Session 2

FISCAL CONSOLIDATION

WHAT AFFECTS FISCAL CONSOLIDATION? – SOME EVIDENCE FROM OECD COUNTRIES

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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.(1) 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.(2)

Continues as long as the CAPB improves. An interruption is allowed without terminating the episode as long at 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).

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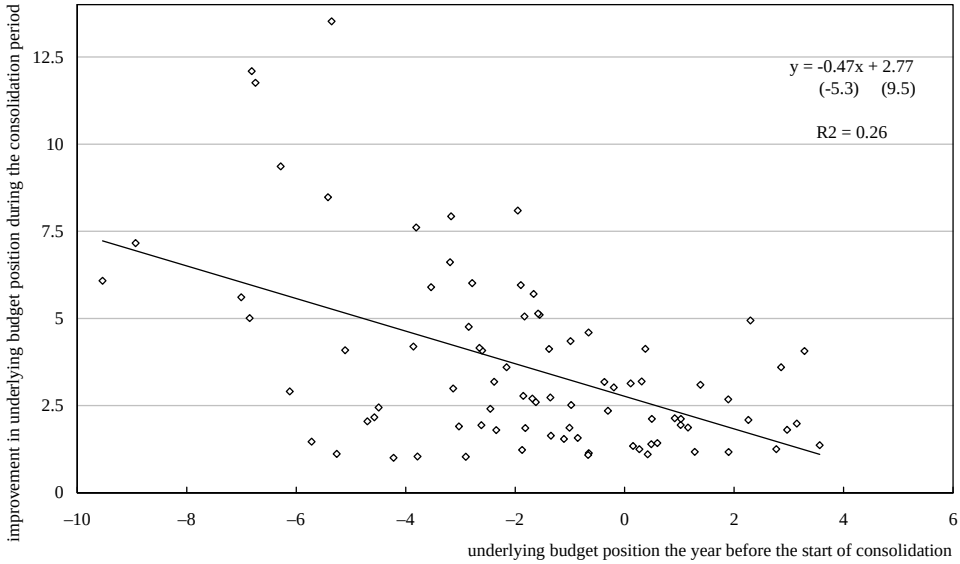
(1) Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom and the United States.

(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.[1]

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.

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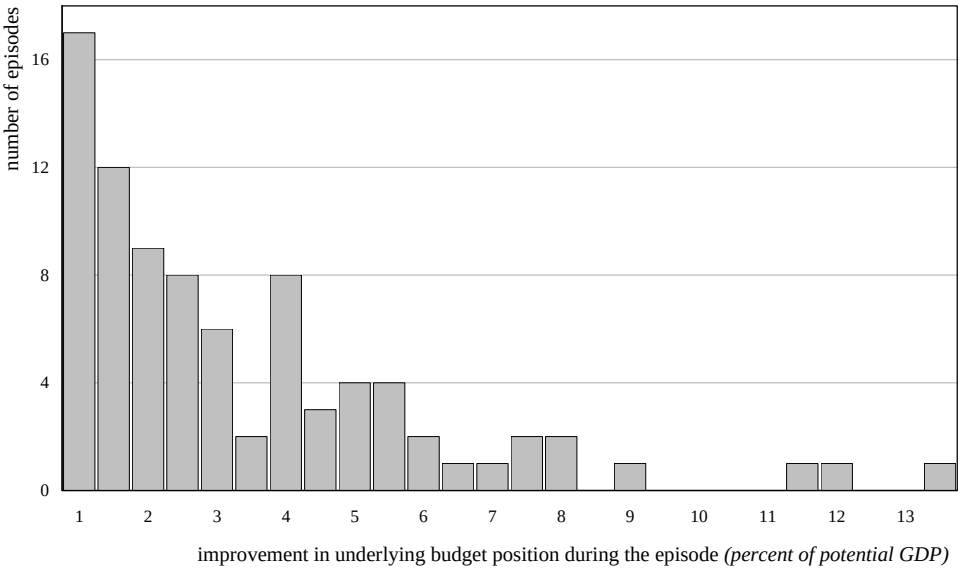
[1] Among large consolidation outcomes (improvements in cyclically-adjusted balances in terms of per cent of potential GDP) were: Canada in the 1990s (8.1 per cent); Portugal in the 1980s (8.5 per cent); Sweden in the 1980s (9.4 per cent) and in the 1990s (11.7 per cent); Greece in the 1990s (12.1 per 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.

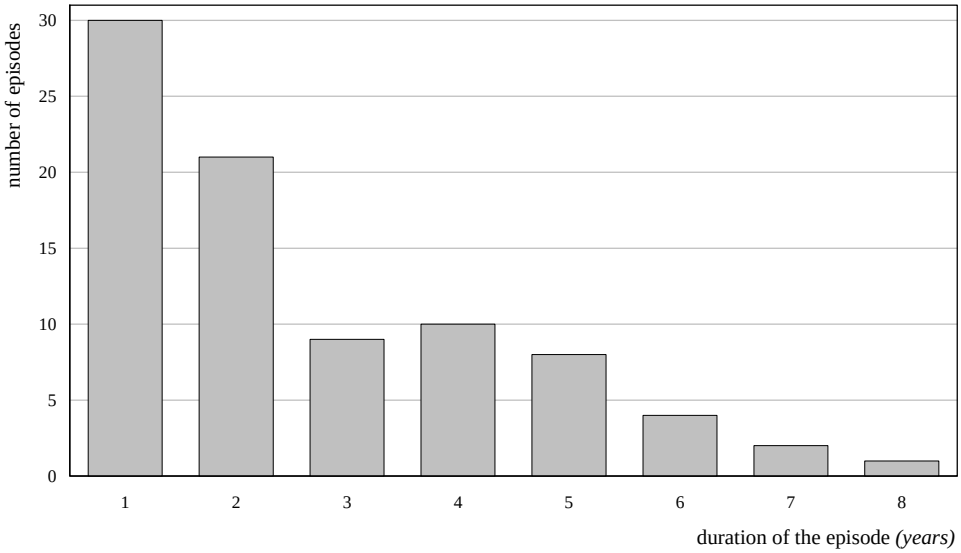
Figure 2

Strength and Duration of Consolidation Episodes

The Distribution of Episodes by the Size of Consolidation



The Distribution of Consolidation Episodes by Duration

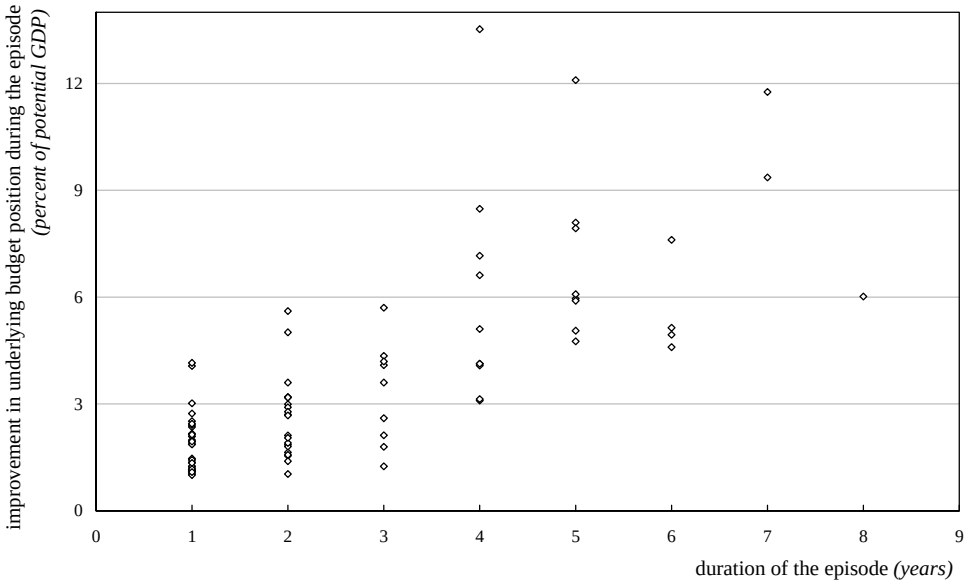


Note: The budget concept referred to is the cyclically-adjusted primary budget balance.
Source: OECD calculations.

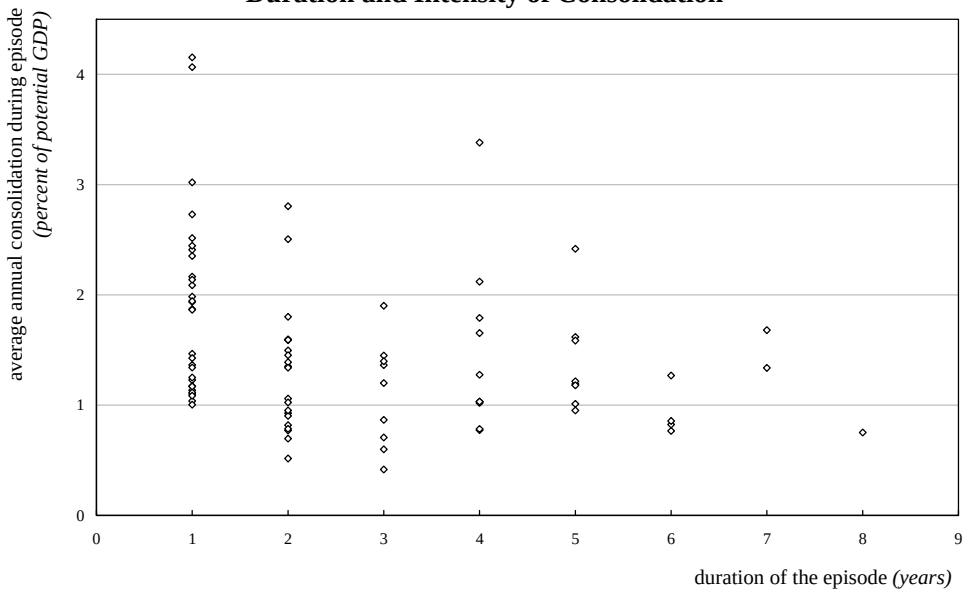
Figure 3

The Relationship Between Duration, Size and Intensity of Consolidation

Duration and Size of Consolidation



Duration 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.[2] 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.[3]

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.[4] 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 ¾ 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

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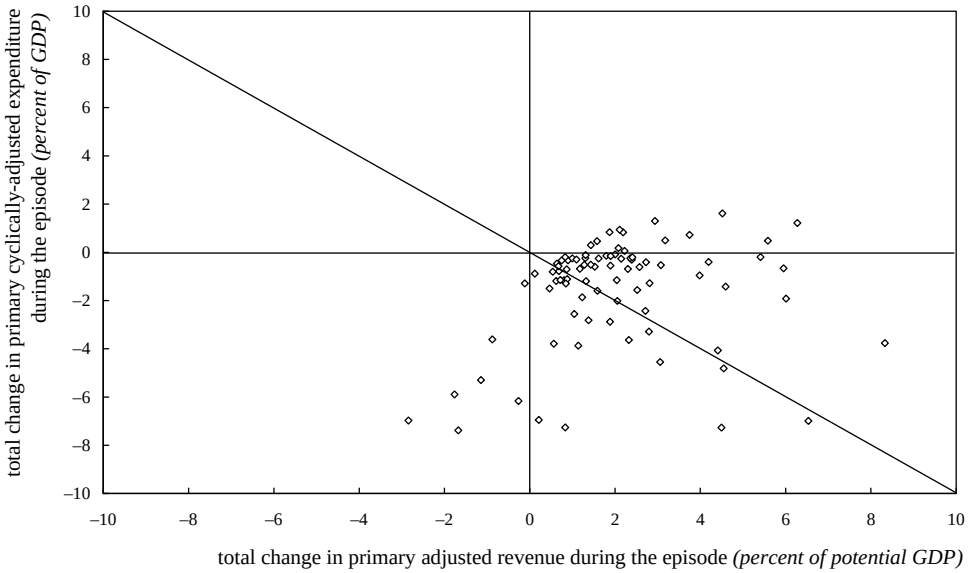
2 Alesina and Perotti (1996); Alesina and Ardagna (1998); and Alesina and Bayoumi (1996). Von Hagen *et al.* (2002) also find that the likelihood of sustaining consolidation efforts seems to rise when governments tackle politically sensitive items on the budget such as transfers, subsidies and government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

3 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.

4 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

The Role of Spending and Revenue in Consolidation Episodes



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).[5]

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").[6] 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.

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[5] 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.

[6] 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).

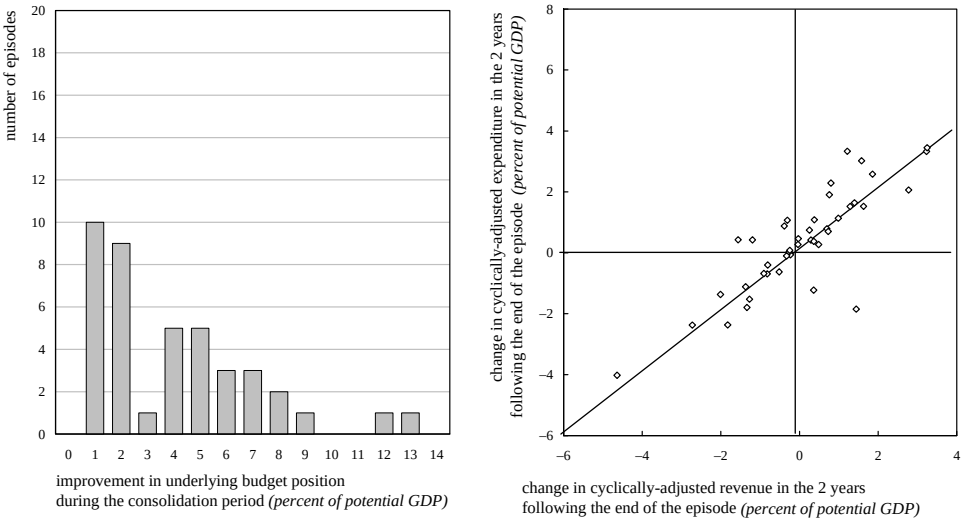
Figure 5

Comparison of Consolidation Episodes With and Without Backtracking

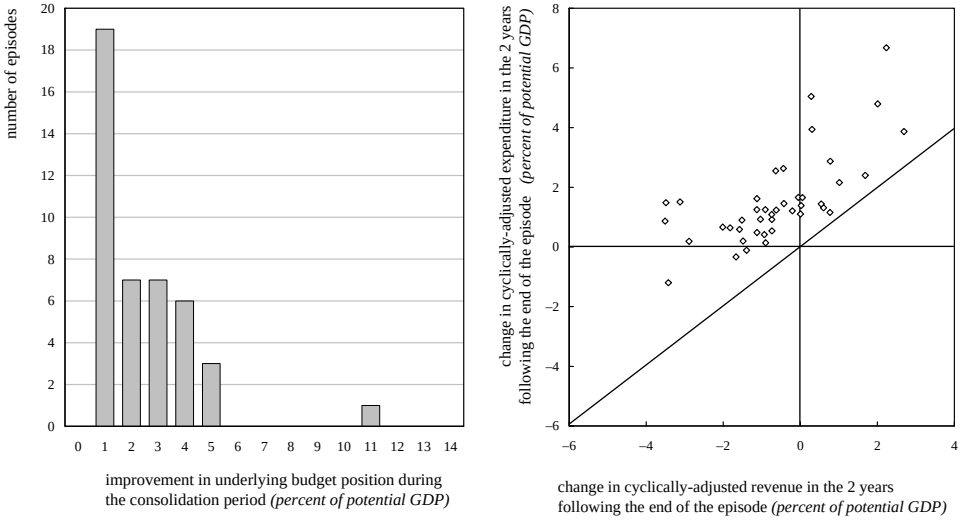
Distribution of Episodes by the Size of Consolidation

Expenditure and Revenue Changes Subsequent to Consolidation

Episodes Followed by Little or No Backtracking



Episodes Followed by 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.[7] 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.[8]

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").[9] 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).[10]

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.[11] 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

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7 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.

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

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

10 All other variables are evaluated at their mean.

11 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

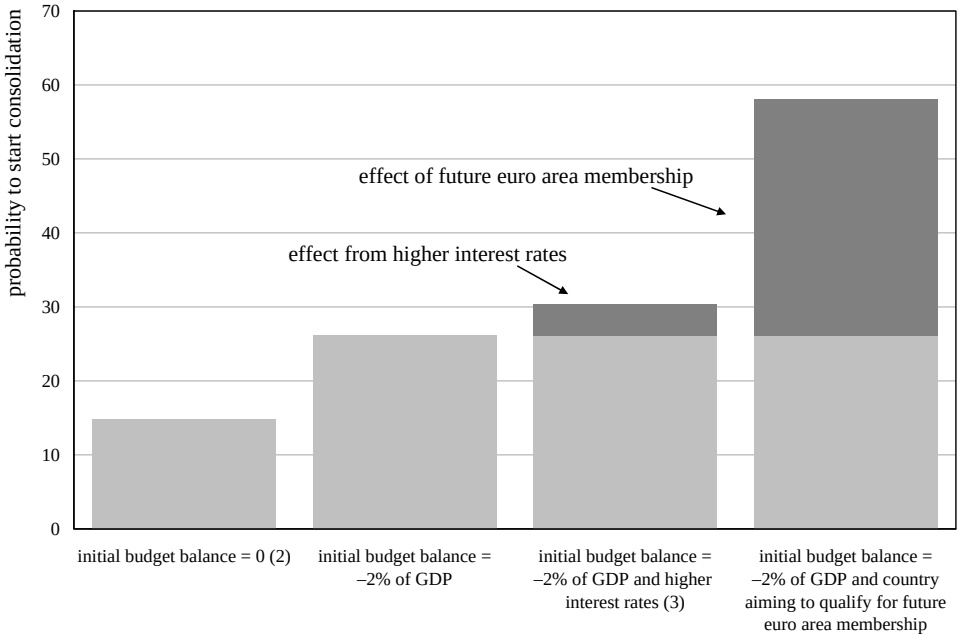
	Probability to start	Size of the adjustment	Intensity of the adjustment	Probability to stop the episode	Probability to reach a primary balance that stabilises debt
Year before the episode started					
Cyclically-adjusted primary balance	–0.046****	–0.567****	–0.594**	0.187****	
	(–6.54)	*(–4.92)*	*(–1.78)*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



(1) 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.
(2) Measured by the cyclically-adjusted primary balance.
(3) 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.[12]

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12 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.[13]

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.[14] 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).

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

[14] 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.[15]

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 (Wierts, 2007).

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[15] 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:

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

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

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,[16] 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)[17] 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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16 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).

17 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).[18]

More specifically, the regression equation is given by:

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

with

C = dependent variable

Y = explanatory variables

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

[18] For econometric details, see *e.g.* Maddala (1985).

α, δ = parameters to be estimated,

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

ε = error term

φ, ϕ = density and distribution function of the normal distribution

The parameters, α and δ 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.[19] 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, ρ, ν parameters and ν = exp($Z\lambda$) (proportional hazard specification), where λ 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 λ 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.

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[19] 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).

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FISCAL ADJUSTMENTS: DETERMINANTS AND MACROECONOMIC CONSEQUENCES

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1 Introduction

This paper examines the experience of industrial countries that undertook fiscal consolidation, managed to stabilize public finances, and substantially reduce debt without adverse effects on the pace of economic activity. Complementing the analysis of a number of recent studies that have explored this issue, the novelty of the paper lies in using both case studies and econometric analysis, including model-based simulations, to explore a broad range of determinants of the success of fiscal adjustments. Using a cross-sectional framework, the paper studies the determinants of the success, as well as obstacles on the way to fiscal adjustment by examining the following: economic conditions at the start of consolidation; the composition of expenditure and revenue measures; the role of accompanying structural reforms; the contribution of institutional factors; and government actions aimed at garnering public support. The paper also examines the short and long-run effects of fiscal consolidations on economic activity.

The cross-country econometric study of the determinants of fiscal adjustment effort is complemented by fourteen case studies of fiscal adjustments in OECD countries, including each of the G7, during the 1990s and 2000s. The analysis of the effects of fiscal consolidations on economic activity is based both on case studies and on simulations using the Global Integrated Monetary and Fiscal Model (GIMF) developed at the International Monetary Fund (IMF).

The case studies based on the OECD country experience suggest that budgetary difficulties tend to spur adjustment efforts, which are facilitated by a supportive domestic and international growth environment. Fiscal adjustments that rely on cuts in current expenditure have tended to be more durable than revenue-based consolidations. Higher governmental stability and higher institutional quality are also associated with more successful fiscal consolidations.

Regarding the macroeconomic effects of fiscal consolidations on economic activity, the case studies indicate that while adjustments tended to have a moderating influence on growth in the short run, it was not as pronounced as generally anticipated, and in a number cases, the consolidations could even be described as "expansionary". The GIMF-based experiments suggest that the short-run contractionary effects are smallest when the consolidation involves increases in consumption taxes, and largest when it involves cuts in productive public

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[*] International Monetary Fund. The views expressed in the paper are those of authors and should not be attributed to the IMF. The authors are grateful to Mark De Broeck and Robert Gillingham for valuable comments and suggestions.

infrastructure spending. In addition, fiscal consolidation can have positive long-run effects, particularly when the greater fiscal space available after debt has been reduced is used to cut capital income taxes. However, these long-run gains may not occur if the consolidation involves cuts in public infrastructure spending. Fiscal adjustment is also found to have substantial positive spillover effects when implemented by a large economy such as the United States.

The remainder of the paper is structured as follows: Section 2 identifies a number of recent adjustment episodes in the OECD countries; Section 3 analyzes case studies based on a selection of these episodes; Section 4 conducts a cross-section analysis of the determinants of the adjustment effort; Section 5 examines the impact of consolidation on economic activity based both on case studies and simulations using the GIMF; and Section 6 concludes.

2 Identifying episodes and determinants of fiscal adjustment

2.1 Identifying episodes of successful fiscal adjustment

Fiscal consolidations are usually deemed to be successful if they are sustained, and are substantive. A standard approach has been to define a fiscal consolidation (FC) relative to a specific improvement in the cyclically-adjusted primary balance (CAPB), over a 1-3 year period.[1] In addition, a number of existing studies distinguish successful from unsuccessful consolidations by measuring the size of the fiscal adjustment, its duration, or its impact on the debt-to-GDP ratio (e.g. Alesina and Perotti, 1995, and Tsibouris *et al.*, 2006).[2]

For the purposes of the case study analysis presented in this paper, FCs are defined as years in which the ratio of the CAPB to cyclically-adjusted GDP improves by at least 1 percentage point. To determine how successful a given FC is, this paper follows Alesina and Perotti (1995), and Darby *et al.* (2005), and focuses on the degree of debt reduction achieved over the following three years. In particular, the FC can be considered very successful if, three years after the start of the consolidation, the debt-to-GDP ratio is at least five percentage points below the level observed immediately prior to FC. Depending on the degree of debt reduction

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[1] Focusing on the change in the CAPB in percent of cyclically-adjusted GDP permits a more accurate measure of fiscal effort than the unadjusted primary balance, as the CAPB focuses on discretionary changes in fiscal policy net of contributions of cyclical factors.

[2] Data on the cyclically-adjusted primary balances and public debt for all countries considered in this paper are taken from the OECD. The OECD's method of computing the cyclically-adjusted fiscal balance is described in Giorno *et al.* (1995). For tax revenues, the cyclical components are calculated by multiplying output gaps estimated using a production function approach by estimated elasticities with respect to output. In terms of revenues, four different types of taxes are distinguished in the cyclical adjustment process: personal income tax; social security contributions; corporate income tax and indirect taxes. The sole item of public spending treated as cyclically sensitive is unemployment-related transfers. For a recent update of the tax elasticities used to calculate the cyclical component of tax revenues, see Girouard and André (2005).

achieved, FC attempts are also categorized as either "moderately successful" or "unsuccessful", as explained in Appendix 1.

Based on this approach, fiscal adjustments are identified amongst the 24 OECD countries considered in this paper during 1990-2005.[3] To allow an evaluation of the success of FC that occurred during 2003-05, the paper relies on forecasts of public debt for 2006-07 provided by the OECD (2006). The full list of FC episodes is reported in Tables 9-11, along with the estimated and projected changes in the CAPB and debt ratios.

Fourteen of these fiscal adjustments are selected for the purposes of the case studies. These selected episodes include recent examples of FC by each of the G7 countries and the adjustment in Germany since 2003.[4] In addition, they include selected recent consolidations in other OECD countries (Denmark, Ireland, the Netherlands, New Zealand) and several episodes of adjustment that are deemed to have been particularly successful (Finland, Spain, Sweden). All the FCs occurred during the 1994-2005 period, as reported in Table 1. The list is by no means exhaustive (for instance, case studies of successful consolidations in Australia and Belgium are not reported due to space constraints), and therefore the results should be interpreted in conjunction with those of the econometric analysis with a broader country coverage.[5]

2.2 Potential Determinants of Fiscal Consolidation Success

A wide variety of economic, political, and institutional factors have been identified as likely contributors to FC success (see, for instance, Alesina and Perotti, 1995; von Hagen and Strauch, 2001; Darby *et al.*, 2005; and Alesina *et al.*, 2006). These include macroeconomic and political background before and during the consolidation; the design of adjustment (relative importance of expenditure and revenue measures); subnational government participation (for example, via cuts in the provincial wage bill); adoption of structural reforms (for instance, in the area of social security) and changes in institutional framework (for example, introduction of an medium-term expenditure framework, MTEF); and use of various strategies to mobilize public support for the adjustment (for example, highlighting long-run sustainability considerations in the government's communication strategy). The

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[3] The 24 OECD countries considered in the analysis are as follows: Australia, Austria, Belgium, Canada, Denmark, Germany, Finland, France, Greece, Ireland, Iceland, Italy, Japan, Korea, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States.

[4] The adjustment in Germany does not formally qualify as a consolidation episode as the gradual improvement in primary structural balance has not exceeded 1 per cent of GDP in any year. Nonetheless, it presents an interesting case of a recent multiyear consolidation initiative.

[5] It is worth emphasizing that, unlike the case study analysis, the econometric cross-section analysis does not rely on specific thresholds for identifying consolidations. Rather, the cross-section approach relates the full data set on primary balances to the underlying determinants of fiscal policy using statistical inference.

Table 1

Fiscal Consolidation Episodes Used for Case Studies

Country	Years
Canada	1994-97
Denmark	2004-05
Finland	1998
Germany	2003-05
France	1996-97
Ireland	2003-04
Italy	1997
Japan	2004
Netherlands	2004-05
New Zealand	2003
Spain	1996-97
Sweden	1994-98
United Kingdom	1995-98
United States	1994

Source: OECD, and IMF staff calculations.

findings of the literature regarding the relationship between these factors and FC success are briefly summarized below.

It has been widely suggested that budgetary difficulties can oftentimes lead to a consensus to deal with them. High and rising debt-to-GDP ratio has the potential to spur effective FC, and the empirical evidence is generally supportive of this notion (see, for example, von Hagen and Strauch, 2001, henceforth VHS). It has been also suggested that domestic economic conditions can affect the likelihood of FC starting, and succeeding. The evidence on the direction of the impact is, however, inconclusive. On the one hand, Drazen and Grilli (1993) argue that reform is more likely when "things are going badly", and VHS (2001) find that FC has a higher chance of becoming successful when the domestic economy is in a cyclical downturn, although the likelihood of a FC being *attempted* is higher during domestic economic expansions. On the other hand, Alesina and Perotti (1995) find that the probability of successful FC is lower when the economy is in recession.

While the success of FC is also likely to depend on the macroeconomic situation of major trading partners, there is no consensus on the direction of this effect. On the one hand, VHS (2001) find that FCs starting in periods when both the domestic and the international economies are weak are more likely to be successful.

On the other hand, Alesina and Perotti (1995) and McDermott and Wescott (1996) find that many successful fiscal adjustments took place in the second half of the 1980s, *i.e.* a period of high OECD economic growth, and that efforts of FC in the early 1980s, when economic growth in the OECD was low, typically failed.

It has also been argued that the success of FC depends on a simultaneous easing of monetary policy: however, the empirical evidence for OECD countries is again inconclusive. Lambertini and Tavares (2005) find support for this hypothesis, while VHS (2001) report that the monetary policy stance has no explanatory power for the success of FC.

A number of studies have emphasized the importance of political economy factors in determining the outcome of FCs. For instance, coalition governments have been found to be less likely to succeed than single-party and minority governments (Alesina and Perotti, 1995). Alesina *et al.* (2006) report that newly-elected governments, and governments in presidential systems with a large majority of the party in office have a higher likelihood of success. By contrast, frequent changes in governments tend to be associated with larger fiscal deficits, as documented by Alesina and Tabellini (1990) and Tytell and Wei (2004).

A number of studies (e.g., Alesina and Perotti, 1995, and VHS, 2001) have examined the composition of fiscal adjustments and found that while successful and unsuccessful adjustments involve, on average, the same improvement in the cyclically-adjusted primary balance, the former rely mostly on expenditure cuts and the latter tend to rely more on tax increases. Within expenditure, successful adjustments tend to be characterized primarily by cuts in transfers and wage bill. The limited expenditure cuts that occur during unsuccessful adjustments come mainly from government investment.

The involvement of the subcentral tiers of government has often contributed to the success of FCs. For example, Darby *et al.* (2005) find that, for OECD economies over 1979-99, involvement of the subcentral tiers of government was crucial to achieving cuts in expenditure, particularly in relation to the overall size of the government wage bill. In addition, central governments appear to have exerted a strong influence on the expenditure of subcentral tiers through grant allocations, and control of these allocations appears to have had a considerable impact upon the overall success of FC attempts.

Governments used a wide range of strategies to mobilize popular support for fiscal consolidation, including involvement of independent fiscal agencies in the assessment of the unsustainability of a given fiscal policy stance; explicit references by governments to fiscal objectives that need to be attained to address sustainability concerns (*i.e.*, emphasizing long-run pressures on social security, the importance of "halving the deficit by year *x*", and the promotion of a "golden rule"); explicit references to an external anchor, in particular, the need to meet Maastricht criteria; including fiscal consolidation in a package of structural reform measures; and promoting enhanced fiscal transparency that facilitates monitoring of the fiscal stance by the public (as discussed by Tsibouris *et al.*, 2006).

A number of studies suggest that higher-quality fiscal institutions make an important contribution to the success of FC. For example, higher-quality fiscal institutions were shown to be associated with greater expenditure discipline, even after controlling for political pressures (Fabrizio and Mody, 2006).[6] The contribution of institutional quality, as measured by strong and impartial bureaucracies and high democratic accountability, has also been found to be important for fiscal policy performance.[7] In particular, Alt and Lassen (2006) find that a higher degree of fiscal transparency is associated with lower public debt and deficits, after controlling for other explanatory variables.

3 Case studies

The case studies provide a number of useful insights into the determinants of fiscal consolidations and their successes.[8] It is important to emphasize that the analyzed episodes of fiscal consolidation differ widely in terms their size and composition, economic and political background, adjustment strategy, accompanying reforms, and outcomes. Nevertheless, a wide range of substantive conclusions do emerge from the analysis, and are summarized in this section.

3.1 Political, macroeconomic and fiscal background

About three quarters of the surveyed fiscal adjustments were initiated by newly-elected governments (Table 2). This finding is intuitive for the following reasons. First, as in a number of European countries and in Canada in the 1990s, new governments are given an explicit mandate for fiscal adjustment. Secondly, new governments proposed new approaches to tackling old problems. Thirdly, new governments were better positioned to develop a medium-term strategy for fiscal adjustment with maximum ownership. Finally, political costs of initiating an adjustment may well be the smallest at the beginning of a government's elective office, and would be expected to increase as an election date approached.

Most fiscal consolidations were launched during economic downturns or the early stages of recovery from a recession. While launching fiscal consolidation during an upswing may have the obvious merits, including ensuring counter-cyclicality of fiscal policy, less than a quarter of the fourteen adjustment

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[6] The quality of fiscal institutions is typically measured using indices composed of variables that evaluate the budget-preparation stage, budget authorization stage, and budget implementation stage (for example, as constructed by Gleich, 2003, and Yläoutinen, 2004).

[7] See for example, IMF (2003). Interestingly, Abiad and Baig (2005) find that, in emerging market countries, better-quality institutions are associated, on average, with larger deficits. They interpret this seemingly counterintuitive finding as indicating that better institutions are associated with lower risk premia and, hence, a lower need for fiscal adjustment.

[8] A number of recent studies have employed a case study approach to analyzing fiscal adjustments, including Tsibouris *et al.* (2006), Haputmeier *et al.* (2006), and Annett (2006).

episodes were initiated against the background of a strong economic outlook (the exceptions being the U.K., New Zealand, and, to a lesser extent, Spain). This finding is consistent with the notion that it is easier to build a broad consensus about the need for fiscal consolidation during or shortly after a sharp downturn in economic activity.

Fiscal consolidations were also typically preceded by sharp deterioration in government fiscal balances accompanied by rapid increases in public debt levels. The rationale for this may appear self-evident, although there are plenty of instances where a deterioration in the fiscal positions has not been followed by relatively rapid adjustment. Notable exceptions are the recent cases of Denmark and New Zealand, where fiscal consolidations were to a significant extent motivated by the dire long-term outlook of public finances given the fiscal costs of aging population, and Ireland, where fiscal consolidation represented an attempt to arrest the deterioration of budget balance at an early stage.

3.2 Adjustment basis

Fiscal consolidations were approximately equally split between revenue-based and expenditure-based adjustments, with many episodes combining both types of measures (Table 3). On the expenditure side, a number of adjustments relied substantially on capital expenditure cuts (e.g., France, Italy and, more recently, Ireland), and across-the-board sequestration of discretionary spending programs (e.g., Sweden, Finland and, more recently, Japan).

However, the consolidation attempts based on cuts in current expenditure were more sustained on average, possibly because cuts in current expenditure were often accompanied by structural reforms. Reduction in wage bill and social security spending (including social transfers, health care, and unemployment benefits) made an important contribution to fiscal adjustment in a number of cases (e.g., Canada, Finland, Spain and, more recently, the Netherlands). Such cuts were usually facilitated by structural reforms aimed at improving the efficiency of public services provision and the incentive structure of insurance schemes. In contrast, tax increases and capital expenditure cuts were accompanied by structural changes in only a few instances (e.g., tax reforms in Canada and introduction of medium-term capital budgeting in Ireland). In addition, politically difficult measures, such as current expenditure cuts or general tax increases, may well have signaled a strong commitment to continued fiscal consolidation.

While revenue measures ranged widely from one-off tax surcharges to major overhauls of tax systems, successful revenue-based adjustments tended to rely to a significant extent on tax base broadening. In some instances (e.g., in Spain), tax reforms aimed at simplifying the tax system and reducing tax burden on small and medium-sized businesses resulted in higher tax buoyancy and higher revenues over the medium term.

Table 2

Recent Fiscal Consolidation Attempts in Selected Countries: Background

Episode	Political Background	Macroeconomic Background	Government Finances
Canada, 1994-97	Majority federal government elected in 1993 to address fiscal issues; similar election result in 1994–95 in the two largest provinces.	Recovery from recession; low inflation; high output gap and unemployment; exchange rate deprecation; improving current account balance.	Sizable deficit and debt stock; large share of debt held at short term and by nonresidents; high tax-to-GDP ratio; expending entitlements; sub-federal fiscal issues.
Denmark, 2004-05	The ruling center-right coalition entered the second half of its term with a diminishing voter support.	Continued economic slowdown (since 2001) characterized by gradually rising unemployment.	A moderate level of public debt (of about 50 percent of GDP), a near-balanced budget.
Finland, 1998	Both the coalition elected in 1991 and the grand coalition elected in 1995 had a clear mandate for EMU membership.	Gradual consolidation (from 1992) started at the time of deep recession characterized by high output gap, rising unemployment, low inflation, and depreciating exchange rate. By 1998 the economy had recovered and enjoyed a growth rate well above the EU average.	High deficit and medium-level but rapidly increasing debt, high tax-to-GDP ratio and expanding entitlement programs.
France, 1996-97	The president brought forward parliamentary elections by one year to ensure that the new government had a clear mandate for fiscal consolidation and that domestic elections did not interfere with the pre-EMU meeting of the European Council in early 1998.	The consolidation was launched against the background of a slow recovery from a recession, characterized by relatively high unemployment, low inflation, and exchange rate depreciation.	The expansionary policy in response to the 1993 recession left France with a large fiscal deficit and a medium-level but rapidly rising public debt, falling short of the EMU criteria.
Germany, 2003-05	The coalition led by the Social-Democratic Party narrowly won the elections in September 2002. The comprehensive reform plan (Agenda 2010) was unveiled in March 2003.	Three years of static output, high unemployment, concerns about possible deflation, heavy losses in the financial sector.	Fiscal deficit widened to about 3.7 percent of GDP in 2002, with public debt hovering around 60 percent of GDP.
Ireland, 2003-04	The coalition government enjoyed a strong parliamentary majority since 2002. In addition, there were few differences of views within the coalition.	After a decade of strong growth, economic activity (excluding profits of multinationals) decelerated markedly in 2002 and remained subdued in 2003.	Relatively low level of public debt (below 35 percent of GDP), a near-balanced budget, a relatively low tax-to-GDP ratio.
Italy, 1997	The consolidation was preceded by the electoral reforms at both the central and regional levels, which resulted in more stable governments with longer political horizons.	The consolidation attempt was launched during the time when growth turned negative in late 1996 - early 1997 after strong performance in 1995, and the return of the recession of the early 1990s was perceived as likely. Inflation was declining but the unemployment remained high.	Very high debt (of over 115 percent of GDP in 1997), rising in spite of fiscal consolidation attempts since early 1990s.
Japan, 2004	Ruling coalition since 2000. In 2004, the positions of the ruling party in both houses of parliament shrank as the government's approval rating hit the low of 36 percent (compared to 70–90 percent in 2001), partly due to the passage of pension reforms.	Gradual economic recovery since mid-2002, with contributions from both exports and domestic demand, characterized by gradually declining unemployment and easing of deflation.	A decade of high fiscal deficits (about 8 percent of GDP in 2003) led to a rapid accumulation of public debt, which reached 160 percent of GDP. The revenue-to-GDP ratio remained below 30 percent, while social security outlays kept rising.

Table 2 (continued)

Recent Fiscal Consolidation Attempts in Selected Countries: Background

Episode	Political Background	Macroeconomic Background	Government Finances
Netherlands, 2004-05	As a result of early elections in January 2003, center-right coalition government took office.	There had been a significant downturn in activity since 2000. During the two years, growth averaged barely 0.2 percent, with unemployment rising. Activity began to pick up in 2004 and growth was projected at about 1 percent in 2004 and 1¾ percent in 2005. The authorities had the challenge of nurturing the emerging recovery while ensuring fiscal sustainability.	There had been a sharp deterioration in the fiscal position with the 3 percent Maastricht deficit ceiling breached in 2003. The general government balance worsened by almost 5½ percentage points during the first three years of the decade, as a result of the 2001 tax reform, increases in health care and education spending, and a higher deficit of local governments (reaching 0.6 percent of GDP).
New Zealand, 2003	Competitive political environment, with the opposition calling on the ruling Labour Party to introduce more tax cuts and improve the quality of health and education services. However, the September 2005 elections did not lead to any significant relaxation of fiscal policy and the incumbent party was re-elected with a confirmed mandate for continued fiscal consolidation.	Solid and accelerating economic growth, narrowing current account deficit, unemployment at a 16-year low.	A slight budget surplus and a moderate level of public debt (of about 40 percent of GDP), which exceeded, however, the government's long-term target of 30 percent of GDP.
Spain, 1996-97	Elected in March 1996, the coalition government had a mandate for fiscal consolidation.	A relatively rapid economic recovery after the recession that culminated in a negative growth in 1993. While economic activity was on the rise and inflation gradually subsided, high unemployment (at above 20 percent of labor force) proved to be persistent.	Public financed have been gradually deteriorating since 1988 with fiscal deficit exceeding 7 percent of GDP in 1995. Public debt has rapidly risen to over 70 percent of GDP.
Sweden, 1994-98	The Social Democrat minority government launched fiscal consolidation following the 1994 general elections.	The deepest recession since the 1930s, accompanied by high inflation, quickly rising unemployment, exchange rate depreciation and associated improvement in the current account balance.	Fiscal deficit exploded to over 12 percent of GDP as a result of the cyclical downturn and the underfinanced tax reform of 1990–91, with public debt reaching 80 percent of GDP.
United Kingdom, 1995-98	The popularity of the conservative party by the middle of the term was low. After 18 years of being in opposition, the Labour Party won elections in May 1997 with an overwhelming majority in Parliament. The new government confirmed the course of fiscal consolidation and introduced a number of new policy reforms, including transferring the responsibility for setting interest rates from the Treasury to the Bank of England.	Three successive years of solid economic growth, led by private consumption. Unemployment was falling rapidly, while inflation remained relatively low.	Public sector fiscal deficit increased to over 7 percent of GDP by 1994, the debt-to-GDP ratio was on the rise and already exceeded the target level of 40 percent by about 8 percentage points.
United States, 1994	New Democratic President took over in January 2003. The Congress was also Democratic and there was expectation of an initiative to reduce debt.	Economic activity had been weak for some time, and unemployment was rising.	The federal government fiscal situation had been deteriorating at a sharp pace. The deficit was almost 5 percent of GDP. In nominal terms federal debt had quadrupled over 1980–92 and the debt ratio was projected to continue rising at a high rate.

Sources: Country authorities, OECD, Economist Intelligence Unit, and IMF staff reports.

Table 3

Recent Fiscal Consolidation Attempts in Selected Countries: Adjustment Basis

Episode	Adjustment Basis	Size and Composition	Revenue Measures	Expenditure Measures
Canada, 1994-97	Expenditure, complemented by some revenue measures.	Cyclically adjusted primary fiscal balance improved by 6.6 percent of GDP over 1994–97. Expenditure cuts accounted for about 85 percent of the improvement.	Higher excises, broadening of the personal income tax and corporate income tax bases, and increases in corporate income tax rates.	Cuts in wage bill, unemployment benefits, defense spending, agricultural and business subsidies, and transfers to provinces.
Denmark, 2004-05	Mixed, with emphasis on expenditure restraint.	Cyclically adjusted primary fiscal balance improved by about 2.9 percent of GDP over 2004–05. Expenditure restraint accounted for approximately half of the improvement.	Tax revenues exceeded expectations, largely owing to rising oil and gas prices, in spite of a reduction in personal income tax rates in 2004, and a "tax freeze" in effect since 2002.	Caps on expenditure growth in real terms led to a gradual reduction in the expenditure-to-GDP ratio.
Finland, 1998	Expenditure, complemented by some revenue measures.	Cyclically adjusted primary fiscal balance improved by about 1.7 percent in 1998 (and by cumulative 10 percent of GDP over 1992–2000). Expenditure cuts accounted for about 85 percent of the improvement.	Broadly revenue-neutral tax reform raising payroll taxes and user fees.	Across-the-board cuts in social benefits, transfers to municipalities, subsidies, wages, and capital spending.
France, 1996-97	Revenue, complemented by some expenditure measures.	Cyclically adjusted primary fiscal balance improved by about 3 percent of GDP over 1996–97. Revenue measures accounted for more than 85 percent of the improvement.	Broadening of tax base, temporary profit tax surcharges, increase in VAT rate in 1996, one-off dividend payments.	Reduction in capital spending, curtailing health care and defense expenditure.
Germany, 2003-05	Expenditure, with some revenue measures foreseen in the future.	Cyclically adjusted primary fiscal balance improved by about 0.6–1.6 percent of GDP over 2003–05 (according to different estimates), mainly as a result of expenditure measures.	Income tax cuts partly offset savings achieved through expenditure measures.	Reduction in health care spending, tightening unemployment benefit entitlements.
Ireland, 2003-04	Revenue, complemented by some expenditure measures.	Cyclically adjusted primary fiscal balance improved by about 2.9 percent of GDP over 2003–04. Revenue measures accounted for more than 90 percent of the improvement.	Increases in VAT and excises, changes in capital gains taxation.	Reduction in capital spending, the 2003 wage agreement presented a considerable wage moderation relative to the past.
Italy, 1997	Mixed, with emphasis on revenue.	Cyclically adjusted primary fiscal balance improved by about 2 percent in 1997 (and by cumulative 3.5 percent of GDP over 1994–97). Expenditure and revenue measures approximately equally contributed to the improvement.	A number of temporary and permanent measures, including personal income surtax, levy on severance payments funds, and an increase in VAT rates in 1998, boosted revenues to the record high of over 47.5 percent of GDP.	Curtailed capital spending, reduced transfers to subnational governments; persistent increases in pension and health care outlays were arrested.

Table 3 (continued)

Recent Fiscal Consolidation Attempts in Selected Countries: Adjustment Basis

Episode	Adjustment Basis	Size and Composition	Revenue Measures	Expenditure Measures
Japan, 2004	Mixed, with emphasis on expenditure restraint.	Cyclically adjusted primary fiscal balance improved by about 1.3 percent of GDP in 2004 (and by another 0.2–0.8 percent (according to different estimates) in 2005), mainly as a result of higher revenues combined with expenditure restraint.	Rollback of past income tax cuts, higher-than-expected tax revenues were saved.	Gradual reduction in capital spending; containing growth of social security expenditure; across-the-board cuts in discretionary spending programs.
Netherlands, 2004-05	Expenditure complemented by some revenue measures.	The structural deficit narrowed by about 2.3 percent of GDP over 2004–05. Expenditure measures accounted for more than 75 percent of the improvement.	There were modest base-broadening tax policies, natural gas revenues increased.	A significant cut in civil service employment, a general cut in subsidies; freeze of public sector wages and social security benefits; a reduction in the coverage of the basic public health care package, including abolition of disability insurance scheme for the self-employed.
New Zealand, 2003	Mixed, with a major contribution from buoyant revenues being saved.	Cyclically adjusted primary fiscal balance improved by about 1.4 percent of GDP in 2003 (and by cumulative 3.3 percent since 2000). Expenditure restraint accounted for approximately 40 percent of the improvement.	Tax revenues and surpluses of public enterprises turned out to be higher than expected.	Caps on current expenditure led to a gradual reduction in the expenditure-to-GDP ratio.
Spain, 1996-97	Expenditure, complemented by some revenue measures.	Cyclically adjusted primary fiscal balance improved by about 2.8 percent in over 1996–97 (and by cumulative 4.1 percent of GDP since 1993). Expenditure cuts accounted for about 60 percent of the improvement.	Tax reforms aimed at simplifying the tax code and reducing burden on small businesses, coupled with strengthened tax administration, resulted in a significant increase in tax buoyancy.	Reduction in current expenditure, including cuts in social transfers, wage bill, and health care spending.
Sweden, 1994-98	Expenditure, complemented by significant revenue measures.	Cyclically adjusted primary fiscal balance improved by about 11 percent of GDP over 1994–98. Expenditure cuts accounted for approximately 75 percent of the improvement.	Increases in social security fees, full taxation of dividends and capital gains, increase in personal income tax rates.	Reduction in pension and welfare spending, including unemployment benefits, and cuts across a broad range of spending programs.
United Kingdom, 1995-98	Expenditure restraint, accompanied by revenue measures.	Cyclically adjusted primary fiscal balance improved by 6.4 percent of GDP over 1995–98. Expenditure restraint accounted for about 75 percent of the improvement.	Increases in indirect taxes, and some duties. For equity reasons, VAT on some items was lowered. Abolition of advanced corporation tax rebate, accompanied by a small reduction in corporate tax rate. One-off windfall levy on profits of privatized utilities.	Containing increases in health care and educations spending, some other relatively minor expenditure measures.
United States, 1994	Mainly revenue measures.	Multi-year adjustment with the structural deficit to improve by 2½ percentage points of GDP over the following three years.	Increase in income tax rates (on the top 1.2 percent of taxpayers), and in the corporate tax rate; social security tax increase for the top 15 percent of the social security recipients.	Virtually no expenditure measures, in particular no cuts in social and health care spending.

Sources: Country authorities, OECD, Economist Intelligence Unit, and IMF staff reports. The size of fiscal adjustment is estimated using the OECD data.

Successful fiscal adjustments were often gradual: spanned periods of time of up to a decade (e.g., Finland, Sweden, Spain). The long duration of successful consolidations underscores the importance of anchoring policy objectives within a medium-term framework with a credible commitment to chosen strategies. It also highlights the lags between the adoption of certain types of core structural reforms (in particular in the area of social welfare) and their full impact.

3.3 Adjustment at the subnational level

A number of consolidation episodes were accompanied by the introduction of new mechanisms of policy coordination across different tiers of government (Table 4). In many cases fiscal adjustments involved actions on the part of subnational governments. Some countries prompted such actions by imposing numerical rules on local and regional authorities (the Netherlands, Sweden in 2000), while others adopted a cooperative approach to policy coordination, whereby the central and subnational governments negotiated fiscal targets, which then become binding (Denmark, Spain). At the same time, in the absence of formal mechanisms enforcement of collective decisions sometimes relied fundamentally on moral suasion and peer pressure, with fiscal adjustments nonetheless being successful (e.g., Spain). In some cases tight administrative controls over subnational public finance had already been in place (U.K., Ireland).

Clarification of expenditure responsibilities and revenue assignments of subnational governments made an important contribution to fiscal consolidation in several countries. Clarification of delineation of responsibilities between the tiers of government often helped to alleviate the problem of soft budget constraints and increased the political accountability of local authorities, potentially leading to net savings for the general government. Such reforms supported fiscal consolidations in Italy and Japan, although in some instances (e.g., U.S., France, and Germany) fiscal consolidation attempts appeared to lack support at the subnational level.

3.4 Structural reforms

In several cases, fiscal consolidations were accompanied by the introduction of a medium-term budget framework (Table 5). Multiyear budgeting helped to put fiscal consolidation into perspective, facilitating the adoption of other structural reforms and the communication of fiscal policy objectives to the voters. Several countries made important advances in incorporating the long-term fiscal sustainability analysis into the medium-term policy framework.

A number of fiscal consolidations were supported by structural reforms in the area of health care, unemployment benefits, and pensions. These reforms supported fiscal consolidations directly by raising the efficiency and reducing the cost of public service provision as well as indirectly by contributing to overall economic activity through strengthened incentives to work.

Table 4

Recent Fiscal Consolidation Attempts in Selected Countries: Subnational Adjustments

Episode	Subnational Adjustments
Canada, 1994-97	Cuts in the provincial wage bill, capital spending, and transfers to municipalities totaling 1.7 percent of GDP in FY 1993/94. Provinces raised education and health fees and excises and broadened the corporate income tax base. Ontario and Quebec eliminated deficits in the late 1990s (3 percent of provincial GDP).
Denmark, 2004-05	Starting from 2003, the counties became legally bound to comply with the budget targets (negotiated with the central government and expressed in nominal terms), but expenditure overruns at the local level remain an issue. A broader reform of governance at the subnational level involving a drastic reduction in the number of municipalities was agreed. It will come into force in 2007.
Finland, 1998	Reduction in transfers to municipalities; municipalities cut the wage bill and capital spending and raised property tax, improving their fiscal balances by 2.3 percent of GDP in 1994–95.
France, 1996-97	The consolidation largely lacked support at the subnational level. The "Stability Pact" capped the rate of growth of transfers to local governments by the rate of inflation.
Germany, 2003-05	The Internal Stability Pact (2002) did not result in an agreement on the division of responsibilities for compliance with the Stability and Growth Pact between the central and regional governments, and the attempts to reform the intergovernmental relations were in a political gridlock.
Ireland, 2003-04	No specific measures were introduced. However, the central government has traditionally maintained a tight administrative control over subnational government spending.
Italy, 1997	Tighter control over intergovernmental transfers since 1996, clearer delineation of expenditure responsibilities between the tiers of government, the electoral reform that arguably increased the accountability of local officials.
Japan, 2004	Devolution of tax and spending responsibilities to subnational government led to a cut in subsidies and some net savings, albeit modest. Further reform of the grant allocation system is being considered.
Netherlands, 2004-05	More explicit constraints on the operations of the local governments, including limitations on how much they could borrow; strong emphasis on closer cooperation between the central and local governments. Local governments supported the consolidation effort by improving their balances in 2004–05.
New Zealand, 2003	While no specific measures were adopted, subnational governments pursued prudent fiscal policies.
Spain, 1996-97	In 1992, Spain adopted a cooperative approach to regulating subnational public finances, whereby subnational fiscal targets were negotiated between the central and regional governments. The fiscal consolidation attempted launched by the central government enjoyed only partial support at the regional level.
Sweden, 1994-98	In 1993, the mechanism of distributing relief grants to municipalities was revised, which arguably alleviated the soft budget constraint problem. The central government consolidation attempts were supported at the local level in 1995 and 1997–98.
United Kingdom, 1995-98	No specific measures were introduced at the local authority level. However, the central government has traditionally maintained a tight administrative control over subnational government spending.
United States, 1994	The adjustment was carried out entirely at the federal government level.

Sources: Country authorities, OECD, Economist Intelligence Unit, and IMF staff reports.

Table 5

Recent Fiscal Consolidation Attempts in Selected Countries: Structural Reforms

Episode	Key Fiscal Structural Reforms
Canada, 1994-97	Introduction of medium-term budget framework; shift to block transfers; corporate income tax and personal income tax reforms; pension reform; unemployment insurance reform.
Denmark, 2004-05	Since 2001 fiscal policy has been explicitly guided by medium-term objectives based on the "Plan 2010" framework, reform of intergovernmental relationships.
Finland, 1998	Introduction of medium-term budget framework, shift to block transfers, tax reform aimed at broadening the tax base and reducing tax rates, pension reform.
France, 1996-97	Health care reform (including giving the Parliament a constitutional mandate to set social security spending ceilings), tax reforms aimed a broadening tax base.
Germany, 2003-05	Pension reform (2004, with a delayed effect); health care reform (2004), unemployment benefit reform.
Ireland, 2003-04	Introduction of rolling multi-year capital expenditure budgeting (previously used only for transport); preparation of long-term fiscal projections.
Italy, 1997	Pension reform (1992–97); reform of budget structure aimed at enhanced transparency (1997); strengthened tax administration.
Japan, 2004	Pension reform (2004, with a delayed effect); health care reform (2006); revision of revenue assignments and expenditure responsibilities of local governments.
Netherlands, 2004-05	Changes to the expenditure-based framework to avoid the use of cyclical revenue windfalls to fund permanent spending increases (as had happened in recent periods), and to avoid overperformance under one ceiling benefiting other ceilings; use of medium-term expenditure caps.
New Zealand, 2003	Earlier reforms of the 1990s established a strong institutional framework for medium-term budgeting with incorporation of long-term projections of pension and social welfare spending. In general, the 2003 increase in fiscal surplus largely reflected unexpectedly strong revenues from past reforms during an upswing in the economic cycle.
Spain, 1996-97	Gradual improvements in budgeting and monitoring that later were enshrined in the Fiscal Stability Law (2003); privatization and reorganization of public enterprises; strengthened tax administration.
Sweden, 1994-98	Reform of unemployment benefits with emphasis shifting from cash payments to training, revision of the transfer allocation to municipalities.
United Kingdom, 1995-98	Reform of unemployment benefits, including institution of "welfare to work" scheme to reduce youth unemployment.
United States, 1994	Consolidation was accompanied by intensive discussions regarding health care reform (the costs were rising at a very fast pace and were eating up a larger proportion of the budget). The system was regarded as dysfunctional and had to be changed. Also discussion and agreement on NAFTA.

Sources: Country authorities, OECD, Economist Intelligence Unit, and IMF staff reports.

Table 6

Recent Fiscal Consolidation Attempts in Selected Countries: Mobilization of Popular Support

Episode	Strategies used by governments to mobilize support
Canada, 1994-97	Majority federal government elected in 1993 to address fiscal issues; similar election result in 1994–95 in the two largest provinces.
Denmark, 2004-05	The success of the fiscal consolidation in the 1990s helped build a nation-wide consensus about the importance of prudent fiscal policies.
Finland, 1998	Public consensus emerged that fiscal consolidation was necessary to achieve EMU membership.
France, 1996-97	Partial public consensus emerged that fiscal consolidation was necessary to achieve EMU membership. However, the proposals to reform public pensions and railways triggered protracted strikes in late 1995.
Germany, 2003-05	Although the proposed spending cuts were widely criticized by the opposition and organized social groups, including the unions, voters seem to have been sharing a generals sense of crisis requiring drastic measures. In March 2003 the government identified a multi-year reform agenda to gradually bring labor markets, public finances, and welfare system back on track by 2010.
Ireland, 2003-04	Public support for fiscal consolidation was partial, with a strong opposition from the trade unions. The government responded to a rapid fall in its popularity by substantially reshuffling the Cabinet in September 2004, which revitalized the reform agenda.
Italy, 1997	Public consensus emerged that fiscal consolidation was necessary to achieve EMU membership.
Japan, 2004	Voter support for fiscal consolidation was limited but, despite strong popular resistance, the pension reforms were passed .
Netherlands, 2004-05	The government was determined to comply with the 3 percent deficit limit. Debt and deficit reduction objectives were put into multi-year perspective using medium-term fiscal framework. The role of the Bureau for Economic Policy Analysis (CPB) was seen to be important in bringing consensus on the needed measures.
New Zealand, 2003	The government reiterated the importance of commitment to the principles of medium-term budgeting established earlier (including the need to achieve a surplus on average over the cycle) and emphasized the need for higher savings in the light of future pension and health care obligations.
Spain, 1996-97	Public consensus emerged that fiscal consolidation was necessary to achieve EMU membership.
Sweden, 1994-98	While Sweden eventually decided to opt out of the EMU, the Maastricht criteria helped justify the need for fiscal consolidation. Nevertheless, fiscal consolidation was unpopular with a large share of voters. The September 1998 elections resulted in substantial losses for the Social Democrat Party, although it remained the most represented in the Parliament.
United Kingdom, 1995-98	Significant desire on the part of the population at large for a change in direction, while keeping options open to join EMU in 1999. As the government changed in May 1997, the new Chancellor reiterated his pre-election commitment to the golden rule and his intention to reduce the general government fiscal deficit of 4 percent of GDP in fiscal year 1996/97 to virtual balance by 1998/99 at the same time implementing tax reform to encourage investment.
United States, 1994	The president gave the lead in emphasizing right from the beginning the need to reduce the deficit, in spite of the concerns that it could further depress still weak economic activity. However, there was a recognition that an adjustment could lead to a decline in interest rates that could outweigh the contractionary effect of the deficit reduction. To ensure that the consolidation was credible to garner the maximum benefit from the adjustment, communication strategy was critical. The deficit package passed by an extremely narrow vote in the Congress: by just one vote in the House; and a tie which the Vice-President broke in the Senate. When the Democrat majority was lost in the mid-term 1994 elections the President demonstrated a strong commitment to the original position of continued fiscal discipline, opposed plans by some to provide a stimulus by a large tax cut, withstood the budget crisis in Congress in November 1995, and subsequently won the second term in November 1996.

Sources: Country authorities, OECD, Economist Intelligence Unit, and IMF staff reports.

Structural reforms may also have facilitated future adjustment by developing the appropriate institutional framework. For example, recent fiscal consolidations in Denmark and New Zealand were facilitated by the previous successful consolidations of the 1990s, which laid the foundations of medium-term budgeting, incorporation of long-term fiscal projections, and improved expenditure control. In turn, fiscal consolidations provide an impetus for structural reforms, creating a virtuous circle of enhanced fiscal discipline and higher efficiency of government.

3.5 Mobilization of popular support

Case studies point towards the importance of articulating a broad medium-term economic strategy and the role of fiscal discipline in it to mobilize popular support for the adjustment (Table 6). In the case of European countries in the 1990s such strategies were shaped by the objectives of EMU membership. In other instances they may be seen in the context of long-term developments as well as past successful consolidation episodes (Denmark, New Zealand).

Political leadership is likely to have played an important role in ensuring commitment to fiscal consolidation. Fiscal consolidations may well have been associated with political costs and strengthened the opposition. Hence strong political leadership was needed to ensure continuity of the consolidation policies, as exemplified by the experiences of the U.S. and Japan.

The adoption of fiscal rules by themselves does not generally appear to be sufficient to produce a sustained fiscal adjustment. Nonetheless, fiscal rules developed in the course of fiscal consolidations, presumably signaling heightened policy commitment, do seem to have helped sustain the consolidation efforts. Such rules then often became a permanent feature of legislation (e.g., in Spain) facilitating future adjustments.

4 Cross-section analysis

This section complements the above case study analysis with cross-section evidence based on the latest available data. While the above analysis focused on case studies of particular episodes of fiscal adjustment, this Section uses a wider sample of OECD countries over 1972-2006 and explores the relationship between the magnitude and durability of fiscal adjustment and a number of underlying determinants.[9]

In particular, the analysis examines the correlation between the average fiscal policy stance over three years, as measured by the average CAPB, and the following five sets of variables: (i) public debt at the beginning of the first year; (ii) domestic economic activity at the start of the three-year period; (iii) trading-partner economic

[9] All the data used in the cross-section analysis come from the OECD *Economic Outlook* (2006) database.

activity at the start of the three-year period; (iv) the level of inflation and the stance of monetary policy in the first year; and (v) political and institutional factors.

To facilitate the interpretation of the results, Subsection 3.1 examines bivariate relationships between each variable and fiscal policy effort individually, with conditional relationships evaluated in Subsection 3.2 using a more rigorous multivariate panel regression approach.

It is worth emphasizing that the approach and results of the empirical investigation reported below are consistent with existing studies. As such, the section complements and extends the results in the existing literature using the latest available data for the OECD countries.

4.1 Bivariate relationships

The correlation coefficients between the CAPB and macroeconomic variables reported in Table 7 are consistent with prior work. Primary balances are, in general, positively correlated with the public debt-to-GDP ratio. The higher the public debt level, the tighter the cyclically-adjusted fiscal stance over the subsequent three years. Table 7 also suggests a positive relationship between cyclically-adjusted primary surpluses and per capita real GDP growth. This finding is consistent with the notion that initiating and sustaining a deliberate fiscal consolidation is easier during periods of high growth. The unconditional correlation of the CAPB with the output gap is not statistically significant. There is also a negative and statistically significant correlation between the CAPB and inflation, suggesting that relatively tight fiscal policies are associated with a low-inflation environment. In addition, the relationship between the average CAPB and the real interest rate in the first year (measured by the short-run nominal rate minus current CPI inflation) is weak and not statistically significant.[10]

Cuts in current expenditure are correlated with a strong and statistically significant subsequent improvement in primary balances. In contrast, while the correlation between increases in cyclically-adjusted revenues and subsequent average fiscal surpluses is positive, it is of a substantially smaller magnitude and not statistically significant. Consistent with the previous findings, including those of Alesina *et al.* (2006), the relationship between governmental stability and fiscal policy effort is positive, as is the relationship between institutional quality and the capacity to maintain a tight fiscal policy stance.[11]

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[10] While some studies, such as VHS (2001) find that easing monetary policy can encourage governments to undertake a consolidation, others, such as Tabellini (1986) have argued that monetary tightening – in the form of lower monetary financing of budget deficits – might raise the governments' incentives to initiate FC.

[11] The stability of the government is measured using an index ranging from 1 to 12 which is computed by the *International Countries Risk Guide* (2006) and takes into account the governments' unity, legislative strength, and popular support. Institutional quality is measured by a composite index constructed from the *International Countries Risk Guide* index components "bureaucracy quality", "law and order", "democratic accountability", "corruption", and the country's "investment profile".

Table 7

Cyclically-adjusted Primary Balance:
Correlations with Explanatory Variables
(three-year average, percent of CAGDP)

Public debt-to-GDP ratio	0.326
	(0.000)
Domestic growth	0.201
	(0.005)
Domestic output gap	–0.062
	(0.403)
Trade partner growth	0.189
	(0.011)
Trade partner output gap	–0.085
	(0.247)
Inflation	–0.342
	(0.000)
Real interest rate	0.046
	(0.553)
Change in cyclically-adjusted current expenditure	–0.510
	(0.000)
Change in cyclically-adjusted revenue	0.089
	(0.233)
Governmental stability	0.106
	(0.193)
Institutional quality	0.134
	(0.100)

Source: OECD and ICRG.
Note: Table reports unconditional correlations between three-year average of CAPB (in percent of CAGDP) evaluated using non-overlapping three-year averages over 1972-2005, and variable measured in the first year. Significance levels (*p*-values) are reported in parentheses.

4.2 Multivariate analysis

This subsection looks at the determinants of fiscal policy effort using multivariate panel regressions.[12] As before, the dependent variable is the three-year average of the CAPB. The panel regression results for the macroeconomic variables (growth, output gap, inflation, interest rates) are summarized in Table 12.[13] Lagged debt is estimated to be significantly positively associated with subsequent fiscal effort. A 10 percentage point improvement in the debt-to-GDP ratio is associated with a 0.5 to 0.7 percentage point improvement in the CAPB ratio. This result is consistent with the notion that countries in this sample appeared to attempt to stabilize the debt-to-GDP ratio.

Regarding the contributions of fiscal adjustment composition, the results reported in Table 13 suggest that countries that implement cuts in current expenditure tend to succeed in maintaining a tight fiscal policy stance. In particular, the CAPB ratio has, on average, improved by 1.1 percentage points over the three years following a 1 percentage point reduction in cyclically-adjusted current expenditure. The effect of fiscal consolidations that rely on current expenditure cuts thus appears to be long-lasting. On the other hand, a 1 percentage point increase in cyclically-adjusted revenue is correlated with only 0.4 percentage point improvement in the average CAPB over the following three years.

The results also suggest that higher governmental stability and higher institutional quality have significant explanatory power for subsequent fiscal consolidation success. Frequent changes of government and poor institutions are associated with higher fiscal deficits. Again, these results are consistent with the prior literature.

5 Macroeconomic developments following fiscal adjustments

This section discusses a number of factors that can, in principle, mitigate the possible contractionary effects of FC in the short run, and allow FCs to have expansionary effects on economic activity over the medium term. The discussion starts by reviewing the channels by which fiscal policy has been found, both in theory and empirical literature, to affect output. The section then reports the results of model-based simulation experiments (using the IMF's Global Integrated Monetary and Fiscal Model, GIMF) that distinguish the effects on output according to the composition of fiscal adjustment. Finally, the section reviews the case-study evidence.

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[12] For the details of the econometric methodology employed see Appendix 2.

[13] Given the high correlation between domestic and average OECD growth, the panel framework focuses on domestic economic activity only without explicitly including average OECD growth and output gaps.

5.1 Prior work

The traditional presumption that short-term fiscal multipliers are always positive has been challenged on both theoretical and empirical grounds. In theory, it has been noted that once the impact on risk premiums and expectations is taken into account, the negative demand impact of lower fiscal deficits may be more than offset by an increase in private domestic demand. A growing empirical literature has also critically reassessed the short- and long-term effects of fiscal policy among different countries and time periods. One of the more remarkable findings of this literature has been the possibility of negative fiscal multipliers connected to strong fiscal consolidations. The famous adjustment episodes in Ireland and Denmark in the 1980s – where consolidation was followed by a sharp upturn in growth – triggered several studies suggesting that negative multipliers may in fact be more widespread than suggested by conventional wisdom (Giavazzi *et al.*, 2000). If such instances were indeed quite common, and if the effect of fiscal adjustment on economic activity were related to specific policy design or economic conditions, this could have a profound influence on fiscal policy advice. Finally, fiscal adjustments in large economies may induce positive spillovers for other economies, as discussed in Kumhof *et al.* (2005).

5.2 GIMF simulations

This subsection uses simulations based on GIMF to investigate how fiscal consolidations affect economic activity both in the short run and in the long run, depending on the composition of the fiscal adjustment.

5.2.1 The model

GIMF is an open economy general equilibrium model developed at the IMF that is equipped for both monetary and fiscal policy analysis (Kumhof and Laxton, 2007). The model's nominal and real rigidities, monetary policy reaction function, multiple non-Ricardian features, and a fiscal policy reaction function yield plausible macroeconomic responses to changes in fiscal and monetary policy. For the purposes of this paper the model is calibrated to include a large open economy (calibrated with U.S. data) and the rest of the world.

Ricardian equivalence does not hold for four reasons. First, the model features overlapping generations agents (OLG) with finite lifetimes, *i.e.* a non-zero probability of death in each period. These agents are myopic in the sense that they perceive debt-financed tax cuts as an increase in their human wealth, and attach a low probability to having to pay for them in the future.[14] Second, workers have a

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[14] The model's overlapping generations structure with finitely-lived agents makes it particularly well suited to analyzing the implications of public sector deficits and debt both for the United States and for the rest of

(continues)

life-cycle labor productivity pattern that implies a declining rate of productivity as workers age. This feature means that workers discount the effects of future payroll tax increases as they are likely to occur when individuals become older and less productive. Third, the model contains liquidity constrained consumers (LIQ) who do not have access to financial markets to smooth consumption, and change their consumption one-for-one with changes in after-tax income. Finally, the model includes payroll and capital income taxes that are distortionary because labor effort and private investment respond to relative price movements that result directly from variations in tax rates.

A particularly important feature of GIMF for fiscal policy analysis is that it relaxes the assumption of conventional models that all government spending is wasteful and does not contribute to aggregate supply. Instead, GIMF allows for productive public infrastructure spending that adds to the public capital stock, and enhances the productivity of private factors of production. Real rigidities embedded in the model include consumer habits that induce consumption persistence, investment adjustment costs that induce investment persistence, and import adjustment costs. Nominal rigidities include sticky prices and wages, and pricing to market. (For further details regarding the model, see Kumhof and Laxton (2007).

5.2.2 Calibration

Following Kumhof and Laxton (2007), the model is calibrated to contain two countries, the United States and the rest of the world**.** The fiscal parameters, such as the ratios to GDP of government transfers, purchases of goods and services, and public investment are calibrated based on data from the authorities. The productivity of public capital is calibrated following Ligthart and Suarez (2005) who present a meta analysis of large number of studies of the elasticity of aggregate output with respect to public capital, and estimate this elasticity at 0.14. Accordingly, the model is calibrated so that a 10 per cent increase in public investment is associated with a long-run increase in GDP of 1.4 per cent. Given that public investment represents 3 per cent of GDP, this elasticity of 0.14 implies an average annualized rate of return on public investment of about 3 per cent over 50 years (net of depreciation).[15] The depreciation of public capital is set at 4 per cent per year. The remaining parameters values are set following Kumhof and Laxton (2007).

