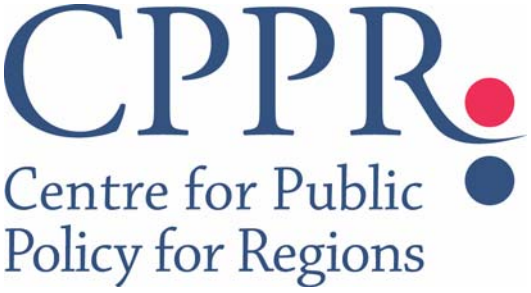

Discussion Paper No. 2

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Fiscal Federalism and Fiscal Consolidation: Evidence from an Event Study

Julia Darby
University of Strathclyde

Anton Muscatelli
University of Glasgow

Graeme Roy
University of Strathclyde

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ABSTRACT

Fiscal consolidations, episodes where governments make large discretionary improvements in their fiscal positions, have received considerable attention, especially in EMU. The existing literature demonstrates that the composition of consolidations is a crucial determinant of their success. We show that sub-central governments also play a key role in consolidations through sustained cuts in expenditures, as their intergovernmental grants are cut. In contrast to existing studies we find that cuts in capital spending at sub-central levels are a feature of successful consolidations. We also show that the government type and the nature of fiscal arrangements in a country impact on these results.

JEL Codes: E62, E63, H62, H77

1. INTRODUCTION

Fiscal consolidations, that is episodes where governments make large discretionary improvements in their fiscal positions, have dominated much of both political and academic discussion of fiscal policy in recent years. In Europe, during the run up to EMU and since the launch of the Stability and Growth Pact, the focus has been on achieving sound sustainable government finances. However, this drive toward consolidation has been shared throughout most OECD countries and is also a key issue in emerging markets, keen to avoid a repeat of financial crises. However, adjustment has not been easy and some previous bastions of fiscal prudence are now struggling to maintain or regain sound fiscal positions. In addition, the potential 'pension crisis' facing many countries means that the issue of fiscal consolidation will remain central.

The established literature on fiscal consolidations, see for example, Alesina and Perotti (1995), Alesina et al. (1998), McDermott and Wescott (1996) and Von Hagen et al. (2001), have concluded that the composition of the consolidation effort is a crucial determinant of the ultimate effect on debt. Consolidation attempts that focus upon key elements of government expenditure are more likely to lead to sustained falls in a country's debt to GDP ratio than those based upon revenue increases.

In this paper we advance this literature in two principal directions. Firstly, previous studies of fiscal consolidation have focussed upon general government data[i]. This has one clear advantage, in that large and consistent data sets are readily available. However, in our view, this advantage is outweighed by a key weakness: the 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), and Roubini and Sachs (1989), assume a single tier of government. However, as outlined in Darby et al. (2003), sub-central governments play a substantial role in the conduct of fiscal policy within a given country. We therefore believe that it is worth extending the existing literature to look at the respective contributions made by sub-central and central government and to examine how these tiers of government interact during consolidation attempts.

Secondly, previous attempts to obtain a descriptive picture of fiscal behavior during consolidation attempts have tended to focus their attention on the period of consolidation – see for example, Alesina and Perotti (1995) and Darby et al. (2005a). Little is known of the behavior of fiscal policy in the immediately surrounding periods. Studies that have looked at fiscal behavior in the surrounding periods have tended to do so in a largely ad hoc manner. We believe that it is important to obtain a clear picture of systematic changes in fiscal variables not just in the period of consolidation but also in the periods surrounding consolidation.

In this paper we adopt an event study approach to explore how sub-central tiers of government react to major discretionary policy shifts at the central level during consolidation attempts. Specifically, we construct a panel dataset for the major OECD economies and assess how central and sub-central expenditures, taxation, and intergovernmental grants change in response to governments' attempts to correct their fiscal positions. Episodes of fiscal consolidation are identified using a methodology which has become standard in the macroeconomics literature (see Blanchard, 1983, Alesina and Perotti, 1995, 1997, Alesina et al., 1998). The event analyses then allows us to examine the timing of expenditure, taxation and intergovernmental grant shifts around the periods of fiscal consolidation. We also develop this analysis by distinguishing between successful consolidations (i.e. ones that have a significant impact on a country's debt to GDP ratio) and unsuccessful consolidations, which do not and show signs of being temporary. In addition to addressing issues related to interactions between central and sub-central tiers of government, we are also able to shed light on the extent to which sub-central tiers of government participate in fiscal consolidations, and hence to macroeconomic adjustment. Finally, by grouping countries according to various characteristics, we can use regression analysis to examine whether some patterns of reaction to fiscal consolidations are particularly applicable to certain groups of countries.

