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FISCAL CONSIDERATION AND DECENTRALISATION: A TALE OF TWO TIERS

BY

JULIA DARBY, V ANTON MUSCATELLI & GRAEME ROY

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FISCAL CONSOLIDATION AND DECENTRALISATION: A TALE OF TWO TIERS

Julia Darby
University of Strathclyde
V. Anton Muscatelli
University of Glasgow
Graeme Roy
University of Glasgow

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Abstract:
This paper contributes to the established literature on fiscal consolidations (e.g. Alesina and Perotti, 1995, 1997, Alesina *et al*, 1998) by investigating the distinct behaviour of central and sub-central tiers of government during general government consolidation attempts. In the light of different degrees of decentralisation across OECD countries, and the different responsibilities devolved to sub-central tiers, we believe that this approach offers an illuminating insight into the analysis of fiscal consolidations and their success.

We show that the involvement of the sub-central tiers of government is crucial to achieving cuts in expenditure, particularly in relation to the overall size of the government wage bill. In addition, central governments appear to exert a strong influence on the expenditure of sub-central tiers through their grant allocations, and control of these allocations appears to have a considerable impact upon the overall success of consolidation attempts. Finally we demonstrate that there is a skewness in cuts towards sub-central capital expenditure both when central governments cut grant allocations and when sub-central governments engage in lone consolidation attempts.

Corresponding Author:
Graeme Roy, Department of Economics, University of Glasgow, G12 8RT.

1: Introduction

Governments' attempts to improve the sustainability of their fiscal balances have been at the forefront of fiscal policy discussion for more than a decade. In some countries the consolidation effort has resulted in sizeable surpluses for the first time in a generation. Debt to GDP ratios have been stabilised and begun to fall. Elsewhere, some previous bastions of fiscal prudence are now struggling to maintain or regain sound fiscal positions. Lower interest rates have reduced debt servicing costs for the majority, but adherence to fiscal rules and the fiscal implications of ageing populations will ensure that the need to strengthen fiscal positions will remain a key issue in the years to come.

An established literature has examined fiscal consolidation attempts and concluded that the composition of the consolidation effort is a crucial determinant of the ultimate effect on debt. Throughout this literature (see for example, Alesina and Perotti [1995] Alesina et al. [1998], McDermott and Wescott [1996] and Von Hagen et al. [2001]) the focus has been on general government data[1]. This has one clear advantage in that large and consistent data sets are readily available, but in our view, this advantage is outweighed by a key weakness. This approach implicitly assumes that governments behave as if a single authority exercises complete control over the size and composition of fiscal balances. Indeed, political economy models of fiscal consolidations, including Alesina and Drazen [1991], Roubini and Sachs [1989], assume a single tier of government. In view of the substantial role played by sub-central governments in the conduct of fiscal policy, we believe that it is worth extending this literature to look at the distinct contributions made by sub-central and central government and examine how these tiers of government interact during consolidation attempts.

The size and responsibilities of sub-central tiers of government differ markedly across countries[2]. In many countries with a federal structure e.g. the USA, Austria, Germany and Canada, sub-central legislatures have considerable political power and sizeable spending and financing responsibilities relative to the central/federal tier. In Canada, for example, data from IMF Government Financial Statistics indicate that over 50% of total government expenditure and revenue is assigned to the sub-central tiers.

In unitary countries it is often assumed that fewer fiscal responsibilities are devolved to lower tiers of government, although it does not necessary follow that their role in fiscal policy is insignificant. Many unitary countries have devolved considerable fiscal responsibilities. For example, IMF figures indicate that in 1998, sub-central government expenditure was 44% of

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[1] General government is defined by the OECD as "all departments, offices, organisations and other bodies which are agencies or instruments of the *central, state or local* public authorities" OECD [2002].

the general government total in Denmark. Even in the UK, still a relatively centralised country, this figure was 22%. Financing responsibilities also vary, with at least some countries avoiding passing on major revenue raising responsibilities. It is relevant to ask whether the central tier retaining control over financing obligations makes fiscal consolidation attempts more or less likely to succeed. In what follows we analyse the roles played by central and sub-central tiers of government during general government fiscal consolidation attempts and show that it is possible to gain a more refined view of both the mechanics of the consolidation process and of the conditions conducive to success.

To anticipate our key results, we begin by verifying a result from the existing literature that successful consolidations tend to be based upon expenditure cuts as opposed to increases in revenue. We show however, that this result is robust to a more refined measure of the success of consolidation attempts, and holds at both central _and_ sub-central tiers, indeed the majority of consolidations involve shared effort across tiers of government. Compositional analysis confirms another existing result; that tackling the government wage bill helps achieve lasting consolidation. We demonstrate that the involvement of sub-central tiers of government is crucial to achieving these cuts in the wage bill. However, our results also demonstrate that a consolidation attempt is less likely to be successful if the relative brunt of the consolidation is skewed toward the sub-central tier. Moreover, we show that high levels of expenditure decentralisation may result in a fiscal environment that is not conducive to successful consolidation attempts, by limiting the ability of central governments to sufficiently tighten their expenditures. Our analysis of revenue by source reveals that many central governments exert a strong influence on the expenditure of sub-central tiers through their grant allocations. Changes in these allocations essentially 'force the hand' of the sub-central tiers to adjust expenditures so have a considerable impact upon the successfulness of consolidation attempts.

An apparent downside is revealed in the analysis of the composition of expenditure in that there is a bias toward cuts in local/regional public investment programs (although the largest adjustment in absolute terms centres upon the wage bill).

Finally, when sub-central governments enact consolidation attempts that are not part of a central government consolidation, their cuts focus almost exclusively upon capital expenditure, as opposed to increases in 'own-source' revenues or cuts in current expenditure. The skewness toward cuts in capital expenditure represents a genuine cause for concern, as they are likely to have long-term implications for local service provision. We discuss all these results in more detail below, but overall they lead us to conclude that the separate roles of

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[2] A recent comparative review of the extent of decentralisation of spending responsibilities and fiscal autonomy of sub-central governments is provided in Darby et al. (2003).

central and sub-central tiers of government should not be ignored when analysing fiscal consolidations.

The structure of the remainder of the paper is as follows. In Section 2 we discuss the data and briefly summarise the importance of sub-central tiers of government in the countries in our sample. Section 3 presents a discussion of the methodology employed to identify fiscal consolidation attempts and to determine the success or failure of each attempt. Section 4 presents an analysis of episodes of fiscal consolidation, focussing on their size, the extent to which the attempts are co-ordinated across tiers of government, and the composition of the adjustments. In Section 5 we switch the focus from general government consolidations to sub-central consolidations and examine their composition. Section 6 concludes.