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the world. The model is complementary to the IMF's Global Fiscal Model that has been used to analyze a variety of fiscal policy and structural reform issues.

[15] The average annualized rate of return of 3 per cent is obtained as follows. A 10 per cent increase in public investment, *i.e.* an investment of 10 per cent × 3 percentage points of GDP = 0.3 percentage points of GDP, yields, after about 50 years, a 1.4 per cent increase in GDP. The geometric average annual rate of return over the 50-year period is thus $\left(\frac{1.4}{0.3}\right)^{1/50} - 1 = 0.031$, *i.e.* about 3 per cent.

5.2.3 The experiments

Each of the five fiscal adjustment experiments conducted using the model involves a permanent reduction in the debt-to-GDP ratio of about 15 percentage points. This adjustment is implemented by reducing the fiscal deficit by 2.5 per cent of GDP in the first two years of the adjustment, and then keeping fiscal deficit 0.5 percentage points of GDP below the original level.

In each scenario, the reduction in the fiscal deficit relies on a different adjustment tool, as follows: (a) increases in payroll taxes; (b) increases in consumption taxes; (c) increases in corporate income taxes; (d) reductions in government purchases of goods and services; and (e) both reductions in both government purchases and cuts in productive government investment. To stabilize the public debt at the lower level, the additional fiscal space available due to the lower interest costs is used either to reduce the initial tax increases (in simulations a, b, and c), or to undo part of the expenditure reductions (simulations d and e). The results are reported in terms of deviations from the baseline scenario, a steady state in which the economy is operating at its potential and the public debt-to-GDP ratio remains stable.

5.2.4 Results

Figures 1 and 2 report the implications of each fiscal adjustment strategy for the principal macroeconomic variables, including GDP and consumption, both in the United States and in the rest of the world. Fiscal tightening induces a near-term reduction in output in the United States in all scenarios (Figure 1). The fiscal consolidation that relies on cuts in consumption taxes has the smallest contractionary effect, reflecting the broad base of consumption taxes and, therefore, their relatively low distortionary effects. However, cuts in productive government investment induce a much sharper short-run negative impact on economic activity. In all scenarios the adverse effect of fiscal tightening on the aggregate demand is in part offset by monetary stimulus that occurs because the central bank manipulates nominal interest rates to lower real interest rates in response to the inflation decline. In addition, the short-run contraction is mitigated by the ability of households to smooth consumption. However, credit-constrained households who cannot smooth their income experience a sharp cut in their consumption in the short run.

Over the medium to long term, fiscal adjustment is seen to yield substantial output gains. These occur when the additional fiscal space available after the reduction in public debt and the associated interest costs is used to cut distortionary taxes. For example, a long-run cut in payroll taxes stimulates output by encouraging labor supply. The supply-side gains are largest when the long-run tax cuts fall on capital income. In addition, when the fiscal consolidation occurs in a large economy such as the United States, long-run output gains also accrue because the increased government savings raise the supply of loanable funds and, other things equal, the real interest rate declines. The lower interest rate in turn crowds in private activity both in the domestic economy and in the rest of the world (Figure 2). Finally, the

Figure 1

Impact of Fiscal Consolidation on the Domestic Economy (United States)

(deviation from baseline – percent)

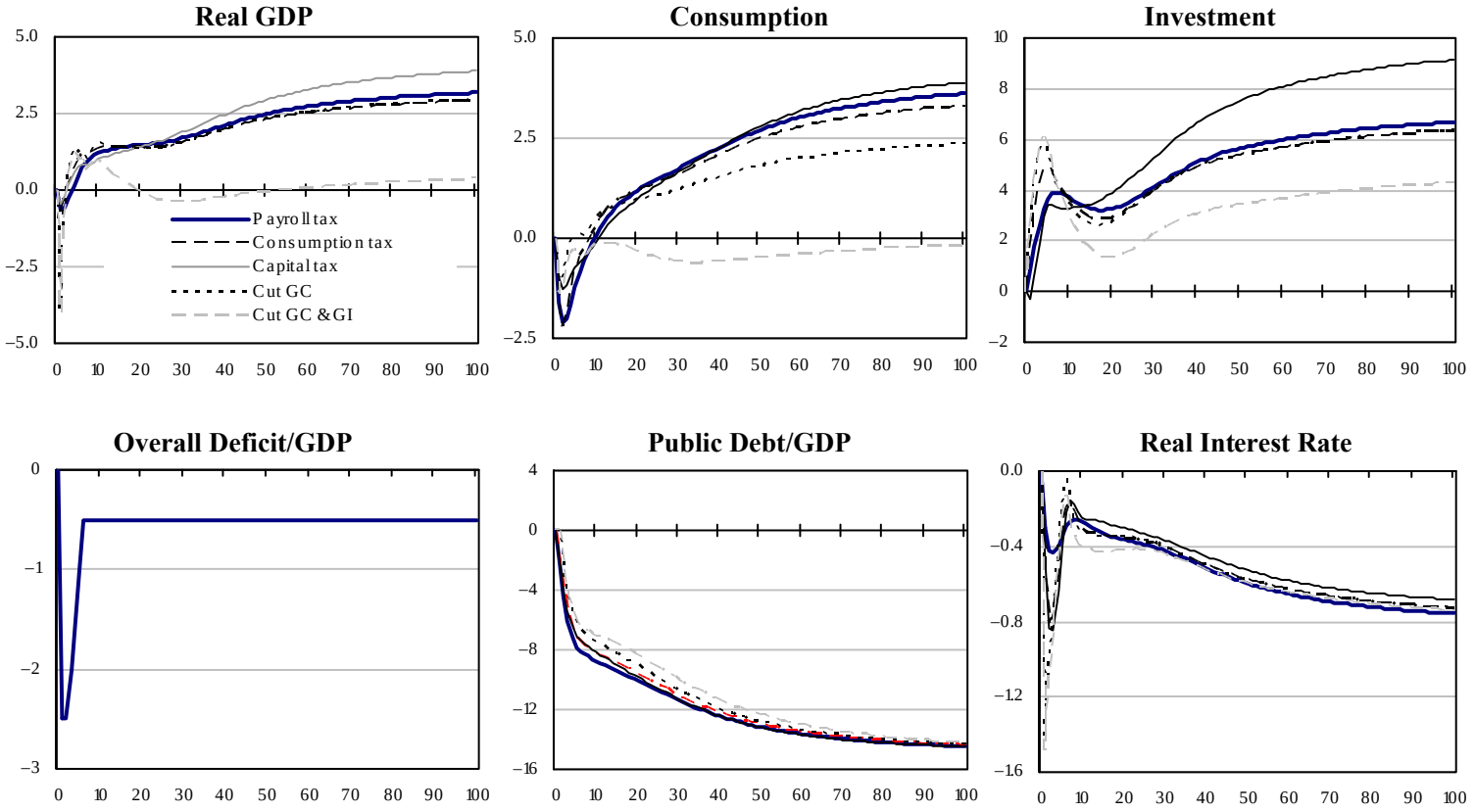
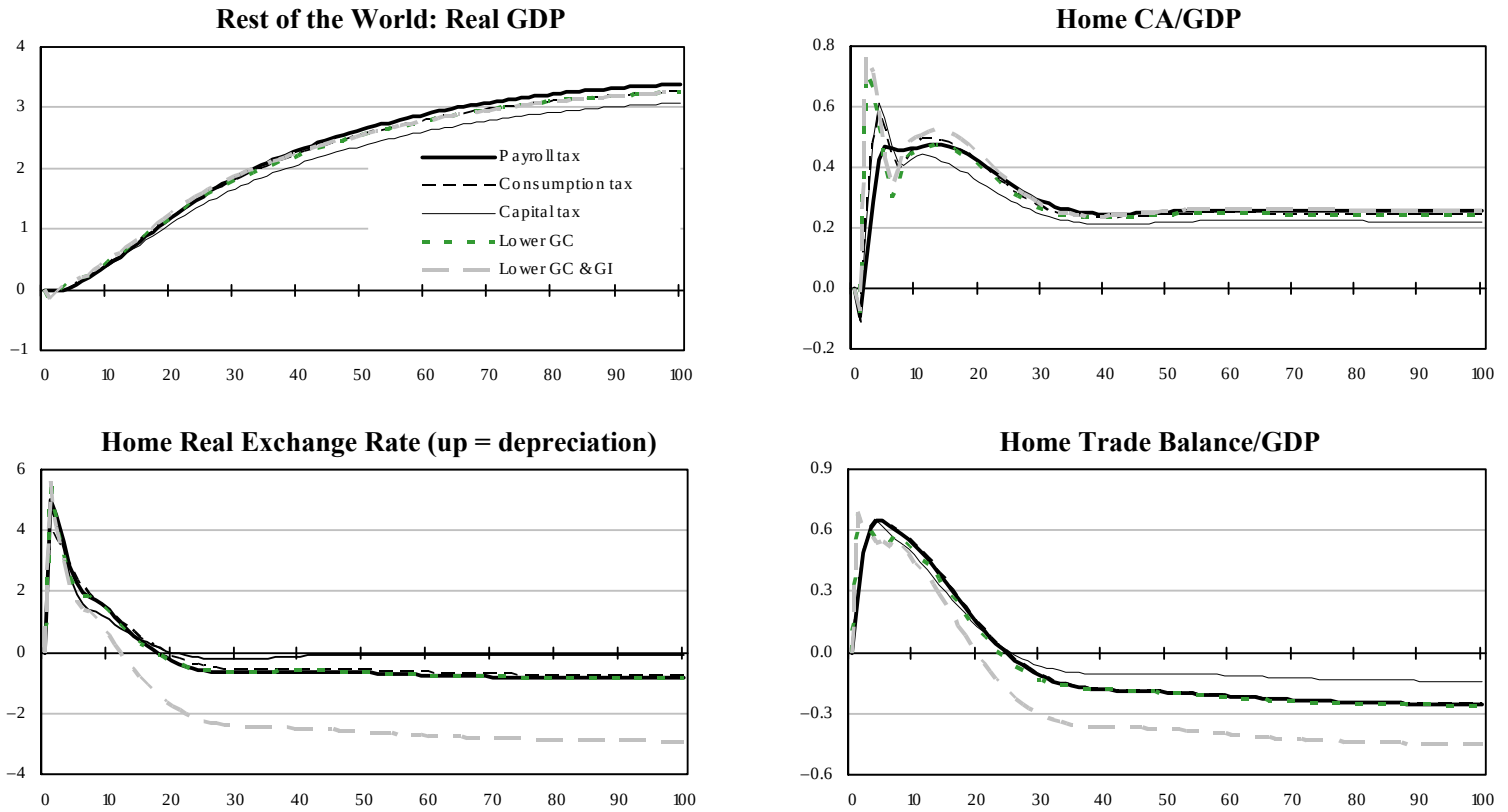


Figure 2

Impact of Fiscal Consolidation in the United States on the Rest of the World
(deviation from baseline – percent)



analysis also reveals that, if the adjustment involves cuts in public investment, the long-run output gains associated with fiscal consolidation may not occur. In particular, as the long-dashed line in Figure 1 illustrates, when the adjustment involves a 10-percent cut in public investment, the long-run output gains become negligible.

5.3 Evidence from case studies

In most cases fiscal consolidations were followed by periods of robust economic growth (Table 8). While economic recovery was somewhat slow in Italy, and moderate decelerations of economic growth in the first years after fiscal adjustments were observed in Canada, the U.S., and New Zealand, other economies performed strongly following the initiation of consolidations. Although this observation may partly reflect the fact that the majority of surveyed fiscal consolidations were initiated during recessions or the early stages of economic recovery, it does suggest that fiscal tightening did not have a pronounced negative impact on economic activity. In some cases, there is evidence of a firming in activity with lower interest rates crowding in the private sector, and strengthening of incentives to work following structural reforms.

Overall, the experiences of the surveyed countries are broadly consistent with the view that fiscal consolidations do not have pronounced short-run adverse effects on activity. Indeed, in many cases they are accompanied by economic expansions, lower interest rates, and strengthened incentives to work.

In addition, most fiscal consolidations were supported by a decline in global interest rates. Lower interest rates led to a decline in the debt service expenditure, reinforcing the consolidation efforts, which in turn further reduced interest rate spreads. This positive dynamics played a particularly important role in fiscal consolidations in countries with particularly high levels of public debt, as in the case of Italy.

6 Conclusions

This paper has analyzed the determinants of successful fiscal consolidations in OECD countries as well as the impact of fiscal adjustments on economic activity in the short and in the long run, on the basis of selected case studies of fiscal consolidations, cross-country econometric analysis for 24 countries, and GIMF-based simulations.

The analysis revealed that fiscal consolidations tend to be initiated during times of fiscal distress, as reflected in high and rising public debt levels, and relatively weak economic activity. Consolidations based on current spending restraint generally have higher chances of succeeding. Strong political leadership is typically required to sustain a fiscal adjustment effort, with strong institutions playing an important supportive role.

Table 8

Recent Fiscal Consolidation Attempts in Selected Countries: Subsequent Developments

Episode	Macroeconomic Developments Following Fiscal Adjustment
Canada, 1994-97	Initial growth spurt, led by exports and investment, followed by two years of slower growth, as adjustment was implemented. Sustained high growth followed with low inflation. Improved current account, led by improved public savings, sharply reduced net foreign debt.
Denmark, 2004-05	Economic activity picked up markedly in 2005, led by domestic demand, with the rate of economic growth substantially exceeding the Euro area average and the rate of unemployment reaching a 30-year low. A slight deceleration is projected in 2006–07. The success of the consolidation effort has been mixed so far, as the government relaxed caps on welfare spending.
Finland, 1998	Strong sustained recovery since 1994, led by investment and exports, in particular in the IT sector. Improved current account balance and strong growth resulted in elimination of net external public debt by 2002.
France, 1996-97	Economic activity picked up in 1998–2000, unemployment declined somewhat, and public debt was maintained below the 60 percent of GDP threshold.
Germany, 2003-05	Led by exports and business investment, economic activity picked up in 2006, while inflation remained moderate. Fiscal consolidation continued, with a VAT increase coming into effect in 2007.
Ireland, 2003-04	Economic activity picked up in 2004–06, inflation declined, and unemployment remained relatively low, the government maintained fiscal surpluses reflecting strong revenues and expenditure restraint.
Italy, 1997	Slow domestic-demand-driven economic recovery since the second quarter of 1997 with growth not exceeding 2 percent, accompanied by a deterioration of the current account and an increase in public external debt, while total public debt declined somewhat.
Japan, 2004	Driven by private consumption and business investment, economic expansion has strengthened, deflation has ended, and unemployment rate declined to an eight-year low. The authorities intend to proceed with consolidation aiming at achieving a primary balance (excluding social security) by 2011.
Netherlands, 2004-05	Initiated by exports, a mild recovery has been underway since mid-2005, characterized by gradually rising employment and absence of significant inflationary pressures. Fiscal deficit was reduced to 2.3 percent in 2004 and further to 0.3 percent of GDP in 2005. Neutral fiscal stance was pursued in 2006 and is expected for 2007.
New Zealand, 2003	After another year of strong economic activity, growth decelerated and the current account widened to 9 percent (or twice the 20-year average). Inflation picked up owing to both high oil prices and tight labor market conditions. The budget continued running high surpluses, as the authorities took into account the cyclical pressures on inflation in determining the timing of policy measures that would reduce the surplus to more normal levels.
Spain, 1996-97	Initially led by exports and subsequently by domestic demand, economic activity picked up markedly and growth averaged 3.4 percent in 1996–2003, while inflation moderated and unemployment rate fell by more than half. Fiscal consolidation efforts were sustained, supported by a sharp decline in interest rate spreads, with the debt-to-GDP ratio decreasing by 14 percentage points between over 1996–2002.
Sweden, 1994-98	Initially led by exports, economic growth picked up markedly in 1994–95 before moderating somewhat in 1996–97 and accelerating again in 1998–99, while inflation moderated from over 4 percent to under 1 percent.
United Kingdom, 1995-98	Economic activity further strengthened through 2000, resulting in buoyant government revenues. A neutral budget was combined with a marked relaxation of monetary policy.
United States, 1994	In spring of 1994, interest rates began to rise and there was a concern that it might choke off the recovery. The economy was getting back on the track, but to have an extended recovery one could not let the recovery get out of hand on the upside. After a slight slowdown in 1995, economic growth accelerated, led by private consumption and business investment, unemployment rate declined, while inflation stayed below 3 percent.

Sources: Country authorities, OECD, Economist Intelligence Unit, and IMF staff reports.

Case studies further suggest that while fiscal adjustments tend to have a moderating influence on growth in the short run, some fiscal consolidations appear to have had expansionary effects. The GIMF-based experiments suggest that the short-run contractionary effects are smallest when the consolidation involves increases in consumption taxes, and largest when they involve cuts in productive public infrastructure spending. In addition, fiscal consolidation can have positive long-run effects, particularly when the greater fiscal space available after debt has been reduced is used to cut capital income taxes. However, these long-run gains may not occur if the consolidation involves cuts in public infrastructure spending. Fiscal adjustment is also found to have large positive spillover effects when implemented by a large economy such as the United States.

There are a number of areas for further research. Perhaps the most important one relates to the distributional effects of fiscal adjustments. This is especially so given the ongoing process of globalization and structural changes in the world economy. Another area to explore would the extent to which simultaneous adjustments in a range of countries might have effects that differ substantially from adjustment in a given country. Such simultaneous adjustment might be warranted by common challenges such as aging of populations or climate change that are being faced by a large number of countries both within the OECD and outside. It is by no means evident that adjustments undertaken in a large number of countries would necessarily be contractionary given the likely beneficial effects of deficit reductions in a number of countries for global interest rates.

APPENDIX 1
THRESHOLD APPROACH TO IDENTIFYING FISCAL CONSOLIDATION SUCCESS

For the purposes of this paper, a fiscal consolidation attempt is defined as a year in which the cyclically-adjusted primary balance-to-GDP ratio increases by at least 1 percentage point. FC can be either successful or unsuccessful. Following Alesina and Perotti (1995) and Darby *et al.* (2005), the measure of success of a fiscal consolidation (the success index, *S*) takes into account the degree of debt reduction achieved over the following three years.

The index takes the highest value ($S = 3$) if the debt-to-GDP ratio falls by at least 5 percentage points in the three years following a FC. If the debt-to-GDP ratio is stabilized within ½ of a percentage point of the initial level or if it decreases by less than 5 percentage points, *S* is set to equal 2. The index takes the lowest value ($S = 1$) if the debt increases by more than ½ per cent of GDP. The values of the index are reported in Tables 9-11.

Table 9

Fiscal Consolidations with Highest Success (*S* = 3), 1990-2005

Country	Year	ΔCAPB(T)	ΔOB(T)	ΔDebt(T+2)	Debt(T–1)
Australia	1997	1.0	1.7	–10.4	39.1
Belgium	1993	2.1	0.7	–5.5	136.5
Belgium	1998	1.1	1.3	–9.2	127.7
Canada	1996	2.6	2.5	–6.4	100.8
Canada	1997	2.3	3.0	–5.0	100.3
Denmark	1999	1.7	1.4	–9.4	69.0
Denmark	2004	1.4	1.8	–9.8	52.8
Denmark	2005	1.5	2.3	–7.4	49.4
Finland	1998	1.7	2.9	–7.9	64.3
Greece	1996	2.0	2.7	–6.8	114.4
Greece	2005	2.1	2.5	–5.4	128.3
Iceland	1995	2.1	1.7	–5.9	55.7
Netherlands	1993	2.6	1.3	–6.7	89.0
Netherlands	1996	2.3	2.4	–6.5	87.0
New Zealand	1992	2.6	2.7	–17.9	
New Zealand	1993	1.5	3.7	–19.5	75.3
New Zealand	2003	1.4	1.4	–5.1	33.7
Norway	1995	2.9	3.1	–8.5	36.9
Spain	1997	1.1	1.8	–6.0	75.6
Sweden	1997	1.6	1.7	–11.2	84.4
Sweden	1998	1.4	2.9	–17.4	82.5
United Kingdom	1998	1.9	2.3	–8.0	53.2

Source: OECD, and authors' calculations.

Table 10

Fiscal Consolidations with Moderate Success (*S* = 2), 1990-2005

Country	Year	ΔCAPB(T)	ΔOB(T)	ΔDebt(T+2)	Debt(T–1)
Australia	1994	1.4	1.0	–1.0	30.7
Australia	2002	1.2	1.3	–2.2	20.9
Austria	1996	1.8	1.7	–2.2	69.6
Austria	2001	2.2	1.5	–0.8	69.5
Canada	1995	1.7	1.4	–4.5	98.2
Finland	2000	3.7	4.9	–2.5	55.5
France	1997	1.1	1.1	–2.2	66.3
Greece	1993	1.1	–1.1	–1.5	102.5
Iceland	2005	2.4	3.0	–3.4	35.0
Ireland	2003	1.3	0.6	–2.7	36.1
Ireland	2004	1.6	1.4	–1.2	34.5
Italy	1997	2.1	4.3	–3.5	128.3
Luxembourg	1993	2.6	1.6	–0.2	4.8
Luxembourg	1997	1.8	2.5	–0.8	6.3
Netherlands	2004	1.6	1.1	0.3	61.9
Netherlands	2005	1.7	1.8	–0.6	62.3
New Zealand	1999	1.6	2.0	–4.2	42.2
New Zealand	2001	1.8	2.0	–3.7	37.4
Norway	1994	1.9	1.7	–1.0	40.5
Portugal	1995	1.4	2.1	–4.2	
Spain	1996	1.7	1.6	–1.1	68.9
Sweden	1996	4.3	4.1	–3.2	82.0
Sweden	2000	1.3	2.7	–4.1	71.3
Sweden	2004	1.3	1.8	–4.5	59.3
Switzerland	1999	1.6	1.5	–0.4	55.6
United Kingdom	1995	1.1	0.9	0.5	47.8
United Kingdom	1997	2.0	2.0	–4.5	52.5
United States	1994	1.1	1.4	–1.1	75.4

Source: OECD, and authors' calculations.

Table 11

Fiscal Consolidations with Low Success (*S* = 1), 1990–2005

Country	Year	ΔCAPB(T)	ΔOB(T)	ΔDebt(T+2)	Debt(T–1)
Austria	1992	1.1	0.9	7.8	57.6
Austria	1997	1.9	2.2	2.5	69.7
Canada	1994	1.1	2.0	2.1	96.9
Finland	1993	1.3	–1.7	7.3	44.7
Finland	1994	1.9	1.5	5.7	57.8
France	1996	2.0	1.4	3.6	62.6
Greece	1991	4.0	4.7	20.1	93.6
Greece	1992	1.1	–1.2	11.1	95.9
Greece	1994	5.3	4.1	2.9	115.9
Greece	1998	1.4	2.3	18.4	112.4
Iceland	1992	1.5	0.1	9.4	38.4
Iceland	1999	1.5	1.8	3.2	48.0
Italy	1991	1.7	0.1	21.7	92.8
Italy	1992	2.4	1.0	21.8	97.2
Italy	1993	1.9	0.4	3.1	102.4
Japan	1997	1.0	1.1	26.6	95.3
Japan	2001	1.5	1.3	15.0	137.1
Japan	2004	1.3	1.7	7.1	160.2
Luxembourg	1994	1.8	1.0	0.8	6.0
Luxembourg	1995	1.1	–0.2	0.6	5.5
Luxembourg	2000	1.3	2.6	1.2	5.6
Netherlands	1991	2.5	2.7	8.4	84.2
Norway	2000	1.3	9.3	5.8	30.9
Norway	2004	2.0	4.1	1.0	49.9
Portugal	2002	2.0	1.4	3.5	61.5
Portugal	2003	1.2	–0.1	6.1	64.9
Spain	1992	1.9	0.9	12.1	49.6
Sweden	1994	2.1	2.1	1.1	79.0
Sweden	1995	1.6	2.3	0.5	83.3
Switzerland	2000	1.5	2.3	4.4	52.6
United Kingdom	1996	1.5	1.6	1.2	52.7

Source: OECD, and authors' calculations.

APPENDIX 2
CROSS-SECTION METHODOLOGY, DATA, AND RESULTS

The empirical specifications estimated in this paper are based on Equation (1), the fiscal policy reaction function that is consistent with the prior literature.

$$capb_{i,t} = \rho d_{i,t-1} + \sum_{j=1}^{J} \beta_j X_{j,i,t} + \alpha_i + \varepsilon_{i,t}, \quad t = 1,...,T, i = 1,...,N \tag{1}$$

In Equation (1), $capb_{i,t}$ is the ratio of the cyclically-adjusted primary balance to cyclically-adjusted GDP in country i and year t; $d_{i,t-1}$ is the public debt-to-GDP ratio observed at the end of period t–1; α_i is a country-specific intercept (fixed effect); and $X_{j,i,t}$ denotes an additional control variable j that explains the evolution of the CAPB. Equation (1) captures the fiscal reaction concept as follows: the coefficient ρ measures the response of the CAPB to deviations of public debt from the implicit target level, while the composite term, $\sum_{j=1}^{J} \beta_j X_{j,i,t}$, represents the response to other conventional explanatory variables. To investigate the extent to which changes in the CAPB are sustained over time, the specification in Equation (1) is estimated for three-year non-overlapping averages of the CAPB, *i.e.*, with $\frac{1}{3}\sum_{k=0}^{2} capb_{i,t+k}$, as the dependent variable. The three-year non-overlapping periods are: 1972-74, 1975-77, 1978-80, 1981-83, 1984-86, 1987-89, 1990-92, 1993-95, 1996-98, 1999-2001 and 2003-05. Each right-hand-side variable is measured in the initial year of each three-year period.

All panel data regression equations are estimated using an annual data sample covering 1972-2005 and 24 OECD countries. The sources of the data are the OECD (2006) *Economic Outlook* and the *International Country Risk Guide* (2006).

Table 12

Estimation Results: Core Macroeconomic Controls
Dependent Variable: Cyclically-adjusted Primary Balance
(three-year non-overlapping averages, percent of CAGDP)

Lagged debt *(percent of GDP)*	0.050	0.059	0.059	0.066	0.071
	(6.13)***	*(7.20)****	*(6.87)****	*(6.63)****	*(7.10)****
Growth of PPP GDP per capita *(percent)*		0.235	0.225	0.156	0.140
		(3.18)***	*(2.85)****	*(2.07)***	*(1.84)**
Output gap *(percent of CAGDP)*			0.023	0.029	0.057
			(0.31)	*(0.42)*	*(0.79)*
Log of inflation				–0.238	–0.040
				(1.08)	*(0.17)*
Real interest rate *(percent)*					–0.053
					(0.81)
Observations	187	179	172	168	162
Number of ifscode	23	23	22	22	22
R-squared	0.19	0.29	0.29	0.38	0.39

Absolute value of *t*-statistics in brackets.
* significant at 10 per cent; ** significant at 5 per cent; *** significant at 1 per cent.
Notes: All equations are estimated with country-fixed effects.
The three-year non-overlapping averages are: 1972-74, 1975-77, 1978-80, 1981-83, 1984-86, 1987-89, 1990-92, 1993-95, 1996-98, 1999-2001 and 2003-05.
Each regressor (right-hand-side variable) is measured in the initial year of each three-year period.

Table 13

Estimation Results: Adding Composition, Political, and Institutional Factors
Dependent Variable: Cyclically-adjusted Primary Balance
(three-year non-overlapping averages, percent of CAGDP)

Lagged debt *(percent of GDP)*		0.071	0.078	0.076
	*(3.92)***	*(7.15)***	*(5.60)***	*(5.58)***
Growth of PPP GDP per capita *(percent)*	0.046	0.123	0.067	0.061
	(0.66)	*(1.63)*	*(0.70)*	*(0.68)*
Output gap *(percent of CAGDP)*	0.144	0.052	0.029	0.043
	*(2.19)***	*(0.73)*	*(0.36)*	*(0.57)*
Log of inflation	–0.099	–0.051	0.105	0.029
	(0.48)	*(0.22)*	*(0.38)*	*(0.11)*
Real interest rate *(percent)*	0.040	–0.090	–0.018	–0.059
	(0.66)	*(1.34)*	*(0.21)*	*(0.73)*
Change in cyclically-adjusted current expenditure *(percentage points of CAGDP)*	–1.096			
	*(5.96)***			
Change in cyclically-adjusted revenue *(percent of CAGDP)*		0.367		
		*(2.20)***		
Governmental stability			0.237	
			*(1.70)**	
Institutional quality				0.113
				*(2.60)***
Observations	162	162	127	127
Number of ifscode	22	22	22	22
R-squared	0.51	0.41	0.33	0.35

Absolute value of *t*-statistics in brackets.
* significant at 10 per cent; ** significant at 5 per cent; *** significant at 1 per cent.
Notes: All equations are estimated with country-fixed effects.
The three-year non-overlapping averages are: 1972-74, 1975-77, 1978-80, 1981-83, 1984-86, 1987-89, 1990-92, 1993-95, 1996-98, 1999-2001, and 2003-05.
Each regressor (right-hand-side variable) is measured in the initial year of each three-year period.

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EXPANSIONARY FISCAL CONSOLIDATIONS IN EUROPE: NEW EVIDENCE

António Afonso[*]

In order to assess the existence of expansionary fiscal consolidations in Europe, panel data models for private consumption are estimated for the EU15 countries, using annual data over the period 1970-2005. Three alternative approaches to determine fiscal episodes are used, and the level of government indebtedness is also taken into account. The results show some evidence in favour of the existence of expansionary fiscal consolidations, for several budgetary spending items (general government final consumption, social transfers, and taxes), depending on the specification and on the time span used. On the other hand, the possibility of asymmetric effects of fiscal episodes does not seem to be corroborated by the results.

1 Introduction

The frequently assumed positive correlation between private consumption and fiscal expansion may be reversed if some particular conditions are in place. For instance, a significant and sustained reduction of government expenditures may lead consumers to assume that a permanent tax reduction will also take place in the near future. In that case, an increase in permanent income and in private consumption may well occur, also generating better expectations for private investment. However, if the reduction in expenses is small and temporary, private consumption may not respond positively to the fiscal cutback. In other words, under the right conditions, consumers might anticipate benefits from fiscal consolidation and act as described above, resulting in a so-called "non-Keynesian" effect of fiscal policy.[1]

This paper contributes to the existing literature on fiscal adjustments by looking at the evidence from a new timing using three different criteria to define the relevant fiscal episodes. The first two criteria are inspired in Giavazzi and Pagano

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[1] See Giavazzi and Pagano (1990). Bertola and Drazen (1993), Barry and Devereux (1995) and Perotti (1999) presented several theoretical explanations concerning the existence of those effects. For an overview of the topic, see Perotti (1998).

(1996) and in Alesina and Ardagna (1998) while a third alternative criterion provides additional cross-check of the results. Moreover, I also take into account the level of government indebtedness and assess as well the possibility of asymmetric effects of fiscal episodes, using all three criteria to determine fiscal episodes.

The organisation of the paper is as follows. Section two briefly reviews the underpinnings of expansionary fiscal consolidations and the available empirical evidence. Section three uses alternative measures to determine fiscal episodes. Section four presents the empirical analysis on expansionary fiscal consolidations in the EU15 via the estimation of private consumption panel data specifications, which use budgetary items as explanatory variables. Finally, section five concludes.

2 Expansionary fiscal consolidations

The basic underlying idea of non-Keynesian effects has been put forward by Feldstein (1982), who stated that permanent public expenses reductions may be expansionist if they are seen as an indication of future tax cuts, giving rise to expectations of a permanent income increase. Additionally, when public expenses keep rising beyond a certain limit, there will be also an increased probability that fiscal consolidation might occur. Bertola and Drazen (1993) define this moment as a "trigger point", after which a fiscal adjustment is highly probable. When the fiscal adjustment occurs, there are expectations that there will be significant future tax cuts, leading therefore to an increase in the consumer's permanent income. The same happens with private consumption, and consumers tend to exhibit Ricardian behaviour.[2]

On the other hand, Blanchard (1990) and Sutherland (1997) maintain that non-Keynesian effects may be associated with tax increases at high levels of government indebtedness. This kind of argument is based on "the expectational view of fiscal policy". If the fiscal consolidation appears to the public as a serious attempt to reduce the public sector borrowing requirements, there may be an induced wealth effect, leading to an increase in private consumption. Moreover, the reduction of the government borrowing requirements diminishes the risk premium associated with public debt issuance, contributes to reduce real interest rates and allows the crowding-in of private investment.

Besides the above mentioned expectational channel a so-called labour market channel could also be active. For instance, Ardagna (2004) mention in this context that the composition of fiscal policy may have economic effects via the labour market as a result of reducing public spending, notably salaries, instead of rising taxes. Giavazzi and Pagano (1990) and Alesina and Perotti (1997) also mention the role of exchange rates in promoting successful fiscal adjustments, since a significant exchange rate depreciation occurred before and during the fiscal consolidations of Ireland and Denmark in the 1980s.[3] Indeed, currency devaluations before or during

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[2] For instance, Afonso (2005b) reports evidence of overall government Ricardian behaviour in the EU15.

[3] Giavazzi and Pagano (1996) and McDermott and Westcott (1996) also analyse these fiscal episodes.

fiscal contractions also could play a role in the success of those consolidations (see, for instance, Hjelm, 2003, and Lambertini and Tavares, 2005).

The available empirical work so far does not seem to completely reject the expansionary fiscal contraction hypothesis. The composition of the adjustment seems to be a relevant issue, that is, to what degree the fiscal contraction is based on tax increases and public investment or government consumption cuts.[4]

3 Determination of fiscal episodes in the EU15

The most commonly used measure of fiscal adjustment, the cyclically-adjusted primary budget balance, allows the correction of all the effects on budget balance resulting from changes in economic activity such as inflation or real interest rate changes. This measure is frequently used either as percentage of GDP or as a percentage of potential output. In the paper I will use cyclically-adjusted primary budget balance as a percentage of GDP since it is a more widely used measure by the international institutions.

Alesina and Ardagna (1998) adopted a fiscal episode definition that allows that some stabilisation periods may have only one year.[5] On the other hand, the definition used by Giavazzi and Pagano (1996) decreases the probability of fiscal adjustment periods with only one year by using a limit of 3 percentage points of GDP for a single year consolidation.[6] However, the above definitions, by choosing arbitrarily 2 or 3 years fiscal adjustment periods, end up determining the number of years subjectively. In other words, in selecting the time span of fiscal episodes one incurs the risk of finding either an excessive number of periods, or of neglecting single year length fiscal episodes.

In order to identify fiscal policy episodes in the EU15, I used a simple approach trying also to minimise, but not necessarily avoiding, *ad hoc* definitions of fiscal episodes. Annual data for the fifteen EU countries, over the period 1970 to 2005, was collected for the primary cyclically-adjusted budget balance, computed by the European Commission. Therefore, a possible measure of fiscal impulse is the first difference of the primary structural budget balance, as a percentage of GDP. With 505 annual observations available, for the group of the 15 EU countries, the

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[4] Alesina and Perotti (1995, 1997b), Giavazzi and Pagano (1996), McDermott and Wescott (1996), Alesina and Ardagna (1998), Perotti (1999), Giavazzi, Jappelli and Pagano (2000), Zaghini (2002) and van Aarle and Garretsen (2003) present empirical results concerning the composition and size determinants of successful adjustments. Heylen and Everaert (2000) empirically contest the idea that government wage cuts contribute to successful fiscal consolidations. Von Hagen, Hughes-Hallet and Strauch (2001) and EC (2003) provide additional descriptive analysis and case studies.

[5] The change in the primary cyclically-adjusted budget balance is at least 2 percentage points of GDP in one year or at least 1.5 percentage points on average in the last two years.

[6] The cumulative change in the primary cyclically-adjusted budget balance is at least 5, 4, 3 percentage points of GDP in respectively 4, 3 or 2 years, or 3 percentage points in one year.

average change in the primary structural budget balance is 0.04 and the standard deviation 1.578.

Our definition of fiscal episode, *FE*, in this case defined as a fiscal consolidation, in period *t*, is as follows:

$$FE_t = \begin{cases} 1, \text{if } \Delta b_t > \gamma\sigma \\ 1, \text{if } \sum_{i=0}^{1} \Delta b_{t-i} / 2 > \sigma \\ 0, \text{otherwise} \end{cases} \quad (1)$$

where b is the primary structural budget balance in period t and σ is the respective standard deviation for the panel sample while γ is applied to determine a multiple of the standard deviation as commonly used in the literature. For simplicity I use γ = 1.5.[7] In other words, a fiscal episode occurs when either the change in the primary cyclically-adjusted balance is at least one and a half times the standard deviation in one year, or when the change in the primary cyclically-adjusted balance is at least one standard deviation on average in the last two years.

Using the definition in (1) one can determine both contractionary and expansionary fiscal episodes. In order to allow for similar definitions available in previous studies, I compute also the episodes using the definitions used by Giavazzi and Pagano (1996) and by Alesina and Ardagna (1998), labelled respectively measures *FE1* and *FE2*, while the criterion defined in (1) provides our measure *FE3*.

According to Table 1, the number of years with fiscal episodes labelled as contractions ranges from 58, in the approach of equation (1), to 81, following the Giavazzi and Pagano (1996) approach. Episodes of fiscal expansion are less common, ranging from 39 to 51 respectively for methods three and one, while fiscal consolidations range from 58 to 81 respectively also for methods three and one. The average duration of the reported fiscal contractions is around 2.5 years for the method inspired by Giavazzi and Pagano (1996), and around 1.8 years for the other two methods. Moreover, 76 and 68 per cent of the episodes determined with criterion one coincide with episodes determined respectively with criterion two and three, and 82 per cent of the episodes determined with criterion two coincide with episodes determined via criterion three.

4 Empirical analysis of expansionary fiscal consolidations

4.1 Empirical specifications

The empirical strategy to assess the evidence on expansionary fiscal

[7] As in all the related literature, here there is also an element of arbitrariness. In this case, 1.5 σ is 2.4 percentage points of GDP, implying a more demanding threshold to determine a fiscal episode.

Table 1

Fiscal Episodes (FE), Based on the Change in the Cyclically-adjusted Primary Budget Balance

Country	FE1		FE2		FE3	
	Expansions	Contractions	Expansions	Contractions	Expansions	Contractions
AU	76	97	76	84, 97, 01	76	84, 97, 01
BE		82-85, 95-96		82-83, 85, 95		82-83
DK	76, 94	83-87, 95-97	76, 82, 94	83-86, 95-96	76, 94	83-86, 95-96
FI	79-80, 87	76-77, 95-96, 00-01	78-79, 87	76-77, 95-96, 00-01	79, 87	76-77, 95-96, 00-01
FR		96-97		95-96		96
GE	75, 90-92	82-83	75, 90-91	82-83	75, 90-91	83
GR	81, 85, 89-90, 01-04	82-83, 87, 91-97	75, 81, 85, 88-89, 01-02, 04	82-83, 86-87, 91-92, 94-97, 05	81, 85, 88-89, 01-02	82-83, 86-87, 91-92, 94-95, 05
IR	75, 78-79, 01-02	76-77, 83-86, 88-89, 04	74-75, 78-79, 95, 99, 01-02	76-77, 83-84, 88-89, 04	74-75, 78-79, 01-02	76-77, 83-84, 88, 04
IT		77, 83, 92-94		77, 83, 91-93		77, 83, 92-93
LU	86-87, 02-05	83-85, 01	86-87, 02-04	83-85, 01	86-87, 02-03	83-85, 01
NL		93, 95-98		91, 93, 95-96		95-96
PT	74, 80-81	82-86, 92	80-81, 05	82-83, 86, 92	80-81, 05	82-83, 86, 92
SP		95-98		95-96		95-96
SW	74, 79-80, 91-94, 02-03	84, 87, 95-99	74, 79, 91-93, 01-02	76, 83-84, 87, 95-97	74, 79, 91-93, 02	87, 95-97
UK	72-75, 92-93, 02-04	81, 95-99	72-73, 92-93, 02-03	81, 95-98	72-73, 92-93, 02-03	95-98
Years with episodes	51	81	47	71	39	58
Average duration (years)	2.0	2.5	1.6	1.8	1.6	1.8

FE1 – Measure used by Giavazzi and Pagano (1996): the cumulative change in the primary cyclically-adjusted budget balance is at least 5, 4, 3 percentage points of GDP in respectively 4, 3 or 2 years, or 3 percentage points in one year.
FE2 – Measure used by Alesina and Ardagna (1998): the change in the primary cyclically-adjusted budget balance is at least 2 percentage points of GDP in one year or at least 1.5 percentage points on average in the last two years.
FE3 – Measure based on (1).

consolidations will rely on the estimation of private consumption specifications, which use budgetary items as explanatory variables. This is quite in line with some of the existing empirical literature. Therefore, the following baseline specification is used:

$$\Delta C_{it} = c_i + \lambda C_{it-1} + \omega_0 Y_{it-1} + \omega_1 \Delta Y_{it} + \delta_0 Y_{it-1}^{oecd} + \delta_1 \Delta Y_{it}^{oecd} + \quad (2)$$

$$(\alpha_1 FCE_{it-1} + \alpha_3 \Delta FCE_{it} + \beta_1 TF_{it-1} + \beta_3 \Delta TF_{it} + \gamma_1 TAX_{it-1} + \gamma_3 \Delta TAX_{it}) \times FC_{it}^m +$$

$$(\alpha_2 FCE_{it-1} + \alpha_4 \Delta FCE_{it} + \beta_2 TF_{it-1} + \beta_4 \Delta TF_{it} + \gamma_2 TAX_{it-1} + \gamma_4 \Delta TAX_{it}) \times (1 - FC_{it}^m) + \mu_{it}$$

where the index i (i = 1,…,N) denotes the country, the index t (t = 1,…,T) indicates the period and c_i stands for the individual effects to be estimated for each country i. These country-specific constants are the only source of heterogeneity in the specifications. In the equation, C represents the private consumption, Y the GDP; Y^{oecd} the OECD's GDP, FCE is the general government's final consumption expenditure, TF the social transfers and TAX the taxes, and all the abovementioned variables are taken as the logarithms of the respective real per capita observations. FC^m is a dummy variable that controls for the existence of fiscal episodes that are labelled as contractions, with m = 1, 2, 3, for each of the three fiscal episode determination strategies used in the previous section. Additionally, it is assumed that the disturbances u_{it} are independent and identical distributed random shocks across countries, with zero mean and constant variance.

In specification (2), ω_1 and δ_1 are the short-run elasticities of consumption to income and to OECD's income respectively. Moreover, α_3, β_3, and γ_3 are the fiscal short-run elasticities of the consumption function for the case when a fiscal consolidation occurs (i.e., $FC^m = 1$). It is straightforward to see, for instance, that $-\omega_0/\lambda$ is the long-run elasticity of consumption to income. Similarly, the long-run effects for the fiscal variables, in the presence of a fiscal consolidation episode, are given by $-\alpha_1/\lambda$, $-\beta_1/\lambda$ and $-\gamma_1/\lambda$ respectively for general government final consumption, social transfers and taxes.

Specification (2) is a standard fixed effects model, essentially a linear regression model in which the intercept term varies over the individual cross section units. The existence of differences between the several countries should then be taken into account by the autonomous term that may change from country to country, in each cross-section sample, in order to capture individual country characteristics.

4.2 Data

In order to assess the possibility of expansionary fiscal consolidations regimes for the EU15, I use annual data spanning the years 1970-2005 for private consumption, GDP, taxes, general government final consumption, and social

transfers. Taxes are the sum of current taxes on income and wealth (direct taxes) and taxes linked to imports and production (indirect taxes).

All variables are taken as the logarithms of real per capita observations. This gives a maximum of 36 years of annual observations for 15 countries and a maximum possible of 540 observations per series. Of the 15 countries in the panel data set, 12 are currently in EMU – Austria, Belgium, Germany, Finland, France, Greece, Ireland, Italy, Luxemburg, Netherlands, Portugal and Spain – and 3 others have not adopted the euro – Denmark, Sweden and the United Kingdom. The source of the data is the European Commission AMECO database (updated on 14 November 2005). Data for OECD population and GDP are taken from the OECD national accounts publications. Additionally, for the entire sample period the common unit root test, as proposed by Levin, Lin and Chu (2002) rejects the existence of a unit root at least at the 5 per cent significance level for all series in first differences.

4.3 Estimation results

The fixed effects model is a typical choice for macroeconomists and is generally more adequate than the random effects model. For instance, if the individual effects are a substitute for non-specified variables, it is probable that each country-specific effect is correlated with the other independent variables. Moreover, since the country sample includes all the relevant countries, and not a random sample from a bigger set of countries, the fixed effects model is a more obvious choice.[8]

According to the results reported in Table 2, in all specifications both the short-run and the long-run elasticity of private consumption to income are statistically significant. The short-run elasticity is approximately 0.66-0.69 in the three specifications. The long-run effect of income is close to one, ranging from 0.95 to 0.97, which indicates that the relation between private consumption and income is rather stable for the EU15 countries.[9] The short-run elasticity for the OECD income is also significant.

Regarding general government final consumption there is no statistically significant short-run effect on private consumption, either when there are fiscal consolidation episodes or not (even though the sign of the estimated coefficients for ΔFCE, α_3 and α_4, is positively in line with the usual Keynesian effects). However, the long-run effect of government final consumption on private consumption turns out to be statistically significant with the first method for determining fiscal episodes

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[8] Additionally, Judson and Owen (1999) show that even if the existence of a lagged endogenous variable could imply biased and inconsistent fixed effects panel estimators, such bias is minor when the cross section dimension is small in relation to the time dimension of the panel. This holds for an unbalanced panel and at least $T = 30$, as in the present case.

[9] The share of private consumption in GDP has some heterogeneity across the EU15 countries, with the country average for the entire sample period ranging from 0.52-0.53 in Finland, Denmark and the Netherlands to 0.66-0.67 in Greece and Portugal.

Table 2

Fixed Effects' Estimation Results for Specification (2), 1970-2005

		FE[1] (I)	*lr*	FE[2] (II)	*lr*	FE[3] (III)	*lr*
λ	C_{t-1}	–0.072 ***		–0.070 ***		–0.069 ***	
		(–4.29)		*(–4.20)*		*(–4.15)*	
ω_0	Y_{t-1}	0.069 ***	0.970	0.068 ***	0.966	0.066 ***	0.951
		(4.39)		*(4.38)*		*(4.26)*	
ω_1	ΔY_t	0.693 ***		0.690 ***		0.688 ***	
		(14.54)		*(14.31)*		*(14.32)*	
δ_0	Y_{t-1}^{oecd}	0.004		0.004		0.004	
		(0.62)		*(0.69)*		*(0.74)*	
δ_1	ΔY_t^{oecd}	0.043 ***		0.041 ***		0.040 **	
		(2.70)		*(2.56)*		*(2.50)*	
α_1	FCE_{t-1}	–0.029 ***	–0.410	–0.027 ***	–0.390	–0.020	–0.290
		(–2.16)		*(–1.90)*		*(–1.35)*	
α_3	ΔFCE_t	0.002		0.022		0.014	
		(0.03)		*(0.42)*		*(0.26)*	
β_1	TF_{t-1}	–0.008		–0.013		–0.013	
		(–0.70)		*(–1.12)*		*(–1.09)*	
β_3	ΔTF_t	–0.012		0.001		0.021	
	$\times FC^m$	*(–0.19)*		*(0.01)*		*(0.28)*	
γ_1	TAX_{t-1}	0.029 **	0.405	0.032 ***	0.451	0.026 **	0.372
		(2.5)		*(2.63)*		*(2.03)*	
γ_3	ΔTAX_t	0.073 *		0.025		0.030	
		(1.67)		*(0.52)*		*(0.56)*	
α_2	FCE_{t-1}	–0.015	–0.214	–0.017 *	–0.241	–0.019 *	–0.290
		(–1.56)		*(–1.73)*		*(–1.94)*	
α_4	ΔFCE_t	0.028		0.025		0.023	
		(0.95)		*(0.84)*		*(0.78)*	
β_2	TF_{t-1}	–0.006		–0.006		–0.005	
		(–0.75)		*(–0.70)*		*(–0.65)*	
β_4	ΔTF_t	0.022		0.020		0.019	
	$\times(1-FC^m)$	*(1.07)*		*(0.96)*		*(0.87)*	
γ_2	TAX_{t-1}	0.015 *	0.209	0.016 *	0.222	0.017 **	0.252
		(1.86)		*(1.94)*		*(2.17)*	
γ_4	ΔTAX_t	–0.008		–0.002		–0.003	
		(–0.33)		*(–0.08)*		*(–0.13)*	
N		505		505		505	
$\bar{R}^2$		0.550		0.577		0.547	
Null hypothesis		Test statistics	*p*-value	Test statistics	*p*-value	Test statistics	*p*-value
$\alpha_1 - \alpha_2 = 0$		1.11	0.29	0.61	0.64	0.00	0.95
$\gamma_1 - \gamma_2 = 0$		2.07	0.15	2.64	0.10	0.61	0.44
$-\alpha_1 - \gamma_1 = 0$		0.00	0.97	0.14	0.71	0.23	0.63

Notes: The *t*-statistics are in parentheses. *, **, *** indicate values statistically significant at the 10, 5, and 1 per cent level respectively. The data sample includes yearly observations for the EU15 countries over the period 1970-2005. *lr* is the long-run elasticity of private consumption with respect to the relevant explanatory variables.

FC^1: measure used by Giavazzi and Pagano (1996); FC^2: measure used by Alesina and Ardagna (1998); FC^3: measure based on the method proposed in (1).

and when there are fiscal consolidations (α_1); with method two (both with and without fiscal consolidations); and with method three when there are no fiscal consolidations (α_2).

Interestingly, the long-run elasticity of private consumption with respect to general government final consumption is negative, which indicates that a reduction of government consumption increases private consumption in the long-run. Moreover, one should also notice that the magnitude of such long-run elasticity is higher when a fiscal consolidation episode occurs ($FC^m = 1$ in (2)), for the first two methods used to determine the fiscal episodes. Therefore, cuts in general government final consumption seem to stimulate private consumption in the long-run, with or without fiscal consolidation episodes, but that stimulus is higher in the presence of such fiscal episodes. For instance, and taking the results from method two (see column II in Table 5), a 1-euro decrease in general government final consumption is estimated to raise long-run private consumption by 24 cents, if there are no fiscal consolidation episodes, and by 39 cents when a fiscal consolidation takes place. With method one such effect is 21 and 41 cents, respectively without and with fiscal consolidations.

Concerning taxes, the short-run effect does not seem to be overall statistically significant, with the exception of the first approach (column I in Table 2), indicating that a tax raise, together with a fiscal consolidation episode, could increase private consumption (a non-Keynesian effect). On the other hand, the coefficients of lagged taxes (γ_1, γ_2) always come out statistically significant, implying a similar significance for the respective long-run effect of taxes on private consumption. Since such long-run elasticity is positive, this would indicate that tax increases contribute to increase private consumption in the long-run, again in a non-Keynesian fashion. This long-run elasticity is more statistically significant when a fiscal consolidation episode takes place, and its magnitude is also higher under such circumstances ($\gamma_1 > \gamma_2$), even though one cannot reject the null hypothesis that the two coefficients are identical (except for the second approach, see Table 2). For instance, in the presence of a fiscal consolidation episode a 1-euro raise in taxes could contribute to increase private consumption in the long run by 37-45 cents.

Another point worth mentioning is that the long-run effects of both general government final consumption and taxes are quite similar in absolute value and statistically significant, when a fiscal consolidation episode occurs (see values of α_1 and γ_1 in column I of Table 2 and their corresponding long-run counterparts, and notice also that in this case the null $-\alpha_1 = \gamma_1$ is not rejected). Therefore, one can envisage, for this case, the long-run effect on private consumption as given approximately by *0.41*(FCE-TAX)*, which would imply that increases of general government final consumption net of taxes negatively impinge on private consumption. Put in other words, faced with an increase in general government final consumption net of taxes consumers would behave in a Ricardian way by presuming the need for future higher taxes.

In what concerns social transfers, the results from Table 2 do not show any statistical significance, implying an absence of relevant effects on private consumption from that fiscal component.

In order to assess possible effects from the institutional changes that occurred in the EU in the 1990s, alternative sub-sample periods can be considered to take into account the signing of the European Union Treaty on 7 February 1992 in Maastricht, with the setting up of the convergence criteria. Therefore, I split the time sample into the pre- and post-Maastricht period, using 1992 as the first year of the new EU fiscal framework, and re-estimated the specifications for the resulting two time intervals. This might be a way of controlling for common changes in fiscal policy as response to common problems as, for instance, the need to make additional efforts in order to comply with the EMU convergence criteria. Table 3 reports the estimation results for the post-Maastricht period.

Concerning the post-Maastricht period the estimation results seem to be more in line with the results obtained previously for the entire time series sample, even if taxes (general government final consumption) gain (loose) statistical significance. On the other hand, the long-run elasticity of social transfers is now statistically significant and negative, generally regardless of the existence of fiscal consolidation episodes (see also that in Table 3 one does not reject the null $\beta_1 = \beta_2$). If higher social transfers lead to lower private consumption, this could be seen as an indication of a substitution effect or as a non-Keynesian effect with consumers anticipating future higher taxes to finance the current social transfers.

Regarding the pre-Maastricht period the overall estimation results do not seem to show any significant effects, either in the short or in the long run, from fiscal variables on private consumption. Therefore, these results are not reported.

4.4 The relevance of government indebtedness

It has been mentioned in the literature that the effects of government spending on private consumption may depend on the level of government indebtedness. Specifically, the effects of government spending could become less Keynesian if large increases in general government debt occur or if debt-to-GDP ratios are already at a high level.

To assess how different levels of government indebtedness may impinge on the responsiveness of private consumption, I considered two alternative thresholds for the debt-to-GDP ratio by using two dummy variables *Byear* and *Bcountry*. These debt ratio thresholds variables are defined as follows. $Byear_{it}$ takes the value 1 if the debt ratio is above the year average and 0 otherwise, where "year average" is the simple average of the debt-to-GDP ratio in year t for the entire cross country sample. $Bcountry_{it}$ takes the value 1 if the debt ratio is above the country

Table 3

Fixed Effects' Estimation Results for Specification (2), Post-Maastricht, 1992-2005

		FE[1] (I)	*lr*	FE[2] (II)	*lr*	FE[3] (III)	*lr*
λ	C_{t-1}	–0.216 ***		–0.226 ***		–0.222 ***	
		(–3.51)		*(–3.62)*		*(–3.60)*	
ω_0	Y_{t-1}	0.150 ***	0.696	0.168 ***	0.694	0.155 ***	0.698
		(3.02)		*(4.38)*		*(3.17)*	
ω_1	ΔY_t	0.592 ***		0.588 ***		0.594 ***	
		(7.81)		*(7.55)*		*(7.71)*	
δ_0	Y_{t-1}^{oecd}	0.051 **		0.050 *		0.048 *	
		(1.97)		*(1.91)*		*(1.86)*	
δ_1	ΔY_t^{oecd}	0.043		0.042		0.042	
		(1.35)		*(1.26)*		*(1.28)*	
α_1	FCE_{t-1}	–0.027	–0.127	–0.071 *	–0.164	–0.023	–0.135
		(–1.01)		*(–1.33)*		*(–1.08)*	
α_3	ΔFCE_t	0.037		0.036		0.052	
		(0.77)		*(0.68)*		*(0.88)*	
β_1	$TF_{t-1} \times FC^m$	–0.062 ***	–0.287	–0.050 ***	–0.222	–0.053 ***	–0.240
		(–3.28)		*(–2.69)*		*(–2.98)*	
β_3	ΔTF_t	0.015		0.084		0.096	
		(0.20)		*(1.16)*		*(1.23)*	
γ_1	TAX_{t-1}	0.091 ***	0.422	0.092 ***	0.406	0.087 ***	0.392
		(3.24)		*(3.36)*		*(3.18)*	
γ_3	ΔTAX_t	0.015		0.019		0.027	
		(0.30)		*(0.36)*		*(0.50)*	
α_2	FCE_{t-1}	–0.043	–0.202	–0.043	–0.192	–0.044 *	–0.198
		(–1.62)		*(–1.63)*		*(–1.67)*	
α_4	ΔFCE_t	–0.015		–0.016		–0.018	
		(–0.28)		*(–0.31)*		*(–0.36)*	
β_2	$TF_{t-1} \times (1-FC^m)$	–0.050 ***	–0.229	–0.048 ***	–0.213	–0.048 ***	–0.218
		(–3.33)		*(–3.25)*		*(–3.30)*	
β_4	ΔTF_t	0.013		0.002		0.002	
		(0.30)		*(0.94)*		*(0.05)*	
γ_2	TAX_{t-1}	0.095 ***	0.438	0.095 ***	0.421	0.095 ***	0.427
		(3.51)		*(3.54)*		*(3.55)*	
γ_4	ΔTAX_t	0.097 ***		0.097		0.094 ***	
		(2.99)		*(3.06)*		*(3.04)*	
N		206		206		206	
$\bar{R}^2$		0.617		0.618		0.618	
Null hypothesis		Test statistic	*p*-value	Test statistic	*p*-value	Test statistic	*p*-value
$\alpha_1 - \alpha_2 = 0$		0.82	0.37	0.13	0.72	0.59	0.44
$\gamma_1 - \gamma_2 = 0$		0.10	0.76	0.09	0.77	0.45	0.50
$-\alpha_1 - \gamma_1 = 0$		3.99	0.05	3.02	0.08	3.33	0.07
$\beta_1 - \beta_2 = 0$		1.13	0.29	0.03	0.87	0.14	0.71

Note: see notes to Table 2.

average, where "country average" is the debt-to-GDP ratio on average in country i for the entire sample.[10] Using the country average debt-to-GDP ratio in each year is relevant since capital markets do compare individual country positions vis-à-vis some perceived group average. Moreover, if for some years the debt ratio of a given country is clearly above the group average, notably in the EU context, the public may become more aware of the existence of fiscal imbalances and react differently.

These debt threshold variables can then be interacted with the dummy variables that reflect the existence of fiscal consolidation episodes, in order to see if the existence of a higher or a lower level of public indebtedness in the previous period makes a difference for private consumption decisions. For instance, for the *Byear* dummy the testable empirical specification can be extended from (2) and written in the following way:

$$\Delta C_{it} = c_i + \lambda C_{it-1} + \omega_0 Y_{it-1} + \omega_1 \Delta Y_{it} + \delta_0 Y_{it-1}^{oecd} + \delta_1 \Delta Y_{it}^{oecd} + \tag{3}$$

$$(\alpha_{10} FCE_{it-1} + \alpha_{30} \Delta FCE_{it} + \beta_{10} TF_{it-1} + \beta_{30} \Delta TF_{it} + \gamma_{10} TAX_{it-1} + \gamma_{30} \Delta TAX_{it}) FC_{it}^{m} (1 - Byear_{it-1}) +$$
$$(\alpha_{20} FCE_{it-1} + \alpha_{40} \Delta FCE_{it} + \beta_{20} TF_{it-1} + \beta_{40} \Delta TF_{it} + \gamma_{20} TAX_{it-1} + \gamma_{40} \Delta TAX_{it})(1 - FC_{it}^{m})(1 - Byear_{it-1}) +$$
$$(\alpha_{11} FCE_{it-1} + \alpha_{31} \Delta FCE_{it} + \beta_{11} TF_{it-1} + \beta_{31} \Delta TF_{it} + \gamma_{11} TAX_{it-1} + \gamma_{31} \Delta TAX_{it}) FC_{it}^{m} Byear_{it-1} +$$
$$(\alpha_{21} FCE_{it-1} + \alpha_{41} \Delta FCE_{it} + \beta_{21} TF_{it-1} + \beta_{41} \Delta TF_{it} + \gamma_{21} TAX_{it-1} + \gamma_{41} \Delta TAX_{it})(1 - FC_{it}^{m}) Byear_{it-1} + \mu_{it}$$

According to the estimation results for specification (3), reported in Table 4, now general government final consumption is not statistically significant in explaining private consumption, regardless of the existence of a fiscal consolidation episode, and when the ratio is below the debt threshold. This result holds for the three different methodologies used to determine fiscal consolidation episodes. If the debt ratio is above the debt threshold and in the absence of a fiscal consolidation episode, the long-run effect of the general government final consumption (α_{21}) varies across the three methods of determination of fiscal episodes.

As regards social transfers, the short-run effect on private consumption is positive and statistically significant when there are no fiscal consolidation episodes and when the debt-to-GDP ratio is below the defined threshold (β_{40}). On the other hand, in the presence of a fiscal consolidation episode and if the previous period debt-to-GDP ratio was already above the debt ratio threshold, social transfers have a negative (non-Keynesian) long-run effect on private consumption (β_{31}). The same is true for the long-run effect of social transfers (β_{11}).

The results from Table 4 indicate also that taxes have a positive (non-Keynesian) long-run effect on private consumption when there are no fiscal consolidations and when the debt ratio is below the relevant threshold (γ_{20}).

[10] For instance, the period average of the debt-to-GDP ratio ranged from 10.3 and 42.1 per cent respectively for Luxembourg and Germany to 86.2 and 100.6 percent respectively in Italy and Belgium. On the other hand, the simple cross-country average for the debt ratio had a minimum value of 27.5 per cent in 1973 and a maximum value of 72.9 per cent in 1995.

Additionally, for the cases when the debt ratio is above the threshold, the significance of such non-Keynesian effects increases, which could be interpreted along the lines proposed by Blanchard (1990), as a reduction of uncertainty about future fiscal policy unbalances. Moreover, the robustness of the result is higher when a fiscal consolidation occurs (γ_{11}), under the first two strategies used to determine the existence of fiscal episodes (columns I and II of Table 4).[11]

The alternative set of results for specification (3), using as the dummy threshold for the debt-to-GDP ratio the average in year t for the entire country sample, as determined in (5), are reported in Table 5. These additional results show that when the debt threshold is not surpassed, general government final consumption has a negative (non-Keynesian) long-run effect on private consumption and this effect is of a bigger magnitude when there is a fiscal consolidation episode ($|\alpha_{10}| > |\alpha_{20}|$). This result is mostly visible for the first and third strategies used to determine the occurrence of fiscal episodes (columns I and III in Table 5), and it also holds when the country debt-to-GDP ratio is above the country average and when there is a consolidation episode (α_{11} in column I).[12]

Taxes depict a positive (non-Keynesian) long-run effect on private consumption when the debt-to-GDP ratio is below the relevant threshold. When the debt ratio threshold is surpassed a positive and statistically long-run effect of taxes on private consumption is mostly visible when coupled with a fiscal consolidation episode (γ_{11}).

Social transfers have a statistically significant negative long-run effect when a fiscal consolidation episode occurs and the debt ratio is above the threshold, for the last two methods used to determine the fiscal episodes (β_{11}, columns II and III in Table 5). Below the debt threshold social transfers have a positive (Keynesian) short- and long-run impact on private consumption, which is only significant for the first method of selection of fiscal episodes (β_{10} and β_{30} in column I).

I did an additional analysis regarding alternative debt-to-GDP ratio thresholds. For instance, with the thresholds of 40 and 60 per cent, this breaks the panel sample into three more or less equal sized sub-samples, with 196, 164 and 184 observations respectively below 40 per cent, between 40 and 60 per cent and above 60 per cent. However, the results for such alternative calculations (not reported in the paper for the sake of size) did not provide relevant additional insights.

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[11] The interaction of the year average for the debt dummy with the fiscal episode dummy results in a split of the fiscal episodes into two roughly equal sized sub-samples (for the three methods used to determine the fiscal episodes).

[12] One can mention that the use of the country average for the debt dummy interaction results approximately in a two thirds (one third) sub-sample of fiscal consolidations episodes coupled with the debt-to-GDP ratio above (below) the threshold.

Table 4

Fixed Effects' Estimation Results for Specification (3), *Byear* Dummy for Debt Ratio Threshold, 1970-2005

		FE[1] (I)	*lr*	FE[2] (II)	*lr*	FE[3] (III)	*lr*
λ	C_{t-1}	–0.073 ***		–0.072 ***		–0.074 ***	
		(–4.22)		*(–4.14)*		*(–4.20)*	
ω_0	Y_{t-1}	0.065 ***	0.894	0.064 ***	0.887	0.064 ***	0.862
		(3.96)		*(3.95)*		*(3.89)*	
ω_1	ΔY_t	0.678 ***		0.675 ***		0.668 ***	
		(16.06)		*(15.50)*		*(15.49)*	
δ_0	Y^{oecd}_{t-1}	0.014		0.002		0.002	
		(0.22)		*(0.23)*		*(0.23)*	
δ_1	ΔY^{oecd}_{t}	0.040 **		0.038 **		0.036 **	
		(2.47)		*(2.30)*		*(2.21)*	
α_{10}	FCE_{t-1}	–0.018	–0.251	–0.017	–0.231	–0.019	–0.261
		(–1.04)		*(–0.88)*		*(–0.95)*	
α_{30}	ΔFCE_t	0.029		0.069		0.039	
		(0.43)		*(0.72)*		*(0.43)*	
β_{10}	TF_{t-1}	0.006		0.005		0.004	
	$\times FC^m$	*(0.51)*		*(0.34)*		*(0.25)*	
β_{30}	ΔTF_t	0.077		0.104		0.090	
	$\times (1-Byear)$	*(0.99)*		*(1.2)*		*(0.93)*	
γ_{10}	TAX_{t-1}	0.015	0.209	0.015	0.206	0.018	0.249
		(1.09)		*(0.94)*		*(1.10)*	
γ_{30}	ΔTAX_t	0.095		0.040		0.025	
		(1.61)		*(0.56)*		*(0.33)*	
α_{20}	FCE_{t-1}	–0.017	–0.227	–0.017	–0.233	–0.017	–0.227
		(–1.28)		*(–1.28)*		*(–1.28)*	
α_{40}	ΔFCE_t	0.035		0.030		0.003	
		(1.05)		*(0.92)*		*(0.09)*	
β_{20}	TF_{t-1}	–0.004		–0.002		–0.001	
	$\times (1-FC^m)$	*(–0.38)*		*(–0.23)*		*(–0.10)*	
β_{40}	ΔTF_t	0.039 **		0.038 **		0.039 **	
	$\times (1-Byear)$	*(2.12)*		*(2.09)*		*(2.15)*	
γ_{20}	TAX_{t-1}	0.019 *	0.262	0.018 *	0.253	0.018 *	0.243
		(1.86)		*(1.75)*		*(1.72)*	
γ_{40}	ΔTAX_t	–0.012		–0.002		0.003	
		(–0.39)		*(–0.06)*		*(0.09)*	

Note: see notes to Table 2.

Table 4 (continued)

Fixed Effects' Estimation Results for Specification (3), *Byear* Dummy for Debt Ratio Threshold, 1970-2005

			FE[1] (I)	*lr*	FE[2] (II)	*lr*	FE[3] (III)	*lr*
α_{11}	FCE_{t-1}		–0.018 *(–1.10)*	–0.250	–0.021 *(–1.26)*	–0.294	0.003 *(0.15)*	
α_{31}	ΔFCE_t		0.022 *(0.45)*		0.029 *(0.60)*		0.057 *(1.09)*	
β_{11}	TF_{t-1}	$\times FC^m$ $\times$ *Byear*	–0.027 ** *(–2.22)*	–0.371	–0.025 ** *(–1.97)*	–0.349	–0.034 *** *(–2.91)*	–0.455
β_{31}	ΔTF_t		–0.1385 ** *(–2.13)*		–0.129 * *(–1.93)*		–0.062 *(–0.69)*	
γ_{11}	TAX_{t-1}		0.040 *** *(3.25)*	0.545	0.041 *** *(3.43)*	0.572	0.028 * *(1.94)*	0.375
γ_{31}	ΔTAX_t		0.070 *(1.38)*		0.046 *(0.95)*		0.061 *(1.04)*	
α_{21}	FCE_{t-1}		0.020 ** *(2.37)*	0.275	–0.022 *(–1.64)*	–0.310	–0.030 ** *(–2.12)*	–0.405
α_{41}	ΔFCE_t		0.066 *(1.00)*		0.067 *(1.08)*		0.058 *(0.99)*	
β_{21}	TF_{t-1}	$\times(1-FC^m)$ $\times$ *Byear*	0.004 *(0.30)*		0.004 *(0.35)*		0.007 *(0.59)*	
β_{41}	ΔTF_t		–0.045 *(–0.76)*		–0.048 *(–0.84)*		–0.053 *(–0.97)*	
γ_{21}	TAX_{t-1}		0.020 ** *(2.37)*	0.275	0.019 ** *(2.23)*	0.259	0.024 *** *(2.75)*	0.318
γ_{41}	ΔTAX_t		0.023 *(0.68)*		0.021 *(0.63)*		0.018 *(0.56)*	
N			489		489		489	
$\bar{R}^2$			0.546		0.543		0.540	
Null hypothesis			Test statistics	*p*-value	Test statistics	*p*-value	Test statistics	*p*-value
$\beta_{30} - \beta_{40} = 0$			0.23	0.63	0.56	0.45	0.27	0.60
$\beta_{40} - \beta_{31} = 0$			7.02	0.01	5.88	0.02	1.23	0.27
$\beta_{31} - \beta_{41} = 0$			1.24	0.27	0.93	0.33	0.01	0.93
$\gamma_{10} - \gamma_{11} = 0$			2.73	0.09	2.54	0.11	0.24	0.62

Note: see notes to Table 2.