To anticipate our key results, we begin by showing that the majority of consolidations involve shared effort across tiers of government. We also replicate a result from the existing literature: that successful consolidations tend to be based upon expenditure cuts as opposed to increases in revenue. The first new result we obtain shows that successful fiscal consolidations at central government level bring with them similar,

and sustained, cuts in expenditure at the sub-central level. Indeed, in the case of successful consolidation attempts, a pattern emerges in which central governments first cut intergovernmental transfers to lower tiers of government and then, rather than raising sub-central revenues, the sub-central tier make cuts in their expenditure. In short, it appears that successful fiscal consolidations are characterized by cutbacks in intergovernmental grants, which are more than matched by cutbacks in sub-central expenditures. It therefore appears that there is a strong correlation between success in consolidating central fiscal deficits and similar actions from lower tiers of government.

In contrast, periods of consolidation that are unsuccessful are typically characterized by temporary increases in central taxation revenues, an absence of any change in intergovernmental grants, no tendency for change in sub-central tax revenues, and only a small temporary reduction in sub-central expenditures.

Third, Alesina and Perotti (1995, 1997) identified cutbacks in capital expenditures at central government level as a prevalent feature of unsuccessful fiscal consolidations. Our disaggregate analysis reveals that, where consolidations are successful, sub-central tiers of government have to make significant cuts in their capital expenditures. This would appear to imply that the burden of adjustment to investment falls onto lower tiers of government. Furthermore, it would appear that central governments worry less about the long-term (i.e. public investment) consequences of consolidation, if these decisions are taken at local level. In addition, there is evidence that when faced with cuts in intergovernmental grants during consolidations, sub-central governments tend to maintain expenditures on wages at the expense of capital expenditure: there seems to be a definite switch towards public consumption. This might be interpreted as a variant of the effect identified by Gramlich (1987): in that sub-central governments appear to seek to defend current service provision while reducing spending on infrastructure and resisting raising taxation. This could be explained by the fact that in many of the OECD countries in our sample the states/regions and local authorities have much more limited powers to vary taxation than in the USA. In a companion paper, Darby et al. (2005b), we demonstrate that this behavior is evident across all instances when grants are cut and not just in periods of consolidation.

Finally, we find that the institutional arrangements in countries (the government type and the nature of the fiscal arrangements) do impact at the margin on the results. In particular, coalition governments tend to be less likely to cut grants to sub-central governments during fiscal consolidation attempts.

The structure of the remainder of the paper is as follows. In Section 2 we discuss the data and briefly summarize the importance of sub-central tiers of government in the countries in our sample. In Section 3 we discuss the identification of consolidation attempts. Section 4 sets out the econometric methodology, Section 5 reports our results and Section 6 concludes.

2. SCOPE OF THE STUDY

The data used in this study are annual and taken primarily from IMF Government Financial Statistics (GFS), 2002 Edition, supplemented with data from the OECD Statistical Compendium, 2002 Edition. GFS provides the best internationally comparable data on fiscal variables for fifteen OECD countries that are disaggregated by tier of government[ii], subdivided between three levels (central, state and local categories). These data allow us to construct an unbalanced panel dataset with 336 observations covering the period 1970-99. A full description of the data is provided in an Appendix.

The dataset we employ does have some weaknesses. First, little or no distinction is made between tax revenues from taxes, where the sub-central tiers control both the tax rates and/or the tax base, and revenues from tax sharing arrangements, this has led us to supplement the GFS data using OECD (1999) and information provided by Jonathan Rodden of MIT for Canada and the USA. In our empirical work we use this additional data to distinguish between countries in terms of their differing degrees of fiscal autonomy[iii]. Another second weakness is that, to the extent that central government's can exert influence on sub-central spending patterns through directives (see Ebel and Yilmaz, 2002), GFS will overstate the true nature of sub-central expenditure autonomy. Nonetheless, the GFS data remain the best available for our purposes.