2: Data and the nature of sub-central fiscal autonomy

2.1 Data

The basic data used throughout our analysis are annual, and are taken primarily from IMF Government Financial Statistics (GFS), 2002 edition but supplemented with general government debt data from the OECD Statistical Compendium. GFS is the key source of internationally comparable data relating to fiscal variables disaggregated by tier of government. A major advantage of GFS data over that provided in OECD revenue statistics is in the richness of the decomposition of expenditure and revenue available[3]. We are able to focus on fifteen OECD countries: our unbalanced panel dataset covers as much of the period 1970-1999 as feasible for each country, and totals 336 observations[4].

One weakness in GFS relates to the composition of tax revenues available to sub-central tiers of government. Essentially, no distinction is made between tax revenues from tax sharing, which involves little real autonomy of the sub-central tier, and 'own taxes' where the sub-central authorities exercise some degree of independent control over the tax rate, the tax base or both. We have been able to supplement the GFS data with more detailed information relating to 1995 using OECD (1999) for the majority of countries and with data collected by Jonathan Rodden at MIT in the cases of the USA and Canada. Unfortunately we have been unable to obtain this information in the cases of Australia and France.

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[3] Some well known caveats apply to the use of these data, see for example the discussions World Bank [2001] and Ebel and Yilmaz [2002] and Darby et al. [2003]. In particular, to the extent that central government exert influence through directives, GFS data will overstate the true extent of sub-central expenditure autonomy. Nonetheless the GFS data remain the best available.

[4] Sample periods are as follows: Australia 1980 – 98, Austria 1970 – 94, Belgium 1978 – 98, Canada 1979 – 99, Denmark 1977 – 99, Finland 1972 – 93, France 1978 – 97, Germany 1974 – 98, Netherlands 1975 – 97, Norway 1980 – 98, Spain 1980 – 1997, Sweden 1978 – 98, UK 1974 – 98, and USA 1980 – 99.

2.2 The nature of sub-central fiscal autonomy

From Figure 1 we can immediately see that, despite a fair degree of cross-country heterogeneity, sub-central governments tend to play an important role in the conduct of fiscal policy. On average across the 15 countries, over a third of total fiscal expenditure (35.1%) and a quarter of revenues (25.6%) are assigned (i.e. under the control of) sub-central governments. The figure also allows us to see the relative size of fiscal imbalances. The vertical distance between each point and the 45° line shows how dependent the country's sub-central tier of government is on grants from the central tier.

Figure 1: Fiscal Decentralisation
(sub-central expenditure and revenues as percentages of general government totals)
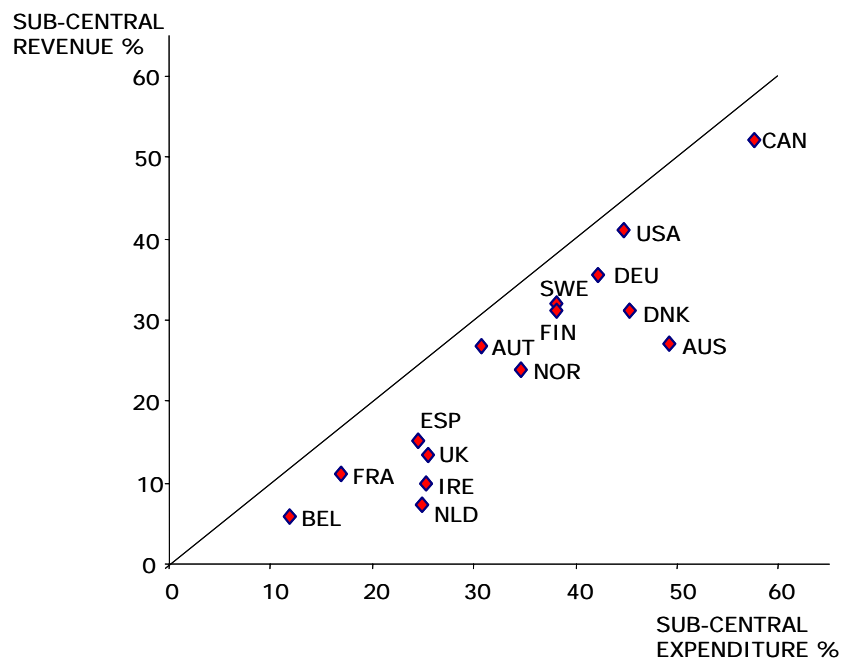
Source: IMF Government Financial Statistics (2002 edition).

Note: figures shown are sample averages.

Figure 2 breaks down expenditure into a number of its key components and shows that sub-central authorities undertake a sizeable proportion of most categories of general government expenditure. The existing literature has focused on general government data and has emphasised the importance of control over the government wage bill. It is therefore of particular interest to note that, on average, some 61% of the general government wage bill is accounted for by expenditure at the sub-central level.

Figure2:   The Composition of Sub-Central Government Expenditure[5]
(as a percentage of general government totals in each category)