Table 5

Fixed Effects' Estimation Results for Specification (3), *Bcountry* Dummy for Debt Ratio Threshold, 1970-2005

			FE[1] (I)	*lr*	FE[2] (II)	*lr*	FE[3] (III)	*lr*
λ	C_{t-1}		–0.076 *** *(–4.32)*		–0.074 *** *(–4.08)*		–0.075 *** *(–4.14)*	
ω_0	Y_{t-1}		0.068 *** *(4.19)*	0.895	0.065 *** *(3.93)*	0.873	0.067 *** *(4.06)*	0.886
ω_1	ΔY_t		0.683 *** *(16.11)*		0.679 *** *(15.34)*		0.675 *** *(15.55)*	
δ_0	Y_{t-1}^{oecd}		0.002 *(0.38)*		0.003 *(0.48)*		0.003 *(0.47)*	
δ_1	ΔY_t^{oecd}		0.039 ** *(2.45)*		0.039 ** *(2.30)*		0.035 ** *(2.11)*	
α_{10}	FCE_{t-1}		–0.201 *** *(–5.63)*	–2.645	–0.084 *(–1.59)*	–1.134	–0.131 ** *(–2.39)*	–1.745
α_{30}	ΔFCE_t		–0.273 *** *(–2.64)*		–0.024 *(–0.15)*		–0.084 *(–0.55)*	
β_{10}	TF_{t-1}	$\times FC^m \times (1-Bcountry)$	0.093 *** *(4.85)*	1.223	0.035 *(1.21)*		0.049 *(1.64)*	
β_{30}	ΔTF_t		0.209 *** *(3.04)*		0.135 *(1.05)*		0.161 *(1.28)*	
γ_{10}	TAX_{t-1}		0.105 *** *(5.56)*	1.376	0.051 * *(1.77)*	0.683	0.075 *** *(–2.67)*	0.997
γ_{30}	ΔTAX_t		0.186 *** *(2.90)*		0.040 *(0.39)*		0.030 *(0.31)*	
α_{20}	FCE_{t-1}		–0.025 * *(–1.94)*	–0.334	–0.027 ** *(–2.00)*	–0.362	–0.027 ** *(–2.01)*	–0.356
α_{40}	ΔFCE_t		0.025 *(0.73)*		0.020 *(0.58)*		0.020 *(0.59)*	
β_{20}	TF_{t-1}	$\times(1-FC^m) \times (1-Bcountry)$	–0.002 *(0.24)*	–0.032	–0.001 *(–0.05)*		0.001 *(0.05)*	
β_{40}	ΔTF_t		0.028 *(1.42)*		0.029 *(1.34)*		0.029 *(1.43)*	
γ_{20}	TAX_{t-1}		0.027 *** *(2.71)*	0.356	0.027 ** *(2.57)*	0.360	0.025 ** *(2.41)*	0.332
γ_{40}	ΔTAX_t		–0.035 *(–1.09)*		–0.026 *(–0.80)*		–0.023 *(–0.70)*	

Note: see notes to Table 2.

Table 5 (continued)

Fixed Effects' Estimation Results for Specification (3)
***Bcountry* Dummy for Debt Ratio Threshold, 1970-2005**

			FE[1] (I)	*lr*	FE[2] (II)	*lr*	FE[3] (III)	*lr*
α_{11}	FCE_{t-1}		–0.028 ** *(–2.02)*	–0.363	–0.024 *(–1.63)*	–0.320	–0.010 *(–0.64)*	
α_{31}	ΔFCE_t		0.009 *(0.19)*		0.028 *(0.53)*		0.061 *(1.22)*	
β_{11}	TF_{t-1}	$\times FC^m \times Bcountry$	–0.014 *(–1.12)*		–0.021 * *(–1.78)*	–0.278	–0.021 * *(–1.81)*	–0.274
β_{31}	ΔTF_t		–0.068 *(–1.09)*		–0.065 *(–1.04)*		0.042 *(0.65)*	
γ_{11}	TAX_{t-1}		0.038 *** *(3.33)*	0.499	0.040 *** *(3.70)*	0.534	0.027 *(2.41)*	0.354
γ_{31}	ΔTAX_t		0.072 *(1.55)*		0.062 *(1.37)*		0.088 * *(1.92)*	
α_{21}	FCE_{t-1}		–0.018 *(–1.30)*	–0.240	–0.017 *(–1.23)*	–0.229	–0.023 *(–1.68)*	–0.311
α_{41}	ΔFCE_t		0.043 *(0.69)*		0.051 *(0.82)*		0.044 *(0.74)*	
β_{21}	TF_{t-1}	$\times(1-FC^m) \times Bcountry$	0.004 *(0.44)*		0.004 *(0.43)*		0.005 *(0.50)*	
β_{41}	ΔTF_t		0.010 *(0.16)*		–0.004 *(–0.07)*		–0.017 *(–0.29)*	
γ_{21}	TAX_{t-1}		0.015 *(1.61)*	0.190	0.013 *(1.49)*	0.180	0.018 * *(1.92)*	0.234
γ_{41}	ΔTAX_t		0.038 *(1.17)*		0.035 *(1.07)*		0.030 *(0.97)*	
N			489		489		489	
$\bar{R}^2$			0.553		0.543		0.542	
Null hypothesis			Test statistics	*p*-value	Test statistics	*p*-value	Test statistics	*p*-value
$\alpha_{10} - \alpha_{20} = 0$			25.98	0.00	1.57	0.21	3.82	0.05
$\gamma_{11} - \gamma_{21} = 0$			1.01	0.32	1.71	0.19	0.02	0.88
$\beta_{11} - \beta_{21} = 0$			2.18	0.14	5.12	0.02	5.49	0.02

Note: see notes to Table 2.

4.5 Are contractions different from expansions?

In the current set up the assessment of asymmetric responses to fiscal policy episodes can be done using the following alternative specification:

$$\Delta C_{it} = c_i + \lambda C_{it-1} + \omega_0 Y_{it-1} + \omega_1 \Delta Y_{it} + \delta_0 Y_{it-1}^{oecd} + \delta_1 \Delta Y_{it}^{oecd} + \quad (4)$$

$$(\alpha_5 FCE_{it-1} + \alpha_6 \Delta FCE_{it} + \beta_5 TF_{it-1} + \beta_6 \Delta TF_{it} + \gamma_5 TAX_{it-1} + \gamma_6 \Delta TAX_{it}) \times (1 - FC_{it}^m) \times (1 - FX_{it}^m)$$
$$+ (\alpha_2 FCE_{it-1} + \alpha_4 \Delta FCE_{it} + \beta_2 TF_{it-1} + \beta_4 \Delta TF_{it} + \gamma_2 TAX_{it-1} + \gamma_4 \Delta TAX_{it}) \times (1 - FC_{it}^m) \times FX_{it}^m$$
$$+ (\alpha_1 FCE_{it-1} + \alpha_3 \Delta FCE_{it} + \beta_1 TF_{it-1} + \beta_3 \Delta TF_{it} + \gamma_1 TAX_{it-1} + \gamma_3 \Delta TAX_{it}) \times FC_{it}^m + \mu_{it}.$$

In equation (4) FC^m is still a dummy variable that controls for the existence of contractionary fiscal episodes. Therefore, as before, FC^m assumes the following values: $FC^m = 1$ when there is a contractionary fiscal episode and $FE^m = 0$ when such episode does not occur. On the other hand, FX^m is a dummy variable that controls for the existence of expansionary fiscal episodes. FX^m assumes the following values: $FX^m = 1$ when there is an expansionary fiscal episode and $FX^m = 0$ when such episode does not occur.

The estimation results for (4) are reported in Table 6. For the case where a fiscal consolidation occurs the results are naturally virtually identical to what was reported before in Table 2. When a fiscal expansion episode takes place one can notice that the long-run effect of taxes on private consumption is still positive (non-Keynesian) even if less statistically significant, which in the end does not seem to support the idea of asymmetric consumer behaviour (γ_2).

Interestingly, in the absence of fiscal episodes, the long-run effect of taxes is also present (γ_5), while the negative long-run impact of general government final consumption expenditure on private consumption also holds true, even if now only statistically significant for the third strategy of determination of fiscal episodes (α_5 in column III).

Again, specification (4) was estimated only for the post-Maastricht period and the results are presented in Table 7. Overall, for this sub-period, there is more statistical evidence of effects of fiscal components on private consumption than for the entire time sample. Once more, when a fiscal consolidation takes place, the results are similar to the ones reported in Table 3, with social transfers depicting a negative long-run effect on private consumption (β_1) and taxes having a positive long-run effect (γ_1).

In the presence of fiscal expansions, broadly similar effects on private consumption can be observed, as when a fiscal consolidation occurs. Eventually, one could notice that when a fiscal expansion takes place the magnitude of the short-run effects of taxes on private consumption is somewhat bigger than in the absence of fiscal episodes ($\gamma_4 > \gamma_6$), and also that the long-run effects are not statistically significant in the case of a fiscal contraction (γ_3). Nevertheless, overall one has to

Table 6

Estimate Results of Fixed Effects for Specification (4), 1970-2005

			FE[1] (I)	*lr*	FE[2] (II)	*lr*	FE[3] (III)	*lr*
λ	C_{t-1}		–0.073 ***		–0.070 ***		–0.070 ***	
			(–4.35)		*(–4.20)*		*(–4.23)*	
ω_0	Y_{t-1}		0.070 ***	0.961	0.066 ***	0.949	0.065 ***	0.925
			(4.42)		*(4.23)*		*(4.15)*	
ω_1	ΔY_t		0.689 ***		0.681 ***		0.675 ***	
			(14.37)		*(13.89)*		*(14.04)*	
δ_0	Y_{t-1}^{oecd}		0.004		0.004		0.004	
			(0.65)		*(0.69)*		*(0.76)*	
δ_1	ΔY_t^{oecd}		0.042 ***		0.040 ***		0.037 **	
			(2.59)		*(2.50)*		*(2.31)*	
α_5	FCE_{t-1}	$\times(1-FC^m)$ $\times(1-FX^m)$	–0.015	–0.198	–0.015	–0.207	–0.017 *	–0.233
			(–1.41)		*(–1.53)*		*(–1.74)*	
α_6	ΔFCE_t		0.036		0.039		0.037	
			(1.14)		*(1.17)*		*(1.18)*	
β_5	TF_{t-1}		–0.005		–0.006		–0.005	
			(–0.60)		*(–0.67)*		*(–0.63)*	
β_6	ΔTF_t		0.020		0.022		0.020	
			(0.86)		*(0.92)*		*(0.87)*	
γ_5	TAX_{t-1}		0.014 *	0.184	0.015 *	0.202	0.017 **	0.226
			(1.72)		*(1.82)*		*(2.06)*	
γ_6	ΔTAX_t		–0.006		0.005		0.005	
			(–0.23)		*(0.19)*		*(0.20)*	
α_2	FCE_{t-1}	$\times(1-FC^m)$ $\times FX^m$	–0.025		–0.024		–0.036	
			(–0.96)		*(–1.00)*		*(–1.42)*	
α_4	ΔFCE_t		–0.072		–0.069		–0.126 *	
			(–0.97)		*(–1.05)*		*(–1.78)*	
β_2	TF_{t-1}		–0.015		–0.012		–0.017	
			(–1.01)		*(–0.89)*		*(–1.16)*	
β_4	ΔTF_t		0.033		0.011		–0.024	
			(0.63)		*(0.21)*		*(–0.39)*	
γ_2	TAX_{t-1}		0.032 *	0.438	0.030 *	0.404	0.047 **	0.641
			(1.67)		*(1.80)*		*(2.52)*	
γ_4	ΔTAX_t		0.009		0.010		0.030	
			(0.15)		*(0.17)*		*(0.45)*	
α_1	FCE_{t-1}	$\times FC^m$	–0.030 **	–0.409	–0.026 *	–0.359	–0.020	–0.273
			(–2.09)		*(–1.74)*		*(–1.31)*	
α_3	ΔFCE_t		0.001		0.026		0.017	
			(0.02)		*(0.48)*		*(0.32)*	
β_1	TF_{t-1}		–0.008		–0.014		–0.013	
			(–0.72)		*(–1.20)*		*(–1.13)*	
β_3	ΔTF_t		–0.014		–0.004		0.017	
			(–0.22)		*(–0.05)*		*(0.22)*	
γ_1	TAX_{t-1}		0.030 **	0.406	0.033 ***	0.445	0.027 **	0.375
			(2.50)		*(2.66)*		*(2.14)*	
γ_3	ΔTAX_t		0.073 *		0.025		0.030	
			(1.65)		*(0.52)*		*(0.57)*	
N			505		505		505	
$\bar{R}^2$			0.549		0.547		0.550	

Notes: The *t*-statistics are in parentheses. *, **, *** indicate values statistically significant at the 10, 5, and 1 per cent level respectively. The data sample includes yearly observations for the EU15 countries over the period 1970-2005. *lr* is the long-run elasticity of private consumption with respect to the relevant explanatory variables. FC^1, FX^1: measure used by Giavazzi and Pagano (1996); FC^2, FX^2: measure used by Alesina and Ardagna (1998); FC^3, FX^3: measure based on the method proposed in (1).

conclude that this evidence does not seem to give much support to the hypothesis of asymmetric effects of fiscal episodes.

Still from Table 7, one can see that in the absence of fiscal episodes, general government final consumption has mostly no impact on private consumption. On the other hand, negative long-run effects can be detected both for social transfers (β_5) and for taxes (γ_5), while the short-run effect in the case of taxes (γ_6) is also statistically significant and negative. Such effects were essentially absent when the entire time sample was considered, which could imply some differences in the public perception of fiscal policy in the post-Maastricht period.

5 Conclusions

In this paper I assessed whether expansionary fiscal consolidation in the European Union can be considered part of conventional wisdom. In other words, the paper searches for possible evidence of so-called non-Keynesian effects of fiscal policy, and this was done via panel specifications of private consumption.

Fiscal episodes, expansions and contractions, for the EU-15 countries over the period 1970 to 2005, were determined using the first difference of the primary structural budget balance as the relevant indicator, together with three alternative strategies. The first one was used by Giavazzi and Pagano (1996), and the second was used by Alesina and Ardagna (1998). The third one, proposed in this paper, assumes that a fiscal episode occurs when either the change in the primary cyclically-adjusted balance is at least one and a half times the standard deviation of the overall sample in one year, or when the change in the primary cyclically-adjusted balance is at least one standard deviation on average in the last two years.

The estimation results, using a fixed effects panel data strategy show that the long-run elasticity of private consumption with respect to general government final consumption is negative, which indicates that a reduction of government consumption increases private consumption in the long-run. The magnitude of such long-run elasticity is higher when a fiscal consolidation episode occurs.

On the other hand, the results seem to indicate that a tax raise, together with a fiscal consolidation episode, could have a positive long-run effect on private consumption. Furthermore, increases of general government final consumption net of taxes negatively impinge on private consumption in the long-run. Put in other words, given an increase in government final consumption net of taxes, consumers may behave in a Ricardian way by presuming the need for future higher taxes.

The long-run elasticity of social transfers is statistically significant and negative, regardless of the existence of fiscal consolidation episodes, but only for the post-Maastricht period. This negative effect on private consumption could be interpreted as an indication of a substitution effect, if the government replaces

Table 7

Fixed Effects' Estimation Results for Specification (4), 1992-2005

			FE[1] (I)	*lr*	FE[2] (II)	*lr*	FE[3] (III)	*lr*
λ	C_{t-1}		–0.218 *** *(–3.41)*		–0.233 *** *(–3.58)*		–0.238 *** *(–3.83)*	
ω_0	Y_{t-1}		0.147 *** *(2.95)*	0.675	0.156 *** *(3.22)*	0.668	0.161 *** *(3.35)*	0.674
ω_1	ΔY_t		0.549 *** *(6.59)*		0.590 *** *(7.49)*		0.562 *** *(7.11)*	
δ_0	Y_{t-1}^{oecd}		0.058 ** *(2.07)*		0.053 * *(1.88)*		0.057 ** *(2.03)*	
δ_1	ΔY_t^{oecd}		0.042 *(1.27)*		0.043 *(1.20)*		0.044 *(1.29)*	
α_5	FCE_{t-1}		–0.048 * *(–1.72)*	–0.222	–0.039 *(–1.48)*		–0.044 *(–1.64)*	
α_6	ΔFCE_t		–0.010 *(–0.16)*		–0.028 *(–0.45)*		–0.026 *(–0.47)*	
β_5	TF_{t-1}	$\times(1-FC^m)$ $\times(1-FX^m)$	–0.056 *** *(–3.39)*	–0.256	–0.058 *** *(–3.63)*	–0.265	–0.056 *** *(–3.65)*	–0.259
β_6	ΔTF_t		–0.009 *(–0.20)*		–0.025 *(–0.57)*		–0.024 *(–0.56)*	
γ_5	TAX_{t-1}		0.106 *** *(3.48)*	0.489	0.104 *** *(3.45)*	0.477	0.106 *** *(3.58)*	0.488
γ_6	ΔTAX_t		0.107 *** *(2.72)*		0.093 ** *(2.35)*		0.100 *** *(2.73)*	
α_2	FCE_{t-1}		–0.078 * *(–1.74)*	–0.358	–0.028 *(–0.71)*		–0.084 * *(–2.03)*	–0.384
α_4	ΔFCE_t		–0.157 *(–1.61)*		0.029 *(0.28)*		–0.276 ** *(–2.55)*	
β_2	TF_{t-1}	$\times(1-FC^m)$ $\times FX^m$	–0.061 *** *(–2.67)*	–0.278	–0.050 ** *(–2.15)*	–0.230	–0.074 *** *(–2.92)*	–0.341
β_4	ΔTF_t		–0.077 *(–0.67)*		0.072 *(0.83)*		–0.228 ** *(–2.17)*	
γ_2	TAX_{t-1}		0.140 *** *(3.08)*	0.646	0.104 *** *(3.45)*	0.477	0.164 *** *(4.32)*	0.755
γ_4	ΔTAX_t		0.154 * *(1.79)*		0.183 ** *(2.23)*		0.315 *** *(3.78)*	
α_1	FCE_{t-1}		–0.033 *(–1.14)*		–0.032 *(–1.15)*		–0.031 *(–1.10)*	
α_3	ΔFCE_t		0.035 *(0.71)*		0.041 *(0.77)*		0.044 *(0.75)*	
β_1	TF_{t-1}	$\times FC^m$	–0.069 *** *(–3.51)*	–0.316	–0.057 *** *(–2.95)*	–0.260	–0.060 *** *(–3.25)*	–0.274
β_3	ΔTF_t		0.003 *(0.04)*		0.081 *(1.08)*		0.087 *(1.10)*	
γ_1	TAX_{t-1}		0.104 *** *(3.25)*	0.477	0.097 *** *(3.21)*	0.477	0.098 *** *(3.25)*	0.452
γ_3	ΔTAX_t		0.023 *(0.41)*		0.018 *(0.31)*		0.026 *(0.44)*	
N			206		206		206	
$\bar{R}^2$			0.611		0.612		0.625	
Null hypothesis			Test statistics	*p*-value	Test statistics	*p*-value	Test statistics	*p*-value
$\gamma_6 - \gamma_4 = 0$			0.29	0.59	1.03	0.31	6.85	0.01
$\gamma_4 - \gamma_3 = 0$			0.34	0.56	1.10	0.30	7.55	0.01

Note: see notes to Table 6.

consumers in paying for, say, some health items, or as a non-Keynesian effect with consumers anticipating future higher taxes to finance the current social transfers.

Interacting debt threshold variables with the fiscal consolidation episodes dummies, gives additional information regarding whether the existence of a higher or a lower level of public indebtedness in the previous period makes a difference for private consumption decisions. For instance, the short-run effect on private consumption of social transfers is positive and statistically significant when there are no fiscal consolidation episodes and when the debt-to-GDP ratio is below the defined threshold (the cross-country year average). On the other hand, in the presence of a fiscal consolidation episode and if the previous period debt-to-GDP ratio was already above the debt ratio threshold, social transfers have a negative (non-Keynesian) long-run effect on private consumption. The same is true for the long-run effect of social transfers. Additionally, the possibility of asymmetric effects of fiscal episodes does not seem to be corroborated by the results.

Overall, the results obtained for the EU15 for the period 1970-2005 seem to hint to the existence of some possible Ricardian behaviour from consumers when a fiscal consolidation event takes place. However, one must be cautious to welcome into conventional wisdom the idea of expansionary fiscal consolidations. Specific country analysis, outside the scope of this paper, could provide additional insight into the possibility of such theoretical reasoning. Moreover, it is far from clear whether one can use the positive expansionary fiscal consolidations experiences that occurred in the past in a few countries as a rational for similar policy prescriptions in other EU countries.

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ASSESSING OVERALL FISCAL EFFORT IN ECA, 1995-2004

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This paper[1] *uses the method of measuring tax capacity and tax effort to analyze how well ECA countries*[2] *are utilizing their tax capacities, relative to the average performance across countries. Among the variables that have been identified to be determinants of tax shares are: (i) tax evasion, and (ii) control of corruption, although they are found to be less important than conventional factors. The tax effort indices obtained show that generally the ECA countries are making better use of their tax bases to increase revenue than countries from Latin America or East Asia. However, there are substantial variations in tax effort among ECA countries and several countries have the potential to increase revenues via making better use of their tax bases (increased tax effort), and improving the quality of their institutions. Our results can be used to provide guidance on the proper mix of fiscal policy in the event of budgetary imbalance or growing debt burdens.*

Introduction

The assessment of tax performance and the international tax comparisons might be used to see whether a given country could achieve the level of taxation required to attain government targets without seriously "burdening" the economy (Bird, 2006). In this case the levels achieved in other countries may be a sort of a guide to the contribution of tax system to growth. This approach assumes that overly high taxes or badly structured tax system may be associated with higher level of output distortion and hence with lower growth. The need of sustainable fiscal policy brings up another important reason for the considerable attention that has been paid to the measures of tax effort. The tax effort may, for example, be used for judging the potential of taxation for funding public spending increases. High indices would

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[1] The paper is a background note for the World Bank Regional Study ECA Regional Study on Public Finance and Economic Growth (not published yet). The broad goals of the study are (1) to deepen understanding of public finance policies and trends in the Europe and Central Asia (ECA) region, (2) to explore how these policies and trends affect economic growth and poverty reduction in ECA, (3) to benchmark public finance policies and trends in ECA with those of rapidly growing emerging market countries in other regions, and (4) to help ECA countries identify ways to improve the efficiency and enhance the impact on growth of their public finance systems. The study compares fiscal patterns and trends in ECA countries against those in fast-growing economies in other regions. It focuses on 10 ECA countries (Albania, Croatia, Georgia, Kyrgyz Republic, Poland, Romania, Serbia, Slovakia, Turkey, and Ukraine) and 6 comparator countries (Chile, Ireland, Korea, Spain, Thailand and Vietnam). Annex 4 provides the background to the proposed selection of ECA and comparator countries.

[2] Europe and Central Asia (Albania, Armenia, Azerbaijan, Belarus, Bosnia & Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, FYR Macedonia, Georgia, Hungary, Kazakhstan, Kosovo, Kyrgyz Republic, Latvia, Lithuania, Moldova, Poland, Romania, Russian Federation, Serbia and Montenegro, Slovak Republic, Slovenia, Tajikistan, Turkey, Turkmenistan, Ukraine and Uzbekistan).

indicate that taxation as a funding source is already highly burdened and that either other funding sources should be tapped, or spending increases postponed. Countries have very different philosophies about taxation and very different methods of collecting their revenue. Different tax policy choices affect growth differently and a similar argument applies to the way total government expenditure is used.

Tax policy choices also depend on a country's preference as to such public policy goals as attaining a desired distribution of income and wealth and increasing the rate of economic growth. However, regardless of what a particular country may want to do with its tax system, or what it should do with respect to fiscal objective function, it is always constrained by what it can do. The yield of the tax system is a function of the tax bases available (economic structure), the rates applied to these bases, and the capacity to levy taxes effectively. Given these, the success of the authorities in exploiting the tax potential and in attaining the taxation target will depend on the need and desire for government spending, or willingness to tax.

The determinants of tax performance

During the past decade, some ECA countries have increased taxation quite dramatically, while in the other countries tax rates have remained roughly the same. Similarly, tax structure has changed over time. In fact, tax ratios in ECA range from well under 20 percent in a few countries, most of which are middle income – for example, Georgia, Kyrgyz Republic, and Tajikistan – to roughly 40 percent in a few high-income countries in Europe such as Slovenia and Hungary. Surprisingly, some middle income countries (*i.e.* Belarus, Bulgaria, Macedonia, Turkey, Ukraine, and Uzbekistan) also have high ratios. Similarly, some higher-income countries (*i.e.* Korea, Ireland, the United States), had considerably lower tax ratios than others, with Hong Kong being the extreme case in this respect.

Broadly, tax ratios for countries in the Europe and Central Asia Region (ECAvary by income levels. Yet, the "income determinism" of the tax level appears to be lower for the rich countries than for the middle income countries (see Figure 1). Some richer countries (in ECA represented by the Baltic countries) have chosen to levy much lower taxes than others. Thus, the high income countries tax ratios seem to reflect more choice than capacity to tax. For various reasons, many countries seem to exempt from taxes a large share of agricultural activities (see Figure 2).[3] Additionally, tax evasion, which leads to the loss of tax revenue, is becoming of serious concern to ECA countries governments (see Figure 4). The average size of the untaxed economy in ECA countries was 40.5 per cent of GDP in 2002-03, with Georgia, Azerbaijan, Ukraine and Belarus having by far the largest shadow economies. In addition, many ECA countries are characterized by inefficient

[3] For instance, in many developing countries large share of agriculture is normally subsistence, which does not generate sizeable taxable surpluses. On the other hand, in rich countries political reasons dominate. Here the agricultural sector is often taxed in many implicit ways such as; import quotas, tariffs, or controlled prices for output (Bird, 1978; Tanzi, 1992).

Figure 1

Income Level and Tax Revenue

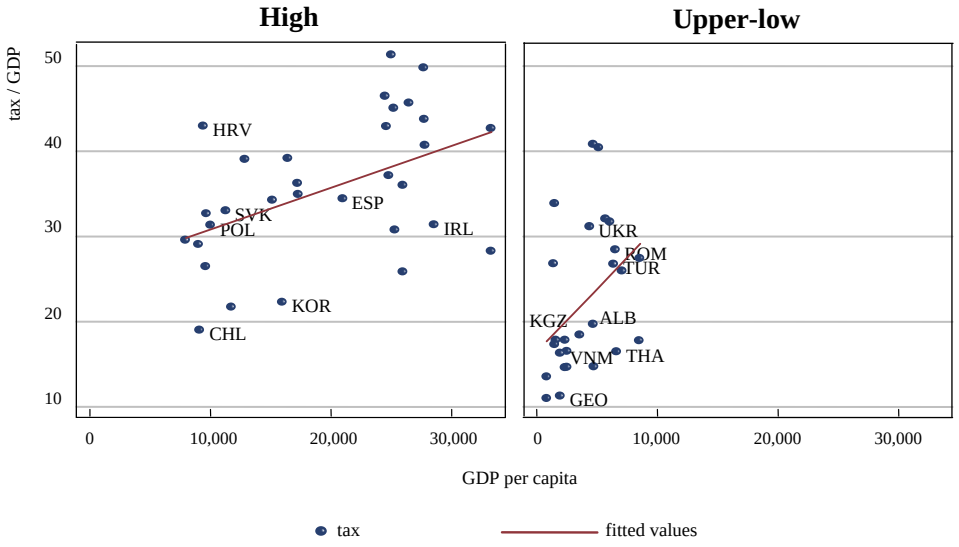
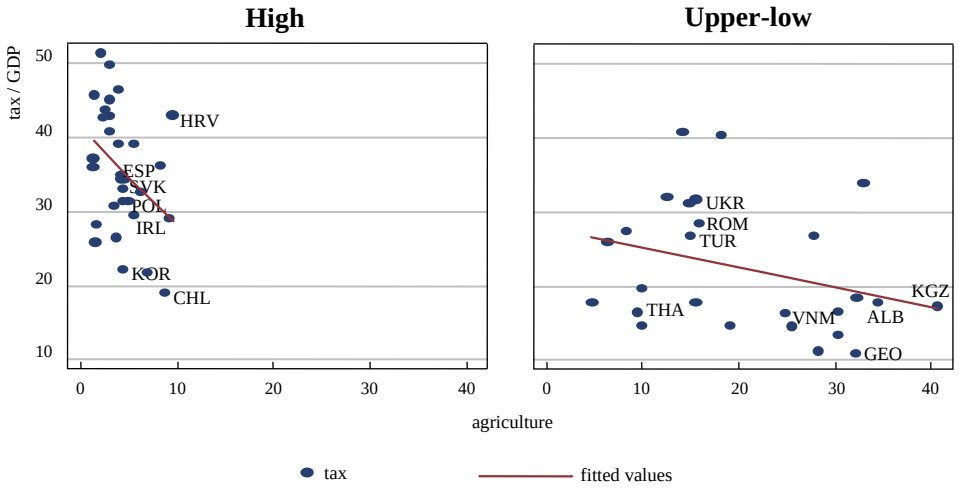


Figure 2

Agriculture and Tax Revenue
(percent of GDP)



Note: The sample size was mainly determined by the availability of information, set of 57 countries was used (including 26 ECA, 6 Non-ECA comparators). Data were averaged over the 10 year period.
Source: World bank database, staff calculations.

Figure 3

Control of Corruption and Tax Revenue

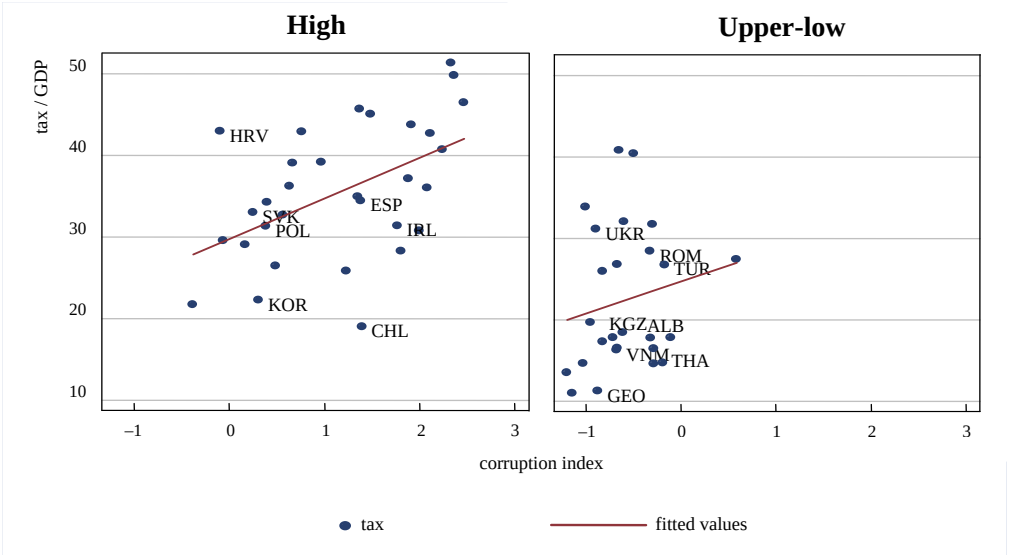
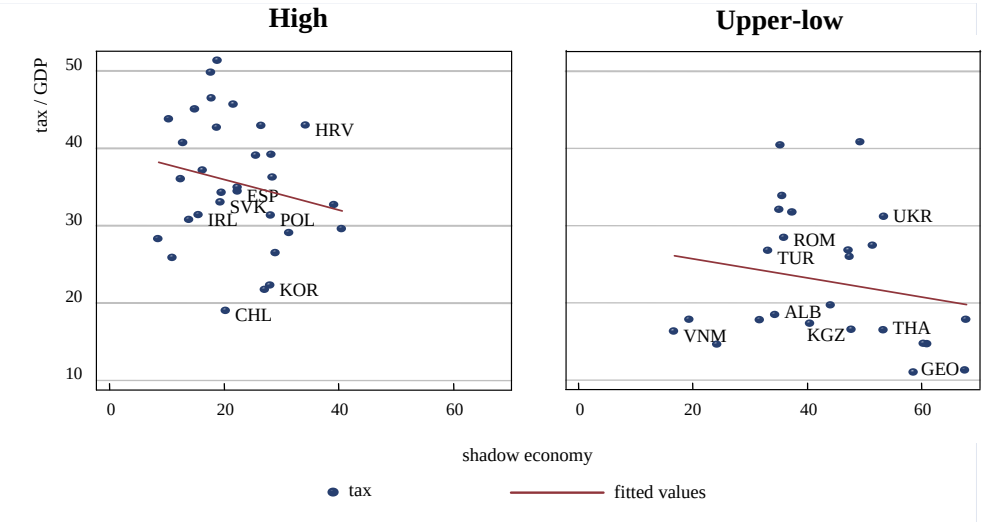


Figure 4

Shadow Economy and Tax Revenue
(percent of GDP)



Note: The sample size was mainly determined by the availability of information, set of 57 countries was used (including 26 ECA, 6 Non-ECA comparators). Data were averaged over the 10 year period.
Source: World bank database, staff calculations.

tax administrations and weak domestic legal and institutional structures, which create opportunities for corruption and impair efforts to raise tax revenues (see Figure 3).

A more formal analysis of the tax performance across ECA countries in the period 1995-2004 confirms that per capita income, the share of agriculture in GDP, and the ratio of trade to GDP, are the most consistent explanatory variables of the tax ratio in the region (see Annex 1).

Regression results prove the greater ease of taxing the profits of industry, than the income from agriculture. Nevertheless, as countries become richer, the importance of manufacturing as a source of tax revenue declines. On top, the agriculture sector is much more difficult to tax for less developed countries. We also find support for Tanzi's hypothesis stating that the larger is the share of agriculture in GDP the lower is the need to spend on governmental activities and services, as many public sector activities are city based. On the contrary to the earlier studies (*i.e.* Teera, 2004) we observe that the trade as a source of revenue is not inversely related to the level of economic development.

In line with common observation we find that the high income countries[4] have a statistically significant higher tax ratio than other countries in our sample. Generally, our findings are robust to the inclusion of additional variables that have been used to model the tax ratio in the literature (inflation, external debt, rural population), while more sophisticated empirical models tend to yield slightly higher elasticities of the key explanatory variables with respect to the tax share.

In addition, improving the quality of institutions (*i.e.* reducing corruption) and public services' provision, which promote formality and willingness to pay taxes, appears to have a positive, albeit statistically insignificant, impact on tax performance. However, this apparent weak relationship may arise from potential endogeneity of regressors (the level of development, the shadow economy, and the quality of institutions). For example, there is a tendency for quality and quantity of public services' provision to be higher at higher levels of per capita GDP. Further, typically the size of the untaxed economy is in part a function of tax policy (*i.e.* in Belarus the high labor taxes discourage formal employment, and create an incentive for a large informal economy).

Presentation and discussion of the results

ECA countries on average have a "good" tax effort[5] (index close to 1.0), collecting very similar tax revenue to those that would be predicted, given its

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4 Above $10,065 GNI per capita (31 countries in our sample).

5 Tax effort is measured by comparing the actual tax ratio of a country with that predicted by using panel regression, equation 2 of Table A.1. An index of one means the country's tax effort is at the expected level, given the structural factors of the country. In other words, the country is using its taxable capacity at level consistent with the average of the other countries in the sample.

economic structure. In terms of tax effort the ECA region looks better than both Latin America and East Asia and Pacific (see Annex 3). However, the aggregate outcome for the whole ECA results from diverse tax performance across countries. Our analysis shows that the high tax effort[6] indices characterize Uzbekistan, Bosnia and Herzegovina, Belarus and Croatia, followed by Macedonia, Moldova and Turkey. In contrast, in Georgia, Tajikistan, and Armenia tax effort index is below 0.8. At the same time, most of the non-ECA comparator countries are in the lower range of the index, *i.e.* below unity.

Intertemporal comparisons of tax effort indices over the period 1995-2004 present that these countries that had a high/medium tax effort index in 1995 experienced a downward trend in their index (excluding Turkey and Moldova), see Figure 6. There was no clear pattern observed within the group of countries with initially low tax effort. Some of them have substantially increased their tax effort in the recent years (*i.e.* Tajikistan, Georgia, Armenia, and Albania) while others have experienced further declines (*i.e.* non-ECA countries Ireland, Japan, Thailand, Vietnam).

The disaggregated model attributes the decline in tax effort indices more to reduction in the direct than indirect tax effort (*i.e.* Slovakia, Poland, Romania, Ireland, Macedonia), with only Hungary and Vietnam being notable exceptions. The tax performance improvement was more balanced, with Tajikistan, Turkey, Georgia, and Armenia relying mainly on indirect tax effort recovery. Differently, the improved tax effort of Armenia and Kazakhstan appears to result mainly from an increase in direct tax effort.

The results for selected 10 ECA countries and 6 comparator countries (reported in Table 1) identify Croatia and Turkey as countries of high tax effort, and Georgia, Thailand, Ireland and Korea as low tax effort countries. For the other countries, most recently their tax effort is not significantly different from one (Spain is a perfect case). Within this group tax effort indices seem to be relatively stable over the 1995-2004, though some countries have either upward (Turkey, Albania) or downward trend (Slovakia, Ireland, Vietnam).

As shown in Figure 7, the tax effort has been on the rise in Turkey due to an increase in indirect tax effort – indicating the tax collection being above the potential – and reached its peak in 2001. Since then, it has trended down slightly, on the back of lower direct tax collection *vis-à-vis* the potential. In contrast, in Albania a rise in tax effort index has trailed better than potential collection of direct taxes. Slovakia, Ireland and Poland have experienced a downward trend in their tax effort index, due to sizeable decline in direct tax effort (with some help from the lower indirect taxation).

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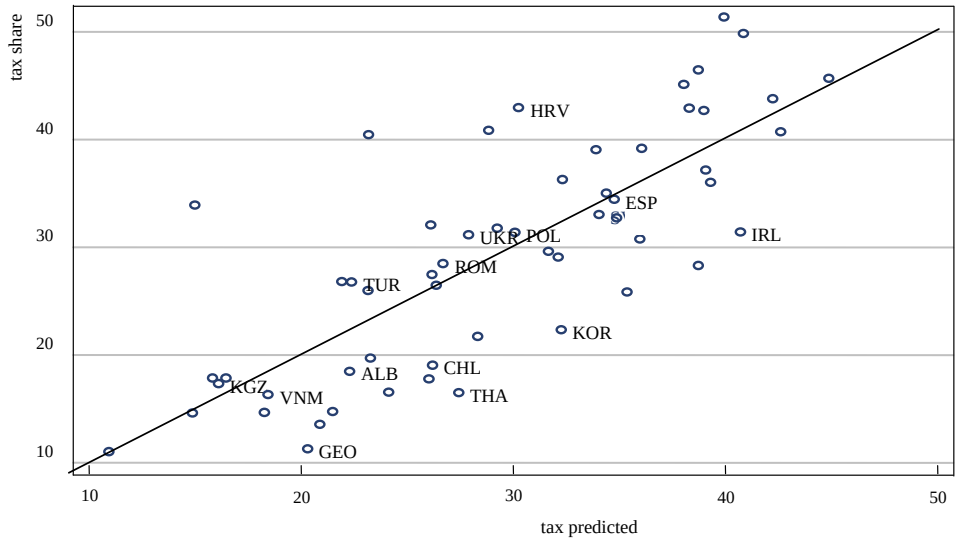
[6] We consider following classification: high index (=> 1.2), medium index (1.1> x >0.9) and low index (<=0.8).

Figure 5

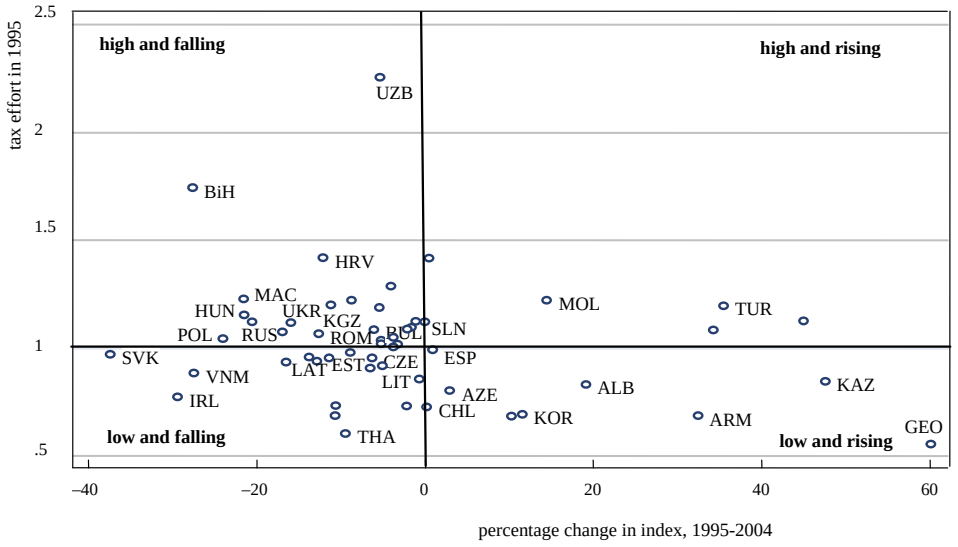
Relationship of Actual Tax Share to Predicted Tax Share, Average 1995-2004



Source: WDI, Staff calculations.

Figure 6

Percentage Change in Tax Effort Index, 1995-2004



Source: Staff calculations.

Table 1

Tax Effort Trends in Selected ECA and Non-ECA Countries

ECA countries	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Albania	0.8	0.6	0.6	0.8	0.8	0.9	0.9	1.0	1.0	n.a.
Croatia	1.6	1.2	1.6	1.5	1.6	1.2	1.5	1.3	1.3	1.4
Georgia	0.3	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	n.a.
Kyrgyz Republic	1.3	1.2	1.1	1.2	1.0	0.9	0.9	1.1	1.1	n.a.
Poland	1.2	1.2	1.1	1.1	1.0	1.0	0.9	1.0	1.0	0.9
Romania	1.1	1.2	1.0	1.1	1.2	1.1	1.0	0.9	1.0	n.a.
Slovak Republic	1.2	1.2	1.1	1.0	1.0	0.9	0.8	0.9	0.8	0.8
Turkey	0.9	1.0	1.1	1.2	1.2	1.3	1.4	1.2	1.3	1.3
Ukraine	1.2	1.3	1.3	1.2	1.1	1.0	1.0	1.1	1.0	1.0
Non-ECA comparators										
Chile	0.7	0.7	0.7	0.7	0.7	n.a.	n.a.	n.a.	n.a.	n.a.
Ireland	0.9	0.9	0.8	0.8	0.8	0.7	0.7	0.6	n.a.	n.a.
Korea	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	n.a.
Spain	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	n.a.
Thailand	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.6	0.6	n.a.
Vietnam	1.1	1.1	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8

Source: Staff calculations.

As for policy implications, care must be taken in the interpretation of the tax effort index. It is dangerous to use such an index to separate the "bad guys" from the "good guys" because understanding of the underlying factors that determine tax effort is complicated. The tax effort index at any given point of time is determined by a complex combination of factors reflecting both abilities (economic, political and institutional) as well as needs (e.g., to smooth output fluctuation, to equalize distribution of income, to service debt). For instance, low tax effort can result from ineffective use of country's potential tax base; weak institutions (e.g., tax administration) but also from a "preference" for a low level of taxation (which is linked to the demand for government services).

Thus, in addition to studying the conventional factors (tax handles), now we turn our attention to the governance and corruption related problems as potential reasons behind poor governments' revenue record. We found some evidence that there might be a relationship between tax performance and institutions or informal/shadow economy[7] (see Figure 9, Annex 1). It seems that in our group of countries weak governance and high corruption influence the tax revenue, possibly through their contribution to tax evasion, improper tax exemptions, and weak tax and customs administration.

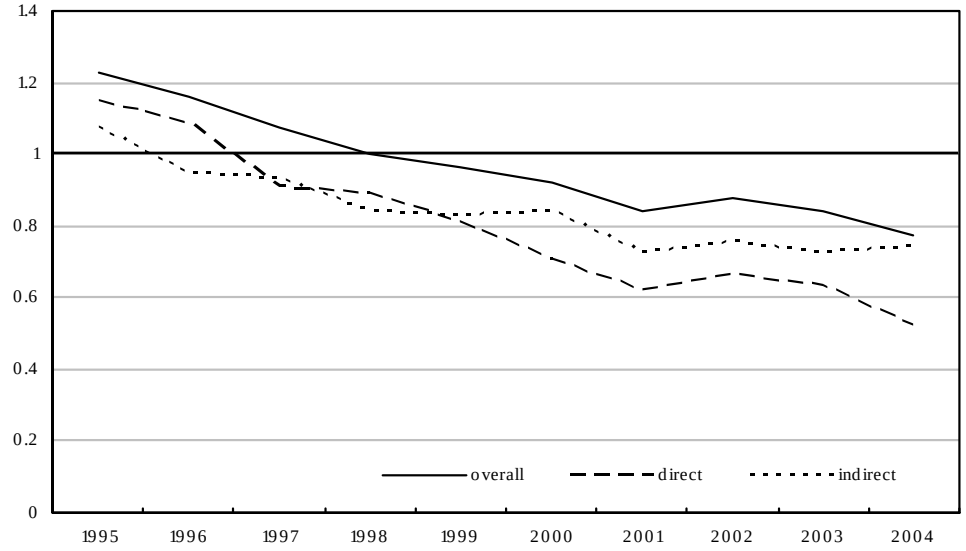
[7] A more formal analysis of the relationship between the institutional variables and tax revenue show that not only do conventional factors matter, but that institutions could also determine tax effort to a some extend, see Annex 1, Table 5).

Figure 7

Trends in Tax Effort Indices – Turkey

Figure 8

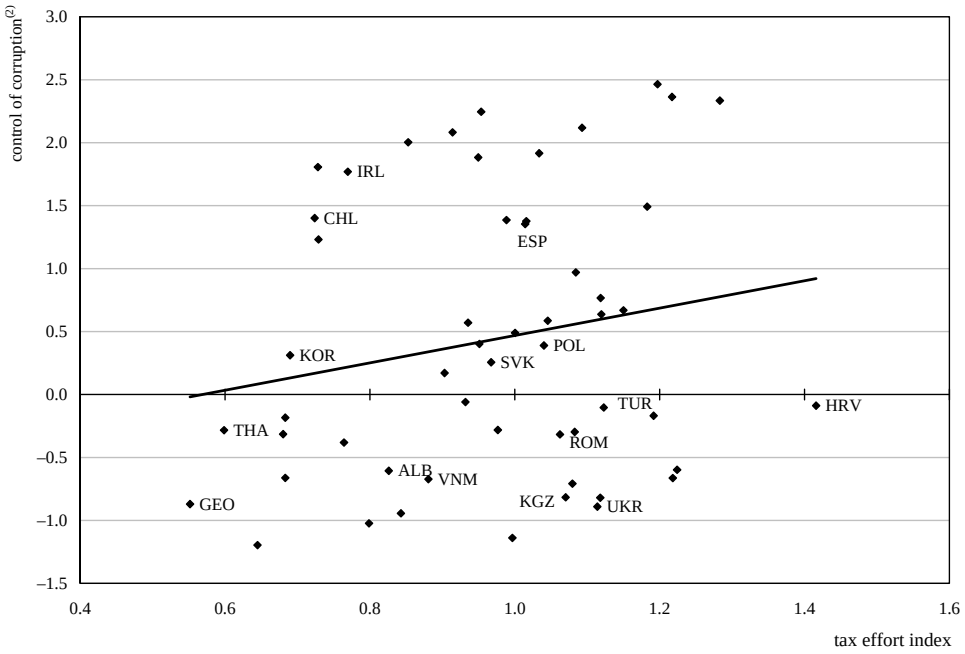
Trends in Tax Effort Indices – Slovakia



Note: For more countries, see Annex 2.
Source: Staff calculations.

Figure 9

Tax Effort and Public Sector Governance Indicators – 57 Countries[1]



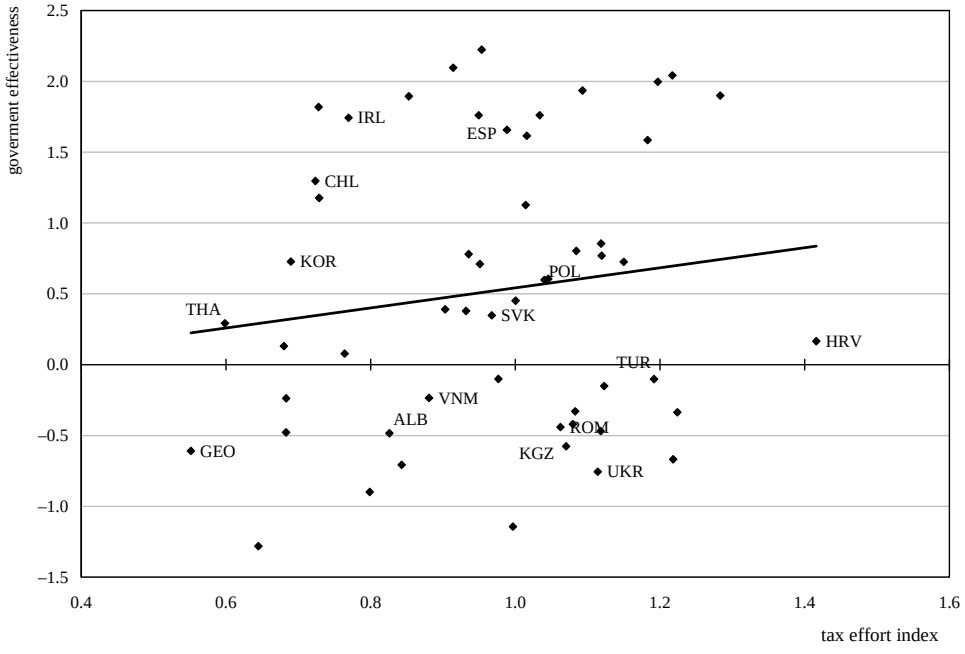
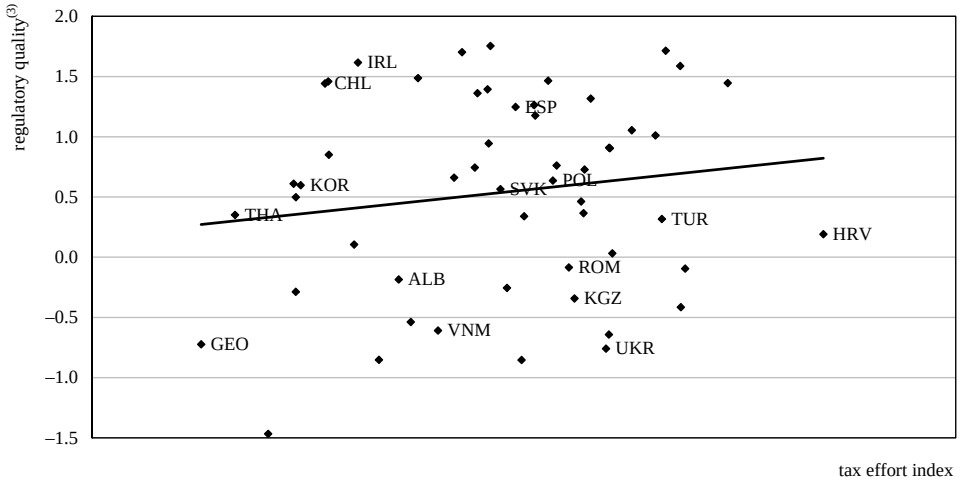
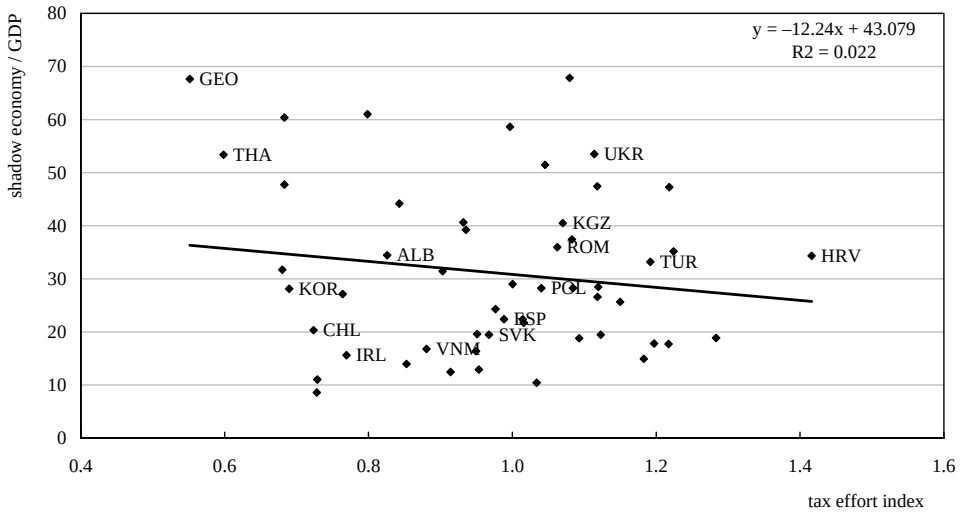


Figure 9 (continued)

Tax Effort and Public Sector Governance Indicators – 57 Countries(1)

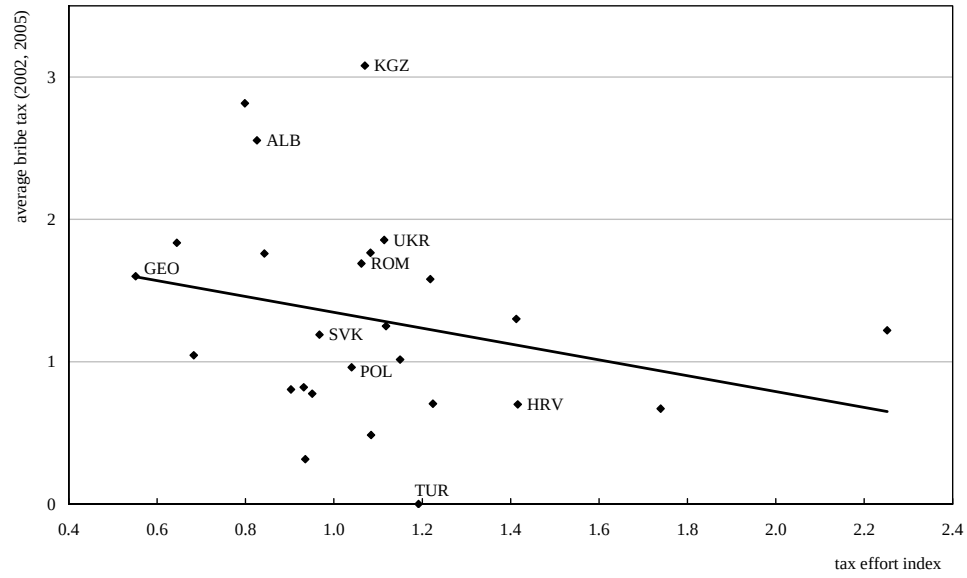


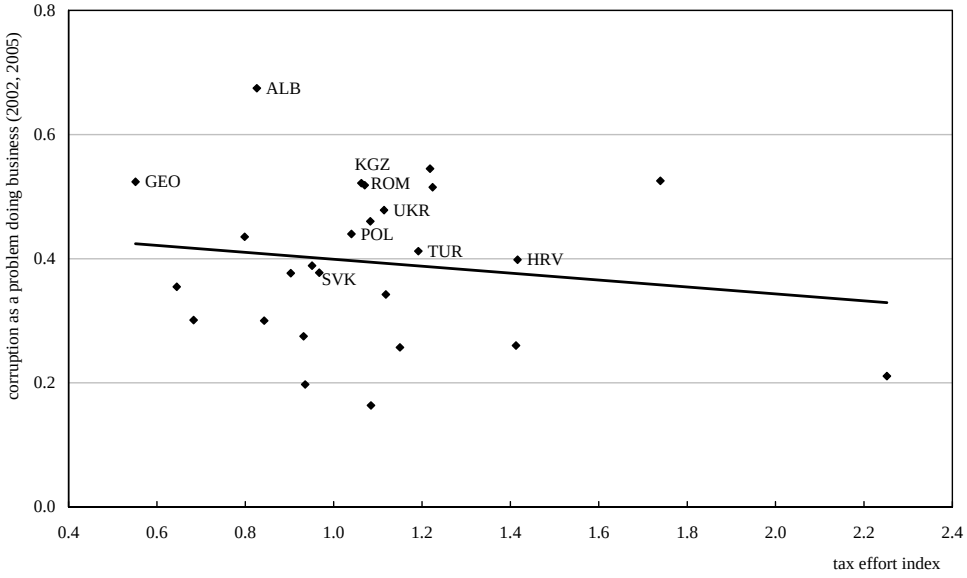


Based on Kaufmann's Governance Indicators, Schneider's estimations of shadow economy.
All data: period average.
Note: Government effectiveness reflects, the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.
(1) Excluding 2 outliers: Uzbekistan and Bosnia-Herzegovina.
(2) "Control of corruption" contains the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.
(3) "Regulatory quality" embraces the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

Figure 10

Tax Effort and Public Sector Governance Indicators – ECA Countries[(1)]

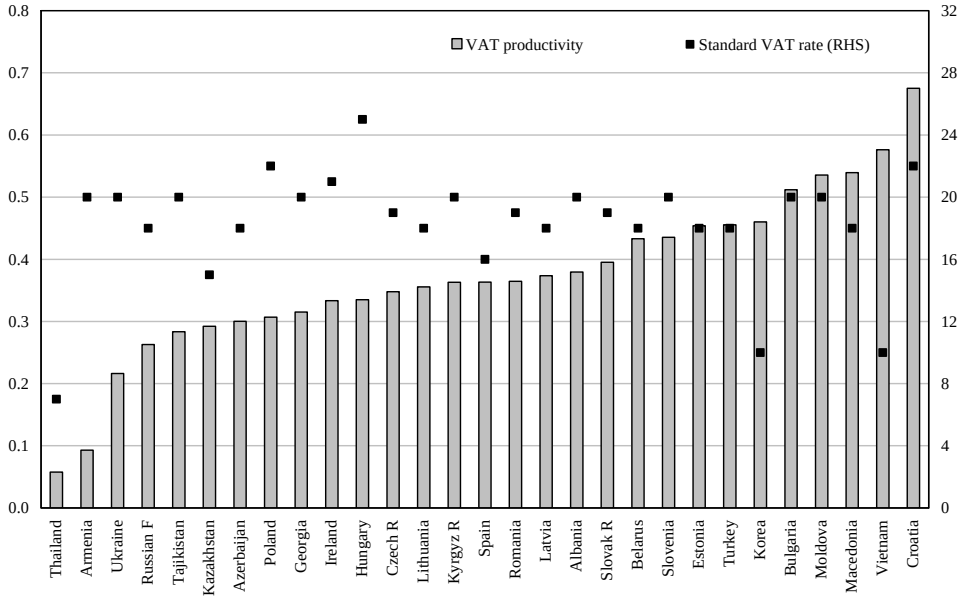




Based on the Business Environment and Enterprise Performance Survey (BEEPS).
All data: period average.
(1) excluding 2 outliers: Uzbekistan and Bosnia-Herzegovina.

Figure 11

VAT Revenue Productivity, 2004



Note: VAT/CIT productivity is defined as VAT/CIT revenue as a share of GDP divided by the standard top rate.
Source: Various, staff calculations.

The basic bivariate results[8] confirm some priors and offer useful insight in setting up a stage for further analytical work. The selected figures in the following pages are informative. The government effectiveness and regulatory quality are seen to be an increasing function of tax effort, which likely reflect the fact that countries with more legitimate, efficient and credible governments tend to have on average higher capacity to ensure tax compliance, and thus exert higher tax effort. Similarly, different measures of corruptions (e.g. a bribe tax, a corruption as a problem of doing business and a control of corruption) seem to support the view that corruption lowers the tax collection. In other words, in a corrupt regime there are a variety of situations in which the government may suffer net revenue loss as an unanticipated outcome of intensified tax effort. A less clear-cut, but still intuitive, negative relationship is seen between shadow economy and tax effort index. It seems that

[8] Results of the bivariate regressions should be interpreted with cautious given a number of problems that are commonly encountered in this type of relationships (e.g. omitted variables bias, outliers).

Table 2

Tax Effort vs Tax Productivity, Average Values, 1995-2004

	High Tax Effort Good Administration	High Tax Effort Bad Administration	Low Tax Effort Good Administration	Low Tax Effort Bad Administration
VAT	Croatia, Macedonia, Moldova, Turkey, Bulgaria, Bielarus	Russia, Kazahstan	Vietnam, Korea, Estonia, Slovakia, Ireland	Tajikistan, Armenia, Thailand
CIT	Belarus, Bulgaria, Croatia, Moldova	Macedonia, Kyrgyz R.	Ireland, Vietnam, Korea, Slovakia, Lithuania	Tajikistan
PIT	Turkey, Croatia, Macedonia	Hungary, Slovenia	Thailand, Korea, Azerbaijan	Armenia, Georgia, Vietnam, Tajikistan

Source: staff calculations.

countries with a large shadow economy (which is a proxy for low tax morale[9] and high tax evasion) collect smaller tax revenue to this that could be predicted given their economic structure.

Another approach to look at institutional quality is to examine effectiveness of tax administration. Historically, many approaches for measuring effectiveness of tax administration have been used (Gallagher 2004). That is why we decided to use "revenue productivity",[10] measure which is the most common and easiest to calculate.

While measuring the effectiveness of tax administration, by comparing statutory tax rates with effective tax yields (*i.e.* using "productivity" indices, see Figure 11, Figure 12, Annex 2) we find either "low tax effort" countries with relatively effective tax administration (the Baltic countries, Ireland, Korea, Slovakia, Vietnam) or weak tax administration (Armenia, Georgia, Tajikistan), see Table 2. For the latter countries, low tax effort may become a serious obstacle in their attempts to embrace effective fiscal policy. These countries have the potential to increase tax revenues through making better use of their tax bases (increased tax effort) and strengthening tax administration (by strengthening institutional arrangements, technical capacities, etc.). They may want to consider widening the tax base by subjecting previously exempt income to taxation, reducing credits and allowances and, where possible, implementing lower marginal tax rates (to discourage tax avoidance and evasion).

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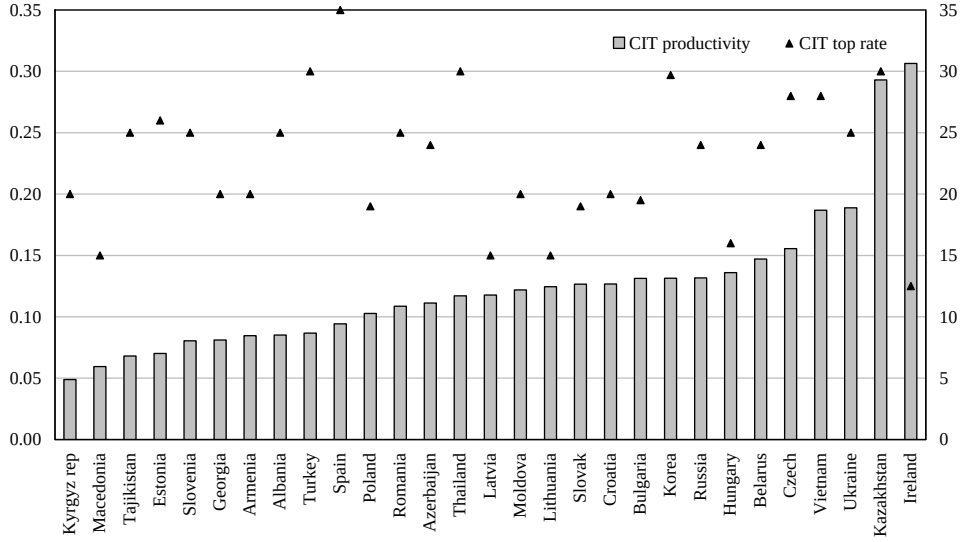
9 The tax morale is usually to be correlated with low tax morale (see, for example, Alm and Torgler, 2004) partly through lower moral cost of tax evasion and otherwise weaker motivation to pay taxes.

10 VAT/CIT productivity rate is merely the ratio of VAT/CIT collections to GDP divided by the nominal VAT rate. PIT productivity measure is calculated by dividing the personal income tax revenue as percent of GDP by the top marginal tax rate, and multiplied by the top income tax bracket value. Measuring PIT productivity is fraught with difficulties stemming from different treatment of capital gains, corporate dividend income, and the levels and types of tax deductions and credits that are available from country to country. Thus we treat it with cautious.

Figure 12

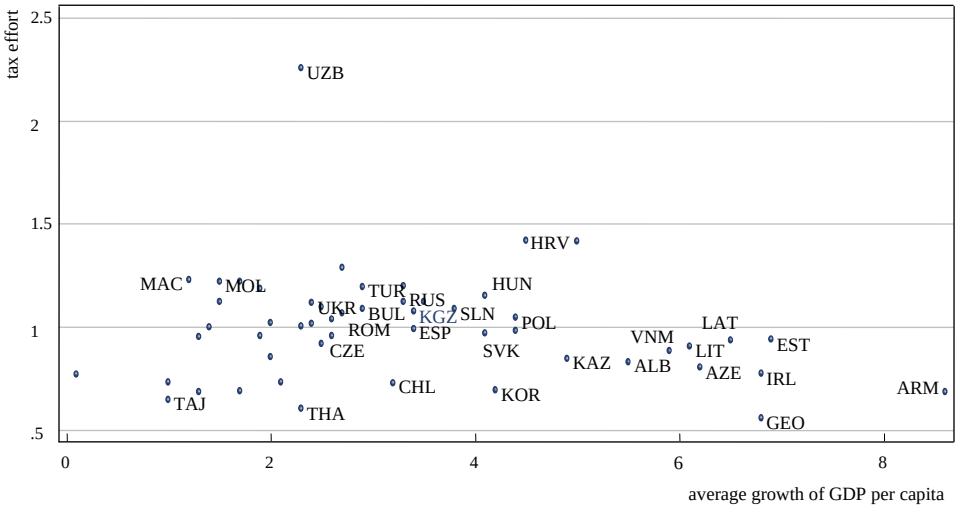
CIT Revenue Productivity, 2004



Note: VAT/CIT productivity is defined as VAT/CIT revenue as a share of GDP divided by the standard top rate.
Source: Various, staff calculations.

Figure 13

Tax Effort Index vs GDP Per Capita Growth, Average Values, 1995-2004



Source: Staff calculations.

Relatively low tax effort in the countries with good tax administration may result from their lower demand for publicly provided goods and services, which could explain why they choose to expand less "tax effort" (as measured by the model) on their potential tax bases, relative to the others.

On the other hand, Bulgaria, Belarus, Croatia, Turkey and Moldova, represent countries with relatively high tax effort and effective tax administration. Given the fact that some of them still have fairly large untaxed sector, our results seem to suggest over-taxation. Thus, these countries may need to consider lowering the taxes, to enhance their growth rates.[11] None of them had an average growth rate higher than 5 per cent in the last decade (see Figure 13). For Russia, Kazakhstan, Kyrgyz Republic, Hungary and Slovenia addressing institutional weaknesses in tax and customs administration may be a viable option to enhance the economy's tax-generating capacity, which may allow for tax/deficit reduction. In these countries, there is also a scope for encouraging tax compliance. In case of Hungary, Macedonia, Slovenia it can be done by reduction in the rates and progressivity of the individual and corporate income tax, which should promote formalization of the grey economy, as well as act on the perception that tax rates are "fair".

The measures of tax effort do have implications for country's economic policy not only in the event of low growth but also may indicate appropriate policy for dealing with a fiscal imbalance. If a country is facing a budget deficit imbalance, and already making the maximum use of its taxable capacity, this would suggest that regaining budget balance (and/or reducing a debt level) would require expenditure rationing rather than tax increases. This is true for several ECA countries, mainly for Turkey, Kyrgyz Republic, Hungary, Croatia, but also for Albania and Poland (see Figure 14, Figure 15). One might conclude that a country with a high tax effort index has little potential for financing additional government spending through taxation as opposed to countries with low tax effort indices.

The non-ECA comparator group reveals a favorable picture in terms of budget position, despite fairly low tax effort. Here again, the low tax effort indices appear to be more a matter of choice than any particular difficulty in rising tax revenue (predominantly, they are characterized by strong institutional structures, and low shadow economy).

As for policy implications, it is important to emphasize that neither a low index of tax effort necessarily indicates that the country should raise taxes nor does a high index indicate that taxes should be lowered. Our findings indicate that such a decision should emerge from a careful consideration of expenditure needs, alternative sources of finance, the effects of the particular taxes that would be changed, and administrative capability.

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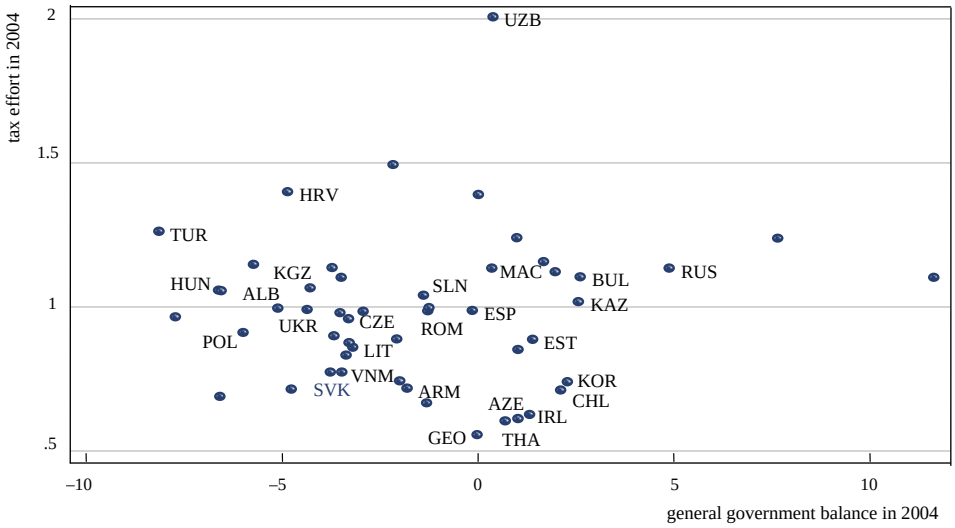
[11] The international empirical evidence on the links between taxes and growth is inconclusive, although some findings seem relatively robust. Many studies found a significant negative relation between aggregate tax-to-GDP ratio and growth although the size of the effect differs considerably (Engen and Skinner, 1996; Cashin, 1995; Fölster and Henrekson, 2001, World Bank, 2006).

