

## WHAT AFFECTS FISCAL CONSOLIDATION? – SOME EVIDENCE FROM OECD COUNTRIES

*Stéphanie Guichard, Michael Kennedy, Eckhard Wurzel and Christophe André\**

### 1 Introduction

Fiscal consolidation is required in most OECD countries. This is especially so in view of medium- and long-term spending pressures on public finances, related, *inter alia*, to ageing. Countries that are successful in consolidating will then face the challenge of locking in the gains achieved. Against that background, in this paper we present evidence on the factors that in the past were associated with successful consolidation and with the preservation of those gains.

Based on a dataset covering a large number of OECD fiscal consolidation episodes starting in the late 1970s, we first present descriptive evidence on the features of these experiences and factors that may have affected the way they unfolded. Subsequently, regression analysis is used to identify a set of macroeconomic conditions and policy set-ups that have been effective in triggering and sustaining these efforts.

### 2 Stylised features of fiscal consolidation episodes

Using the definition presented in Box 1, since 1978, there were 85 fiscal consolidation episodes in the 24 countries under review. These episodes include only those that, once started, resulted in a noticeable improvement in the cyclically-adjusted primary balance (CAPB). A number of stylised patterns emerge from these episodes, as discussed below.

#### 2.1 Initial conditions, size and duration

In line with findings from earlier analysis (Ahrend *et al.*, 2006a and references cited therein), fiscal conditions prevailing just before the beginning of a consolidation episode seem to have had an impact on the size of subsequent efforts (Figure 1). The more negative was the CAPB (*i.e.*, the larger the cyclically-adjusted deficit), the larger was the size of ensuing fiscal consolidation. This may reflect that large deficits made it more necessary to consolidate and, at the same time, raised public awareness of the extent of the problem, making it easier to act.

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### Box 1 Defining consolidation episodes

The sample comprises all episodes of fiscal consolidation – as defined below – among 24 OECD member countries since 1978 for which reliable data on key fiscal variables are available.<sup>(1)</sup> To identify episodes the same definitions were applied as in Ahrend *et al.* (2006). According to this definition, a fiscal consolidation episode:

*Starts* if the cyclically-adjusted primary balance (CAPB) improves by at least one percentage point of potential GDP in one year or in two consecutive years with at least ½ percentage point improvement occurring in the first of the two years.<sup>(2)</sup>

*Continues* as long as the CAPB improves. An interruption is allowed without terminating the episode as long as the deterioration of the CAPB does not exceed 0.3 per cent of GDP and is more than offset in the following year (by an improvement of at least 0.5 per cent of GDP).

*Terminates* if the CAPB stops increasing or if the CAPB improves by less than 0.2 per cent of GDP in one year and then deteriorates.

The results of this mechanical definition were checked with OECD country experts and minor adjustments were made. The size of fiscal consolidation is measured by the change in the cyclically-adjusted primary balance as a percentage of potential GDP over the episode (last year of the episode minus the year before it starts) and the intensity is measured as the size divided by the length of the episode. Overall, the sample covers 85 consolidation episodes (see Appendix).

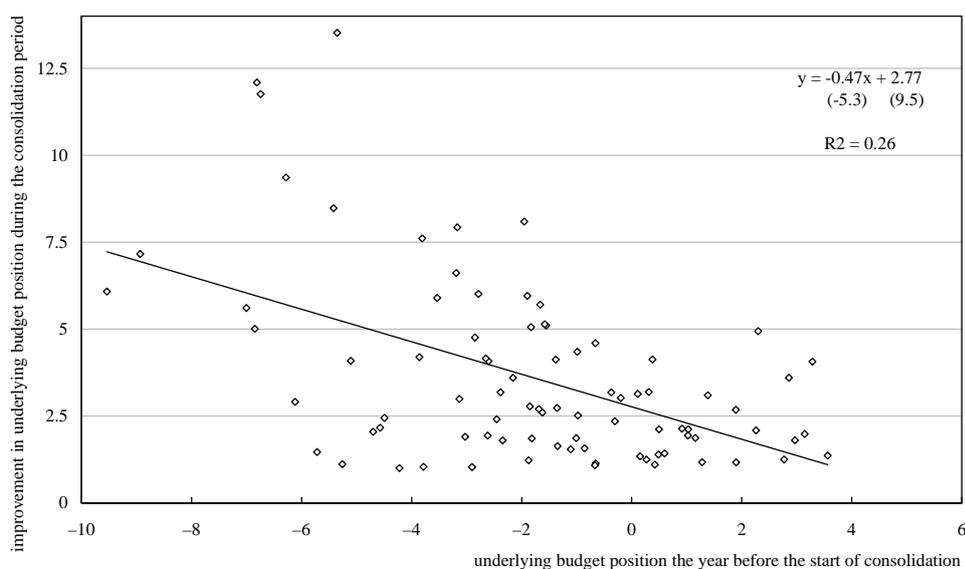
(1) Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom and the United States.

(2) The cyclically-adjusted primary balance, which here is based on the method outlined in Girouard and André (2005), is an imperfect measure of discretionary policy actions. It can be affected for instance by asset price cycles (Girouard and Price, 2004; and Morris and Schuknecht, 2007) and one-off measures (Dafflon and Rossi 1999; von Hagen and Wolff, 2004; Koen and van den Noord, 2005) that do not reflect the policy stance. It is also affected by the measurement issues surrounding the output gap. However, given that only large changes qualify as consolidation spells, this problem is reduced. Debt-interest payments (as well as interest incomes) are excluded as they are largely outside the control of the fiscal authorities and thereby do not reflect directly the policy stance.

Most of the consolidation episodes were of short duration and involved only modest gains (Figure 2). The median improvement of the CAPB was 2.8 per cent of GDP and the median duration was two years. There were, however, a number of

Figure 1

**Initial Fiscal Positions and Subsequent Adjustment**  
(percent of potential GDP)



Note: The budget concept referred to is the cyclically-adjusted primary budget balance. The total change during the episode is defined as the value in the last year of the episode minus the value in the year before the start of the episode.

Source: OECD calculations.

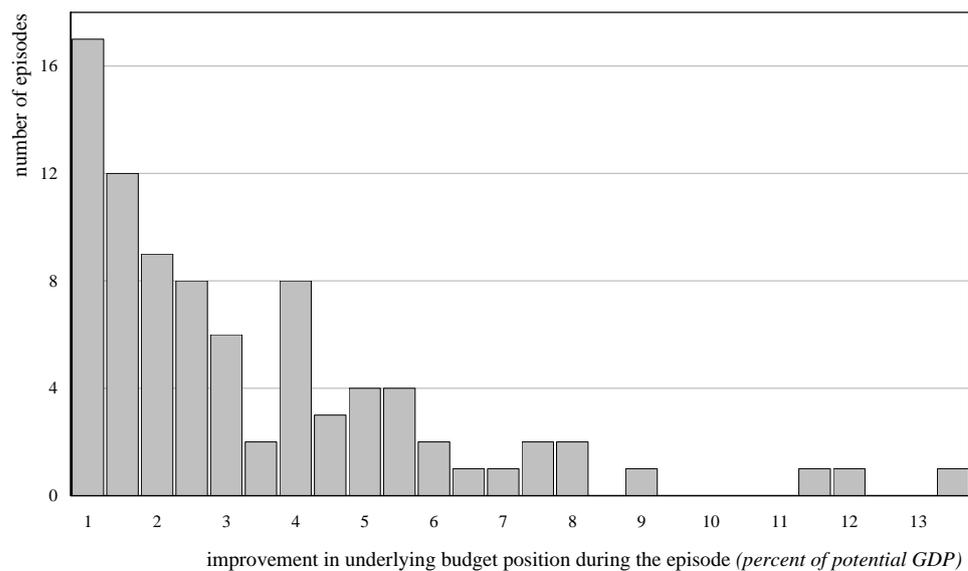
large efforts, amounting to improvements of more than 8 per cent of GDP, as well as a few episodes lasting from six to eight years.<sup>1</sup>

In general, sizeable consolidation episodes also lasted for long periods, and vice versa (Figure 3, upper panel). On the other hand, long consolidation episodes tended to involve a lower “intensity” of effort, measured as total size of the consolidation per year (Figure 3, lower panel). Intense efforts are likely difficult to maintain over time either because of adjustment fatigue or because large, easy-to-implement measures (“the low-hanging fruit”) tend to be done first. At the same time, large improvements obviously reduce the need for continued consolidation.