Wage Bill

Transfers

Non-Wage Current Expenditure

Capital Expenditure
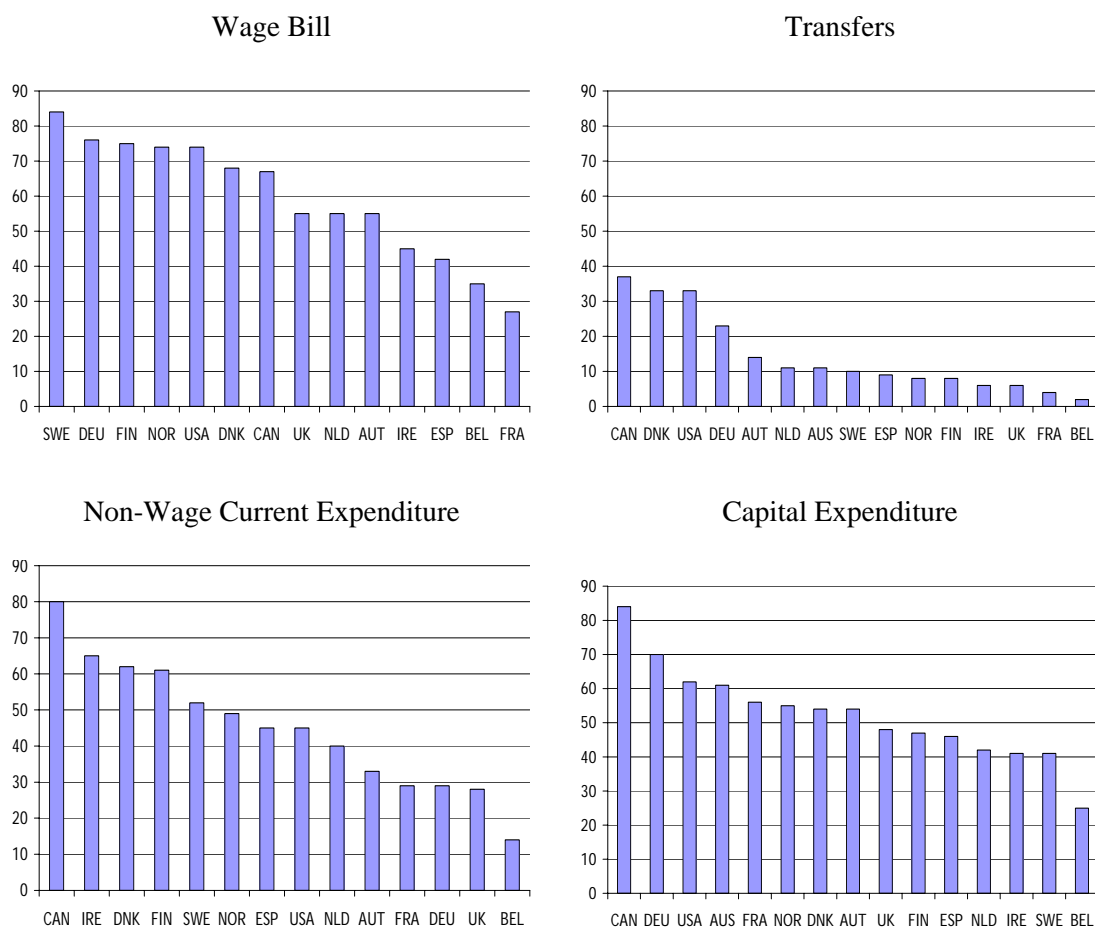
Source: IMF Government Financial Statistics (2002 edition)

3: Fiscal Consolidations

In this section we set out our definition of a fiscal consolidation attempt; the methodology employed to identify consolidation attempts; and the approach taken to measure their success or failure. In common with the existing literature we define a fiscal consolidation as a discretionary attempt to improve general government fiscal balances. In order to focus on discretionary policy actions it is necessary to abstract from the effects of automatic stabilisers, we also abstract from interest payments since these reflect earlier borrowing and are affected by changes in monetary policy. This leads us to focus on changes in the structural primary balance as a proportion of GDP.

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[5] Note that GFS does not split sub-central current spending into wage and non-wage components for Australia.

As yet, there is no universally accepted technique for decomposing the primary balance to GDP ratio into its cyclical and discretionary components, although representative discussions of the merits and drawbacks of various approaches can be found in Gramlich [1990], Bouthevillain and Quinet [1999], Bruni and Tujula [1999] and Chalk [2002].

3.1 The Blanchard fiscal impulse

We take our lead from Alesina and Perotti [1995], Alesina, Perotti and Tevares [1998] and others in employing a method due to Blanchard [1993][6] to construct fiscal impulses, i.e. the discretionary changes in fiscal policy from one year to the next. The relative size of this impulse is then used to identify years in which significant consolidation attempts have been undertaken. The method is simple, transparent and appears to generate reliable results.

In practice, the Blanchard method extracts cyclical movements in the primary balance using individual regressions for each component of the primary balance that incorporate the country specific unemployment rate and a set of deterministic variables (a constant, and a deterministic trend)[7]. Predicted values for revenues and transfers are then calculated conditional on the previous year's unemployment rate (i.e. by replacing the contemporaneous unemployment rate with its lagged value in the estimated equations) and this allows us to construct a predicted primary balance based on an unchanged unemployment rate. The Blanchard measure of the structural fiscal impulse is then calculated by subtracting the predicted cyclically adjusted primary balance from its actual value.

3.2 Identifying General Government Fiscal Consolidation Attempts

Having generated a set of discretionary fiscal impulses it is necessary to introduce an operational definition of a fiscal consolidation attempt. Since there is no 'script' that governments follow in consolidation attempts, or indeed a comprehensive and accurate record of when governments instigated changes in their policy stance with the intention of improving their fiscal balances, the standard approach is to use some kind of subjective criteria (see for example McDermott and Wescott [1996], Kamps [2001], Giavazzi et al. [2000], OECD

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[6] A commonly used alternative is to cyclically adjust the primary balance by applying the Hodrick Prescott filter (see for example Bruni and Tujula [1999] and Röger and Ongena [1999]). Bruni and Tujula [1999] report results based on both the Blanchard and HP methods and judge the Blanchard method to be superior in identifying periods of tight fiscal stance that accord with the consensus of commentators.

[7] Our general regressions included unemployment, a constant, time and time squared. For each regression, the best performing specification was chosen on the basis of F and t-tests assessing the individual and joint significance of the contribution of the time and time^2 terms. Note these regressions are not intended to provide a full explanation of the behaviour of the fiscal balances, the deterministic terms are included purely on statistical grounds and reflect the requirement that the regressions are reasonably well specified and that the equation residuals are stationary.

[1996], Heylen and Everaert [2000] and Von Hagen et al. [2001])[8]. It is unlikely that the measured discretionary fiscal impulse will be exactly zero even when there is no discretionary policy action enacted by governments. So, the key objective is to distinguish between small adjustments and a category of significant, determined attempts to improve the fiscal position.

The criteria used in the existing literature differ slightly from paper to paper. In what follows we apply the original Alesina and Perotti [1995] definition[9]:

Definition 1:

A period of fiscal consolidation is deemed to have occurred in a given year if the discretionary fiscal impulse is greater than or equal to +1.5 percent of GDP.

3.3 Classifying the Success of Fiscal Consolidation Attempts

Of course, not all consolidation attempts are successful[10]. The success/failure classification scheme adopted by Alesina and Perotti [1995 and 1997], Alesina et al. [1998] and Von Hagen et al. [2001] is based upon observed changes in the debt to GDP ratio in the periods subsequent to a consolidation attempt. Specifically:

Definition 2:

A fiscal consolidation is successful if, three years after the consolidation attempt, the ratio of debt to GDP is at least five percentage points below the level observed immediately prior to the consolidation attempt.

The above definition of success does not take into account the differential effort that would be required by governments to reduce their debt to GDP ratio given their differing initial (pre-consolidation) conditions. If a government manages to stabilise its debt to GDP ratio from a previously explosive path it seems reasonable to view this as a relatively successful outcome.

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[8] A small number of studies have adopted a "narrative approach" to the analysis of discretionary monetary policy, notably Romer and Romer [2000], but we are not aware of any cross-country studies of fiscal policy that adopt this approach.