Figure 14

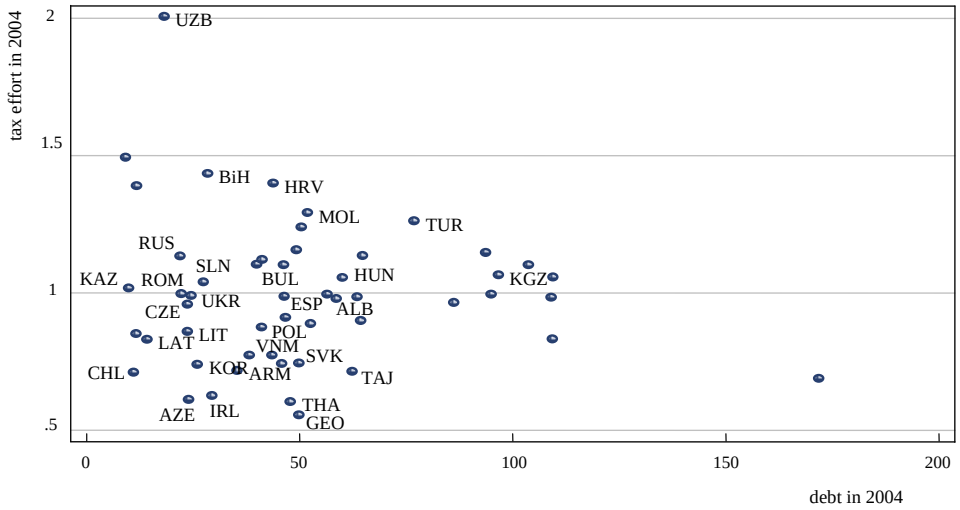
Tax Effort Index in 2004 vs General Government Balance
(percent of GDP)



Source: IMF WEO, staff calculations.

Figure 15

Tax Effort Index in 2004 vs Debt
(percent of GDP)



Source: IMF WEO, staff calculations.

Tentative conclusions

An important finding is that, broadly, the ECA countries now make use of their tax bases that is not out of line with international norms, although for some individual countries the tax effort (at least of that covered by the formal transactions) has stayed small by international standards, while in a few others, it remains excessive.

Looking ahead, therefore, the main fiscal challenge on the revenue side is to improve the efficiency of tax system and make it more growth oriented. Broadening the tax base (by subjecting previously exempt income to taxation and reducing exemptions and allowances) as well as strengthening tax administration, which could allow some further reduction of rates in limited cases, should address this challenge. For countries with relatively effective tax administration and high tax effort lowering the tax rates or changing their structure could be a viable option.

Building technical capacity and institutions to further improve the economic aspects of governance is a must. Stronger institutions can allow countries to sustain relatively lower tax effort index and higher growth rate. While further work may be necessary to determine the exact channels of influence of institutions on tax collection and shadow economic activity – this study helps to provide evidence of the above links and highlight the need for a more ambitious research agenda.

TAX EFFORT: THE ROLE OF INSTITUTIONS

ANNEX 1 – REGRESSION ANALYSIS

Estimation methodology

There has been only limited effort to develop comprehensive tools for assessing tax performance across countries so far. Typically, there are two main approaches used to measure a country's tax effort. In its simplest form comparisons can be based on differences between the effective tax rates and the standard tax yield following the methodology developed in Tanzi (1981), Schaffer and Turley (2000). An alternative is to calculate a tax effort index as a ratio of actual tax share to the predicted (or potential) tax share (regression approach). The predicted tax ratio is determined from regression relating tax shares to various explanatory variables that serves as proxies for tax bases or other factors that might affect country's ability to tax.

Following recent tax effort literature (e.g., Stotsky and WoldeMariam, 1997, Piancastelli, 2001, Eltony and Nagy, 2002, Bird, Martinez-Vazquez and Torgler, 2004, and Hudson and Teere, 2004), we use a stochastic model for estimating tax revenue, where T/Y is the tax ratio and Xi (i = 1....n) represent various independent variables expected to influence the tax ratio, while U is the error term:

$$T/Y = f(Xi \ldots Xn, U)$$

The independent variables employed in the basic model, trailing those used in the most recent literature, are: gross national product per capita, the ratio of trade to GDP (import plus export values over GDP), the share of the mining sector and the agricultural sector in GDP, and population growth (an overview of the variables applied in previous empirical studies is provided in Table 3). The other variables, including external debt; CPI, rural populations etc. are variables which are expected to check robustness of the base results. The role of the time trend is to capture any global trend in taxation.

The analysis uses panel data for 57 developed and developing countries, including 26 ECA and 6 non-ECA comparator countries over the period 1995-2004. The choice of sample is motivated by the need to obtain data set composed of countries with similar characteristics to ECA and comparator countries, as well as data availability. Data were obtained from World Development Indicators, IMF Regional Fiscal Data Set, IMF Country Profile Chapter IV, Schneider and Klinglmair 2003 and the Government Finance Statistics from MOFs in respective countries. A set of 57 countries was taken into account and divided into three groups: 10 in the lower middle income group,[12] 16 in the upper middle income group and 31 in the higher income group,[13] as defined by the World Development Indicators 2004.

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[12] $825-$3,255 GNI per capita.

[13] Above $10,065 GNI per capita (31 countries in our sample).

Table 3

Summary of Selected Previous Studies of Tax Effort

Variable	Piancastelli (2001)	Torgler (2004)	WoldeMariam (1997)	Grigorian (2005)	Teera (2004)	Eltony (2002)
1. Economic development						
GDP per capita	+	+/–	+	+	+/–	+
Population density					+	
Population growth		–				
Urban population				+		
2. Economic structure						
Agriculture, Value added *(percent of GDP)*	–	+	–	–	–	–
Manufacturing, Value added *(percent of GDP)*	+		+		+/–	
Mining, Value added *(percent of GDP)*			–			–
Services, Value added *(percent of GDP)*	+					
3. Openness						
Import *(percent of GDP)*			+/–			+
Export *(percent of GDP)*			+			–
Trade (Export + Import) *(percent of GDP)*	+	–		–	+	
4. Control variables						
External Debt *(percent of GDP)*					–	
Consumer Price Index				–		
Inequality		–				
Aid *(percent of GDP)*					+	
Share of Fuel in total export				+		
5. Institutions						
Shadow economy *(percent of GDP)*		–		–	+/–	
Index governance		+				
Regulation to entry		–				
Composite institutional quality				+		
Tax morale		+/–				
Method of estimation	Fix effect model	OLS	Fix and Random models	Fix effect model	Fixed effects model, Heteroskedasticity-consistent standard errors	Fix effect model

Source: Author's collections.

Empirical results

Table 4

Panel Regression Outcome (Prais-Winsten Estimation), 1995-2004

	EQ1	**EQ2 Base**	**EQ3 Sensitivity**	**EQ4 Sensitivity**	**EQ5 Sensitivity**	**EQ6**	**EQ7**
GDP per capita	.001* *(.000)*	.001* *(.000)*	.001* *(.000)*	.001* *(.000)*	.000* *(.000)*	.001* *(.000)*	.001* *(.000)*
Trade	.059* *(.007)*	.056* *(.006)*	.056* *(.007)*	.051* *(.007)*	.046* *(.010)*	.056* *(.009)*	.025** *(.013)*
Agriculture	–.137* *(.048)*	–.113* *(.046)*	–.112* *(.051)*	–.149* *(.062)*	–.185* *(.049)*	–.104* *(.039)*	–.224* *(.033)*
Manufacturing	.098 *(.064)*					.161* *(.082)*	.222* *(.091)*
Population growth	–1.881* *(.320)*	–1.767* *(.309)*	–1.729* *(.329)*	–1.720* *(.342)*	–1.356* *(.373)*	–1.643* *(.318)*	–1.781* *(.306)*
Dummy lower middle income	–3.368* *(1.232)*	–3.135* *(1.028)*	–1.324* *(1.119)*	–.719* *(1.119)*		–3.249* *(1.161)*	0.734 *(0.100)*
Dummy high income	.438 *(.432)*	1.028* *(.410)*	1.618* *(.248)*	1.691* *(.375)*		1.467* *(.539)*	1.598* *(.518)*
Oil dummy	–5.437* *(1.285)*	–4.742* *(.927)*	–5.356* *(.966)*	–5.147* *(.966)*	–6.863* *(.928)*	–5.410* *(1.320)*	–3.817* *(1.312)*
Trend	–.151 *(.099)*						
Population rural			–.008* *(.001)*	–.008* *(.001)*	–.010* *(.001)*		
CPI				–.039* *(.015)*	–.031* *(.019)*		
External Debt					–.046* *(.012)*		
GDP per capita* Manufacturing						–.00002* *(2.391)*	–.000* *(1.750)*
GDP per capita* Agriculture							.000* *(5.690)*
GDP per capita* Trade							2.740* *(4.150)*
Const.	324.56 *(198.52)*	20.96* *(.867)*	22.26* *(.867)*	25.72* *(1.754)*	29.59* *(2.271)*	17.38* *(1.386)*	16.51* *(1.337)*
No. of observ.	485	509	426	426	282	485	485
R-square	0.59	0.59	0.59	0.60	0.44	0.60	0.63

* significant at 5 per cent level, ** significant at 10 per cent level.
Standard errors reported in brackets.
Note: external debt variable only available for developing countries.

The panel data model uses both time series and cross section data. The model was firstly estimated with both "fixed effects" (using the least squares dummy variable (LSDV) approach) and "random effects" (applying generalized least squares (GLS) approach). The Hausman test consistently rejects the random effects model in favor of the fixed effects model.

However, in the next step the normal distribution of the error term was rejected and diagnostic tests revealed problems of cross-sectional correlation. To deal with the problem of cross-sectional correlation, the Prais-Winsten estimators[14] were employed.

The model performs generally well with estimated coefficients for the explanatory variables in line with the previous findings in the literature (see Table 4). Higher GDP per capita is associated in our results with higher tax ratio. The structure of the economy seems to matter. The tax ratio is negatively related to the share of agriculture in GDP and positively related to the share of manufacturing sector in GDP, but the latter variable proved to be statistically insignificant (equation 1). This reflects, no doubt, the greater ease of taxing the profits of industry than the income from agriculture. The insignificance of manufacturing is somewhat surprising, although it may potentially be explained by a negative correlation with agricultural share or the impact of variables such as manufacturing share is not the same for all countries at all stages of development. Thus we repeat our regression with interactive terms between manufacturing and GDP per capita (equation 6) included. Accordingly, manufacturing has become significant. Moreover, the significantly negative coefficient on the manufacturing-GDP per capita interactive term may mean that as countries become richer so the importance of manufacturing as a source of tax revenue declines. Moreover, the agriculture sector is much more difficult to tax in less developed countries (the significantly positive coefficient on the agriculture-GDP per capita interactive term). A faster rate of population growth leads to a lower tax ratio, while openness is associated with a higher tax effort. Inclusion of dummy variables controls for differences in stage of development in our sample and reveals that the lower middle income countries have statistically significant lower tax ratio than other countries in the sample. On the contrary, we observe that high income countries have a statistically significant higher tax ratio than other countries in our sample.

Moreover, in order to paint a more realistic picture of the country's taxable capacity *vis-à-vis* its natural resource base we included dummy variable[15] for important oil producers countries. The easiness of taxing natural resource extraction is likely to generate more tax revenue than non-fuel activities. The coefficient for oil dummy has the predicted negative signs and is statistically significant in all

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[14] The method is an alternative to feasible generalized last squares for fitting the linear cross-sectional time – series models when disturbances are not assumed to be independent and identically distributed, and it is preferable to the feasible GLS when the number of observations and time span are limited.

[15] OIL dummy takes value of 1 if the share of fuel (and related products) in total merchandize exports exceeds 40 per cent is negative and insignificant.

equations. Finally, the trend variable is generally negative, indicating that ceteris paribus tax ratios are falling, but not statistically (equation 1).

A similar exercise was carried out with respect to the indirect and direct taxes collection across countries.

Robustness test

Including the rural population, inflation and external debt leaves the results unchanged (in terms of the signs and significance). Populations in rural areas and inflation have an expected negative impact on tax ratio. The base variables remain robust, even after inclusion three interactive terms between manufacturing and GDP per capita and also agriculture and the openness variable and GDP per capita (equation 7). For the debt variable, the negative coefficient was also anticipated as according to Tanzi (1989) a high debt burden can create macroeconomic imbalances that may tend to reduce the tax level. That is, servicing of the foreign debt requires a trade account surplus, which in turn may require a reduction in imports.

Modified model: the role of institutional variables

We now turn to the cross section estimates which allowed us to include the institutional (demand) variables such governance indicators (*i.e.* government effectiveness, regulatory quality, corruption) and control for the size of shadow economy.[16] They were not included into panel estimation regression as they do not reveal much variation over time. The explanatory variables follow these employed in the panel model (the basic regression corresponds to the equation 2 from the first table) as regression passed test of the omission variable (suggesting that the functional form is correct) and the test for homoskedasiticy.

The empirical results, presented in Table 5 strongly suggest strongly that the conventional factors play a significant role in the determination of the tax ratio, while the institutions perform less well. Although in some cases (*i.e.* shadow economy, corruption index) coefficients took the right sign, often they were insignificant. The lack of significance of the institution variables may be caused by potential causality between the level of development, the shadow economy, and the governance variables. For example, more affluent countries have usually better quality institutions, and smaller shadow economy (the significantly positive coefficient on the shadow economy-GDP per capita interactive term seems to confirm that observation, EQ4). Moreover, causality may run from taxes to informal sector (high taxes tend to encourage informality). Although, we experimented with

[16] The shadow variable reflects tax evasion.

Table 5

Cross-section Results, Mean Values for Years 1995-2004 for 57 Countries (in Which 26 ECA + 6 Comparators)

	EQ1 Base	**EQ2**	**EQ3**	**EQ4**	**EQ5**	**EQ6**	**EQ4**
GDP per capita	.001* *(.000)*	.001* *(.000)*	.001* *(.000)*	.001** *(.000)*	.001* *(.000)*	.001 *(.000)*	.000 *(.000)*
Trade	.072* *(.032)*	.080* *(.032)*	.086* *(.034)*	.078* *(.034)*	.068* *(.033)*	.068* *(.033)*	.079* *(.035)*
Agriculture	–.118 *(.014)*	–.226** *(.016)*	–.169 *(.143)*	.016 *(.163)*	–.182 *(.152)*	–.168 *(.143)*	–.016 *(.178)*
Population growth	–2.281* *(1.163)*	–1.966* *(1.152)*	–2.188* *(1.172)*	–1.863* *(1.176)*	–2.311* *(1.227)*	–2.440* *(1.167)*	–1.869* *(1.167)*
Shadow economy			***–.069 (.095)***	***–.169** (.103)*			–0.126 *(.113)*
Shadow economy_1					***–.019 (0.226)***		
Corruption						***2.740 (2.337)***	***1.706 (2.401)***
GDP per capita* Agriculture		.001* *(.000)*					.000 *(.000)*
GDP per capita* Shadow				.001* *(.000)*			.001* *(.000)*
Const.	20.39 *(3.975)*	16.21* *(4.525)*	22.63* *(6.560)*	19.62* *(1.386)*	21.23* *(10.66)*	22.85* *(1.386)*	20.24* *(6.572)*
No. of observ.	57	57	56	56	57	57	56
R-square	0.54	0.56	0.54	0.67	0.54	0.58	0.56

* significant at 5 per cent level, ** significant at 10 per cent level.
Standard errors reported in brackets.

instrumental variable approach[17] it did not improved our estimates (EQ 5).

This suggests that considerable caution should be exercised in calculating effects of institution variables on tax performance; further work should seek to identify those magnitudes more reliably.

[17] Following Davoodi (2006) we assumed that the shadow economy is driven mainly by tax burden; quality of institutions and GDP per capita.

ANNEX 2
ADDITIONAL FIGURES

Figure 16

Tax Effort vs Tax Productivity

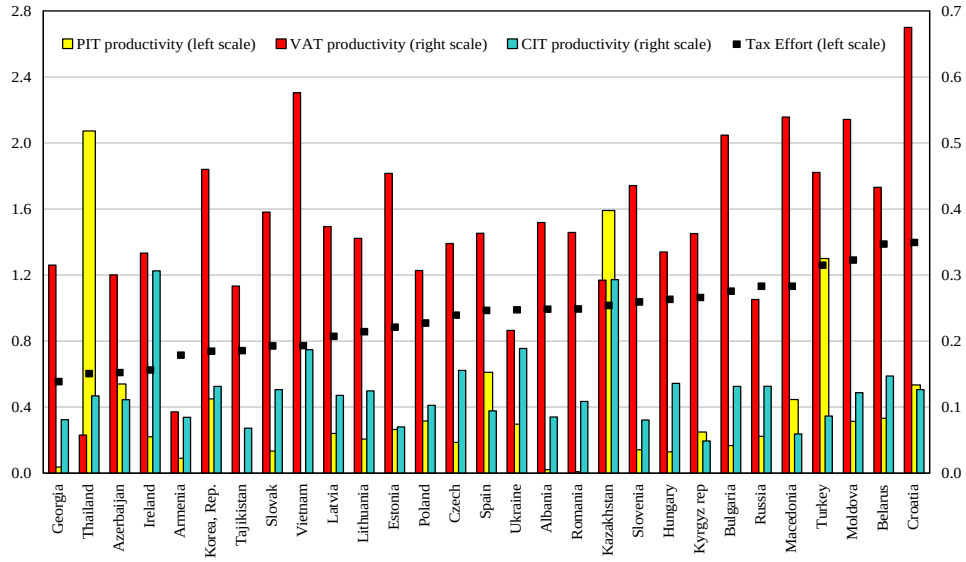


Figure 17

PIT: Marginal Rate and Productivity

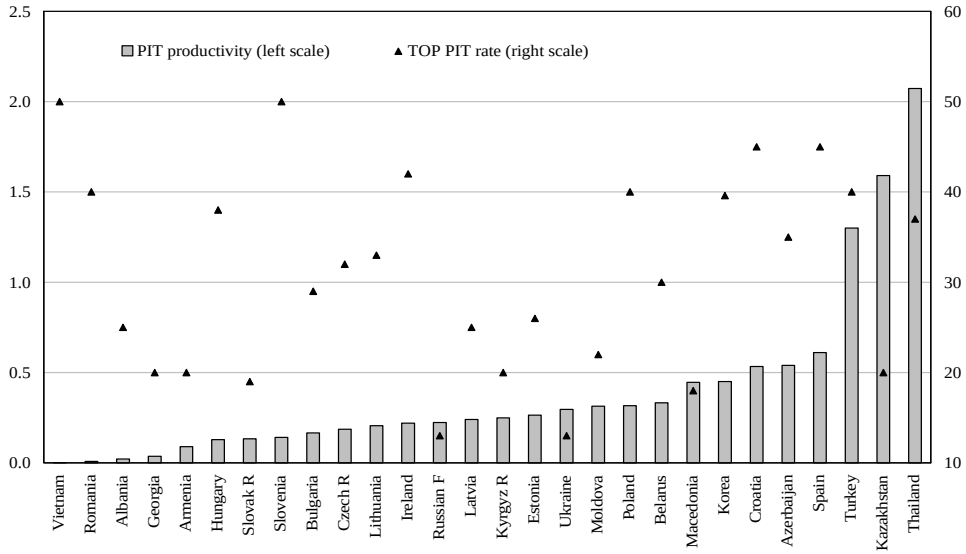
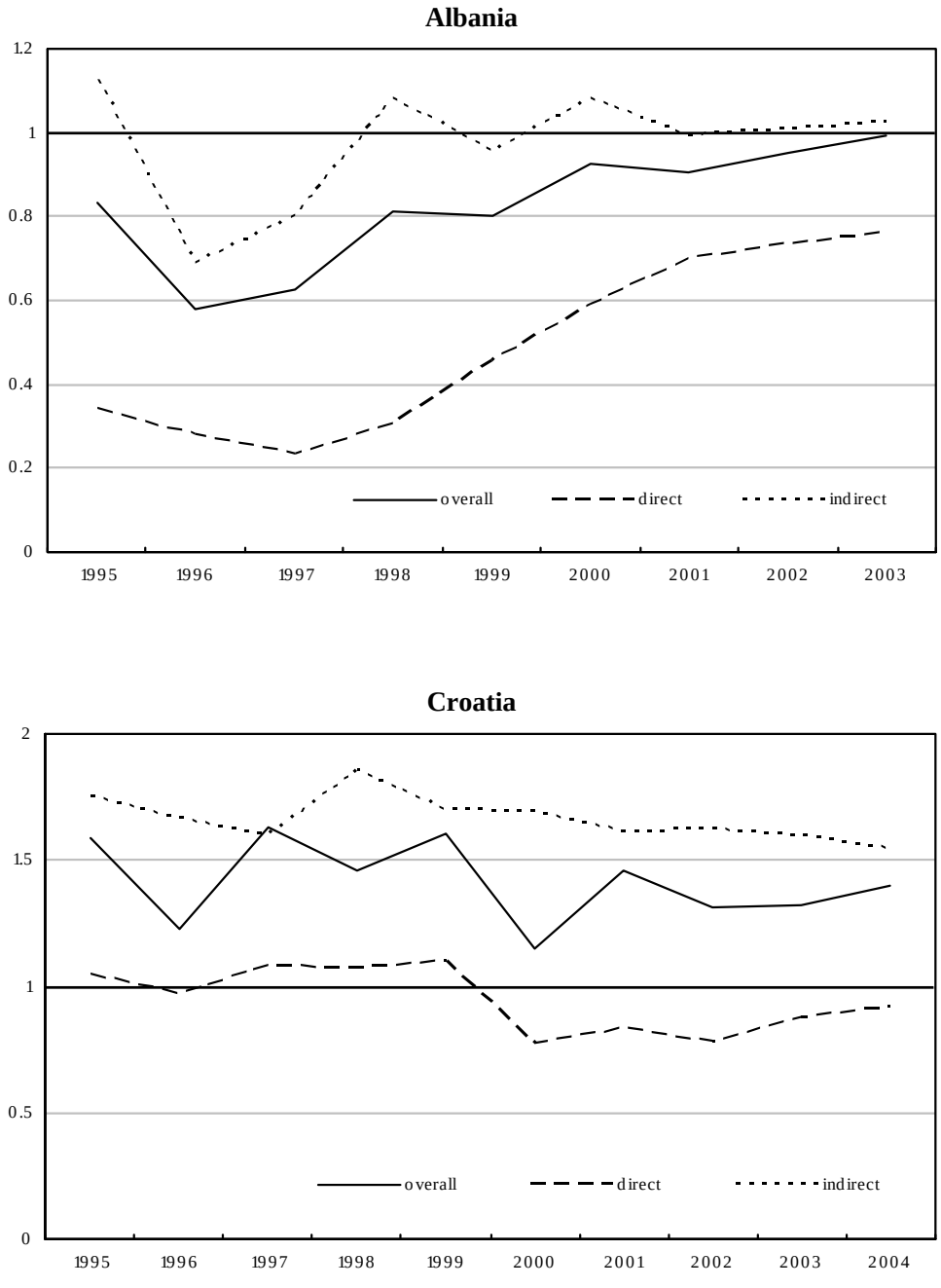


Figure 18

Trends in Tax Effort Indices for Selected ECA and Non-ECA Countries

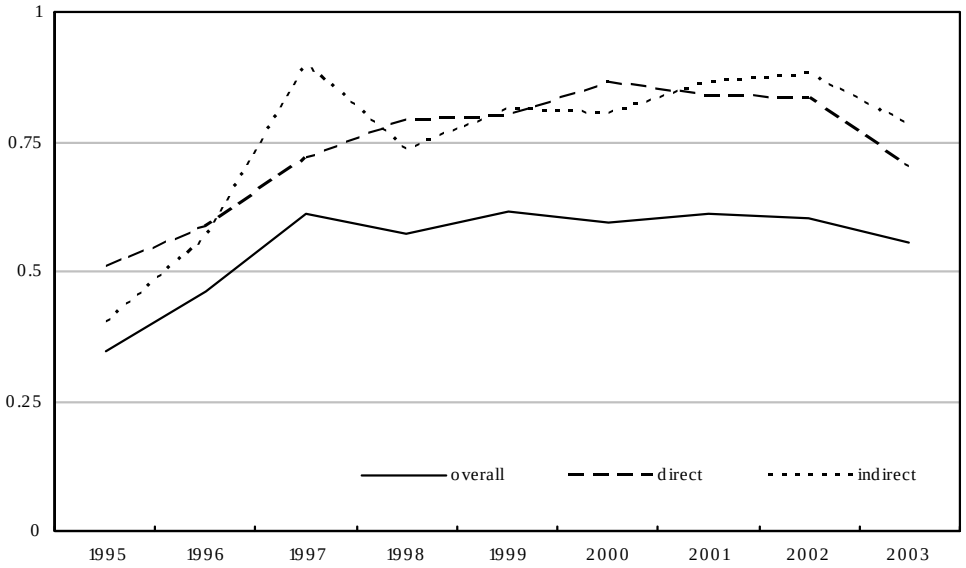


Source: staff calculations.

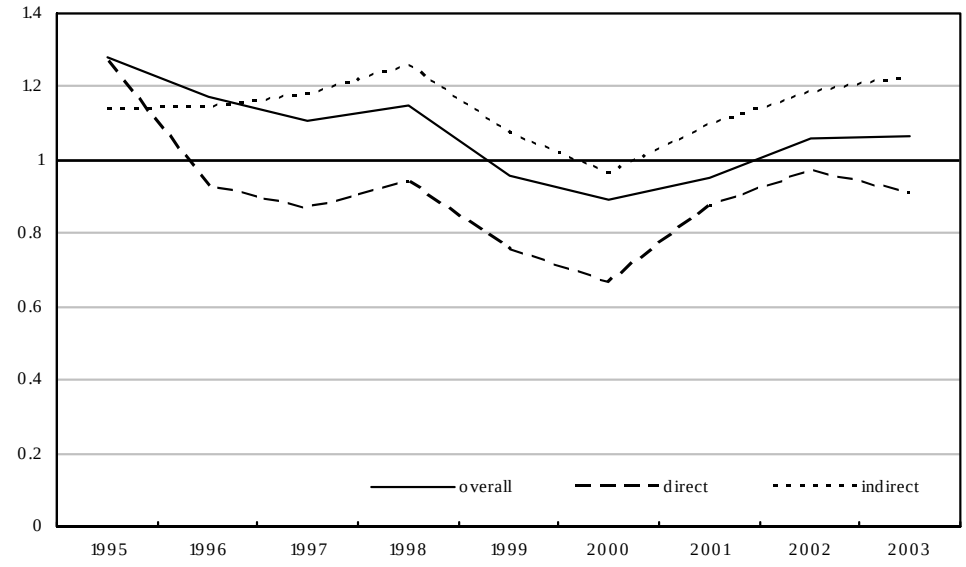
Figure 18 (continued)

Trends in Tax Effort Indices for Selected ECA and Non-ECA Countries

Georgia



Kyrgyz Republic

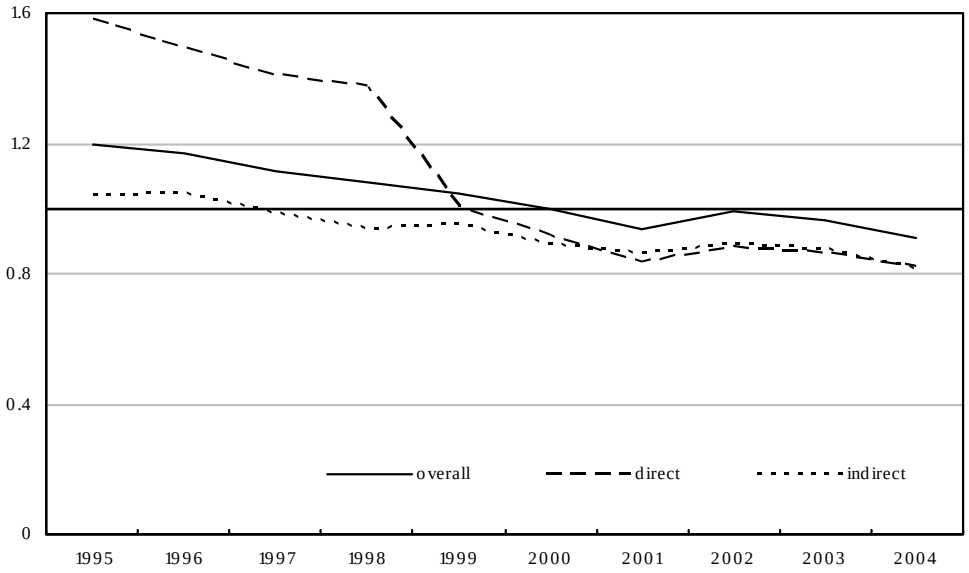


Source: staff calculations.

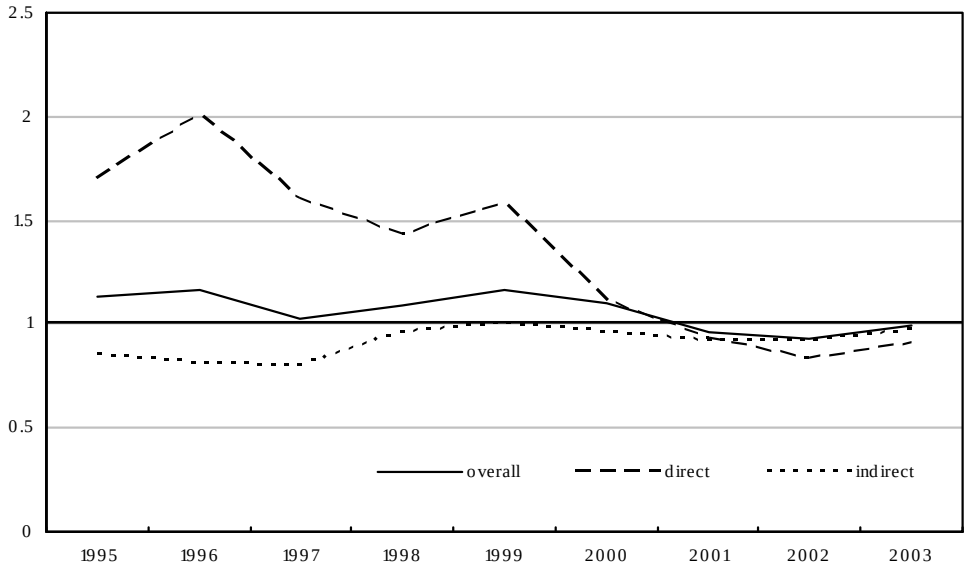
Figure 18 (continued)

Trends in Tax Effort Indices for Selected ECA and Non-ECA Countries

Poland



Romania

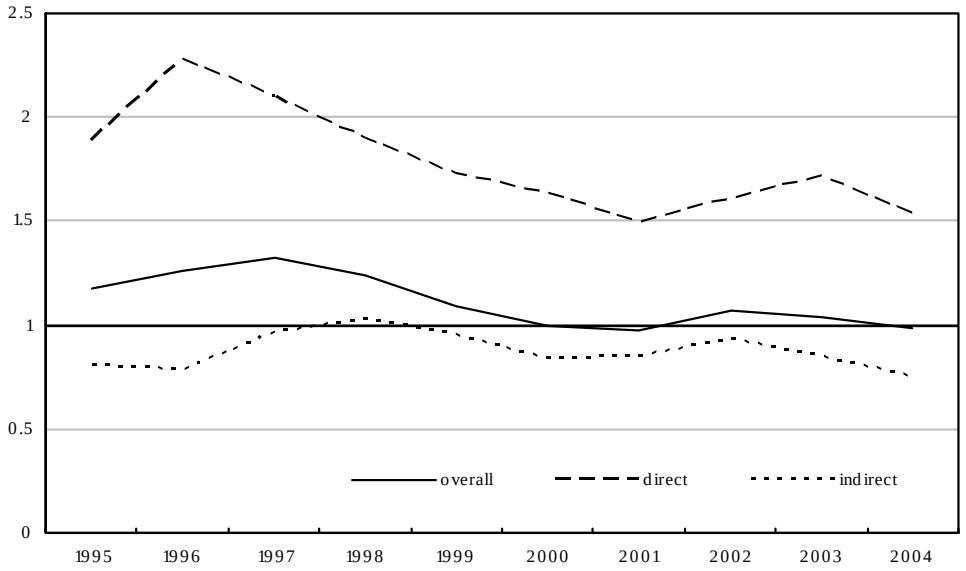


Source: staff calculations.

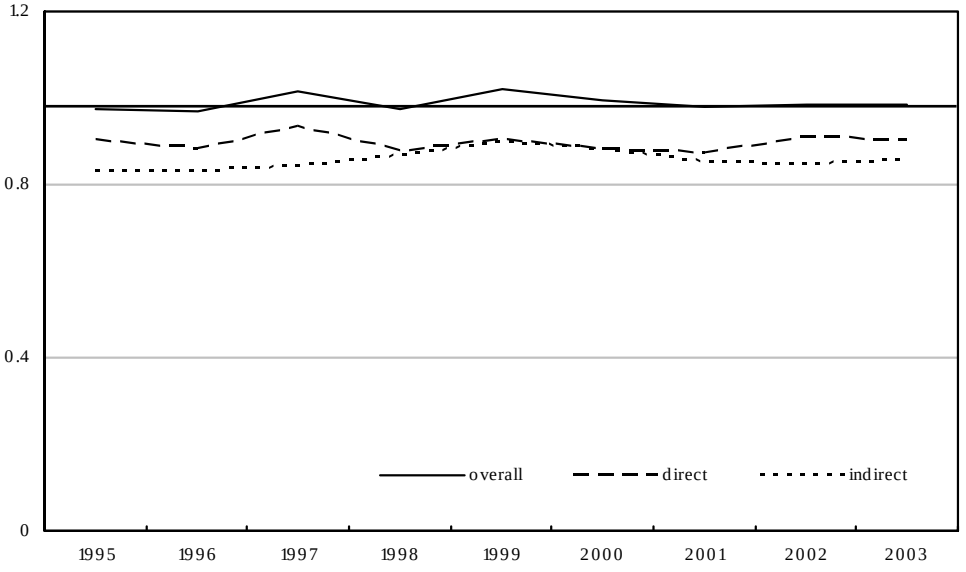
Figure 18 (continued)

Trends in Tax Effort Indices for Selected ECA and Non-ECA Countries

Ukraine



Spain

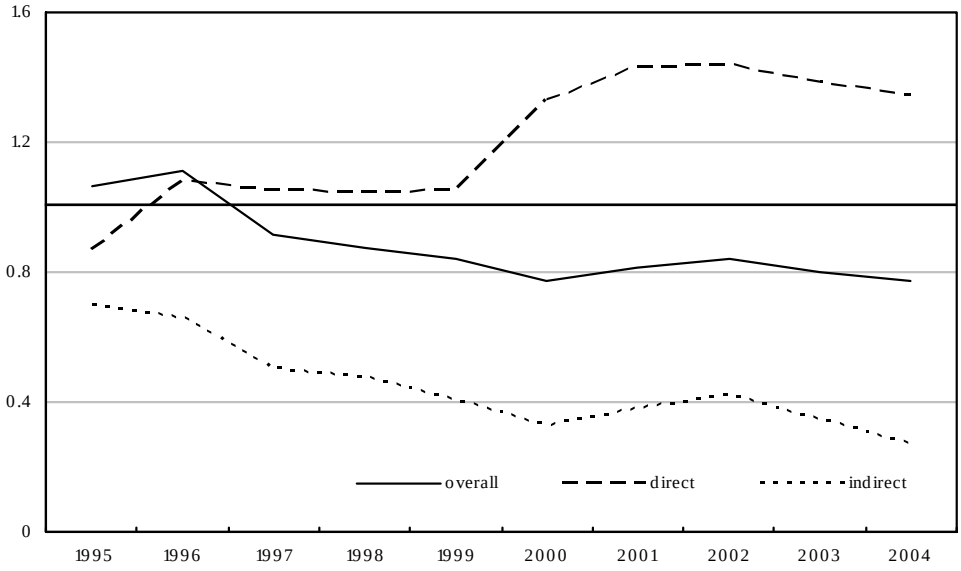


Source: staff calculations.

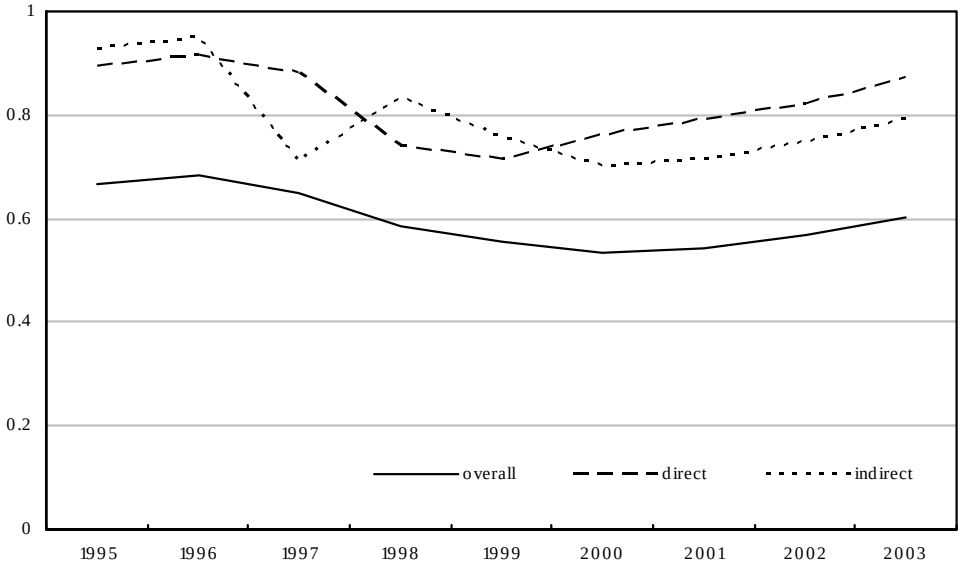
Figure 18 (continued)

Trends in Tax Effort Indices for Selected ECA and Non-ECA Countries

Vietnam



Thailand



Source: staff calculations.

ANNEX 3
SUMMARY OF THE RESULTS

Table 6

Tax Effort Index – ECA and Selected Non-ECA Countries
(average values in the period 1995-2004)

Countries	Tax/GDP	Tax Effort		
		Overall	Direct	Indirect
Albania	**18.4**	**0.8**	**0.5**	**1.0**
Armenia	16.5	0.7	0.8	0.7
Azerbaijan	14.6	0.8	1.0	0.7
Belarus	40.8	1.4	1.4	1.5
Bosnia and Herzegovina	40.4	1.7	n.a.	1.8
Bulgaria	31.7	1.1	1.0	1.1
Chile	***18.9***	***0.7***	***0.0***	***1.0***
Croatia	**42.9**	**1.4**	**0.9**	**1.7**
Czech Republic	34.2	1.0	0.8	0.9
Estonia	32.7	0.9	1.0	0.8
Georgia	**11.2**	**0.6**	**0.7**	**0.7**
Hungary	39.0	1.1	1.0	1.1
Ireland	***31.4***	***0.8***	***0.9***	***1.0***
Kazakhstan	19.6	0.8	1.2	0.6
Korea	***22.3***	***0.7***	***0.8***	***0.7***
Kyrgyz Republic	**17.3**	**1.1**	**0.9**	**1.1**
Latvia	29.6	0.9	1.1	0.8
Lithuania	29.0	0.9	1.1	0.9
Macedonia, FYR	32.0	1.2	0.8	1.2
Moldova	26.8	1.2	1.2	1.5
Poland	**31.3**	**1.0**	**1.1**	**0.9**
Romania	**28.4**	**1.1**	**1.3**	**0.9**
Russian Federation	25.9	1.1	0.9	1.3
Slovak Republic	**33.0**	**1.0**	**0.8**	**0.8**
Slovenia	39.1	1.1	0.6	1.9
Spain	***34.4***	***1.0***	***0.9***	***0.9***
Tajikistan	13.5	0.6	0.6	0.8
Thailand	***16.4***	***0.6***	***0.8***	***0.8***
Turkey	**26.7**	**1.2**	**1.5**	**1.1**
Ukraine	**31.1**	**1.1**	**1.8**	**0.9**
Uzbekistan	33.9	2.3	n.a.	n.a.
Vietnam	***16.3***	***0.9***	***1.2***	***0.4***
ECA (26)	28.5	1.1	1.0	1.1
-CIS (11)	22.8	1.1	1.1	1.0
-EU8 (8)	33.5	1.0	0.9	1.0
-Rest (7)	31.5	1.2	1.0	1.3

Table 7

Intertemporal Comparison of Tax Effort Indices: ECA and Non-ECA Countries

Country	Tax/GDP	Tax/GDP	Tax		Direct		Indirect	
	1995	**2004**	1995*	**2004****	1995*	**2004****	1995*	**2004****
Albania	**17.7**	**22.0**	**0.8**	**1.0**	**0.3**	**0.8**	**1.1**	**1.0**
Armenia	13.0	**17.0**	0.5	**0.7**	1.3	**0.7**	0.4	**0.6**
Azerbaijan	12.3	**15.4**	0.6	**0.6**	1.2	**1.2**	0.4	**0.6**
Belarus	37.3	**42.9**	1.4	**1.4**	1.8	**1.3**	1.3	**1.5**
Bulgaria	31.6	**33.6**	1.2	**1.1**	1.3	**0.8**	1.1	**1.2**
Croatia	**44.4**	**40.9**	**1.6**	**1.4**	**1.0**	**0.9**	**1.8**	**1.5**
Czech Republic	34.9	**35.0**	1.0	**1.0**	0.9	**0.9**	0.9	**0.8**
Estonia	33.9	**32.6**	1.0	**0.9**	1.2	**0.9**	0.9	**0.8**
Georgia	**5.8**	**15.4**	**0.3**	**0.6**	**0.5**	**0.7**	**0.4**	**0.8**
Hungary	42.0	**37.0**	1.3	**1.1**	1.0	**1.0**	1.4	**1.0**
Ireland	*32.8*	***30.0***	*0.9*	***0.6***	*1.1*	***0.6***	*1.0*	***0.9***
Kazakhstan	15.8	**23.3**	0.7	**1.0**	1.0	**1.6**	0.7	**0.5**
Korea	*19.4*	***25.5***	*0.7*	***0.7***	*0.9*	***0.9***	*0.7*	***0.7***
Kyrgyz Republic	**20.1**	**18.4**	**1.3**	**1.1**	**1.3**	**0.9**	**1.1**	**1.2**
Latvia	30.0	**28.0**	1.0	**0.8**	1.1	**1.0**	0.8	**0.7**
Lithuania	28.1	**29.0**	0.9	**0.9**	1.1	**1.0**	0.9	**0.8**
Macedonia, FYR	34.9	**30.8**	1.4	**1.1**	1.1	**0.6**	1.4	**1.2**
Moldova	24.8	**29.8**	1.1	**1.3**	1.3	**1.4**	1.8	**1.5**
Poland	**33.3**	**29.6**	**1.2**	**0.9**	**1.6**	**0.8**	**1.0**	**0.8**
Romania	**28.8**	**27.9**	**1.1**	**1.0**	**1.7**	**0.9**	**0.9**	**0.9**
Russian Federation	31.1	**27.3**	1.4	**1.1**	1.2	**0.9**	1.4	**1.5**
Slovak Republic	**38.4**	**28.7**	**1.2**	**0.8**	**1.1**	**0.5**	**1.1**	**0.7**
Slovenia	36.2	**40.4**	1.1	**1.0**	0.5	**0.8**	2.1	**1.1**
Spain	*32.8*	***35.8***	*1.0*	***1.0***	*0.9*	***0.9***	*0.8*	***0.9***
Tajikistan	9.9	**15.2**	0.3	**0.7**	0.3	**0.6**	0.0	**1.1**
Thailand	*17.8*	***17.4***	*0.7*	***0.6***	*0.9*	***0.9***	*0.9*	***0.8***
Turkey	**19.7**	**30.4**	**0.9**	**1.3**	**1.2**	**1.4**	**0.8**	**1.4**
Ukraine	**32.6**	**29.2**	**1.2**	**1.0**	**1.9**	**1.5**	**0.8**	**0.8**
Uzbekistan	33.5	**30.9**	2.1	**2.0**	n.a	**n.a.**	n.a.	**n.a.**
Vietnam	*17.2*	***16.7***	*1.1*	***0.8***	*0.9*	***1.3***	*0.7*	***0.3***
ECA (26)	28.1	**28.8**	1.1	**1.0**	1.1	**1.0**	1.1	**1.0**
-CIS (11)	21.5	**24.1**	1.0	**1.0**	1.2	**1.1**	0.8	**1.0**
-EU8 (8)	34.6	**32.5**	1.1	**0.9**	1.1	**0.9**	1.1	**0.8**
-rest (7)	31.1	**32.1**	1.3	**1.2**	1.1	**0.9**	1.3	**1.3**
Non-ECA Countries (31)	29.6	**30.9**	0.9	**0.9**	0.9	**1.1**	1.0	**0.9**
High income (30)	35.8	**35.4**	1.0	**1.0**	1.0	**1.0**	1.1	**0.9**
Upper mid income (17)	24.1	**25.7**	1.0	**1.0**	1.0	**0.9**	1.0	**1.0**
Low mid income (10)	16.5	**21.0**	1.0	**1.1**	0.9	**1.4**	0.9	**1.1**

* last available data (1995 or 96), with exception of Russian Federation, Moldova (1997), and Bulgaria, Bosnia (1998).

** the most recent data (2004 or 03), with exception of Hungary, Ireland, Slovakia and Uzbekistan (2002).

Table 8

Tax Effort Index – Full Sample
(average value in the period 1995-2004)

Country	Tax/GDP	Tax Effort		
		Overall	Direct	Indirect
Sweden	51.3	1.3	1.5	1.1
Denmark	49.8	1.2	1.8	1.4
Finland	46.4	1.2	1.3	1.2
Belgium	45.6	1.0	0.9	0.8
France	45.0	1.2	0.9	1.0
Austria	43.7	1.0	0.9	1.0
Croatia	42.9	1.4	0.9	1.7
Italy	42.9	1.1	1.1	1.0
Norway	42.6	1.1	0.9	1.7
Belarus	40.8	1.4	1.4	1.5
Netherlands	40.7	1.0	0.7	0.9
Bosnia and Herzegovina	40.4	1.7	n.a.	1.8
Slovenia	39.1	1.1	0.6	1.9
Hungary	39.0	1.1	1.0	1.1
Germany	37.1	0.9	0.7	0.9
Greece	36.2	1.1	1.0	1.1
UK	36.0	0.9	1.1	1.0
Portugal	34.9	1.0	0.9	1.1
Spain	34.4	1.0	0.9	0.9
Czech Republic	34.2	1.0	0.8	0.9
Uzbekistan	33.9	2.3	n.a.	n.a.
Slovak Republic	33.0	1.0	0.8	0.8
Estonia	32.7	0.9	1.0	0.8
Macedonia, FYR	32.0	1.2	0.8	1.2
Bulgaria	31.7	1.1	1.0	1.1
Ireland	31.4	0.8	0.9	1.0
Poland	31.3	1.0	1.1	0.9
Ukraine	31.1	1.1	1.8	0.9
Australia	30.7	0.9	1.3	0.8
Latvia	29.6	0.9	1.1	0.8
Lithuania	29.0	0.9	1.1	0.9
Romania	28.4	1.1	1.3	0.9
United States	28.2	0.7	0.9	0.5
Uruguay	27.4	1.0	0.6	1.0
Moldova	26.8	1.2	1.2	1.5
Turkey	26.7	1.2	1.5	1.1
South Africa	26.4	1.0	2.1	0.7

Table 8 (continued)

Tax Effort Index – Full Sample
(average values in the period 1995-2004)

Country	Tax/GDP	Tax Effort		
		Overall	Direct	Indirect
Russian Federation	25.9	1.1	0.9	1.3
Japan	25.8	0.7	0.8	0.5
Mongolia	22.9	1.1	1.3	1.2
Korea	22.3	0.7	0.8	0.7
Argentina	21.7	0.8	0.4	1.1
Kazakhstan	19.6	0.8	1.2	0.6
Chile	18.9	0.7	0.0	1.0
Albania	18.4	0.8	0.5	1.0
Bolivia	17.8	1.1	0.9	1.2
Mexico	17.7	0.7	0.7	0.8
Kyrgyz Republic	17.3	1.1	0.9	1.1
Armenia	16.5	0.7	0.8	0.7
Thailand	16.4	0.6	0.8	0.8
Vietnam	16.3	0.9	1.2	0.4
Peru	14.7	0.7	0.8	0.8
Azerbaijan	14.6	0.8	1.0	0.7
India	14.6	1.0	0.9	1.4
Tajikistan	13.5	0.6	0.6	0.8
Georgia	11.2	0.6	0.7	0.7
Nigeria	10.9	1.0	1.5	0.7
Regions				
ECA (26)	28.5	1.1	1.0	1.1
-CIS (11)	22.8	1.1	1.1	1.0
-EU8 (8)	33.5	1.0	0.9	1.0
-rest (7)	31.5	1.2	1.0	1.3
LAT (6)	19.7	0.8	0.6	1.0
MENA (1)	26.7	1.2	1.5	1.1
South Asia (1)	14.6	1.0	0.9	1.4
EAP (4)	19.5	0.8	1.0	0.8
AFR (2)	18.7	1.0	1.8	0.7
Income				
High income (30)	36.0	1.0	1.0	1.0
-EU 8	33.5	1.0	0.9	1.0
-ECA (9)	34.5	1.0	0.9	1.1
Upper mid income (17)	24.8	1.0	1.0	1.0
-ECA (12)	27.2	1.1	1.1	1.1
Low mid income (10)	18.5	1.1	1.0	1.0
-ECA (5)	20.5	1.1	0.9	1.0

Table 9

Intertemporal Comparison of Tax Effort Indices: Full Sample

Country	Tax/GDP	Tax/GDP	Overall		Direct		Indirect	
	1995	**2004**	1995	**2004**	1995	**2004**	1995	**2004**
Albania	17.7	**22.0**	0.8	**1.0**	0.3	**0.8**	1.1	**1.0**
Argentina	20.9	**26.0**	0.8	**0.8**	0.3	**0.5**	1.1	**1.2**
Armenia	13.0	**17.0**	0.5	**0.7**	1.3	**0.7**	0.4	**0.6**
Australia	29.6	**31.5**	0.9	**0.8**	1.3	**1.3**	0.8	**0.8**
Austria	41.6	**43.0**	1.0	**1.0**	0.9	**0.9**	1.0	**1.0**
Azerbaijan	12.3	**15.4**	0.6	**0.6**	1.2	**1.2**	0.4	**0.6**
Belarus	37.3	**42.9**	1.4	**1.4**	1.8	**1.3**	1.3	**1.5**
Belgium	44.8	**45.8**	1.0	**1.0**	0.9	**0.9**	0.9	**0.8**
Bolivia	13.6	**19.3**	0.9	**1.1**	0.6	**1.5**	0.9	**1.3**
Bosnia and Herzegovina	41.0	**39.2**	2.0	**1.4**	n.a	**n.a.**	1.8	**1.8**
Bulgaria	31.6	**33.6**	1.2	**1.1**	1.3	**0.8**	1.1	**1.2**
Croatia	44.4	**40.9**	1.6	**1.4**	1.0	**0.9**	1.8	**1.5**
Czech Republic	34.9	**35.0**	1.0	**1.0**	0.9	**0.9**	0.9	**0.8**
Denmark	49.4	**49.0**	1.3	**1.2**	1.9	**1.7**	1.4	**1.3**
Estonia	33.9	**32.6**	1.0	**0.9**	1.2	**0.9**	0.9	**0.8**
Finland	46.0	**44.9**	1.3	**1.1**	1.2	**1.1**	1.2	**1.2**
France	44.2	**44.2**	1.2	**1.1**	0.8	**0.9**	1.0	**0.9**
Georgia	5.8	**15.4**	0.3	**0.6**	0.5	**0.7**	0.4	**0.8**
Germany	38.2	**36.2**	1.0	**0.9**	0.8	**0.7**	0.9	**0.9**
Greece	32.4	**35.9**	1.1	**1.1**	0.8	**0.9**	1.2	**1.1**
Hungary	42.0	**37.0**	1.3	**1.1**	1.0	**1.0**	1.4	**1.0**
India	14.7	**15.7**	1.1	**1.0**	0.7	**1.3**	1.6	**1.3**
Ireland	32.8	**30.0**	0.9	**0.6**	1.1	**0.6**	1.0	**0.9**
Italy	41.2	**43.4**	1.1	**1.1**	1.1	**1.1**	1.0	**0.9**
Japan	27.8	**15.3**	0.8	**0.7**	0.9	**0.7**	0.4	**0.5**
Kazakhstan	15.8	**23.3**	0.7	**1.0**	1.0	**1.6**	0.7	**0.5**
Korea	19.4	**25.5**	0.7	**0.7**	0.9	**0.9**	0.7	**0.7**
Kyrgyz Republic	20.1	**18.4**	1.3	**1.1**	1.3	**0.9**	1.1	**1.2**
Latvia	30.0	**28.0**	1.0	**0.8**	1.1	**1.0**	0.8	**0.7**
Lithuania	28.1	**29.0**	0.9	**0.9**	1.1	**1.0**	0.9	**0.8**
Macedonia, FYR	34.9	**30.8**	1.4	**1.1**	1.1	**0.6**	1.4	**1.2**
Mexico	16.7	**19.5**	0.7	**0.7**	0.6	**0.8**	0.8	**0.8**
Moldova	24.8	**29.8**	1.1	**1.3**	1.3	**1.4**	1.8	**1.5**
Mongolia	19.2	**32.5**	1.0	**1.5**	1.6	**2.6**	0.8	**1.6**

Table 9 (continued)

Intertemporal Comparison of Tax Effort Indices: Full sample

Country	Tax/GDP	Tax/GDP	Overall		Direct		Indirect	
	1995	**2004**	1995	**2004**	1995	**2004**	1995	**2004**
Netherlands	42.0	**38.8**	1.0	**0.9**	0.8	**0.7**	0.9	**0.9**
Nigeria	6.4	**16.0**	0.4	**1.2**	0.6	**2.5**	0.5	**0.7**
Norway	41.1	**43.9**	1.1	**1.1**	0.8	**1.0**	1.8	**1.5**
Peru	15.4	**14.9**	0.7	**0.7**	0.7	**0.8**	0.9	**0.8**
Poland	33.3	**29.6**	1.2	**0.9**	1.6	**0.8**	1.0	**0.8**
Portugal	33.6	**33.9**	1.0	**1.0**	0.9	**0.9**	1.1	**1.0**
Romania	28.8	**27.9**	1.1	**1.0**	1.7	**0.9**	0.9	**0.9**
Russian Federation	31.1	**27.3**	1.4	**1.1**	1.2	**0.9**	1.4	**1.5**
Slovak Republic	38.4	**28.7**	1.2	**0.8**	1.1	**0.5**	1.1	**0.7**
Slovenia	36.2	**40.4**	1.1	**1.0**	0.5	**0.8**	2.1	**1.1**
South Africa	25.0	**26.8**	1.0	**0.9**	1.9	**2.1**	0.8	**0.7**
Spain	32.8	**35.8**	1.0	**1.0**	0.9	**0.9**	0.8	**0.9**
Sweden	48.5	**50.8**	1.3	**1.2**	1.4	**1.4**	1.1	**1.1**
Tajikistan	9.9	**15.2**	0.3	**0.7**	0.3	**0.6**	0.0	**1.1**
Thailand	17.8	**17.4**	0.7	**0.6**	0.9	**0.9**	0.9	**0.8**
Turkey	19.7	**30.4**	0.9	**1.3**	1.2	**1.4**	0.8	**1.4**
UK	35.0	**35.3**	0.9	**0.9**	1.1	**1.0**	1.1	**1.0**
Ukraine	32.6	**29.2**	1.2	**1.0**	1.9	**1.5**	0.8	**0.8**
Uruguay	26.1	**26.3**	1.0	**1.0**	0.5	**0.7**	1.0	**1.0**
Uzbekistan	33.5	**30.9**	2.1	**2.0**	n.a	**n.a.**	n.a.	**n.a.**
Vietnam	17.2	**16.7**	1.1	**0.8**	0.9	**1.3**	0.7	**0.3**
Regions								
ECA (26)	28.1	**28.8**	1.1	**1.0**	1.1	**1.0**	1.1	**1.0**
-CIS (11)	21.5	**24.1**	1.0	**1.0**	1.2	**1.1**	0.8	**1.0**
-EU8 (8)	34.6	**32.5**	1.1	**0.9**	1.1	**0.9**	1.1	**0.8**
-rest (7)	31.1	**32.1**	1.3	**1.2**	1.1	**0.9**	1.3	**1.3**
Non-ECA Countries (31)	29.6	**30.9**	0.9	**0.9**	0.9	**1.1**	1.0	**0.9**
Income								
High income (30)	35.8	**35.4**	1.0	**1.0**	1.0	**1.0**	1.1	**0.9**
Upper mid income (17)	24.1	**25.7**	1.0	**1.0**	1.0	**0.9**	1.0	**1.0**
Low mid income (10)	16.5	**21.0**	1.0	**1.1**	0.9	**1.4**	0.9	**1.1**

ANNEX 4
SELECTION OF THE FOCUSED COUNTRIES

(Source: Concept note of Public Finance and Economic Growth in Europe and Central Asia, November 2005, The World Bank).

ECA countries

Regional study "Public Finance and Economic Growth in Europe and Central Asia" proposes to focus much of the analysis on a subset of ECA and fast-growing non-ECA countries to facilitate more in-depth and cross-cutting analysis of comparisons and trade-offs within and among countries. The question is what criteria should be used for country selection given the wide diversity in the ECA region and outside. Several factors create pressures on public finance systems, and it would be hard to establish a typology of countries based on a comprehensive analysis of tensions and risks. However, a few key factors deserve special attention, as they are either cross cutting or affect key functions of modern welfare states where expenditure pressures are typically being felt:

- *The quality of public sector governance* is an overarching factor affecting the efficiency of management, targeting, and financing of public expenditure programs. Poor governance is likely both to reduce the efficiency of public spending and to raise the economic costs of taxation. Weak public sector governance also affects the capacity of governments to formulate and maintain a sound fiscal framework over time, thus increasing the risk of implementing unsustainable expenditure programs leading to cycles of booms and busts. The quality of governance is partially correlated with the level of per capita income, as low-income countries have fewer resources to spend in support of public administration and government accountability. Thus there is likely to be a strong need for public spending for education, infrastructure, and other public services even where governance is weak, making the question of the appropriate size of the public sector particularly problematic.
- *Demographics* affect public expenditures for both pensions and health care of senior citizens. Although the financial situation of pension and public health care systems greatly depends on their relative coverage, generosity, targeting, and efficiency of management, expenditure pressures are generally expected to increase in tandem with population aging.
- *The size of the school-aged population and the existing level of educational attainment* may affect public expenditure on education. As countries compete more intensely in global markets, it becomes more important to fill educational gaps in order to maintain international competitiveness. The larger the school-aged population in proportion to total population, the stronger the expected pressures on public expenditures to ensure adequate school enrolment ratios and bridge potential gaps in educational attainment. Although poor educational outcomes may, to some extent, reflect inefficient use of available resources,

bridging large gaps in education usually calls for additional expenditures – either directly through the provision of services by the public sector, or indirectly, for example, through the financing of educational voucher programs.

- The availability of large sources of *non-tax revenue*, usually in the form of hydrocarbon revenues, raises specific challenges for public finance management, but also creates much needed fiscal room for expenditure financing. Oil-rich countries are able to finance priority expenditure programs while keeping taxes at a relatively low level, which is usually reflected into a large non hydrocarbon budget deficit.[18]

Based on the above considerations, a few simple criteria have been combined with a view to grouping ECA countries according to potential tensions being faced by their public finance systems.

- Country Policy and Institutional Assessment (CPIA) ratings on public sector management and institutions, combined with an indicator of "bribe frequency", were used as a measure of the quality of public sector governance.[19]
- The old age dependency ratio (population over 65 years as percent of working-age population) was used as a measure of potential tensions on pay-as-you go pension systems and health care systems.
- The size of school-aged population (population aged 6 to 18 years in percent of total) was used as an indicator of possible expenditure pressures in the future.
- The share of fuel exports in total export revenues was used to identify countries that benefit from significant hydrocarbon fiscal resources.

Combining (as a simple average) the old-age dependency and the size of school-aged population provides an approximate sense of potential tensions on social spending. Of course, actual social spending tensions may be much higher than suggested by demographics owing to unreformed pay-as-you-go pension systems and depending on existing inefficiencies in public health care and education systems. When this indicator is further combined with the public sector governance indicator, a classification of ECA countries into four groups can be established (Table 10 – detailed country rankings by indicator, including per capita PPP GDP are provided in Annex 1).

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[18] Although the availability of hydrocarbon revenues may affect the level and structure of taxation, the decisions concerning the level of public expenditure should not be directly related to the presence of hydrocarbon windfalls. Sound public finance would call for public expenditure programs to be driven by the marginal productivity and cost of public resources. Although the presence of hydrocarbon windfalls could temporarily lower the cost of public expenditure financing, eventually the decisions whether the return to expenditure programs outweighs the cost is independent of hydrocarbon wealth and should be better taken in the context of medium-term expenditure planning.

[19] The following ratings on public sector management and institutions, closely related to public finance management, were used from CPIA: (i) Quality of Budget and Financial Management; (ii) Efficiency of Revenue Mobilization; and, (iii) Quality of Public Administration. The "Bribe frequency" indicator was extracted from the 2005 version of Business Environment and Enterprise Performance Survey (BEEPS). A single index of the quality of public sector governance was compiled by combining these four indicators.

Table 10

Potential Tensions on Public Finance Systems – ECA Country Groupings[(1)]

	Social spending tensions below average (Pensions, Health, Education, combined)	Social spending tensions above average (Pensions, Health, Education, combined)
Quality of Public sector Governance above average[(2)]	Hungary **Slovakia** Czech Republic **Poland** **Turkey**	Estonia Latvia Lithuania Bulgaria **Croatia** Armenia
Quality of Public sector Governance below average[(2)]	Kazakhstan* Bosnia Macedonia FYR Azerbaijan* **Romania** Russia* Belarus **Albania** Moldova	**Georgia** **Serbia and Montenegro** **Ukraine** Uzbekistan Tajikistan **Kyrgyz Republic** Turkmenistan*

* Countries with significant hydrocarbon export revenue earnings.
(1) Proposed set of case studies is bolded and highlighted.
(2) Countries in each group are ranked by decreasing order in terms of their quality of public sector governance. Ranking of Turkmenistan is based only on the three selected CPIA governance indicators, as BEEPS is not available for this country.

According to the simple typology in Table 10, weak public sector governance and potentially high social spending tensions could pose risks in public finance systems. Shaded areas in the table highlight country groups likely to face higher tensions in their public finance systems – with the group most at risk being the one where weak public sector governance is combined with high potential tensions on social spending. This group includes a mix of countries that may face social spending tensions for diverse reasons – either reflecting pressures from aging populations, or because they will need to cater to the education needs of large young populations.

The proposed selection of case studies is intended to cover all four country groups highlighted above, so as to draw comparative lessons from countries facing diverse public finance challenges in the functional expenditure areas to be analyzed in Part 2 of the study. Relatively more emphasis will be placed on countries with quality of public sector governance below the average for the region as a whole (6 out of proposed 10). Availability of high quality data and up-to-date information

is also important, and a Public Expenditure Review is either available or under preparation in almost all of the countries proposed. Countries with substantial hydrocarbon earnings have not been included as their situation may not be as directly comparable to those without such economic "rents".

As noted earlier, the proposed set includes the following 10 ECA countries: Albania, Croatia, Georgia, Kyrgyz Republic, Poland, Romania, Serbia, Slovakia, Turkey, and Ukraine.

Non-ECA Comparators

The selection of comparator countries outside of ECA emphasizes successful growth performance. The goal is to compare the fiscal policies and resulting public revenue and expenditure patterns of a set of high-growth countries at roughly similar levels of per capita income to our ECA focus countries. We propose to select the following six countries: Chile, Ireland, Korea, Spain, Thailand, and Vietnam.

All six have experienced average per capita growth rates of over 2.5 percent for the past ten years, and their range of per capita incomes (particularly at the start of the last decade's high growth period) and population size are roughly similar to the range in our ECA focus countries. Several other non-ECA countries have similar 10-year growth rates but are considered less appropriate because either their economies are less diversified or otherwise less comparable to ECA (Costa Rica, Dominican Republic, Malaysia, and Uganda), their growth experience has been affected by conflict (Sri Lanka) or other distortions and special factors (Greece), or fiscal data at the general government level are unlikely to be readily available (Tunisia).

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IF YOU WANT TO CUT, CUT, DON'T TALK: THE ROLE OF FORMAL TARGETS IN ISRAEL'S FISCAL CONSOLIDATION EFFORTS, 1985-2007

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Each of the seven governments in Israel since the successful 1985 stabilization program stated a commitment to reducing the deficit, easing the public debt burden and curtailing the share of public expenditure in GDP. Beginning in 1992, formal multi-year declining deficit ceilings were also adopted. However, only two periods during the last 22 years, 1985-92 and 2003-06, can be characterized as episodes of sustainable consolidation, and one of them preceded the introduction of the ceilings. The formal targets were often missed, and they underwent frequent revisions, including each time there was a cabinet change. Furthermore, in the 10 years that followed the introduction of the ceilings, little progress, if any, was made toward fiscal consolidation. In light of these developments, this paper concludes that the contribution of fiscal rules to fiscal consolidation or policy credibility in Israel was minor, at most. We also find that the two successful consolidation episodes followed programs that included – at the outset – specific measures sufficient to cut expenditure substantially over the short and medium terms. This absolved future policymakers from the political responsibility for adopting the specific measures needed to meet the formal aggregate targets set by their predecessors. The key lesson, at least in the Israeli context, is that setting formal macro-fiscal targets for future governments is not an effective pre-commitment measure; credibility requires the current policymaker to take all the "heat" and implement the specific – even if gradual – measures that will lower expenditure over the medium term. The pessimistic finding is that such measures were adopted only at times of crisis and after less comprehensive policy changes failed. The optimistic observation is that once implemented, these measures appear to survive cabinet changes and economic fluctuations.

1 Introduction and background

Between 1983 and 1985, after more than a decade of large fiscal deficits which averaged more than 10 per cent of GDP, Israel suffered several economic and financial crises. These crises were reflected in what was in effect the bankruptcy of the banking system in late 1983, a mounting deficit in the current account of the balance of payments, an accumulation of public debt that exceeded 250 per cent of GDP by 1985 and accelerating price increases that, by 1985, reached hyper-inflation levels. In light of the repeated failures of various policy adjustments during the early

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1980s, these crises led policymakers to recognize that a comprehensive stabilization program, based predominantly on fiscal consolidation, was required. In June 1985 the government announced such a program, which had a lasting effect on the fiscal balance and the ratio of public debt to GDP, reduced the share of public expenditure in GDP and made a critical contribution to the deceleration of inflation. This program marked the end of fiscal dominance in Israel, as it was accompanied by a ban on government borrowing from the central bank.

Although the change in fiscal policy since the 1985 stabilization plan was dramatic, the resulting level of the deficit was not sufficient to reduce the public debt to GDP ratio to the common levels in the developed countries, even in the long run. These relatively high deficit and debt levels left the Israeli economy vulnerable to financial crises in the event of unfavorable external economic shocks or deterioration in the security situation. This risk, along with the stubbornly high inflation (although at much lower rates than in the early 1980s), suggested that further reduction of the deficit was called for.

However, along with the need for further fiscal consolidation, in the early 1990s Israel faced the challenge of absorbing a massive wave of immigration from the former Soviet Union. While promising a marked contribution to economic growth in the medium and long run, the absorption process required considerable public resources in the short run to pay for the living expenses and housing of the immigrants. The annual one-off costs of absorption were in the order of magnitude of 3.5 per cent of GDP in 1991 and 1992 and were expected to decline in later years as the numbers of new immigrants fell and as those who arrived in previous years settled in.[1]

Fiscal policy in the early 1990s, therefore, faced the contradictory challenges of absorbing the immigrants in a way that would allow them to become effective participants in the labor force as soon as possible, while persuading the markets that the government was committed to fiscal consolidation and would reduce the public deficits over the medium term. As Drazen (2000) suggests, there are two ways to tackle such conflicting targets: reputation or rules. Since reputation was still shaky, given the not-so-remote crises of the early 1980s, the government turned to rules: in late l991 – as part of the 1992 budget discussions – a multiyear deficit target was introduced. The target indicated that even though the near-term deficits would be high, due to the pressing needs of absorption, the government was committed to reaching a balanced budget within four years. This commitment fitted well within the global context of the time, as the Maastricht criteria were negotiated and similar arrangements were adopted in other countries. In Israel, the medium-term commitment took the form of a law, thus formally making it binding on future cabinets – an important credibility-enhancing feature, because 1992 was an election year.

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[1] For detailed figures on the fiscal cost of the absorption process see Dahan and Strawczynski (2001).

While the medium-term deficit target of 1992 was adopted in the very specific circumstances of that period, formal medium-term deficit targets have been a permanent feature of Israel's fiscal policy ever since. This was also consistent with IMF recommendations (IMF, 1996b).[2] Kopits and Symanski (1998) argue that such fiscal rules can be very useful in overcoming the time inconsistency problem of a fiscal policy framework, by correcting the tendency of policymakers to run deficits.[3] They stress that, to be effective, the rules must be intended for permanent application by successive governments. This argument is strengthened by the IMF findings (IMF 1996a) that consolidation attempts based on one-off measures – rather than structural, long-term, ones – tend to fail. The political reasoning behind this argument, following Kydland and Prescott (1977) and Persson and Tabellini (1990), is that the policymaker who makes the original decision suffers most from the negative political consequences of reducing public expenditure.[4] Once the target is set, future policymakers bear a lower political cost for adhering to it. Moreover, if they divert from the target, they may be held responsible for damaging macroeconomic performance. Consequently, such rules would reduce the appetite of future policymakers to abandon the preset targets. Since this mechanism is also understood by the public, it is an important component of the credibility of such medium-term targets.