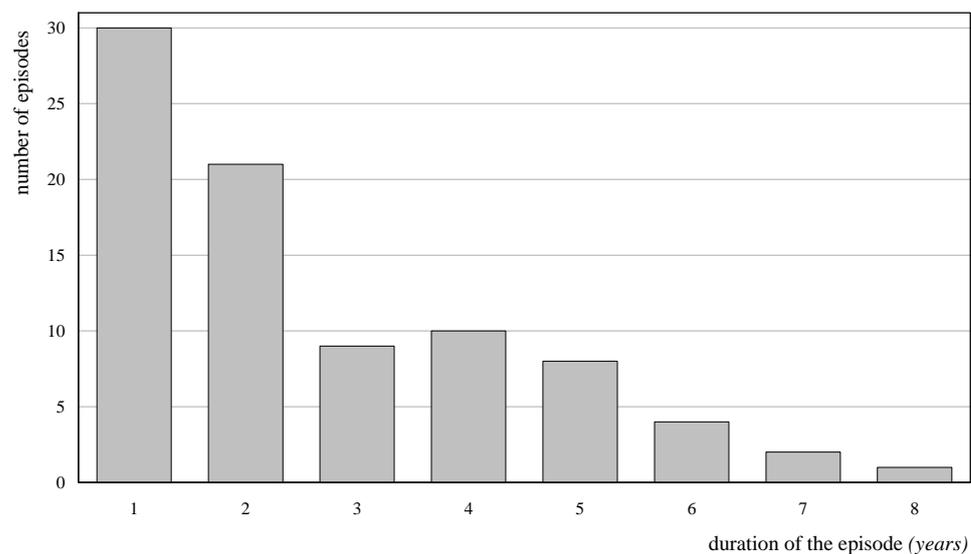
<sup>1</sup> Among large consolidation outcomes (improvements in cyclically-adjusted balances in terms of per cent of potential GDP) were: Canada in the 1990s (8.1 per cent); Portugal in the 1980s (8.5 per cent); Sweden in the 1980s (9.4 per cent) and in the 1990s (11.7 per cent); Greece in the 1990s (12.1 per cent); and Denmark in the 1990s (13.5 per cent). As to duration, fiscal consolidation was sustained for six years in Australia in the second half of the 1990s as well as in Belgium in the 1980s and 1990s; and in the United Kingdom and the United States in the 1990s. Consolidation lasted for seven years in Sweden in the 1980s and 1990s and for eight years in Japan in the 1980s.

Figure 2

**Strength and Duration of Consolidation Episodes**  
**The Distribution of Episodes by the Size of Consolidation**



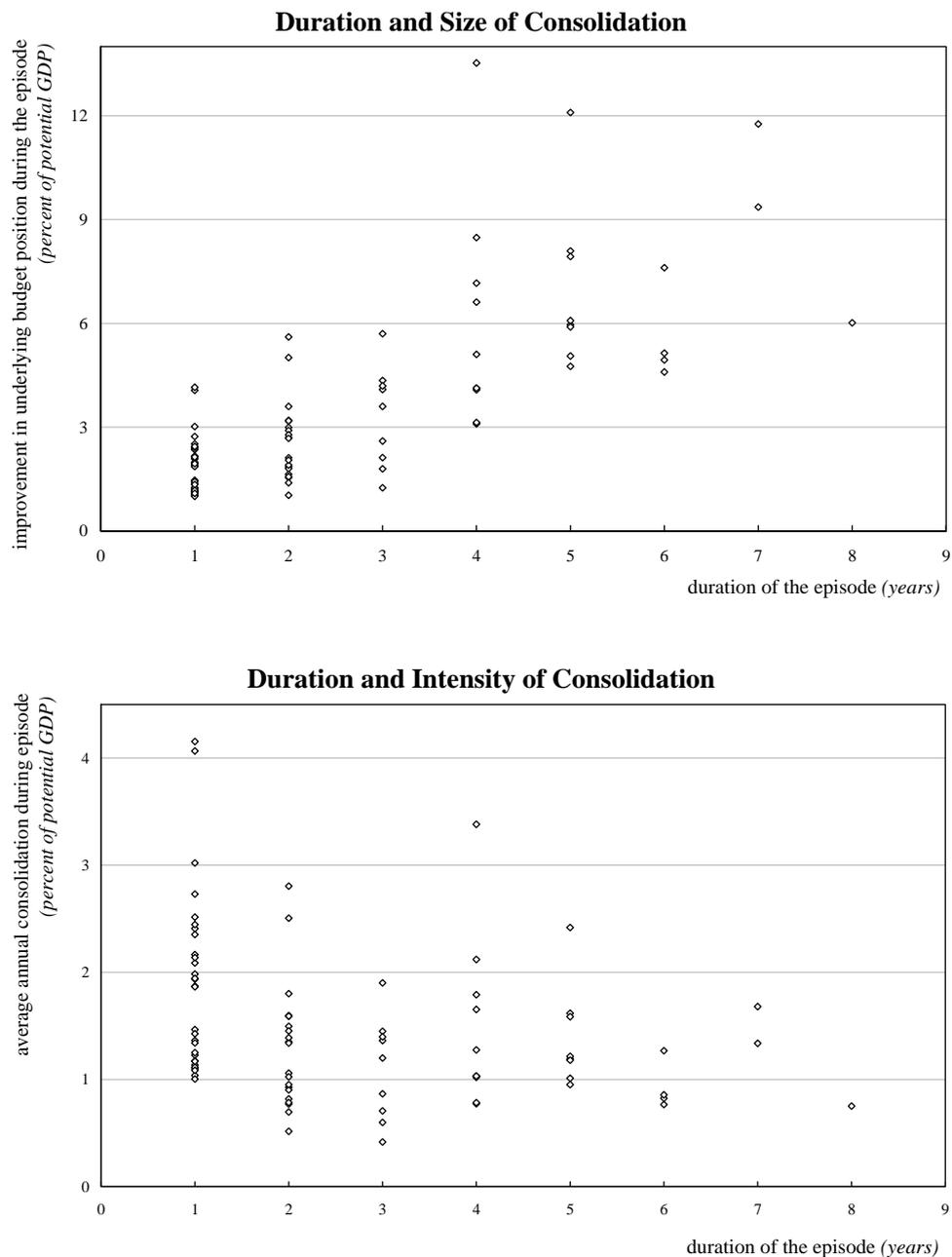
**The Distribution of Consolidation Episodes by Duration**



Note: The budget concept referred to is the cyclically-adjusted primary budget balance.  
 Source: OECD calculations.

**Figure 3**

**The Relationship Between Duration, Size and Intensity of Consolidation**



Note: The budget concept referred to is the cyclically-adjusted primary budget balance.  
 Source: OECD calculations.

## 2.2 Quality of the adjustment and successful consolidation

A number of arguments and empirical studies suggest that spending restraint (notably with respect to government consumption and transfers) is more likely to generate lasting fiscal consolidation and better economic performance.<sup>2</sup> Indeed, related research suggests that both policy and long-term interest rates are more likely to fall when consolidation relies on current expenditure cuts rather than on tax increases, possibly reflecting the effects of the latter on costs and prices (Ahrend *et al.*, 2006a). Moreover, there is evidence that the composition of fiscal consolidation is important for saving and growth, with spending based consolidation resulting in lower household saving and higher GDP growth.<sup>3</sup>

Despite the case in favour of spending-based efforts, on average across the consolidation episodes studied here, revenue increases accounted for a larger fraction of the total reduction in the CAPB. About three quarters of the episodes under review involved both expenditure cuts and revenue increases and almost two thirds of the episodes involved larger contributions from revenue increases than from expenditure cuts (Figure 4). Reductions in capital expenditures usually played a smaller role in the total spending adjustment but in some cases they compensated for increases in current spending.