[9] A limitation of Definition 1 is that it does not account for more gradual consolidations involving small changes over longer time horizons. Any criterion used is necessarily subjective, but it remains possible that we have ignored a number of smaller but more sustained consolidation attempts. Whilst we recognise this, there is a danger that the use of more liberal criteria would reduce the discriminatory power of the tests that follow. Alesina and Perotti [1995] and Alesina et al. [1998] do allow for the possibility of two-year consolidations and it is worth noting that our key results remain robust to this change. For a discussion of the duration of fiscal consolidations see, for example, Von Hagen et al. [2001].

[10] Discussions of the 'success rates' of recent fiscal consolidations are provided in IMF [2001], EC [2002] and OECD [2002].

To better capture relative success, and to discriminate across a range of alternative outcomes following a consolidation attempt, we make use of the more refined success index in definition 3. In the remainder of the paper we present our results based on both definitions 2 and 3.

Definition 3:

An index of success/failure, SI, is classified as follows:

SI = 3   if the level of the debt to GDP ratio falls by at least 5 percentage points in the three years following a consolidation attempt (equivalent to "success" in definition 2).

SI = 2   if the level of the debt to GDP ratio stabilises (within half a percentage point tolerance of the initial level rate) or if it decreases by less than 5 percentage points over the three years following a consolidation attempt.

SI = 1   if the growth rate of the debt to GDP ratio over the three years following a consolidation attempt is less than that observed in the three years prior to the consolidation attempt (here we use a tolerance of 10% of the initial growth rate).

SI = 0   if none of the above apply the attempt is classified as a failed consolidation attempt.

3.4 Consolidation Attempts of Sub-Central Governments

It seems likely that the majority of consolidation episodes are instigated at the level of central government. However, our dataset also allows us to identify consolidation attempts made by the sub-central tier of government. Given the smaller scale of sub-central budgets it is necessary to adapt definition 1 for use at the sub-central level:

Definition 4:

A period of sub-central fiscal consolidation is deemed to have occurred in a given year if the weighted discretionary fiscal impulse is greater than or equal to +1.5 percent of GDP or if the weighted discretionary fiscal impulse exceeds 1.25 percent of GDP for two consecutive years.

The weight applied in each case is the sub-central tier's percentage share of general government expenditure.

We allow for two-year consolidations at the sub-central level given the relatively smaller size of this tier and the likelihood that in practice such consolidations are likely to be more gradual than at the centre[11].

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[11] We have allowed for only single year sub-central consolidations and full results are available on request. Degrees of freedom become relatively small and though our results remain robust, obtaining statistical inference with such limited observations is more difficult.

3.5 Episodes of Fiscal Consolidation and some initial analysis

Table 1 lists the years in which we have identified consolidation attempts at both the general government level and for the sub-central tier.

Table 1: Chronology of Fiscal Consolidation Attempts

	Year of Attempted Consolidation at General Govt level	Year of Attempted Consolidation at sub-central tier	Of which, collaboration between tiers	Year of successful consolidation attempt at General Govt. level
Australia	1982, 96 & 98	1998	1998	1996 & 98
Austria	1984	1977, 80 & 88		-
Belgium	1982, 85, 86 & 94	1982, 83, 84, 85, 91 & 95	1982, 85 & 94/5	1994
Canada	1982, 87, 95, 96 & 97	1982, 87, 93 & 94	1982, 87 & 94/5	1996 & 97
Denmark	1983, 84 & 86	1983	1983/4	1983 & 84
Finland	1976, 81, 84, 88 & 93	1975, 88 & 89	1975/6 & 88/9	-
France	87 & 97	1980 & 86	1986/7	-
Germany	1976, 77 & 82	1976, 77 & 98	1976,77	-
Ireland	1976, 83, 84, 87, 88 & 89	1976, 77, 83 & 87	1976,77,83,87	1987, 88 & 89
Netherlands	1983, 85, 88, 91 & 93	1976, 81, 82, 83, 88 & 89	1983, 88/9	-
Norway	1981, 83, 89, 90 & 94	1981, 90 & 94	1981, 90 & 94	1981 & 94
Spain	1985, 86 & 97	1983, 87 & 92	1986/7	1997
Sweden	1981, 82, 83, 84, 87, 92, 94, 95 & 96	1995, 97 & 98	1995 & 96/97	1984, 87 & 96
UK	1976, 77, 87, 88, 96, 97 & 98	1975, 76, 77, 81 & 92	1976 & 77	1976, 77, 87, 88, 97 & 98
USA	-	-	-	-
Total	61	47	27	22

The dates in the first column are broadly similar to those reported in Alesina and Perotti [1995], allowing for the difference in our sample period and for minor revisions to the published data. It is also useful to note that a number of episodes that have been discussed at length in the existing literature are represented, including the UK in the late 1990s, and Denmark and Ireland in the late 1980s, see, for example Dornbusch [1989], Giavazzi and Pagano [1990], Bradley and Whelan [1997], Lambertini and Tavares [2000] and Hjelm and Johansson [2002]. In the fourth column we indicate the dates of successful consolidation

attempts, as classified using definition 2 above. Of a total of 61 attempted consolidations, 22 (36%) are classified as successful; 27 general government consolidation attempts involve consolidation at the sub-central tier, of which 12 (44%) are judged successful. There are several sustained periods of consolidation (including the UK 1996-1998, Ireland 1987-1989 and Sweden 1981-1984) and it is noticeable that successful consolidations tend to occur close to, i.e. within a two to three year period of, other attempted consolidations.

Using our more refined success index, 22 general government consolidation attempts achieved the toughest criterion of a fall in the debt to GDP ratio that exceeded 5 percentage points (SI = 3); 12 resulted in a stable debt to GDP ratio or a decline of less than 5 percentage points (SI = 2); 17 attempts resulted in a reduction in the growth rate of the debt to GDP ratio, so satisfied our weakest definition of success (SI = 1) and the remaining 10 of the 61 consolidation attempts fell in the failed category (SI = 0).

Alesina and Perotti [1995] suggested that where a relatively large number of consolidation attempts in a given country end in failure this may be the result of ill-judged 'stop-go' policies. To explore this hypothesis we have recorded the number of discretionary fiscal expansions undertaken by each country in the final row of Table 2.