3. IDENTIFYING FISCAL CONSOLIDATION ATTEMPTS

In common with the existing literature, we define a fiscal consolidation as a discretionary attempt to improve general government fiscal balances. This of course requires that we abstract from the effects of automatic stabilizers and interest payments on outstanding debt, to focus movements in the structural primary balance as a proportion of GDP. While there is no universally accepted way of decomposing the primary fiscal balance to GDP ratio into its cyclical and discretionary components[iv], we adopt the methodology used in Alesina and Perotti (1995, 1997), and Alesina et al. (1998), who follow Blanchard (1993) in using the constructed fiscal impulses to measure discretionary changes in fiscal policy from one year to the next.

For each country in our sample, we construct the Blanchard measure of the fiscal impulses by regressing each component of the primary balance on unemployment, a constant, and a linear and quadratic time trend. We then calculate predicted values for components of the primary balance, conditional on the previous year's unemployment rate, giving the predicted cyclically adjusted primary balance. The Blanchard measure of the structural fiscal impulse is then calculated by subtracting the predicted cyclically adjusted primary balance from its actual value[v].

Having constructed a measure of discretionary changes in fiscal policy for each country, there are two ways of proceeding. The first is simply to use this measure as part of a cross country panel dataset to examine common features which characterize shifts in general government discretionary fiscal policy. However, the problem with this approach is that the measured discretionary fiscal impulse is unlikely to be zero even where there is no discretionary policy action enacted by governments, simply because there is no perfect way of decomposing automatic and discretionary fiscal changes. The risk is that any statistical analysis based on such a dataset will lack statistical power. A second way of proceeding is to focus on *significant* changes in discretionary fiscal policy. This will ensure that our results are not driven unduly by cyclical changes. An operational definition of a significant positive fiscal impulse, i.e. a period of fiscal consolidation is provided by Alesina and Perotti (1995)[vi]:

Definition 1: A period of fiscal consolidation is deemed to have occurred in a given year if the discretionary general government fiscal impulse is greater than or equal to 1.5% of GDP.

This definition allows us to identify a number of consolidation episodes from the panel data. These episodes can be classified further into successful or unsuccessful. To be more precise, we again follow previous studies on fiscal consolidation (see, for example, Alesina and Perotti (1995)) in defining a subjective criterion for the success or failure of a consolidation attempt, in terms of the improvement of the general government fiscal position[vii]:

Definition 2: A fiscal consolidation is deemed to be successful if, three years after the consolidation attempt, the ratio of debt to GDP is at least 5 percentage points below the level observed immediately prior to the consolidation attempt.

Having identified a number of periods of significant fiscal consolidation, we can analyze our data. As we shall see below, a useful approach is provided by the methodology of event studies. Using definition 1, we can identify 61 separate consolidation attempts[viii]. Of these, using definition 2, 22 conform to our definition of success. Table 1 reports the countries and date for which we have identified fiscal consolidation attempts. As might be expected, nearly all (59 out of 61) general government consolidation attempts are either led by central government or involve both tiers of government. There are only 2 cases in which the sub-central tier consolidated when no consolidation effort could be identified at the central tier.

4. ECONOMETRIC METHODOLOGY

Event studies provide a regression based method of examining the time profile of key variables of interest around the time of specific events, in our case fiscal consolidations. Event studies are less common in macroeconomics, but are more commonplace in finance[ix]. Here we use the event study approach to compare and contrast significant changes in key fiscal variables before, during, and after a year identified as corresponding to a fiscal consolidation attempt, as compared to 'normal' or reference conditions, i.e. non-consolidation years. This allows is to obtain the predicted time profile for each of the fiscal variables (expressed as percentages of GDP) both during the period of consolidation and in periods immediately prior to, and after, the fiscal impulse. More specifically, each event window comprises five years;

two years prior the fiscal consolidation attempt, the period of the consolidation itself, and the two years that follow. The length of the event window is a choice variable, and was chosen based upon the significance of the time in the relevant regressions. Our results suggest that the window encompassing two years prior to consolidation and two years after is appropriate.

