal balance to changes in GDP (Girouard and Andre, 2005). The countercyclicality of discretionary fiscal policy is measured by the contemporaneous correlation between annual changes in the cyclically-adjusted primary balance and in the output gap.
Source : OECD.

1. Correlation coefficients for individual countries are not statistically significant in several cases, which is not surprising, given the small sample size and the fact that cyclical considerations are not the only ones driving changes in fiscal stance. However, correlations calculated pooling observations for groups of countries are highly significant, as shown in Table 1. These correlation coefficients cannot be interpreted as behavioural relationships (reaction functions) because they are affected by simultaneity bias. In particular, to the extent a tighter fiscal stance negatively affects current output, the degree of counter-cyclicality may be over estimated.

2. This pattern of behaviour was highlighted also in OECD (2003) and European Commission (2001). However, Gali and Perotti (2003) find that fiscal policies in euro-area countries have become more countercyclical over time. Moreover, Forni and Momigliano (2004) show that if fiscal policy responses turn out to be more countercyclical if they are evaluated with reference to output gap estimates available in real time to policymakers.

3. Episodes of fiscal consolidation: the role of changes in monetary stance

Identifying consolidation episodes

8. The absence of a simple relationship between fiscal and monetary stance does not rule out the possibility of more complex interactions, possibly conditioned by specific sets of circumstances. Episodes of fiscal consolidation, of which there are numerous examples in OECD countries over the past 25 years, are a particularly interesting setting to explore in this regard. This section looks at such episodes in order to

examine how changes in monetary policy stance during episodes can affect progress in consolidation efforts. Multivariate analysis is used to control for the observed constraints on monetary action, in order to identify the extent to which monetary channels *per se* can assist consolidation.

9. Again, the reference variable used to identify consolidation episodes is the cyclically-adjusted primary balance (CAPB), which is taken as a proxy for the discretionary component of fiscal policy, though it can still be affected by one-off factors and accounting distortions,[6] as well as by autonomous revenue fluctuations not netted out by the cyclical adjustment process.[7] Episodes of fiscal consolidation are identified as starting when the CAPB increases by at least one percentage point of GDP (in one year or over two consecutive years with at least ½ point in the first year). The threshold is intentionally set somewhat lower than in other similar studies, which often use a minimum threshold of 1.5 percentage points, as the objective is to cast the net wide at first and then analyse the factors that differentiate episodes that are sustained from those that remain small or are aborted quickly. The episode is deemed to continue for as long the CAPB continues to increase. An episode is classified as being "seriously pursued" if in the two years following the adjustment which initiated the episode (see above), an additional adjustment of at least one percentage point of GDP is achieved.[8] The dataset includes annual data covering 24 OECD countries from 1980 to 2005.[9]

10. While the real short-term interest rate (deflated with core inflation) is used initially as the main proxy for monetary stance, alternatives such as nominal long and short rates are also experimented with in the multivariate analysis to check the possible transmission of effects via the term structure. For the purpose at hand, which is to analyse monetary policy actions over and above those required for short-term economic stabilisation, it would be desirable to have some sort of "cyclically-adjusted" indicator also for changes in monetary stance. A potentially useful indicator in this regard is the change in the monetary policy stance *relative to what would be expected to occur under a Taylor rule*. For example, monetary stance is likely to be tighter than suggested by a Taylor rule where debt sustainability worries feed into inflation expectations via perceptions of monetisation dangers or current account and currency problems.[10]

Episodes in their macroeconomic context

11. Some light can be shed on the circumstances determining whether monetary policy operates to assist consolidation or acts in a way that makes it more difficult by considering four different phases since 1980 in which fiscal consolidation efforts in OECD economies were affected by the changing macroeconomic context and the resulting constraints on monetary policy action. Figure 2 provides the context in terms of cyclical position and interest rate levels during consolidation periods (those periods are shaded in the chart):

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6. Koen and van den Noord (2005).

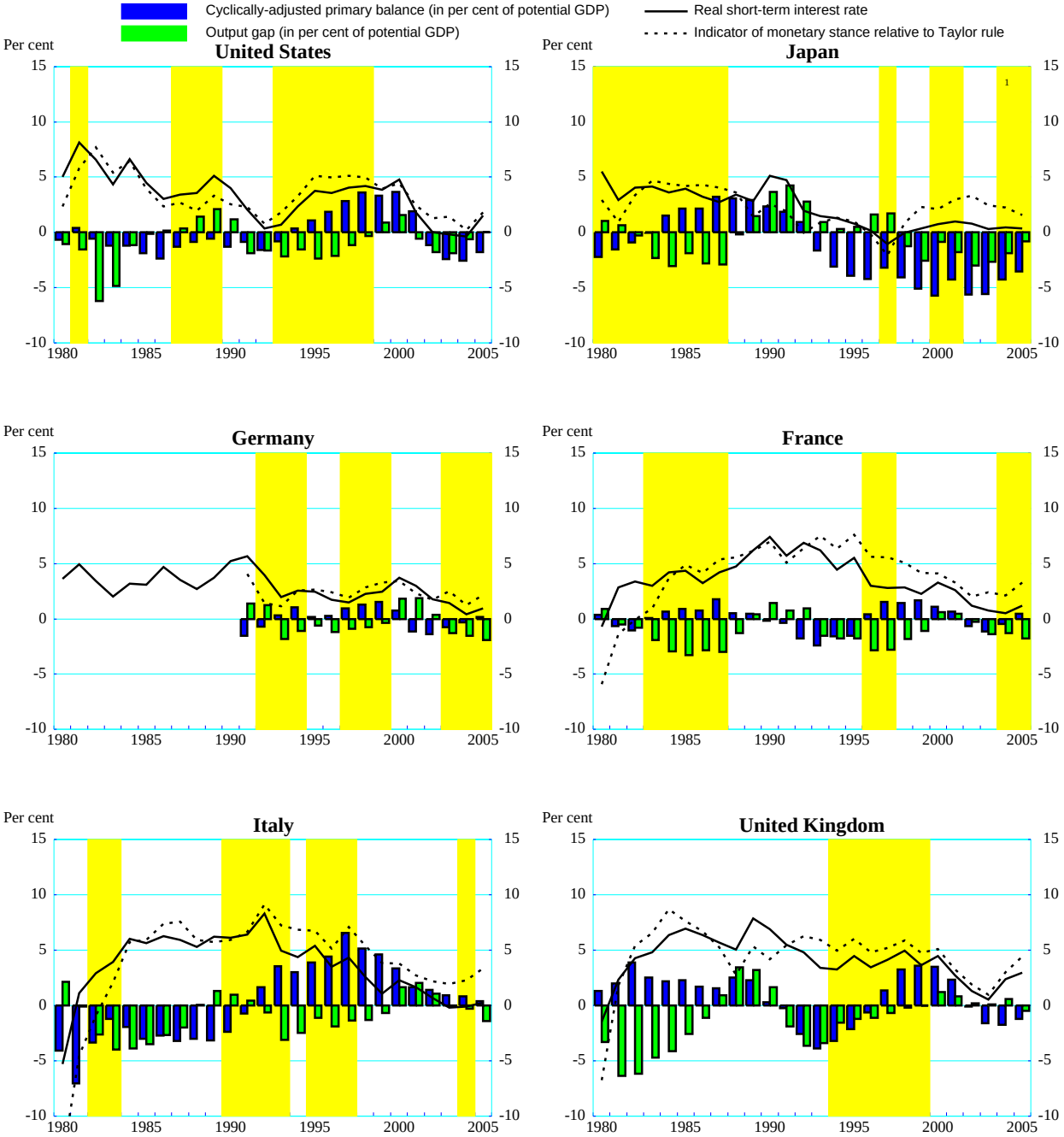
7. See Girouard and Price (2004).

8. To reduce the risk that the use of a mechanical identification criterion would lead to a misidentification of episodes, for example if balances are distorted by one-off factors, a check of the results was conducted with the help of OECD Country Desks. In addition, the cyclically-adjusted balances are corrected for a number of major one-off-effects, such as the sale of UMTS licences in 1999-2000.

9. Consolidation episodes that had started before 1980 or that were still ongoing beyond 2005 were dropped from the list. OECD projections for 2006 were used to determine whether an episode was still ongoing.

10. The Taylor-rule benchmark is here constructed only for *changes* in real short interest rates, assigning a 0.5% weight to both changes in inflation and in the output gap. Unlike calculating the interest rate *levels* prescribed by a Taylor rule, this does not require assumptions regarding the levels of the neutral real interest rate and the inflation target.

Figure 2. Fiscal consolidation episodes, cyclical positions and indicators of monetary stance

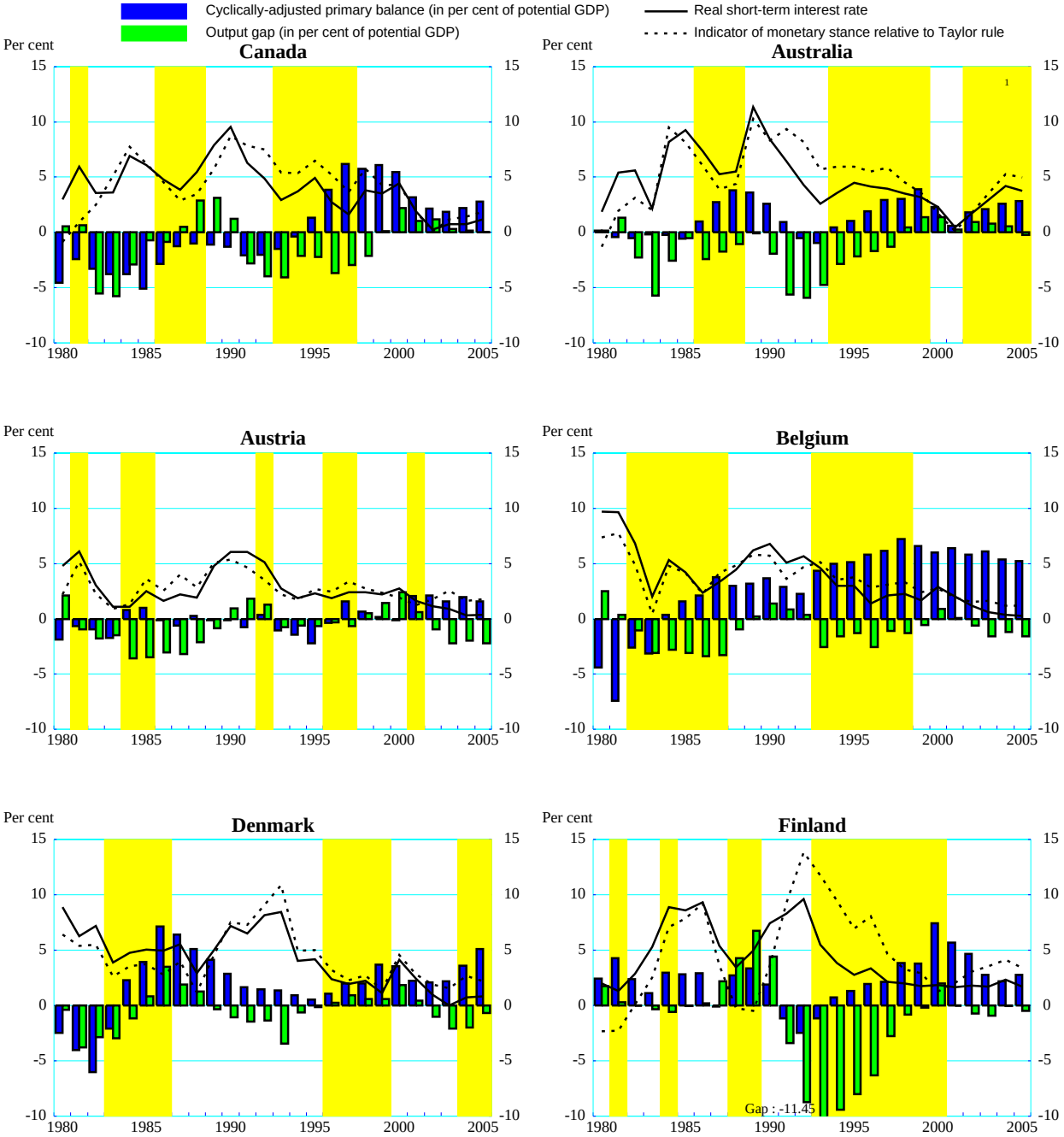


1. The indicator is calculated as the difference between the actual real short rate and the level prescribed by a Taylor rule with 0.5 weights for both the inflation rate and the output gap, in per centage points. The level of the indicator is then rebased so that its average over the period shown is the same as for the real short rate.

Note : Shaded areas indicate fiscal consolidation episodes.

Source : OECD.