Table 2: Consolidation attempts, success rates and discretionary expansions[12]

	Sweden	UK	Ireland	Finland	Norway	Canada	Netherlands	Belgium	Denmark	Australia	Spain	Germany	France	Austria	USA	Total
Number of consolidation attempts	9	7	6	5	5	5	5	4	3	3	3	3	2	1	0	61
Success index (SI)	1.9	2.9	1.7	0.6	1.6	1.8	1.6	1.5	2.7	2	2.3	1	1	0	0	1.5
Number of discretionary expansions	2	6	4	6	4	2	2	1	3	2	1	2	2	3	1	41

A relatively large number of both consolidation attempts and discretionary expansions took place in a number of countries including Denmark, the UK, Ireland, Finland and Norway. However, these countries are not uniformly associated with low rates of success rates of consolidation attempts: Denmark and the UK record relatively high success rates; but conversely Finland and Norway combine a relatively large number of both consolidation attempts and discretionary expansions took place in a number of countries including Denmark,

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[12] We identified discretionary fiscal expansions in a symmetric manner to consolidations. That is, a discretionary expansion was deemed to have occurred if the fiscal impulse was at least 1.5% of GDP.

the UK, Ireland, Finland and Norway. However, these countries are not uniformly associated with low rates of success rates of consolidation attempts: Denmark and the UK record relatively high success rates; but conversely Finland and Norway combine relatively large number of discretionary adjustments with relatively low success rates, so only these two countries within our sample accord with the Alesina and Perotti 'stop-go' hypothesis.

Finally, it's worth examining the behaviour of the European countries in our sample in the run-up to the launch of EMU. During this period the Maastricht criteria were seen by some as having helped some of the more lax governments in providing a credible 'political pre-commitment' to the objective of reducing structural budget deficits. We can offer limited support to the success of this the forced discipline. Of the EMU countries included in our sample, five made significant adjustments in the post-Maastricht period (Belgium 1994, France 1997, the Netherlands 1993, Finland 1993 and Spain 1997); Germany and Ireland did not make significant consolidation attempts during the 1990s, though at this stage they already had deficit and debt ratios very close to, or within the thresholds set[13].

We now turn to analysing the distinct roles of central and sub-central tiers of government in fiscal consolidation attempts.

4: Analysing Consolidation Effort Across Tiers of Government

In what follows we start by looking at the discretionary impulses attributable to each tier of government during a general government consolidation attempt and show that sub-central tiers of government do play important roles in the consolidation process, contemporaneously with the central tier[14]. We then look in more detail at the composition of the consolidation effort, first by separating out the changes in expenditure and revenue and then by breaking down these aggregates into their key components. In addition to examining consolidations instigated by central governments we also look at those instigated by the sub-central tier. This enables us to ask if the sub-central tier behave differently when consolidating alone.

4.1 Analysis of discretionary fiscal impulses by tier of government

Table 3 shows the average sizes of the discretionary fiscal impulse as a proportion of GDP, across all the identified consolidation attempts (refer back to Table 1 for details), across successful and failed attempts (denoted "S" and "F") respectively, and disaggregated by tier

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[13] In the case of Austria, our sample ends in 1994 and hence we are unable to detect any discernible effects attributable to the Maastricht criteria.

[14] We have looked at whether central government adjustments lead sub-central ones, but the contemporaneous fiscal impulses at sub-central level are almost uniformly greater. For a more comprehensive analysis of the timing and duration of various changes see our companion paper, Darby et al. [2004], which employs event study methodology.

of government. The final column of the table indicates whether the difference between average impulses in successful as opposed to failed consolidation attempts is statistically significant on the basis of a two sample t-test[15].

Table 3: Discretionary fiscal impulses during General Government consolidation attempts
(each shown as % of GDP)

All/Successful/Failed	All, n=61	S, n=22	F, n=39	signif:
Central	2.08	2.47	1.86	*
Sub-Central	0.40	0.43	0.38	
Success Index (SI):	SI=3, n=22	SI=2, n=12	SI=1, n=17	SI=0, n=10
Central	2.47	2.22	1.82	1.51
Sub-Central	0.43	0.23	0.31	0.68

The above results confirm that the average discretionary impulse at general government level, where general = central + sub-central, is larger in successful as opposed to failed consolidation attempts (as found by Alesina and Perotti [1995], Alesina et al. [1998] and Von Hagen et al. [2001]). The size of the central government fiscal impulse is larger in successful as opposed to failed consolidation attempts and this difference is statistically significant at the 10% level. In addition, the lower panel of the table reveals that the size of the central impulse is increasing in the degree of success (as measured by the Success Index). Sub-central impulses are also larger on average during successful as opposed to failed consolidation attempts but this difference is not statistically significant. The results based on the success index are more revealing: in the most successful consolidation attempts there are relatively large sub-central impulses but the average impulse is largest overall for the failed category, SI=0. It is interesting to note that in the more successful adjustments (SI=3,2,1) the sub-central tier achieves around 10-15% of the total impulse on average, while in the least successful case the sub-central tier's contribution exceeds 30% and the overall general impulse is relatively small. We can interpret these results as demonstrating that the dominant adjustment in general government consolidation attempts is made by the central tier, though sub-central tiers of government are generally actively involved too; also, if the consolidation effort is skewed toward the sub-central tier, the attempt is less likely to be successful.

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[15] The null hypothesis in each case is that the size of the impulse is identical in successful and failed consolidation attempts. A single '*' in the "signif:" column denotes significance at the 10% level, while '**' and '*' denote significance at the 5% and 1% levels respectively.

4.2 Analysis of the composition of consolidation attempts

The existing literature has concluded that a consolidation attempt is most likely to succeed if it is focussed on cuts in expenditure, and in particular, on cuts in the government wage bill and transfer payments. In contrast consolidations based upon tax hikes and cuts in public sector investment seem more likely to represent short-lived effort and to end in failure. In principle this distinction is unsurprising. Consolidations based upon a tightening of current expenditures have been shown on a number of occasions to generate a negative ('non-keynesian') fiscal multiplier (for example, Ireland 1987-89 and Denmark 1984-86 see Giavazzi and Pagano [1990]). Clearly, debt to GDP ratios are more likely to fall in periods of positive economic growth, ceteris paribus. Further, cuts to expenditure tend to be politically more difficult than raising revenue, take for example decisions to alter welfare benefit criteria, cut public sector wage bills etc. Such action can send a clear signal to the private sector that the government is serious about improving their financial position and in turn lead to increases in private sector consumption. Moreover, such cuts tend to be more permanent (it takes a long-time to pass legislation which alters welfare benefit payments etc) and sustained cuts are more likely to lead to falling debt-to GDP ratios[16].

Here, for the first time, we present results of a compositional analysis of consolidation attempts using data disaggregated by tier of government as well as by function.

Table 4: Expenditure and revenue changes during general govt. consolidation attempts
(each shown as % of GDP)

	Total Expenditure				Total Revenue			
	All, n=61	S, n=22	F, n=39	signif	All, n=61	S, n=22	F, n=39	signif
Central	-0.56	-1.19	-0.21	***	0.76	0.51	0.89	
Sub-Central	-0.24	-0.56	-0.07	***	0.14	0.08	0.17	
Success Index:	SI=3, n=22	SI=2, n=12	SI=1, n=17	SI=0, n=10	SI=3, n=22	SI=2, n=12	SI=1, n=17	SI=0, n=10
Central	-1.19	-0.46	-0.12	0.16	0.51	0.87	0.69	1.27
Sub-Central	-0.56	-0.32	-0.06	0.21	0.08	-0.17	0.34	0.29

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[16] For a summary of these issues, see Alesina and Perotti [1994] & [1995].