The econometric methods we employ are similar to those used by Tornell and Westermann (2002) in an analysis of business cycles around the time of financial crises. We apply panel data methods, where the panel regressions include fixed effects to account for cross-country heterogeneity and we use Weighted Least Squares (WLS) to account for the effects of heteroscedasticity[x]. Each fiscal variable is regressed over the entire sample (for all countries, i, and all time periods, t) on a series of time dummies. The parameters attached to the time dummies capture the time profile of the variables. More precisely, the coefficients on the time dummies should capture the differences between each period in the event window relative to non-consolidation years.

We carry out two sets of regressions. First we examine all consolidation attempts collectively, where T is defined as the actual year of a consolidation attempt:

$$y_{i,t} = \alpha_i + \beta_1 D_{i,T-2} + \beta_2 D_{i,T-1} + \beta_3 D_{i,T} + \beta_4 D_{i,T+-1} + \beta_5 D_{i,T+2} + \varepsilon_{1i,t} \qquad (1)$$

where y_{it} is the fiscal variable of interest in country i at period t, and $D_{i,T+j}$ are time dummies, equal to 1 in +j/-j periods from the consolidation period, and zero in all other periods.

Second, we subdivide the set of identified fiscal consolidations into the 'successful' and 'unsuccessful' categories and perform the following regression:

$$\begin{aligned} y_{i,t} = {} & \alpha_i + \varphi_1 D^S_{i,Q-2} + \varphi_2 D^S_{i,Q-1} + \varphi_3 D^S_{i,Q} + \varphi_4 D^S_{i,Q+1} + \varphi_5 D^S_{i,Q+2} \\ & + \delta_1 D^U_{i,P-2} + \delta_2 D^U_{i,P-1} + \delta_3 D^U_{i,P} + \delta_4 D^U_{i,P+1} + \delta_5 D^U_{i,P+2} + \varepsilon_{2i,t} \end{aligned} \qquad (2)$$

where again y_{it} is the fiscal variable of interest in country i at period t, $D^S_{I,P\pm j}$ are time dummies, equal to 1 in +j/-j periods from the successful consolidation period (denoted t=P) and zero in all other periods and $D^L_{I,Q\pm j}$ are time dummies, equal to 1 in +j/-j

periods from the unsuccessful consolidation period (denoted t=Q) and zero in all other periods.

Each estimated coefficient (β_κ, φ_κ, δ_κ) captures the estimated difference between period k in the event window and the average position in non-consolidation years. Thus, for instance, if the dependent variable is the annual change in central government expenditure, a significantly negative β implies that in the year prior to the consolidation the change in central government expenditure was significantly lower than in non-consolidation years (the 'normal', or reference period).

As we shall see below, having estimated the standard event study regression it may be useful to see if individual countries or groups of countries display significantly different behavior from the rest of the countries in the event sample. For instance, we might wish to consider whether those countries with different types of central government (e.g. coalition or single-party governments) display different behavior in terms of fiscal adjustment at central and sub-central level. Or we might want to consider if countries with federal rather than unitary structures display a different adjustment pattern. Equation 1 can be modified to incorporate tests of these hypotheses by including an interactive dummy variable:

$$\begin{aligned} y_{i,t} = {} & \alpha_i + \beta_1 D_{i,T-2} + \beta_2 D_{i,T-1} + \beta_3 D_{i,T} + \beta_4 D_{i,T+1} + \beta_5 D_{i,T+2} + \\ & \lambda_1 C_l D_{i,T-2} + \lambda_2 C_l D_{i,T-1} + \lambda_3 C_l D_{i,T} + \lambda_4 C_l D_{i,T+1} + \lambda_5 C_l D_{i,T+2} + \varepsilon_{3i,t} \end{aligned} \tag{3}$$

where C_l is a dummy variable which takes a value of unity in the case of a particular country or group of countries and is equal to zero in all other cases. The estimated coefficient on the interactive dummy variable captures the additional effect of this category of country over and above that identified by the standard dummies. For instance, taking the previous example, if C_l is a dummy representing the current Eurozone countries, a significantly negative λ_1 would indicate that in the year of a consolidation attempt, central government expenditure is significantly lower than in non-Eurozone countries during fiscal consolidations.