The Israeli experience with formal deficit targets since 1992 suggests that their use as an instrument to overcome the time inconsistency problem and increase the credibility of fiscal policy may be problematic. The legal numerical medium-term targets were repeatedly missed and often changed. While the potential contribution of the multiyear targets increased as the of governments' term-in-office kept getting shorter, in practice each new government changed the targets. Moreover, the fiscal aggregates themselves did not seem to improve during that period; such an improvement seems to have begun only in 2003, although the formal targets kept changing.

In the remainder of this paper we will examine Israel's attempts to consolidate her fiscal accounts since 1985, in light of the arguments about the usefulness of fiscal targets. To do so, we divide the period into four sub-periods – two of which can be characterized as representing successful consolidations and the other two as unsuccessful ones – and examine the characteristics of fiscal policy in each one. Then we discuss what seem to be the common features of the successful consolidation attempts and of the unsuccessful ones. Section 2 examines the fiscal developments from the implementation of the 1985 stabilization program until 1990. Section 3 examines the mass-immigration period of the early 1990s, the introduction of formal deficit targets in 1991, and the policy switch of the Rabin government,

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[2] For a comprehensive discussion of the role of pre-specified fiscal targets in enhancing credibility see von Hagen (2006).

[3] However, Israel's medium-term targets do not strictly match the fiscal rule definition proposed by Kopits and Symansky, which refers to a much longer horizon.

[4] That logic is also supported by the analysis of Cukierman and Metzler (1986), who show that a rule is necessary for maintaining fiscal discipline by a government wishing to get reelected.

elected in late 1992. Section 4 examines the performance under fiscal rules until the 2003 crisis, and Section 5 discusses the 2003 consolidation program. In Section 6 we compare the performance in these sub-periods, and Section 7 analyzes the features that played a role in the successful and unsuccessful consolidation attempts and suggests some policy implications.

2 The 1985 stabilization program and the post-stabilization years

Following the 1973 war Israel's fiscal position deteriorated dramatically: general government deficits were rarely below 10 per cent of GDP and between 1980 and 1984 they averaged 12 per cent.[5] Based on the average growth rate during that decade, about 4 per cent annually, this magnitude of the deficit implied that the long-run debt to GDP ratio would stabilize at about 300 per cent – clearly not a viable policy option. As the debt ratio approached these levels in 1983, and as repeated attempts to moderately adjust the deficit and the nominal aggregates failed, financial and economic crises began to occur in an accelerating rate and policymakers could no longer avoid the necessary adjustment.

In June 1985 the coalition government of the two major parties decided on a stabilization plan which included a marked fiscal consolidation.[6] The fiscal measures included temporary steps, meant to tackle the immediate crisis, as well as structural reforms intended to handle the underlying weakness of the fiscal accounts. A key component of the program was a legal ban on government borrowing from the central bank, thus forcing the government to finance its deficits by borrowing from the public (or privatizing assets) from that time on. Although fiscal adjustment was the key component of the plan, no numerical targets were specified for the size of the deficit or the debt to GDP ratio in the years that followed. Nevertheless, many of the measures that the program introduced aimed at affecting the fiscal accounts in the medium term – rather than in the short run.

The key short-term fiscal measures adopted in the program were a suspension of the COLA arrangement for a one-year period, which resulted in a substantial temporary cut in real wages due to the very high inflation rate, an initial cut in product subsidies and a 42 per cent depreciation of the shekel during the month of June 1985 alone.[7] On the revenue side, a temporary surtax was imposed on the self-employed and local taxes were adjusted in a way that resulted in a temporary surge in the municipalities' revenues. Another important one-off factor was a special grant of $1.5 billion from the US government (about 6 per cent of GDP, spread over 2 years) which helped to reduce the debt burden and enhance confidence in the foreign exchange market. In addition to these direct policy measures the deceleration

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5 Bank of Israel Annual Report, 2006, Statistical Appendix, Table 6.A.3.

6 Although the "national unity" coalition enjoyed a strong majority in the Knesset (the Israeli parliament), the plan was approved in the cabinet with a margin of only one vote. For details of the political process of the program's approval see Bruno (1991) and Razin and Sadka (1993).

7 For a detailed description of the program see Bank of Israel (1985), *Annual Report*.

of inflation itself had a substantial effect on tax revenues due to the "reverse Tanzi effect", most of which was expected to fade out within a year or two.

To be credible, however, the program had to be perceived as having a lasting effect on the fiscal accounts. For that purpose the program also included medium – and long-term measures that would sustain the lower deficit as the effects of the short-term measures came to an end. There were three key permanent measures of the program: 1) a substantial cut in defense spending, reflecting the declining security risks due to the peace agreement with Egypt and the gradual withdrawal from South – Lebanon; 2) a cut in subsidized directed credits to the business sector; 3) a sharp reduction in product subsidies. Because all these measures required time until their full effects could be realized – due to pre-existing government commitments – temporary measures were needed to stabilize the fiscal accounts in the first few years; these measures were mostly on the revenue side. Also, the government benefited from an agreement with the US government to convert all future aid flows from loans to grants.[8]

An important medium-term revenue-increasing measure was a change in corporate tax legislation (the Steinberg Commission recommendations) which curtailed the negative effects of the remaining inflation (which averaged 20 per cent annually during 1986-91) on tax revenues. Along with the erosion of the Tanzi effect due to the reduction of inflation,[9] this measure was expected to increase business taxes substantially. Nevertheless, because the revenue measures were not intended to raise the tax burden permanently, the government almost immediately reduced the statutory corporate tax rates, and soon after that the personal income tax rates and social security contributions as well, to ensure that within a four-year period the tax burden would not exceed its pre-stabilization level. Thus, by 1989 and 1990 the full effect of the program's measures was in place, and it was fully on the expenditure side (Table 1).

The composition and structure of the program quite closely matched those characterizing sustainable consolidation efforts, as classified by Alesina, Perotti and Tavares (1998). The decline in the share of public expenditure in GDP exceeded the reduction in the deficit; tax rates – especially on profits and wages – decreased and the tax burden fell. Moreover, the ratio of public investment to GDP was not reduced, despite the sharp reduction in overall expenditure. Although the economy entered a deep recession in late 1988 and 1989, the deficit in 1989 and 1990 still averaged only 6 per cent of GDP – half the pre-stabilization level – and the sustained cyclically adjusted deficit was 5 per cent of GDP.[10] While the program did not at the

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8 This was in addition to the one-off special grant mentioned above.

9 In a period of sharp deceleration in inflation there are two components of the reverse Tanzi effect: one, which is temporary, is related to the deceleration itself, and the other, which is permanent, is related to the lower level of inflation.

10 The sustained cyclically adjusted deficit is calculated in the usual manner, adjusting revenues and expenditures to the output gap. However, it takes into account the fact that, on average, the economy operates below the potential level of GDP – which is the full-employment level of output. By doing so this

(continues)

Table 1

Factors Contributing to the Decline of Israel's General Government Deficit, 1980-90
(percent of GDP)

	1980-84 Average	1985	1986	1987	1988	1989	1990
Total Revenue	**57.4**	**65.5**	**63.4**	**57.5**	**54.0**	**49.5**	**49.1**
o/w taxes	39.3	40.9	43.8	42.7	40.6	37.0	36.4
Total Expenditure	**69.2**	**64.5**	**59.7**	**57.3**	**56.3**	**55.6**	**54.8**
o/w Defense	19.5	18.5	15.9	14.5	12.9	12.1	12.4
Producer and credit subsidies	8.9	6.2	4.2	4.2	4.1	3.4	2.7
Investment	2.3	1.8	2.0	2.4	2.6	2.5	2.7
Interest	10.9	12.6	11.6	10.3	9.3	9.1	8.7
Other	27.6	25.5	26.1	26.1	27.5	28.4	28.4
General Government Balance	**–11.8**	**1.0**	**3.7**	**0.1**	**–2.3**	**–6.1**	**–5.7**

outset specify numerical targets that could be used as a benchmark, this was a dramatic improvement compared to the pre-stabilization decade. Still, in the early 1990s Israel was at a point where clearly further consolidation was needed.

3 Absorption of the mass-immigration wave and the introduction of multi-year deficit ceilings: 1990-94

Following five years of stabilization, and emerging from the deep recession of 1989, Israel faced a new challenge in the early 1990s: the absorption of a massive immigration wave. In just two years – 1990 and 1991 – about 380,000 immigrants (8 per cent of the 1989 population) came to Israel. Since Israel's absorption policy is to provide the basic needs of every immigrant, including living costs for the first 18 months, subsidized housing and language training, the budgetary costs of absorption were substantial. In 1991 and 1992 these costs peaked at about 3.5 per cent of GDP and pushed the general government deficit to 5 per cent of GDP (Table 2), well above the path envisaged by the government. Nevertheless, excluding the direct one-off absorption costs, the deficit declined to the levels achieved in 1987 and 1988 – prior to the 1989 recession.

measure provides a better approximation for the path of the fiscal accounts in a "no change in policies" scenario over the medium term.

Table 2

Key Components of the Change in the General Government Balance 1990-1994

	1990	1991	1992	1993	1994
Total Revenue	**49.1**	**49.1**	**48.7**	**48.7**	**47.9**
o/w taxes	35.7	35.5	36.1	36.0	36.6
bilateral transfers	7.2	7.4	6.3	5.9	4.8
Total Expenditure	**54.8**	**53.4**	**54.3**	**53.5**	**51.3**
o/w Defense	12.4	11.7	10.2	10.0	9.0
Interest	8.7	7.9	7.2	6.9	6.4
Absorption-related(1)	1.4	3.8	3.4	1.6	0.5
Other	32.3	30.0	33.5	35.0	35.4
General Government Balance	**–5.7**	**–4.3**	**–5.6**	**–4.8**	**–3.4**
General government balance excluding absorption costs	*–4.3*	*–0.5*	*–2.2*	*–3.2*	*–2.9*

(1) One-off expenditures related to the absorption of immigrants which included government payments for the construction of housing and the direct cost of the "absorption basket" paid for immigrants in their first two years in Israel.

Despite the temporary fiscal pressures arising from absorption costs, the underlying fiscal trends remained positive in 1991 and 1992. The erosion of defense expenditures – a key element of the stabilization strategy since 1985 – persisted and contributed more than 2 percentage points to the decline in the share of public expenditure in GDP. Additionally, the government began to "cash in" on the effects of stabilization with reduced interest payments, which reflected the decline in the debt to GDP ratio and lower interest rates. On the revenue side, the government adopted a medium-term plan to moderately reduce the statutory corporate tax rate and cut import duties. The cost of these changes was in the same order of magnitude as the expected rise in the tax/GDP ratio due to the progressive nature of the Israeli tax system[11] hence it was not expected to raise the deficit.

Faced with the challenge of proceeding with fiscal consolidation while bearing the temporary costs of absorption, the government decided in late 1991 to adopt a multi-year declining deficit ceiling, beginning with the 1992 budget. That multiyear framework was intended to reflect the government's commitment to eliminate the deficit as these costs phase out, and was based on the nearly balanced underlying fiscal position in 1991. Accordingly, the program specified a decreasing

[11] The elasticity of tax revenues to GDP growth in Israel is estimated at about 1.1 (Brender, 2001).

medium-term deficit path from 6.2 per cent of GDP in 1992 towards a balanced budget in 1995.[12] These targets did not require additional fiscal measures in the coming years, beyond those that were already in place. The continuing long-term plan to gradually reduce defense expenditures and the on going decline in interest payments were expected to reduce the share of expenditure in GDP by roughly 2 percentage points within three years. Combined with the effect of the phase-out of temporary absorption costs, this decline was sufficient to account for the required reduction in the deficit, as well as for the expected decrease of income from foreign transfer payments. Specifying a multi-year path was viewed as particularly important because 1992 was an election year.

In his budget speech Minister of Finance Modai detailed the strategy and some of the perceived advantages of multi-year budgetary planning and targets. *"Multi-year planning, which is beyond the planning of one year or another, will prevent shocks that result from political changes, which are typically focused on the short horizon"* (page 1, author's translation). He stated further *"In the next few years the government will free resources to the business sector by gradually reducing the deficit until its complete abolition by 1995. This is also a message to the business community abroad"* (page 2). And, he also described the strategy*: "The most significant budgetary decision by the government is the one on a declining deficit path. … This is an achievable target based on the expected rise in economic activity and a substantial decrease in government expenditure, due to the ending of the immigration wave, and stability or a moderate rise in spending on other items, such as defense, social services and public administration"* (page 7).

While performance in 1992 through 1994 was broadly consistent with the medium-term strategy presented in 1991, the strategy itself was short-lived. The Rabin government that took office in July 1992, had to adopt the "old" target for 1993, and actually succeeded in achieving it. However, with a faster-than-expected decline in the number of immigrants – and the associated costs – this success masked a rise in non-absorption civilian primary expenditure (Table 2). Moreover, within its first year in office the government adopted various policies that implied a substantial increase in key expenditure items. Therefore, by the time the 1994 budget was prepared the government decided to abandon the medium-term deficit reduction path "inherited" from its predecessor. The decision included both an increase of the 1994 target by 0.8 per cent of GDP – despite the above-mentioned decline in absorption costs – and the abandonment of the 1995 target of a balanced budget. Instead, the government adopted a new multi-year target of "reducing the deficit every year compared to the previous year".

The upward revision of the deficit target marked the first failure of medium-term deficit targets in Israel. The main contribution of legislated multi-year targets is that they provide credibility and assure market participants and citizens about the future path of policies. The role of legislation in this context is particularly important in the transition between governments: laws are supposed to be more

[12] The targets from 1992 to 1996 were specified for the domestic central government deficit.

binding than cabinet decisions of a previous government. However, the Rabin government simply changed the target when it became inconvenient. The ineffectiveness of the pre-commitment mechanism was particularly daunting in this case because it took place against the background of high growth and diminishing exogenous budgetary pressures. In the event, the deficit in 1994 was actually smaller than the original target set in 1991.

The change in policy was not limited to the deficit targets. Beginning in 1993 the government began to raise civilian primary expenditure at an ever increasing pace. While absorption-related costs decreased between 1992 and 1994 by 3 percentage points of GDP, the government increased its other civilian primary expenditure by 2 per cent of GDP.[13] Therefore, by 1994 the sustained cyclically adjusted deficit (excluding one-off absorption costs) rose to 3.3 per cent of GDP, compared with 1.6 per cent in 1992. More importantly, the government embarked on a set of reforms that accelerated the growth rate of public expenditure: in some areas over the medium term, and in others, permanently. These reforms included, inter alia, a series of generous wage agreements in the public sector, changes in the promotion and wage-setting mechanisms in the public sector (Sussman and Zakai, 1997, 2001), higher transfer payments and more liberal criteria for entitlements.[14]

4. The era of revised fiscal targets: 1995-2003

Consistent with its new medium-term target of reducing the deficit every year with respect to the previous budget, the government set the deficit target for 1995 at 2.75 per cent of GDP. This target was well above the target of a balanced budget originally set for 1995 (Table 3) and also substantially higher than the actual deficits in 1993 and 1994 (Table 4). Even so, the actual deficit in 1995 exceeded the target (Figure 1). This recipe – unambitious short-term targets, which are missed anyway – characterized fiscal policy in most of the years that followed. In late 1995, consistent with the existing legislation, the government adopted a deficit ceiling for 1996 that was 0.25 per cent of GDP lower than the original target for 1995. In practice, however, the actual deficit in 1996 was much higher than the target, suggesting that the measures included in the budget were not suitable to meeting the target.

The new government headed by Prime Minister Netanyahu that took office in the second half of 1996 changed the definition of the target from domestic central government deficit to overall central government deficit, and set new medium-term declining deficit targets until 2001. The new target presented the government with the immediate task of reducing the deficit by 0.8 per cent of GDP in 1997 compared with the actual deficit in 1996. To achieve this target the government implemented a package of tax measures – equivalent to about 0.7 per cent of GDP – and reduced

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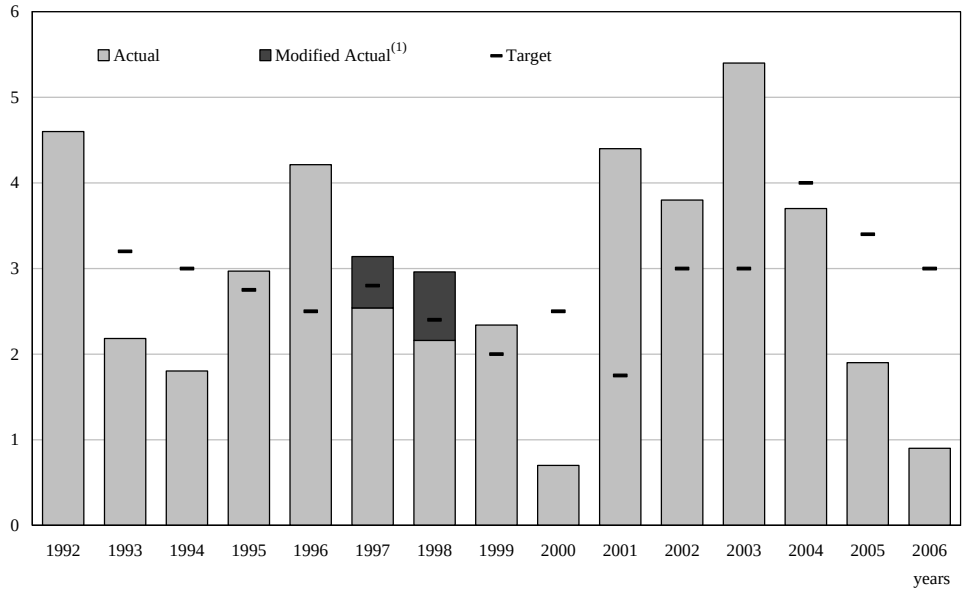
[13] Important components of this expansion were the roads infrastructure and the budget for teaching hours in the public education system.

[14] A detailed discussion of the development of the numbers of recipients of transfer payments relative to the size of the relevant populations appears in the Bank of Israel Annual Report for 1998 (Section 5.5).

Figure 1

Central Government Performance with Respect to the Official Deficit Targets
(percent of GDP)



(1) The "modified actual" deficit is the deficit excluding the unexpected component of the accounting revenues from "realized BOI profits".

transfer payments and infrastructure investment. Combined with the phasing out of absorption costs, as the numbers of new immigrants continued to decline, these measures reduced the deficit by about 1 per cent of GDP (depending on the definition used).[15] Technically, the government has also succeeded in keeping the deficit below the official ceiling, but this was only due to unexpected revenues resulting from new accounting procedures, which contributed about 0.6 per cent of GDP to the reported revenues. In line with its pre-stated target, the government adopted a deficit ceiling of 2.4 per cent of GDP for 1998, 0.4 per cent below the 1997 target, and also met it, due to the same technical surprise as in the 1997 budget.[16] In 1999 the deficit target was missed.

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15 For a detailed analysis of the composition of the 1996 policy package see Bank of Israel Annual Report, 1996, Chapter 3.

16 The change of the target from the domestic to the overall deficit implied that an item titled "Realized Bank of Israel Profits" would become part of the government's revenues for the purpose of meeting the deficit target. This item – which has nothing to do with the actual profits of the BOI, or with the transfer of profits to the central government, was expected to contribute less than 0.1 per cent of GDP in the 1997 budget. However, due to various financial developments this item "ballooned" to more than 0.6 per cent of GDP, a fact that was realized only after the 1998 budget was also approved. In 1998, these "profits" were budgeted again at less than 0.1 per cent of GDP but the recorded figure at yearend was 0.9 per cent of GDP.

Table 3

Budget Rules and Targets, 1991-2003

Decision Year	Target Deficit *(percent of GDP)*	Notes
1991	1992 – 6.2% 1993 – 3.2% 1994 – 2.2% 1995 – 0.0%	Adoption of declining deficit law. The deficit was specified in term of the domestic balance
1993	1994 – 3.0% Will be reduced each year over the next 3 years	Upward revision of the annual and medium-term deficit targets
1994	1995 – 2.75%	-
1995	1996 – 2.5%	-
1996	1997 – 2.8% 1998 – 2.4% 1999 – 2.0% 2000 – 1.75% 2001 – 1.5%	Moving from domestic deficit to overall deficit, including Bank of Israel's "realized profits"
1999	2000 – 2.5% 2001 – 2.25% 2002 – 2.0% 2003 – 1.5%	
2000	2001 – 1.75% 2002 – 1.5% 2003 – 1.25%	Downward revision. The deficit was redefined during the fiscal year to exclude the Bank of Israel's "profits"
2001	2002 – 2.4% 2003 – 2.0% 2004 – 1.5% 2005 – 1.0%	Upward revision. The target for 2002 was increased to 3.0 per cent before the budget was approved
2002	2003 – 3.0% 2004 – 2.5% 2005 – 2.0% 2006 – 1.5% 2007 – 1.0%	From 2007 onwards, 1 per cent

A new government, headed by Prime Minister Barak, took office in 1999 and raised the deficit target again: the ceiling for the year 2000 was set at 2.5 per cent of GDP, and the path for the subsequent years was raised accordingly. However, with the surge in economic activity during the year 2000, revenues increased dramatically and the year ended with a much lower-than-expected deficit – only 0.7 per cent of GDP. At that time the government decided to lower the deficit target for 2001 by 0.5 per cent of GDP – the only such incident since the adoption of the multi-year targets – but to a level that was 1 per cent of GDP higher than the actual deficit in 2000. At the same time the government introduced several expansionary policy initiatives – especially related to transfer payments – and loosened policies with respect to the public sector wage bill. By the time the 2001 budget was presented to the Knesset the government has already lost its parliamentary majority, the Palestinian uprising began and elections were called for February 2001.

The new government, headed by Prime Minister Sharon followed in its predecessors' footsteps, and raised the deficit ceiling for 2002, as well as the deficit path for the following years. In 2001 the deficit exceeded the target (set by the previous government) by nearly 3 per cent of GDP. In 2002, despite a second increase of the deficit target to 3 per cent of GDP, and a comprehensive deficit-reducing policy package in the middle of the year, the deficit exceeded even the revised target. Accordingly, the government raised the deficit ceiling for 2003 again – to 3 per cent of GDP. Nevertheless, keeping in mind that 2003 was an election year, the government did not neglect to specify a medium-term deficit path for its successor, reaching 1.0 per cent of GDP by 2007.

The technical view of the performance of deficit targets between 1994 and 2003 presented above clearly suggests that they did not contribute much to the credibility of fiscal policy during that period. Despite the multi-year legislation, each new government raised the deficit target, and in most years the target was missed anyway (Figure 1). While all the governments adopted the "magic numbers" of a deficit target of 1 or 1.5 per cent of GDP in the medium-term, the operative deficit target for the next year always hovered around 3 per cent of GDP – when measured according to the current definition. Moreover, actual deficits remained most of the time between 3 and 4 per cent of GDP, with few exceptions (Table 4). It appears that the deficit targets were not an effective instrument to overcome the time inconsistency problem – either within governments' terms of office, or clearly between them. A cynic may even argue that the deficit targets became an instrument enhancing time inconsistency, as they were used by governments to embarrass their successors.

Nevertheless, one may wish to take a broader view of that policy experience. Throughout that 10-year period policymakers presented three underlying policy targets: 1) to reduce the deficit as a per cent of GDP, 2) to lower the public debt to GDP ratio, 3) to cut the share of public expenditure in GDP. Examining the progress made throughout the period in achieving these targets may be more insightful in interpreting the policies than technically following the achievement of the formal

Table 4

Central Government Balance According to Various Definitions[1]

Year	Domestic Balance	Overall Balance Including the BOI	Overall Balance
1993	***–2.2***	–2.3	–2.3
1994	***–1.8***	–2.2	–2.2
1995	***–3.0***	–3.9	–4.2
1996	***–4.2***	–3.6	–4.0
1997	–2.9	***–2.5***	–3.2
1998	–2.7	***–2.2***	–3.1
1999	–2.7	***–2.3***	–3.2
2000	–0.5	–0.7	***–0.7***
2001	–3.4	–4.4	***–4.4***
2002	–3.4	–3.8	***–3.8***
2003	–5.2	–5.4	***–5.4***
2004	–3.1	–3.7	***–3.7***
2005	–1.1	–1.9	***–1.9***
2006	–0.2	–0.9	***–0.9***

[1] The effective definition for the purposes of the deficit target is shown in italics and bold type.

targets. To avoid repetition, this discussion is postponed to Section 6, following the discussion of the different policy experience in 2003-06.

5 The consolidation program of 2003 and its aftermath

Following the January 2003 elections Prime Minister Sharon formed a new government with former prime minister Netanyahu as Finance Minister. The new government had to deal immediately with an intensifying financial crisis. Against the background of two consecutive years of negative growth, security threats emerging from the imminent second Gulf war and Palestinian terrorist attacks, and slow global growth, Israel's fiscal position deteriorated – despite the adoption of the adjustment package of mid-2002. By early 2003 short-term interest rates approached 12 per cent, and the yield on 10 year indexed government bonds was 6 per cent. It was clear that the deficit target of 3 per cent of GDP was unrealistic and would be exceeded by a wide margin, and that the deficit and debt dynamics were on an unsustainable path (Table 5).

Table 5

Projected Budget Balance and Debt/GDP Ratios
Before and After the 2003 Adjustment Program[1]
(percent of GDP)[2]

	2003	2004	2005	2006
Before the Program: No Adjustment				
Central government balance	–6.0	–7.0	–7.1	–7.2
Public debt	105.7	109.5	111.5	113.6
After the Adjustment Program				
Central government balance	–5.4	–5.1	–4.4	–3.7
Public debt	105.0	106.9	106.4	105.0
After the 2004 Budget[3]				
Central government balance	–5.4	–4.1	–3.7	–3.2
Public debt	103.3	104.7	104.4	102.8
***Ex post* Balance Projection in Early 2004**[4]	…	–3.7	–2.6	–1.7
Actual Balance	–5.4	–3.7	–1.9	–0.9

[1] All the scenarios assumed the same growth rate - 4 per cent annually – and interest rates – for the purpose of illustration. The debt ratio in the scenario that presents the effects of the 2004 budget reflects valuation changes that took place between June 2003 and January 2004.
[2] All the figures are adjusted to the current, revised, GDP definition.
[3] A projection based on the specific measures adopted in the program and with the 2004 budget.
[4] A projection based on the measures adopted by early 2004 and the actual growth rate in 2004-2006.

The task of persuading the markets that the government was committed to fiscal adjustment was particularly daunting in light of the dismal fiscal performance in the previous decade and the surge of the deficit so soon after the 2002 package. The former suggested that yet another plan promising to reduce the deficit at some time in the future was unlikely to resume market confidence. The latter indicated that another package based only on short-term measures, which would not deal with the structural factors that keep pushing public expenditure up, would be unlikely to persuade the public that it was sustainable. Thus, the crisis called for a front-loaded program with measures that would also consolidate the fiscal position in the medium and long run.

In March 2003 the government presented a comprehensive fiscal adjustment program which was focused almost entirely on the expenditure side. The program included immediate reductions in a broad range of expenditure items as well as measures phased in to reduce spending over the longer horizon. While some of the measures did not survive the political approval process and the negotiations with the trade unions, the remaining measures still accounted for 0.6 per cent of GDP in 2003 and for an additional 1.3 per cent in 2004. These measures included mostly cuts in ministries' operational budgets, in transfer payments, and a dramatic reduction of housing subsidies. An important measure in the program was a two-year agreement with the trade unions on a 4 per cent reduction in public-sector nominal wages.

Although the immediate impact of the program was quite substantial, it was not sufficient to change the medium-term dynamics of the budget. To do that the program also included a broad range of structural measures that were designed to change the growth rate of expenditure over the medium (and long) run. These measures included 1) a nominal freeze of social security allowances for three years, to be followed by a change of their updating mechanism from indexation to the average wage to indexation to the CPI, 2) a gradual, although substantially front-loaded, reduction of child allowances, including an equalization of the allowance for all new-born infants at the level of a first child (the lowest level), 3) a reduction in all public-sector employees' budgetary pensions and the introduction of employee contributions to the program, 4) a nominal freeze of many budgetary items for a 5-year period, 5) a change in the promotion and wage adjustment procedures in the government sector, 6) comprehensive pension reform, including raising the retirement age from 65 to 67 for men (within 5 years) and from 60 to 64 for women (within 8 years),[17] and 7) a program for gradual downsizing of military personnel.

The measures implemented at the initial stage of the program succeeded in halting the rise in the deficit, and even allowed for a small decline in 2004. However, the projected decline was not sufficient to reverse the debt dynamics for at least two more years (Table 5). To achieve a speedier decline in the deficit, the government adopted a second set of budgetary cuts during the discussions on the 2004 budget. These measures were also predominantly (about 70 per cent) on the expenditure side, and brought the projected deficit close in line with the new deficit target of 4 per cent of GDP.[18] Moreover, that package included further specified cuts in the ministries' budgets for the years 2005 through 2010. Along with the approval of the 2004 budget the government also introduced a medium-term budget framework with a (legislated) deficit ceiling of 3 per cent of GDP, beginning in 2005. The medium-term framework was supplemented by a new component – an expenditure ceiling restricting its real annual growth to 1 per cent from 2005 until 2010.

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[17] The legislation provides for a further rise in the retirement age for women – to 67, by 2017 – unless a public committee recommends otherwise.

[18] The original 2004 budget included unsustainable cuts in defense spending and in government grants to the local authorities. These cuts were replaced in February 2004 by cuts in other budget items, a step that contributed to the credibility of the budget framework.

In addition to the budgetary cuts, the government also introduced severe procedures for approving spending and budgetary reallocations by the ministries. Since the Israeli budget is presented in great detail,[19] and because transferring even small amounts between items requires the approval of the Ministry of Finance, these new procedures became a significant barrier to government spending. The impact of these controls became especially significant because of the need to adjust the composition of the ministries' budgets in line with the hundreds of specific decisions introduced as part of the adjustment packages in 2003 and 2004. The effect of these procedures was reflected in significant under spending of the budget in the years 2003 through 2005, as well as in a higher than usual share of annual expenditure during the month of December in those years. In 2006, the low execution rate of the civilian ministries' budgets was used as a buffer that facilitated an increase in defense spending, due to the hostilities in the Lebanese border, within the expenditure ceiling.[20]

Examining the fiscal performance since the initiation of the 2003 program suggests a sea-change compared with the performance during the previous decade. The central government balance improved from a projected deficit of 6 per cent of GDP in 2003 – and an even higher deficit projected for the later years – to a deficit of 0.9 per cent of GDP by 2006 (Table 5). The entire decrease in the deficit was due to a reduction in the share of expenditure in GDP. Specific measures adopted with the adjustment program account for a decrease in the deficit of 4 per cent of GDP (from a projected level of 7.2 per cent for 2006 to 3.2 per cent). An additional decrease of 1.5 percentage points reflects the faster-than-projected growth. Furthermore, at least part of the remaining decline can be attributed to the effects of the administrative budgetary measures, discussed above, and to the decline in interest rates as a result of the unexpected improvement in the fiscal position. Therefore, almost all the decrease in the deficit from March 2003 can be attributed to the measures adopted in the context of the adjustment program.

While fiscal consolidation progressed substantially during 2003-06, the role of fiscal targets remained questionable. In 2003 the government abandoned the deficit ceiling. For 2004 the deficit ceiling was raised from the level of 2.5 per cent of GDP, set in 2002, to 4 per cent, a target that was actually achieved. At the same time the government adopted a deficit ceiling of 3.0 per cent of GDP for 2005 (Table 6) and a cap of 1 per cent on the growth rate of real expenditure (deflated by the CPI). During the preparation of the 2005 budget, however, the government decided to raise these ceilings to allow for the increased expenditures related to the disengagement from the Gaza Strip. In the event, though, the deficits in both 2005 and 2006 were well below the originally targeted ceilings (Figure 1). Expenditure in 2005 was also well below the original ceiling.

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[19] Ben-Bassat and Dahan (2007).

[20] In fact, expenditure in 2006 exceeded the ceiling by 0.45 per cent of GDP – the amount of government compensation for damages to citizens suffered during the war. Special accounting procedures allowed this expenditure to be recorded as a reduction in tax revenues.

Table 6

Budget Rules and Targets 2003-2006

Decision Year	**Deficit Target** *(percent of GDP)*	**Expenditure Growth**	**Notes**
2003	2004 – 4.0% 2005 Onward – 3.0%	2005-2010 1 per cent real growth every year	
2004	2005 – 3.4%	Expenditures equivalent to 0.4 percent of GDP related to the costs of disengagement are excluded from the ceiling	Deficit ceiling raised by 0.4 per cent of GDP to account for costs of disengagement
2006 - May	2007 – 3.0% 2009 – 1.0%	2007-2010 1.7 per cent real growth every year	Expenditure growth excluding disengagement
2006 - September	2007 – 3.0% 2009 – 1.0%	2007-additional 4.6 billion NIS, 2008-additional 2.5 billion NIS	Increased expenditure ceiling due to one-off costs related to the war in the Lebanese border

In May 2006 a government headed by Ehud Olmert, a senior member of Sharon's former government, took office. Despite the lower-than-budgeted spending in 2003-05, as well as in the first few months of 2006, the new government raised the permitted annual growth rate of expenditure to 1.7 per cent (approximately the population growth rate), beginning in 2007. However, later in 2006 that same government decided to raise the 2007 ceiling again – by 0.7 per cent of GDP – to account for the one-off expenditures related to the second Lebanon war. Additional one-off expenditure was provided for in an increased ceiling for 2008.

The experience of the consolidation effort in 2003-06 shows that pre-specified measures can go a long way in helping governments, including subsequent cabinets, to meet the original program targets. In the following section we will try to examine this particular sub-period in the broader context of the attempts to reach fiscal consolidation during the past 22 years.

6 Integrated analysis, 1985-2006

The development of Israel's main fiscal aggregates in the past 22 years varied substantially between the four sub-periods discussed above. While formal fiscal targets were set during most of that period, the key question, eventually, is how the

government progressed in each of these sub-periods towards fiscal consolidation. Specifically, the finding above that the official targets were constantly missed and often revised does not categorically imply that they were not useful. It may be argued that they served as a constraint that was instrumental in progress, even though formally they were missed. To be able to reflect on the targets' effectiveness one should also examine the development of the fiscal aggregates themselves with respect to the broad policy targets repeatedly stated by the government: 1) reducing the deficit: 2) cutting the share of public expenditure in GDP; 3) reducing the debt to GDP ratio.

In comparing the end-points of this 22-year period, Israel's general government deficit decreased by 10 percentage points of GDP: from an average 11.8 per cent in 1980-84 to 1.4 per cent in 2006.[21] However, this decline was not uniform throughout the period. In the immediate aftermath of the 1985 stabilization program the budget recorded a temporary surplus. Between 1989 and 1993, when the temporary measures and disinflationary effects on revenues faded away, the deficit stabilized at roughly 5 per cent of GDP and the cyclically adjusted deficit at 4.4 per cent (Table 7); excluding the one-off immigration absorption costs in the early 1990s, the cyclically adjusted deficit averaged about 2 per cent during that period (Figure 2). Even though there were no official deficit targets at that time (until 1992) the cyclically adjusted deficit (excluding absorption costs) was consistent with long-term convergence to a debt to GDP ratio of about 50 per cent.

The multiyear deficit ceilings adopted in 1991 were consistent with the underlying deficit in that year and were intended to send a message that as absorption costs phase-out the deficit would be reduced accordingly. With hindsight, 1991 was a year of an exceptionally low underlying deficit, so achieving the target required the new government to reduce the deficit by some 1.5-2 per cent of GDP until 1995. The new government, however, abandoned the consolidation process: generous expenditure programs were adopted and the deficit target was raised. Although the results were not immediately visible – due to the phase-out of absorption costs and high growth (Table 7) – the underlying cyclically adjusted deficit rose in 1993 and then surged in 1995 and 1996. The near-crisis deficit levels reached in 1996 forced the government to cut the deficit in 1997, but the cyclically adjusted deficit stayed above 4 per cent until 2003. Thus, between 1992 and 2003 there was no progress towards consolidation despite repeated government policy statements that the objective was consolidation and the constant presence of ambitious formal medium-term targets. Only in 2003, when the deficit surged and a financial crisis emerged, did effective fiscal consolidation take place, and the sustained cyclically adjusted deficit was reduced by almost 4 percentage points of GDP, to levels unseen since the 1980s.

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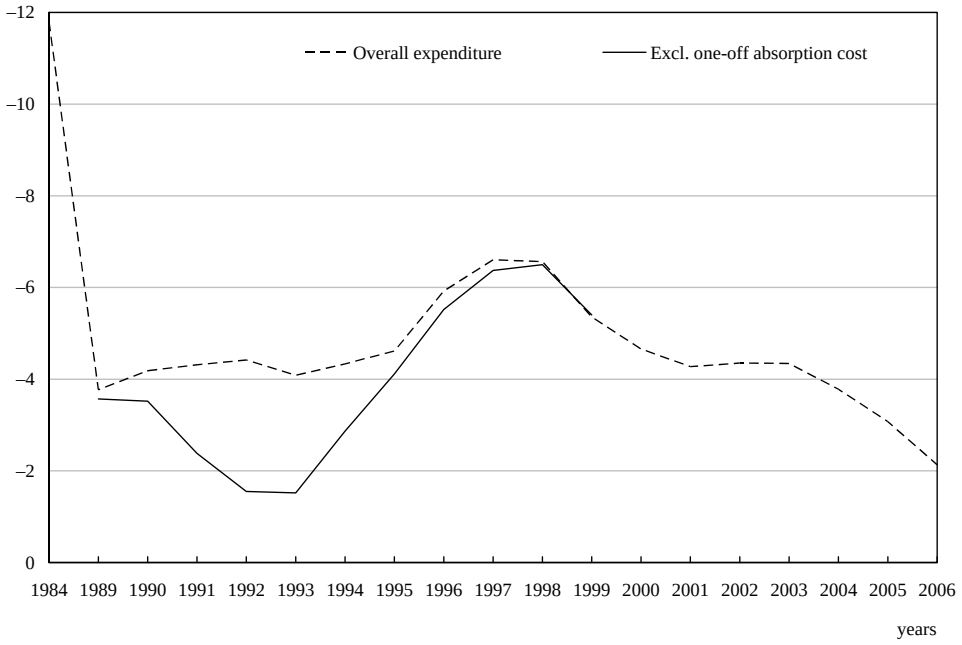
[21] The formal fiscal targets were set in terms of the central government budget. However, because the coverage of the budget and its accounting practices changed several times (for details see Bank of Israel Annual Report 2004, Box 3.A) we focus here on the more comprehensive, and internationally common, concept of general government.

Figure 2

Sustained Cyclically-adjusted Deficit, 1980-2006[(1)]
(percent of potential GDP)



(1) Three years moving average, from 1989. In 1984 average for 1980-1984.

The deficit path is also reflected in the development of the debt to GDP ratio during the period. The reduction of the deficit from 11.8 per cent of GDP before the 1985 stabilization program to just over 4 per cent in the early 1990s, and the fact that the deficit stabilized around that level (Figure 2), implied a convergence of the debt ratio to about 100 per cent (given Israel's average long-term growth rate of about 4 per cent and valuation effects).[22] This was indeed the case: until 1995 the debt ratio fell continually, although at a decelerating rate, as it converged to its new equilibrium level (Figure 3). Once that level was reached the trend decline stopped until 2005.[23] The decline of the debt ratio in 2005-06 reflects the lower cyclically adjusted deficit; if the average deficit level of the last 3 years persists, then this decline may be the beginning of the debt ratio's convergence to 50 per cent.

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22 Because most of Israel's debt is indexed to the CPI, whose growth rate is lower than that of the GDP deflator, the long-term ratio was around 95 per cent.

23 Substantial fluctuations between 1999 and 2002 reflected the growth spree of the year 2000 and the recession that followed.

Table 7

Sustained Cyclically-adjusted General Government Balance[1], 1988-2007

Year	General Government Balance *(percent of GDP)*	Output Gap[2] *(percent)*	Ratio of Actual GDP to Its Sustained Potential *(index)*	Sustained Cyclically-adjusted Balance[2] *(percent of potential GDP)*
1987	0.1	–1.5	101.6	–1.0
1988	–3.2	–4.3	98.8	–2.7
1989	–6.1	–6.0	96.9	–4.8
1990	–5.7	–4.4	98.6	–5.1
1991	–4.3	–6.0	97.0	–3.0
1992	–5.6	–4.2	98.8	–5.1
1993	–4.8	–4.7	98.3	–4.1
1994	–3.4	–2.2	100.9	–3.8
1995	–4.6	–0.1	103.1	–6.0
1996	–6.1	1.3	104.5	–8.0
1997	–4.5	0.0	103.2	–5.8
1998	–4.5	0.1	103.3	–5.8
1999	–3.6	–1.1	102.0	–4.4
2000	–1.5	3.0	106.3	–3.7
2001	–4.1	–1.6	101.6	–4.7
2002	–5.2	–5.9	97.0	–4.6
2003	–6.1	–7.7	95.2	–3.7
2004	–4.6	–6.4	96.6	–3.0
2005	–3.1	–4.8	98.2	–2.5
2006	–1.4	–3.2	99.8	–0.9

[1] The sustained cyclically-adjusted balance is calculated in the same way as the cyclically-adjusted deficit but with respect to an output level which is calculated by mutiplying potential GDP by the average ratio of actual GDP to its potential in the past 20 years.
[2] In percent of potential GDP.

The driving force behind the changes in the size of the deficit was the share of public expenditure in GDP, while the tax to GDP ratio was remarkably stable during most of the period, after its decline in the late 1980s (Figure 4). Public expenditure fell from 65 per cent of GDP in 1985 to 51 per cent in the early 1990s (excluding absorption costs) and stayed at that level until 2003. Despite the statements of successive governments on the need to contain public expenditure, only the 2003 stabilization plan succeeded in reducing its share in GDP again (Figure 4). The unsuccessful experience with meeting the deficit targets during 1995-2003 is especially surprising given the stable expenditure and tax ratios and in particular because there was never a need for an interim budget throughout the period.

Figure 3

Public Debt
(percent of GDP)

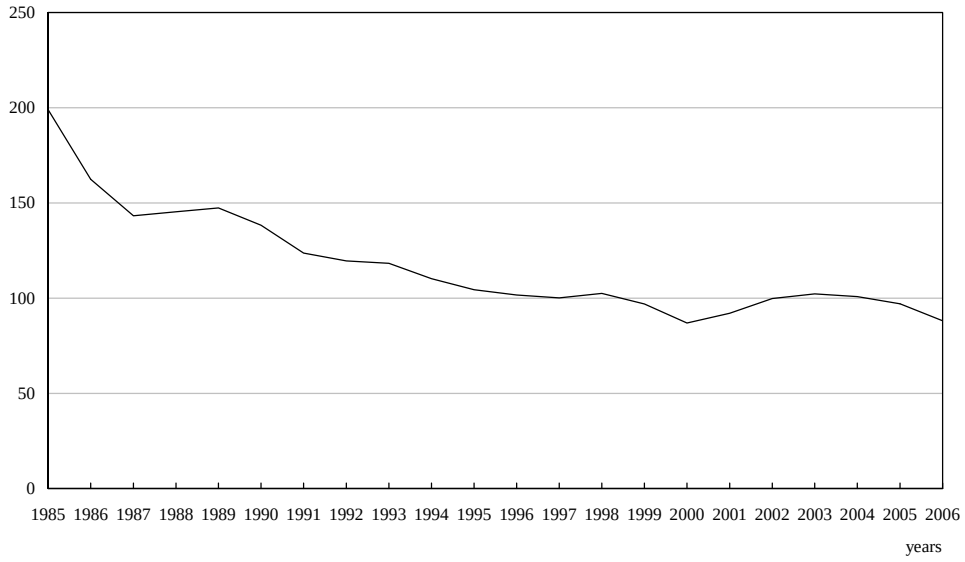

Figure 4

General Government Expenditure and Taxes
(percent of GDP)

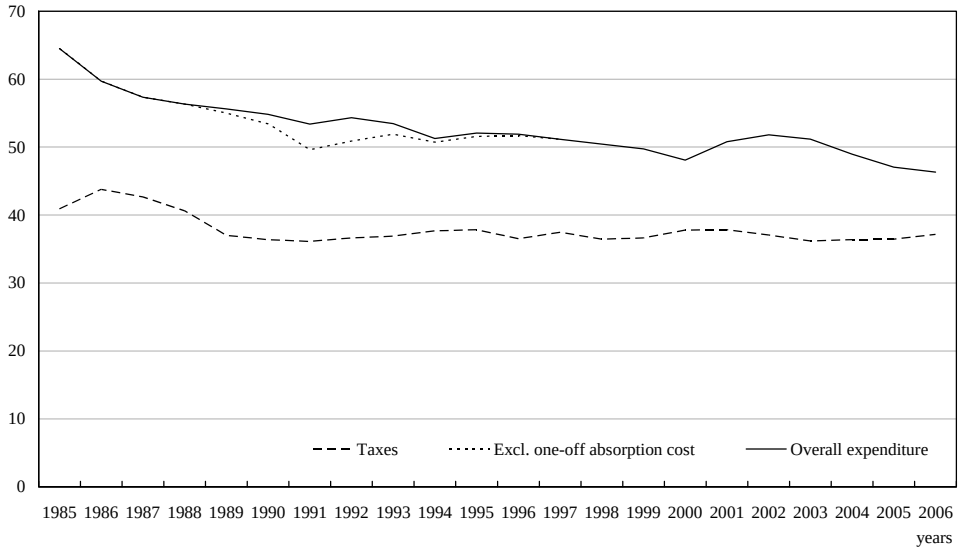

Table 8

Growth Rates of Public Expenditure in Israel, 1994-2006
(percent, deflated by implicit price index of business-sector product)

	1985-1989	1990-1993	1994-1999[1]	2000-2001	2002	2003-2005	2006
	(growth rate, annual average)						
Total public expenditure	0.0	6.0	4.4	5.8	1.9	0.4	3.6
Total primary public expenditure	0.4	7.1	4.6	6.2	3.1	0.0	4.8
Defense expenditure[2]	*–3.8*	*1.6*	*2.5*	*4.2*	*11.2*	*–2.1*	*7.7*
Current primary civilian expenditure	*–0.3*	*5.4*	*7.4*	*7.3*	*0.6*	*0.0*	*4.2*
Public consumption excluding defense imports	0.2	7.3	7.4	5.7	3.8	0.4	5.1
Civilian consumption	3.0	7.4	9.3	6.2	2.0	1.5	4.4
(Per capita civilian consumption)	1.3	3.3	6.6	3.6	–0.1	–0.3	2.6
Domestic defense consumption[2]	–1.4	0.6	2.7	4.9	8.9	–1.1	7.5
Transfer payments to households	9.1	9.3	6.3	9.6	–0.7	–1.2	1.9
(Per capita transfer payments)	7.3	5.2	3.7	6.9	–2.7	–3.0	0.1
Producer and price subsidies[2]	–13.0	–7.0	–7.7	6.4	–14.4	3.1	35.0
Transport infrastructure	…	…	–0.8	4.3	24.0	18.1	2.4
Transfer payments on capital account	–6.2	47.1	–4.7	1.9	5.4	3.2	3.7

[1] Since 1995, including expenditure due to the National Health Law.
[2] Expenditures on these items in 2006 reflect the direct costs of the war in the Lebanese border.
Source: Based on Central Bureau of Statistics data.

The analysis of the fiscal aggregates suggests that substantial progress towards fiscal consolidation was achieved between 1985 and the early 1990s and, again, beginning in 2003. On the other hand, between 1992 and 2003 performance was dismal. Table 8 compares the dynamics of public expenditure between the periods. During 1985-89 real public expenditure (nominal expenditure deflated by business-sector prices) did not rise at all. The two key components of the program are visible: defense expenditures decreased at an average annual rate of 3.8 per cent and producer and price subsidies by 13 per cent. At the same time civilian public consumption rose at a lower rate than the long-term growth rate of GDP. Although

transfer payments to households rose rapidly, this came from a low base and reflected the need to compensate low-income families for the reduction of subsidies.

The evident change in expenditure dynamics in the early 1990s is striking. Primary expenditure rose by 7.1 per cent annually, first reflecting absorption costs and then their replacement by other – mostly current – expenditure. Public consumption rose at an unsustainable annual average rate of 7.3 per cent (3.3 per cent per capita) and transfer payments by 9.3 per cent. Since the government policies in that period affected the dynamics of public expenditure and not only their level, they impacted on the following years – until 2002 – as well. Faced with such daunting dynamics, any subsequent government wishing to reduce the deficit would have had to break the mechanisms that raised transfer payments and the automatic wage crawl – a task that calls for a confrontation with many vested-interest groups. While the governments elected during that period recognized that such a change would have to be phased-in over a few-years, all four of them chose to set the medium-term deficit target for their successor while neglecting to make the required decisions to change the expenditure dynamics. Consequently, annual revenue projections had to be stretched in some of the years to match the increase in expenditure.

The change in expenditure dynamics due to the 2003 stabilization program is also evident in Table 8. During 2003-05 the level of primary public expenditure did not increase in real terms, as the measures implemented in 2003 gradually took effect.[24] Unlike in the 1985 program, in 2003 the change in expenditure dynamics was more broadly based, as reflected in the near freeze of real public consumption (aided again by a decline in defense spending) and the decrease in transfer payments.

7 Conclusions

The evolution of Israel's fiscal policy in the past 22 years highlights two periods of successful consolidation: 1985-92 and 2003-06; in the 10-year period between them very little progress was made towards consolidation – despite the repeated setting of policy targets to that effect. The key factor that is pointed out here as contributing to the success in these two episodes is tackling the underlying public expenditure dynamics upfront. In both cases the government at the outset adopted specific measures to contain expenditures in the following years. By doing so subsequent cabinets were relieved of the need to confront interest groups – although their perseverance in preventing the reversal of the measures should not be underestimated.

The arguments in favor of fiscal targets typically focus on the need to restrict macroeconomic manipulations, taking into account Keynesian considerations.

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[24] Developments in 2006 are primarily related to the war on the Lebanese border. See further discussion below.

However, the findings above seem to be more consistent with the perception of the deficit bias as a microeconomic phenomenon. the budgeting process may, in many cases, be dominated by political forces that focus on specific budget items, rather than on macro characteristics such as the deficit. Valesco (1999), Hallerberg and von Hagen (2006) and Persson, Roland and Tabellini (2005) discuss the "deficit bias" as a microeconomic phenomenon with macroeconomic consequences: the result of pressures by many interest groups pushing their own interests, while not fully accounting for the related cost[25] – the "common pool" problem. This problem is particularly relevant for coalition governments as is the case in Israel. In the current context this problem implies that even when a deficit target is set in advance a government that still has to decide on – and implement – the specific measures to cut the deficit would likely prefer to avoid the associated political cost and bear the cost of changing – or missing – the aggregate target. This may be especially true if the magnitude of the required measures is substantial or when the target was set by a former cabinet. To overcome this problem Tanzi (1994) highlights the need for consistency between the official targets and actual policy measures and stresses that medium-term targets need to be supported by well – specified future policy measures. Buti, Eijffinger and Franco (2003) also point out the need to distinguish between one-off and long-term structural measures in policy evaluation.

While adopting comprehensive programs that specify the policy measures over the medium term is clearly the prescription for fiscal consolidation that emerges from this analysis, the question is, how does a government generate the will and the political might to implement such a program? The common feature of the two successful episodes in Israel gives no reason for optimism: both episodes occurred at a time of emerging financial crisis, and both programs were adopted after failed attempts to stabilize the economy with less comprehensive programs. Paraphrasing Churchill, this experience suggests that "You can trust the government to do the right thing, after it exhausted every other possibility." A second important feature in both episodes, although much more so in 1985, is the reduction of defense expenditure as part of the program.

Formal fiscal targets seemed to have played a very limited positive role, if any, in Israel's progress towards fiscal consolidation. During the consolidation period of 1985-92 the government did not adopt official medium-term fiscal targets at all. This did not prevent the preservation of the substantial decline of the deficit and its continuation (net of absorption costs) until 1992. The initial introduction of the deficit target seemed as a plausible statement of policy intentions with respect to the phasing-out of the absorption costs. However, the immediate change of the target in 1992 turned this instrument into a platform for postponing policy efforts. Until 2003, with the exception of the 1997 budget, the governments preferred to pay the price for changing the pre-set fiscal targets, or simply missing them, rather than to tackle the underlying expenditure dynamics.

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[25] Phelps (1985) provides a detailed discussion of the conceptual issues underlying the suboptimal equilibrium reached in group decisions.

The successful consolidation of 2003 took place at a time where formal fiscal targets were present. However, their role in the initiation of the 2003 program was limited. In fact, in 2003 the government explicitly announced that it was abandoning the deficit target for that year and was not adopting a new one. In the process of preparing the 2004 budget the government raised the former deficit ceiling to match the projected effect of the adopted policy measures, so clearly the target was not a binding constraint, but rather a reflection of projected performance. The repeated upward revisions of both the expenditure and deficit ceilings in 2005-07, while performance was much better than the initial targets and in line with the estimates at the time it was introduced, suggest that the role of the formal targets remains limited. The formal targets did not – and still do not – serve as a mechanism for overcoming the time inconsistency problem for governments.

If formal policy targets are no credible guide to the evolution of Israel's fiscal aggregates, what can be implied about them? In the past 22 years changes in the underlying expenditure dynamics were relatively rare. Therefore, an analysis of the expected expenditure dynamics – based on existing policies – can provide guidance for future fiscal developments. Detailed publication of such estimates would provide the public with worthwhile information as to the sustainability of the fiscal targets and – more importantly – the expected development of the fiscal position. Past and current experiences suggests that in cases of a mismatch it is the targets that will usually change – not the policies. Nevertheless, in Israel, any forward-looking fiscal analysis should be conditional on the security situation, and the related defense expenditures, which remain the wild-card in all fiscal scenarios. This is particularly evident in the developments in 2006 and the looming threat of a substantial permanent increase in defense expenditures as a result of the war.

Finally, a word on the markets. In contrast to the proposal to use fiscal rules – or other fiscal policy guidelines – and support them with pre-specified measures (e.g., Tanzi, 1994; Buti *et al.*, 2003), it is argued by some scholars that market discipline may be a sufficient substitute. Kopits (2001), as well as many others in the fiscal institutions literature, points out the slow response of markets to expanding fiscal deficits and deterioration in the underlying fiscal position, and demonstrates it in the slow response of rating agencies. In the Israeli case, the study by Ber, Brender and Ribon (2004) shows that market interest rates in Israel respond not only to actual fiscal performance but also to the fiscal targets – despite their poor performance. Moreover, the data show no evidence for a decrease in the effect of the targets on interest rates, despite their dismal performance.

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THE QUALITY OF FISCAL ADJUSTMENT AND THE LONG-RUN GROWTH IMPACT OF FISCAL POLICY IN BRAZIL

Fernando Blanco and Santiago Herrera[*]

This paper describes the main trends of Brazil's fiscal policy during the last decade and analyzes: (1) the ability to raise the primary surplus in response to external shocks, (2) the pro-cyclical nature of fiscal policy, and (3) the long-run impact of government expenditure composition and taxation.

The use of the primary balance as a policy tool is analyzed within the Drudi-Prati model, wherein the government uses the primary balance to reveal its commitment to service its debt. We verify that both the debt ratio and the primary balance are determinants of spreads and credit ratings in Brazil. However, the relationship is non-linear: the impact of the primary balance on spreads is amplified as the debt ratio increases.

Using an Autoregressive Distributed Lag (ARDL) approach, we analyze the relationship between the primary balance and economic activity, finding a positive correlation in the long run. However, in the short run, fiscal expansions are associated with primary balance reductions and vice-versa during output contractions confirming the pro-cyclical nature of fiscal policy in the short run.

The paper uses two approaches, the autoregressive distributed lag (ARDL) and a cointegrating VAR, to analyze the interaction between public expenditure composition and taxation on growth. Similar results are obtained: large elasticities of output with respect to capital stocks, a significant negative impact of taxation on long-run GDP, and a negative impact of government consumption and transfer payments on GDP. These results shed light on the contribution of fiscal policy to disappointing growth performance in Brazil during the past decade.

Introduction

Throughout the 1990s, Brazil started a process of economic reform including liberalizing trade, relaxing price controls, and privatizing public enterprises. Although some problems remained at first, such as higher public sector deficits and limited exchange rate flexibility, the country corrected most of these and steered a course toward stability by the end of the millennium. In fact, since 1999, Brazil has

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made substantial efforts to adjust its fiscal accounts., adopting credible rules that govern the budget process The hallmarks of this process are the Fiscal Responsibility Law and the impressive primary surplus achieved between 1999 and 2005.

Despite the impressive results some vulnerability still remain. In particular, the quality of the fiscal adjustment brings doubts about growth prospects and the own continuity of the hard fiscal stance. The fiscal adjustment has been accomplished through strong revenue increases (the tax burden has grown from 29 per cent of GDP in 1998 to 35 per cent in 2004) and by curtailing public investment (investments by federal government fell from 1.1 per cent of GDP in 1998 to 0.5 per cent in 2005). The increase of the tax burden and the compression of public investment are harming growth prospects which can complicate future debt dynamics. On the other hand, the permanent increase of current expenditures and the impossibility to maintain the tax burden growth are negatively affecting the sustainability of the current fiscal adjustment effort. To sustain growth while re-orienting public finance towards investment therefore represents the next chapter of Brazil's national economic reforms.

The paper is organized in four sections following this introduction. The first one describes the main fiscal trends since the 1990s, focusing on the period 1999-2005. The second section examines a mechanism that would allow fiscal policy to be more responsive to shocks, by permitting automatic stabilizers to operate throughout the business cycle to mitigate the pro-cyclicality of Brazilian fiscal accounts. This section computes the long-run effects of different variables on the primary balance and estimates the cyclical component of the primary surplus. The third section examines the long-term impact of public finance on growth, using a modified production function approach, in which private and public capital are considered inputs, jointly with different types of public expenditure. Results indicate large elasticities of output with respect to capital stocks, negative impact of public consumption and transfers in the long run, and a significant negative impact of taxation on long-run GDP. The fourth section summarizes the results and concludes.

1 Background: Brazilian fiscal policy in the period 1990-2005

This section is divided into four parts. The first one describes fiscal outcomes during the last 15 years, focusing on the fiscal adjustment of 1999-2005. The second section highlights the flexibility of fiscal policy during this volatile period, and examines the role of the primary surplus as a signaling device in a world of imperfect information. The third section assesses the quality of the fiscal adjustment identifying the type of adjustment carried out-revenue increasing or expenditure cutting. The fourth section attributes the type of fiscal adjustment to the high budget rigidity.

1.1 Fiscal policy trends in Brazil

During the last years of the military regime, the Brazilian public sector showed signs of financial fragility. Slower growth combined with the external shocks, led to a fall in public sector savings. The re-democratization process deepened the fiscal disequilibria, because the new democratic government set out to satisfy repressed social demands for redistribution. The 1988 Constitution expanded the social responsibilities of the state, guaranteed free access to social services, established higher social security benefits, and defined a generous regime for public sector employees (Bevilaqua and Werneck, 1998). The new Constitution also modified the federal fiscal system, creating an imbalance between resources and responsibilities among levels of government. Finally, the 1988 Constitution increased the rigidity of public spending through the earmarking of an important part of fiscal revenues.

These measures had a very perverse effect on public finances, but inflation postponed the collapse of the fiscal regime. During this high-inflation period, the asymmetric indexation to inflation of revenues and expenditures, higher for revenues than for expenditures, produced artificially positive balances (Cardoso, 1998). Additionally, the negative real interest rates and the inflation tax generated soft budget constraints and positive fiscal outcomes.

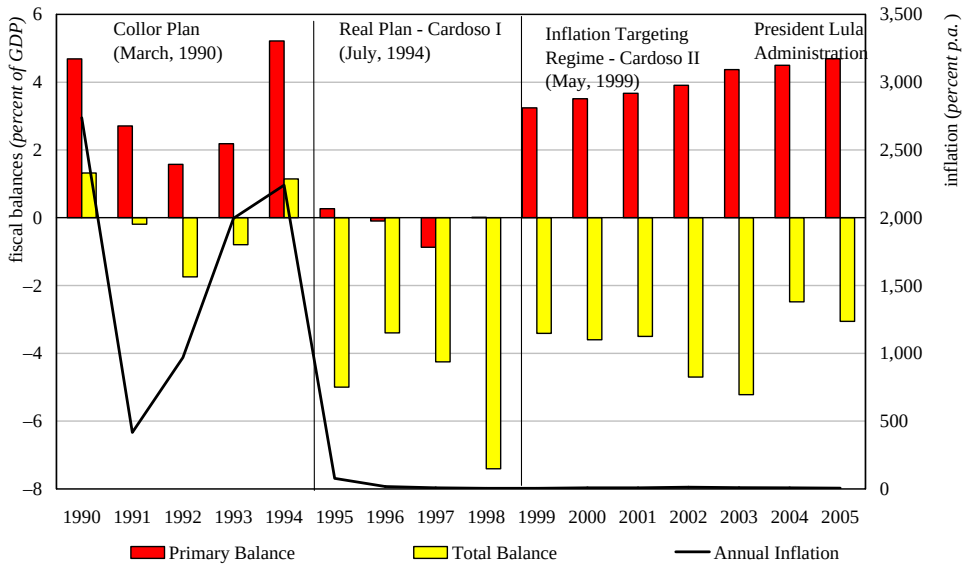
The evolution of fiscal accounts during 1990-2005 can be divided into three sub-periods, as shown in Figure 1. The first one, 1990-94, registers positive primary outcomes and operational equilibriums. In the second one, from 1995 to 1998, the primary surplus vanishes, while the last sub-period, 1999-2003, corresponds to the fiscal adjustment years and shows a permanent improvement of the primary surplus from –0.2 per cent of GDP in 1998, to 4.7 per cent in 2005.

The end of the inflationary process in the mid 1990s coincided with deteriorating fiscal outcomes in 1995-98. Inflation was not only a revenue source, but was also a useful mechanism to control government spending in real terms during the high inflation era (Cardoso, 1998). This loss of flexibility, combined with a lack of decisive fiscal reform, produced rising public sector deficits. The excess spending relative to national income was financed in liquid international capital markets, with public debt rising from 29 per cent of GDP in 1994 to almost 42 per cent in 1998.

The central bank sterilized these capital inflows through open market operations to avoid monetary expansion and maintain a pegged exchange rate. This response complicated the situation even more because it entailed rising central bank (domestic) debt and climbing interest rates that raised the cost of servicing public debt. High interest rates combined with the pegged exchange rate attracted even more capital, worsening the state of affairs. The higher debt and the rigid fiscal, monetary, and exchange rate policies, left the economy vulnerable and with no capacity to absorb shocks. When the Asian and Russian financial crises occurred in 1997-98, Brazil was severely affected due to its sizeable external financing requirements. In January 1999, the central bank abandoned its crawling peg

Figure 1

Brazil – Fiscal Results and Inflation, 1990-2005



exchange rate regime in favor of a flexible rate and adopted an inflation-targeting framework for managing monetary policy.

In 1999, the country tackled its fiscal imbalance by launching the Fiscal Stability Program, which consisted not only in raising taxes, but also in designing a legal framework for fiscal policy management. The government set and met stringent targets for the primary fiscal surplus; the public sector primary surplus increased permanently from 3.3 per cent of GDP in 1999 to 4.7 per cent of GDP in 2005.

However, the high interest rates and the exchange rate devaluations of 1999, 2001 and 2002 prevented a more accentuated reduction of operational deficits. Consequently, the primary surpluses were not sufficient to truncate the rising path of public debt. Table 1 compares the three periods. During 1995-98, the operational balance deteriorated by almost 5 per cent of GDP in comparison with the period 1990-94. This was a result of a rise of 1.5 per cent of GDP in interest payments and a fall of the primary surplus of 3.5 per cent of GDP. The federal government was responsible for 60 per cent of fall in the operational balance, and for more than 40 per cent in the decrease of the primary surplus. States and local governments and public enterprises were responsible for 30 per cent each for the worsening of the results.

Table 1

Fiscal Balances,* 1990-2005
(percent of GDP)

	Annual Average		
	1990-1994	**1995-1998**	**1999-2005**
	(A)	**(B)**	**(C)**
1) Operational Balance (3 – 2)	–0.05	–5.01	–1.46
Federal Government	0.52	–2.48	–1.72
States and Municipalities	–0.25	–1.98	–0.30
Public Enterprises	–0.31	–0.55	0.54
2) Real Interest Payments	3.33	4.84	5.48
Federal Government	1.26	2.78	4.13
States and Municipalities	0.86	1.64	1.08
Public Enterprises	1.20	0.42	0.24
3) Primary Balance	3.27	–0.17	4.01
Federal Government	1.78	0.30	2.41
States and Municipalities	0.61	–0.34	0.78
Public Enterprises	0.89	–0.13	0.82

* (+) Surplus (–) Deficit.

Due mostly to the 2002 debt crisis (analyzed in the next section) and to tight monetary policy, interest payments rose from 4.8 per cent of GDP in the 1995-98 period to 5.5 per cent of GDP in 1999-2005. The operational balance improved by 3.5 per cent of GDP, from –5 per cent of GDP to –1.5 per cent of GDP corresponding to an improvement of 4.2 per cent of GDP in the primary balance. The Federal government contributed half the adjustment, while state and local governments and public enterprises with 25 per cent of the adjustment in primary accounts.[1]

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[1] Regarding the operational balance, the federal contribution was low (only 16 per cent) due to the impact of the greater effect of interest rates on federal accounts. On the other hand, the interest payments for state and municipalities have been reduced because of the bail-out operation of 1997-98. This operation has substituted state bonds for federal bonds and re-scheduled state debt, producing a subsidy from the federal government to the states. This means higher interest payments for the federal government and lower ones for state governments.

1.2 The flexible primary surplus as a device to signal fiscal sustainability

How do governments that are not fully credible signal regime sustainability? Based on the Drudi-Prati (2000)[2] model that rationalizes debt accumulation and delayed stabilization, we analyze the Brazilian case. The main testable implication of the Drudi-Prati (DP) model is the existence of a positive relationship between the spreads and the debt level and a negative association between spreads and primary balances. This relationship is conditioned on the debt level: Given uncertainty about the likelihood of default, the government will use the primary balance as a signaling tool to reveal to investors its true type. As the debt level rises, the dependable government (though not fully credible) will use more actively its primary balance as a signaling tool.

Spreads on sovereign debt are crucial determinants of the nominal exchange rate in Brazil and on domestic interest rates. What is the relation between these rates and the fiscal variables? For Brazil, primary balances and spreads show a non-stable association (Figure 2). From 1994 to 1998, when fiscal balances deteriorated, spreads declined. After 1999, when fiscal balances improved, spreads declined further. Drudi and Prati verified this non-monotonic relationship in their study of several European countries. The relationship between public debt and spreads is also non-monotonic. From 1994-97, when the debt ratio was low and slightly rising, spreads fell. Since 1999, however, Brazilian spreads and debt ratios appear to have settled at a higher level (Figure 3). Drudi and Prati (DP) described a similar phenomenon for the European countries.

The DP model predicts that the primary fiscal balances and public debt ratios enter the rating (spreads) function, and that the primary balance has a more influential role when debt ratios are high. This section verifies econometrically the following three testable implications of the DP model: 1) Debt ratios and primary balances are complementary in the spreads function; 2) The signaling role of the primary balance increases with the debt ratio; and, 3) If the government is dependable, then the primary balance will rise when the debt ratio increases.

To verify the complementary role of fiscal balances and debt ratios in the spreads function, we regressed the sovereign spreads on the first two variables (lagged). Table 2 shows that both variables enter significantly in the spreads function with the expected signs.

The second implication of the DP model, namely the changing nature of the signaling role of primary balances, is captured by two alternative approaches. First, a dummy variable is defined for a specific signaling period and interacted with the primary balances. The original regression is augmented with this new auxiliary variable, and the sum of both coefficients has to be larger than the primary balance coefficient by itself. For the second approach, an auxiliary variable is constructed by the interaction of the primary balances with the debt ratio. If this variable is

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[2] Drudi, F. and A. Prati (2000), "Signaling Fiscal Regime Sustainability", *European Economic Review*, Vol. 44, pp. 1897-930.