The success of consolidation policies might be judged according to whether fiscal adjustment is large enough to stabilise the debt-to-GDP ratio.<sup>4</sup> According to this criterion, slightly more than half of the consolidation episodes were successful. Moreover, in some 80 per cent of these cases the sustainable position was maintained for at least two years. These successful episodes involved larger improvements in the CAPB (by almost  $\frac{3}{4}$  percentage point of potential GDP compared with the median episode size) and lasted for longer (about twice as long as the median episode length of two years) than in the other cases.

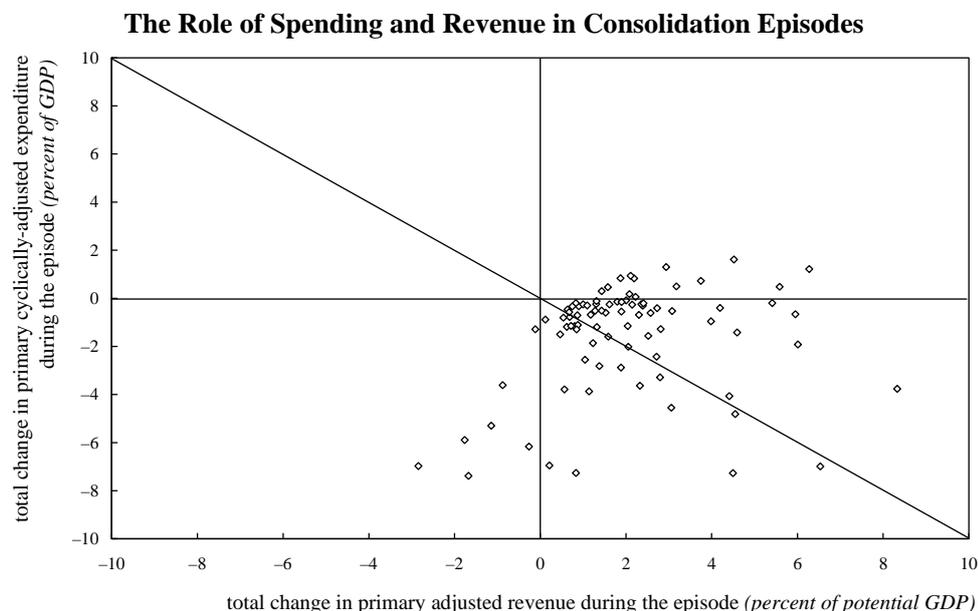
On the other hand, half of the episodes under review were not successful in the sense that one third or more of the total reduction in the CAPB achieved during the consolidation phase was unwound in the two following years. For one-fifth of all episodes, the CAPB deteriorated by more (as a per cent of potential GDP) than it improved during the consolidation phase. Perhaps not surprisingly, backtracking

<sup>2</sup> Alesina and Perotti (1996); Alesina and Ardagna (1998); and Alesina and Bayoumi (1996). Von Hagen *et al.* (2002) also find that the likelihood of sustaining consolidation efforts seems to rise when governments tackle politically sensitive items on the budget such as transfers, subsidies and government wages.

<sup>3</sup> Bassanini *et al.* (2001), Ardagna (2004) and de Mello *et al.* (2004). Cournède and Gonand (2006), in the context of a dynamic general equilibrium model with overlapping generations, argue that tax increases are a much more costly way of achieving fiscal sustainability compared with spending restraint.

<sup>4</sup> Looking directly at the debt-to-GDP ratio has the disadvantage of including stock-flow adjustments that affect the level of debt but might be unrelated to discretionary consolidation policies and even reflect fiscal gimmickry designed to reduce debt levels in the short-term without improving the underlying government balance sheet. Considering the gap between the actual primary balance and what is necessary to stabilise the debt-to-GDP ratio during the episode and its immediate aftermath (typically in the following two years), as is done here, avoids this difficulty. This approach has been followed by Baldacci *et al.* (2004).

Figure 4



Source: OECD calculations.

– defined as the loss of a third of the consolidation gains or more within two years – is more likely to occur when improvements in the CAPB during the preceding consolidation episode were small (Figure 5). In addition, backtracking is almost always associated with spending increases (Figure 5, lower panel).<sup>5</sup>

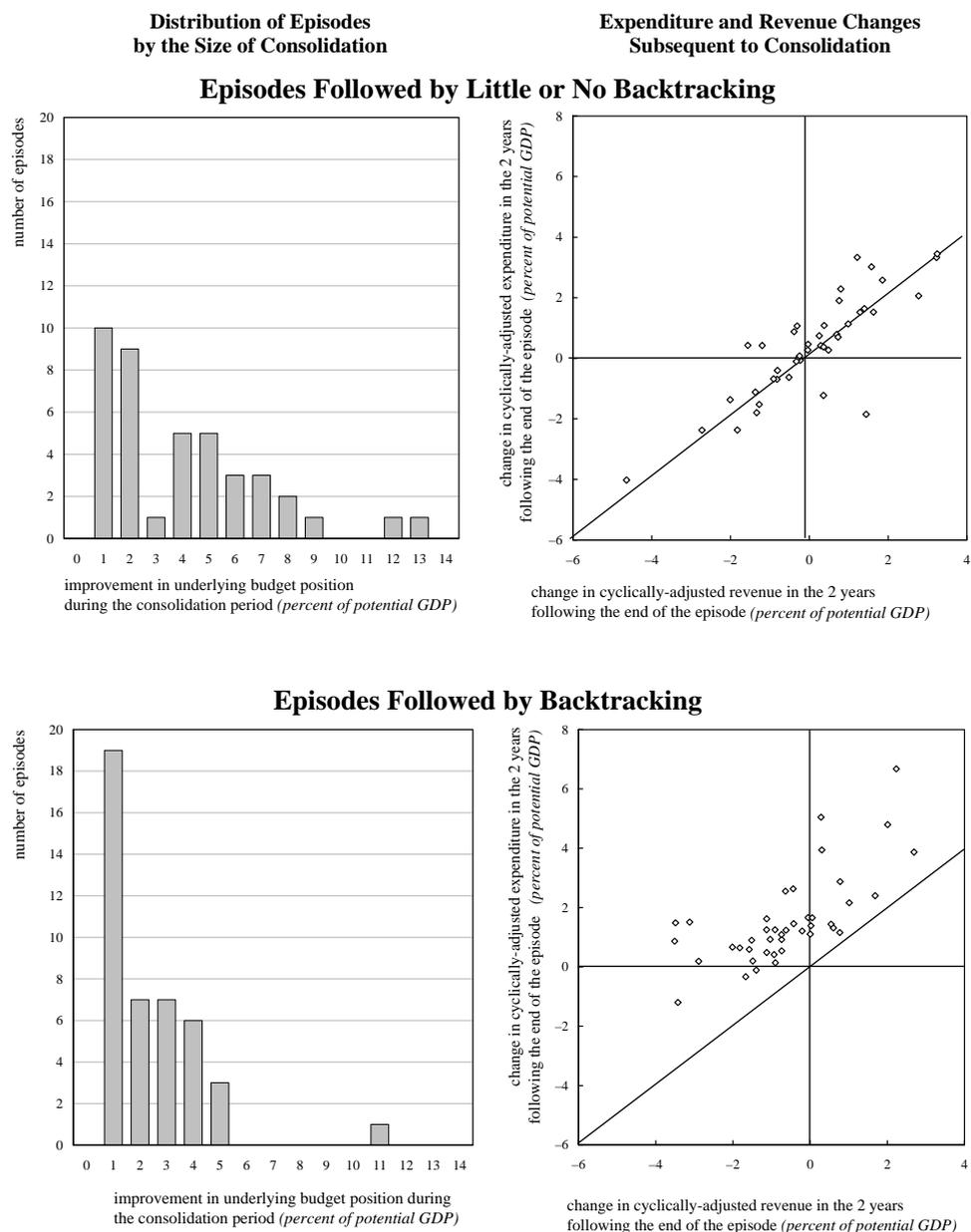
Over the past decade and a half, a large number of countries have introduced fiscal rules with the aim of containing the political economy mechanisms leading to excessive spending and deficits (often referred to as “deficit bias”).<sup>6</sup> Rules can focus on spending, deficits or revenues and may, in part, be seen as a tool to better communicate to the public fiscal objectives and outcomes. Using simple bivariate analysis, however, there is no clear relationship across consolidation episodes between the existence of a fiscal rule and a number of fiscal indicators (the total change in the CAPB, the change in revenues or the amount of backtracking). This suggests that the relationship may be weak or that it can only be detected by controlling for the other aspects of the consolidation process already mentioned.