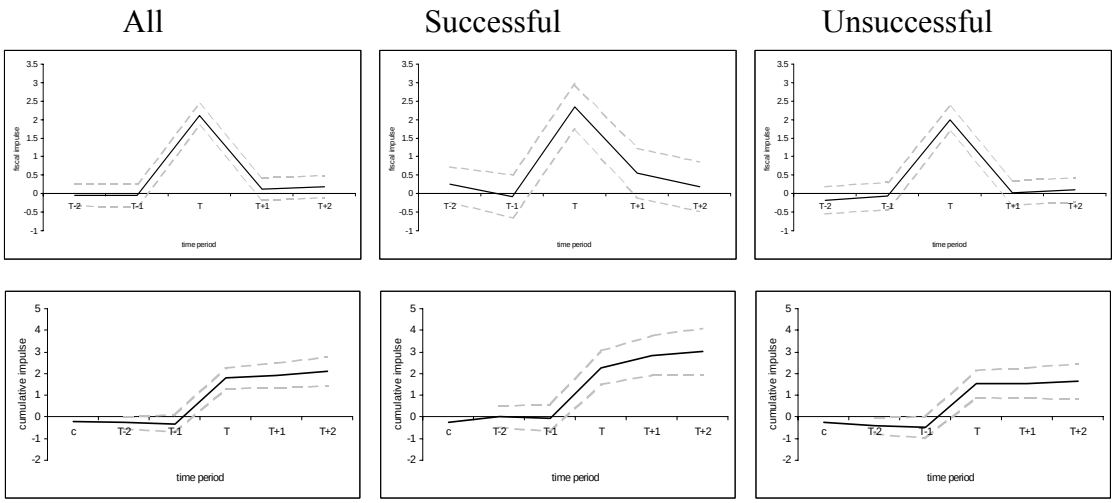
5. RESULTS

We present our results in a series of graphs, shown in Figures 1 to 22. As noted above, we consider all the consolidations which fall into Definition 1, and then sub-divide

them into the categories of successful and unsuccessful, using Definition 2. The upper row of graphs in each panel shows the time profile for the fiscal variable of interest (e.g. fiscal impulse, change in expenditure etc.) for all consolidations, successful consolidations, and unsuccessful consolidations respectively. In addition to plotting the coefficients we also show the relevant standard error bands which allow easy identification of the time periods in which a given estimated change is significantly different from zero. The lower row of graphs in each panel shows the cumulative change in the fiscal variable of interest which is obtained by summing the respective coefficients over the event window. Again, alongside these cumulative changes we show the relevant asymptotic standard error bands.

Figure 1 shows the extent to which consolidations have involved an improvement in the fiscal position of the central government, as measured by the annual change in the Blanchard fiscal impulse.

Figure 1: Central Government Fiscal Impulse



By definition, fiscal consolidations have involved sizeable central government fiscal impulses in period T. It is also interesting to note that the time profile of the consolidations around period T is similar regardless of whether the fiscal consolidation is ultimately successful or not. However, the cumulative plots indicate that successful fiscal consolidations have typically involved a larger cumulative fiscal contraction (shown as a positive fiscal impulse), as the improvements at time T are amplified in post-consolidation periods.

Figure 2: Sub-Central Government Fiscal Impulse

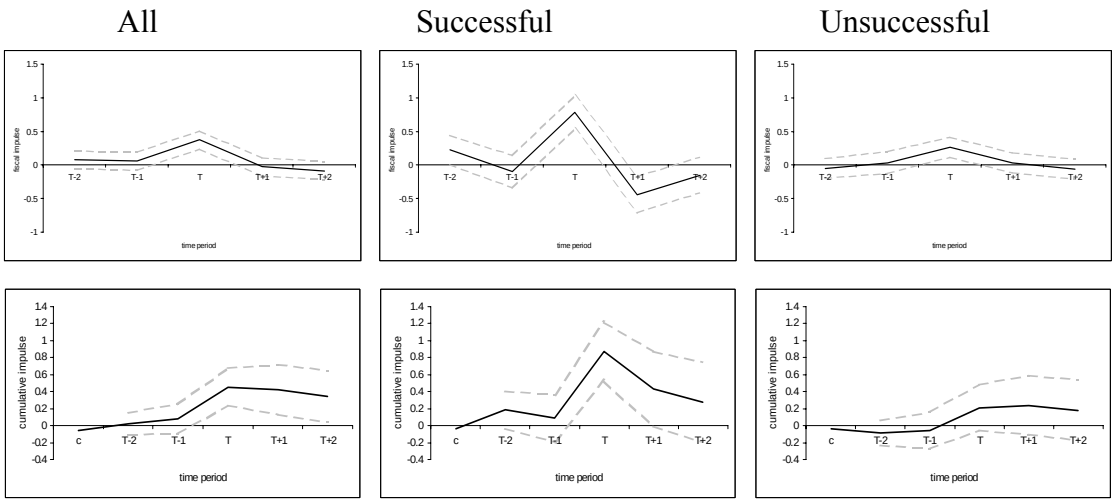
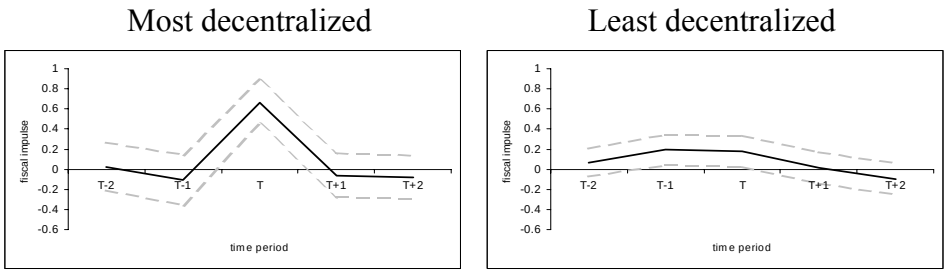