Figure 2 (cont.) Fiscal consolidation episodes, cyclical positions and indicators of monetary stance



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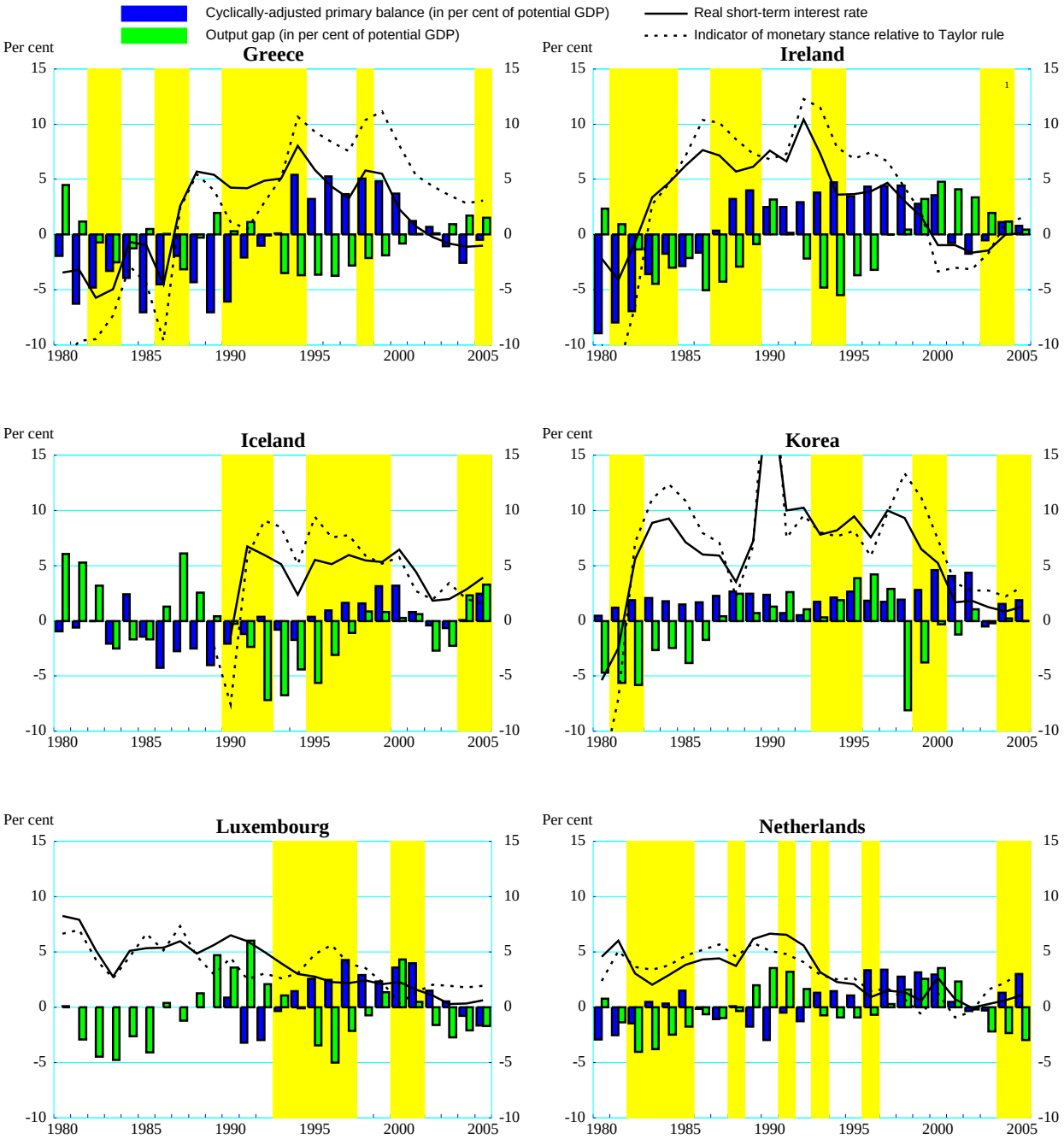

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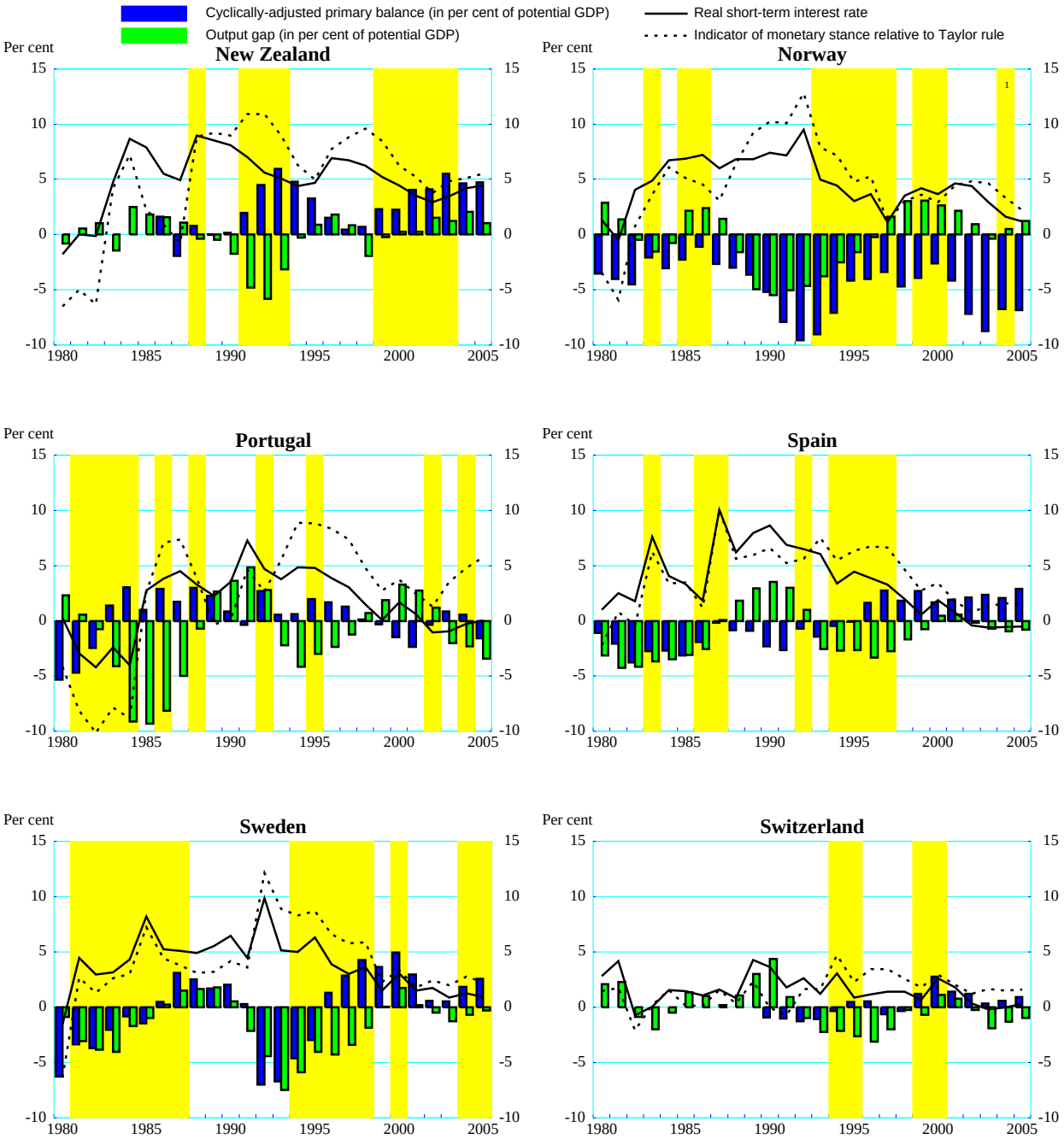


1. The indicator is calculated as the difference between the actual real short rate and the level prescribed by a Taylor rule with 0.5 weights for both the inflation rate and the output gap, in per centage points. The level of the indicator is then rebased so that its average over the period shown is the same as for the real short rate.

Note : Shaded areas indicate fiscal consolidation episodes.

Source : OECD.

- *In the early- to mid-1980s* fiscal consolidations were undertaken in several countries at a time when economies were entering deep recessions and the monetary authorities were wrestling against the inflationary consequences of the second oil shock, compounded in some cases by currency devaluations. They were not in a position to help offset the impact of fiscal restraint. Therefore, in most of the episodes occurring at this time -- including both several short episodes (such as Canada in 1981 and Italy in 1982-1983) as well as some longer ones (Sweden and Japan 1981-1987, Denmark 1983-1986, France 1983-1987, Ireland 1981-1984) -- real short interest rates either were not lowered or were actually increased.[11] In the few cases where interest rates did come down, at least in the initial phase of the episode (Belgium 1982-1987 and the Netherlands 1982-1985), this may have helped the fiscal authorities to go on with consolidation efforts. In Belgium and in France also the initial real exchange rate depreciation contributed to supporting aggregate demand during the fiscal adjustment. But there are cases, such as Sweden, where a substantial fiscal retrenchment was pursued with no support from monetary authorities or from the exchange rate and the economy gradually emerged from the recession.

- *During the expansionary phase of the late 1980s* fiscal consolidations were undertaken *e.g.* in Canada and Australia (1986-1988), in Ireland (1986-1989) and in the United States (1987-1989). While US interest rates were gradually raised during this episode in line with the cyclical situation, in the other three countries the monetary stance can be described as supportive, with short real rates falling during the initial part of the episode even though the output gap was narrowing. In Australia and in Canada additional support came from the fact that real effective exchange rates started from a depreciated position.

- *A few consolidation episodes occurred in European countries in the early 1990s,* with economies at or just past the cyclical peak and already slowing down. While in the case of Germany (1992-1994), Austria (1992) and the Netherlands (1991 and again in 1993) interest rates were coming down, and generally did so more than would have been prescribed by a Taylor rule, in the case of Italy (1990-1993), Greece (1990-1994) Portugal and Spain (1992) interest rate movements, partly driven by responses to the ERM crisis, were less supportive.

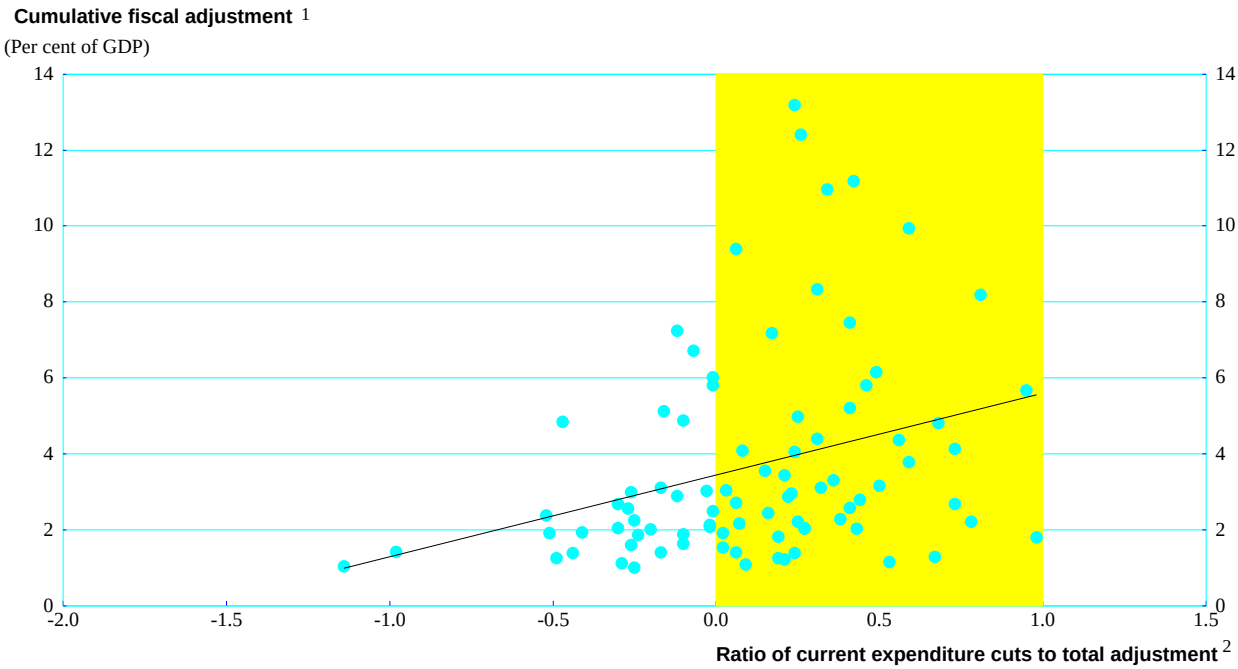
- *A greater concentration of episodes can be found starting in the mid-1990s,* when economies were running below potential but in most cases were already in the process of recovering from cyclical troughs. Large consolidations occurred in Australia (1994-1999), Canada (1994-1997), Denmark (1996-1999), Norway (1993-1997), Sweden (1994-1998), the United Kingdom (1994-1999), the United States (1993-1998) and, among the future euro-area countries, in Belgium (1993-1998), France (1996-1997), Finland (1993-2000), and Italy (1995-1997). Partly as an effect of the large shift in fiscal stance, in several of these episodes output growth fell short of potential and output gaps deteriorated, at least initially. In the euro-area countries, but also in Australia, Canada, Norway and Sweden monetary easing helped to support activity, with real short rates declining during the episodes by more than indicated by the Taylor rule, while in the United Kingdom and the United States buoyant growth was enough to sustain continuing fiscal adjustment, with no help from monetary easing. In several cases (Australia, Canada, Finland, Italy and Sweden) a depreciated exchange rate also contributed to support activity.