Figure 2

Primary Fiscal Balances and Sovereign Spreads in Brazil, 1994-2003

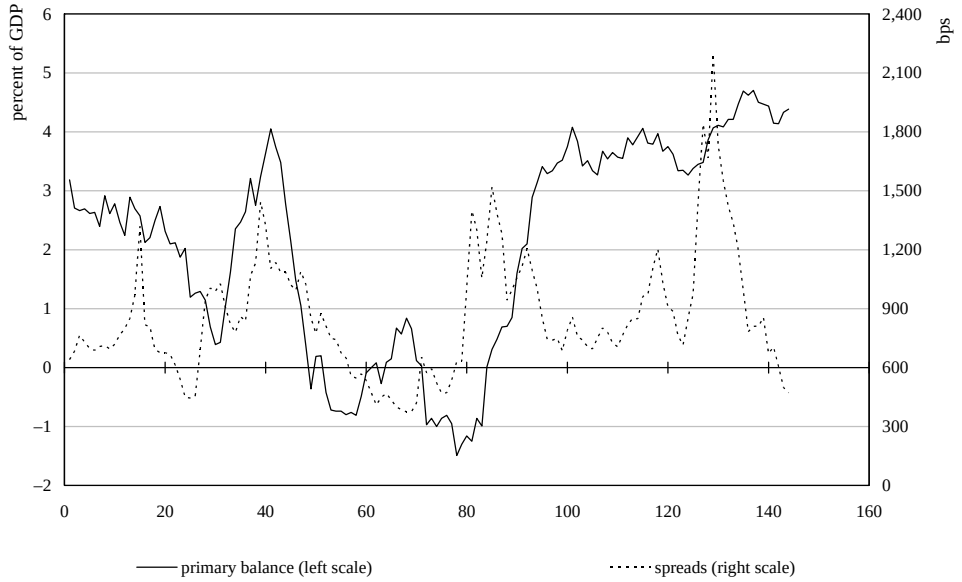


Figure 3

Public Debt Ratio and Sovereign Spreads in Brazil, 1994-2003

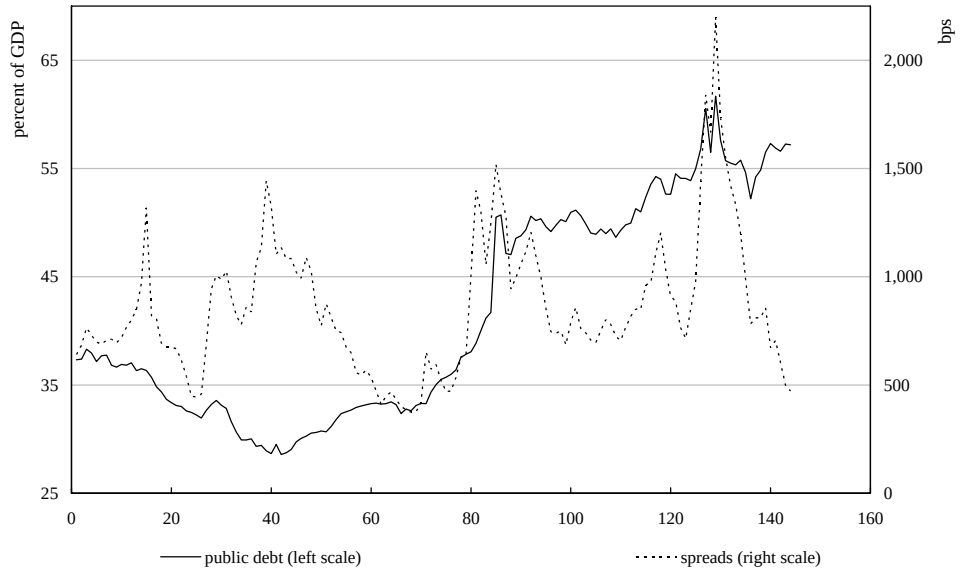


Table 2

Complementary Roles of Debt Ratios and Primary Balances as Spreads' Determinants

Dependent Variable: EMBORLAT
Method: Least Squares
Sample (adjusted): 1995:02 2002:01
Included observations: 84 after adjusting endpoints
Newey-West HAC Standard Errors & Covariance (lag truncation=3)

Variable	Coefficient	Std. Error	*t*-statistics	Prob.
C	–0.26	0.06	–4.45	0.00
DEBTY(–1)	0.01	0.00	4.48	0.00
PRIMBAL(–1)	–0.02	0.01	–2.40	0.02

R-squared	0.454	Mean dependent var	–0.011
Adjusted *R*-squared	0.441	S.D. dependent var	0.083
S.E. of regression	0.062	Akaike info criterion	–2.698
Sum squared resid.	0.309	Schwarz criterion	–2.611
Log likelihood	116.295	*F*-statistic	33.723
Durbin-Watson stat.	0.362	Prob. (*F*-statistic)	0.000

EMBORLAT= Brazil EMBI spreads orthogonalized from Latin EMBI average
DEBTY= Debt to GDP ratio
PRIMBAL= Primary fiscal balance

significant, then the hypothesis of the difference in the signaling role cannot be rejected.

For the first approach, we defined the signaling period from June 1999 to the time when the inflation-targeting approach was adopted and the Fiscal Responsibility Law was enacted. Given the significance of this auxiliary variable (Table 3), we cannot reject the hypothesis that primary balances affected spreads more forcefully during this signaling period. The alternative approach (Table 4) shows that the primary balance coefficient rose with the debt ratio, implying that signaling takes time and is not a once-and-for-all event. Drudi and Prati obtained the same result for Italy and Belgium.

The third and final implication of the DP model, the positive association between the primary balance and the debt ratio if the government is dependable is reflected in Table 5.

Table 3

The Changing Role of Primary Balances – Test 1

Dependent Variable: EMBORLAT

Method: Least Squares

Sample (adjusted): 1995:02 2002:01

Included observations: 84 after adjusting endpoints

Newey-West HAC Standard Errors & Covariance (lag truncation=3)

Variable	Coefficient	Std. Error	*t*-statistics	Prob.
DEBTY(–1)	0.013764	0.002046	6.726813	0.0000
PRIMBAL(–1)	5.95E–05	0.005334	0.011153	0.9911
DSIG*PRIMBAL(–1)	–0.054382	0.012458	–4.365126	0.0000
C	–0.500954	0.075216	–6.660195	0.0000
R-squared	0.641035	Mean dependent var.		–0.011316
Adjusted *R*-squared	0.627574	S.D. dependent var.		0.082535
S.E. of regression	0.050368	Akaike info criterion		–3.092458
Sum squared resid.	0.202958	Schwarz criterion		–2.976705
Log likelihood	133.8832	*F*-statistics		47.62098
Durbin-Watson stat.	0.611709	Prob. (*F*-statistics)		0.000000

All variables defined in preceding table

DSIG=1 for *t*>January 1999; 0 otherwise

1.3 The type of Brazilian fiscal adjustment, 1999-2005

During the first four years of the Real Plan (1995-98), fiscal accounts were imbalanced due mostly to the loss of inflation as an adjustment mechanism and to the lack of decisive fiscal reform. As Table 6 shows, the weaker fiscal stance registered during the1995-98 period is explained by rising expenditure, which grew by 16 per cent, with personnel and social security benefits expanding the most. Revenue rose just 8 per cent or 1.4 per cent of GDP, with growth concentrated on taxes, while the revenues of the Social Security System remained stable. *In sum, the fiscal expansion of 1995-98 was caused by rising expenditure and not to revenue reduction.*

The adjustment of the federal fiscal accounts in the last six years has been based on revenue increases and investment cuts. During 1999-2005, tax revenue rose by 4.6 per cent of GDP. Spending also grew, but at a slower rate: it rose by 2.5 percentage points of GDP during 1999-2005. As in the 1995-98, current

Table 4

The Changing Role of Primary Balances – Test 2

Dependent Variable: EMBORLAT
Method: Least Squares
Sample (adjusted): 1995:02 2002:01
Included observations: 84 after adjusting endpoints
Newey-West HAC Standard Errors & Covariance (lag truncation=3)

Variable	Coefficient	Std. Error	*t*-statistics	Prob.
C	–0.530713	0.071481	–7.424499	0.0000
DEBTY(–1)	0.014446	0.001826	7.912960	0.0000
PRIMBAL(–1)	–0.024688	0.003926	–6.288602	0.0000
PRIMBAL(–1)*(DEBTDEV)	–0.002630	0.000572	–4.593340	0.0000
R-squared	0.632718	Mean dependent var.		–0.011316
Adjusted *R*-squared	0.618945	S.D. dependent var.		0.082535
S.E. of regression	0.050949	Akaike info criterion		–3.069552
Sum squared resid.	0.207661	Schwarz criterion		–2.953799
Log likelihood	132.9212	*F*-statistics		45.93872
Durbin-Watson stat.	0.632039	Prob. (*F*-statistics)		0.000000

DEBTDEV=Deviation of the debt ratio from the sample mean

expenditure accounted for the bulk of the rise, while capital spending were reduced. In this case, personnel expenditures remained stable while social security benefits and intergovernmental transfers experienced more dramatic increases.

The revenue-increasing nature of the 1999-2003 fiscal adjustment raises concerns about its sustainability. International experience shows that revenue-based adjustments tend to be short-lived (Alesina and Perotti, 1996). As spending follows the rising revenue, the adjustment effort is weakened and the lasting effect is a larger government.

1.4 The rigidity of expenditure as the main explanation of the type of adjustment

Fiscal adjustment was revenue-based because of the rigidity of public spending. At the federal level, this rigidity is caused by three factors: i) the rise of social security and social assistance benefits; ii) the job tenure stability rules for public servants made impossible reducing the public sector payroll; and, iii) the constitutional earmarking of an important part of federal tax revenues.

Table 5

Primary Balances and Debt Ratios

Dependent Variable: PRIMBAL
Method: Least Squares
Sample (adjusted): 1995:01 2002:01
Included observations: 85 after adjusting endpoints
White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	*t*-statistics	Prob.
C	–2.921112	1.048574	–2.785795	0.0066
DEBTY(–1)	0.112549	0.022527	4.996247	0.0000

R-squared	0.247189	Mean dependent var	1.631294
Adjusted *R*-squared	0.238119	S.D. dependent var	2.060787
S.E. of regression	1.798774	Akaike info criterion	4.035336
Sum squared resid.	268.5538	Schwarz criterion	4.092810
Log likelihood	–169.5018	*F*-statistics	27.25346
Durbin-Watson stat.	0.049271	Prob. (*F*-statistics)	0.000001

The 1988 Constitution reinforced the three factors of expenditure rigidity through the concession of higher social security benefits and softening the eligibility criteria, defining a generous regime for official public employees which included job tenure and higher compensation and pension benefits equal to 100 per cent of exit salaries, extending these benefits to all public sector employees and strengthening the intergovernmental transfers system. The 1988 Constitution favored the expansion of social responsibilities of the state, guaranteeing free access to social services, particularly health services, creating the unemployment insurance, establishing minimum social security benefits (1 minimum wage), and universalizing it by extending coverage to rural workers.

Figure 4 shows the rising share of mandatory spending between 1986 and 2003. The increasing rigidity is due to the rise of personnel, social security and assistance transfers, and the intergovernmental transfers to states and municipalities that increased from 55 per cent of non-financial expenditure in 1986 to almost 80 per cent in 2003.

As a result of the growing share of mandatory spending, investment and other current expenditures decreased their share from around 51 per cent of primary expenditure to less than 20 per cent in 2001. Clearly, social security transfers are the fastest-increasing type of expenditure, generating a huge deficit that has to be covered by the Treasury. Figure 5 shows the evolution of the social security system

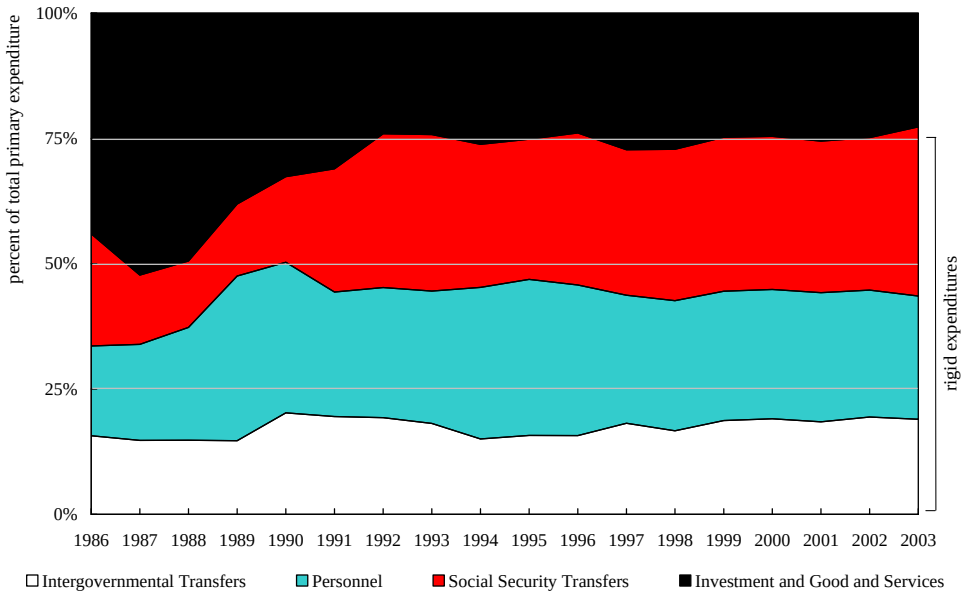
Table 6

Federal Government Primary Surplus Changes, 1990-2005

Categories	Annual Averages (% of GDP)							Variation 95/98 - 99/05			
	1990-1994 (A)	1995-1998 (B)	1999-2005 (C)	(B) – (A)	Percentual Variation	Decomp I	Decomp II	(C) – (B)	Percentual Variation	Decomp I	Decomp II
I Total Revenue	17.3	18.6	23.2	1.3	7.7	101.6	100.0	4.6	24.6	221.5	100.0
Treasury Revenue	11.9	13.6	18.0	1.7	14.6	132.5	130.4	4.3	31.8	209.6	94.6
Tax Revenue	11.0	12.0	16.6	1.1	9.9	82.7	81.4	4.5	37.6	218.8	98.8
Other Treasury Revenues	1.2	1.6	1.4	0.4	32.1	29.5	29.0	–0.2	–12.0	–9.2	–4.2
Social Security Revenue	5.0	5.1	5.3	0.1	2.7	10.3	10.1	0.2	3.3	8.2	3.7
II Total Expenditure	15.8	18.4	20.8	2.6	16.4	–197.7	100.0	2.5	13.5	–120.0	100.0
Personnel and Social Contributions	4.4	5.2	5.1	0.7	17.0	–57.2	29.0	–0.1	–1.3	3.3	–2.8
Social Security Benefits	4.2	5.4	6.7	1.2	30.0	–95.3	48.2	1.3	23.4	–61.0	50.8
Other Current and Capital Expenditures	4.3	4.8	5.2	0.5	11.1	–36.4	18.4	0.4	8.3	–19.0	15.9
Subsidies	0.1	0.2	0.3	0.1	98.2	–8.0	4.0	0.1	51.3	–5.2	4.4
FAT	0.2	0.6	0.6	0.3	138.7	–24.5	12.4	0.0	2.4	–0.6	0.5
Other- Goods and Services and Investment	4.0	4.0	4.3	0.0	1.1	–3.4	1.7	0.3	6.8	–13.1	10.9
Intergovernmental Transfers	2.9	3.0	3.9	0.1	3.9	–8.7	4.4	0.9	29.4	–43.3	36.1
Primary Balance (I – II)	**1.6**	**0.3**	**2.4**	**–1.3**	**–81.7**	**100.0**		**2.1**	**708.1**	**100.0**	

Figure 4

Brazil: Federal Primary Expenditure Composition



Source: STN.

imbalances during the period 1990-2005. In 1990 the deficit was 1.4 per cent of GDP in 2005 it reached 5.7 per cent becoming the most important source of pressure for government accounts.

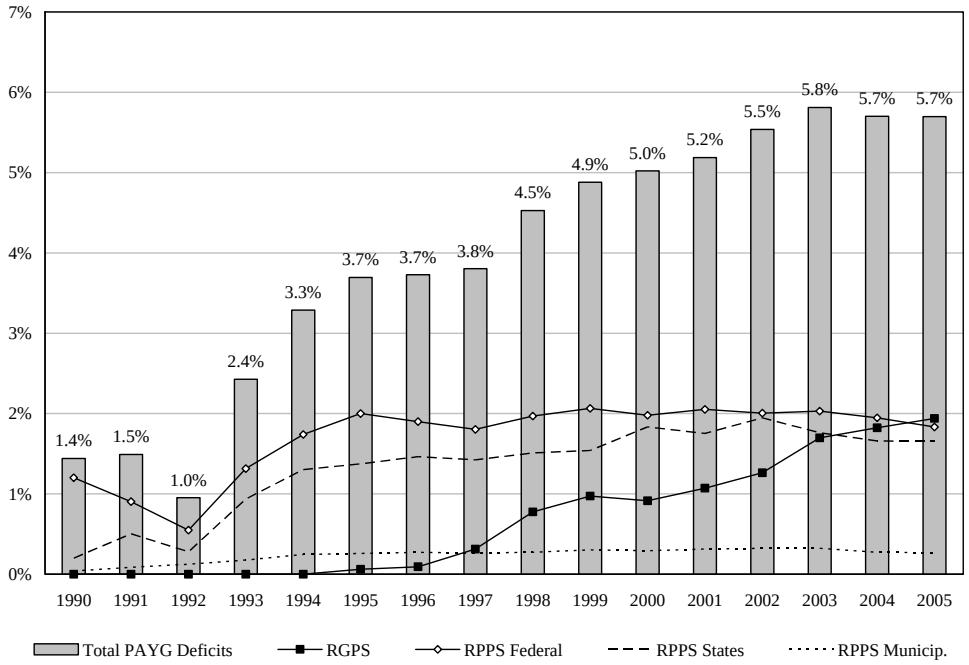
2 Policy rigidity and the 2002 crisis

In sharp contrast with the 1998-1999 adjustment, Brazil's fiscal policy did not react to the shocks in early 2002. This policy rigidity compounded uncertainty arising from other sources and led to asset price changes that complicated the situation even more. The government's commitment to maintain a constant primary surplus seemed to falter as the primary balance declined during the first semester (Figure 6) amidst a heated political debate on the stance of future fiscal policy.

The rigidity of fiscal policy may have been at the root of the 2002 crisis. Inflexibility was the result of structural factors and transitory circumstances. The structural inflexibility of the budget exists in expenditures as discussed in the previous section. But fiscal policy rigidity was also due to the short-term effect of the October presidential elections. The government's coalition had weakened because of internal disputes in anticipation of the presidential election. Additionally,

Figure 5

Social Security Imbalances, 1990-2005



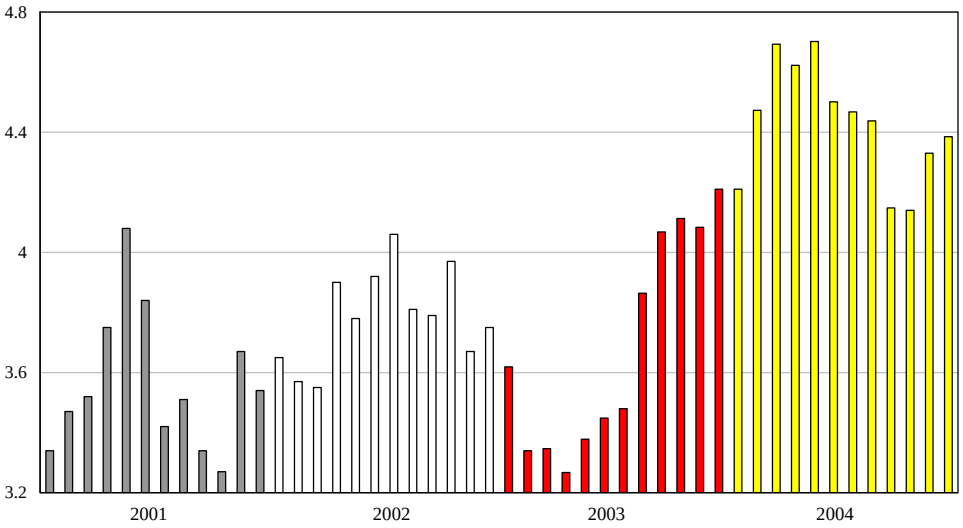
corruption allegations in congress led to the impeachment of its president, a strong supporter of the government's economic policy. In this context, crucial reforms with fiscal impact, such as the public servants social security and tax reform, were left pending. Other reforms, such as the extension of the financial transactions tax, the CPMF, stalled. With the political campaign heating up in the first quarter, it was practically impossible to get support for any adjustment. Additionally, any change would have been interpreted as transitory given that a new government would take office in the near future.

Uncertainty regarding the future government's commitment to fiscal adjustment (irrespective of who won the election) generated concerns about the future value or liquidity of public debt. Given the concentration of public debt holdings in mutual funds (to be discussed in the next section), a large resource outflow affected them in the period April-October. In its peak, the run represented more than 6 per cent of the intermediaries' net worth (Figure 7).

The sell-off of government securities caused a fall in their price (rising spreads), and pressured the exchange rate to depreciate (Figure 8). The rising spreads and the exchange rate depreciation were also associated with capital outflows from Brazil. As Figure 9 shows, in September and October of 2002, capital

Figure 6

Primary Fiscal Balance of the Public Sector, 2000-2003
(percent of GDP)



Source: Bacen, Boletín Estadístico, several issues.

Figure 7

Net Resource Flow to Mutual Funds
(fraction of net worth)

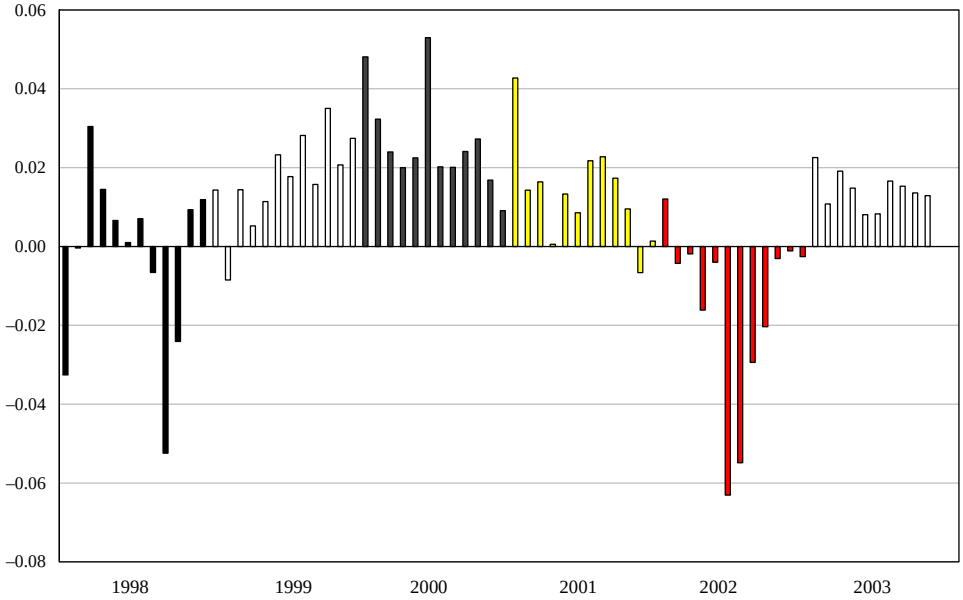


Figure 8

Brazilian Spreads and Exchange Rate
(January 2000-April 2003)

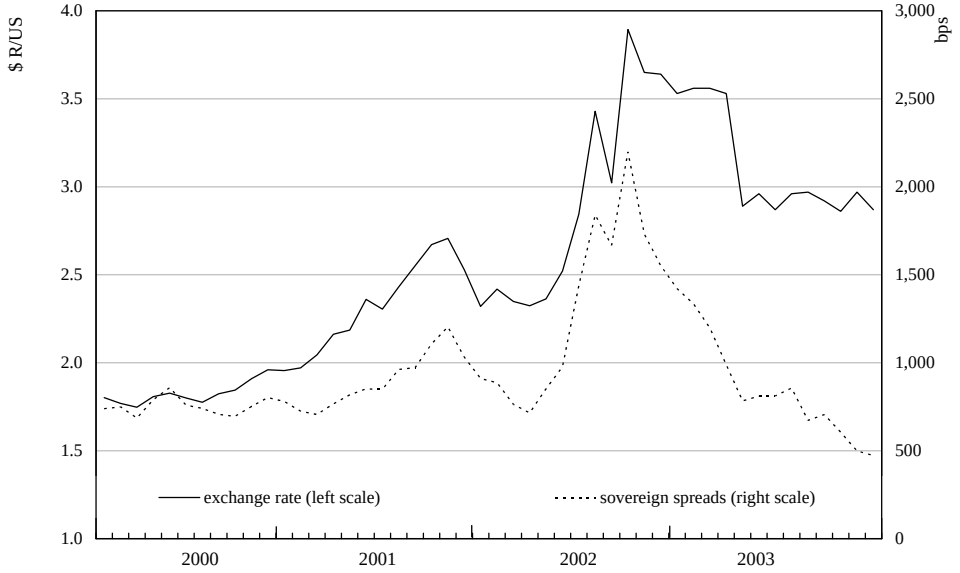
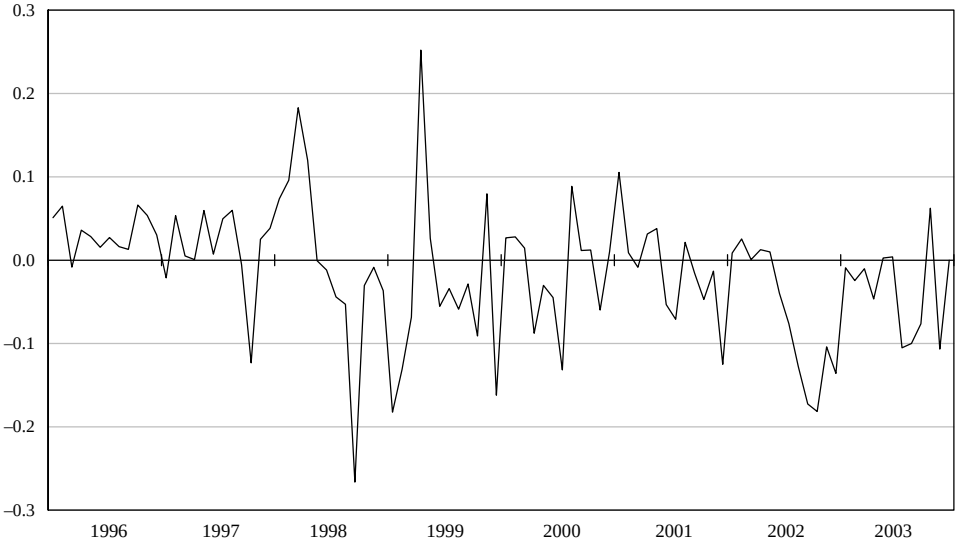


Figure 9

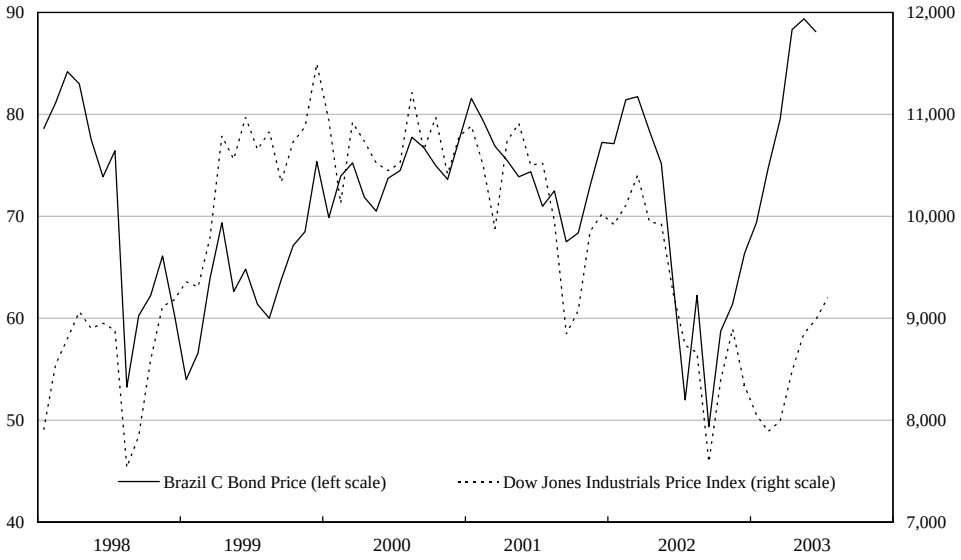
Capital Flows to Brazil
(ratio to international reserves)



Source: Bacen and JP Morgan.

Figure 10

Co-movement of Brazil C Bond Prices and the Dow Jones Index
Evidence of Global Factors' Influence on Brazilian Asset Prices



Source: World Bank staff calculations.

outflows reached a peak of almost 20 per cent of international reserves of the central bank.[3] During these months the exchange rate also reached a peak of 4 reais per dollar. Consequently, the debt level rose due to its indexing to the exchange rate. This fact aggravated concerns on debt sustainability which exerted further downward pressure on the demand for Brazilian sovereign bonds and pushed their prices even lower in a vicious circle.

The fall of Brazilian government securities' prices and capital outflows also occurred because of a global phenomenon: the rise in uncertainty and risk aversion caused by the growth slowdown in the industrialized nations, the terrorist attacks in the United States, and the corporate corruption scandals of the more mature capital markets around the world. This fact exerted additional downward pressure on Brazilian government bonds, and their prices moved in tandem with those of other assets worldwide (Figure 10). Favero and Giavazzi (2003) show how Brazilian spreads depend on domestic factors (the stance of fiscal policy) and on global conditions. The relationship is non-linear: when domestic fundamentals are sound, this relationship is not as strong, but when fiscal fundamentals are weak, the effect of global factors is amplified.

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[3] Capital flows exclude foreign direct investment and IMF resources.

Faced with mounting difficulties in rolling over the domestic debt, the central bank redeemed a fraction of debt falling due by printing money. Consequently, the monetary base expansion exceeded nominal GDP growth (Figure 11). The monetary effect of public domestic debt redemptions during the second semester of 2002 reached the tenor of 30 per cent of base money (Figure 12). It is crucial to point out, however, that the monetary expansion originated by the treasury's operation began in the second semester of 2001 and could have been interpreted as a leading indicator of the more turbulent episodes that were to unravel in mid 2002.

Moreover, base money grew in lockstep with the faster depreciation of the currency. This pressured inflation, which accelerated between June and December, reaching a peak of 5.8 per cent per month in November (Figure 13). Monetary growth and rising inflation increased the government's revenue from money creation up to the equivalent of 2.0 per cent of GDP[4] (Figure 14). In these circumstances, the authorities' credibility faltered. It is interesting to note that the seignorage peak occurred in the first quarter of 2003, a few months after the public debt ratio had stabilized and the exchange rate had appreciated. This implies that interest rates could not be lowered as quickly as many would have desired.

The monetary authorities reacted variously to the shocks during 2001-02. Initially, from March 2001 to July 2001, the central bank raised the Selic rate from 15.25 to 19 per cent. From then on, it maintained the Selic at 19 per cent, until February 2002, when it reduced it 25 bps, then lowered it again in March and July. In mid-October 2002, the central bank bumped up the Selic three percentage points to 21 per cent and then raised it two more times until reaching 25 per cent before the year's end (Figure 15). As the Selic rose, the exchange rate partially reversed its depreciating trend, and the debt stock (as a percent of GDP) decreased. Looking (*ex post*) at this behavior, it is legitimate to wonder why the central bank did not raise interest rates before October.

Several factors might explain the central bank delayed reaction and some are related to considerations described by Blanchard's model. The first reason is that, before September-October, the fiscal conditions were inadequate. Public debt to GDP increased from 49 to 53 per cent in 2001, and climbed further to 57 per cent by mid-2002 without any policy response. With the primary balance decreasing during the first semester of 2002, it is understandable that sustainability concerns dominated investor sentiment.[5] With taxes and expenditures predetermined by the electoral process and the structural rigidity of the budget, the adjustment of the government's real cash flow could come through several avenues: an increase in the price level, a higher seignorage, or a default. The nature of the fiscal regime

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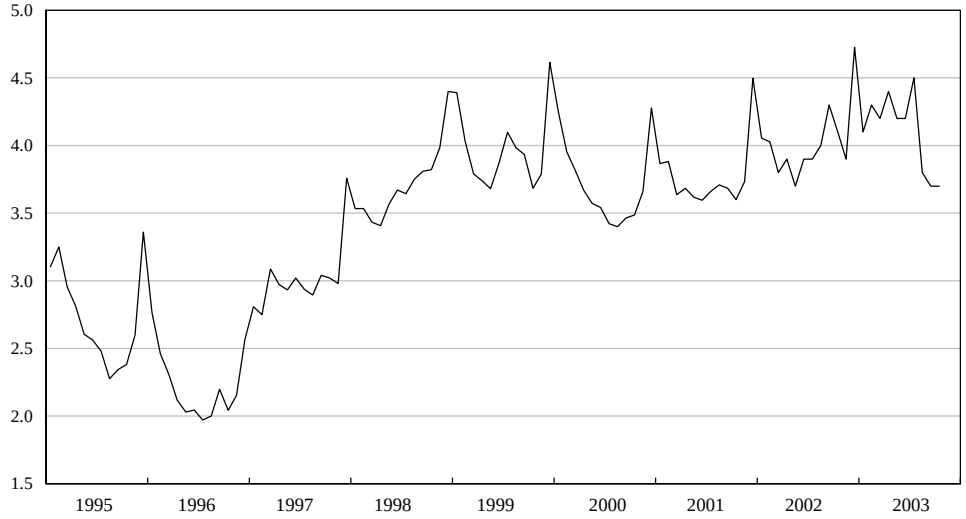
[4] The figures reported in the text and in the graph are estimated by multiplying the base money as a share of GDP times the growth rate on base money. Eliana Cardoso (1998) estimates the average inflation tax revenue in Brazil during the 50 years ending 1995 at 2 per cent of GDP.

[5] This is what Blanchard calls the "wrong" fiscal conditions. Woodford (2001) call this a non-Ricardian environment. A Ricardian environment is one in which expected future primary surpluses adjust to compensate variations in the present value of debt, while in non-Ricardian regimes this policy adjustment certainty is non-existent.

Figure 11

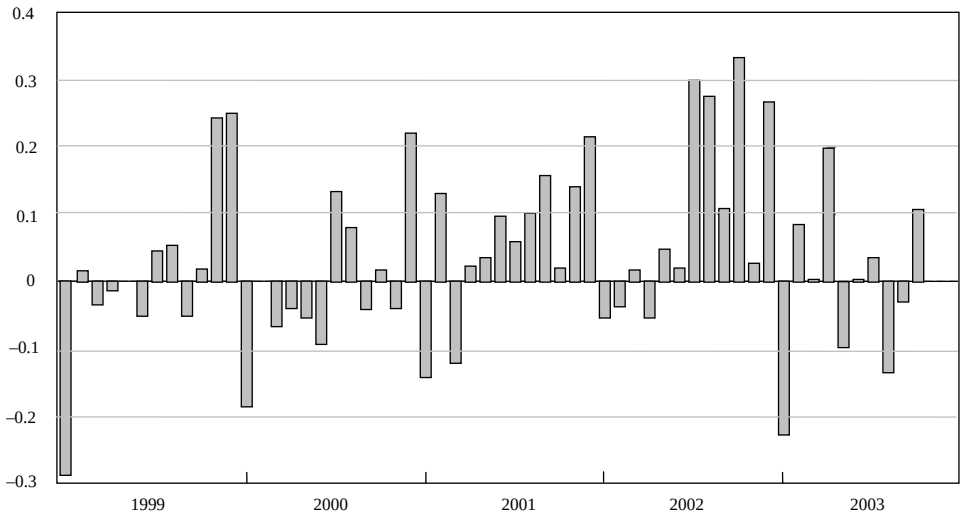
Money Base as a Share of GDP
(seasonally-adjusted data)



Source: World Bank staff calculations based on Bacen data.

Figure 12

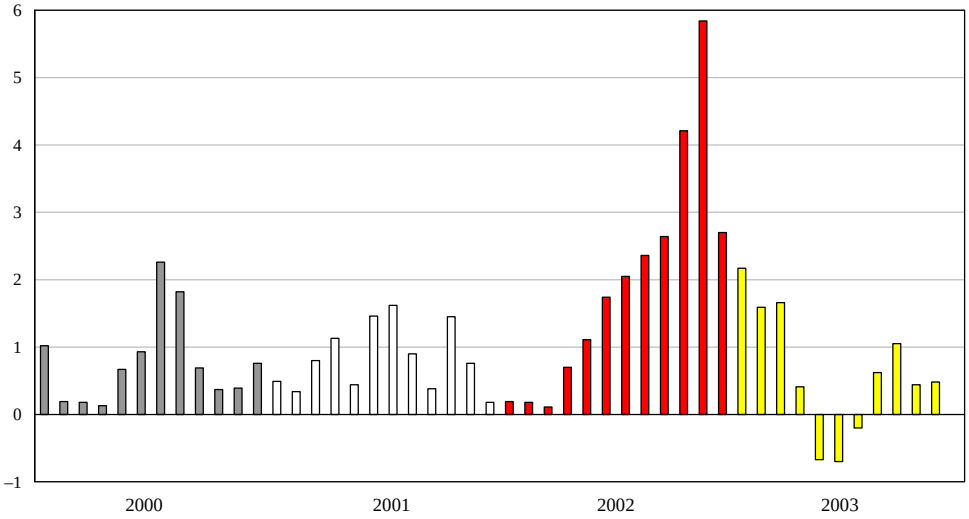
Monetary Impact of Treasury's Operations, 1999-2003
(ratio to the monetary base)



Source: World Bank calculations based on Bacen data.

Figure 13

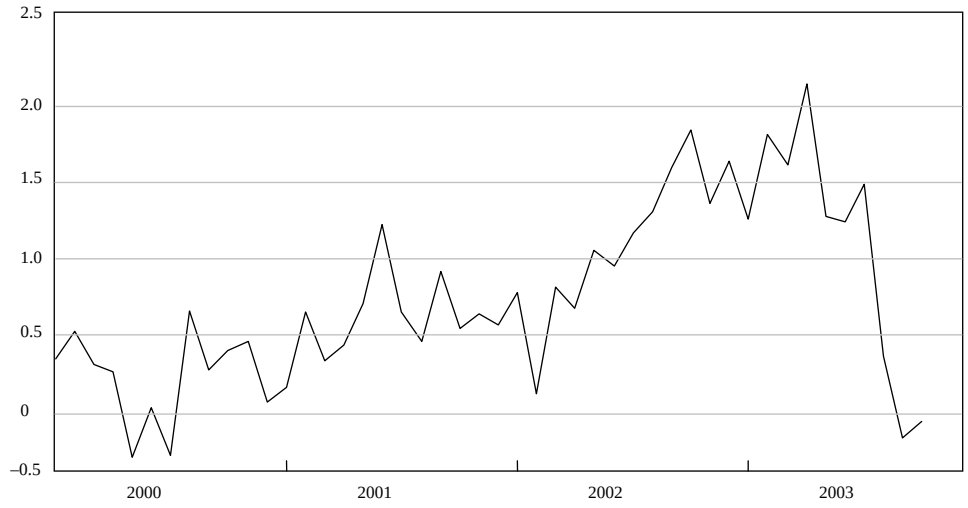
Money Base as a Share of GDP
(seasonally-adjusted General Price Level IGP-DI)



Source: FGV.

Figure 14

Seignorage from Money Creation, 2000-03
(percent of GDP)



Source: World Bank calculations described in the text.

could have switched from one in which the primary surplus would be adjusted with certainty to ensure debt sustainability to one where there was uncertainty on how the adjustment would take place. *A priori* it was difficult to envision how the adjustment would take place, and the composition of public debt, which we discuss in the following section, determined the final outcome.

The crucial point to bear in mind is that, under the circumstances of rising debt levels with an unresponsive fiscal policy, raising the Selic could have been inflationary.[6] The higher cost of debt service (with an unresponsive primary surplus) would have led to a higher probability of default. This, in turn, would have accelerated capital outflows, increasing pressure on the currency to depreciate and hence, on inflation. Since printing money and higher prices were part of the solution to the imbalance in the government's present-value borrowing constraint, fiscal expectations were inconsistent with a stable price level. In fact, since September 2001 inflation expectations were permanently above the central bank's central target and by mid-2002 market expectations of inflation were regularly above the forecasts of the more robust models (Minella *et al.*, 2003). Additionally, there is evidence of changes in the price formation mechanism in Brazil at the end of 2002 that researchers attribute to changes in the exchange rate pass-through (Belaisch, 2003). However, these changes in the observed price formation and inflation expectations generating mechanisms could have also been the result of the changes in fiscal expectations arising from a different fiscal regime during this brief period.

Empirical verification of the nature of the prevailing fiscal policy regime in a particular period poses challenges both from the conceptual and practical viewpoints. At the conceptual level, verification of the nature of the fiscal regime would require testing whether the primary surplus would have been the same if another price sequence would have been observed.[7] Unfortunately, history only shows the actual one realization of the price level and hence it is impossible to verify whether the surplus would have been the same with a different price sequence (Woodford, 2001; Kocherlakota *et al.*, 1999).

At the more practical level, verification of the character of the fiscal regime focuses on testing the responsiveness of the primary balance to changes in different variables (Bohn, 1998). These tests perform regressions of the primary surplus on the public debt ratio and other control variables to verify the significance of this particular coefficient. A positive (and significant) response of the primary surplus to

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[6] Woodford (2001) shows how the price level may be determined by fiscal variables. The government's inability to balance its budget constraint via adjustments in the primary surplus implies that the price level is the adjustment mechanism. Hence, the budget constraint acts as an equilibrium condition which determines a unique price level associated with the particular fiscal policy. Previous episodes of Brazilian inflation in the 1970s and 1980s have been explained based on these grounds (Loyo, 1999). The Favero-Giavazzi and Blanchard papers extend this theory to allow the price of debt (or the sovereign risk premium) to be the adjusting factor.

[7] In a controlled experiment situation, if another price (of goods or of sovereign debt) sequence could be associated with the same fiscal policy, then the hypothesis could be falsified. However, in reality we only observe the actual price sequence and, hence, cannot tell whether the fiscal policy would have been the same under a different price sequence.

changes in the debt ratio implies that this policy variable was the adjustment factor. In Brazil, the brevity of the period during which this regime change might have occurred, limits any statistical testing. There are, however, studies that test this hypothesis using longer sample periods, with results extremely sensitive to the period of analysis. For instance, two papers report contradictory evidence: Favero and Giavazzi show that the primary surplus is highly persistent and unresponsive to any oscillation in the debt level; Wyplosz concludes that the observed surplus was similar to the one that would have resulted if the government had followed a rule that tried to stabilize the debt ratio while allowing some counter-cyclical action. It is very likely that this divergence obeys to the different sample periods: while the first study estimates the relationship after July 1999, the second one begins in 1998. Since there is a regime shift in fiscal policy in 1998-1999 described elsewhere (World Bank, 2000) and verified econometrically, the Favero-Giavazzi paper does not capture this change.

The second explanatory factor for the central bank's resistance to raise the policy rate was the vulnerable situation of mutual funds. Given the run on mutual fund deposits, raising the Selic would have been extremely risky because of the potential to aggravate losses to these intermediaries. Mutual funds were registering losses due to updating their balance sheets with new mark-to – market regulation from the central bank. Raising the Selic would have increased the risk of a generalized run on the system. Additionally, in the face of a decreased demand of public bonds, to be described in the next section, the central bank was supporting the price of these assets. Under this extraordinary circumstances imposed by the public bond price support role, equivalent to an interest rate peg, liquidity was endogenous, and hence it would have been contradictory to try to control liquidity (by raising the Selic).[8] Given that monetary policy was unable to respond, it would have been desirable that fiscal policy had been more responsive to the shocks.

By October 2002, the characterization of the economy had changed in several respects: (1) the run on mutual funds had been contained; (2) the presidential candidates had already agreed on sound fiscal policy principles; (3) the primary surplus reversed its decreasing trend and rose to unsurpassed levels. Clearly, the factors that originated the "wrong" expectations were not present any more. The central bank was then free to raise interest rates and quickly moved in this direction, bringing about the expected traditional results of the currency appreciating in response to tighter monetary policy as described in Figure 15. Control of the economy was gradually regained and consolidated after the first quarter of 2003.

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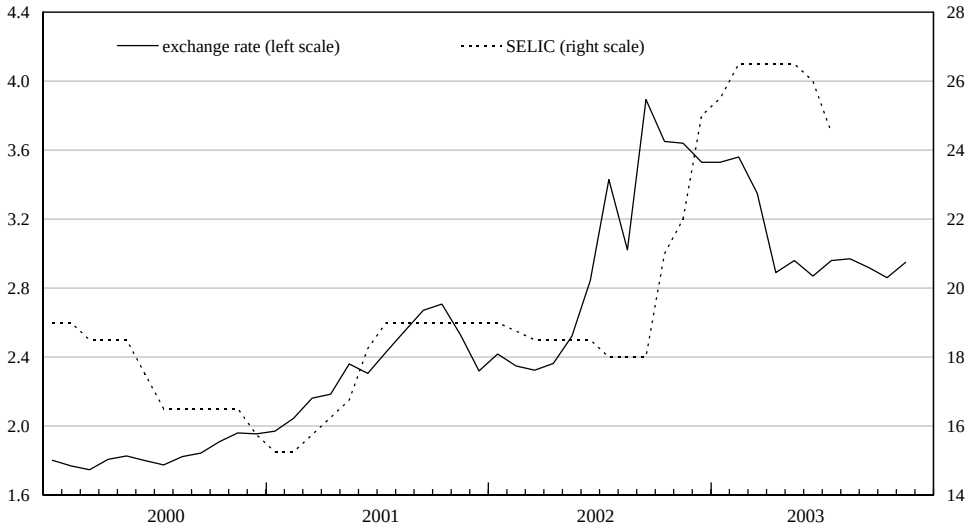
[8] The Brazilian circumstances of a fixed primary surplus, and a central bank acting to support the price of public bonds (by pegging the interest rate) fit perfectly Woodford's characterization of the typical non-Ricardian regime (Woodford, 1998 and 2001), with the implication of the effect of fiscal expectations on the price level.

Figure 15

Short-term Policy Interest Rate (Selic) and Exchange Rate in Brazil, 2000-03



Source: Bacen.

3 Pro-cyclical fiscal policy in Brazil

The vicious circle of pro-cyclical fiscal policy, volatility and limited creditworthiness has been amply documented for Latin America (Gavin, Hausmann, Perotti and Talvi, 1996). Pro-cyclical fiscal policy is explained by the following factors: a) limited access to international credit markets during a shock implies that countries are unable to follow a tax-smoothing approach and have to tighten fiscal policy; b) tax structures that are heavily dependant on cyclical-sensitive income, such as indirect taxes (Gavin and Perotti, 1997); and c) weak institutional structures that do not allow generation of large enough primary surpluses in good times and lead to increased spending during expansionary phases (Talvi and Vegh, 2000). Several authors have attempted to documented the pro-cyclical nature of Brazil's fiscal policy (IMF, WEO, 2002) but results are not very robust.

To examine the relationship between the primary balance and economic activity in the short and in the long run, we adopted the Autoregressive Distributed Lag (ARDL) approach (Pesaran and Shin, 1999; and Pesaran, Shin and Smith, 1999) because it is robust to the order of integration and cointegration of the regressors, hence the pre-testing procedures may be avoided. This approach also has the advantage that the lags in each of the regressors are allowed to be different, and the endogeneity problem can be eliminated by appropriate selection of the lag length (Pesaran and Shin, 1999).

Table 7

Estimated Long-run Coefficients for the Primary Balance, 1991:01-2002:01

	AIC	RBSC	SBC	HQC
Debt-to-GDP ratio	.14* *(.05)*	.15* *(.05)*	.14** *(.07)*	.12*** *(.07)*
Output (in logs)	18.3* *(5.6)*	20.8* *(5.6)*	21.2* *(6.9)*	18.0* *(6.5)*
REER (in logs)	–7.6* *(1.9)*	–7.6* *(1.8)*	–8.96* *(2.71)*	–9.8*** *(2.57)*
Real interest rate	–.01*** *(.004)*	–.01** *(.003)*	–.01** *(.008)*	–.01* *(.004)*
Sovereign spreads (in logs)	.30 *(.65)*	.44 *(.65)*	.37 *(.89)*	.01 *(.84)*

Standard error in parentheses.
* significant at the .01 level; ** significant at the .05 level; *** significant at the .10 level.

Table 7 shows that, in the long run, output is positively correlated with the primary balance. However, Table 8 shows that, in the short run, the correlation is negative, implying that fiscal expansions are associated with primary balance reductions, and the primary balance increases during output contractions, verifying the pro-cyclical nature of fiscal balances. Another interesting result depicted in Table 7 is the positive and significant relationship between the primary balance and the public debt ratio. This fact may be interpreted as the result of a fiscally responsible sovereign that adjusts its primary to compensate changes in the debt ratio.

Finally, in this section we estimate the cyclical component of the primary balance by regressing this variable on the long-run components of each of the explanatory variables used in the previous exercise. The residual of such regression is the part of the primary balance explained by the transitory or cyclical components of each of the explanatory variables. Hence, we interpret this residual as the cyclical component of the primary balance (Figure 16). In general, we observe that this component fluctuates between plus or minus 1 per cent of GDP, with the most recent levels close to lower bound. That is, at the end of 2003, the economic slowdown and other transitory fluctuations of variables affecting the primary balance had a negative impact of close to 1 per cent of GDP, compared to the positive impact of more than 1 per cent of GDP in early 2000. Given that the observed primary balance improved by .5 per cent of GDP during the period, the structural balance improved by close to 1.5 per cent of GDP.

Table 8

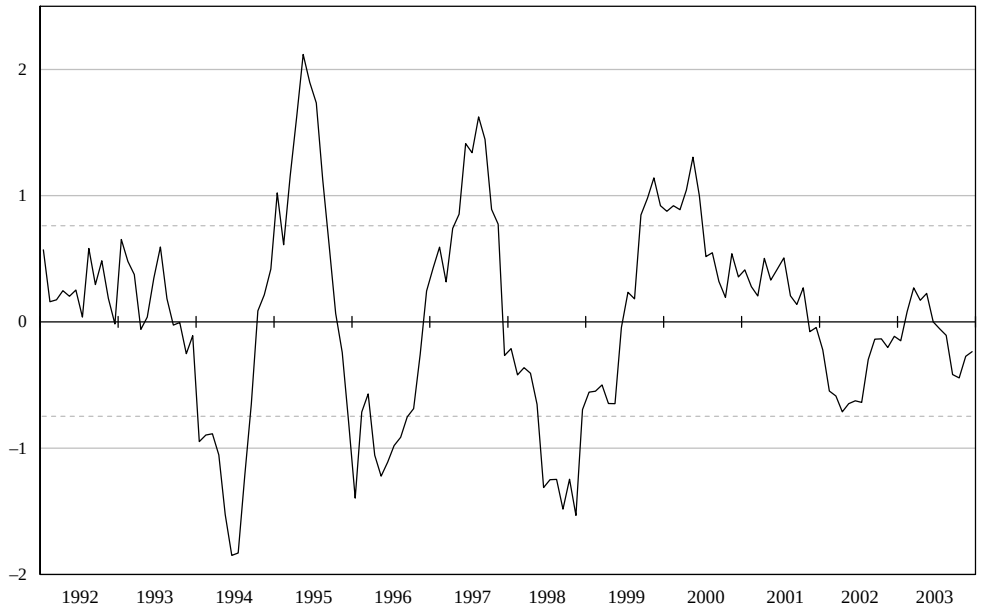
Error-correction Representation for the Selected ARDL Models, 1991-2002
(dependent variable: d *primary balance)*

	AIC	RBSC	SBC	HQC
Error-correction term (–1)	–.20*	–.21*	–.13*	–.14*
*d*Primary (–1)	.04	.02		
*d*Primary (–2)	.17**	.16**		
*d*Primary (–3)				
*D*debty	–.014	.007	.018**	.017***
*D*debty (–1)	–.038	–.013		
*D*debty (–2)	–.027	–.018		
*D*debty (–3)	–.081***	–.085*		
*D*Output	–1.87	–1.7	–1.27	–1.5
*d*Output (–1)	–2.36***	–3.1**		
*d*Output (–2)	–3.18**	–3.6*		
*d*Output (–3)	–1.98***	–2.27**		
*D*reer	–1.49*	–.39	–1.2*	–1.4*
*D*REER (–1)				
*D*REER (–2)				
*D*REER (–3)				
Dselicr	–.0004	–.004	–.001**	.006
dSelicr (–1)	–.001	–.009		
dSelicr (–2)	.001			
dSelicr (–3)				
Dembi	.44**	.45**	0.4**	.43**
dEmbi (–1)	–.66*	–.60*	–.67**	–.63*
dEmbi (–2)		–.30		
dEmbi (–3)				
R-Bar^2	.30	.30	.21	.23
D.W.	2.15	2.06	2.09	2.05

* Significant at the .01 level, ** significant at the .05 level, *** significant at the .10 level.

Figure 16

Cyclical Component of the Primary Balance
(percent of GDP)



4 Public expenditure composition and growth

In this section we estimate the long-run and short-run impact of government expenditure on Brazilian growth using two related methods. First, we use the single-equation ARDL methodology used in the previous section, and then we use a multiple-equation co-integrating VAR approach to examine the relationship among the several variables.

Using data for 1950-2000, the Autoregressive Distributed Lag (ARDL) estimates a long run relationship and an error correction representation between income per capita, private and public capital stocks per capita and three components of government current expenditure (subsidies, social security and assistance transfers and consumption).[9] The estimation also included tax revenues and public debt as a share of GDP to control for the government's budget identity and the potential negative effects of the government financing on economic activity. The data for the stocks of private and public capital were obtained from

[9] It also has the advantage that the lags in each of the regressors are allowed to be different, and the endogeneity problem can be eliminated by appropriate selection of the lag length (Pesaran and Shin, 1999).

Table 9

Estimated Long-run Coefficients for the GDP per capita, 1950-2002

	AIC	RBSC	SBC	HQC
Private Capital Stock per capita (in logs)	0.30* *(0.10)*	0.29* *(0.10)*	0.30* *(0.10)*	0.30* *(0.10)*
Public Capital Stock per capita (in logs)	0.71* *(0.11)*	0.72* *(0.12)*	0.71* *(0.11)*	0.71* *(0.11)*
Gov. Expenditures: subsidies per capita (in logs)	–0.04** *(0.02)*	–0.03*** *(0.02)*	–0.04** *(0.02)*	–0.04** *(0.02)*
Gov. Expenditures: consumption per capita (in logs)	0.11 *(0.06)*	0.10 *(0.06)*	0.11 *(0.06)*	0.11 *(0.06)*
Gov. Expenditures: social security and assistance transfers (in logs)	0.004 *(0.061)*	–0.04 *(0.07)*	0.004 *(0.061)*	0.004 *(0.061)*
Tax Revenue-to-GDP Ratio	–1.01** *(0.37)*	–0.82** *(0.35)*	–1.01** *(0.37)*	–1.01** *(0.37)*
Total Debt-to-GDP Ratio	0.30* *(0.09)*	0.32* *(0.08)*	0.30* *(0.09)*	0.30* *(0.09)*
Constant	–0.29 *(1.00)*	0.03 *(1.12)*	–0.29 *(1.00)*	–0.29 *(1.00)*
Trend	–0.002 *(0.003)*	–0.001 *(0.003)*	–0.002 *(0.003)*	–0.002 *(0.003)*

Standard errors in parentheses.
* Significant at the .01 level, ** significant at the .05 level, *** significant at the .10 level.

Reis *et al.* (2002) and the flow data, that is income per capita and government current expenditures come from the National Accounts System-IBGE.

Tables 9 and 10 report the long-run coefficients and short-run dynamics estimated with this method.[10] Table 9 shows that, in the long run the elasticity of output with respect to the public capital stock is larger than in that of the private sector. The estimated elasticity seems high when it is compared with estimated values for the US or OECD economies (Sturn and de Haan, 1995; Hurlin, 2001), but similar to existing Brazilian estimates for infrastructure (Cavalcanti, 2004). However, the negative impact of the tax ratio is surprisingly large: an increase of 1 percentage point in the tax ratio lowers GDP per capita by 1 per cent.

[10] The tables report results for the different models: Akaika (AIC), Schwarz (SBC), R-Bar Squared (RBSQ) and Hanaan-Quinn (HQ). The production function was estimated in per capita terms, dividing all the arguments by the economically active population. There are 8 variables: GDP per capita, private capital stock per capita, public capital stock per capita, government subsidies, government consumption, government social security transfers, tax revenue ratio to GDP, and the public debt ratio to GDP. The maximum lag was 3. This produced a total of 262,144 possible combinations: AIC, SBC and HQC selected an ARDL (1, 2, 0, 1, 0, 0, 0, 3) while the RBSC selected a (1, 2, 1, 1, 0, 1, 0, 3) model.

Table 10

Error-correction Representation for the Selected ARDL Models, 1952-2002
(dependent variable: d *GDP per capita)*

	AIC	RBSC	SBC	HQC
Error-correction term (–1)	–0.52* *(0.08)*	–0.57* *(0.09)*	–0.52* *(0.08)*	–0.52* *(0.08)*
d(Private Capital Stock per capita)	1.66* *(0.23)*	1.87* *(0.27)*	1.66* *(0.23)*	1.66* *(0.23)*
d(Private Capital Stock per capita) –1	0.55*** *(0.28)*	0.63** *(0.31)*	0.55*** *(0.28)*	0.55*** *(0.28)*
d(Public Capital Stock per capita)	0.37* *(0.05)*	0.15 *(0.23)*	0.37* *(0.05)*	0.37* *(0.05)*
d(Gov. Expenditures: subsidies per capita)	0.004 *(0.008)*	0.004 *(0.008)*	0.004 *(0.008)*	0.004 *(0.008)*
d(Gov. Expenditures: consumption per capita)	0.06 *(0.04)*	0.06 *(0.04)*	0.06 *(0.04)*	0.06 *(0.04)*
d(Gov. Expenditures: social security and assistance transfers)	0.002 *(0.032)*	0.02 *(0.03)*	0.002 *(0.032)*	0.002 *(0.032)*
d(Tax Revenue to GDP Ratio)	–0.53* (0.17)	–0.46** (0.18)	–0.53* (0.17)	–0.53* *(0.17)*
d(Total Debt to GDP Ratio)	–0.17** *(0.06)*	–0.16** *(0.06)*	–0.17** *(0.06)*	–0.17** *(0.06)*
d(Total Debt to GDP Ratio) –1	0.06 *(0.07)*	0.04 *(0.09)*	0.06 *(0.07)*	0.06 *(0.07)*
d(Total Debt to GDP Ratio) –2	0.24* *(0.06)*	0.26* *(0.06)*	0.24* *(0.06)*	0.24* *(0.06)*
d(Constant)	–0.15 *(0.52)*	0.01 *(0.64)*	–0.15 *(0.52)*	–0.15 *(0.52)*
d(Trend)	–0.001 *(0.002)*	–0.001 *(0.002)*	–0.001 *(0.002)*	–0.001 *(0.002)*
R^2	0.88	0.89	0.88	0.88
D.W.	1.99	1.92	1.99	1.99

* Significant at the .01 level, ** significant at the .05 level, *** significant at the .10 level.

Government expenditure in consumption or social security has no statistically significant effect on per capita GDP, while subsidies have a negative impact. The positive effect of public debt ratio is somewhat puzzling and could reflect an endogeneity problem, *i.e.* that as GDP per capita increases there is a larger demand for financial assets and public bonds is one of those assets that domestic agents demand. To examine this hypothesis, we used Granger causality tests and the Wu-Hausman exogeneity test and both lead to the non-rejection of the exogenous public debt hypothesis.

In the short run (Table 10) private capital has a greater impact on GDP per capita than the public capital. Government expenditures have no effect on GDP, and tax rates have a negative impact on GDP. Public debt has also negative impact on GDP per capita in the short-run.

The long run results are puzzling for two reasons. First, because the high public capital elasticity and, second, because the fact that the public sector elasticity is higher than the private one. This fact is also present in several of the classic studies for the US and OECD economies, such as Aschauer (1989), Ram and Ramsey (1989), Eisner (1994), Sturn and de Haan (1995), Balmaseda (1997) and Viverberg (1997). Hurlin (2001a, 2001b) shows that, in general, papers based on time series analysis of variables in levels, like the present one, tend to find large output elasticities of public capital. Hurlin shows that there are two potential sources of bias for this finding: a) the endogeneity of the factors of production, *i.e.* the fact that the productivity of private capital may depend on the level of public capital; and b) the fact that in most of those studies the output and the inputs are not cointegrated and the variables are non-stationary leading to the spurious regression problem.

The first source of bias may not be a serious problem in this specific case, given the ARDL methodology produces consistent estimates of the long run coefficients (Pesaran and Shin, 1997). We tested for the correlation between both private and public capital and the residual of the regression, and were unable to reject the exogeneity of these variables. The second source of potential bias may be a problem, because based on the ARDL approach and the proposed method to test for long run relationships (Pesaran, Shin and Smith, 1999) the computed F-statistics between the upper and lower bounds that do not allow firm rejection or non-rejection of the null hypothesis of no long-run relationship.

To examine further this potential problem, we adopted a multiple equation cointegrating VAR approach. This approach will also allow examination of relationships between variables that the single-equation ARDL approach did not allow. With the same set of variables, we were unable to reject the hypothesis of up to four cointegrating vectors. To reduce the dimensionality of the problem (and based on the variance decomposition) we excluded the debt variable and were able to reduce the number of cointegrating vectors to two.[11]

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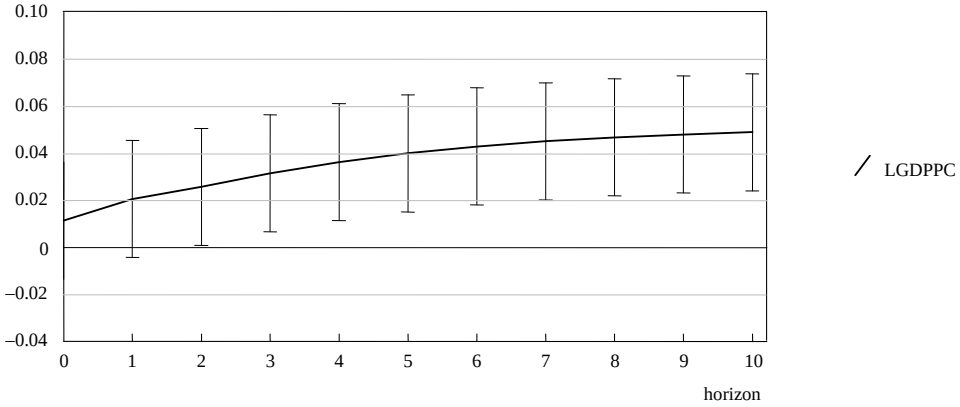
[11] See the Appendix, downloadable from the World Bank site, Research Paper No. WPS 4004, for the cointegration tests. One of the vectors, however, showed no persistence in the deviations from the

(continues)

Figure 17

Generalized Impulse Response(s) to One S.R. Shock in the Equation for LKSTPUBP



With the specified system of six variables we examined the response of per capita GDP to multiple shocks with the Generalized Impulse Response Function. A one standard deviation shock to public capital (5 per cent of GDP) implies a 5 per cent higher GDP (Figure 17), with the full adjustment taking a period of 8 to 10 years; this fact implies a long-run elasticity of about .7, almost identical to the long run elasticity estimated by the single-equation (ARDL) method. This approach, however, has the advantage of allowing examination of the impact of this shock on other variables. For instance, such a shock to public capital is also associated with an increase in private capital of almost 5 per cent by the end of the forecasting horizon (Figure 18) verifying some degree of complementarity between both types of capital.

A shock to private capital stock, representing a rise of 6 per cent (in the long run) is associated with a higher GDP by 4 per cent (Figure 19). This would imply a long-run elasticity of about .6, much higher than the one estimated by the ARDL.

Another interesting result refers to the impact of a tax shock. A permanent increase of the tax ratio (of 1.5 per cent of GDP) is associated with a lower GDP per capita of close to 1 per cent (Figure 20), similar to the ARDL result. The same shock is associated with a lower private capital stock (Figure 21).

A shock that leads to a permanent rise of government consumption expenditure (of 7 per cent in real terms) is associated with a fall in per capita GDP (Figure 22). This shock is associated with a higher tax ratio (Figure 23), lower private capital stock (Figure 24) and lower public capital stock as well (Figure 25).

equilibrium relationship to system-wide shocks. The other vector, on the contrary, showed temporary deviations from the equilibrium relationship returning after a few years. We arbitrarily eliminated the first one and remained with a single cointegrating vector.