Figure 2 shows the discretionary fiscal impulse implemented by the sub-central tiers of government, and shows how they fared during these general government consolidation attempts. It is interesting that the consolidation effort is shared between tiers of government as indicated by the fact that the period T dummies attract positive coefficients that are significantly different from zero. This suggests that contractions in the discretionary fiscal balance are significant larger during consolidation years[xi]. We also identify a major difference between successful and unsuccessful consolidations; in the former, sub-central tiers of government share a considerable part of the burden of macroeconomic adjustment. Also note that in the period following the discretionary fiscal tightening there is a partial reversal at sub-central level (the T+1 dummies attract negative coefficients that are significantly less than zero). This may indicate some resistance to the consolidation effort.

A fundamental question of interest is whether a greater degree of fiscal decentralization implies less control over fiscal policy at sub-central level? Rodden (2002) and Rodden and Wibbels (2003) and Tanzi (2001), have argued that greater fiscal decentralization might result in a potential deterioration in macroeconomic control, since sub-central tiers of government have an incentive to focus myopically on local issues. Although we do not attempt to answer this question directly, we do examine the extent to which the group of most decentralized countries contribute to overall consolidation attempts, and gauge whether there is evidence of greater resistance to central government consolidation efforts within such countries. In Figure

3 we have divided the sample into groups of countries with 'high' and 'low' degrees of fiscal decentralization. To be precise, the division is made using the percentage of expenditure and revenue assigned to the sub-central tier with eight countries allocated to the 'high' category and the remaining 7 countries allocated to the 'low' category[xii].

Figure 3: Sub-Central Fiscal Impulse split by level of decentralization



The results represented in Figure 3 shows that the average fiscal impulse is significantly larger in the 'most decentralized' countries at time T. The improvement, relative to non-consolidation years, is as much as 0.5% of GDP. Thus, a high degree of decentralization does not seem to be inconsistent with the sub-central tiers of government sharing the burden of adjustment. As we shall see below, concurrent cuts in central government grants appear to be an important element behind this shared adjustment.

Having looked at the time profile of the overall fiscal positions, we now examine the detailed evolution of total expenditures and revenues and their key components during the event window. Note that we examine total expenditure defined as total primary expenditure excluding intergovernmental transfers (i.e. excluding interest payments and transfers to other levels of national government), to avoid double counting. Similarly total revenue includes all tax and non-tax revenues but excludes grants received from other tiers of national government. Intergovernmental grants and transfers are analyzed separately.