12. From this variety of experiences, it is evident that the extent to which fiscal consolidation can be assisted by monetary easing is heavily constrained by the economic circumstances, but that in some cases a supportive monetary policy stance has helped. At the same time, a few background facts can be identified

11. The increase in real short rates in some of these cases (France, Italy and the United Kingdom) is even larger if measured against the benchmark of a Taylor rule, given that the output gap was turning negative and inflation had started to decline.

with respect to the composition of fiscal adjustments. While in most episodes increases in cyclically-adjusted revenues and cuts in primary current expenditure both contributed to the adjustment, there are also quite a few cases where they act at cross-purposes and one or the other has to bear more than the full burden of the adjustment. In these cases, and especially when the ratio of expenditure-to-GDP keeps growing, the overall size of the adjustment tends to be small (Figure 3). There may thus be some connection between the nature of the fiscal consolidation exercise and monetary policy, which the next section examines in more detail.

Figure 3. Consolidation episodes : cumulative fiscal adjustment and share of current expenditure cuts



1. Cumulative change in cyclically-adjusted primary balances during episode, in per cent of GDP.
2. Ratio of cumulative reduction in cyclically-adjusted primary expenditure to cumulative change in the cyclically-adjusted primary balance.
Source : OECD calculations.

4. Regression analysis

Setup

13. The quantitative analysis attempts to identify the factors affecting monetary and fiscal interactions, controlling for the influence of other potential determinants of fiscal and monetary conduct. It is based on the identification of fiscal consolidation "episodes" as described above, distinguishing between those that were *"started"* but abandoned fast, and those that were *"continued"*. Episodes are further ranked according to their degree of *success*, based *e.g.* on the cumulative adjustment or the extent to which the adjustment of the cyclically-adjusted primary balance is "permanent". Multivariate econometric analysis is used to relate the likelihood of an episode being started or continued, and its degree of success, to initial conditions such the starting fiscal position, the level or the direction of change in the output gap, inflation and the exchange rate, and changes in monetary stance. The main question addressed is whether the specified conditions make it more likely that fiscal consolidations, once undertaken, will be *continued* or *successful*, and to what extent monetary policy variables can influence the conduct and outcome of fiscal consolidation efforts.

14. Regression techniques are used to explain the various indicators describing the occurrence and the success of fiscal adjustment during the episodes as defined above. Some regressions use the full sample of relevant yearly observations (*i.e.* panel data), to investigate what determines whether an episode gets started or not, whether an episode (once started) is continued or not, and the yearly amount of fiscal adjustment during an episode. Other regressions use a sample consisting of all episodes (each episode counting as one observation) to examine what explains whether an episode – once started – gets *"seriously pursued"* or not, the success of an episode (as *e.g.* measured by the total adjustment achieved during the episode, or the length of the adjustment effort), and how much slippage occurs in the direct aftermath of a consolidation episode.

15. The main explanatory variables used in the regressions are as follows:

- As an indicator of the "need for adjustment" a synthetic indicator is used that reflects the initial levels of both the overall budget balance and public debt in per cent of GDP, measured the year before consolidation starts. More precisely, the synthetic indicator is constructed as the difference between the current cyclically-adjusted overall balance and a "target" level, defined as that required to bring the gross debt ratio from the current level to zero over 30 years under the assumption of nominal income growth in line with actual realisations extended with OECD Medium-Term Baseline projections.[12] We would expect adjustment to be more likely to start and to be pursued, and also to be larger, when the "need for adjustment" is stronger.

- The output gap or the unemployment gap (*i.e.* the distance between the current unemployment rate and the NAIRU) is used as an indicator of cyclical position. They are included as explanatory variables either in level or in first differences. If taken in level, these variables should indicate whether fiscal adjustment is more likely to occur in "good" or in "bad" times. On the other hand, first differences would show whether the timing of fiscal consolidation is predominantly pro-cyclical or countercyclical. In order to avoid simultaneity, these variables are always used lagged by at least one year.[13]

- Changes in interest rates (using long and short rates, both nominal and real) are included to assess interactions between monetary and fiscal variables.[14] However, their interpretation may not be straightforward. Lower interest rates may encourage fiscal consolidation by offsetting its potentially negative impact on aggregate demand, or may discourage it, if they are perceived as reducing the need and/or urgency for fiscal adjustment, *e.g.* if revenues are higher due to increased economic activity or if they are easing the interest burden on public debt. Moreover, the fact that market interest rates are affected by expectations -- a decline in long rates may be responding to a credible fiscal adjustment plan -- introduces potential simultaneity problems. To limit these, variables are lagged. But fully disentangling these cross-effects is difficult without detailed case studies and higher-frequency data.

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12. By combining information on both the flow and the stock dimension of a country's fiscal situation, this measure should in principle be preferable to indicators that reflect only one of them. Of course, the benchmark used (the budgetary balance needed to drive net debt to zero in 30 years) may be regarded as arbitrary, as for example it does not take into account the size of the ageing-related fiscal challenges faced by different countries. However, results are not very sensitive to changes in that benchmark.

13. Simultaneity arises from the fact that discretionary fiscal policy will affect contemporaneous output Lagging output related variables can be justified on the ground that fiscal policy is generally set in advance. An alternative solution, following Gali and Perotti (2003), would be to use instrumental variables.

14. Real interest rates, both short and long, are calculated subtracting the core CPI inflation rate from the nominal rate. When nominal interest rates are included in the specification, core inflation is also included as a control.

- The (lagged) real effective exchange rate is included as a control variable. In general, a depreciated currency could facilitate fiscal adjustment to the extent that it would help offset its adverse effect on output. At the same time, in some cases a recent or ongoing depreciation may be the indicator of a "crisis of confidence" that adds to the pressure for fiscal retrenchment (and/or difficulties for further state borrowing).

- Changes in inflation rates are used as an additional control variable. However, the sign of its effect may be ambiguous. On the one hand, by reducing the real debt burden an unanticipated increase in inflation tends to diminish the pressure for fiscal adjustment. On the other hand, higher inflation (regardless of whether it is anticipated) can improve the primary balance via fiscal drag and may provide incentives for adjustment by making it easier to contain expenditures that are set in nominal terms.

16. The variable to be explained and the type of regression are specified in a number of alternative ways, in order to capture the different aspects of the decision-making process leading to a fiscal consolidation and the different stages of a consolidation episode:

- *REGRESSION SERIES* 1: A probit regression where the dependent variable is a binary variable indicating the start of a consolidation episode. This is run on a sample of yearly observations excluding those observations where an episode was already in progress. As the Breusch-Pagan LM test argues against the use of random effects panel estimators, probit regressions are run on the pooled sample.

- *REGRESSION SERIES* 2: A probit regression where the dependent variable is a binary variable indicating continuation of an ongoing consolidation episode. This is run on a sample containing those yearly observations where an episode was in progress. Again, following the indication of the above-mentioned test, regressions are run on the pooled sample.

- *REGRESSION SERIES* 3: A panel fixed effects regression where the dependent variable is the change in the CAPB. This is run on the same sample as in regression series 2. This time both the Breusch and Pagan LM test and the Hausman test indicate that random effects are unwarranted, and a Chow test indicates that fixed effects are preferable to pooling. Consequently panel fixed effect regressions are used. The exceptions are some additional pooled regressions run in order to test whether the euro area has behaved differently.

- *REGRESSION SERIES* 4: A probit regression where the dependent variable is a binary variable indicating that an episode was *"seriously pursued"* after the initial starting period (*i.e.* an episode is considered as seriously pursued if following the starting period, an additional adjustment of at least one percentage point is achieved within two years). This is run on a sample including all episodes (*i.e.* each episode represents one observation).

- *REGRESSION SERIES* 5: The cumulative change in the CAPB over a whole adjustment episode, interpreted as an indicator of "success", is used as the dependent variable. As this LHS variable is by design truncated (*i.e.* larger than one), truncated regression techniques are used and run on a sample constituted by all episodes (same sample as in regression series 4). [15]

- *REGRESSION SERIES* 6: As an alternative indicator of "success", the deceleration in the pace of debt accumulation which results from the consolidation episode is used as the dependent variable.

15. The use of panel data techniques on the sample of episodes is not very adequate given the nature of this sample, which is also formally confirmed by Chow and Breusch-Pagan LM tests.

This is calculated as the difference between average annual change in the gross debt-to-GDP ratio in the two years leading up to and in the two years following the episode. While this variable – by design – has the drawback of measuring the effect of the cumulative change in the *overall* fiscal balance, not corrected for cyclical effects, it has the advantage of being more robust to accounting gimmickry than the cumulative change in the CAPB used in the previous regression series. We run robust OLS regressions (which allow to correct for the influence of outlier observations) on a sample constituted by all episodes (same sample as in regression series 4).

- *REGRESSION SERIES* 7: The cumulative length (in years) of an adjustment episode is used as the dependent variable. As this LHS variable is by design truncated (*i.e.* larger or equal than one), truncated regression techniques are used and run on a sample constituted by all episodes (same sample as in regression series 4).

- *REGRESSION SERIES* 8: Robust OLS regressions where the dependent variable is the cumulative change in the CAPB in the 2 years *after* a consolidation episode. This is run on a sample constituted by all episodes. The purpose is to assess what determines the extent to which the adjustment is maintained.

17. In addition to the regressions reported above, a large number of robustness checks were run, generally with qualitatively unchanged results. For example, all regressions were rerun excluding the "need for adjustment" variable, with no qualitative changes in the main results. A number of additional control variables were also tried out which turned out to be insignificant (results are not reported for conciseness). Regressions were also rerun excluding certain sub-samples, also with no significant changes in main results. Finally regressions were rerun using White-corrected standard errors, as well as by relaxing the assumption of independence within the observations from one country, again without noteworthy qualitative changes in results. Pooled OLS regressions were also run using median regressions, again with the main results remaining qualitatively unchanged. Results were also basically unaffected by quite substantial data revisions to the cyclically adjusted data which occurred towards the end of the work on this article.

Regression analysis: results

18. The main results can be summarised as follows (see Table 2; see also Tables A1-A8 in the Appendix for details). Fiscal consolidation is more likely to be undertaken when a country is facing a serious fiscal imbalance. More precisely, the synthetic indicator of "need for adjustment"[16] is always highly significant in explaining when adjustment episodes are started. However, the influence of the initial situation does not stop there. When the initial situation is more severe, fiscal adjustment is also more likely to be pursued, adjustment will be continued for longer, and the size of the adjustment (measured in various ways) will tend to be larger. Finally, a difficult financial situation even continues to exert some influence in the aftermath of an adjustment episode, insofar as there is a lower tendency for slippage.

16. As an alternative, the cyclically-adjusted overall budget balance, calculated as a per cent of GDP and measured before consolidation starts, was also used, with broadly similar results.

Table 2. **Summary of results from econometric analysis**

	Probability that episode is started	Probability that episode is continued (yearly basis)	Size of adjustment (yearly basis)	Probability that episode is seriously pursued (after initial period)	Size of cumulative adjustment (total episode)	Deceleration in pace of debt accumulation (total episode)	Length of episode	Extent of slippage in aftermath of episode
Indicator of "need for adjustment"	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +	+ +	– –
Real Exchange Rate	– – –	– –		–				
Share of expenditure cuts		+	+	+ +	+ +	+ +	+ + +	
Share of capital expenditure cuts			– –					
Cyclical indicators:								
Output gap		– – –	– –	– – –	– – –	– – –	– – –	+ +
Unemployment gap		+ + +		+ +	+ +	+ + +	+ + +	
Indicators of monetary stance:								
Change in nominal short rate		– –	– –	– –	– –	– – –	– – –	
Change in real short rate		– – –	– – –	– –	– –	– – –	– – –	
Change in real short rate relative to Taylor rule		– –	– – –	– –	–	– –	–	
Financial market indicators								
Change in nominal long rate			– –		– – –	– – –	– –	
Change in real long rate			– –		– –	– – –	– –	

Note: The algebraic signs refer to the sign of the estimated effect of the explanatory variable (indicated by row) on the explained variable (indicated by column). Only effects found to be statistically significant are indicated. One, two and three signs indicate significance at the 10%, 5% and 1% level, respectively. See Appendix for detailed information on the exact specification and results of the regressions.