Table 4 reports average changes in total expenditure and revenue achieved during successful and failed consolidation attempts respectively[17].

We again begin by confirming the findings in the literature based on general government data (e.g. Alesina and Perotti [1995] and Von Hagen et al. [2001]) in that successful consolidation attempts are associated with large general government expenditure cuts, in excess of 1.7% of GDP on average. In contrast, failed attempts are associated with significantly smaller cuts in expenditure and somewhat larger revenue hikes (though note that the difference in revenue hikes across successful and failed attempts is not statistically significant).

A new result revealed in Table 4 is that successful consolidation attempts are associated with substantial expenditure cuts by both the central and sub-central tiers of government. In failed consolidation attempts the expenditure cuts achieved across all tiers of government are significantly smaller, and the lower portion of the table reveals that in the least successful category, SI=0, expenditure of both tiers actually rises. The lower panel of Table 4 shows that the largest increases in revenue are recorded for both tiers when SI=0 i.e. in the least successful consolidation attempts. The average increase in revenues collected by the central tier when SI=0 is more than twice that achieved in the most successful consolidation attempts, i.e. when SI=3, while for sub-central tiers the adjustment to revenues is more than three times larger.

Overall, these results offer clear support to the hypothesis that the composition of a consolidation attempt is critical to its probability of success. At each tier of government, the average cuts in expenditure associated with consolidation attempts fall in size as we reduce the stringency of the requirement for success; the reverse pattern is observed across revenue changes, whereby the greater success accords with less reliance on increases in revenue, and less reliance on adjustment at the sub-central level.

The above analysis has shown that all tiers of government, central and sub-central, are actively engaged in most consolidation attempts. However, it does not allow us to disentangle which level of government takes the relative brunt of the expenditure or revenue adjustment. To examine this question, we have calculated the percentage share of general government expenditure and revenues conducted or received by the respective tiers both prior to and following each consolidation attempt. Overall, the average shares of general government

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[17] Total expenditure is defined as primary expenditure less transfers (grants) paid from one tier of government to another. The focus on primary spending ensures that interest payments on outstanding debt are excluded from the analysis, since governments have little discretion over these in the short term. Transfers from the central tier of government to sub-central tiers will be recorded when they are spent at the sub-central level, so to include this as an element of central government spending would result in double counting.

Total Revenue includes tax revenue, non-tax revenues (from fees and user charges) but excludes grants received from other levels of national government (though grants received from outside government, e.g. the EU, are included).

expenditures conducted at the sub-central tier alter little during consolidation attempts but if we differentiate between successful and failed attempts the share of general government expenditure assigned to sub-central authorities is 19% higher on average after a successful attempt and some 5% lower after failed attempts. Again, this suggests that skewness of expenditure cuts toward the sub-central tier is not conducive to success. The sub-central share of general revenues falls by some 18% on average during a consolidation attempt but this decline is more pronounced in successful (22%) as opposed to failed attempts.

4.3 The composition of adjustment and the extent of decentralisation

As highlighted in section 2.2, the extent to which spending responsibilities are decentralised differs markedly across countries. In table 5 we split the countries into two groups, the most and the least decentralised[18], we then look for differences in their behaviour of these groups during consolidation attempts.

Table 5: Expenditure and revenue changes during general govt. consolidation attempts
(each shown as % of GDP)

	Total Expenditure			Total Revenue		
	Least Decentralised n=33	Most Decentralised n=28	signif	Least Decentralised n=33	Most Decentralised n=28	signif
Central	-0.18	-1.01	***	1.03	0.43	**
Sub-central	-0.27	-0.22		0.23	0.06	

It is now apparent that there are significant differences in the behaviour of the central government tier across these two groups. The most decentralised countries rely less on expenditure cuts, and more on revenue hikes, than their less decentralised counterparts. This result might be expected given the central tier's relatively smaller expenditure responsibilities, although it is interesting to note that a similar pattern does not emerge at the sub-central level where the average changes in expenditure are insignificantly different from one another. We can tentatively interpret these results as consistent with binding constraints on the adjustment choices of the central tiers - the greater the extent to which spending responsibilities are decentralised the more difficult it is likely to be to achieve co-ordinated cuts. Instead we see a bias toward reliance on the instrument that the central tier can control most readily i.e. centrally determined revenues. Since we have already shown that adjustment that focuses on

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[18] Countries classified as most decentralised (>35% of expenditure conducted by the sub-central tiers) include Norway, Sweden, Finland, Australia, Germany the USA and Canada. The least decentralised group includes Belgium, France, the Netherlands, Ireland, the UK, Spain and Austria.

revenue raising is less likely to be successful in achieving lasting fiscal consolidation this evidence is supportive of Tanzi's [2001] argument that fiscal decentralisation may lead to macroeconomic difficulties.

4.4 The composition of expenditure and revenue changes during consolidation attempts

We extend our analysis by splitting up the expenditure aggregates into their key components: current expenditure (less interest payments) and capital expenditure[19].

Table 6: Changes in expenditure components during general government consolidations
(each shown as % of GDP)

	Current Expenditure				Capital Expenditure			
	All	S	F	signif	All	S	F	signif
Central	-0.40	-1.18	-0.04	***	-0.16	-0.14	-0.16	
Sub-Central	-0.15	-0.49	-0.03	**	-0.10	-0.16	-0.07	
Success Index:	(3)	(2)	(1)	(0)	(3)	(2)	(1)	(0)
Central	-1.18	-0.24	-0.07	0.35	-0.15	-0.24	-0.10	-0.18
Sub-Central	-0.49	-0.37	0.09	0.26	-0.17	-0.15	0.09	0.01

Once again there is a clear correlation between the size of cuts in current expenditure and success. On average, the cuts are significantly larger during successful consolidation attempts, and across all tiers of government. Furthermore, the larger the cuts in current expenditure achieved the greater the success of the consolidation attempt, and again this result holds at each tier of government. At the central government level there is no significant difference in the size of the cuts observed according to our measures of success. The pervasive nature of these cuts across all consolidations suggests that cuts in central government capital expenditure do not contribute to the success of a consolidation attempt.