<sup>5</sup> Consolidation episodes relying on tax increases that were partially offset by higher spending during the episode were on average characterised by smaller improvements in the CAPB, shorter duration and more backtracking.

<sup>6</sup> For an overview on the sources of “deficit bias”, see von Hagen (2002). Also relevant are Rogoff and Silbert (1988); Persson and Tabellini (2000); Shi and Svensson (2002); and Alesina and Tabellini (2005).

Figure 5

### Comparison of Consolidation Episodes With and Without Backtracking



Note: The budget concept referred to is the cyclically-adjusted primary budget balance. An episode is followed by backtracking if more than 30 per cent of the improvement in the cyclically-adjusted primary budget balance during the episode is lost in the two years following the end of the episode.

Source: OECD calculations.

### 3 Identifying factors that support fiscal consolidation

The econometric evidence presented in this section is aimed at identifying the influence of various factors (notably macroeconomic and fiscal conditions, the composition of the fiscal adjustments and the existence of fiscal rules) along several dimensions of the consolidation process. These include: the initiation of a consolidation spell; the size of consolidation; the duration of consolidation; and success in reaching debt sustainability. The role fiscal rules have made to these various dimensions of consolidation is discussed separately.<sup>7</sup> The following sub-sections cover each of these four aspects in turn and Table 1, where the econometric results are synthesized, will be used as a guide to the discussion.<sup>8</sup>

#### 3.1 Factors prompting and influencing the size and intensity of consolidations

Econometric analysis confirms that the initial budget balance has played a significant role in kicking off consolidation (Table 1, column 1 marked “probability to start”).<sup>9</sup> For example, a cyclically-adjusted primary deficit of 2 per cent of (potential) GDP is associated with a 13 percentage point higher probability of initiating consolidation than a balanced primary budget (Figure 6).<sup>10</sup>

There is weak econometric evidence that this effect can be compounded by higher long-term interest rates (relative to an international reference level). One interpretation is that when the potential gain in terms of falling interest rates is high, consolidation becomes more attractive. Indeed, the fall in interest spreads through the 1990s in a number of cases appears to have led to a more relaxed primary budget stance. There is no evidence that the size of the output gap played a significant role in triggering consolidation episodes.<sup>11</sup> Elections, on the other hand, have played a significant role: the probability of undertaking consolidation rose just after a general election suggesting that governments are more ready to start consolidation once a full legislative term lies ahead. In addition, in contrast with earlier research (Buti and van den Noord, 2004) suggesting that upcoming elections produce slippage in European countries, no support for the traditional “political

<sup>7</sup> In the estimated equations, fiscal rules are accounted for by three dummy variables, representing the existence of a budget rule supplemented by an expenditure rule; euro area countries during the qualification phase to the euro; and euro area countries under the Stability and Growth Pact.

<sup>8</sup> The results presented in Table 1 represent the final specifications following a general to specific procedure to identify the relevant explanatory variables.

<sup>9</sup> However, high debt levels were not found to increase the likelihood of starting a fiscal consolidation exercise.

<sup>10</sup> All other variables are evaluated at their mean.

<sup>11</sup> However, running the same type of regressions on episodes of fiscal expansion (defined exactly as the opposite of fiscal consolidation), it turned out that the probability of starting a fiscal expansion increased when the output gap is positive (results not reported here). Intermediate results also showed, in line with Ahrend *et al.* (2006a), that a depreciation of the real effective exchange rate can contribute to triggering a fiscal consolidation episode (but data availability reduces the size of the sample by about half).

Table 1

## Summary of the Main Results: Parameter Estimates

	Probability to start	Size of the adjustment	Intensity of the adjustment	Probability to stop the episode	Probability to reach a primary balance that stabilises debt
<b>Year before the episode started</b>					
Cyclically-adjusted primary balance	-0.046 <sup>****</sup> (-6.54)	-0.567 <sup>****</sup> (-4.92)	-0.594 <sup>**</sup> (-1.78)	0.187 <sup>****</sup> (4.14)	
Gap to primary balance sufficient to stabilise debt (actual-target)					0.195 <sup>****</sup> (3.47)
Long term interest rates (domestic rate – foreign reference)	0.010 <sup>*</sup> (1.88)	0.199 <sup>**</sup> (2.43)	0.078 <sup>***</sup> (3.41)		
Output gap (actual-potential)		-0.113 <sup>*</sup> (-1.66)	0.061 <sup>**</sup> (2.54)	0.079 <sup>*</sup> (1.89)	-0.127 <sup>**</sup> (-2.37)
Elections (dummy taking the value 1 on election years)	0.140 <sup>***</sup> (3.12)				
<b>Composition of the adjustment<sup>(1)</sup></b>					
Share of primary current expenditure cuts		2.289 <sup>****</sup> (4.42)			
Share of social spending cuts					1.191 <sup>***</sup> (3.09)
Share of public investment cuts			-0.919 <sup>**</sup> (-2.23)	-0.758 <sup>**</sup> (-2.56)	
Share of direct tax increases				-0.180 <sup>**</sup> (-2.27)	
<b>Other</b>					
Duration of the episode <sup>(2)</sup>				1.952 <sup>****</sup> (8.13)	0.261 <sup>****</sup> (3.47)
<b>Policy rules</b>					
Expenditure rule and budget balance rule		1.493 <sup>**</sup> (2.07)		-1.001 <sup>****</sup> (-3.35)	0.586 <sup>**</sup> (2.08)
Euro countries 1992-97	0.2556 <sup>****</sup> (3.57)				
Euro countries 1998-2005			0.979 <sup>*</sup> (1.84)		
Observations	372	73	73	225	64
R <sup>2</sup>	0.192	0.487	0.267	..	0.560

Note: Pseudo R2 for probit; adjusted R2 for pooled regressions.

Reported coefficients for the probit equations (col 1 and 5) are the marginal effects (*i.e.*, impact of the change of the explanatory variable by one unit).

Numbers in brackets are the *t*-statistics. Significance levels: \* 10%, \*\* 5%, \*\*\* 1%, \*\*\*\* 0.1%.

Constants are not reported. Coefficients of the inverse Mills ratio (used to account for the sample selection bias in the size and intensity regressions) are not reported.