19. The probability of consolidation being pursued and of it being successful is also higher under adverse cyclical conditions.[17] While the probability of an adjustment episode being started does not depend significantly on cyclical variables, the probability that it will continue and the size of the total adjustment are larger when unemployment is high relative to the NAIRU or when the output gap is large and negative.[18] Adverse cyclical conditions finally also prevent slippage once an adjustment period is

17. For the effect of cyclical positions, it is possible that -- as both the output gap and the unemployment gap have by construction a tendency for mean reversion -- a bad initial position is in fact a proxy for expected above-par growth.

18. Other studies obtained mixed results on the effects of starting economic conditions, although this may depend in part on the specification of the cyclical variables. Von Hagen and Strauch (2001) find that after controlling for global cyclical conditions, a favourable domestic cyclical situation, measured by the output gap, makes it more likely that a consolidation will be undertaken, but less likely that it will be successful. Lambertini and Tavares (2000) find that GDP growth is usually slower than average before successful

terminated. Correlations with *changes* in the unemployment gap or the output gap have the same signs but are usually statistically insignificant. This suggests that fiscal consolidation is more likely to proceed in "bad times" than in "good times". A possible explanation is that the political consensus needed to undertake painful adjustment may be easier to reach in a situation of "crisis". Another possibility is that policy-makers decide consolidation policies more on the basis of actual balances (which look worse in recessions) than of cyclically-adjusted balances, so that the cyclical variable picks up some of the effect due to the initial budgetary position.[19]

20. Consolidation is also more likely to be started after large exchange rate depreciations and when inflation is high,[20] and it is more likely to be continued when the real effective exchange rate is depreciated relative to its long-run average.[21] This probably indicates that fiscal consolidations often follow exchange rate crises and are part of the measures taken to restore confidence. However, it may also mean that a depreciated exchange rate helps fiscal adjustment by offsetting part of its adverse effects on aggregate demand.

21. Finally, the extent of consolidation achieved depends also on the composition of fiscal adjustment as between current primary expenditure cuts and revenue-raising measures.[22] A higher share of non-capital expenditure cuts in the total adjustment effort not only increases the likelihood that an adjustment is pursued, but is also connected with larger cumulative adjustments.[23] Contrary to previous studies[24], however, we do not find slippage in the aftermath of the episode to be significantly affected by the share of expenditure cuts as opposed to tax increases in the overall adjustment of the primary balance.

22. After controlling for the above influences, consolidation is more likely to succeed when interest rates are falling.[25] Interest rate variables do not have an impact on the probability that a fiscal adjustment period is started, but declines in nominal and real short rates are associated with a higher likelihood that the

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consolidations. However, Ardagna (2004a) finds that lagged GDP growth has a statistically significant (though small) positive effect on the likelihood of success.

19. As indicated above, our synthetic indicator of "need for adjustment" is based on the cyclically-adjusted overall balance.

20. As regards inflation, the effect of a high initial level on the start of consolidation may be due to the fact that the "inflation tax" is difficult to maintain unless repeated "inflation surprises" can be engineered, and offsetting measures are eventually needed to meet the government budget constraint. Another possibility is that high inflation may be associated with increases in revenue due to fiscal drag, which would show up as a discretionary tightening of fiscal stance unless it is offset by other measures.

21. Lambertini and Tavares (2000) also find that exchange rate devaluations are a significant predictor of successful fiscal consolidations.

22. This is consistent with results obtained by Alesina and Perotti (1995) and by Von Hagen *et al*. (2002).

23. Interestingly, a high share in capital expenditure cuts has the inverse effect, *i.e*. diminishes the probability of continuation and size of adjustment, though this effect rarely comes out significant. Capital expenditures are usually easier to cut than current expenditures, but their reduction may not be sustainable if it leads, for example, to a deterioration of public infrastructure.

24. See, for example, Alesina and Perotti (1997).

25. As mentioned in the introduction, relatively few papers in the literature on consolidation episodes specifically address this question. Of those, only the study by Von Hagen and Strauch (2001) finds that monetary conditions have an influence on fiscal consolidation episodes. Contrary to the results presented here, they find that easier monetary conditions increase the likelihood that consolidation will be undertaken, but not that it will be pursued and successful. However, this result may be connected to the specification of the monetary variable (a monetary conditions index combining the impact of real interest rates and of the effective exchange rate).

adjustment is pursued, and falling nominal and real short and long rates are associated with greater success as measured by the total adjustment achieved during an episode.[26] This also holds true if the explanatory variable used is the difference between the actual change in real rates and the change that would be dictated by a Taylor rule -- an indicator that should capture the part of the change in monetary stance that departs from the "standard" policy response to current output and inflation changes.

23. These results are open to more than one interpretation. They could imply that falling interest rates, by supporting economic activity, help to encourage the continuation of consolidation efforts. But they could also mean that monetary authorities and financial markets are reacting favourably to signals that the fiscal authorities are committed to persevering in their consolidation efforts. In other words, the regressions may be picking up some reverse causation from (expected) fiscal policies to monetary variables. A proxy for the perceived "quality" of an adjustment effort, based on the share of expenditure cuts, turns out to be significant as a predictor of the size and duration of consolidation episodes, in line with previous findings in the literature.[27] When this additional control variable is included the impact of the interest rate variables on the success of fiscal consolidation decreases, as does its significance. This is consistent with evidence that fiscal adjustments which include a higher share of cuts to current expenditures -- and are therefore likely to be perceived as more credible -- tend on average to elicit a stronger interest rate response.[28] In episodes where at least half of the adjustment was achieved through current expenditure cuts, both short-term policy rates (measured relative to the Taylor-rule benchmark) and long-term bond yield differentials show larger overall declines and are more likely to start falling in the early stages of the consolidation episode (Figure 4).[29]

24. This suggests that the interest rate variable is in part picking up the endogenous reaction of monetary authorities and/or financial markets to the credibility of fiscal plans. Those features of fiscal adjustment plans that help establish their credibility can also contribute to set in motion a virtuous cycle in the interaction with monetary variables. This may not be the whole story. But a fully-fledged analysis of the interactions between fiscal stance, expectations and monetary policy actions would require the use of higher-frequency data and additional information on "news" about fiscal plans and outcomes, is not attempted here. Nor can it be concluded that a more accommodative monetary stance is always accompanied by substantial fiscal adjustment. Figure 5 shows that in situations where monetary policy reacts to initial adjustment efforts via lower real interest rates, a wide variety of adjustment outcomes resulted, ranging from large and protracted efforts (Belgium in 1982-1987, Canada in 1994-1997; Sweden in 1994-1998) to episodes abandoned after one year (Japan in 1997; the Netherlands in 1996). By contrast, when the monetary stance was tightened in the early stages of an episode -- after adjusting for changes in inflation and cyclical positions -- the consolidation usually did not go very far, with a few exceptions (most notably, Sweden 1981-1987).

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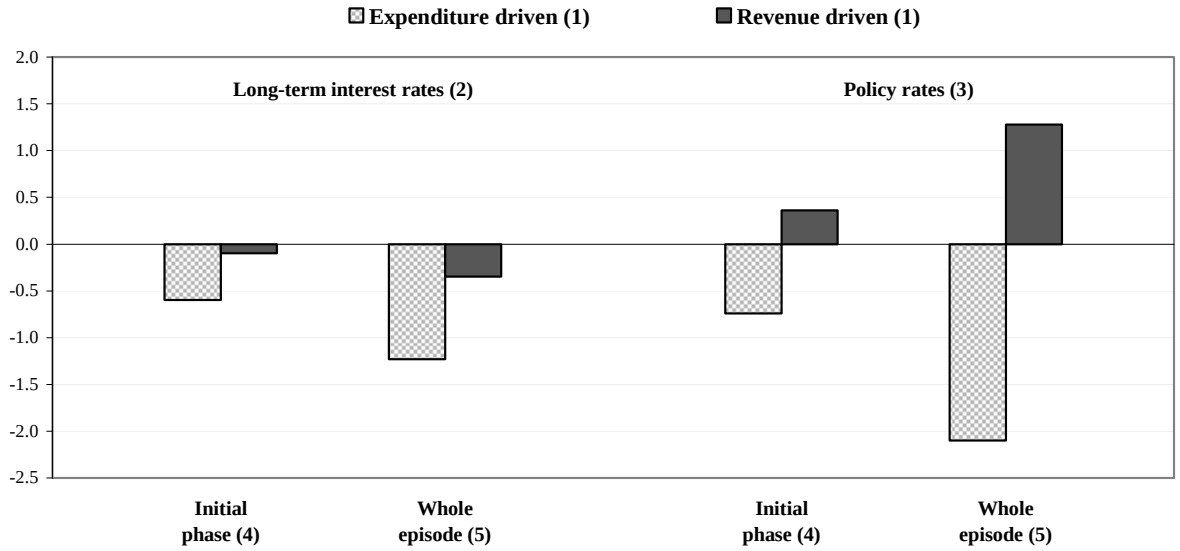
26. If interest rates are not included among regressors, the level in inflation is only statistically significant as a factor determining whether a consolidation episode is started, but neither levels nor changes in inflation are significant by themselves for explaining whether consolidation is continued or how far it will be continued.

27. See Alesina and Perotti (1997) and Von Hagen *et al*. (2002).

28. Ardagna (2004b) also finds that fiscal consolidations that are larger and that rely more on expenditure cuts tend to be accompanied by larger declines in long-term interest rates.

29. Long-term interest rate differentials are measured relative to German rates for European countries, relative to the US rates for other countries. The United States and Germany, as well as Japan and the United Kingdom, are excluded from the sample for the calculation of average responses. Long-term interest rate differentials are a better proxy for the perceived sustainability of fiscal policies than absolute interest rate levels, which also reflect cyclical and other influences on global bond markets. A more in-depth analysis should also ideally include a control for exchange rate regimes, which varied both across countries and across time during the sample period.

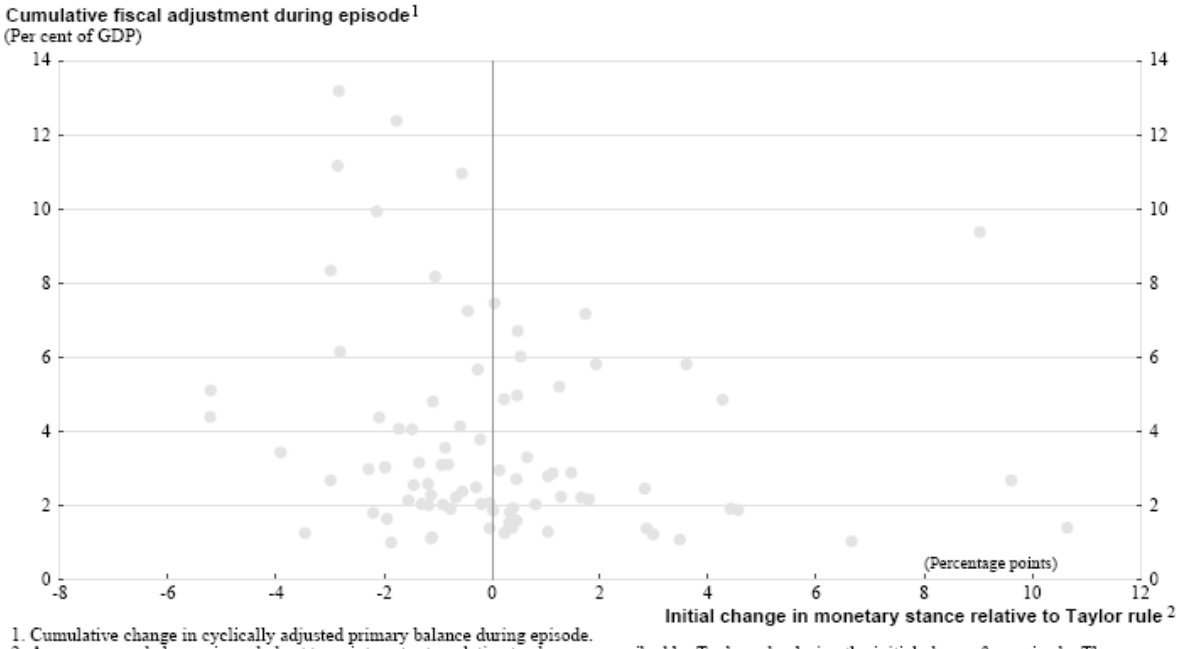
Figure 4. Response of long-term interest rates and policy rates during episodes of fiscal consolidation



1. Episodes are labelled as expenditure driven if cuts in current expenditure account for half of the overall adjustment or more, as revenue driven otherwise. Episodes undertaken in the absence of "need for adjustment" (as measured by our synthetic indicator) are excluded from the sample.
2. Changes in long-term interest rates as measured by changes in the spread of the 10-year government bond yield relative to the corresponding US yield (for non-European countries) or German yield (for European countries). Episodes for the United States, Germany, Japan and the United Kingdom are excluded from the sample.
3. Difference between the actual change in the real short-term interest rate and the change that would be prescribed by a Taylor rule with 0.5 coefficients for both the output gap and inflation.
4. Cumulated change over the period (the first 1 or 2 years) it took for the adjustment to reach the threshold of 1% of GDP, necessary to qualify as an episode.
5. Cumulated change over the entire consolidation episode.