The absolute size of the cuts in capital expenditure as a proportion of GDP are small relative to the cuts in current expenditure, but it is important to note that the value of current expenditure is roughly ten times larger than capital expenditure for the countries in our sample, so the proportionate cuts in capital spending are actually relatively severe. This is especially important when interpreting the figures for the sub-central tier, where around 40% of the overall contraction in expenditure is borne by regional and local public investment programs and where significantly larger cuts in capital spending occur during more successful

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[19] As before, payments made by central to sub-central tiers of government are stripped-out of current and capital expenditure.

consolidation attempts, as shown in the final row in Table 6. This reveals a clear downside of the consolidation process, such cuts, where sustained can be expected to have a significant adverse consequences for local service provision in the long run.

Table 7 presents a disaggregation of current expenditure into the government wage bill, transfers and subsidies, and purchases of goods and services. Across all three categories of expenditure larger expenditure cuts are associated with successful as opposed to failed consolidation attempts. The results also highlight the statistically significant role of cuts made at the sub-central level in each case.

Table 7: Changes in components of current expenditure during general govt. consolidations
(each shown as % of GDP)

	Goods and Services[20]				Social Transfers & Subsidies[21]				Wage Bill			
	All	S	F	signif	All	S	F	signif	All	S	F	signif
Central	-0.06	-0.16	-0.01	**	-0.21	-0.76	0.10	***	-0.14	-0.19	-0.12	
Sub-Central	0.00	-0.09	0.05	**	-0.06	-0.15	0.00	**	-0.12	-0.22	-0.07	**
Success Indx:	(3)	(2)	(1)	(0)	(3)	(2)	(1)	(0)	(3)	(2)	(1)	(0)
Central	-0.16	-0.02	-0.03	0.04	-0.83	0.02	0.05	0.25	-0.19	-0.24	-0.09	0.00
Sub-Central	-0.09	0.00	0.05	0.12	-0.17	-0.15	0.09	0.01	-0.22	-0.22	-0.05	0.10

Cuts in social transfers and subsidies are particularly large and not surprisingly skewed toward central government which plays the dominant role in these categories of expenditure. Evidently, a large and distinct tightening of welfare programs by the central tier increases the likelihood that a given consolidation will be successful. The role of the sub-central tier is more important in the remaining elements of current expenditure: during successful consolidations around one third of the total cuts in the purchases of goods and services and more than half the cut the cut in the government wage bill stem from cuts made by the sub-central tiers of government. In fact, the significant element of cuts in the government wage bill relate solely to the sub-central tier, where the wage bill is cut by significantly larger amounts during successful as opposed to failed consolidation attempts.

These are important results. Whilst previous studies have stressed the importance of reducing the government wage bill as a key determinant of success, the prominent role of the sub-central tier of government in this process has not previously been identified. A clear

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[20] Lack of appropriate disaggregated data leads us to exclude Australia from these tables.

[21] Transfers and subsidies for Irish sub-central data includes inter-government transfers from the centre.

implication of this result is that central governments wishing to enact a successful fiscal consolidation should consider coordinating with the sub-central tier and in particular should emphasise the importance of reducing their wage bill in this process. One way in which this may be conducted in practice is via some form of centralised element to public sector pay settlements, although adjustment to public sector employment and hours of work will also be important.

In Tables 8 and 9 we switch our focus to decomposing changes in revenue during consolidation attempts. Recall that the aggregate figures in Table 4 suggested that failed consolidation attempts have tended to be associated with a greater increase in non-grant revenues at both the central and sub-central tiers as compared with successful consolidation attempts, although this difference was not statistically significant. In disaggregating total revenue into its components we are able to refine this result and pin down some significant differences between successful and failed consolidation attempts.

Table 8: Composition of changes in Revenue during consolidation attempts
(each shown as % of GDP)

	Tax Revenues				Non-Tax Revenues				Grants[22]			
	All	S	F	signif	All	S	F	signif	All	S	F	signif
Central	0.70	0.60	0.73		0.02	-0.13	0.10	*	0.02	0.00	0.03	
Sub-Central	0.10	0.14	0.08		0.00	-0.08	0.06	**	-0.16	-0.47	0.02	***
Success Index:	(3)	(2)	(1)	(0)	(3)	(2)	(1)	(0)	(3)	(2)	(1)	(0)
Central	0.60	0.87	0.69	1.27	-0.13	-0.09	0.09	0.36	0.00	0.09	0.00	-0.02
Sub-Central	0.14	-0.17	0.34	0.29	-0.08	0.04	0.06	0.10	-0.47	0.02	-0.02	0.09

In Table 8 we disaggregate revenues by source: taxes, non-tax revenues (essentially user charges and fees), and grants, and Table 9 splits tax revenues accruing to the sub-central tiers into 'shared' taxes, that are controlled and distributed by the central tier, and 'own-source' tax revenues over which the sub-central tiers have a degree of autonomy. Unfortunately GFS does not distinguish between shared and own tax revenues, but we have been able to supplement this source with data for 1995 from OECD [1999] and from Rodden [2002]. Sub-central taxes

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[22] For two of our observations, Spain 1985 and 1986, constitutional reform resulted in the assignment of certain expenditures to sub-central tiers to be financed by grants. Thus our data points are likely to be influenced by such changes. Upon elimination of these two observations, the average change in grants during unsuccessful consolidations stands at –0.05 and the difference between successful and unsuccessful consolidations remains significant.

are identified as 'own-source' if the sub-central authorities have the ability to control the tax rate, or the tax base, or both.

As we would expect, the figures in Table 8 confirm that the largest source of increased revenues during consolidations stems from taxation and is mostly driven by changes at the central tier. Results relating to our success index support the view that outright failed consolidations, where SI=0, rely to a far greater extent upon tax hikes (as opposed to cuts in expenditure) than do successful ones.

Table 9: Autonomous sub-central changes in tax revenue during consolidation attempts
(each shown as % of GDP)

	'Shared' Tax Revenues				'Own-source' Tax Revenues			
	All	S	F	signif	All	S	F	signif
Sub-Central	0.02	0.06	0.00		0.08	0.08	0.08	
Success Index:	(3)	(2)	(1)	(0)	(3)	(2)	(1)	(0)
Sub-Central	0.06	-0.05	0.06	0.11	0.08	-0.22	0.26	0.18

Table 9 demonstrates that autonomous or 'own-source' changes in sub-central taxation contribute a sizeable proportion of overall tax adjustment during consolidation attempts. The two least successful consolidations (SI=1,0) typically involve the largest increases in sub-central governments' 'own-source' taxation.

Conclusive results are uncovered in Table 8 in relation to non-tax revenues (typically these comprise user charges and fees). When either tier of government tries raise additional revenues from these sources the consolidation is likely to fail. Indeed, successful consolidation attempts appear to be associated with a decline, rather than a rise, in non-tax revenues. The difference is statistically significant in each case.