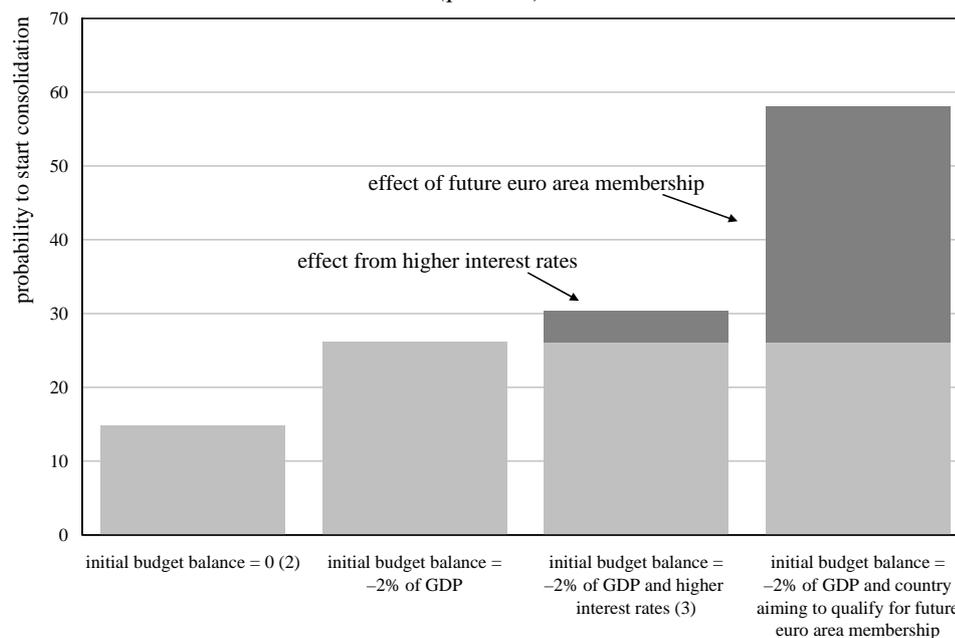
<sup>(1)</sup> Share of each budget item in the improvement of the primary balance over the entire episode or time-varying with duration in the probability-to-stop regression.

<sup>(2)</sup> Elapsed time of consolidation in the probability-to-stop regression (a parameter value exceeding one indicates that the likelihood that the episode ends increases with its duration). Total length of the episode in the probability-to-reach regression.

Source: OECD calculations.

Figure 6

**Factors Affecting the Probability of Starting Fiscal Consolidation<sup>(1)</sup>**  
**Probability of Starting Fiscal Consolidation in Different Past Circumstances**  
*(percent)*



<sup>(1)</sup> Based on pooled probit analysis across 24 OECD countries and over the period 1978-2003 (equation shown in the first column of Table IV.1). Probabilities are evaluated at sample means for all other variables entering the estimated equation.

<sup>(2)</sup> Measured by the cyclically-adjusted primary balance.

<sup>(3)</sup> Interest rate gap to international reference is 300 basis point higher.

Source: OECD calculations.

cycle” was found for this broader set of countries: the probability of entering a phase of fiscal consolidation did not significantly fall just before a general election.

Turning to the size of fiscal consolidation (column 2 labelled “size of adjustment” in Table 1), the analysis confirms again the significant role of initial budgetary conditions. The higher the initial primary deficit, the larger was the overall consolidation that was achieved over a consolidation episode. Similarly, the size of fiscal consolidation was also larger when interest rates were relatively high.<sup>12</sup>

<sup>12</sup> Similar results were obtained using the unemployment gap (difference between the unemployment rate and the structural unemployment rate (NAIRU)) rather than the output gap. The gaps used are *ex post* due to limited availability of real time data.

There is some suggestive evidence that this is also the case when initial activity was weak.

More relevant for policy design are the respective roles played by expenditure- as against revenue-based consolidation. The size of the fiscal adjustment increased when episodes were driven by cuts in primary current expenditures. In alternative specifications (not shown), a heavy weight on individual current expenditure items (public consumption and social transfers) was also found to have a significant positive impact on the magnitude of the consolidation achieved.<sup>13</sup>

The “intensity of the adjustment” (consolidation per year, column 3) was also affected by various macroeconomic developments. A larger initial deficit and higher long-term interest rates were associated with an increased intensity of adjustment. Weak activity at the outset, while increasing the size of consolidation, seems to reduce the intensity of effort: intense efforts are difficult when the economy is weak, making the adjustment more drawn out. Consolidation efforts based on public investment cuts have also tended to be less intense.

### 3.2 Factors affecting the length of consolidation episodes

A larger initial deficit was associated with a longer consolidation period (column 4 labelled “probability to stop the episode” in Table 1). As suggested above, the probability of ending a consolidation period was also lower if it was initiated at the time of a large negative output gap. Perhaps not surprisingly, the longer a period of consolidation has been underway, the more likely it was to come to an end. Long efforts are likely to lead to adjustment fatigue.<sup>14</sup> Another possible interpretation is that the longer an episode lasts the larger the likely cumulated adjustment and accordingly the chance that successful consolidation will have been achieved.

As concerns the instruments of consolidation, a large share of direct tax increases and public investment cuts raised the likelihood that a consolidation period would *continue*. These results are open to different interpretations. One such, suggested in previous research, is that it may reflect that some countries relied on “switching strategies” (von Hagen *et al.*, 2002), meaning that the government starts fiscal consolidation by raising taxes and/or cutting investment and then, subsequently, moves on to a broader strategy which would involve reducing current spending (which is more politically sensitive and takes more time to implement).

<sup>13</sup> Kumar *et al.* (2007) also found a larger impact on primary balances of reductions in cyclically-adjusted primary expenditure than revenues.

<sup>14</sup> This effect might be more pronounced than the estimates suggest, as uncontrolled sample heterogeneity tends to bias empirical hazards downwards (towards “negative duration dependence”).

### 3.3 *Factors contributing to success in reaching debt sustainability*

An episode of consolidation begun under weak economic activity had a higher probability of success in the sense of reaching debt sustainability (Table 1, column 5). This may reflect the effect of weak initial conditions in terms of boosting the overall size of consolidation, as discussed above.

Turning to the composition of consolidation, a greater weight on cuts in social spending tended to increase the chances of success. A reason for this could be that governments more committed to achieving fiscal sustainability may also be more likely to reform politically sensitive areas. As a by-product of doing so, they may at the same time bolster the credibility of the consolidation strategy, thereby improving its chances of success.

The longer an episode lasted the higher was the probability that it would achieve success. Taken together with the previously discussed positive relationship between stopping consolidation and duration this is consistent with the interpretation that long episodes are frequently terminated because they have achieved success.

### 3.4 *The econometric evidence on the role of fiscal rules*

Fiscal rules, in particular those that have expenditures as a focus (Table 2), are estimated to have affected several dimensions of fiscal consolidation. Differentiating budget balance rules according to whether they are combined with expenditure rules or not, it appears that the former have a more favourable effect on consolidation outcomes. The size of fiscal consolidation was significantly larger and the consolidation efforts sustained for longer when such rules were present. The results also indicate that adoption of a spending rule on top of a budget balance rule helped in the achievement and maintenance of a primary balance that was sufficient to stabilise the debt-to-GDP ratio.<sup>15</sup>

The finding that expenditure rules were an important ingredient in the success of a consolidation episode has intuitive appeal given the fact that most backtrackings in the sample studied here occurred on the spending side. The estimates may, however, also just reflect that countries supplementing the objective to achieve fiscal balance with expenditure rules are in general more committed to pursuing fiscal consolidation, and in particular to addressing issues regarding spending control (Wierds, 2007).

<sup>15</sup> The European Commission has built some indicators of rules characteristics that focus on their “strength”; see European Commission (2006) and Ayuso-i-Casals *et al.*, (2006). The strongest rules have a constitutional base with no margin for adjusting the objectives, are monitored and enforced by independent authorities, include automatic correction and sanction mechanisms in case of non compliance and are closely monitored by the media. This work shows that, in Europe at least, strong national rules are usually associated with better fiscal outcomes, and the characteristics that seem to matter most are the statutory base of the rule, the body in charge of enforcement (independent authority, government, etc.) and the enforcement mechanism (including the role of sanctions). See also Kennedy *et al.* (2001) and Mills *et al.* (2001).