Source: OECD calculations.

Figure 5. Consolidation episodes : cumulative fiscal adjustment and initial change in monetary stance relative to Taylor rule



1. Cumulative change in cyclically adjusted primary balance during episode.
2. Average annual change in real-short term interest rate, relative to change prescribed by Taylor rule, during the initial phase of an episode. The inital phase may include one or two years, depending on how long it takes for the adjustment to reach the treshold of 1 per cent of GDP, necessary to qualify for the definition of an episode. The Taylor rule assigns a 0.5 per cent weight both to changes in core inflation and to changes in the output gap.

Source : OECD calculations.

25. Intertemporal evidence suggests that institutional factors may be key to determining monetary-fiscal interactions. Given the small sample of observations available, the analysis did not focus specifically on how the likelihood of fiscal adjustment being undertaken and its degree of success varied across time for each country. However, the experience of countries that are now members of the euro area is interesting in that respect. Pooled regressions, controlling for all other variables, show that these countries were significantly less likely than others to undertake fiscal consolidation over the period 1980-92. Things changed, however, over the 1992-97 "qualification period", when prospective euro-area members became more likely to start to consolidate than other OECD countries, although perhaps still less likely to pursue the process vigorously. Following EMU entry, the heightened propensity of euro-area countries to start consolidation vanished, as they reverted to being less likely to continue consolidation than the OECD average. This result suggests that institutional setups that help reinforce the credibility of fiscal plans also increase the likelihood that monetary authorities and financial markets will respond favourably to fiscal consolidations.

Changes in interest payments and their effects on consolidation

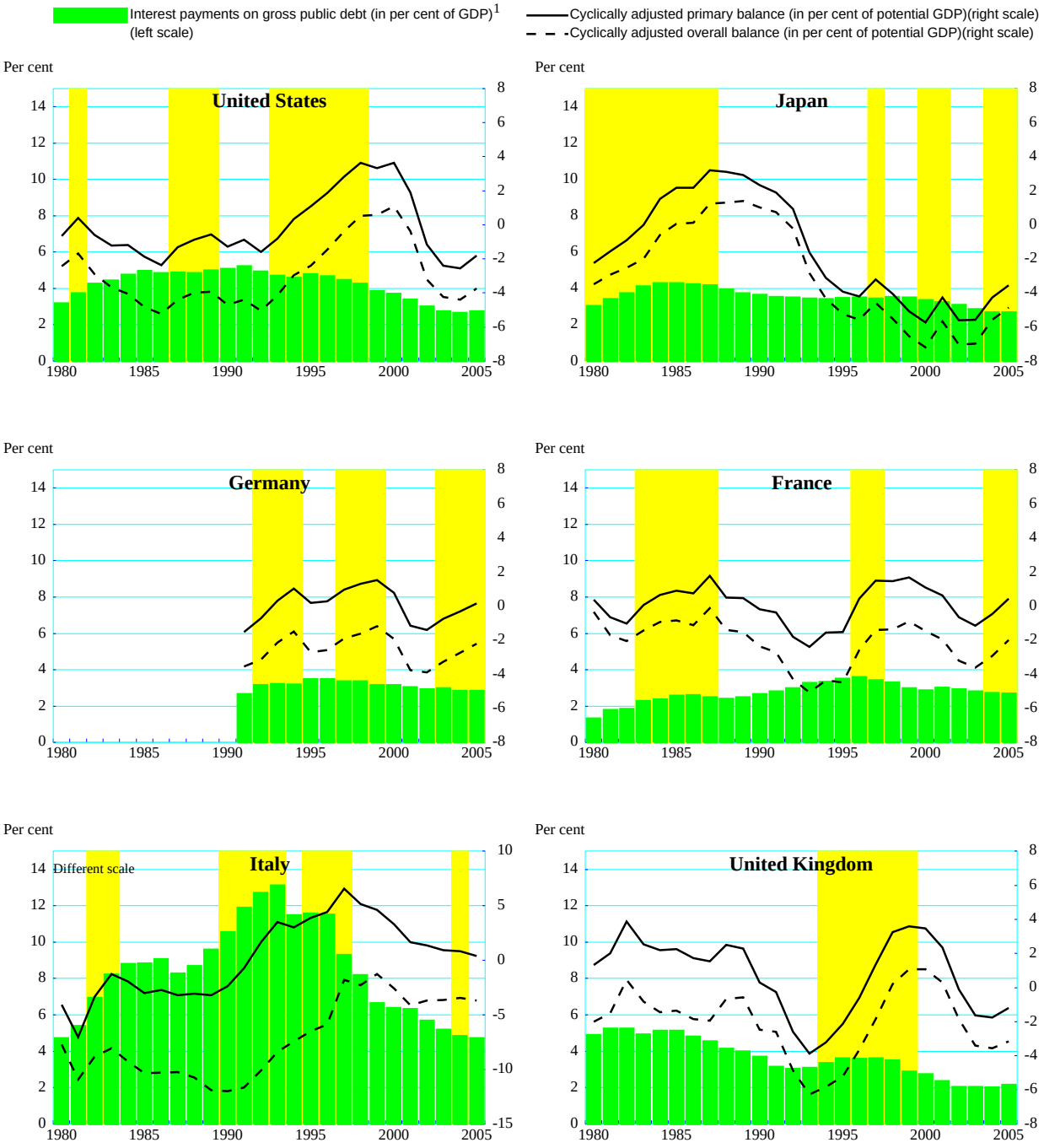
26. While monetary easing appears to help fiscal consolidation, there is some evidence that the transmission of this effect is not (or not mainly) related to declining interest payments on public debt. Indeed, comparing across episodes, a declining interest burden -- whether due to the effects of the adjustment itself on the debt dynamics or to a lower average interest cost -- tends to be partly offset by a

lower intensity of adjustment as measured by the change in the cyclically-adjusted primary balance.[30] The tendency to offset changes in interest payments with shifts in the primary balance is also observed in the immediate aftermath of consolidation episodes (Figure 6).

In some cases this behaviour may be the result of the country reaping the benefits of a front-loaded adjustment profile, where the initial improvement of the primary balance is large enough to invert the trend of the debt ratio and to restore credibility, leading to lower market interest rates. Thus, some of the large consolidation episodes of the 1990s -- such as Belgium in 1993-1998 and Canada in 1995-1997 -- were followed by periods where primary surpluses were gradually eroded, broadly offsetting the benefits from the parallel decline in interest payments, but still allowing these countries to approximately maintain the improvement in the overall balance that had been achieved through the consolidation. By contrast, in Italy the erosion of the primary surplus after the 1995-1997 consolidation was far in excess of the decline in interest payments, leading to a deterioration of the overall cyclically-adjusted balance and reversing a large part of the earlier gains (Figure 7). A similar reversal of earlier consolidations has occurred in France, the United Kingdom and the United States.

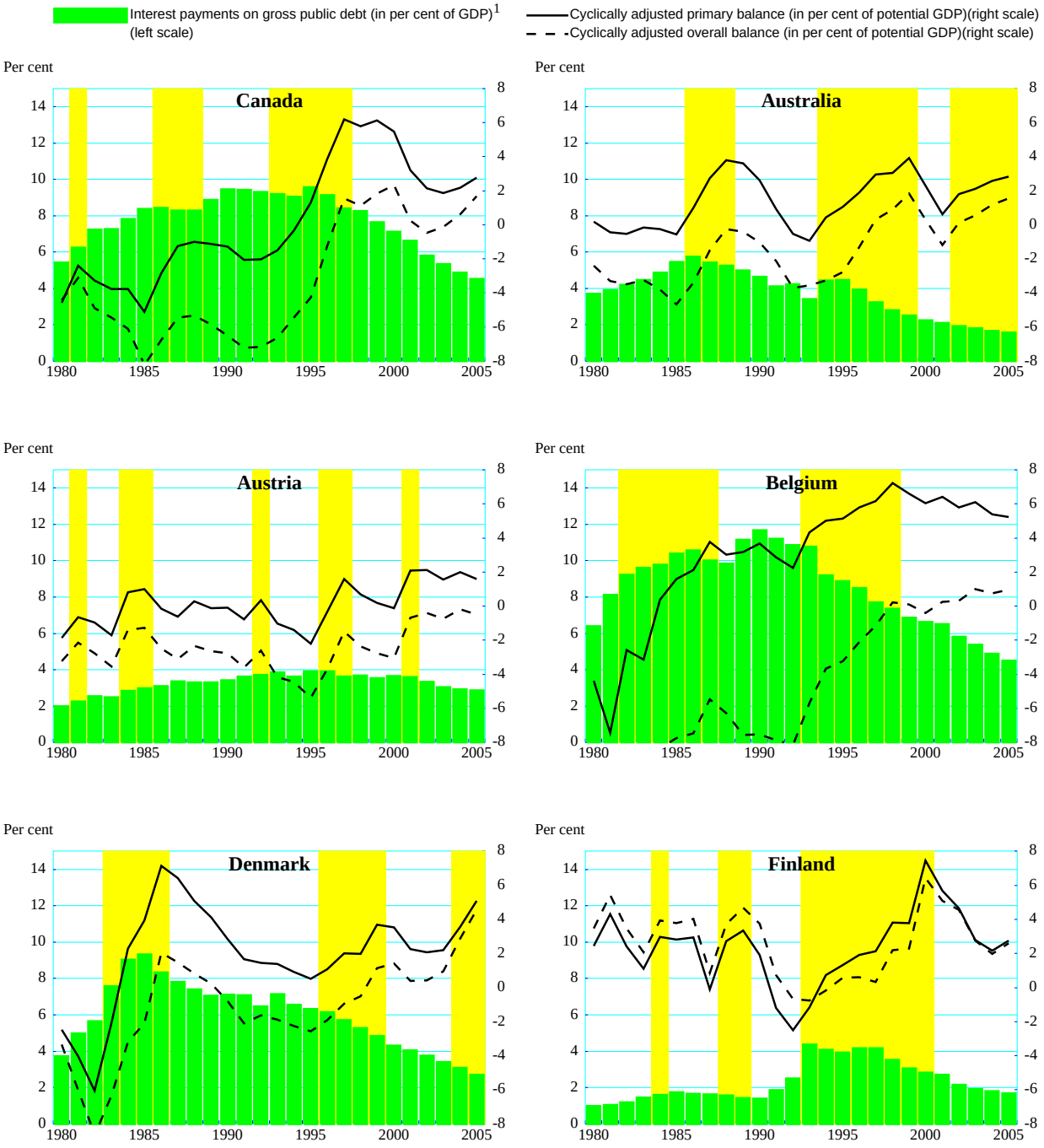
30. The average annual fiscal adjustment during episodes is positively correlated with the average change in gross interest payments. The correlation stays significant also after controlling for our indicator of the "need for adjustment".

Figure 6. Evolution of gross interest payments and of cyclically-adjusted primary and overall fiscal balances



1. Gross interest payments do not exactly correspond to the difference between the primary and the overall balance, which is net interest payments. Nevertheless, the time profile of gross and net interest payments is similar for most countries, with a few exceptions.
Note : Shaded areas indicate fiscal consolidation episodes.
Source : OECD.