Figure 18

Generalized Impulse Response(s) to One S.E. Shock in the Equation for LKSRPUBP

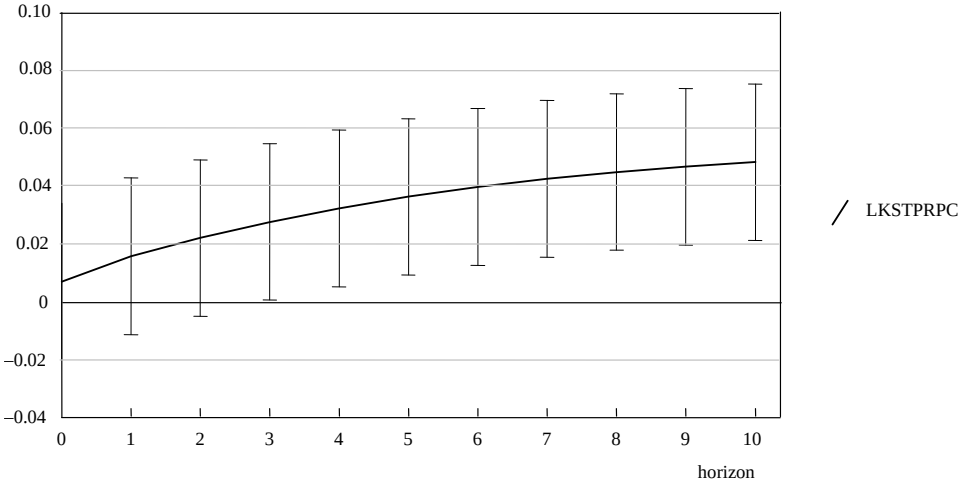


Figure 19

Generalized Impulse Response(s) to One S.E. Shock in the Equation for LKSTPRPC

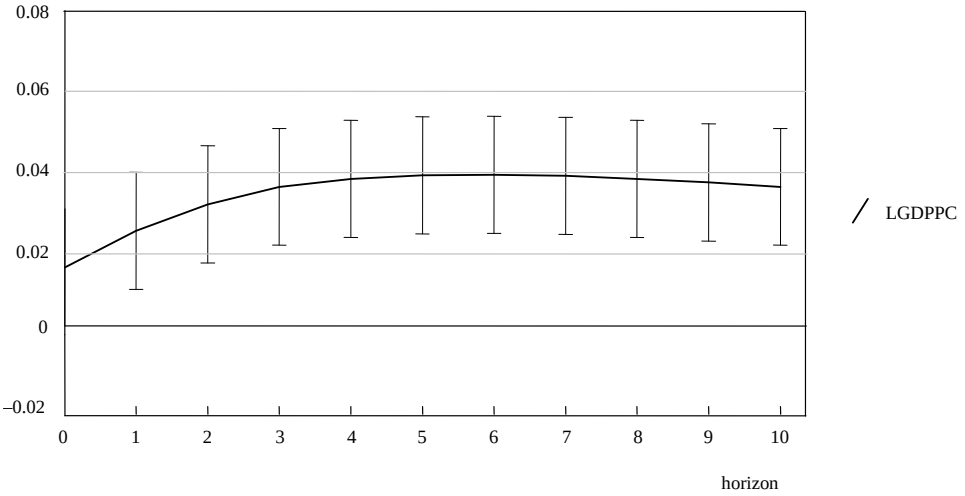


Figure 20

Generalized Impulse Response(s) to One S.E. Shock in the Equation for TOTTAXGD

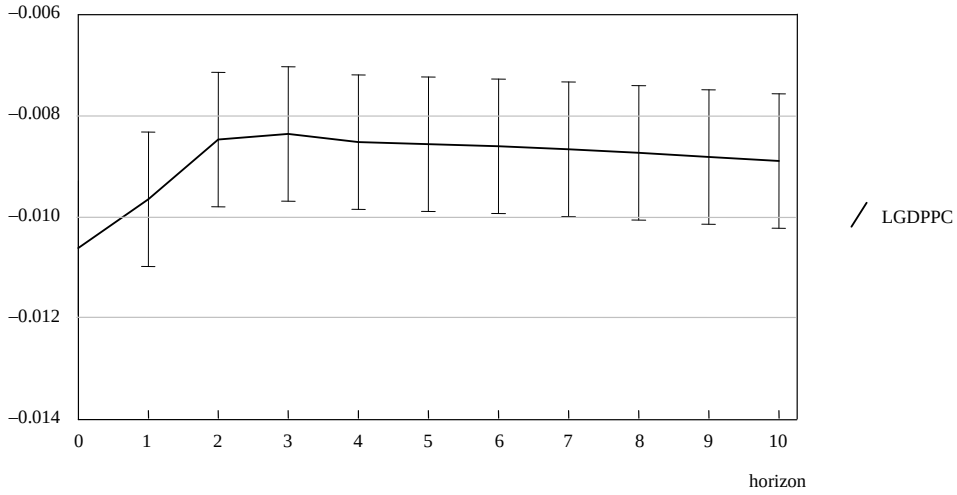


Figure 21

Generalized Impulse Response(s) to One S.E. Shock in the Equation for TOTTAXGD

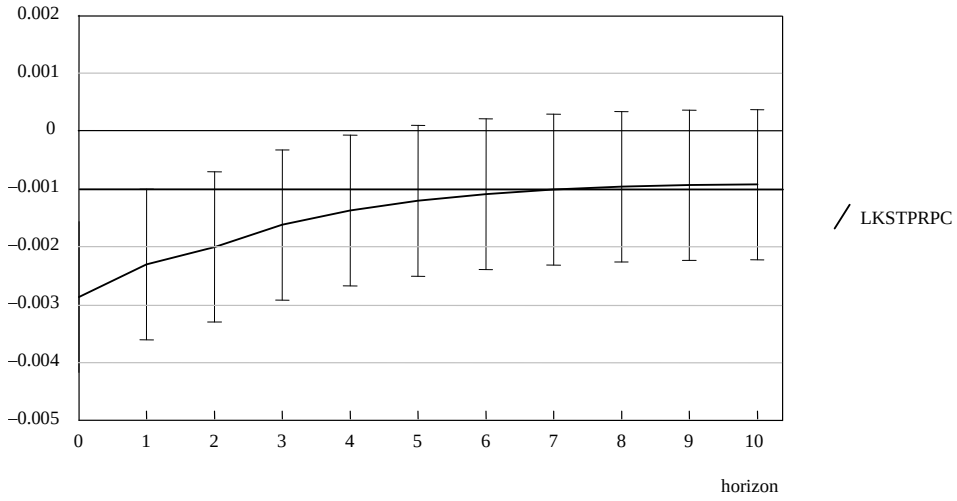


Figure 22

Generalized Impulse Response(s) to One S.E. Shock in the Equation for LGOVCONP

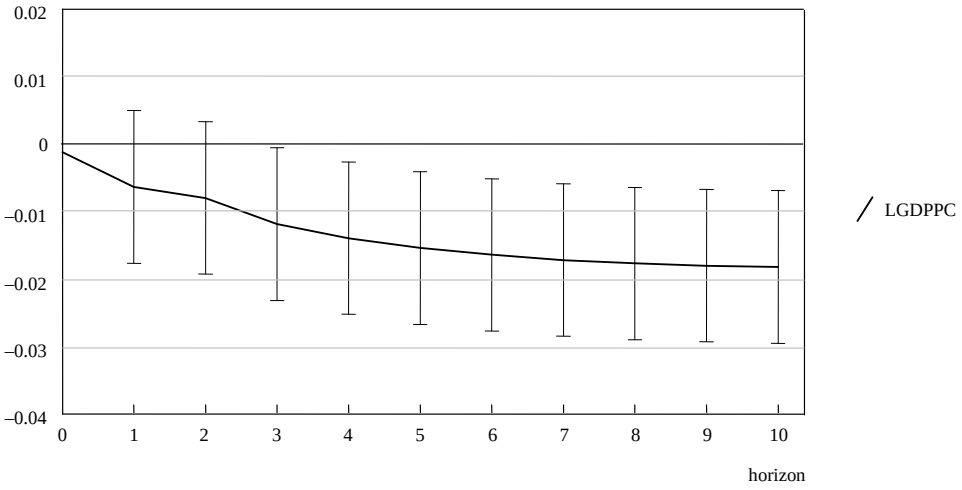


Figure 23

Generalized Impulse Response(s) to One S.E. Shock in the Equation for LGOVCONP

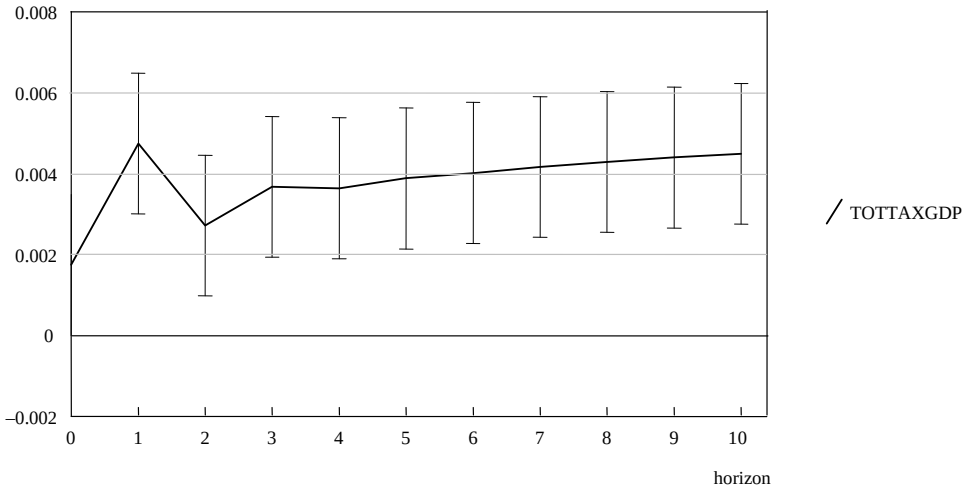


Figure 24

Generalized Impulse Response(s) to One S.E. Shock in the Equation for LGOVCONP

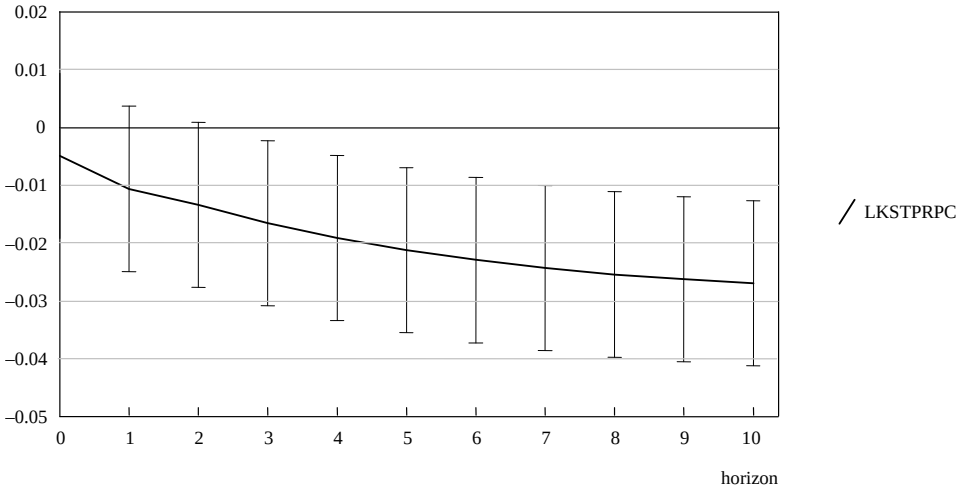


Figure 25

Generalized Impulse Response(s) to One S.E. Shock in the Equation for LGOVCONP

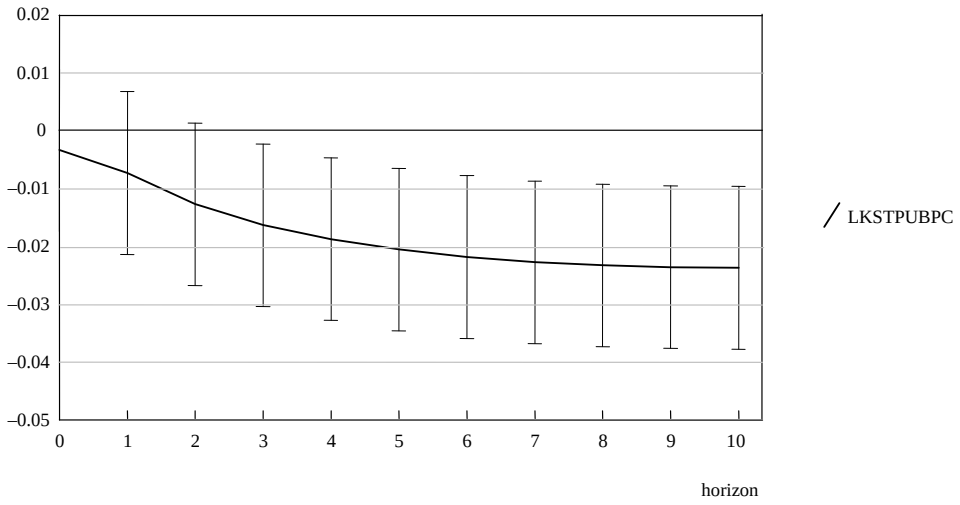


Figure 26

Generalized Impulse Response(s) to One S.E. Shock in the Equation for LGOVSSTP

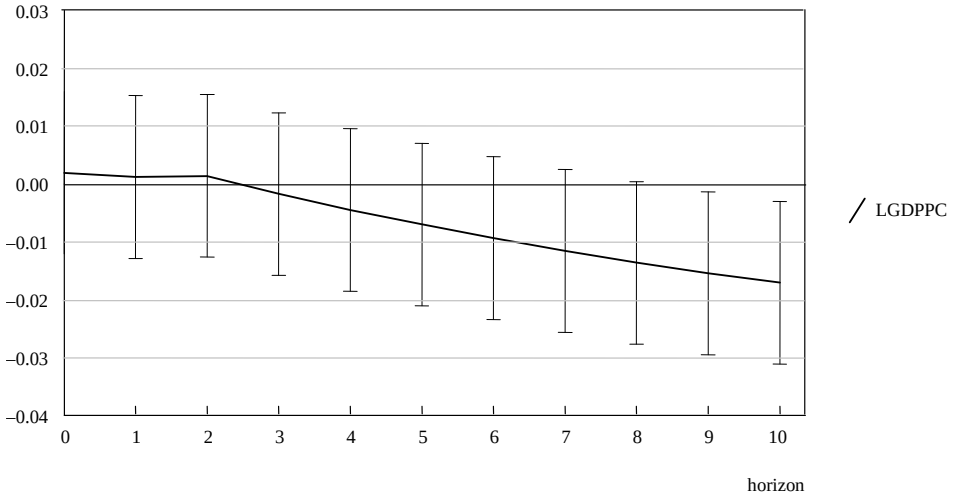
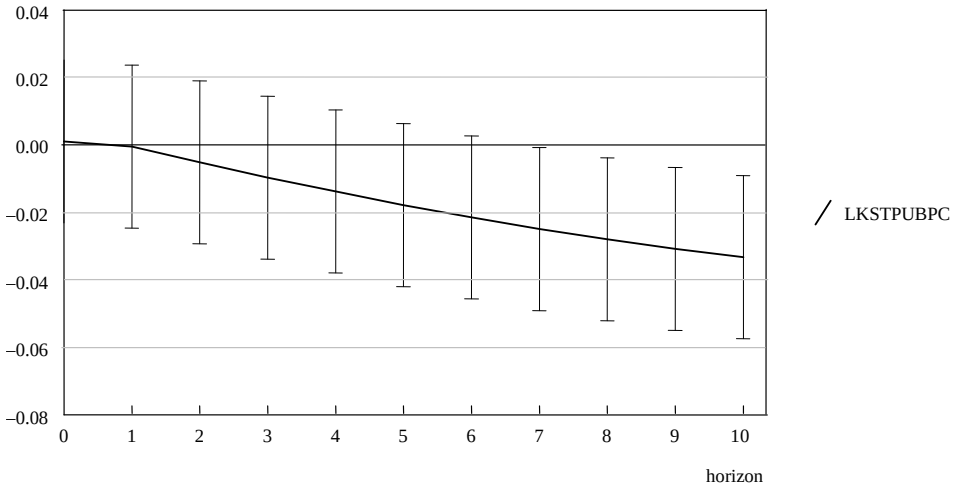


Figure 27

Generalized Impulse Response(s) to One S.E. Shock in the Equation for LGOVSSTP



The other two types of government expenditures, namely the subsidies and social security transfers have negligible effects on GDP in the medium term and opposing effects in the long run. Given the small size of this type of expenditure, we will focus here on the effect of social security transfers (see the Appendix, downloadable from the World Bank site, Research Paper No. WPS 4004, for results of subsidies). Social security transfers have a negative growth effect (Figure 26), primarily because of the associated reduction in the public sector capital (Figure 27). A 5 per cent increase in the social security payments is associated with a fall of 3 per cent in the public capital stock.

5 Conclusions and policy implications

During the past decade, the successful episodes of Brazilian stabilization coincide with those when fiscal policy was flexible to increase primary surpluses, while crises emerge when there is little flexibility to adjust this fiscal variable to external shocks. For instance, the 1998-1999 episodes show the importance of the primary balance as a signaling tool in a world of imperfect information. In contrast to the 1998-1999 stabilization, fiscal policy was unresponsive to shocks in 2002, causing concerns of fiscal policy sustainability. Compounded by electoral uncertainty, the situation ended in the 2002 debt crisis.

The Brazilian fiscal adjustment has been of mixed quality. On one hand, most of the adjustment has been revenue-based and cutting capital expenditures. In the early 1990s, the tax burden was 25 per cent of GDP while in 2005 it reached 37 per cent. On the other hand, the expenditure composition shows the rising trend in social security and assistance transfers.

Our findings show that Brazilian fiscal policy is pro-cyclical in the short run: output expansions are associated with smaller primary balances, while output contractions with higher ones. In the long run, however, the evidence shows that fiscal policy is countercyclical, that is a 1 per cent increase in output is associated with a higher primary balance of 0.2 per cent of GDP.

The econometric analysis using historical data from Brazil indicates positive and strong growth effects of public physical capital stock and public investments: a shock to public capital of 1 per cent of GDP is associated with a higher GDP of the same magnitude. However, the effect of additional taxes is of the same order of magnitude in the opposite direction: higher taxes reduce growth. Hence the impact of the productive spending is neutralized by the effect of the additional taxes required to fund the capital expansion. A long-run solution to recovering an adequate level of public investments must be sought in reallocation of public spending within the fixed overall fiscal envelope. This means the need to re-examine the composition of the current expenditures, including those allocated to the social sectors that today consume a lion’s share of Brazil’s public expenditures.

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THE LACK OF FISCAL CONSOLIDATION IN AN INFLATIONARY ECONOMY: URUGUAY 1970-2006

Gerardo Marcelo Licandro Ferrando and Leonardo Vicente[*]

Different from the papers presented in this session, this one analyzes the lack of fiscal consolidation within a framework of tensions between the objectives of consolidation and price stability. By using a model of time inconsistency with fiscal objectives and a Government's budget constraint similar to the Uruguayan one, it is shown that the existence of nominal debt in domestic currency and the possibility of reducing real expenditure generate incentives in addition to seignorage *for the fiscal use of inflation, avoiding a more lasting consolidation process. By analyzing Uruguayan data between 1970 and 2006 it is evidenced how the real adjustment of Primary Expenditure through inflation has been the key in the fiscal stabilization episodes of the past 35 years. Through the analysis of episodes, correlations and OLS regressions, it is shown that inflation acceleration has played a major role in improving the fiscal balance owing to its effect on real expenditure. Nonetheless, such improvements have been transitory, while real expenditure has bounced back once the adjustment phase was over. This paper offers an institutional reading, since it suggests that the setting of inflation objectives by the Government together with a bias against fiscal consolidation may result in a relative high inflation level.*

1 Introduction

Successful fiscal stabilization episodes have been rare in the Uruguayan economy during the last 35 years, and almost always the length was short. As a result, there is a strong deficit bias, with a primary deficit on average, which ends on debt accumulation. Beyond the well-known political economy reasons for this behavior, inflation seems to play an important role in adjusting the fiscal balance without the pain of a consolidation process. Moreover, there are some fiscal incentives for the generation of inflation linked to the inflation tax, the reduction of the *ex post* real value of nominal debt and especially the decrease of real Primary Expenditure.

As a result, there have been some structural changes in the economy. First, after long decades of chronic inflation, indexation mechanisms to the US dollar were generated, that limited, through the elimination of nominal debt in domestic currency, the Government's capability to default public debt holders. Furthermore, the virtual disappearance of domestic currency, with broad monetary aggregates

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achieving almost 5 per cent of the GDP in 2002, and with Monetary Base that in the 1990s is reduced to half its level of the previous decade, also show the reduction of the use of domestic currency for transactional purposes. Finally, the Organic Act of 1995 limited the Central Government financing by the Central Bank to 10 per cent of the Primary Expenditure of the previous year, an institution which was tested in the hardest stress test: the crisis of 2002.

This work tries to draw the attention to the fact that, in spite of the structural changes previously described, there are still today and there could emerge in the future, incentives to the use of inflation with fiscal purposes, preventing fiscal consolidation. During the financial crises suffered by Uruguay over the period (1982 and 2002), a big part of the fiscal adjustment was accompanied by the effect of inflation on real salaries and pensions. In addition thereto, active policies of reconstruction of markets in UY Pesos, that should stimulate the domestic-currency denomination of banking credit and nominal public debt, and the recovery of the transactional role of domestic currency, are liable to generate incentives for the resurgence of the long-term inflationary phenomenon. This issue is important, as it could give rise to a conflict between the institutional design and the policy of reduction of the financial fragility by the reconstruction of nominal debt markets.

The rest of this paper is designed as follows: Section 2 presents a conceptual framework based on the Government's Budget Constraint to identify the different effects of inflation on public finances. Then, we include the constraint in a simple model of time inconsistency of monetary policy, showing, in addition to the real sector motives, fiscal incentives to inflationary financing that could be preferred to the rise in traditional taxes. Section 3 shows the historical evolution of these channels, putting the stress on the structural disappearance of nominal debt in domestic currency, and on the structural reduction of the inflation tax base. Furthermore, the role of inflation is established as a way to improve the primary balance through the reduction of real indexed primary expenditure above the erosion in real tax revenue. It is shown that this adjustment tool has deep but transitory effects: when it is intended to reduce inflation, it generates an endogenous increase of the aforementioned expenditure. Section 4 discusses the permanent and future role of inflation as a fiscal tool, draws some conclusions and suggests the remaining agenda.

2 Inflation on public finances: the conceptual framework

In this chapter we will derive the Government's Budget Constraint (GBC) in real terms, in order to show the different effects of inflation per category (income, expenses and financing), type of indexation (backward or forward looking), and degree of anticipation. Finally, we include this constraint in a simple time-consistency model so as to derive fiscal incentives for inflation.

2.1 The government's budget constraint in real terms

Following the classical literature on the subject, as Buiter (1985), Marfán (1988), or Blejer and Cheasty (1991), we start with the GBC, which equals needs with funding sources in nominal terms.

$$D + iB_n + Ei^*B^* + P.\bar{i}\bar{B} = \dot{H} + \dot{B}_n + E.\dot{B}^* + P.\dot{\bar{B}} \quad (1)$$

The left hand side of (1) presents the Public Sector's financial needs, determined by the difference between revenues and expenditure, where $D=G-T$ is the primary deficit, G being the expenditure that does not pay interest (Primary Expenditure), and T being the primary revenue, basically linked to tax receipts. The other terms account for payments of the interest bill on non-monetary net debt, which is denominated in nominal domestic currency ($i.B$); foreign currency expressed in domestic one ($E.i^*.B^*$), where E is the nominal exchange rate; and inflation-linked $(P.\bar{i}\bar{B})$, where P is the CPI index and the bars express constant units in domestic currency. The right hand side presents the net funding sources, given by changes in monetary debt $\dot{H}$, H being the Monetary Base or high power money, and non-monetary debt, whatever its denomination may be $(\dot{B}_n, \dot{B}^*, \dot{\bar{B}})$.

Starting from (1), breaking down nominal variables into real variables and prices, adding the Fisher parity for interest rates, and deflating by P we obtain the Public Sector's financial needs in real terms:[1]

$$d+(r+\pi)b_n+(\bar{r}+\pi)\bar{b}+(r^*+\pi^*).eb^* = (\pi h+\dot{h})+(\pi b+\dot{b})+(\pi\bar{b}+\dot{\bar{b}})+e(\pi^*.b^*+\dot{b}^*) \quad [2] \quad (2)$$

Isolating real revenue and expenditure from the left hand side, we obtain the real deficit:

$$d + r.b_n + \bar{r}.\bar{b} + r^*.e.b^* = (\pi.h + \dot{h}) + \dot{b} + \dot{\bar{b}} + e.\dot{b}^* \quad (3)$$

Subtracting (3) from (2), the difference is given by:

$$\pi.b_n + \pi.\bar{b} + e.\pi^*.b^* \quad (4)$$

This equation reflects the (possible) monetary compensation to the debt holder because of the real loss caused by inflation.

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[1] The detailed derivation of this equation, as well as equations (10) and (15) can be found in Annex 1.

[2] $e=E/P$ is a relative price, its variation being the real devaluation (appreciation). If P^* is assumed constant, it also represents the real exchange rate.

On the other hand, the first term on the right hand side of both equations presents the nominal change of the Monetary Base in real terms, or seignorage *s*, broken down in its two components:

$$s = \frac{H}{P} = \dot{h} + \pi .h$$

Since real demand of money depends among other things on transactions, part of seignorage is linked to a "genuine" increase of real demand for money ($\dot{h}$), combined with economic growth. Meanwhile, another part is obtained through a transfer of real resources from the Private Sector to the Public Sector by the use of money, whose tax base is h and whose rate is π; this is the so-called inflation tax.

One can treat $\pi.h$ as another tax, on the left hand side of (3), isolating on the right hand side changes on real net debt; an alternative presentation is then (3'):

$$d + r.b_n + \bar{r}.\bar{b} + r^*.e.b^* - \pi .h = \dot{h} + \dot{b} + \dot{\bar{b}} + e.\dot{b}^* \qquad (3')$$

Finally, if debt structure per currency is composed of a θ participation of nominal debt, γ of foreign currency denominated debt and $(1-\theta-\gamma)$ of price-indexed debt, $\theta = \frac{b_n}{b}, \gamma = \frac{e.b^*}{b}; (1-\theta-\gamma) = \frac{\bar{b}}{b}$ *;* we can summarize (3') as follows:

$$d + b.\left(\theta .r + \gamma .r^* + (1-\theta-\gamma).\bar{r}\right) - \pi .h = \dot{h} + \dot{b} + \dot{\bar{b}} + e.\dot{b}^* \qquad (3'')$$

2.2 Effects of inflation on financing, revenue and expenses

Inflation affects different budget items, causing endogenous changes in the fiscal balance and in Public Debt. These "balance sheet" effects determine changes in the real value of assets and liabilities without necessarily changing flows of revenue and expenses.

The net effect of inflation on public finances is *a priori* indeterminate, depending on the anticipated nature thereof, and on the indexation degree of the different items. Non-indexed items are endogenously adjusted in real terms in the event of changes in π; on the other hand, inflation only has effects insofar as it is, at least partially, non-anticipated.

Equation (3'') shows three channels through which (non-anticipated) inflation can change the real value of debt:

- Inflation tax on money. This is a well-known item in the literature: the impact effect is positive, the final effect being indeterminate. It depends on the degree of adjustment of real demand of money to inflationary surprise; in particular, a positive effect arises when the inflation-elasticity of money demand is less than unity, a situation that is more probable in more stable countries.

- Inflation tax on nominal debt in domestic currency. In the same way as tax on money is collected, its close substitutes can also be taxed, depending on expectations (anticipated or non-anticipated inflation, π, π^e rate) and on indexation mechanisms (indexed or non-indexed debt). The inflation tax might possibly be collected on nominal (non-indexed) debt, since nominal interest rate is fixed *ex ante*, incorporating expected inflation. So, in (4) the term $\pi.b_n$ is then $\pi^e.b_n$. When there are differences between π^e, π, there is a transfer of resources, although of an uncertain nature: if $\pi > \pi^e$ ($\pi < \pi^e$) the net transfer is to the Public Sector (to the Private Sector). Nonetheless, an inflationary surprise improves the real fiscal balance without ambiguity. In countries with a history of high inflation this type of debt is not very frequent, linked to the *original sin* problem.[3] [4] The final effect of inflation on the flow of real interest is indeterminate, being lower in absolute value when indexation mechanisms are more developed.[5]
- Real primary deficit, *i.e.*, the difference between Primary Expenditure g and primary revenue τ, both in real terms. This is the bulk of the paper, so we deeply explain it as follow.

The final effect depends on the legal, institutional and administrative framework, where the central role is played by collection and expenditure lags, and indexation mechanisms.

Furthermore, the consequences of inflation are different on revenue and on expenditure: revenue is mechanically adjusted by effective inflation; primary expenditure implicitly or explicitly incorporates an adjustment to expected inflation. Another difference appears when we observe deflators: while revenue, when collected on the GDP, moves according to the GDP deflator, expenditure, when being determined by budget and/or discretionary increases, is adjusted by CPI.[6]

In a tax system based on expenditure like the Uruguayan one, where there are lags between tax accrual and its effective collection, an acceleration of inflation reduces real tax receipts; this is the so-called "Olivera-Tanzi effect", which is illustrated as follows:[7]

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[3] This problem has been studied at length after Eichengreen and Hausmann (1999).

[4] An inflation-indexed debt eliminates this problem, while the effect on debt in foreign currency depends on the difference between effective and expected real exchange rate. For more details, see Annex 1.

[5] The effects of inflation on debt denominated in foreign currency are left aside in this work, as relative prices issues are beyond of its scope. A detailed and recent analysis can be read in Rial and Vicente (2003).

[6] This introduces a "terms of trade" effect which adds new distortions even with a stable inflation rate. The gap between both deflators can be very important, especially in small open economies facing huge macroeconomic distortions and price adjustment. Nonetheless, this has not been sufficiently studied in the relevant literature, and is out of the purpose of this paper. For a succinct mention thereto, see Quinet and Bouthevillian (1999).

[7] This concept is fairly known in the literature. See Julio Olivera (1967); Vito Tanzi (1977). In progressive tax systems based on income there also appears the "fiscal drag" phenomenon, when inflation changes the real value of revenue categories.

$$\tau_t = \frac{T_t}{P_t} = \frac{\bar{\tau}_{t-n}}{(1+\pi)^n} \tag{5}$$

τ being the effective real collection, $\bar{\tau}$ the accrued tax receipt in real terms, n the lag period. Consequently, real revenue is deteriorated according to the magnitude of inflation, its acceleration, the lag between generation and collection, and the absence of indexation mechanisms.[8]

Something similar occurs with Primary Expenditure; the lag appears between the budgetary or readjustment time, and the actual financial disbursement. Within Primary Expenditure there are discretionary expenses that do not explicitly depend on inflation, such as public investment and purchases, which are assumed to be constant in real terms, being represented by α. The rest of the items are indexed with a certain lag, in some cases in a discretionary way, mainly public salaries and social transfers to the Social Security System; they will be called Indexed Primary Expenditure (IPE) and represented by $\boldsymbol{\omega}$. The IPE is inflexible in quantities, changing its real value when nominal adjustment differs from inflation. Incorporating these elements:

$$g_t = \frac{G_t}{P_t} = \frac{\bar{\omega}_{t-s}}{(1+\pi)^s} + \alpha_t \tag{6}$$

Primary Expenditure's real dilution will positively depend on its weight ω, on the inflation rate and its acceleration, and on the lag in nominal adjustment s.[9]

Generally, and this is how it happens in the Uruguayan case, the lag in tax receipts is shorter than in Primary Expenditure ($n<s$). Consequently, we can combine (5) and (6), expressing taxes in terms of period t, updating the IPE n periods, to show the net effect on expenditure:

$$d_t = g_t - \tau_t = \alpha_t + \frac{\bar{\omega}_{t-s+n}}{(1+\pi)^{s-n}} - \tau_t \tag{7}$$

IPE is adjusted according to expected inflation, whereby the net effect of an inflation surprise (acceleration) is positive, since it reduces primary deficit d.

Finally, we can summarize the effects of inflation on the GBC in continuous time as follows:

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[8] If tax collection is fully indexed there is no loss for fiscal lags; consequently, both real collections coincide.

[9] This effect is called in recent literature "the Patinkin effect", after Patinkin (1993) used it to analyze the Israeli stabilization of 1985. However, this effect is older, as many authors developed this concept previously. See Cardoso (1998).

$$\left[\underbrace{\alpha + \frac{\overline{\omega}}{(1+\pi)^{s-n}}}_{[A]} - \underbrace{\tau}_{[B]} \right] + \underbrace{b.\left(\theta.r + \gamma.r^{*} + (1-\theta-\gamma).\overline{r}\right)}_{[C]} - \underbrace{\pi.h}_{[D]} = \underbrace{\dot{h} + \dot{b}}_{[E]} \tag{8}$$

The effects of inflation on public finances are indeterminate, depending on many factors, *inter alia* the ones described above: inflation expectations, structure of assets and liabilities in domestic currency, structure of revenue and expenses, degree of monetization, reaction of money demand to changes in expected inflation, and indexation mechanisms.

Equation (8) summarizes the effects of non-anticipated inflation on public finances. *Ceteris paribus*, it makes it possible for real expenditure to be diluted beyond the reduction of real tax receipts, reducing the primary deficit ([*A*] and [*B*]). In addition, it reduces real interest payments of nominal debt [*C*], while the final effect on inflation tax and *seignorage* is indeterminate, though it has a positive impact [*D*].[10] Inflation perfectly anticipated has no real effect but the inflation tax. All these factors cause financial changes, reflected on the change in real net debt, even if stocks remain unchanged [*E*].

In view of these effects, there is an apparent inflationary bias from public finances. This issue is studied in the following section.

2.3 The model

To illustrate the fiscal incentives to generate inflation we use a framework similar to the one proposed by Calvo and Guidotti (1992), and Goldfajn (1997). A two-period version is presented where the Government, after deciding the amount of debt financing, chooses the optimal mix of policy instruments to finance the budget of year 2. We will assume that debt structure is given, and that it can include three types of liabilities: nominal debt in domestic currency, debt indexed to domestic inflation, and debt in US dollars. The Government can pay expenditure with increases in taxes – which are assumed to be indexed at nominal income level – or with inflation. Additionally, the economy presents a structure consistent with a Phillips curve. The Government's problem can be summarized as follows: choose the inflation rate so that:

$$\text{Max } V = E\left[\lambda(y - \bar{y}) - \frac{\pi^{2}}{2} - \rho\tau \right] \tag{9}$$

where λ and ρ are positive constants that indicate the relative weights of the different arguments of the Government's utility function.

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[10] On impact, it also reduces interest on foreign currency-denominated debt in $\gamma.b$, *via* real appreciation of the domestic currency, while it has no effect on the indexed debt $(1-\theta-\gamma).b$.

The GBC in period two is a simplified discrete time version of equation (8). Thus, finding the value of τ; incorporating the transversality condition for non-monetary debt (zero debt at the end of t=2) and of long run equilibrium for Monetary Base; imposing, to simplify, that all expenditure is indexed (α=0); and specifying the components of the real rates, we obtain:

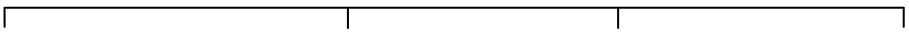
$$\tau = \frac{\varpi_1\left(1+\pi^e\right)}{(1+\pi)(1+g)} + \frac{b_1}{1+g}\left(\theta\cdot\frac{1+i}{1+\pi} + \gamma\cdot\frac{\left(1+i^*\right)(1+e)}{1+\pi} + (1-\theta-\gamma)\cdot\frac{(1+r)(1+\pi)}{1+\pi}\right) - \frac{k\pi}{1+\pi} \quad (10)$$

All variables refer to period 2 unless otherwise indicated; all variables are measured in terms of GDP. Here g is the real growth rate of the economy, i is the nominal rate of interest in domestic currency, e is the rate of change of the nominal exchange rate, and i* is the reference international rate of interest.[11] We have assumed that inflation does not affect real balances, k, in order to avoid emergence of multiple equilibria resulting from the existence of a Laffer curve.

Consumers are assumed to be risk-neutral in consumption.[12]

$$1+i = \left(1+i^*\right)\left(1+e^e\right) = (1+r)\left(1+\pi^e\right) \quad (11)$$

Where e^e and π^e refer, respectively, to expected devaluation and inflation rates. The timing of the game is as follows: the game starts once financing with debt and its composition per currencies have been decided. The Government then chooses the way how financing is completed, through taxes and inflation.



We will assume, for the sake of simplicity, that the Government directly controls the inflation rate. Additionally, we will assume that the purchasing power parity (PPP) holds.

$$\pi = e + q \quad (12)$$

where $\boldsymbol{q}$ is the real exchange rate, which is assumed to be constant.

GDP is determined by the existence of a Phillips curve.

$$y = \alpha + a\cdot\left(\pi - \pi^e\right) \quad (13)$$

where α and a are positive constants.

In the way it is considered, the optimization problem of the Central Bank includes two main types of incentives to generate inflation above the expected one.

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[11] Introducing the sovereign risk premium would not affect the analysis.

[12] Fixed risk premiums would not affect the results.

- Real motives. The Phillips curve in this case can represent the channel through the wage agreements of the traditional literature, or a subtlest beggar thy neighbor type of effect.
- Fiscal motives.
  a. Inflation reduces current expenditure in real terms.
  b. Inflation reduces the real weight of nominal debt in domestic currency.
  c. Monetary financing.

Below we show the inflation rates that are obtained with these incentives in the case of a discretionary central bank, that is, which takes as given the decisions of the private sector. In order to show this process, first we have to work in the simplification of the Government's budgetary equation.

Starting from (10), if we replace interest rates with their equivalents in terms of the real interest rate, and then we linearize by a degree-one Taylor series around zero in its determinants, we obtain:

$$\tau = \varpi_1\left(1-\left(\pi-\pi^e\right)\right)+b_1\left[r-\theta\left(\pi-\pi^e\right)-\gamma\left(q-q^e\right)\right]-k\pi \qquad (14)$$

We can replace (13) and (14) in the utility function of the Central Bank, derive with respect to inflation, and impose purchasing power parity, to obtain that discretionary inflation can be represented as:

$$\pi^D = a\lambda+\rho\left(\varpi_1+\theta\cdot b_1+k\right) \quad [13] \qquad (15)$$

On the other hand, if the PPP is not complied with, when $q<q^e$, the deficit increases endogenously, both because of the flows of interests and because of the debt stocks. These effects are out of the study of this paper; see Rial and Vicente (2003) for a discussion and quantification thereof.

This shows that discretionary inflation positively depends on: the effectiveness of inflationary surprise to increase activity,[14] the importance of GDP growth motive in the Central Bank's utility function, the importance of the tax reduction motive for the Central Bank, the amount of Indexed Primary Expenditure, the amount of debt in domestic currency, and the monetization of the economy.

So that, fiscal variables can determine inflation in the case of a Government that prefers this way to stabilize the budget against the rise in taxes and/or the reduction of nominal expenditures. From a political economy point of view, this mechanism is less harmful for the Government's position.

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[13] These results are robust to other utility functions of the Central Bank and other specifications of the weight of taxes, as for instance a quadratic form. These changes affect the commitment inflation rate, which is not the purpose of this work.

[14] Alternatively, it would be the effectiveness to improve net exports under the assumption of nominal rigidities.

3 Inflation and public finances in Uruguay, 1970-2006

This chapter begins with a short description of the behavior of inflation over the period. Section 3.2, after reviewing the financing structure, focuses on the effects of inflation on deficit financing, including dilution of nominal debt and *seignorage*. Subsequently, in Section 3.3 the main stylized facts linked to primary revenue and expenses are analyzed, starting by a description thereof, then presenting some econometric results, to finally analyze in-depth the endogenous adjustment of Indexed Primary Expenditure (IPE). Section 3.4 summarizes and concludes this chapter.

3.1 Inflation over the period

Average annual inflation over the period was 46.5 per cent. The standard deviation of inflation was 30 per cent, and it ranged between 4.4 per cent (2001) and 112.5 per cent (1990). Along the sample Uruguay had three exchange rate-based stabilization plans (ERBSP) (1968-71, 1978-82, and 1990-2002), which were abruptly abandoned to return to high inflation.

The period 1970-74 presents an acceleration of inflation from 20 per cent, linked to the 1968 heterodox stabilization plan, until almost 100 per cent (annual averages). The 1974-82 period is characterized by a gradual decrease, intensified by the 1978 plan based on an active crawling peg for the exchange rate, which succeeded in lowering inflation to 20 per cent *per annum*. High inflation returned after the abandonment of the plan leading to an average of 60 per cent in the first years; towards the end of the period inflation accelerated, reaching 112.5 per cent in 1990. From 1990 and on, a new ERBSP starts which would bring down inflation to below the 5 per cent mark in 2001. The 2002 crisis causes a temporary increase in inflation (20 per cent in 2003), which will later converge to the present level of 6 per cent. This volatility is a favorable framework to assess the effects of inflation on public finances.

3.2 Inflation and General Government financing[15]

3.2.1 Defaulting nominal debt

Nominal debt in domestic currency was, regardless of the existence of interest rate ceilings and until the emergence of chronic inflation in the fifties, an important financial instrument for the Uruguayan Government. Since then, although some

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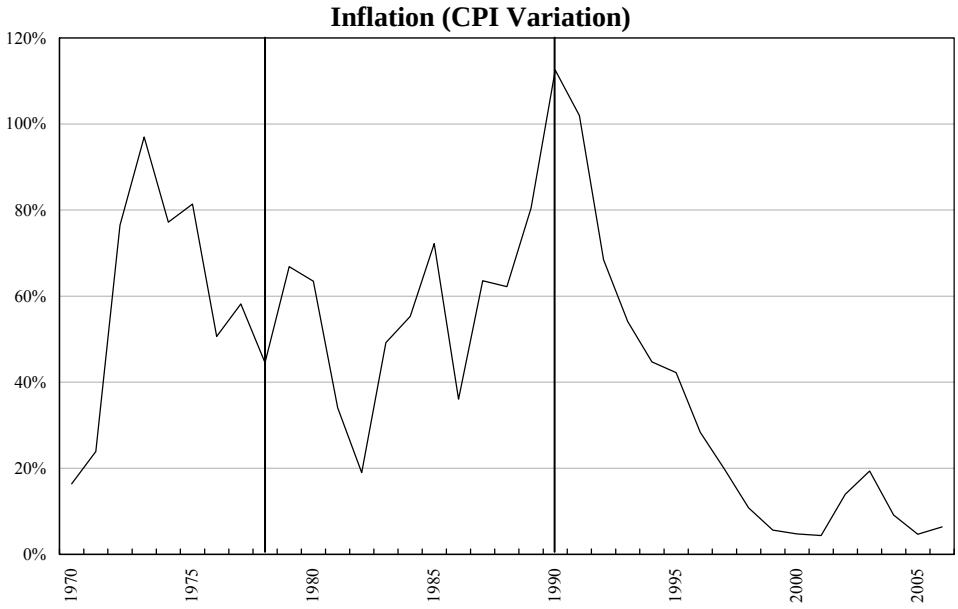
[15] Here we present a proxy of the General Government, represented by the consolidated Central Government and Social Security System (a public pension fund (BPS) and military and police social security funds), through the transfers from the former to the latter. We do not have information of Local Governments for the whole period. An interesting extension would be to analyze revenue and expenses of the BPS; moreover, to expand the coverage of the Public Sector, including Public Enterprises and the Central Bank.

Figure 1



Source: Central Bank of Uruguay.

efforts to force debt placement through pension funds (Bertoni and Sanguinetti (2004)), the share of UY Pesos in the debt portfolio dimmed gradually.[16]

With the appearance of high inflation, the *original sin* problem arose; causing the disappearance of this instrument in practically the whole period. The 2002 financial crisis caused -among other consequences- the return of nominal debt as the only possible way of financing in a complicated environment: bills in UY Pesos were issued in 2002-03, but for short terms (15, 45, 75 days) and paying high interest rates: from 160 per cent falling to 20 per cent (nominal *per annum*), within a context of low inflation (14-19 per cent).

Simultaneously, the Government started to issue inflation-indexed debt in UI (Indexed Units) for longer terms (3 to 10 years), in a conscious attempt to enter a "road to redemption".[17]

As of December 2006, total debt in UY Pesos accounted for 8.7 per cent of GDP.[18]

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[16] See for instance Banda and Santo (1983), Bertoni and Sanguinetti (2004).

[17] For references, see Eichengreen, Hausmann and Panizza (2003).

[18] After 1996, some Bonds in nominal wage-indexed units (UR) were issued, exclusively allocated to the recently created private Pension Funds. Both because of the small amounts and its specific demand they cannot be considered as part of a de-dollarization strategy.

Table 1

General Government Debt[(1)]
(UY pesos, percent of GDP)

Year	Total	CPI-linked	Nominal	Linked/Total
2001	0.0	0.0	0.0	100
2002	3.0	1.9	1.1	63
2003	7.9	5.2	2.7	66
2004	6.6	6.1	0.5	92
2005	6.5	6.2	0.3	96
2006	8.7	8.7	0.0	100

(1) Amount Outstanding out of the Public Sector.
Source: Central Bank of Uruguay.

The figures in the table clearly state a fact and a dilemma. The fact is that, despite the recent "*pesification*" (nominal debt in UY Pesos), eroding the real value of nominal debt in domestic currency is not an effective tool to regain fiscal sustainability in the present. However, the ongoing process of *pesification* of debt might generate an element of tension between the objectives of price stability and fiscal sustainability in the future with an inappropriate institutional framework.

3.2.2 Seignorage and its components

From 1970 to 1985, within a context of high inflation only interrupted by the 1978-82 Exchange Rate-Based Stabilization Plan (ERBSP), the Consolidated Public Sector could finance up to 4 points of GDP through monetization of the deficit.[19] After the 1990 ERBSP, monetization and fiscal deficit fell simultaneously. Until 1998, seignorage could finance the reduced deficit, but since then, it represents a source of funds of 1-2 per cent of GDP, almost disappearing in the last few years, implying a structural change.[20, 21]

As a result, one of the main characteristics of deficit financing has been the structural loss of *seignorage*: its yield was on average 2.8 per cent of GDP in the Seventies, 2.6 per cent in the 1980s, 1.1 per cent in the 1990s, and 0.3 per cent in the present decade.

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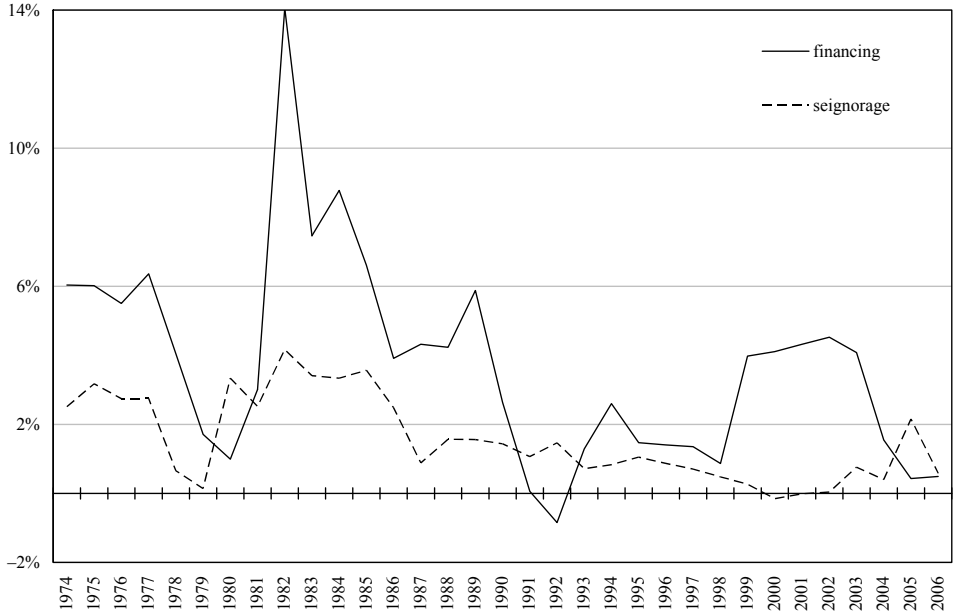
[19] Since fiscal deficit in those years was sometimes lower, and there were other financing sources, this tax enabled other uses, which in general were reserve accumulation. This phenomenon is documented, moreover, in Banda and Santo (1983) and Banda (1994).

[20] The increase in deficit was financed by Government bonds in foreign currency and, after 2002, with new multilateral loans.

[21] Annex 2 presents annual data of deficit financing, *seignorage* and its components.

Figure 2

Public Sector's Financing & Seignorage
(percent of GDP)



Source: Central Bank of Uruguay

This evolution can be noted in both *seignorage* components: the reduction of the inflation rate, especially in the 1990s, limits the amount of the inflation tax, while technological changes linked to the appearance of close substitutes for money reduce money demand in terms of GDP; this, in turn, contributes to reduce the tax base.[22]

Before the 1990s there were relatively high degree of monetization (some 9 per cent of GDP) and inflation rates. Nonetheless, inflation acceleration at the end of the 1980s causes a sudden fall of monetization to half its value, which constituted the traditional "high equilibrium" of inflationary finances. In the 1990s, however the gradual fall of the inflation rate, the more "genuine" *seignorage* component, the demand of Monetary Base in terms of GDP, has kept relatively constant in its new lower level, which averages 3.8 per cent in the period 1990-2004; this produces a structural change in money demand. At the same time there were institutional changes: the Organic Act of the Central Bank establishes an operational limit to monetary funding of the Central Government's deficit, which

[22] Bucacos (2003), using simulations for specific years, comes to the same conclusions.

Figure 3

Degree of Monetization
(MB/GDP)

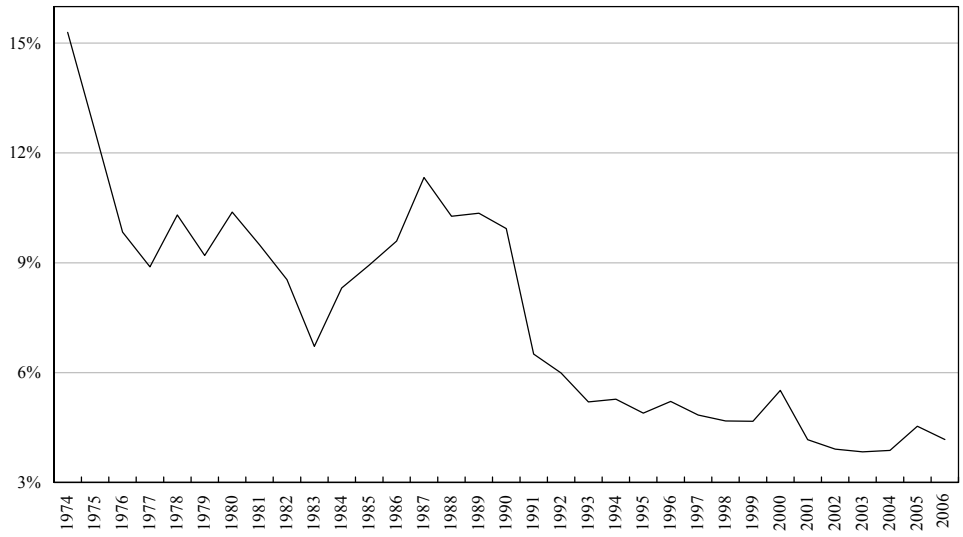
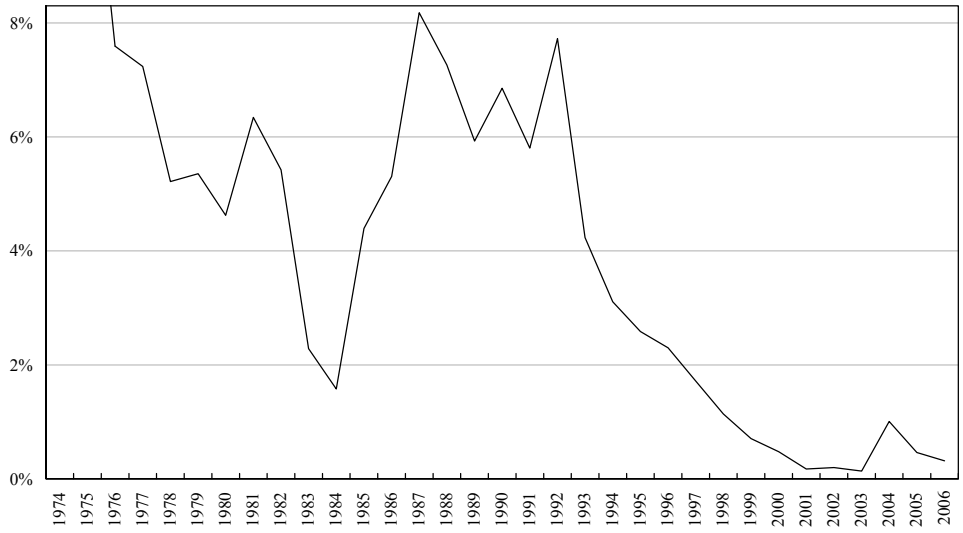


Figure 4

Inflation Tax
(percent of GDP)



Source: Central Bank of Uruguay.

cannot exceed 10 per cent of the Primary Expenditure of the previous year's National Budget.[23] Given this, the collection of the inflation tax in the final years of the stabilization process (1998-2002) averaged only 0.3 per cent of GDP.

Putting both pieces together, the returns of money printing through inflation have been considerably reduced. For instance, the inflation acceleration of 1983 collected through inflation tax 3.8 per cent of GDP, while in 2002-2003 it accounted for just 0.6 per cent of GDP per annum.

Nonetheless, current remonetization (2005-06) could be indicating the beginning of a new structural change to make it possible for inflationary finance to achieve a "low equilibrium". In order to consolidate this tendency, target inflation should necessarily be kept in low levels, avoiding incentives for a short-term inflationary funding.

3.3 Effects on the General Government's primary balance

3.3.1 Structural and legal framework of Primary Revenue and Expenses[24]

Public finances in Uruguay over the period 1970-2006 are characterized by an average General Government's primary deficit of 0.8 per cent of GDP, which shows high volatility: its standard deviation is 2.3 per cent of GDP, achieving its historical maximum after the crisis of 1982, and in the other end presenting surplus in specific years, at the beginning of the 1980s and of the 1990s, reaching its maximum in 2006. This development has taken place within the framework of an increase in the share of primary revenues and expenses in GDP: revenues went from 13 to 20 points of GDP in the period, while expenses increased from 16 to 22 points at the beginning of this decade. It should be noted that both categories exhibit high and similar standard deviation, around 2.3 per cent of GDP.

The Government has discretionary power in its tax policy, in order to create and modify taxes, fix rates, tax bases and exemptions, by means of laws and decrees. Taxes are mainly linked to expenditure, wages and pensions, and foreign trade, with a declining participation, and present a weighted average lag in collection of approximately 22 days. The bulk of Central Government's collection (75 per cent of the total over the period) is collected by the Taxation Office (DGI), whose main taxes (VAT and IMESI) represent 2/3 of total collection and fall on expenditure.[25] This tax structure was consolidated in the first half of the Seventies and, in spite of structural changes in regulation, has not substantially changed as regards its structure, although it certainly has increased its levels.

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[23] Law No. 16.696, dated 30th March 1995, articles 47 and 49.

[24] Annex 3 presents a more detailed analysis of the legislation over the period, which in turn updates the Borchardt, Pereira and Vicente (2001) compilation, as well as its effects on collection lags per taxes.

[25] VAT accounts for almost half of the DGI's collection, while the IMESI, a bunch of different taxes on selected goods and services, has a participation of 16 per cent.

Figure 5

General Government Primary Balance: Actual and CAPB
(percent of GDP)

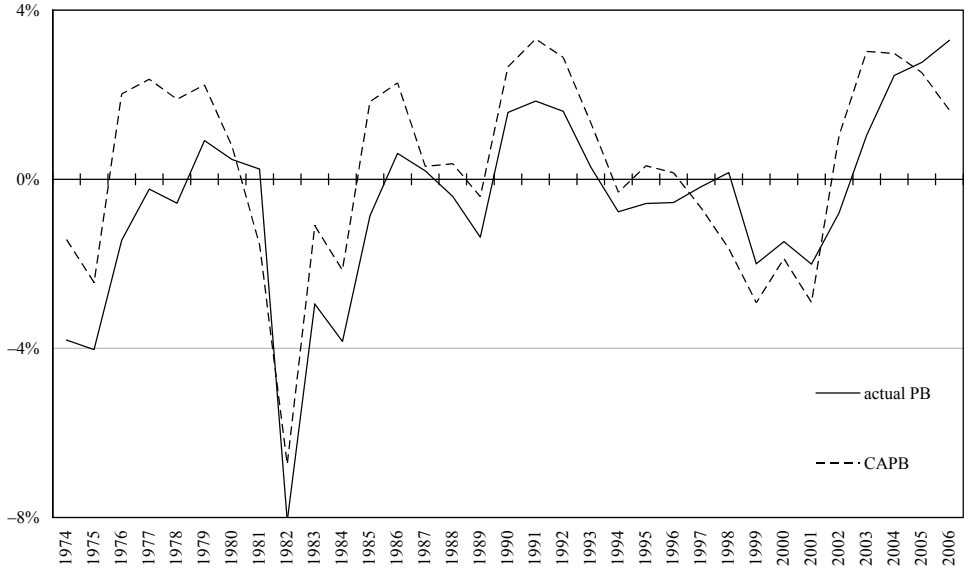
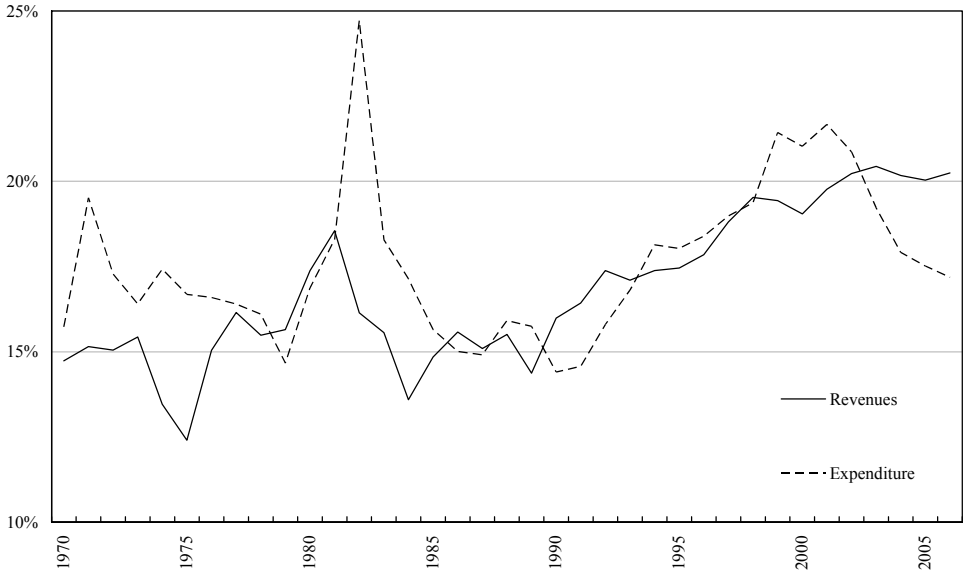


Figure 6

General Government Primary Revenues and Expenditure
(percent of GDP)



Source: Central Bank of Uruguay.

Figure 7

Indexed Primary Expenditure
(share of total expenditure)

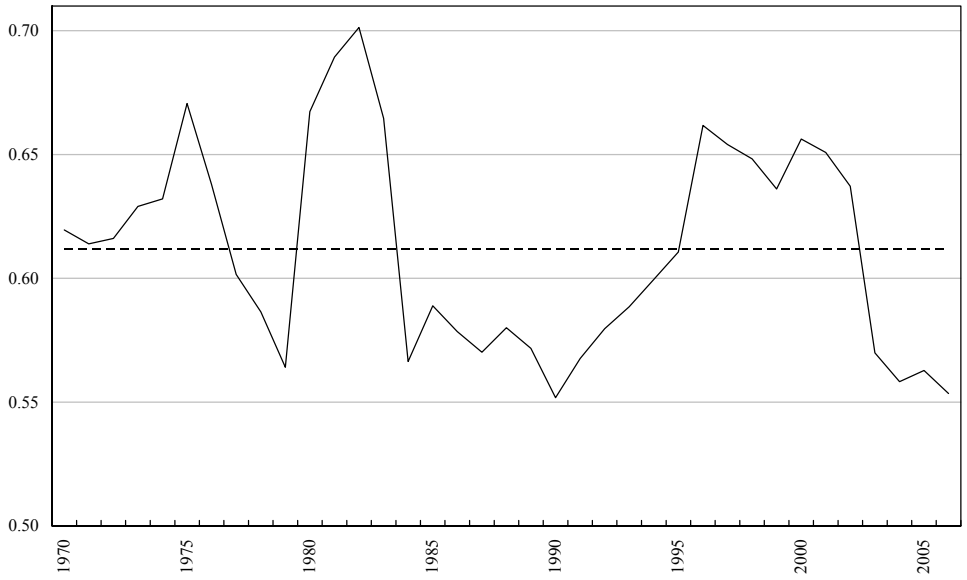


Figure 8

Wages and Salaries
(percent of GDP)

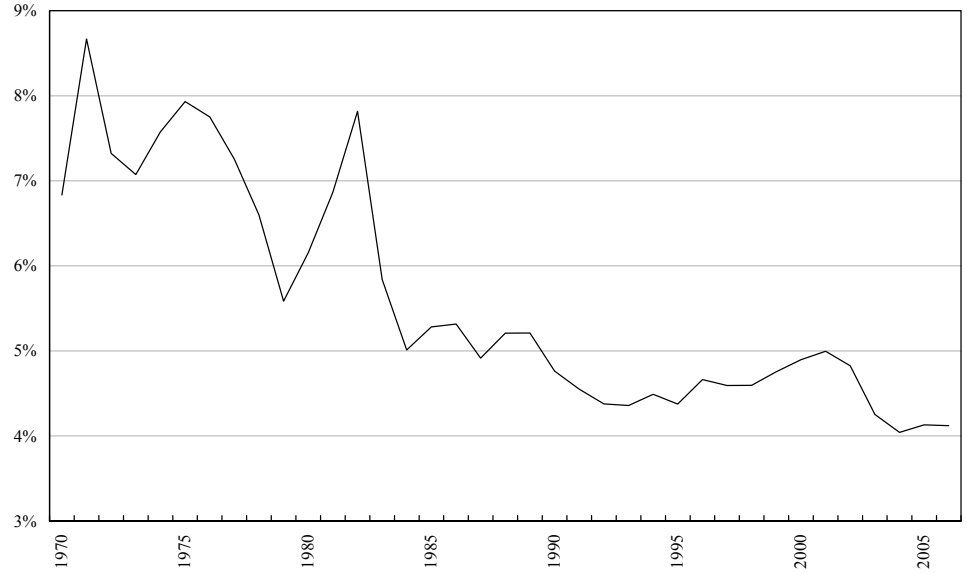
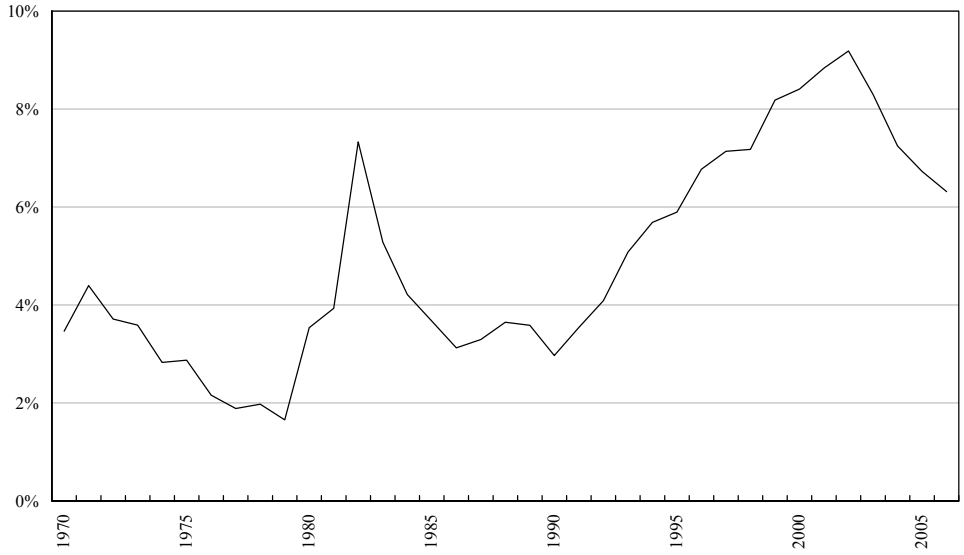


Figure 9

Transfers to Social Security (BPS)
(percent of GDP)



Source: Central Bank of Uruguay.

Current Primary Expenditure, composed of the Government's consumption and transfers to other public or private agents, mostly transfers to the Social Security System (BPS and the Military and Police Funds), accounts for 82 per cent of total expenditure. In particular, public salaries and transfers to Social Security, which are subject to indexation rules and present a procyclical behavior, weight together 60 per cent of total expenditure. We shall call them Indexed Primary Expenditure.

Salaries adjustment period has varied between quarterly, four-monthly and annual, while, after the Constitutional Reform of 1989, the Government has lost its discretionary power as regards the amount, the time and then the lags of pension adjustments. Since then, both BPS revenue and expenses, and consequently their financial balance, shall be endogenously determined by inflation. The rest of the Primary Expenditure (purchases and investments) is managed on a discretionary basis without an explicit adjustment to inflation, while interest payments are endogenously determined by financial variables that cannot be controlled by the spending policy.

3.3.2 Reaction of primary balance to changes in inflation

A first approach to quantify the effects of inflation on the primary balance of the Public Sector in Uruguay is through the correlation matrix between the different

Table 2

Correlation Matrix: Fiscal Variables, GDP and Inflation, 1970-2005

Fiscal Variables	GDP	Inflation
Total Receipts	0.96	–0.58
Net Taxes DGI	0.95	–0.54
VAT	0.95	–0.55
IMESI	0.70	–0.18
IRIC	0.93	–0.72
Primary Expenditure	0.95	–0.71
Indexed Primary Expenditure	0.93	–0.78
Transfer to Social Security	0.91	–0.74
Salaries	0.57	–0.42
Interest	0.64	–0.47
GDP	1.00	–0.69
Inflation	–0.69	1.00

items of primary revenue and expenses, GDP growth and inflation, which is summarized in the table above.

On the one hand, there is a positive and strong correlation between almost all the selected items and GDP. This feature appears on receipts as well as Primary Expenditure, the latter being determined by Social Security. On the other hand, there is a negative correlation between GDP and inflation. These facts determine the usefulness of including GDP as a control variable.

Correlations with respect to inflation are generally negative for all items, being higher for Primary Expenditure than for receipts. The inverse relationship between receipts and inflation, mostly explained by tax receipts, would be showing the effect of lags in collection, which is, however, lower than those of expenditure, especially IPE, confirming the favorable net effect of inflation on primary balance presented in Section 2.

A similar correlation can be seen between inflation and tax collection and VAT, while taxes with longer lags, like IRIC, present a higher correlation. The variable with the higher negative correlation with inflation is IPE, explained firstly by transfers to Social Security, while salaries present a lower correlation. Given this important relationship and that it accounts for 60 per cent of total spending, it is confirmed that this is the central variable to be analyzed in detail. Finally, the relationship between interest and inflation, relatively weak, has to be complemented

with the inclusion of the exchange rate, since almost the whole interest bill has been denominated in foreign currency.[26]

A more structural analysis of revenue, expenses and inflation, where GDP is included as a control variable, makes it possible for reactions of the different items to changes in inflation rate. Due to lack of higher frequency data for the whole period 1970-2005, annual data are used; estimations are made by OLS; all variables are expressed in logarithms; the different revenue and expenses items are deflated by CPI; real GDP is deflated by its implicit deflator, and inflation is measured as a CPI variation.

The results in general show: expected signs and high significance level for GDP, this being consequently a good control variable; a good general adjustment of regressions; and, in the case of receipts, a first degree autocorrelation is detected (low values of statistical DW, subsequently confirmed by the Breusch-Godfrey test). Autocorrelation of residuals implies that OLS results become inefficient, but they keep the properties of being unbiased and consistent. Since the purpose here is a historical analysis, not to make forecasts, this is a second order limitation.

Here we present the results obtained for consolidated revenue and IPE; other results omitted in this section are presented in Annex 4.

Total tax revenues, composed of DGI collection, foreign trade, and Wage and Pension Tax (IRP) present a statistically non-significant relation with inflation. This is due to: the low relationship of inflation with foreign trade receipts, as the nominal exchange rate is not included in the analysis, the small sample, and the continuous changes in regulations, both on tariffs and IRP.[27] Consequently, the analysis for receipts has to focus on the net tax collection of *DGI* (*NT_DGI* variable). The following equation is then estimated:

$$NT\_DGI_t = C + \alpha.GDP_t + \beta.INFLA_t$$

The results obtained are shown below (*t*-statistics in brackets):

$$NT\_DGI_t = \underset{(-9.9)}{-5.33} + \underset{(17.2)}{1.79}.GDP_t + \underset{(1.7)}{0.04}.INFLA_t$$

$$R_C^2 = 0.93 \qquad F = 214.7 \qquad DW = 0.38$$

The α coefficient, associated to GDP, shows the expected sign and a high significance level. Nonetheless, it can be noticed that inflation has only 10 per cent

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[26] See Rial and Vicente (2003).

[27] The IRP is created in 1982, with a rate of 1 per cent on salaries and pensions (law 15.294, 15th June 1982). As from the fiscal adjustment of 1990 there have been many modifications thereof, generally increasing its rates and diversifying brackets of taxpayers. Later, in 2004, rates and brackets are reduced to their 1990s' levels. Changes in tariffs were much more frequent.

significance, in addition to be positively, and not negatively correlated with real tax collection; anyway, this relation is very weak. On the other hand, residuals show first order serial autocorrelation. When solving the problem including the lagged dependent variable, the coefficient of inflation almost does not change, becoming significant (see Annex 4).

This result can be explained due to several factors. Firstly, as indicated, the average lag between generation and collection of taxes is small, especially in main taxes, as VAT and IMESI; moreover, when working with annual data, this effect is diluted, whereby not very significant collection losses via Olivera-Tanzi should be expected. Analyzing per tax, it is noticed that the β coefficient is positive for VAT and IMESI, while is negative for IRIC, a tax with a longer lag, supporting this hypothesis.[28] On the other hand, as stated above, in the whole period there were innumerable changes in regulations with a marked bias to increase tax pressure; this factor, in addition to going in the opposite direction to inflation, also explains why the relation with GDP is fairly higher than one. In this same respect, several taxes have been created in the course of the period, with the consequent increase in net collection beyond GDP or inflation effects.[29] Another factor to be taken into account is that elasticities are different according to the business cycle; *i.e.*, evasion is countercyclical. Finally, the positive sign could also be explained by a favorable effect of relative prices, combined to the evolution of the implicit prices of collection with reference to general CPI.[30]

Consequently, the effect on receipts requires a study in depth, which we leave for another work, as the focus here is the real reduction of expenditure.

In the case of real Primary Expenditure, *IPE* as well as the components thereof present an inverse and significant relation with inflation, both current and lagged one period. On the other hand, they show a positive and significant relation with *GDP*, thus presenting a procyclical feature.

Several regressions were made as follows:

$$IPE_t = C + \alpha.GDP_t + \beta.INFLA_t + \theta.D_t$$

where D_t designates dummy variables.

Variants refer, on the right hand side, to the inclusion of current or lagged inflation. On the left hand side variables used were: salaries, transfers to BPS, to the

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[28] Arbeleche and Bension (1996), using a different methodology to analyze years 1994-95 come to a similar conclusion; in this case, the loss for lags in collection averages 0.4 per cent of GDP in each year, versus 0.7 per cent on average for expenses, in a context of annual inflation slightly higher than 40 per cent.

[29] In this respect, in 1980 the IMAGRO and the ITP were created; in 1984, the IRA, the IMEBA and the IVEME-ICOME; in 1986 the IMABA; in 2001, Tax on sportsmen, ICOSIFI, Revenue Tax on Insurance Companies, IMESSA, ICOSA and COFIS, while many tax rates and bases for existing taxes were increased.

[30] Part of the effect, VAT on imports, is determined by real devaluation (appreciation); in the case of the IMESI, since this deal with some goods with managed prices, relative prices change on a more discretionary basis. This is an interesting issue of study for the future.

Military and Police Funds, to the total Social Security System, and total IPE. In all cases the parameters were significant and had the expected signs; the global adjustment was very good; and on several occasions residual correlation was ruled out through the Breusch-Godfrey test. Here we present the regression of better adjustment for IPE.

$$IPE_t = 2.74 + 1.26.GDP_t - 0.10.INFLA_{t-1} - 0.33.D\_BPS79_t - 0.22.D\_BPS05_t + 0.25.D\_1982_t$$

(–7.6) (17.8) (–5.5) (–4.0) (–2.6) (3.1)

$$R_C^2 = 0.95 \qquad F = 119.4 \qquad DW = 1.37$$

Its goodness-of-fit is high and the signs of GDP and lagged inflation coefficients are the expected ones, confirming the procyclical nature of IPE and its inverse relationship with the inflation rate. Three dummy variables are included: one for the Social Security Reform of 1979, which determined an abnormal increase in the number of retired persons; another one for the year 1982, where there was a combination of a strong increase in transfers along with an important update of cash flow between the Government and BPS, resulting in an abnormally high expenditure, not related to the business cycle; and the other for the recent labor formalization process of 2005, that implied an important once-and-for-all increase in the number of taxpayers.[31] [32]

It can be seen that an increase (reduction) of current inflation in 1 per cent causes a reduction (increase) of 0.1 per cent in real IPE on the following period, the behavior being very similar when working without lags in inflation. Consequently, inflation acceleration does reduce real expenditure, more than offsetting the real erosion of receipts. On the other hand, the dependent variable varies in the same direction and is more volatile than GDP.

Both behaviors are stronger in transfers to Social Security than in salaries. In such transfers, that finance the public social security imbalance, inflation is highly significant and presents a value of β = –0.157, being this relationship weaker after 1989. On the other hand, as in this latter period there was an important economic growth, its correlation with GDP is also very strong. Salaries depend in a smaller degree on the cycle, while their more discretionary nature partly blurs the effects of inflation. Finally, the nominal adjustments of these items are made in short terms (quarterly, four-monthly) during most part of the period, whereby, on considering annual average data, the statistical effect of inflation is diluted.

These results of real dilution and procyclical Primary Expenditure are similar to the ones obtained by Guerson (2004), using impulse response functions, with data until 2003. The author finds that the probability of fall of the real Primary

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[31] These phenomena are detailed in Section 3.3.3 below.

[32] Similar results are obtained if the 1982 dummy is omitted. However, it is important when working with more disaggregated data (Annex 4).

Expenditure given the acceleration of inflation is 0.92, and a positive and lasting impulse – response on the Primary Expenditure of GDP innovations (both in real terms).

Finally, we investigate the reaction of the Primary Balance (PB) to changes in inflation, finding the following results:

$$PB_t = \underset{(58.1)}{0.66}.GDP_t + \underset{(4.22)}{0.20}.INFLA_t - \underset{(-25.6)}{5.97}.D\_1982_t + \underset{(3.0)}{0.75}.D\_BPS05_t$$

F = 115.1 DW = 1.39

The regression is highly significant, being the signs of GDP and inflation the expected ones. A 1-point increase in inflation determines an improvement in real Primary Balance of 0.2 percentage points. These results are similar if we include lagged inflation instead of the current one, and if a constant in the equation is included, being then a robust estimation.[33]

This type of relation seems to be the prevailing configuration in Latin America. In such sense, using a similar approach to this one, Aguilar and Gamboa (2000) analyze the case of Mexico, finding that the real dilution of Primary Expenditure is greater than the one on Revenues; as a result, inflation acceleration improves the Primary Balance. Cardoso (1998) makes a simulation based on a simple model of inflationary finances for the Brazilian economy, finding that, under certain rates of inflation, the effect of the inflation on the Primary Expenditure dominates the effect on Revenues, and then improving the Primary Balance.