The behaviour of grants from other tiers of government, again highlighted in Table 8, are also of clear interest. In successful consolidation attempts, grants to sub-central tiers of government are cut substantially while in failed consolidation attempts grants appear to alter very little. The difference between the average changes is statistically significant at the 1% level. These results appear to show that central governments have been more successful in consolidation attempts when they have 'forced the hands' of the sub-central tiers through reducing their grant allocations. Grant allocations tend to be highly visible and politically sensitive, so it seems reasonable to deduce that cuts in grants can have a strong signalling effect, thereby indicating that the central government is serious about addressing the fiscal position. In many cases the sub-central tier have little autonomy to raise other sources of

revenue, or to borrow, so cuts imposed directly constrain the expenditure of sub-central authorities. The close correlation between cuts in grants and cuts in expenditure is essentially the reverse of the 'Fly-Paper Effect' documented by Gramlich [1977] and others[23]. Again, we note that a downside of this relationship the substantial cut in public investment discussed above in relation to Table 6. Together these results suggests that it may be desirable for central governments to consider offering greater protection to regional and local public investment programs when following a strategy of cutting grant allocations.

4.5 Consolidation attempts implemented by Sub-Central Tiers of Government

Our analysis so far has focussed on consolidation attempts identified in general government data, the majority of which will have been instigated at the central government level. In this section we turn our attention to consolidations solely identified in sub-central government data. Here we explore the timing and composition of the adjustments undertaken by sub central tiers of government and contrast these results with their behaviour during general government consolidation attempts. We are unaware of any previous studies that have looked at the mechanics of how sub-central governments consolidate. A key question is whether the sub-central tiers behave differently when consolidating alone as opposed to when they adjust in conjunction with the centre.

Our final table concentrates on the composition of the 20 consolidation attempts identified in the sub-central government data that do not correspond to consolidation attempts at the general government level.

A striking feature of consolidation attempts enacted by sub-central tiers alone is that cuts in capital expenditure dwarf those in other components of expenditure, and the wage bill actually increases as a percentage of GDP[24]. Overall, cuts in capital expenditure occur in 15 out of the 20 observed consolidations while cuts in current expenditure occur in only 9 instances. We can surmise that this bias toward capital spending may reflect a lack of alternatives given allocated spending commitments and constraints on required standards of provision imposed by central governments. It is also potentially consistent with myopic behaviour of local politicians who may wish to preserve current services at the expense of public investment. Finally, if the benefits of sub-central investment are not all captured within the region, externalities in the form of spillovers to other regions may also result in tendency to under-provision when financing constraints are tightened.

[23] The 'Fly-Paper Effect' refers to the empirical phenomenon that increases in lump-sum transfers to sub-central tiers stimulates increases in local spending to a far greater extent than increases in local income.

[24] The figures for spending on goods and services and for total expenditure are somewhat influenced by two outliers relating to Finland and the UK in 1975, but nonetheless, the clear message is that relative burden of expenditure adjustment is centred upon public sector investment.

Table 10: Composition of adjustments during lone sub-central consolidation attempts[25]
(each shown as % of GDP)

Expenditure				
Current Expenditure	of which:			Capital Expenditure
	Goods and Services	Wage Bill	Transfers and subsidies	
0.05	-0.01	0.04	0.02	-0.12
(0.76)	(0.19)	(0.44)	(0.32)	(0.25)

Revenue			
Taxation, of which:		Non-Tax Revenues	Grants
Total	Own-Taxes		
0.25	0.21	0.04	0.29
(0.57)	(0.50)	(0.18)	(0.62)

Relative to the pattern observed during general government consolidations, changes in revenues appear to be relied upon more extensively in lone sub-central consolidations. The revenue raising comes from both autonomous sources (i.e. "own" tax revenues and to a far lesser extent non-tax revenues), as well as higher grants allocations from central government.[26]

In summary, there are clear distinctions between changes in sub-central revenues and expenditures that occur as part of a general fiscal adjustment and those that occur during an independent consolidation implemented by the sub-central tier. When central government consolidates it may force sub-central governments to cut particular expenditures, such as the wage bill, perhaps in part through centrally agreed pay settlements or through the grant system. In contrast, when sub-central governments consolidate alone, it would appear that brunt of the adjustment is made in own tax revenues and capital expenditure, sometimes assisted by increases in grant allocations from the central tier.

5: Conclusions

In this paper we have examined fiscal consolidation attempts across a range of OECD countries. We have verified a result from the existing literature that successful general

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[25] Standard deviations are given in brackets, but given the relatively small degrees of freedom and reasonable measure of 'success' we do not make a distinction between successful and unsuccessful consolidations.

[26] The figures for changes in grants also contain two substantial positive outliers, which match those in the current expenditure calculations above. In fact these sub-central consolidations were conducted in conjunction with a

government consolidations tend to be based upon expenditure cuts as opposed to increases in revenue. However, our main contribution is to explore the implications of fiscal decentralisation for fiscal consolidation, an issue which appears to have been ignored in the empirical literature to date.

We have demonstrated that most successful consolidation attempts involve concerted adjustments by both central and sub-central tiers of government. We have also revealed that the sub-central tier is crucial in achieving cuts in both capital and current expenditure, and particularly in the wage bill, a key area in which cuts appear to result in sustained improvement. We conclude that sub-central governments play a crucial role in helping the success of a general consolidation. Further, we have shown that cuts in grants from central to sub-central tiers of government tend to be made during successful consolidation attempts. We suggest that these cuts act as both a visible signal of the central government's intention to consolidate and that they also 'force the hand' of the sub-central tier for which even marginal changes in grants can have a major impact on expenditure, given their typically limited alternative sources of revenues. An apparent downside appears to be the extent to which forced adjustments to sub-central expenditures appear to be borne, by cuts in capital as opposed to current expenditures.

The behaviour of sub-central tiers appears to differ, depending upon whether adjustment is conducted as part of a general government consolidation effort or is conducted by sub-central tier in isolation. The latter concentrate upon revenue increases and cuts in capital expenditure, rather than focusing on areas that have been shown to result in more sustainable improvements in fiscal balances at the general government level.

In future work, we hope to address the extent to which heterogeneity among different country's government structures impact upon the achievement of successful fiscal consolidations. As we have seen, countries differ quite considerably with regard to the degree of fiscal responsibility over elements of expenditure and in autonomy in revenues that is in the hands of sub-central governments. If this heterogeneity can help explain the relative successes and failures of consolidation efforts we should be able to consider issues relating to institutional design that is beneficial to macro control with decentralisation.

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period of decentralisation involving increases in sub-central current expenditure financed by increased top-down grants. Upon eliminating these two observations the average change in grants falls to 0.19.

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