Figure 6(cont.). Evolution of gross interest payments and of cyclically-adjusted primary and overall fiscal balances



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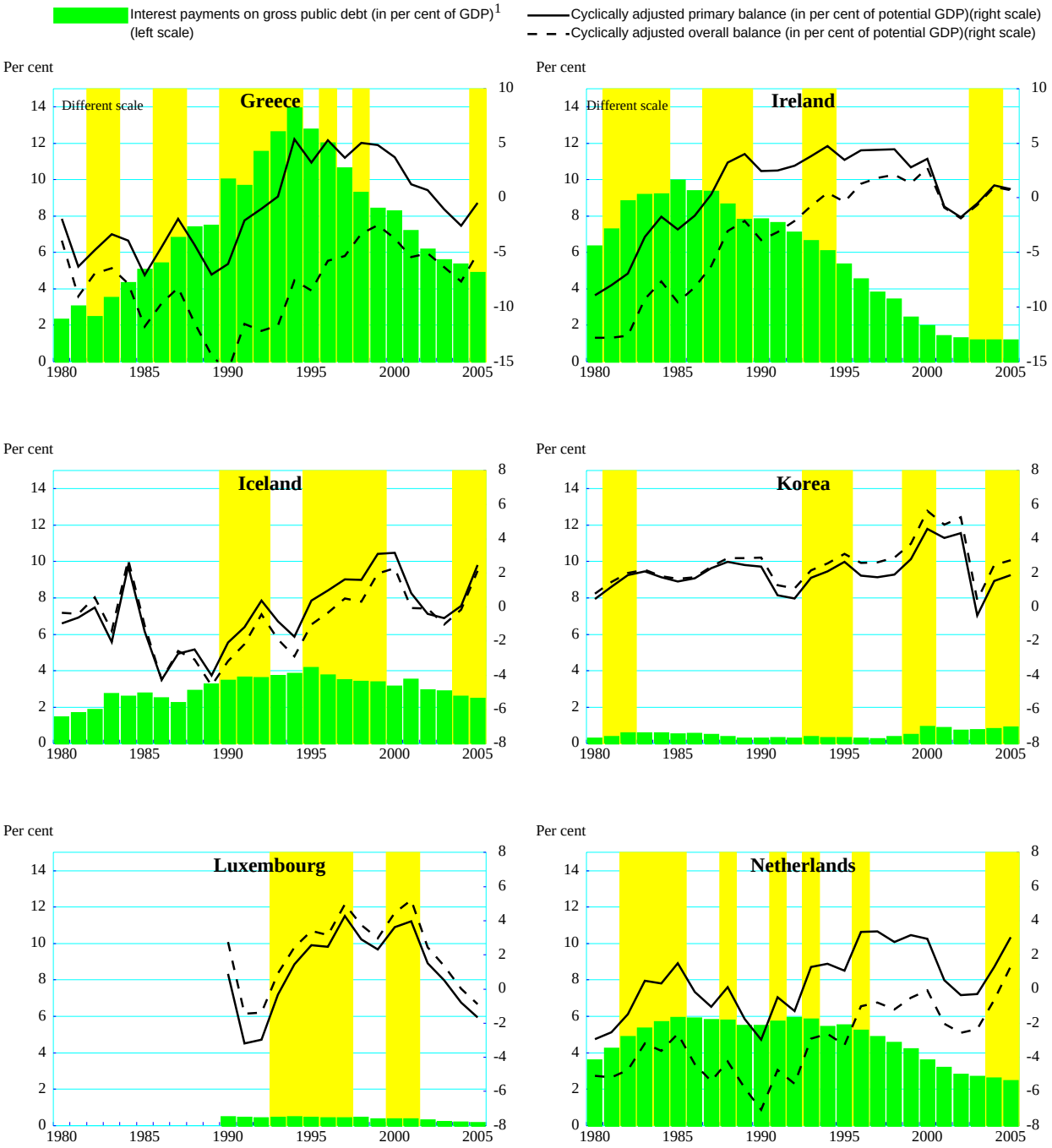

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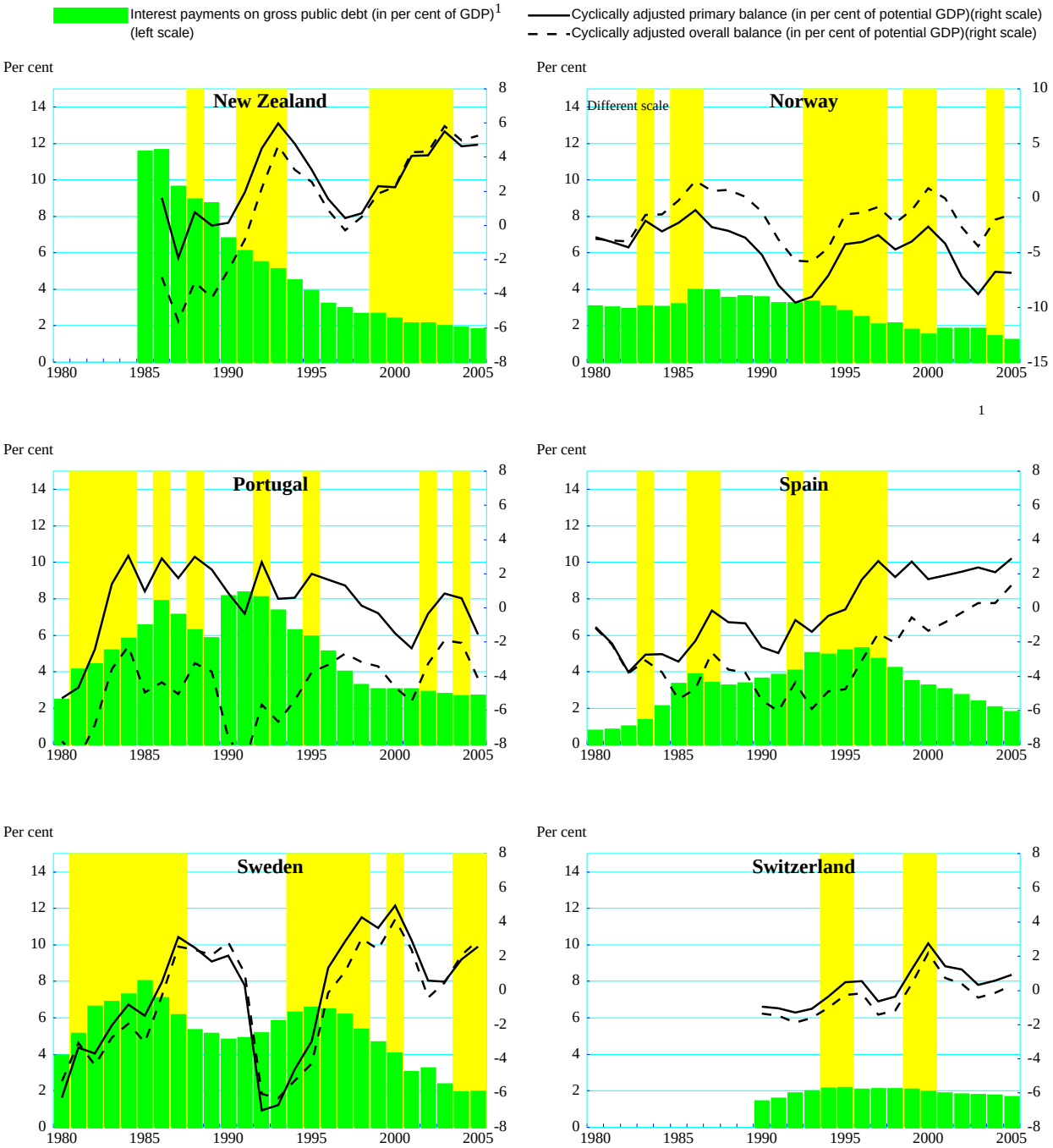

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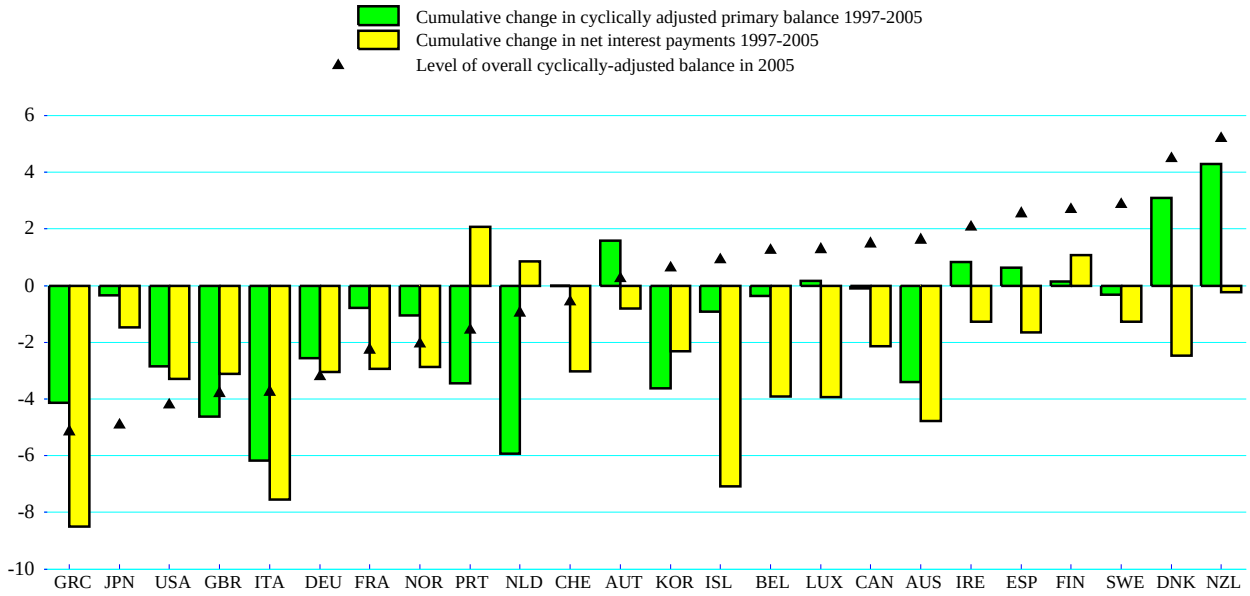
Note : Shaded areas indicate fiscal consolidation episodes.
Source : OECD.

Figure 7. Cumulative change in interest payments and cyclically adjusted primary balances 1997-2005



Source : OECD.

5. Some policy considerations

27. The message from the above analysis is a rather mixed one for policy setting. Fiscal consolidations tend to occur when large budget deficits threaten sustainability and usually when other macroeconomic indicators -- inflation, the exchange rate and unemployment -- suggest a "crisis" situation. These *forces majeures* may also be important in constraining monetary policy. But after controlling for these factors, an easing of monetary stance seems to be associated with stronger fiscal consolidation. Though it is difficult to judge to what type of monetary developments fiscal policy is reacting and, in particular, whether monetary developments are autonomous or are themselves reacting to fiscal policy, it is unclear how consolidation episodes have fitted, or should fit, into central bank reaction functions.

28. Monetary policy does not usually respond explicitly to fiscal stance, largely out of concern about compromising central bank autonomy. But where its focus is on price stability it will generally respond to fiscal developments "to the extent that they pose risks to price stability".[31] This would normally include a response to the effect that fiscal policy is expected to have on aggregate demand pressures. Beyond that, a direct response channel would thus seem to be ruled out in principle. In a context of uncertainty as to the effective implementation and durability of a planned fiscal restriction, the monetary authority would continue to eschew any response to fiscal policy that looked like compromising a stance of "non-accommodation".[32] Even for central banks with a dual mandate, the experience of the 1970s, when high

31. Issing (2002).

32. See for example *Remarks by Chairman Alan Greenspan* (Closing remarks at a symposium sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, August 27, 2005): "Monetary policy,

public indebtedness was inflated away, still causes central bankers to worry about potential monetisation – or the deflationary impact of preventing it.[33]

29. Allowing for the above imperatives, the scope for monetary policy reaction to consolidation efforts is defined by their credibility. To the extent that fiscal plans are expected to be implemented, they can normally be expected to be factored into central banks' macroeconomic projections. Similarly, the reaction of bond yields will reflect financial markets' assessment of the credibility of fiscal plans. In this regard it is crucial from the both central bank's and market participants' point of view whether an adjustment is structural or just cosmetic, and whether it is expected to be lasting or soon reversed. The assessment is likely to be influenced by the fiscal authorities' track record, and this creates a potential for a suboptimal Nash equilibrium: monetary authorities, viewing fiscal consolidation plans as insufficiently credible, refrain from offsetting their potential deflationary impact -- or at least not until the effects can be seen, which may be too late -- and this in turn discourages fiscal authorities from going through with their original consolidation plans. While this outcome may be regrettable, the central bank can only be reluctant to take the risk of moving pro-actively in response to fiscal assumptions that may later prove to be wrong, since that would then force it to reverse its earlier policy moves, with potentially destabilising consequences on the economy and on financial markets.

30. Moving from such a "prisoner's dilemma" to a superior outcome through some form of implicit coordination would seem to be possible and desirable, as evidenced by the fact that monetary stance has assisted fiscal consolidation in a number of episodes. While it is probably easier to start a fiscal consolidation programme in a "crisis" than in good times, it may be difficult to maintain momentum if, after some time, the economic situation does not show a clear improvement, and favourable reactions from monetary policy and financial markets can help there. But the circumstances in which monetary easing can propitiate fiscal consolidation would seem to be heavily dependent upon institutional circumstances. Credible fiscal rules must play an important role here, but the identification of what precise policy actions and what institutional features are most effective in generating confidence in the fiscal consolidation process requires further research.

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for example, cannot ignore the potential inflationary pressures inherent in our current fiscal outlook, especially those that could arise in meeting commitments to future retirees. However, I assume that these imbalances will be resolved before stark choices again confront us and that, if they are not, the Fed would resist any temptation to monetize future fiscal deficits. We had too much experience with the dangers of inflation in the 1970s to tolerate going through another bout of dispiriting stagflation."