The relationship found between inflation, receipts and IPE constitute the traditional case of improvement of the fiscal balance through inflationary surprise. Inflation acceleration reduces the primary deficit, through the real reduction of indexed expenses, which are stronger than the Olivera-Tanzi effect on receipts. In the opposite direction, a fall of inflation combined with a lack of credibility on its persistence endogenously deteriorates primary deficit, reflecting one of the costs of disinflation. This is particularly relevant for transfers to Social Security after the Constitutional Reform of 1989, whereby adjustments were deprived of their discretionary power.

The evolution of IPE is analyzed in more detail below, taking into account the macroeconomic and regulatory environment indicated above.

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[33] The Primary Balance presents negative values in several years, so that logarithms cannot be computed. To solve this problem, a constant was added. As a result, the coefficients of the involved variables do not change, except for the one of the constant, which becomes non-significant.

3.3.3 Stabilization plans, financial crises and primary expenditure

General Government's Primary Expenditure during the last 35 years presented some stylized facts, such as its procyclical nature, an increase during the favorable stages of price stabilizations, a sharp fall at the end of these plans, and a subsequent increase some 3 years later.

The procyclical nature of Primary Expenditure is explained partly by the co-movement of primary revenue and expenses of the Central Government (ρ=0.94). This means a *pari passu* increase at the time of economic growth, and an adjustment of expenses simultaneously with the endogenous fall of receipts, said adjustment partly falling on IPE. Part of the explanation is given by the traditional business cycle during an ERBSP, with an initial expansion and a final recession. On the other hand, the structure of Primary Expenditure is biased to non-tradable goods, such as salaries, social security benefits, hiring of services and expenses in non-tradable. This structure, together with the typical real appreciation of these plans, provokes a relative increase of non-tradable goods prices, determining an endogenous increase of spending.

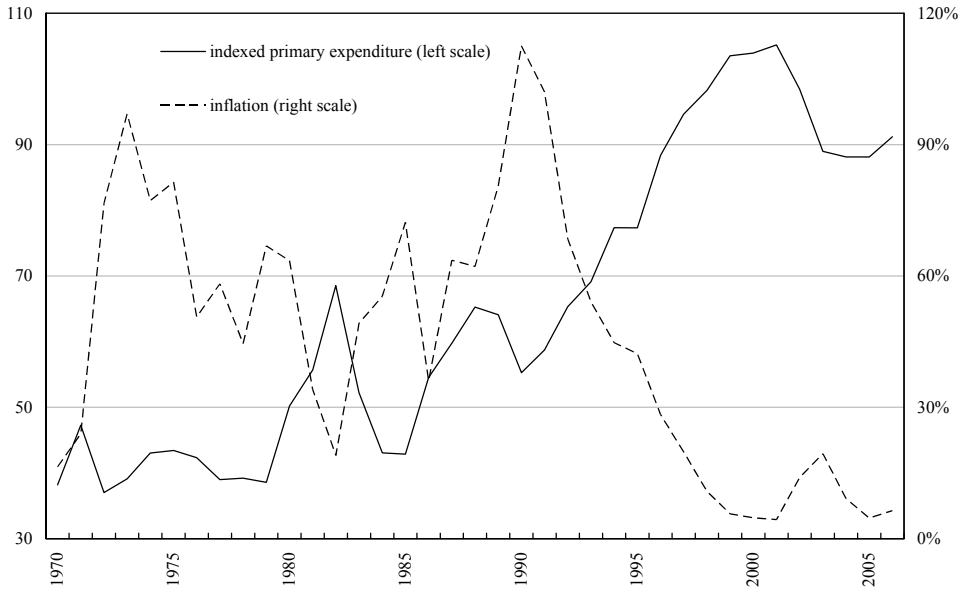
Then, together with the sudden end of these plans, a strong fall of Primary Expenditure can be observed, and a subsequent recovery some 3 years later. This adjustment appears in all the items, both in the discretionary and in the indexed ones. In the latter, the real reduction appears in spite of the existence of nominal increases, via inflation acceleration, constituting the traditional case of dynamic inconsistency. This pattern can be observed both at the end of the 1982 and 2002 stabilization plans. Taken into consideration, among other things, that the average and the variance of inflation were much higher in the first case, the real adjustment of IPE was much harder, its recovery having also been greater afterwards.

In the period 1978-82 there was an increase of all the items of Primary Expenditure, accompanying the evolution of receipts. This feature was stronger in IPE over the last 2 years, as a result of a more pronounced fall of inflation, together with a backward looking indexation criterion with annual adjustment. Thus, in 1982, real Primary Expenditure increased 20 per cent.[34] After the end of the ERBSP in November 1982, together with a jump in the exchange rate, a sharp recession and inflation acceleration, real Primary Expenditure shrank for 3 consecutive years, its fall being on impact the biggest of the 35 years under study, while IPE shrank a real 23.8 per cent, or 4.9 per cent of GDP, both for salaries (–21.7 per cent) and transfers to Social Security (–25.5 per cent). The inflation acceleration of 1984 and 1985 reduced again IPE in real term by 17.5 and 8 per cent, respectively, the latter considering only social security benefits, since in 1985-86, with the return of democracy and the Wages Councils, public salaries were discretionarily increased

[34] There were also some discretionary changes in Social Security: in 1979 a grace period was opened, allowing for an increase in the number of beneficiaries and a reduction of the waiting stock, partly explaining the aforementioned increase. Roldós (1990) states that 0.8 points of the 3.5 per cent of GDP increase of expenses of the BPS between 1979 and 1981 were due to an increase of the number of beneficiaries.

Figure 10

Central Government IPE Constant Prices, Inflation



Source: own preparation based on Central Bank of Uruguay data.

on a quarterly or on a four-monthly basis according to past inflation.[35] The real reduction of IPE proved to be a very effective tool to reduce the fiscal deficit *via* inflationary surprise, in the same way as in period 2 of Section 2 model.

Nonetheless, the inflation reduction of 1986 determined a strong growth in IPE in real terms, which continued in the two following years. This is explained to a great extent by two advances on account of the wage annual adjustment (law 15.900) that were fixed in 1987, thus reducing the period of real dilution of IPE.[36] This evolution shows the cost of disinflation, vanishing the initial favorable effect of real dilution. This happens in some "period 3", not contemplated in the model of Section 2.

The above described pattern appears again during the 1990s. In 1990, as a consequence of inflation dynamics, a new stabilizing experience starts; once again, it is an ERBSP, complemented by the fiscal adjustments of 1990 and 1995. The results for the period 1990-99 mark a continuous decrease of inflation from 112.5 to 5.7 per cent, and a strong real appreciation, within a framework of economic growth.

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[35] This practice is explained in article 6 of law 15.809, dated 21st. April 1986.

[36] This law provides annual adjustments on April 1, while the two advances on account were made in September and January of each year.

Figure 11

Indexed Primary Expenditure – Real Change – 1st Plan
(percent)

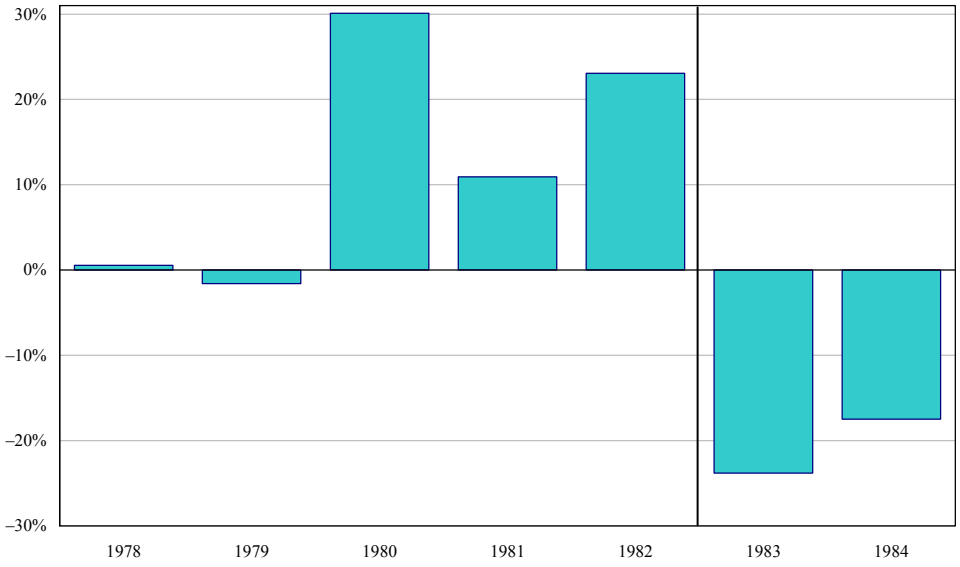
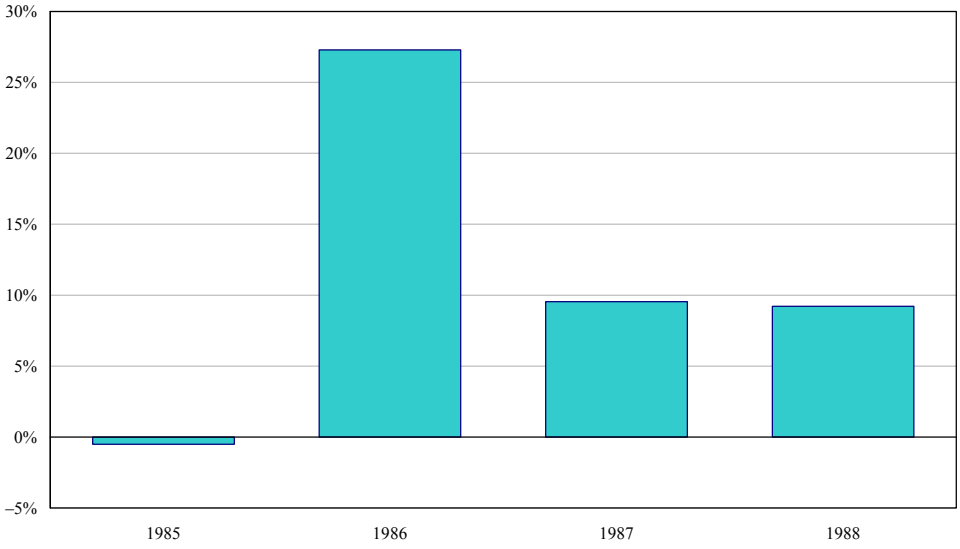


Figure 12

Indexed Primary Expenditure – Real Change – "Period 3"
(percent)



Source: own preparation based on Central Bank of Uruguay data.

Figure 13

Indexed Primary Expenditure – Real Change – 2nd Plan
(percent)

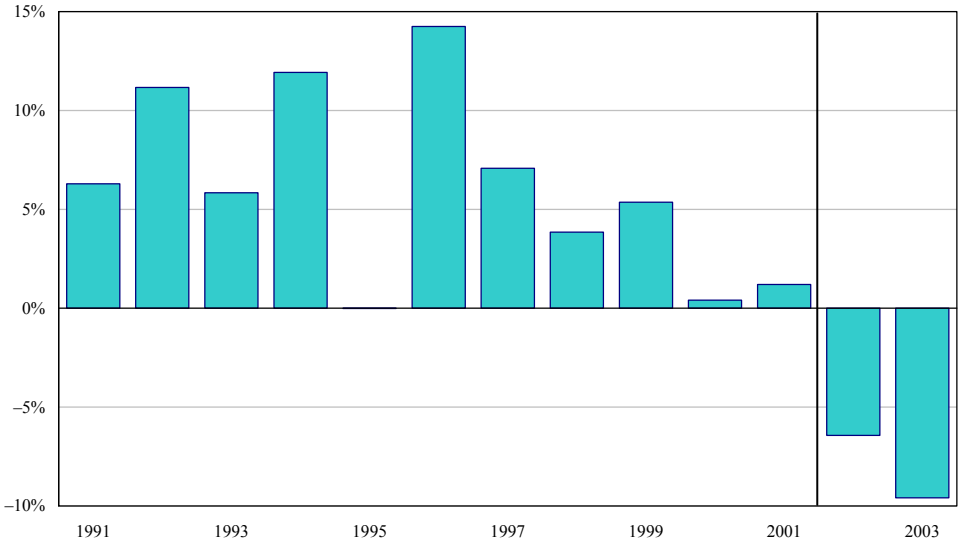
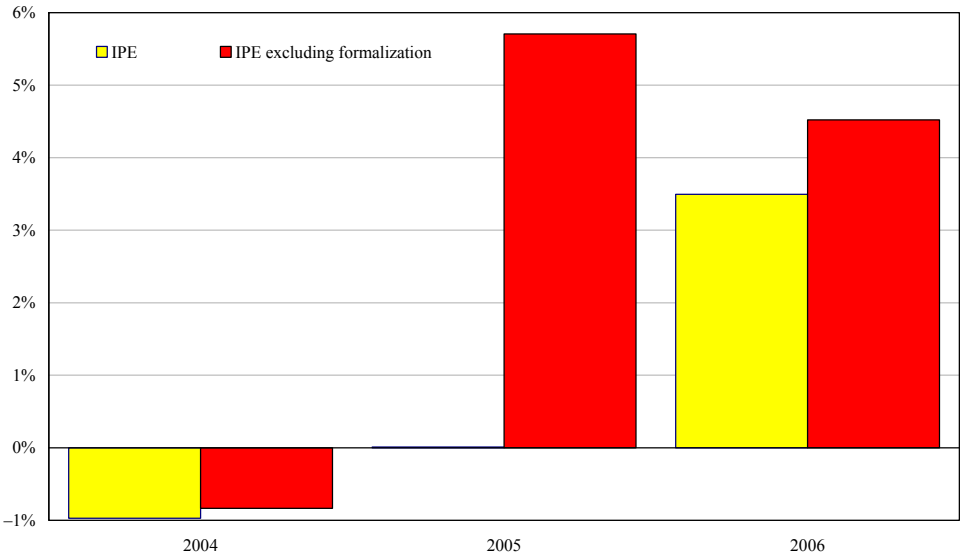


Figure 14

Indexed Primary Expenditure – Real Change – "Period 3"
(percent)



Source: own preparation based on Central Bank of Uruguay data.

Given the structure of expenses concentrated in non-tradable goods, which moreover are backward looking indexed, there is an endogenous increase of real IPE of 7.3 per cent annual average, while transfers to Social Security grow in real terms at two-digit rates in almost the whole period, driven by the constitutional reform of 1989.[37] Thus, the costs of disinflation once again offset the favorable effect of the real erosion of expenditure at the beginning of the decade.

In 2002 the strong nominal devaluation, the acceleration of inflation, and the sharp fall of GDP cause an important fiscal imbalance, which continues in the following years. IPE reproduces the same pattern as in the crisis of 1982, though in a most moderate way: a real fall of 6.4 per cent on impact, followed by a real fall of 10 per cent in 2003. In this period the real reduction of salaries is higher than transfers to Social Security, because of the smaller discretionary margin of the latter after the reform of 1989. Therefore, the effect of real dilution of expenditure has smaller returns, together with lower inflation acceleration.[38] In the final years, inflation falls to 4.7 per cent, while real Primary Expenditure has a slight increase. Salaries raise a real 5 per cent *per annum* on average, while the endogenous increase of average real pensions is compensated by the increase of receipts in the BPS resulting from labor formalization, which reduces transfers from the Central Government.[39] If the formalization effect is ruled out, the indexation effect on Social Security is isolated. In that case, the IPE would grow by a real 5.7 per cent in 2005, and a real 4.5 per cent in 2006.

Finally, comparing the two experiences it is shown that the effect of real IPE reduction through inflation was higher when inflation generated was higher and the indexation mechanism was weaker; consequently, there was a reduction of the inflation acceleration performance in the 2nd Plan. Besides, the positive effect of dilution of real expenditure and more generically of improvement in the primary balance occurs only in the short term; this mechanism brings problems, causing opposite effects in the subsequent disinflation stage.[40]

3.4 Summary

The table below summarizes the main stylized facts in Uruguayan inflationary finances in the period 1970-2006, breaking it down according to macro performance (GDP growth and inflation). The main regular features are: a permanent fall in *seignorage*, mainly because of the almost disappearance of the

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[37] This evolution appears together with a discretionary increase of purchases and investments in almost all the years, the latter showing a marked political cycle.

[38] For a global analysis of the crisis of 2002 exceeding the fiscal scenario, see De Brun and Licandro (2005).

[39] The process of labor formalization, caused by the Wages Councils and greater controls, determines an increase of taxpayers to the BPS of 6.0 per cent in 2004, and 11.6 per cent in 2005, while real social security benefits fall 1.8 per cent in 2004 and increase 6.1 per cent in 2005 (annual averages).

[40] In order to model this kind of problems it would be necessary to repeat the game outlined in Section 2. See Backus and Drifill (1991).

Table 3

Main Macro And Fiscal Variables – Selected Periods
(percent)

	1970-77	**1978-81**	**1982-84**	**1985-90**	**1991-98**	**1999-2002**	**2003-06**
Δ Real GDP	1.8	4.7	–5.7	3.3	4.4	–5.4	6.7
Inflation	64.8	54.1	40.2	69.6	43.9	7.6	9.8
General Government Deficit *(percent of GDP)*	3.0	0.2	6.1	1.6	0.9	4.4	3.0
Seignorage (percent of GDP)	2.8	2.3	2.0	3.0	1.2	–0.2	0.7
Inflation Tax *(percent of GDP)*	5.0	3.7	3.0	5.3	1.7	0.3	0.4
$\Delta\ b_n$	–0.4	0.0	0.0	0.0	0.0	0.8	6.6
Δ Real IPE	0.3	12.4	–8.2	4.2	7.5	–1.7	2.8

Source: own preparation based on Central Bank of Uruguay data. All variables are averages of the period.

inflation tax; inexistence or marginal weight of domestic currency-denominated debt; and inverse relationship between inflation acceleration and real Primary Expenditure; especially, there were strong adjustments of IPE in periods of crisis and recoveries afterwards. The first two factors seem to reverse in the last period (after 2003), creating possible problems of inflationary bias.

4 Summary, conclusions and prospects

In the preceding pages we have established, both from a theoretical and from an empirical point of view, how monetary policy prevented fiscal consolidation in the Uruguayan economy.

Using a time inconsistency model of monetary policy we show that the greater the participation of nominal debt in domestic currency, the amount of indexed expenditure and the degree of monetization, the greater the inflation outcome in a discretionary equilibrium.

The analysis of Uruguayan data suggest that those ways of financing were used and misused over the past 35 years, while there were just a few fiscal consolidation episodes. After changes in private sector's expectations and behavior, we can obtain mixed messages.

Although real erosion of nominal debt in domestic currency was one of the keys of public debt sustainability in the fifties and in the sixties, this tool disappeared with the (demand-driven) dollarization of public debt. After the 2002 crisis, nominal debt in domestic currency re-enters the scene as part of a broader strategy of reconstruction of markets in UY Pesos, although it is still issued for short terms and -at least at the beginning- at high rates.

Monetary financing of the deficit, which played a major role until the beginning of the stabilization plan of 1990, lost importance due to the simultaneous reduction of the tax base and the inflation rate. In the past few years its contribution has not even been sufficient to finance the Central Bank's deficit.

Unlike the two previous channels, there is still a strong negative link between primary balance and inflation acceleration. We have shown that this tool was the one that most contributed to the fiscal adjustment in the episodes of 1982 and 2002. We have also suggested that there is a significant and negative relationship between expenditure and inflation acceleration, particularly in the case of salaries and pensions, which roughly account for 60 per cent of total spending. Tax receipts, however, do not seem to have a significant association with inflation acceleration. As a result, the strong positive association between the primary balance and inflation generates a tension between the objectives of price stability and fiscal consolidation, the latter being the more politically painful option in the short run. Nonetheless, this association causes an endogenous increase of expenditure during inflation stabilization attempts, constituting one of the main costs of disinflation.

From an institutional point of view, in order to limit tensions between objectives of fiscal consolidation and price stability, the proposed reform of the Organic Act of the Central Bank should guarantee an independent institution committed to price stability, as is the international practice. This will leave Fiscal Policy without a tool as effective in the short run as harmful in the long run, opening the door for fiscal consolidation as the only remaining option. As a result, fiscal as well as monetary policy would gain in transparency and accountability.

Finally, this paper leaves an agenda of pending issues. On the one hand, in a small open economy such as ours, the effects of relative prices on the primary balance must be included in the discussion. Moreover, as a natural extension, the coverage should be expanded, both the institutional one, including the Consolidated Public Sector, as well as the period, including the first half of the 20th century. This bigger sample, in turn, could allow for the use of more sophisticated econometric techniques, such as VARs. Furthermore, the endogenous evolution of indexed expenditure leads to a new consideration of structural budget balances methodologies.

ANNEX 1
DERIVATION OF MAIN EQUATIONS

Equation (2)

Starting from $D + iB_n + Ei^*B^* + P.\bar{i}\bar{B} = \dot{H} + \dot{B}_n + \dot{E}.\dot{B}^* + P.\dot{\bar{B}}$ (1), and recalling that $X = (\dot{P}.x) = \dot{P}.x + P.\dot{x} = P.(\pi.x + \dot{x})$, one can split nominal variables into real ones and prices, and incorporate a proxy to the interest rate parity, $i \cong r + \pi; i^* \cong r^* + \pi^*$, neglecting the terms $\pi r; \pi^* r^*$:

$D = P.d$; idem for $B_n, (EB)^*$;

$$\dot{H} = \left(\dot{P}.h\right) = \dot{P}.h + P.\dot{h} = P.\left(\frac{\dot{P}}{P}.h + \dot{h}\right) = P.\left(\pi.h + \dot{h}\right)$$

idem for $\dot{B}_n, \dot{B}^*, \dot{\bar{B}}$. Adding these terms and eliminating P equation (2) is obtained.

Equation (10) derived from (8)

Expressing (8) in discrete time:

$$\alpha_t + \frac{\bar{\omega}_t}{(1+\pi)^{s-n}} - \tau_t + b_{t-1}.\left(\theta.r + \gamma.r^* + (1-\theta-\gamma).\bar{r}\right) - \pi_t.h_t = \Delta h_t + \Delta b_t$$

assuming constant interest rates.

Working with just 2 periods (t=1,2); imposing, to simplify, that all expenditure is indexed (α=0) and allowing for GDP growth (rate g) and inflation (rate π):

$$\frac{\bar{\omega}}{(1+\pi)\cdot(1+g)} - \tau + \frac{b_1}{(1+\pi)\cdot(1+g)}.\left(\theta.r + \gamma.r^* + (1-\theta-\gamma).\bar{r}\right) - \frac{\pi.h}{1+\pi} = (h-h_1) + (b-b_1)$$

where all period 2 variables have no date, τ is expressed in terms of period 2.

Assuming: inflation-constant money demand (k constant), that expenditure adjust according to expected inflation, and breaking down real interest rates:

$$\frac{\bar{\omega}_1\cdot(1+\pi^e)}{(1+\pi)\cdot(1+g)} - \tau + \frac{b_1}{(1+g)}.\left(\theta\cdot\left\{\frac{1+i}{1+\pi}-1\right\} + \gamma\cdot\left\{\frac{(1+i^*)(1+e)}{1+\pi}-1\right\} + (1-\theta-\gamma)\cdot\left\{\frac{(1+r)(1+\pi)}{1+\pi}-1\right\}\right) - k.\pi = (h-h_1) + (b-b_1)$$

Including the transversality condition for the non-monetary debt (b=0 in period 2) and constant Monetary Base in the long run, isolating τ in the *r–h–s*, (10) follows:

$$\tau = \frac{\overline{\omega_1}\cdot(1+\pi^e)}{(1+\pi)\cdot(1+g)} + \frac{b_1}{(1+g)}\cdot\left(\theta\cdot\frac{1+i}{1+\pi} + \gamma\cdot\frac{(1+i^*)(1+e)}{1+\pi} + (1-\theta-\gamma)\cdot\frac{(1+r)(1+\pi)}{1+\pi}\right) - \frac{k.\pi}{1+\pi}$$

Equation (15)

Maximization Program:

Choose π to:

$$\text{Max (9) } V = E\left[\lambda(y-\bar{y}) - \frac{\pi^2}{2} - \rho\tau\right]$$

Subject to:

$$y = \alpha + a\cdot\left(\pi - \pi^e\right) \tag{13}$$

$$\tau = \varpi_1\left(1-\left(\pi-\pi^e\right)\right) + b_1\left[r - \theta\left(\pi-\pi^e\right) - \gamma\left(q-q^e\right)\right] - k\pi \tag{14}$$

(13) and (14) in (9):

$$V = E\left[\lambda\left(\left\{\alpha + a\cdot\left(\pi-\pi^e\right)\right\} - \bar{y}\right) - \frac{\pi^2}{2} - \rho\left\{\varpi_1\left(1-\left(\pi-\pi^e\right)\right) + b_1\left[r-\theta\left(\pi-\pi^e\right) - \gamma\left(q-q^e\right)\right] - k\pi\right\}\right]$$

$$\frac{\partial V}{\partial \pi} = 0 \Leftrightarrow \lambda.a - \pi - \rho\left\{-\varpi_1 - b_1\theta - k\right\} = 0 \Rightarrow (15)\pi^D = \lambda.a + \rho\left\{\varpi_1 + \theta\cdot b_1 + k\right\}$$

ANNEX 2
STATISTIC TABLES

Table 4

Deficit and Monetary Financing
(end-of-the-year data, percent of GDP)

	Fiscal Deficit		*Seignorage*	$\pi.h$	$\Delta(H/Y)$	Residual
	Public Sector	General Government				
1970	3.2	1.9	-	-	-	-
1971	5.7	3.4	-	-	-	-
1972	10.4	3.1	-	-	-	-
1973	5.7	0.8	5.8	12.2	–2.7	–3.7
1974	6.3	4.6	2.9	7.6	–2.8	–1.9
1975	6.4	4.8	3.4	7.2	–0.9	–2.9
1976	5.9	2.9	4.6	5.2	1.4	–2.1
1977	6.8	2.4	2.7	5.4	–1.1	–1.6
1978	4.4	0.5	4.5	4.6	1.2	–1.3
1979	1.8	–1.3	3.9	6.3	–0.9	–1.5
1980	1.1	–0.1	2.6	5.4	–1.0	–1.9
1981	3.2	1.8	0.3	2.3	–1.8	–0.2
1982	14.9	10.2	1.9	1.6	1.6	–1.3
1983	6.9	3.0	2.8	4.4	0.6	–2.2
1984	8.1	5.0	3.8	5.3	0.7	–2.2
1985	6.1	3.1	5.9	8.2	1.7	–4.0
1986	3.6	0.5	4.2	7.3	–1.1	–2.0
1987	4.0	1.2	4.9	5.9	0.1	–1.2
1988	4.2	1.8	4.1	6.9	–0.4	–2.3
1989	5.9	3.2	0.9	5.8	–3.4	–1.5
1990	2.6	–0.2	2.9	7.7	–0.5	–4.4
1991	0.1	–0.8	2.3	4.2	–0.8	–1.1
1992	–0.8	–1.0	2.3	3.1	0.1	–0.9
1993	1.3	1.1	1.4	2.6	–0.4	–0.8
1994	2.6	1.7	1.9	2.3	0.3	–0.7
1995	1.5	1.9	1.1	1.7	–0.4	–0.3
1996	1.4	1.6	1.1	1.1	–0.2	0.1
1997	1.4	1.3	0.9	0.7	0.0	0.2
1998	0.9	1.1	1.4	0.5	0.8	0.1
1999	4.0	3.9	–1.3	0.2	–1.3	–0.1
2000	4.1	3.7	–0.2	0.2	–0.3	–0.1
2001	4.3	4.7	0.0	0.1	–0.1	–0.1
2002	4.5	5.3	0.2	1.0	0.0	–0.8
2003	4.1	5.5	1.3	0.5	0.7	0.2
2004	1.5	2.2	0.4	0.3	–0.4	0.4
2005	0.4	1.6	2.2	0.3	1.9	0.0
2006	0.5	0.5	0.6	0.4	–0.2	0.4

Source: Banco Central del Uruguay.

Table 5

Deficit and Monetary Financing
(annual average data, percent of GDP)

	Fiscal Deficit		*Seignorage*	$\pi.h$	$\Delta(H/Y)$	Residual
	Public Sector	General Government				
1970	3.2	1.9	–	–	–	–
1971	5.7	3.4	–	–	–	–
1972	10.4	3.1	–	–	–	–
1973	5.7	0.8	–	–	–	–
1974	6.3	4.6	2.6	6.1	–1.8	–1.7
1975	6.4	4.8	2.2	5.4	–1.3	–1.9
1976	5.9	2.9	3.8	4.1	1.5	–1.8
1977	6.8	2.4	2.5	4.4	–0.4	–1.5
1978	4.4	0.5	3.2	3.6	0.5	–0.9
1979	1.8	–1.3	2.7	4.7	–1.0	–1.0
1980	1.1	–0.1	2.7	4.6	0.1	–1.9
1981	3.2	1.8	0.7	2.1	–1.1	–0.3
1982	14.9	10.2	0.1	1.1	–0.2	–0.8
1983	6.9	3.0	3.3	3.8	1.8	–2.2
1984	8.1	5.0	2.5	4.1	–0.2	–1.4
1985	6.1	3.1	4.2	6.1	0.9	–2.8
1986	3.6	0.5	3.4	6.1	–0.5	–2.2
1987	4.0	1.2	3.3	4.8	–0.3	–1.1
1988	4.2	1.8	3.6	4.9	0.3	–1.6
1989	5.9	3.2	2.5	5.5	–1.0	–2.1
1990	2.6	–0.2	0.9	4.7	–2.7	–1.2
1991	0.1	–0.8	1.6	3.7	–0.6	–1.5
1992	–0.8	–1.0	1.6	2.5	0.1	–1.0
1993	1.3	1.1	1.4	2.1	0.2	–0.8
1994	2.6	1.7	1.1	1.6	–0.2	–0.4
1995	1.5	1.9	1.5	1.7	0.4	–0.7
1996	1.4	1.6	0.7	1.1	–0.3	0.0
1997	1.4	1.3	0.8	0.8	0.1	0.0
1998	0.9	1.1	0.9	0.5	0.4	0.0
1999	4.0	3.9	0.1	0.2	0.0	–0.2
2000	4.1	3.7	–0.7	0.2	–0.8	–0.1
2001	4.3	4.7	0.0	0.1	–0.1	–0.1
2002	4.5	5.3	0.1	0.5	–0.1	–0.3
2003	4.1	5.5	1.2	0.8	0.7	–0.2
2004	1.5	2.2	0.1	0.3	–0.6	0.4
2005	0.4	1.6	1.4	0.2	1.2	0.0
2006	0.5	0.5	1.1	0.3	0.5	0.2

Source: Banco Central del Uruguay.

ANNEX 3
LEGISLATION AND COLLECTION LAGS

Important structural changes occurred in regulation during this period, such as the simplification of the taxation system that had begun in 1974 and that culminates with the Tax Reform of 1979 (Law 14.948, "Tax Reform", 30th October 1979); the Social Security reforms of 1981, 1989 and 1996; and the gradual dismantling of foreign trade taxes within the framework of bilateral agreements subsequently intensified after creation of the Mercosur since 1990.[41]

Moreover, some fiscal consolidation attempts took place, such as the fiscal adjustments of the 70s, 1990, 1995 and 2002, which as it was mentioned in the paper, were short-lived and do not ended in a successful consolidation process. These landmarks appear in the following laws: law 16.107, "Fiscal Adjustment", dated 3/3/90; law 16.697, "New tax system and improvement of competitiveness of the productive sector", dated 4/25/95; law 17.502 "Financial Stability Law", (Official Gazette 05/31/2002) and law 17.453, "Fiscal Adjustment" (Official Gazette 03/01/2003).

The different fiscal adjustments in general have increased tax rates and broadened tax bases, resulting in an increase of tax pressure without changing its structure, neither its concentration, nor its expenditure-bias taxation. However, the reforms do reduced the average lag in tax collection, consequently reducing the Olivera-Tanzi effect. For instance, the average lag in tax collection for the VAT, the main tax, during 1987-88 is progressively reduced from 75 to 30 days. According to Roldós (1990) 9,7 per cent out of the 18,3 per cent real increase of the VAT collection in 1988 was due to the reduction of the collection lag. As for expenses, these adjustments have promoted a reduction of discretionary spending, without affecting the way of adjusting expenses endogenously determined by inflation.

The main modifications in the Social Security System during the period, broadly speaking, have involved increasing contribution rates, rising the retirement age, increasing requirements for the beneficiaries, and reducing average social security benefits. Nonetheless, the indexation system linked to the average wage rate (AWR) has had very few modifications since it was created in 1979 (Institutional Act 9, October 1979). Previously, pension adjustments were made according to the average between AWR variation and inflation; consequently, this change does not particularly affect the spirit of indexation.

The most important changes have been: the reduction of the period between adjustments, reducing the effect of real dilution, and the elimination of the discretionary power of the time thereof, by Law 15.900 dated October 1987, and the constitutional reform of 1989. The former establishes that pensions will be adjusted every year on April 1, fixing two advances on account within the two months following the AWR of employees of the Central Administration. Strengthening this

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[41] Mercosur is a regional integration process initially composed by Argentina, Brazil, Paraguay and Uruguay.

change, the reform of 1989 established adjustments according to the last AWR every time there is an adjustment of civil servants' salaries, eliminating any and all discretionary power in this respect. This point is written in the Constitution, whose Article 67 states that "(...) Any adjustments to pension assignments shall not be lower than the average wage rate variation, and shall be made on the same occasions when adjustments or increases in salaries of civil servants of the Central Administration are established". As a result, since then both BPS revenue and expenses, and consequently their financial balance, shall be endogenously determined by inflation.[42] It should be mentioned that the Social Security reform implemented in 1996 (Law 16.173, 9/3/1995) created a mixed system, partially pay-as-you-go and partially of capitalization. Although this is a structural change in the system, it does not affect the indexation mechanisms.

Finally, the creation of Mercosur in 1990, which causes a gradual reduction of tariffs together with an increase of the intra-zone trade, determines a gradual reduction of collection for foreign trade, without modifying the source of inflationary distortion, linked to relative prices.

This legal structure determines an average lag in collection of 22 days for the whole period; breakdown of this figure is presented in Table 6.

[42] Moreover, actuarial and evasion factors influence thereon, but they are not the focus of this work.

Table 6

Average Lag in Collection, 1970-2006

	Lag (Days)				Average Lag	Weight on Total Revenue[1]	Weighted Average Lag
	Accrued	Cash	Indexation	Total			
Total Revenues						**89%**	**21.6**
I. DGI						**76%**	**16.2**
1. VAT						**39%**	**9.8**
local	0-30	25	0	25-55	40	25%	9.8
import	0	0	0	0	0	15%	0.0
2. Other tax goods & services (IMESI)						**18%**	**3.3**
gasoline	0	0	0	0	0	9%	0.0
others	0-30	25	0	25-55	40	8%	3.3
3. Corpotate taxes (IRIC)						**8%**	**7.3**
in advance	monthly-variable	25	0	monthly-variable	40	7%	2.7
annual payment	monthly-variable	115	0	monthly-variable	295	2%	4.6
4. Taxes on capital						**4%**	**–4.2**
in advance	monthly-variable	0	0	monthly-variable	–140	4%	–5.0
annual payment	monthly-variable	115	0	monthly-variable	115	1%	0.7
II. Foreign Trade		**0**	**0**	**0**	**0**	**10%**	**0.0**
III. Taxes on Personal Income (IRP)	**0-30**	**5**	**120**	**5-35**	**140**	**4%**	**5.4**

[1] Period average; breakdown by category of every tax average 1992-2006.

ANNEX 4
ECONOMETRIC RESULTS

Dependent Variable: RP
Method: Least Squares
Sample: 1970 2005
Included observations: 36

Variable	Coefficient	Std. Error	*t*-Statistics	Prob.
GDP	0.748854	0.2 25610	3.319249	0.0024
INFLA	0.209908	0.056817	3.694432	0.0009
D_1982	–5.949987	0.240645	–24.72520	0.0000
D_BPS04	0.605190	0.244269	2.477556	0.0191
D_BPS05	0.745952	0.253859	2.938447	0.0063
C	–0.441255	1.174627	–0.375655	0.7098

R-squared	0 .960422	Mean dependent var	3.213964
Adjusted R-squared	0.953826	S.D. dependent var	1.074199
S.E. of regression	0.230825	Akaike info criterion	0.056702
Sum squared resid	1.598411	Schwarz criterion	0.320622
Log likelihood	4.979368	F -s tatistics	145.6004
Durbin-Watson stat	1.394882	Prob(F- statistics)	0.000000

Breusch-Godfrey Serial Correlation LM Test:

Obs**R*-squared	0.000000	Prob. Chi-Square(2)	1.000000

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/08/07 Time: 11:56
Sample: 1970 2005
Included observations: 36
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	*t*-Statistics	Prob.
GDP	0.0 08570	0.235480	0.036392	0.9712
INFLA	0.010987	0.059734	0.183935	0.8554
D_1982	−0.021500	0.256012	–0.083981	0.9337
D_BPS04	−0.073904	0.266464	–0.277351	0.7835
D_BPS05	0.143109	0.279616	0.511804	0.6128
C	−0.035279	1.225948	–0.028777	0.9772
RESID(-1)	0.349436	0.207006	1.688050	0.1025
RESID(-2)	−0.348936	0.207747	–1.679616	0.1042

R-squared	–0.016315	Mean dependent var	3.79E-17
Adjusted *R*-squared	–0.270394	S.D. dependent var	0.213703
S.E. of regression	0.240868	Akaike info criterion	0.183996
Sum squared resid	1.624489	Schwarz criterion	0.535889
Log likelihood	4.688069	Durbin - Watson stat	1.367700

Dependent Variable: NT_DGI
Method: Least Squares
Sample: 1970 2005
Included observations: 36

Variable	Coefficient	Std. Error	*t*-Statistics	Prob.
GDP	1.785298	0.103641	17.22572	0.0000
INFLA	0.042733	0.024871	1.718182	0.0951
C	–5.33573	0.539032	–9.898731	0.0000

R-squared	0.928622	Mean dependent var	4.180775
Adjusted *R*-squared	0.924296	S.D. dependent var	0.394597
S.E. of regression	0.108571	Akaike info criterion	–1.523166
Sum squared resid	0.388994	Schwarz criterion	–1.391206
Log likelihood	30.41698	F-statistics	214.6624
Durbin-Watson stat	0.381768	Prob(F-statistics)	0.000000

Dependent Variable: NT_DGI
Method: Least Squares
Sample (adjusted): 1972 2005
Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	*t*-Statistics	Prob.
GDP	0.970498	0.241043	4.026241	0.0004
INFLA	0.050626	0.021446	2.360608	0.0252
NT_DGI(–1)	0.850710	0.183304	4.640966	0.0001
NT_DGI(–2)	–0.333604	0.137742	–2.421955	0.0219
C	–3.124263	0.835423	–3.739737	0.0008

R-squared	0.964214	Mean dependent var	4.209222
Adjusted *R*-squared	0.959278	S.D. dependent var	0.387384
S.E. of regression	0.078173	Akaike info criterion	–2.124740
Sum squared resid	0.177218	Schwarz criterion	–1.900275
Log likelihood	41.12057	F-statistics	195.3445
Durbin-Watson stat	1.322043	Prob(F-statistics)	0.000000

Dependent Variable: IPE
Method: Least Squares
Sample (adjusted): 1971 2005
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	*t*-Statistics	Prob.
GDP	1.287164	0.072171	17.83489	0.0000
INFLA(–1)	–0.097917	0.017849	–5.485900	0.0000
D_BPS79	–0.325337	0.081774	–3.978504	0.0004
D_BPS05	–0.218965	0.085617	–2.557505	0.0160
D_1982	0.250519	0.082063	3.052750	0.0048
C	–2.877899	0.379735	–7.578699	0.0000

R - squared	0.953688	Mean dependent var	4.121553
Adjusted *R*-squared	0.945703	S.D. dependent var	0.344550
S.E. of regression	0.080286	Akaike info criterion	–2.051641
Sum squared resid	0.186929	Schwarz criterion	–1.785010
Log likelihood	41.90372	F - statistics	119.4374
Durbin-Watson stat	1.374423	Prob(F-statistics)	0.000000

Breusch-Godfrey Serial Correlation LM Test:

Obs**R*-squared	0.000000	Prob. Chi-Square(2)	1.000000

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/08/07 Time: 11:54
Sample: 1971 2005
Included observations: 35
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	*t*-Statistics	Prob.
PIB	0.000362	0.076281	0.004746	0.9962
INFLA(–1)	–0.000343	0.019106	–0.017939	0.9858
D_BPS79	0.082052	0.104484	0.785303	0.4391
D_BPS05	0.028542	0.093469	0.305364	0.7624
D_1982	0.011234	0.089906	0.124948	0.9015
C	–0.005754	0.401247	–0.014339	0.9887
RESID(–1)	0.390690	0.231265	1.689360	0.1027
RESID(–2)	–0.012790	0.230042	–0.055597	0.9561

R - squared	–0.038881	Mean dependent var	–4.29E-16
Adjusted *R*-squared	–0.308220	S.D. dependent var	0.074148
S.E. of regression	0.084808	Akaike info criterion	–1.899212
Sum squared resid	0.194197	Schwarz criterion	–1.543703
Log likelihood	41.23620	Durbin-Watson stat	1.121369

Dependent Variable: SSS
Method: Least Squares
Sample (adjusted): 1971 2005
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	*t*-Statistics	Prob.
PIB	2.307968	0.139527	16.54139	0.0000
INFLA(–1)	–0.150501	0.034507	–4.361484	0.0001
D_BPS79	–0.553111	0.158091	–3.498684	0.0015
D_BPS05	–0.348744	0.165521	–2.106950	0.0439
D_1982	0.489983	0.158651	3.088425	0.0044
C	–9.104417	0.734133	–12.40158	0.0000

R-squared	0.944191	Mean dependent var	3.423476
Adjusted *R*-squared	0.934569	S.D. dependent var	0.606796
S.E. of regression	0.155215	Akaike info criterion	–0.733208
Sum squared resid	0.698658	Schwarz criterion	–0.466577
Log likelihood	18.83114	F-statistics	98.12682
Durbin-Watson stat	1.210091	Prob(F-statistics)	0.000000

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COMMENTS ON SESSION 2
FISCAL CONSOLIDATION

WHAT IS NEEDED, WHAT IS (SOMEWHAT) USEFUL AND WHAT IS NOT NEEDED: LESSONS FROM THREE NON-OCDE COUNTRIES

Hubert Kempf[*]

I am very grateful to the Banca d'Italia and Daniele Franco for giving me the opportunity to discuss the three papers devoted to cases of fiscal consolidation, which took place in Israel, Brazil and Uruguay over the recent decades. I use a loose definition of fiscal consolidation: fiscal consolidation refers here to a medium- to long-term reduction in public deficits and a stabilisation or a reduction in the public debt to GDP ratio. A more precise definition of fiscal consolidation is given by Guichard *et al.* (2007).[1]

I would first like to emphasise the salient features of these three processes.

1. In the case of Israel, the process of fiscal consolidation has been lengthy, unruly and at times ineffective. It started in 1985. The result has been mixed. The effectiveness of a drive toward a reduction in fiscal deficits rests on the capacity of a government to impose current sacrifices. On the contrary, the strategy of constraining future governments and fooling public opinion with promises is ineffective. "Talking" cannot be confounded with "doing".
2. The Brazilian consolidation process may be qualified as irregular and unbalanced. The process started in 1990. It has been pursued until 2006.[2] A relaxing of the fiscal effort happened in the subperiod 1995-99. Most of the adjustment has been made through increased taxes, rather than expenditure cuts. These cuts mainly targeted investment expenditures. Interestingly, this process has encountered a crisis which proved to be the acid test for its viability. In 2002, year of a presidential election, a typical "confidence" crisis occurred, with runs

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The views expressed do not necessarily reflect those of the Banque de France.

[1] Guichard *et al.* (2007) define a fiscal consolidation episode as follows. 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;
- *continues* as long as the CAPB improves. An interruption is allowed without terminating the episode as long at 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.

As the methodologies followed in the three papers are quite different, it appears suitable to use a more vague definition.

[2] History will tell us whether the Brazilian fiscal policies are firmly grounded on sound principles.

on mutual funds, increasing spreads and depreciation of the currency. It has been stopped when all candidates including the newly elected president endorsed the principles of sound fiscal policies.

3. Finally, the Uruguayan process has proved to be original in the following sense. Given the fiscal profligacies of the seventies and eighties, the Uruguayan authorities were gradually unable to use the inflation tax as an adjusting tool for deficit, as more and more agents reduced their exposure to the national currency. A fiscal consolidation was de facto taking place through the dollarization of the economy. It implied the disappearance of the basis for the inflation tax. Now through effective fiscal consolidation, a reconstruction process of peso-isation is under way. It may prove fragile.

Which lessons can we draw from these three fiscal consolidation experiences?

The received view on fiscal consolidation in developed economies, as recently expressed by OECD's experts (see *OECD Economic Outlook 2007*, and Guichard *et al.*, 2007) can be summarized as follows:

1. bad circumstances (high or increasing deficits, high interest rates) tend to trigger episodes of fiscal consolidation;
2. episodes of fiscal consolidation tend to be brief and of limited success;
3. successful episodes tend to rely more on cuts in expenditures and in particular, expenditures on social transfers and programmes;
4. fiscal rules tend to be correlated with successful fiscal consolidation. However the causal link is disputable. In addition their capacity to accommodate cyclical evolutions has to be high.

Actually, our three cases partly concur with this view, but also differ quite markedly from it in some important aspects. This is likely to be due to the fact that these countries do not belong to the set of advanced countries represented by OECD, either because they are too poor, or their situation is peculiar (e.g., Israel facing difficult times due to the Middle-East crisis). According to me, there are four features which are common to the three cases.

1. In the three countries, fiscal consolidation has been linked with institutional reforms, although they took place at different stages of the process. Structural changes in the spending and taxing process have taken place. The process in Brazil has been a bit chaotic since the end of the military regime created huge expectations about social programmes. In 1999, a "Fiscal Responsibility Law" was adopted and the Central Bank was able to adopt an inflation-targeting framework. Israel adopted a ban on government borrowing from the central bank in 1985. Finally, Uruguay adopted in 1995 a law drastically reducing the capacity of the Central Bank to finance public deficit. This confirms the need to adapt the institutional/legal frame to a policy of sound public finance. However a unique list of requested items for fiscal soundness does not exist. As the authors of the OECD's Economic Outlook study justly remark, the legal environment must be

adapted to the institutions and the political systems in place in each country.[3] This feature is congruent to the OECD countries.

2. The end of fiscal dominance appears a key element for fiscal consolidation. In the three countries, in the past, fiscal authorities could rely on the central bank's help to finance their deficits: the central bank was pressured by the Treasury.[4] This facility has been curtailed in the three countries, as we have just seen. The case of Brazil is not so clear-cut as the Central Bank does not possess a high degree of independence,[5] and may still be obliged to lend to the Brazilian Treasury, but the actual monetary financing of public debt steadily decreases, and the switch to inflation targeting is a sign that the facilities of the inflation tax are largely (but maybe temporarily) reduced.
3. Any progress toward fiscal consolidation is temporary and can easily be derailed. In the three countries under study, the succession of governments has led to reversals in fiscal policies and sudden increases in public deficits. Moreover, in their paper Licandro Ferrando and Vicente express the fear that the rebirth of a national currency effectively used in Uruguay could tempt Uruguayan governments to use again the inflation tax as a way to balance public budgets: in this country the end of fiscal dominance cannot yet be taken for granted. However the fragility of a process of fiscal consolidation is also common to any OECD country, as the cases of Germany and the US in the first years of the 21st century make clear. Vigilance can never be eased or weakened.
4. This explains why a successful process has to be backed by political consensus so as to survive the succession of governments. This feature is particularly evident in the case of Brazil and the episode of 2002: the pledge by the newly elected president to support fiscal consolidation has been critical in its continuation and eventual success. A fiscal consolidation programme proves credible and thus can (more easily) be enforced when a broad consensus covering a large part of the political spectrum supports it. It was the case in Israel in 1985 and also in 2003 when the Sharon government faced a weakened and not too restive opposition. Finally the decrease in seignorage income in Uruguay has been steady, and endorsed by the various governments, including in the last period. It is important thus that a consensus be built to rule out "manifest errors" in fiscal policy.

What then do these experiences tell us about the conduct of fiscal policy? I would like to comment on two items currently hotly debated, fiscal rules and fiscal stabilization councils.

First, do we need fiscal rules? Probably yes, but we should discriminate between them as their efficiencies markedly differ. The effectiveness of a fiscal rule depends:

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3 See OECD (2007), p. 242.

4 How past is the past depends on each country, of course.

5 See Jacome (2001).

a) negatively on the ability of policymakers and taxpayers to circumvent it,
b) positively on its ability to adjust to cyclical evolutions. A fiscal rule, constraining the ability to spend or tax by a government can be overcome by various means: through tax evasion, factor mobility, creative accounting, or last but not least, absence of commitment. The case of Israel is quite telling: just the wording of a fiscal rule is not enough. The revision of the Stability and Growth Pact in Europe is also an example of the difficulty to tailor an adequate fiscal rule.

From the evidence drawn from our three countries, but also from many other cases, the most useful fiscal rule is a no seignorage rule. Balanced budget rules are less convincing. Altogether, continuous political will matters, more than rules.

Second, do we need fiscal stabilization councils? Fiscal stabilization councils are advocated by some economists as a way to stop public deficits. Their utility depends on three things. First, the existence of deficits is due to the presence of a deficit bias, that is on a time-inconsistency problem; second, the members of a fiscal stabilization council should be so wise and clever as never to make any error in the diagnosis on the current macroeconomic situation, so that their own credibility as policymakers is not ruined; third, the politicians in charge of the government do not have their own agenda, and find no way nor any desire to circumvent more or less openly the programme defined by the fiscal council. Needless to say, by no means these assumptions can be taken as certified facts. It can even be feared that fiscal stabilization councils could be used to obscure the unwillingness of a government to serious tackle a strongly degraded fiscal situation and make more complex and cumbersome the highly political process of fiscal adjustments. In our three cases, no such fiscal stabilization council was created.

In brief, we can draw some lessons from these three stories about fiscal events in three non-OECD countries:[6]

1. What is needed for a successful fiscal consolidation: first, a broad political consensus; second, the elimination of fiscal dominance. We have seen that both features have been critical in our three countries.
2. What is useful: some fiscal rules, adapted to local circumstances and institutional framework. A sensible consolidation programme should predominantly target the expenditure side, and rather consumption expenditures rather than investment ones. Fiscal rules may be helpful, but probably more as a signal of the will to redress public accounts, than as a proper straightjacket constraining governments.
3. What are not needed: discourses about future efforts when they are not linked to immediate curtailments in public deficits and expenditures. From this perspective, fiscal stabilization councils are likely to be just another variety of smokescreen device.

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[6] Admittedly, this generalization has no econometric-like value: the evidence is a bit insufficient to properly draw clear-cut “lessons”, with a high degree of generality. I use the word in a thought-provoking turn of mind.

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COMMENTS ON SESSION 2
FISCAL CONSOLIDATION

Doris Prammer[*]

1 Comments on "What Affects Fiscal Consolidations? – Some Evidence from OECD Countries" by Stéphanie Guichard, Michael Kennedy, Eckhard Wurzel and Christophe André and "Fiscal Adjustments: Determinants and Macroeconomic Consequences" by Manmohan S. Kumar, Daniel Leigh and Alexander Plekhanov

This contribution very briefly summarizes the papers presented in Session 2, which all deal with fiscal consolidations, before discussing the topic of successful fiscal consolidations and specifically commenting on the two papers presented by Eckhard Wurzel and Daniel Leigh. These two papers try to identify, in an OECD context, determinants that facilitate successful fiscal consolidations – defined as an improvement in the deficit or debt ratio. The contributions by Afonso and Mohr *et al.* assess the macroeconomic effects of fiscal episodes. They show that different consolidation strategies may have different macroeconomic effects and contrast short-run effects with long-run consolidation effects on growth and its components. Skrok *et al.* analyse how successful ECA countries are in utilizing their tax capacities. The papers by Brender, Herrera *et al.*, and Vicente *et al.* respectively, focus on fiscal consolidation experiences in individual countries. In particular, these papers assess the role for fiscal rules and inflation in reducing fiscal imbalances and deal with the relationship between fiscal policy and economic activity in the countries selected.

The remainder of this comment will focus on the two papers by Wurzel *et al.* and Leigh *et al.*, which contribute to the literature on successful fiscal consolidations.

2 Findings from existing literature on successful fiscal consolidations

Since the seminal contribution of Alesina and Perotti in 1995 a fairly rich literature has emerged on the topic of fiscal consolidations. The main and almost unambiguous findings are that a successful fiscal adjustment is characterized by primary expenditure cuts rather than tax increases; that the initial state of public finances and of the economy plays a role; and that successful consolidators tend to cut transfer payments and government wage expenditure.

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The views expressed herein are those of the author and should not be attributed to the Oesterreichische Nationalbank or the Eurosystem.

However, there is no consensus on how much the size of the fiscal consolidation, the monetary stance, exchange rate movements and GDP growth rates affect consolidation outcomes.

Moreover, Ardagna (2004) has even questioned the "conventional wisdom" linking the likelihood of success to the composition of consolidation measures. Based on country cases, she suggests that both expenditure- and revenue-based consolidations may be successful. Recently, additional factors have been given attention in assessing the likelihood of success such as the (EU) fiscal framework and political factors such as the role of political leadership, the timing of consolidations with respect to elections, and the composition of governments.

There are several reasons why the literature on successful fiscal consolidations is that ambiguous. First, the studies use different samples with regard to data vintages and sources,[1] which in turn might be based on different methods for cyclical adjustment; they differ with respect to time spans covered and, of course, include different sets of countries. Second, the methodological approaches for analysing successful consolidations comprise *case studies* focusing on a small number of countries; *descriptive studies* summarizing characteristics of a larger number of countries; and *cross-countr*y studies or *panel regressions* testing econometrically for the determinants of successful adjustments. The third and most important reason for the heterogeneous findings, however, is the lack of a commonly agreed (quantitative) definition, both for the term "consolidation" and for the term "successful consolidation". As neatly summarized by the European Commission (p. 175), "A definition of successful consolidation involves at least three different elements: (i) a measure of fiscal consolidation, (ii) a reference period over which a given size of consolidation is implemented, and (iii) a criterion discriminating between success and failure". In the absence of a consensus, authors will choose definitions that will fit their given research questions.

3 Research focus of the papers

The research of Wurzel *et al.* and Leigh *et al.* focuses on very similar questions, namely (1) on identifying the main determinants that affect fiscal consolidations with respect to its start, size and durability; and (2) on identifying properties of successful fiscal consolidations as compared to unsuccessful ones. In addition Leigh *et al.*'s paper also deals with effects of consolidations on macroeconomic variables in a simulation exercise.

However, the authors address these questions using different underlying definitions of successful consolidations and different empirical methods (compare also Table 1). To obtain their results, both papers use data for the 24 OECD member states from the 1970s to 2005 and 2006 respectively. While Wurzel *et al.* rely on

[1] Different data bases such as AMECO or OECD use different methods for cyclical adjustment, on which most of the recent literature is based.

Table 1

Comparison Leigh-Wurzel

	Leigh *et al.*	**Wurzel *et al.***
Sample	24 OECD countries 1978-2005	24 OECD countries 1972-2006
Method	Comparative Statistics Econometrics	Country Case Studies Comparative Statistics Econometrics
Definition of Consolidation	ΔCAPB > 1 percentage point of potential GDP in 1 year or 2 consecutive years (at least 0.5pp in first year) terminated if ΔCAPB < –0.3% of GDP	*Country Studies:* *ΔCAPB > 1 percentage point of potential GDP in 1 year* *Econometrics:* 3 year average of fiscal stance, measured by CAPB
Definition of Success	Primary Balance large enough to stabilize debt/GDP during the period and the two following years	*Country Studies:* Very successful: debt/GDP 5 percentage points lower after 3 years Moderate Success: debt/GDP at least stabilizes after 3 years *Econometrics:* no definition

Source: Leigh *et al.* and Wurzel *et al.*

cross-country descriptive statistics of the 24 countries, correlation analysis and econometric methods (linear regression, probit), Leigh *et al.* investigate consolidation experiences in individual countries applying correlation analysis and a multivariate panel regression. Wurzel *et al.* define a fiscal consolidation as a period in which the cyclically adjusted primary balance (CAPB) improves by at least 1 percentage point of potential GDP in one year or in two consecutive years with at least ½ percentage point improvement in the first year. A consolidation continues as long as the CAPB improves; a deterioration of <0.3 percentage points is accepted if offset the following year. Leigh *et al.*'s definition of a fiscal consolidation is quite similar for the country case studies, where a consolidation is defined as an improvement in the CAPB by at least 1 percentage point of potential GDP; however, for the correlation analysis and econometric estimations no formal definition for consolidation periods is set but just the average fiscal policy stance over three years, as measured by the CAPB, is correlated with explanatory variables.

According to Wurzel *et al.* a successful fiscal consolidation is characterized by a primary balance that is large enough to stabilize the debt-to-GDP ratio during the consolidation period and the two following years. Leigh *et al.* consider a fiscal adjustment a success if three years after the consolidation, the debt to GDP ratio is at

least 5 percentage points below the pre-consolidation ratio; a consolidation is moderately successful if the debt-to-GDP ratio is at least stabilized. However, no formal definition of success is applied for the econometric estimation.

As already observed in the existing literature, due to the arbitrariness of the different definitions applied, the periods identified as successful fiscal episodes in the two studies vary considerably, even though data sources and time spans covered are quite similar.

4 Results

Leigh *et al.*'s empirical assessment shows that (1) the size of lagged debt is positively associated with subsequent fiscal effort; *i.e.* high initial debt-to-GDP ratios that are considered unsustainable can prompt consolidations. (2) Supportive domestic (& international) growth environment facilitate maintaining tight fiscal policies. (3) Cuts in current expenditure deliver more sustained fiscal consolidations than revenue increases. (4) Higher government stability and higher institutional quality are associated with more successful consolidations. (5) However, there seems to be no significant role for the output gap, inflation and real interest rate in determining the likelihood of consolidations or their success.

Wurzel *et al.* find that (1) low initial cyclically adjusted primary balances (CAPB), *i.e.* a weak initial situation, and high interest rates are important for prompting fiscal adjustments as well as for boosting their size and duration. (2) The initial economic situation, measured as the output gap, affects the size and the intensity of the adjustment. (3) A fiscal adjustment started under a weak economic environment had a higher likelihood of success in the sense of reaching debt sustainability. (4) Cuts in current expenditure are associated with larger consolidations, and if these cuts mostly affect social spending they increase the chances for success. (5) Elections play a role in initiating a consolidation, and fiscal rules with embedded expenditure targets are found to be associated with larger and longer adjustments and higher success rates.

The conclusion drawn from these two papers is that current expenditure cuts, in particular cuts of social spending, are more supportive for fiscal consolidations and for their success than revenue increases. Furthermore, some kind of rule or institutional indicator, such as the time of election or government composition etc., matters for fiscal adjustments. However, there seems to be no consensus on the importance of macroeconomic conditions (output gap), interest rates, initial debt levels or the size of the CAPB for (successful) fiscal consolidations. These findings confirm "conventional wisdom" that expenditure cuts are imperative for successful consolidations, but hardly resolve the inconclusiveness of the existing literature on the other aspects determining consolidations.

Furthermore, even though both papers use cyclically adjusted primary balances, when defining the characteristics of a consolidation, "good" cyclically adjusted data is not necessarily available for all revenue and expenditure categories.[2] Hence, with respect to the specific role of growth, the criticism stated by McDermott and Westcott already in 1996 (p. 741), seems to remain valid: "Given the interactions between economic growth and changes in public debt ratios, it is difficult to distinguish between the contribution of good growth to successful consolidations and the effect of successful consolidations in boosting demand and growth".

5 Some comments and suggestions for further work

Leigh *et al.* identify the determinants of successful fiscal consolidations based solely on case studies on fiscal reforms in 14 countries which have generally been classified as successful. The insight provided by the analysis of individual countries is very interesting as it goes beyond the existing literature with respect to the importance of structural reforms, the mobilization of popular support and the adjustment at subnational levels. However, in order to properly identify the determinants that separate successful from unsuccessful consolidations, the authors should also analyse episodes of unsuccessful fiscal consolidations. This would enable the authors to assess if there is indeed a difference between successful and unsuccessful consolidations other than related to GDP growth. Of particular interest is whether different policy measures have been taken during successful and unsuccessful consolidation periods, with a view to advising policy makers accordingly.

The focus of Wurzel *et al.*'s paper is mostly on what factors affect different aspects of fiscal consolidations; for example which determinants have prompted fiscal adjustments, affect its size, duration and intensity. Less focus is given on which factors are imperative for the success of a consolidation with respect to stabilizing and reducing the debt-to-GDP ratio.

According to the estimation results it seems that several factors that are important for the start, duration, intensity and size of an adjustment are irrelevant for the success of the consolidation with respect to stabilising debt and vice versa. Given these facts, one could conclude that a consolidation's size, duration and intensity are not linked to its success. If this is a valid conclusion should the focus not be redirected and expanded towards identifying the determinants of successful consolidations? After all,the ultimate goal for policy makers should be to increase the sustainability of public finances by reducing the debt-to-GDP ratio rather than just knowing what determines start, size, and duration of a fiscal consolidation.

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[2] Wurzel (2007) p. 8: "…for expenditure items where cyclically-adjusted variables are not available the non-adjusted ones (both for the numerator and the denominator) were used".

To get deeper insights into the determinants of successful fiscal consolidations it might be interesting to further break down expenditure cuts according to functional classification. Applying the literature of the quality of public finances and growth one could try to assess what a cut in certain expenditure categories during consolidations generally classified as successful might imply for future growth and growth potential, respectively.

Furthermore, it could be interesting to assess the impact of one-off measures and so-called creative accounting measures on consolidations and their success – given the very short-term-oriented definitions for successful consolidations; in particular whether the findings on successful consolidations still hold if one-off effects are taken into account. Moreover, knowledge on one-off measures used for consolidations is important for assessing the future scope for successful fiscal adjustments, as some one-off measures increasing the likelihood of success might cease to be an option, e.g. privatizations.

Last but not least, future research should take into account the importance of exchange rate and interest rate policies for successful consolidations. As exchange rate depreciations or devaluations and country-specific interest rate adjustments increasing competitiveness are not available as policy instruments any longer in Economic and Monetary Union (EMU), consolidating successfully might prove harder (Lambertini and Tavares, 2005) within EMU.

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COMMENTS ON SESSION 2
FISCAL CONSOLIDATION

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First, I would like to thank Daniele Franco and the Banca d'Italia for organising this excellent workshop. As usual, the organisation is first class and the atmosphere stimulating. I would also like to thank the organisers for giving me the opportunity to comment two of the papers presented in this session. I will deal them one by one.

1 Discussion on "Assessing Overall Fiscal Effort in ECA, 1995-2004" by Emilia Skrok and Aristomene Varoudakis

In their paper, Skrok and Varoudakis assess the ability – or willingness – of governments to collect taxes. They use two performance indicators. The first indicator is the index of tax effort calculated as a ratio of actual taxes collected to estimated reference taxes that could be collected. The second indicator is the productivity of tax collection calculated as the ratio of effective tax rate to administrative tax rate, where the effective tax rate is the ratio of tax revenue to GDP. The results indicate that tax effort varies substantially among European and Central Asian countries (ECA) and several countries have potential to increase tax revenue by increasing tax effort.

The approach raises many important questions on the forces driving the developments in the tax to GDP ratio and the issues that should be taken into account when comparing these developments in different countries. Together with the indicators of tax effort and the productivity of tax collection, information on the driving forces could be used in analysing whether tax increases or expenditure cuts are the suitable measures for fiscal consolidation.

First, are taxes determined by the need to finance expenditure or is expenditure determined by the ability to collect taxes? It seems that global tax competition has restricted the capabilities to automatically rely on additional taxes as an obvious solution to finance the increase in expenditure. Second, what economic, political and institutional factors determine tax effort and what is the role of public welfare benefit systems in the comparison of tax effort? Here again, expenditure side matters. In the sense of net benefits paid, countries can run effectively the same welfare benefit system with completely different actual taxes as percentage of GDP. This naturally affects the estimate on the relevant "reference" taxes as percentage of GDP and distorts the comparison of tax effort in different countries.

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Revenue from inflation tax as percentage of GDP could be used as a further indicator in the comparison of tax effort. Inflation tax, seigniorage or central bank monetary income is the way for institutionally less developed countries to collect taxes. Reliance on inflation tax indicates that there are administrative problems in tax collection, e.g. because of poor tax administration, weak institutions, tax evasion or large shadow economy. It might be useful to assess the relevance of inflation tax in ECA countries. Central banks' balance sheets and decisions on the distribution of central banks' profits should give information on the amount and relevance of inflation tax.

A further suggestion would be to apply the idea of efficient frontier to the estimation of tax effort, as in the case of the estimation of production function. This might shed some light on the phenomenon of over-taxation which was observed in some ECA countries.

Finally, in the paper, effective tax rates are calculated as a ratio of tax revenue to GDP and not to the actual tax base. This is the inevitable choice on the basis of the availability of reliable data but, unfortunately, it complicates the country comparison. In addition to the differences in the capabilities of effectively levying taxes on tax bases, e.g. private consumption, the differences in the country specific productivity indices depend on the differences in the ratio of tax bases to GDP. Lower ratios of tax base to GDP results in lower productivity indices, irrespective of the actual effectiveness of tax collection.

2 Discussion on "Expansionary Fiscal Consolidation in Europe: New Evidence" by António Afonso

In his paper, Afonso searches for evidence on expansionary fiscal consolidation. He proposes an indicator to identify fiscal episodes – contractions or expansions – and uses a fixed effect panel data specification of private consumption for EU 15 over 1970-2005 to empirically test his hypotheses.

Technically, the debate on expansionary fiscal consolidation concentrates on the sign and the size of the impact of fiscal policy measures on economic activity in the long and especially short run. According to the non-Keynesian view, fiscal consolidation can lead to strongly improved long-term income expectations and, other things being equal, trigger an immediate increase in current private-sector spending rather than a reduction, in contrast with the traditional conclusions of Keynesian theory. The literature[1] suggests that the occurrence of non-Keynesian

[1] For surveys see, e.g., Briotti, M.G. (2005), "Economic Reactions to Public Finance Consolidation: A Survey of the Literature", European Central Bank, Occasional Paper, No. 38, or Prammer, D. (2004), "Expansionary Fiscal Consolidations? An Appraisal of the Literature on Non-Keynesian Effects of Fiscal

(continues)

effects of fiscal policy may depend on such factors as the composition of the fiscal program, the size and persistence of the fiscal adjustment, the initial state of public finances (e.g. the debt to GDP ratio), the international macroeconomic environment and the conduct of domestic monetary and exchange rate policies.

Afonso finds that long-run elasticity of private consumption with respect to public consumption is negative, with respect to tax revenue positive and with respect to public consumption net of taxes negative and even more so under contraction episodes. The long-run elasticity of private consumption with respect to social transfers is also negative but only for post-Maastricht period. These results hint to non-Keynesian behaviour of consumers in the long run. In addition, high initial debt-to-GDP ratio seems to strengthen the non-Keynesian behaviour to some extent.

However, the results by Afonso do not support the non-Keynesian view that fiscal consolidation has expansionary effects on economic activity in the short run. The simulation results are clear on this while the results by Afonso on the short-run elasticities are too vague to make any conclusions in any direction. On the whole, the conclusions made by Afonso are fair to the evidence presented: country-specific analysis is essential to be able to separate the role of fiscal consolidation from that of the numerous non-fiscal factors affecting economic activity.

The role of non-fiscal factors – such as changes in external macroeconomic environment, exchange rate and monetary policy stance, structural reforms in labour, capital and goods market and in social benefit systems as well as EU accession – in shaping the outcome of fiscal consolidation is emphasised e.g. by Barry (1991),[2] Eichengreen (1998)[3] and Blanchard (2000).[4] Regarding the often cited fiscal episodes in Denmark in 1983-84 and in Ireland 1988-89, they argue that, contrary to e.g. Giavazzi and Pagano (1990),[5] Bertola and Drazen (1993)[6] and Alesina and Perotti (1997),[7] no expansionary fiscal contraction was actually experienced, when the impact of non-fiscal factors is taken into account. The positive macroeconomic developments were mainly driven by non-fiscal factors in these countries.

Policy and a Case Study for Austria", *OeNB Monetary Policy & the Economy*, Q3/04, Oesterreichische Nationalbank.

2 Barry, F. (1991), "The Irish Recovery 1987-90: An Economic Miracle?", *Irish Banking Review*, Winter.

3 Eichengreen, B. (1998), "Comment on Alesina, A., R. Perotti and J. Tavares: 'The Political Economy of Fiscal Adjustments'", Brookings Papers on Economic Activity, Vol. 1998, No. 1.

4 Blanchard, O. (2000), *Macroeconomics*, 2nd Edition, Prentice-Hall International.

5 Giavazzi, F. and M. Pagano (1990), "Can Severe Fiscal Contractions Be Expansionary? Tales of Two Small European Countries", *NBER Macroeconomics Annual*, Vol. 5, MIT Press.

6 Bertola, G. and A. Drazen (1993), "Trigger Points and Budget Cuts: Explaining the Effects of Fiscal Austerity", *American Economic Review*, Vol. 83, No. 1.

7 Alesina, A. and R. Perotti (1997), "Fiscal Adjustments in OECD Countries: Composition and Macroeconomic Effects", International Monetary Fund, Staff Papers, Vol. 44, No. 2.

The exercise by Afonso is a valuable addition to the empirical literature on the impact of fiscal consolidation on economic activity. However, the key question for a policy maker still remains. Even if evidence is found in favour of expansionary fiscal consolidation episodes in the past, can the necessary conditions for the success be recognised and fiscal policy actions designed on that basis *ex ante*? Whether we consider short or long-run, recognising sufficient conditions for expansionary fiscal consolidation is difficult because of the major role of the non-fiscal factors and their complex interactions.