Table 2

## Main Fiscal Rules Currently Applied in OECD Countries

Country	Date and name	Characteristics of the set of rules			
		Budget target	Expenditure target	Rule to deal with windfall revenues	Golden rule
Australia	Charter of Budget Honesty (1998)	yes	no	no	no
Austria	Stability and Growth Pact (1997)	yes	no	no	no
	Domestic				
	Stability Pact (2000)				
Belgium	Stability and Growth Pact (1997)	yes	no	yes	no
	National budget rule (2000)				
Canada	Debt repayment plan (1998)	yes	no	yes	no
Czech Republic	Stability and Growth Pact (2004)	yes	yes	no	no
	Law on budgetary rules (2004)				
Denmark	Medium term fiscal strategy (1998)	yes	yes	no	no
Finland	Stability and Growth Pact (1997)	yes	yes	no	no
	Spending limits (1991, revised in 1995 and 1999)				
France	Stability and Growth Pact (1997)	yes	yes	since 2006	no
	Central government expenditure ceiling (1998)				
Germany	Stability and Growth Pact (1997)	yes	yes	no	yes
	Domestic Stability Pact (2002)				
Greece	Stability and Growth Pact (1997)	yes	no	no	no
Hungary	Stability and Growth Pact (2004)	yes	no	no	no
Ireland	Stability and Growth Pact (1997)	yes	no	no	no
Italy	Stability and Growth Pact (1997)	yes	yes	no	no
	Nominal ceiling on expenditure growth (2002)				
Japan	Cabinet decision on the Medium term fiscal perspective (2002)	yes	yes	no	no
Luxembourg	Stability and Growth Pact (1997)	yes	no	no	no
	Coalition agreement on expenditure ceiling (1999, 2004)				
Mexico	Budget and fiscal responsibility law (2006)	yes	no	yes	no
Netherlands	Stability and Growth Pact (1997)	yes	yes	yes	no
	Coalition agreement on multiyear expenditure targets (1994, revised in 2003)				
New Zealand	Fiscal responsibility act (1994)	yes	yes	no	no
Norway	Fiscal Stability guidelines (2001)	yes	no	yes	no
Poland	Stability and Growth Pact (2004)	yes	no	no	no
	Act on Public Finance (1999)				
Portugal	Stability and Growth Pact (1997)	yes	no	no	no
Slovak Republic	Stability and Growth Pact (2004)	yes	no	no	no
Spain	Stability and Growth Pact (1997)	yes	no	no	no
	Fiscal Stability Law (2001, revised in 2006)				
Sweden	Fiscal budget act (1996, revised in 1999)	yes	yes	no	no
Switzerland	Debt containment rule (2001, but in force since 2003)	yes	yes	yes	no
United Kingdom	Code for fiscal stability (1998)	yes	no	no	yes

Source: OECD calculations.

Developments in the euro area illustrate a couple of important points about the rules and their relationship to the consolidation process. During the run up to the introduction of the euro (1992 to 1997), countries were found to have been much more likely to initiate consolidation (Table 1, first column). Indeed, our estimates suggest that the probability of undertaking a consolidation exercise more than doubled with the prospect of membership in Economic and Monetary Union (EMU) (see Figure 6).

This finding is consistent with other work which shows that during the run-up phase to the introduction of the euro EU governments consolidated during election years (Buti and van den Noord, 2004; and von Hagen, 2006). The Maastricht Treaty's well-publicised requirements made very clear the need for fiscal consolidation at the same time as the benefits of adopting the euro were perceived to be very significant, both by policymakers and the public, as were the disadvantages in the case of failure. In the period since the introduction of the single currency, however, membership in the euro area has only had a weakly significant effect on intensity.

#### **4 Summary of the results**

To summarise, major findings of this analysis are:

- Large initial deficits and high interest rates have been important in prompting fiscal adjustment and also boosting the overall size and duration of consolidation. These results may reflect that public awareness of fiscal problems and needs can help in overcoming resistance to consolidation, a hypothesis which is also supported by the observation that qualification for euro area membership significantly increased the probability of starting consolidation. The policy implication would be that consolidation may be helped by the provision of transparent information and analysis of the fiscal situation.
- An emphasis on cutting current expenditures has been associated with overall larger consolidation. This could be because expenditure cuts, as opposed to revenue increases, are more likely to trigger lower interest rates and a sympathetic response of private saving, helping to bolster activity. But it could also reflect that governments more determined to consolidate are more willing to cut current expenditures, possibly thereby also demonstrating a commitment that makes substantial consolidation more feasible.
- Fiscal rules with embedded expenditure targets tended to be associated with larger and longer adjustments, and higher success rates. This could in principle reflect that well designed fiscal rules are effective or, alternatively, that governments committed to prudent fiscal management are more likely to institute a rule.

## APPENDIX BACKGROUND INFORMATION ON METHODOLOGY

### 1 Definition of the main variables

#### 1.1 Macroeconomic and fiscal variables

Fiscal and macroeconomic variables all come from the OECD's Economic Outlook 80 database (see *OECD Economic Outlook Database Inventory*, <http://www.oecd.org/dataoecd/47/9/36462096.pdf>). A fiscal consolidation episode is defined in Box 1 in the main text. The duration of a fiscal consolidation episode is measured by the number of years that elapses between the start (first year) and the end (last year) of an episode according to the criterion given in Box 1. According to this criterion the following consolidation episodes were extracted.

Australia	1979-80, 1986-88, 1994-99, 2002-03
Austria	1981, 1984-85, 1992, 1996-97, 2001
Belgium	1993-98
Canada	1981, 1986-88, 1993-97
Denmark	1983-86; 1996-99
Finland	1981, 1984, 1988-89, 1994-98, 2000
France	1979-80, 1983-84, 1987, 1994-97
Federal Rep. of Germany	1981-85, 1989
Germany	1992-94, 1997-1999
Greece	1979-80, 1982-83, 1986-87, 1990-94, 1996, 1998
Iceland	1990-92, 1995-99
Ireland	1981-84, 1987-89, 1993-94, 2003-04
Italy	1980, 1982-83, 1990-93, 1995-97
Japan	1980-87, 1997, 2001
Korea	1981-82, 1993-95, 1999-2000
Luxembourg	1993-97, 2000
Netherlands	1981-85, 1991, 1993, 1996
Norway	1983, 1985-86, 1993-97, 1999-2000
New Zealand	1987, 1989, 1991-94, 2000-03
Portugal	1981-84, 1986, 1988, 1992, 1995, 2002-03
Spain	1983, 1986-87, 1992, 1994-97
Sweden	1979, 1981-87, 1994-2000
Switzerland	1994-95, 1999-2000
United Kingdom	1979-82, 1988, 1994-99
United States	1981, 1987-1989, 1993-98

In addition, the following definitions apply:

- The size of fiscal consolidation is measured by the change in the cyclically-adjusted primary balance as a percentage of potential GDP over the episode (final year of the episode minus the year before it starts) and the intensity is measured as the size divided by the length of the episode.
- The share of a budget expenditure item in the fiscal adjustment is defined as minus the difference of the relevant item as a percentage of GDP between the final year of the episode and the first year before the start of the episode divided by the difference in the primary balance as a percentage of GDP over the same period. For the duration analysis (the probability of stopping consolidation), the cumulative contribution of the relevant item is a time varying covariate over the duration of the episode.
- The share of a budget revenue item in the fiscal adjustment is defined as the difference of the relevant item as a percentage of GDP between the last year of the episode and the year before the start of the episode, all divided by the difference in the primary balance as a percentage of GDP over the same period. For the duration analysis, the cumulative contribution of the relevant item is a time varying covariate over the duration of the episode.
- For total and current primary expenditures and revenues, and for direct and indirect taxes, cyclically-adjusted variables as a percentage of potential GDP (for both the numerator and the denominator) were used; for expenditure items where cyclically-adjusted variables are not available the non-adjusted ones (both for the numerator and the denominator) were used.
- The primary balance (PB) that stabilises the debt-to-GDP ratio (PBO) is defined as:

$$PBO(t)/GDP(t) = -Debt(t-1)/GDP(t-1) * [1 - (1+i(t)) / (1+g(t))];$$

where  $g(t) = GDP_t/GDP(t-1) - 1$ ;

and  $i(t)$  is defined as a moving average of the implicit interest rates on debt, in particular:

$$i = (1/3) * ggintp[t-2]/ggfl[t-3] + (1/3) * ggintp[t-1]/ggfl[t-2] + (1/3) * ggintp[t]/ggfl[t-1]$$

with  $ggfl$  being general government gross financial liabilities and  $ggintp$  the gross government interest payments. The gap to the primary balance sufficient to stabilise debt is defined as:

$$PB(t)/GDP(t) - PBO(t)/GDP(t)$$

- In defining the spread between the long-term interest rates and those in the reference country, Germany is used for European countries and the United States for the other countries.