33. See Testimony of Chairman Alan Greenspan Federal Reserve Board's semi-annual *Monetary Policy Report to the Congress before the Committee on Financial Services*, U.S. House of Representatives July 20, 2005: "Large deficits could result in rising interest rates and ever-growing interest payments on the accumulating stock of debt, which in turn would further augment deficits in future years. That process could result in deficits as a percentage of gross domestic product rising without limit. Unless such a development was headed off, these deficits could cause the economy to stagnate or worse at some point over the next couple of decades."

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APPENDIX

Tables

A1. Probability that a consolidation episode is started
A2. Probability that adjustment is continued from previous year
A3. Size of yearly fiscal adjustment
A4. Probability of episode being seriously pursued after initial phase
A5. Size of cumulated adjustment during episode
A6. Deceleration in the pace of debt accumulation
A7. Length of adjustment episode
A8. Slippage after episode

Table A.1. **Probability that a consolidation episode is started**

Regression results

Type of regression:	Pooled probit regressions									
Left-hand-side variable	Binary variable indicating start of an adjustment episode									
Explanatory variables	1	2	3	4	5	6	7	8	9	10
Need for adjustment (lagged)	0.03 [4.84]***	0.03 [4.81]***	0.03 [4.15]***	0.03 [4.92]***	0.03 [4.52]***	0.03 [4.98]***	0.03 [4.90]***	0.03 [4.48]***	0.03 [4.48]***	0.03 [4.90]***
Ouput gap (lagged)	-0.01 [0.63]									
Unemployment gap (lagged)		0.00 [0.01]								
Change in RER (lagged)	-0.01 [2.42]**	-0.01 [2.58]***	-0.01 [2.77]***	-0.01 [2.56]**	-0.01 [2.54]**	-0.01 [2.71]***	-0.01 [2.70]***	-0.01 [2.46]**	-0.01 [2.46]**	-0.01 [2.72]***
Core inflation (lagged level)			0.02 [2.77]***							
Euro area countries excluding 1992-1997				-0.04 [0.73]						
Euro area countries 1992-1997	0.21 [2.45]**	0.21 [2.45]**	0.23 [2.69]***	0.18 [2.05]**	0.19 [2.10]**	0.22 [2.56]**	0.21 [2.43]**	0.19 [2.20]**	0.19 [2.21]**	0.19 [2.21]**
Euro area countries 1980-1991					0.00 [0.03]					
Euro area countries 1998-2005					-0.07 [1.10]					
Nominal short rate (lagged change)						0.01 [0.63]				
Real short rate (lagged change)							0.00 [0.31]			
Nominal long rate (lagged change)								-0.02 [0.77]		
Real long rate (lagged change)									-0.02 [1.29]	
Changes in short rates relative to Taylor rule										0.00 [0.10]
Core inflation (lagged change)						0.02 [1.15]		0.02 [1.25]		
(constant not reported)										
Observations	318	318	318	318	318	317	317	305	305	316
Pseudo R2	0.12	0.12	0.14	0.12	0.12	0.13	0.12	0.11	0.11	0.11

(Reported coefficients recalculated as marginal effects, i.e. approximate change in probability of LHS variable if RHS variable increases by one unit; for dummy variables reported coefficient gives change in probability for LHS variable if RHS variable changes from 0 to 1)

(Numbers reported in small font below the coefficients are the corresponding z-statistics)

** significant at 10%; ** significant at 5%; *** significant at 1%*

Table A.2. **Probability that adjustment is continued from previous year**

Regression results

Type of regression: Pooled probit regressions

Left-hand-side variable: Binary variable indicating continuation of an ongoing adjustment episode

Explanatory variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Need for adjustment (lagged)	0.03	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
	[2.99]***	[2.81]***	[2.96]***	[3.12]***	[3.11]***	[2.83]***	[2.84]***	[3.19]***	[3.24]***	[3.19]***	[3.37]***	[3.35]***	[3.08]***	[3.09]***	[3.40]***
Ouput gap (lagged)	-0.04		-0.04	-0.04	-0.04	-0.05	-0.06	-0.05	-0.03	-0.04	-0.03	-0.04	-0.05	-0.05	-0.05
	[2.53]**		[2.54]**	[2.31]**	[2.74]***	[3.09]***	[3.47]***	[3.12]***	[2.35]**	[2.50]**	[2.03]**	[2.56]**	[2.83]***	[3.17]***	[2.84]***
Unemployment gap (lagged)		0.08													
		[2.91]***													
RER relative to historic average (lagged)	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
	[2.29]**	[2.00]**	[2.30]**	[1.87]*	[1.88]*	[1.67]*	[1.64]	[1.54]	[1.80]*	[2.10]**	[1.55]	[1.49]	[1.36]	[1.33]	[1.24]
Euro-area countries excluding 1992-1997	-0.24	-0.28		-0.24	-0.24	-0.25	-0.25	-0.24	-0.27	-0.25	-0.26	-0.27	-0.27	-0.27	-0.27
	[3.04]***	[3.45]***		[3.01]***	[3.05]***	[3.05]***	[3.06]***	[3.06]***	[3.22]***	[3.07]***	[3.11]***	[3.17]***	[3.15]***	[3.16]***	[3.18]***
Euro-area countries 1992-1997	-0.12	-0.14	-0.13	-0.20	-0.20	-0.19	-0.19	-0.18	-0.14	-0.13	-0.20	-0.20	-0.19	-0.19	-0.18
	[1.24]	[1.37]	[1.26]	[1.85]*	[1.85]*	[1.64]	[1.66]*	[1.69]*	[1.33]	[1.23]	[1.85]*	[1.85]*	[1.62]	[1.64]	[1.69]*
Euro-area countries 1980-1991			-0.26												
			[2.62]***												
Euro-area countries 1998-2005			-0.23												
			[2.14]**												
Nominal short rate (lagged change)				-0.05							-0.05				
				[2.24]**							[2.05]**				
Real short rate (lagged change)					-0.05							-0.04			
					[2.59]***							[2.19]**			
Nominal long rate (lagged change)						-0.04							-0.03		
						[1.25]							[0.87]		
Real long rate (lagged change)							-0.03							-0.02	
							[1.47]							[0.95]	
Changes in short rates relative to Taylor rule								-0.03							-0.03
								[2.52]**							[2.03]**
Share of expenditure cuts in total adjustment (lagged)									0.08		0.06	0.06	0.06	0.06	0.06
									[1.92]*		[1.47]	[1.45]	[1.32]	[1.31]	[1.43]
Share of capital-expenditure cuts in total adj. (lagged)										-0.06					
										[1.27]					
Core inflation (lagged change)				0.04		0.03					0.04		0.02		
				[2.11]**		[1.13]					[1.67]*		[0.71]		
(Constant not reported)															
Observations	226	226	226	226	226	208	208	226	215	215	215	215	197	197	215
Pseudo R2	0.11	0.12	0.14	0.14	0.14	0.15	0.15	0.13	0.13	0.13	0.15	0.15	0.16	0.16	0.15

(Reported coefficients recalculated as marginal effects, i.e. approximate change in probability of LHS variable if RHS variable increases by one unit; for dummy variables reported coefficient gives change in probability for LHS variable if RHS variable changes from 0 to 1)

(Numbers reported in small font below the coefficients are the corresponding z-statistics)

** significant at 10%; ** significant at 5%; *** significant at 1%*

Table A.3. **Size of yearly fiscal adjustment**

Regression results

Type of regression:	Fixed-effect panel regressions															Pooled OLS regressions	
Left-hand-side variable	Change in the primary adjusted fiscal balance (by year)																
Explanatory variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Need for adjustment (lagged)	0.25 [7.54]***	0.25 [7.32]***	0.24 [7.40]***	0.24 [7.49]***	0.24 [7.50]***	0.20 [6.27]***	0.20 [6.24]***	0.24 [7.59]***	0.24 [7.43]***	0.25 [7.58]***	0.24 [7.40]***	0.24 [7.42]***	0.19 [6.09]***	0.19 [6.06]***	0.24 [7.48]***	0.11 [5.34]***	0.12 [5.31]***
Ouput gap (lagged)	-0.08 [2.18]**		-0.08 [2.14]**	-0.08 [2.13]**	-0.07 [2.15]**	-0.09 [2.45]**	-0.11 [3.20]***	-0.09 [2.66]***	-0.08 [2.38]**	-0.09 [2.51]**	-0.08 [2.15]**	-0.08 [2.35]**	-0.09 [2.51]**	-0.11 [3.36]***	-0.10 [2.78]***	-0.11 [3.20]***	-0.11 [3.24]***
Unemployment gap (lagged)		0.09 [1.37]															
RER relative to historic average (lagged)			0.00 [0.08]														
Nominal short rate (lagged change)				-0.09 [1.97]**							-0.09 [1.98]**						
Real short rate (lagged change)					-0.11 [2.67]***							-0.10 [2.43]**					
Nominal long rate (lagged change)						-0.18 [2.49]**							-0.16 [2.35]**				
Real long rate (lagged change)							-0.11 [2.40]**							-0.09 [1.89]*			
Changes in short rates relative to Taylor rule								-0.08 [2.61]***							-0.07 [2.28]**		
Share of expenditure cuts in total adjustment (lagged)									0.09 [1.87]*		0.07 [1.56]	0.07 [1.59]	0.08 [1.82]*	0.07 [1.64]	0.07 [1.51]		
Share of capital-expenditure cuts in total adj. (lagged)										-0.06 [2.44]**							
Core inflation (lagged change)				0.12 [2.46]**		0.08 [1.46]					0.10 [2.05]**		0.05 [0.85]				
Euro-area countries excluding 1992-1997																-0.70 [3.61]***	
Euro-area countries 1992-1997																-0.53 [2.17]**	-0.54 [2.21]**
Euro-area countries 1980-1991																	-0.80 [3.33]***
Euro-area countries 1998-2004																	-0.58 [2.15]**
(Constant not reported)																	
Observations	226	226	226	226	226	208	208	226	215	215	215	215	197	197	215	226	226
Number of groups	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24		
Adjusted R2	0.26	0.25	0.26	0.29	0.29	0.27	0.27	0.29	0.28	0.29	0.3	0.3	0.29	0.28	0.3	0.18	0.18

(Numbers reported in small font below the coefficients are the corresponding t-statistics)

** significant at 10%; ** significant at 5%; *** significant at 1%*

Table A.4. **Probability of episode being seriously pursued after initial phase**

Regression results

Type of regression: Pooled probit regressions (one observation per adjustment episode)

Left-hand-side variable: Binary variable indicating whether a consolidation episode was seriously continued after the initial starting phase

Explanatory variables	1	2	3	4	6	5	7	8	9	10	11	12	13	14	15	16
Need for adjustment (end of starting phase)	0.04 [2.74]***	0.04 [2.53]**	0.05 [2.82]***	0.05 [2.74]***	0.04 [2.20]**	0.04 [2.29]**	0.04 [2.00]**	0.04 [1.95]*	0.04 [2.27]**	0.04 [2.61]***	0.04 [2.70]***	0.04 [2.18]**	0.04 [2.31]**	0.04 [2.10]**	0.04 [2.09]**	0.04 [2.28]**
Ouput gap (end of starting phase)	-0.06 [2.05]**		-0.07 [2.67]***	-0.07 [2.62]***	-0.07 [2.47]**	-0.07 [2.57]**	-0.10 [3.09]***	-0.10 [3.17]***	-0.08 [2.83]***	-0.06 [2.19]**	-0.07 [2.59]***	-0.07 [2.30]**	-0.07 [2.29]**	-0.10 [2.89]***	-0.10 [2.91]***	-0.07 [2.46]**
Unemployment relative to NAIRU (end of starting phase)		0.15 [2.56]**														
Relative RER (end of starting phase)	-0.02 [2.00]**	-0.02 [1.56]														
Euro-area countries excluding 1992-1997			-0.05 [0.38]													
Euro-area countries 1992-1997			-0.20 [1.30]	-0.20 [1.29]												
Euro-area countries 1980-1991				-0.02 [0.09]												
Euro-area countries 1998-2004				-0.10 [0.55]												
Nominal short rate (average change during starting phase)					-0.07 [2.02]**							-0.04 [1.20]				
Real short rate (average change during starting phase)						-0.07 [2.12]**							-0.05 [1.39]			
Nominal long rate (average change during starting phase)							-0.06 [1.01]							-0.04 [0.70]		
Real long rate (average change during starting phase)								-0.04 [0.99]							-0.03 [0.83]	
Short rates relative to Taylor rule (average change during starting phase)									-0.06 [1.99]**							-0.04 [1.47]
Share of expenditure cuts in total adjustment (during starting phase)										0.38 [2.49]**		0.32 [1.98]**	0.31 [1.96]**	0.31 [1.97]**	0.31 [2.01]**	0.33 [2.13]**
Share of capital-expenditure cuts in total adj. (during starting phase)											-0.07 [0.52]					
Core inflation (average change during starting phase)					0.07 [1.64]		0.03 [0.61]					0.06 [1.32]		0.03 [0.64]		
(Constant not reported)																
Observations	83	83	83	83	83	83	76	76	83	83	83	83	83	76	76	83
Pseudo R2	0.18	0.21	0.16	0.16	0.19	0.19	0.2	0.2	0.18	0.21	0.15	0.23	0.23	0.24	0.24	0.23