## 1.2 Dummy variables to capture fiscal rules and elections

Two dummy variables were tested that reflect the existence, at least for some significant part of the general government sector, of (i) a budget balance rule defined as rules and targets for the fiscal deficit (cyclically adjusted or not) and (ii) a budget balance rule supplemented by an expenditure rule, defined as a rule and/or target that binds and controls expenditures in annual budgeting, such as expenditure ceilings and caps, and pay-as-you-go principles. These variables are rudimentary indicators as possible changes in the definition of the rule, obedience to the rule, or any characteristic of the rule (such as its legal base, sanctions implied, etc.) are not taken into account. Hence, the fact that the modalities of rules vary from one country to the other and change over time is not accounted for. The dummies are based on the cross-checking of several sources,<sup>16</sup> as well as on OECD country analysts' expertise. When working on episodes, the dummies take the value 1 if the rule exists when the episode starts or is introduced very soon thereafter.

For the regressions, it is the presence or not of a rule in the first year of the episode or soon after the episode started that is taken into account. Finally, two dummies are used to account for respectively the euro qualification contest (1992-97)<sup>17</sup> and the SGP period.

Apart from the duration analysis, the election dummies are set to 1 if there is an election in the year preceding the start of the episode or after the start, respectively. In the duration analysis the dummy equals 1 if there is an election in the current year during the episode or, in an alternative regression, in the year following the current year. The information comes from national sites on elections results; the International Institute for Democracy and Electoral Assistance (IDEA); and wikipedia.org.

## 2 Econometric techniques

The aim is to analyse the key factors behind the different dimensions of fiscal consolidation episodes: the likelihood that such an episode occurs, the size and intensity of fiscal adjustment during an episode, the duration of the episode, and the probability of "success" of the episode in terms of the attainment of a primary balance sufficient to stabilize the debt-to-GDP ratio and maintaining it stable for at least two years. Within each dimension the number of observations in the respective sample varies, as for some explanatory variables observations for early years are not available. For all parts of the econometric analysis, repeated consolidation spells occurring in one and the same country are treated as stochastically independent

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<sup>16</sup> Deroose *et al.* (2006); European Commission (2003 and 2006) ; Fischer (2005); Gruen and Sayegh (2005); von Hagen (2006); IMF (2005); Janssen (2001); Joumard *et al.* (2004); Kennedy *et al.* (2001); Moulin (2004); Poterba (1997); and Tanaka (2005).

<sup>17</sup> For Greece since 1999.

observations. Using a general to specific approach, the variables that were not significant were excluded so as to keep a preferred equation for each dimension.

### 2.1 What factors trigger a consolidation episode?

The model applied to generate the results shown in column 1 of Table 1 is a probit. The model was estimated on a pooled sample of 24 countries. For each year of the pooled sample the information of whether or not a consolidation episode commenced – according to the criterion for the variation in the cyclically-adjusted primary balance (CAPB) as set out in Box 1 in the main text – was utilised for the estimator. Observations (years by country) on ongoing consolidation episodes were dropped. A positive coefficient in column 1 of Table 1 indicates that the respective explanatory variable will raise the likelihood of a consolidation episode starting.

### 2.2 What affects the size and “intensity” of consolidation achieved over a consolidation episode?

The model that generates the estimates of columns 2 and 3 of Table 1 is a linear regression model in which the change in the CAPB as a per cent of potential GDP over the consolidation episode (in column 3 it is the change per unit of time) is regressed on a set of explanatory variables. The sample consists of a maximum of 80 episodes that occurred among the 24 countries under consideration. “Censored” episodes that were not completed in the last year of the sample span (2005) were excluded. The within-sample probability distribution of the dependent variable is truncated from below as the observations on the CAPB are subject to the selection criterion defining the start of a consolidation period, as described in Box 1 in the main text. To arrive at unbiased parameter estimates a two step procedure has been applied that utilises the outcome from the probit model described in the preceding paragraph (first step) in a generalised least squares regression of the change in the CAPB on a set of explanatory variables and a correction term (second step).<sup>18</sup>

More specifically, the regression equation is given by:

$$C = Y\alpha + \hat{G}\delta + \varepsilon,$$

with

$C$  = dependent variable

$Y$  = explanatory variables

$$\hat{G} = \frac{\varphi(X\hat{\beta})}{\phi(X\hat{\beta})}$$

<sup>18</sup> For econometric details, see *e.g.* Maddala (1985).

$\alpha, \delta$  = parameters to be estimated,

$\hat{\beta}$  = parameter estimates from the probit model

$\varepsilon$  = error term

$\varphi, \phi$  = density and distribution function of the normal distribution

The parameters,  $\alpha$  and  $\delta$  are estimated using generalised least squares as the approach generates heteroscedastic residuals.

### 2.3 What influences the duration of consolidation episodes?

The model that generates the estimates in column 4 of Table 1 is a hazard rate model, the hazard rate denoting the exit rate from a consolidation episode, conditional on the episode having not terminated earlier.<sup>19</sup> The model estimates the impact of a set of explanatory variables,  $Z$ , on the likelihood of terminating a consolidation episode. The sample comprises the duration of the consolidation episodes under consideration, measured in years. The estimated duration distribution is Weibull, with hazard

$$h(d) = \nu \rho d^{\rho-1}$$

where  $d$  denotes duration,  $\rho, \nu$  parameters and  $\nu = \exp(Z\lambda)$  (proportional hazard specification), where  $\lambda$  measures the impact of the explanatory variables on the duration of the episodes. To the extent explanatory variables take on different values over the consolidation episode, the exit rate is conditional on the entire path of the explanatory variables over time, up to the period prior of exit. A positive  $\lambda$  coefficient indicates that a higher value of the explanatory variable increases the likelihood of terminating the episode (given its elapsed duration) or equivalently that the episode is likely to last shorter. For  $\rho > 1$  the likelihood of terminating a consolidation episode increases with the duration of the episode.

### 2.4 What influences whether consolidation suffices to stabilise debt?

The model that generates the estimates depicted in column 5 of Table 1 is again a probit. For each consolidation episode in the sample, the information is used of whether or not a consolidation episode is “successful” in attaining a primary surplus that at least stabilises debt during the consolidation episode and maintaining it during the following two years.

<sup>19</sup> For econometric detail see *e.g.* Kalbfleisch and Prentice (1980). In the analysis at hand durations are measured in terms of discrete one-year intervals. For detail on grouping see Wurzel (1988). Earlier application of duration analysis to fiscal consolidation episodes can be found in von Hagen *et al.* (2002); Gupta *et al.* (2003); and Maroto-Illera and Mulas-Granados (2001).

**REFERENCES**

- Ahrend, R., P. Catte and R. Price (2006a), "Interactions Between Monetary and Fiscal Policy: How Monetary Conditions Affect Fiscal Consolidation", OECD, Economics Department, Working Paper, No. 521, Paris.
- (2006b), "Factors Behind Low Long Term Interest Rates", OECD, Economics Department, Working Paper, No. 490, Paris.
- Alesina, A. and S. Ardagna (1998), "Tales of Fiscal Adjustment", *CEPR Economic Policy*, Vol. 13, Issue 27.
- Alesina, A. and T. Bayoumi (1996), "The Costs and Benefits of Fiscal Rules: Evidence from the U.S. States", NBER, Working Paper, No. 5614.
- Alesina, A. and R. Perotti (1996), "Fiscal Adjustments in OECD Countries: Composition and Macroeconomic Effects", NBER, Working Paper, No. 5730.
- Alesina, A. and G. Tabellini (2005), "Why is Fiscal Policy Often Procyclical?", Harvard Institute of Economic Research, Discussion Paper, No. 2090.
- Ardagna, S. (2004), "Fiscal Stabilizations: When Do They Work and Why", *European Economic Review*, Vol. 48, No. 5.
- Ayuso-i-Casals, J., D. Gonzalez Hernandez, L. Moulin and A. Turrini (2007), "Beyond the SGP. Features and Effects of EU National-level Fiscal Rules", paper presented at the 9<sup>th</sup> *Banca d'Italia Workshop on Public Finance*.
- Baldacci, E., S. Gupta, B. Clements and C. Mulas-Granados (2004), "Expenditure Composition, Fiscal Adjustment and Growth in Low-income Countries", International Monetary Fund, Working Paper, No. 02/77.
- Bassanini, A., S. Scarpetta and P. Hemmings (2001), "Economic Growth: The Role of Policies and Institutions", OECD, Economics Department, Working Paper, No. 283.
- Buti, M. and P. van den Noord (2004), "Fiscal Discretion and Elections in the Early Years of EMU", *Journal of Common Market Studies*, Vol. 42, No. 4.
- Cournède, B. and F. Gonand (2006), "Restoring Fiscal Sustainability in the Euro Area: Raise Taxes or Curb Spending?", OECD, Economics Department, Working Paper, No. 520.
- Dafflon, B. and S. Rossi (1999), "Public Accounting Fudges Towards EMU: A First Empirical Survey and Some Public Choice Considerations", *Public Choice*, Vol. 101, No. 1-2, October.
- De Mello, L., P.M. Kongsrud and R. Price (2004), "Saving Behaviour and the Effectiveness of Fiscal Policy", OECD, Economics Department, Working Paper, No. 397.

- Deroose, S., L. Moulin and P. Wierts (2006), "National Expenditure Rules and Expenditure Outcomes: Evidence for EU Member States", *Fiscal Spending Rules*, *Wirtschaftspolitische Blätter*, Vol. 53, No. 1.
- European Commission (2003), *Public Finances in EMU*, Brussels.
- European Commission (2006), *Public Finances in EMU*, Brussels.
- Fischer, J. (2005), "Swedish Budget Rules: Praise from Brussels, Pressure from Home", *ECFIN Country Focus*, Vol. 2, Issue 4, European Commission, Brussels.
- Girouard, N. and C. André (2005), "Measuring Cyclically-adjusted Budget Balances", OECD, Economics Department, Working Paper, No. 434.
- Girouard, N. and R. Price (2004), "Asset Price Cycles, 'One-off' Factors and Structural Budget Balances", OECD, Economics Department, Working Paper, No. 391.
- Gruen, D. and A. Sayegh (2005), "The Evolution of Fiscal Policy in Australia", *Oxford Review of Economic Policy*, Vol. 21, Issue 4.
- Gupta, S., E. Baldacci, B. Clements and E. Tiongson (2003), "What Sustains Fiscal Consolidations in Emerging Market Countries?", International Monetary Fund, Working Paper, No. 03/224.
- Hemming, R. and M. Kell (2001), "Promoting Fiscal Responsibility: Transparency, Rules and Independent Fiscal Authorities", in Banca d'Italia (ed.), *Fiscal Rules*.
- International Monetary Fund (2005), "Sweden: Selected Issues", *IMF Country Report*, No. 05/344, Washington (D.C.).
- Janssen, J. (2001), "New Zealand's Fiscal Policy Framework: Experience and Evolution", New Zealand Treasury, Working Paper, No. 01/25.
- Joumard, I., P.M. Kongsrud, Y.S. Nam and R. Price (2004), "Enhancing the Effectiveness of Public Spending: Experience in OECD Countries", OECD, Economics Department, Working Paper, No. 304.
- Kumar, M., D. Leigh and A. Plekhanov (2007), A Retrospective of Successful Fiscal Adjustment Periods, paper presented at the 9<sup>th</sup> Banca d'Italia Workshop on Public Finance.
- Kalbfleisch, J. and R. Prentice (1980), *The Statistical Analysis of Failure Time Data*, John Wiley and Sons, New York.
- Kennedy, S., J. Robbins and F. Delorme (2001), "The Role of Fiscal Rules in Determining Fiscal Performance", in Banca d'Italia (ed.), *Fiscal Rules*.
- Koen, V. and P. van den Noord (2005), "Fiscal Gimmickry in Europe: One-off Measures and Creative Accounting", OECD, Economics Department, Working Paper, No. 417.

- Maddala, G. (1985), *Limited-dependent and Qualitative Variables in Econometrics*, Cambridge University Press, Cambridge.
- Maroto-Illera, R. and C. Mulas-Granados (2001), "Duration of Fiscal Consolidations in the European Union", FEDEA, Working Paper, No. 2001-19, Spain.
- Mills, P. and A. Quinet (2001) "The Case for Spending Rules", in Banca d'Italia (ed.), *Fiscal Rules*.
- Morris, R. and L. Schuknecht (2007), "Structural Balances and Revenue Windfalls: The Role of Asset Prices Revisited", European Central Bank, Working Paper, No. 737.
- Pain, N., I. Koske and M. Sollie (2006), "Globalisation and Inflation in the OECD Economies", OECD, Economics Department, Working Paper, No. 524.
- Persson, T. and G. Tabellini (2000), *Political Economics – Explaining Economic Policy*, MIT Press, August.
- Poterba, J. (1997), "Do Budget Rules Work?", NBER, Working Paper, No. 5550.
- Rogoff, K. and A. Sibert (1988), "Elections and Macroeconomic Policy Cycles", *Review of Economic Studies*, Vol. 55, No. 1.
- Shi, M. and J. Svensson (2002), "Conditional Political Budget Cycles", CEPR, Discussion Paper, No. 3352.
- Tanaka, H. (2005), "Fiscal Rules and Targets and Public Expenditure Management: Enthusiasm in the 1990s and its Aftermath", *Pacific Economic Papers*, No. 613, Australia National University, Australia-Japan Research Centre, Canberra.
- von Hagen, J. (2002), "Fiscal Rules, Fiscal Institutions and Fiscal Performance", *The Economic and Social Review*, Vol. 33, No. 3.
- (2006), "Fiscal Rules and Fiscal Performance in the EU and Japan", SFB/TR 15 – Governance and the Efficiency of Economic Systems, Discussion Papers, No. 147.
- von Hagen, J., A. Hugues Hallett and R. Strauch (2002), "Budgetary Consolidation in EMU", *European Economy, Economic Papers*, No. 148.
- von Hagen, J. and G. Wolff (2004), "What Do Deficits Tell Us about Debts? Empirical Evidence on Creative Accounting with Fiscal Rules in the EU", CEPR, Discussion Paper, No. 4759.
- Wierds, P. (2007), "On Enforcement, Causality and Circumventing: Can Expenditure Rules Influence Expenditure Outcomes?", paper presented at the 9<sup>th</sup> Banca d'Italia Workshop on Public Finance.
- Wurzel, E. (1988), "Distribution of Single-spell Durations in Sample Designs with Time-aggregated Data", Sonderforschungsbereich 303 Discussion Paper, No. A-162, University of Bonn.