(reported coefficients recalculated as marginal effects, i.e. approximate change in probability of LHS variable if RHS variable increases by one unit; for dummy variables reported coefficient gives change in probability for LHS variable if RHS variable changes from 0 to 1)

(Numbers reported in small font below the coefficients are the corresponding z-statistics)

** significant at 10%; ** significant at 5%; *** significant at 1%*

Table A.5 **Size of cumulated adjustment during episode**

Regression results

Type of regression: Truncated regressions; pooled sample - one observation per adjustment episode

Left-hand-side variable: Cumulated change in the primary cyclically adjusted fiscal balance over the whole adjustment episode

Explanatory variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Need for adjustment (year before start of episode)	1.06	1.27	1.39	1.19	1.03	1.00	0.74	0.86	1.16	1.07	1.44	0.96	0.94	0.66	0.72	0.99
	[2.87]***	[2.70]***	[2.52]**	[2.59]***	[3.12]***	[3.09]***	[3.69]***	[3.17]***	[2.79]***	[3.13]***	[2.54]**	[3.34]***	[3.35]***	[4.07]***	[3.79]***	[3.27]***
Ouput gap (year before start of episode)		-1.14	-1.25	-1.17	-0.85	-0.90	-0.82	-1.14	-0.96	-0.91	-1.45	-0.73	-0.75	-0.69	-0.84	-0.72
		[2.19]**	[2.12]**	[2.22]**	[2.34]**	[2.38]**	[3.14]***	[3.15]***	[2.07]**	[2.40]**	[2.27]**	[2.29]**	[2.33]**	[3.32]***	[3.47]***	[2.08]**
Unemployment gap (year before start of episode)	1.88															
	[2.32]**															
RER relative to historic average (year before start of episode)	-0.26	-0.30														
	[1.34]	[1.50]														
Euro-area countries excluding 1992-1997			-1.96													
			[0.77]													
Euro-area countries 1992-1997			-2.42	-2.21												
			[0.87]	[0.85]												
Euro-area countries 1980-1991				-0.28												
				[0.12]												
Euro-area countries 1998-2004				-9.34												
				[1.37]												
Nominal short rate (effective average change during episode)					-0.91							-0.61				
					[2.45]**							[1.80]*				
Real short rate (effective average change during episode)						-0.89							-0.57			
						[2.38]**							[1.70]*			
Nominal long rate (effective average change during episode)							-1.01							-0.82		
							[3.21]***							[2.94]***		
Real long rate (effective average change during episode)								-0.85							-0.58	
								[2.18]**							[1.96]*	
Short rate relative to Taylor rule (cumulated change during episode)									-0.62							-0.34
									[1.70]*							[1.24]
Share of expenditure cuts in total adjustment (cumulated over episode)										5.97		3.89	4.10	3.29	4.06	5.08
										[2.31]**		[1.72]*	[1.79]*	[2.49]**	[2.64]***	[2.12]**
Share of capital-expenditure cuts in total adj. (cumulated over episode)											-5.02					
											[1.45]					
Core inflation (effective average change during episode)					0.59		0.08					0.39		0.12		
					[1.31]		[0.24]					[0.99]		[0.45]		
(Constant not reported)																
Observations	81	81	81	81	81	81	74	74	81	81	81	81	81	74	74	81

(Numbers reported in small font below the coefficients are the corresponding z-statistics)
** significant at 10%; ** significant at 5%; *** significant at 1%*

Table A.6. **Deceleration in the pace of debt accumulation**

Regression results

Type of regression	Robust OLS regressions; pooled sample - one observation per adjustment episode
Left-hand-side variable	Difference in debt accumulation before and after the episode (difference of average change in gross debt levels in the two years predeeding and the two years following the ep

Explanatory variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Need for adjustment (year before start of episode)	0.33 [2.50]**	0.42 [3.18]***	0.37 [2.77]***	0.38 [2.73]***	0.31 [2.45]**	0.32 [2.54]**	0.33 [2.42]**	0.35 [2.57]**	0.36 [2.80]***	0.40 [3.16]***	0.42 [3.10]***	0.33 [2.63]**	0.35 [2.75]***	0.34 [2.59]**	0.35 [2.69]***	0.36 [2.93]***
Ouput gap (year before start of episode)		-1.25 [5.68]***	-1.25 [5.62]***	-1.26 [5.58]***	-1.32 [6.33]***	-1.30 [6.47]***	-1.31 [6.16]***	-1.38 [6.81]***	-1.26 [5.99]***	-1.29 [6.27]***	-1.31 [6.01]***	-1.33 [6.44]***	-1.29 [6.45]***	-1.34 [6.47]***	-1.39 [7.09]***	-1.26 [6.23]***
Unemployment gap (year before start of episode)	2.40 [5.86]***															
RER relative to historic average (year before start of episode)	-0.03 [0.29]	-0.12 [1.08]														
Euro-area countries excluding 1992-1997			-0.30 [0.23]													
Euro-area countries 1992-1997			2.60 [1.74]*	2.61 [1.73]*												
Euro-area countries 1980-1991				-0.39 [0.27]												
Euro-area countries 1998-2004				0.08 [0.05]												
Nominal short rate (effective average change during episode)					-0.67 [3.01]***							-0.42 [1.80]*				
Real short rate (effective average change during episode)						-0.69 [3.28]***							-0.47 [2.12]**			
Nominal long rate (effective average change during episode)							-1.21 [3.65]***							-1.02 [3.04]***		
Real long rate (effective average change during episode)								-1.01 [3.79]***							-0.89 [3.40]***	
Short rate relative to Taylor rule (cumulated change during episode)									-0.40 [2.54]**							-0.31 [2.00]**
Share of expenditure cuts in total adjustment (cumulated over episode)										3.61 [2.58]**		2.83 [1.93]*	2.62 [1.82]*	2.86 [2.15]**	3.12 [2.42]**	3.14 [2.27]**
Share of capital-expenditure cuts in total adj. (cumulated over episode)											-0.64 [0.42]					
Core inflation (effective average change during episode)					0.76 [2.97]***		0.79 [2.60]**					0.58 [2.25]**		0.78 [2.61]**		
(Constant not reported)																
Observations	76	76	76	76	76	76	69	69	76	76	76	76	76	69	69	76
R-squared	0.4	0.39	0.4	0.4	0.46	0.46	0.53	0.52	0.43	0.43	0.38	0.48	0.47	0.56	0.56	0.47

(Numbers reported in small font below the coefficients are the corresponding t-statistics)
** significant at 10%; ** significant at 5%; *** significant at 1%*

Table A.7 **Length of adjustment episode**
Regression results

Type of regression	Truncated regressions; pooled sample - one observation per adjustment episode
Left-hand-side variable	Length of adjustment episode (in years)

Explanatory variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Need for adjustment (year before start of episode)	0.14	0.10	0.14	0.16	0.12	0.11	0.12	0.13	0.13	0.13	0.16	0.12	0.11	0.12	0.13	0.12
	[2.12]**	[1.72]*	[2.38]**	[2.54]**	[2.18]**	[2.10]**	[2.12]**	[2.13]**	[2.28]**	[2.39]**	[2.53]**	[2.22]**	[2.17]**	[2.25]**	[2.29]**	[2.32]**
Ouput gap (year before start of episode)	-0.35		-0.29	-0.27	-0.23	-0.25	-0.30	-0.35	-0.25	-0.24	-0.30	-0.21	-0.22	-0.27	-0.30	-0.22
	[3.43]***		[3.08]***	[2.78]***	[2.68]***	[2.94]***	[3.27]***	[3.87]***	[2.75]***	[2.85]***	[3.17]***	[2.53]**	[2.72]***	[3.24]***	[3.68]***	[2.58]***
Unemployment gap (year before start of episode)		0.68														
		[3.94]***														
RER relative to historic average (year before start of episode)			-0.101	-0.094	-0.103	-0.1	-0.081	-0.08	-0.094	-0.124	-0.107	-0.121	-0.119	-0.101	-0.102	-0.117
			[2.18]**	[2.03]**	[2.45]**	[2.37]**	[1.98]**	[1.89]*	[2.11]**	[2.85]***	[2.32]**	[2.89]***	[2.85]***	[2.61]***	[2.58]**	[2.75]***
Euro-area countries excluding 1992-1997				-0.67												
				[1.13]												
Euro-area countries 1992-1997				-0.16												
				[0.26]												
Nominal short rate (effective average change during episode)					-0.26							-0.18				
					[2.91]***							[1.91]*				
Real short rate (effective average change during episode)						-0.25							-0.17			
						[2.78]***							[1.82]*			
Nominal long rate (effective average change during episode)							-0.35							-0.26		
							[2.53]**							[1.96]**		
Real long rate (effective average change during episode)								-0.27							-0.19	
								[2.03]**							[1.64]	
Short rate relative to Taylor rule (cumulated change during episode)									-0.14							-0.08
									[1.81]*							[1.19]
Share of expenditure cuts in total adjustment (cumulated over episode)										1.86		1.37	1.41	1.53	1.64	1.67
										[2.99]***		[2.17]**	[2.25]**	[2.75]***	[2.93]***	[2.70]***
Share of capital-expenditure cuts in total adj. (cumulated over episode)											-0.96					
											[1.34]					
Core inflation (effective average change during episode)					0.19		0.13					0.13		0.12		
					[1.67]*		[0.88]					[1.21]		[0.91]		
(Constant not reported)																
Observations	81	81	81	81	81	81	74	74	81	81	81	81	81	74	74	81

(Numbers reported in small font below the coefficients are the corresponding z-statistics)
** significant at 10%; ** significant at 5%; *** significant at 1%*

Table A.8. **Slippage after episode**

Regression results

Dataset and type of regression	Robust OLS regressions; pooled sample - one observation per adjustment episode											
Left-hand-side variable	Slippage, i.e. deterioration in the primary cyclically adjusted fiscal balance in the two years after the end of the adjustment episode											
Explanatory variable	1	2	3	4	5	6	7	8	9	10	11	12
Need for adjustment (last year of episode)[1]	-0.08 [2.32]**	-0.08 [2.31]**	-0.09 [2.57]**	-0.08 [2.28]**	-0.08 [2.25]**	-0.09 [2.52]**	-0.10 [2.60]**	-0.09 [2.43]**	-0.082 [2.29]**	-0.091 [2.29]**	-0.09 [2.30]**	-0.082 [2.29]**
Ouput gap (last year of episode)	0.1 [2.09]**	0.11 [1.99]*		0.1 [2.06]**	0.1 [1.93]*	0.1 [2.32]**	0.1 [2.44]**	0.09 [1.34]	0.112 [2.02]**	0.102 [1.51]	0.108 [1.69]*	0.109 [1.74]*
Change in cyclically adjusted fiscal balance (cumulated over episode)[2]		-0.031 [0.64]										
Unemployment gap (last year of episode)			-0.05 [0.45]									
Share of expenditure cuts in total adjustment (cumulated over episode)				0.007 [0.02]								
Share of capital-expenditure cuts in total adj. (cumulated over episode)					-0.33 [0.92]							
Euro-area countries excluding 1992-1997						0.433 [1.35]						
Euro-area countries 1992-1997						0.163 [0.45]	0.165 [0.46]					
Euro-area countries 1980-1991							0.682 [1.95]*					
Euro-area countries 1998-2004							-0.148 [0.30]					
Nominal short rate (cumulated change during episode)								0.006 [0.13]				
Real short rate (cumulated change during episode)									-0.01 [0.24]			
Nominal long rate (cumulated change during episode)										0.016 [0.23]		
Real long rate (cumulated change during episode)											-0.011 [0.19]	
Short rate relative to Taylor rule (cumulated change during episode)												-0.006 [0.19]
Core inflation (cumulative change during episode)								0.01 [0.18]		0.033 [0.48]		
(Constant not reported)												
Observations	80	80	80	80	80	80	80	80	80	72	72	80
R^2	0.14	0.14	0.09	0.14	0.15	0.17	0.19	0.15	0.14	0.15	0.15	0.14

(Numbers reported in small font below the coefficients are the corresponding t-statistics) ** significant at 10%; ** significant at 5%; *** significant at 1%*

1 Negative coefficients imply that less need for adjustment leads to more slippage in the two years following the end of the adjustment episode.

2 Negative coefficients imply that a larger cumulative adjustment achieved during an adjustment episode implies less slippage in the two years following the end of the adjustment episode.

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