Figure 4: Central Government Total Expenditure

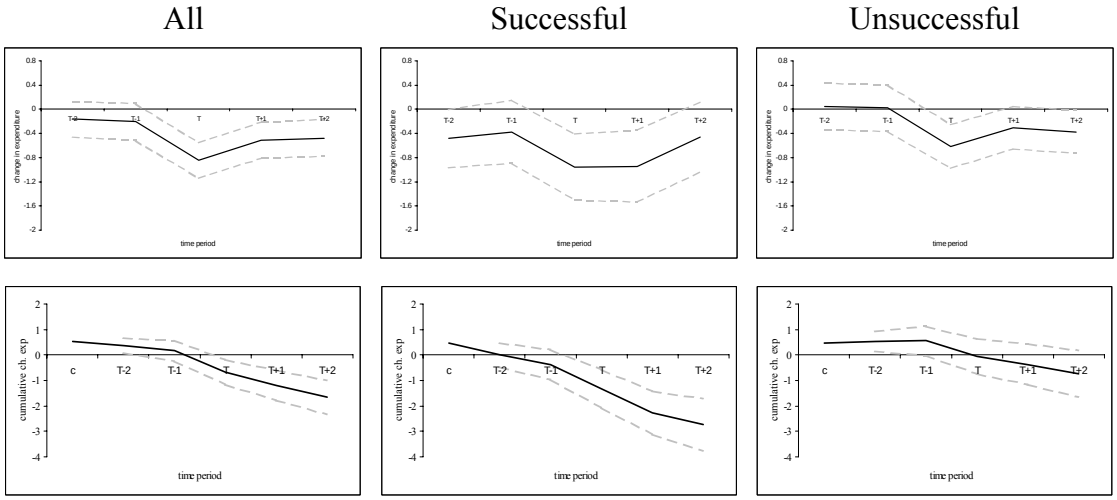
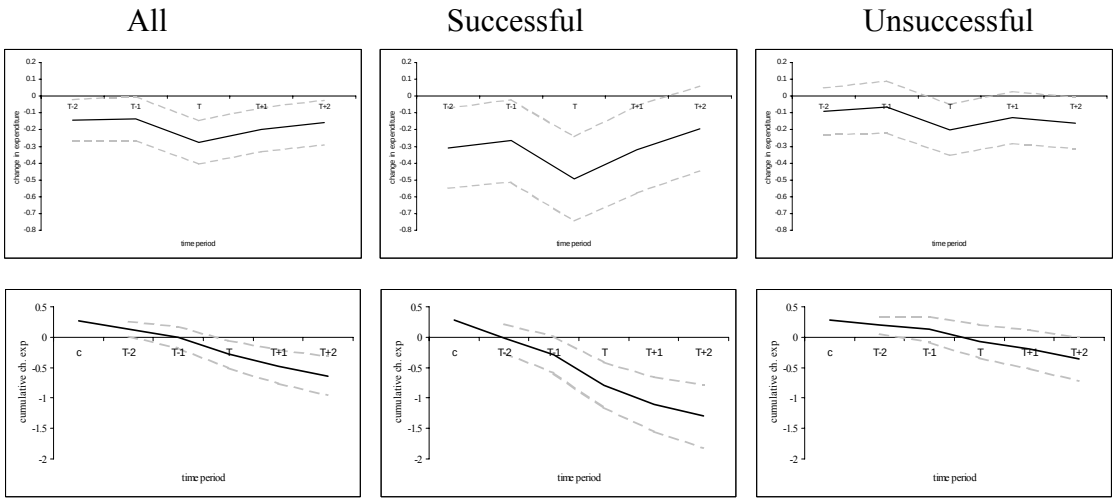


Figure 5: Sub-Central Government Total Expenditure



Figures 4 and 5 show the evolution of central and sub-central total expenditure during consolidation attempts. Figures 6-13 show the equivalent plots for the components of total expenditure (respectively wages, social transfer payments, goods and services and capital expenditure). A number of points can be noted from these results. First, as can be seen from figures 4 and 5, the key difference between successful and unsuccessful consolidation attempts is that the successful consolidations involve consistently tightened expenditure over time, and not just in the period of the consolidation attempt (T). In fact, sustained cuts are evident in the majority of the components of spending, with the exception of central and sub-central governments' capital expenditure.

Second, Alesina and Perotti (1997) suggested that cuts in social welfare spending and wages tend to be evident in successful consolidation attempts; and they stressed that the signaling effect of these types of cuts, through which central governments can demonstrate an important commitment to fiscal control[xiii]. Figures 6, 7, 8 and 9 confirm Alesina and Perotti's observation in that significant and sustained cuts are made in the central government wage bill and in social transfers across both successful and failed consolidations, but the size of the cut is larger, and the demonstration effect stronger, in the successful case.

Figure 6: Central Government Wage Bill

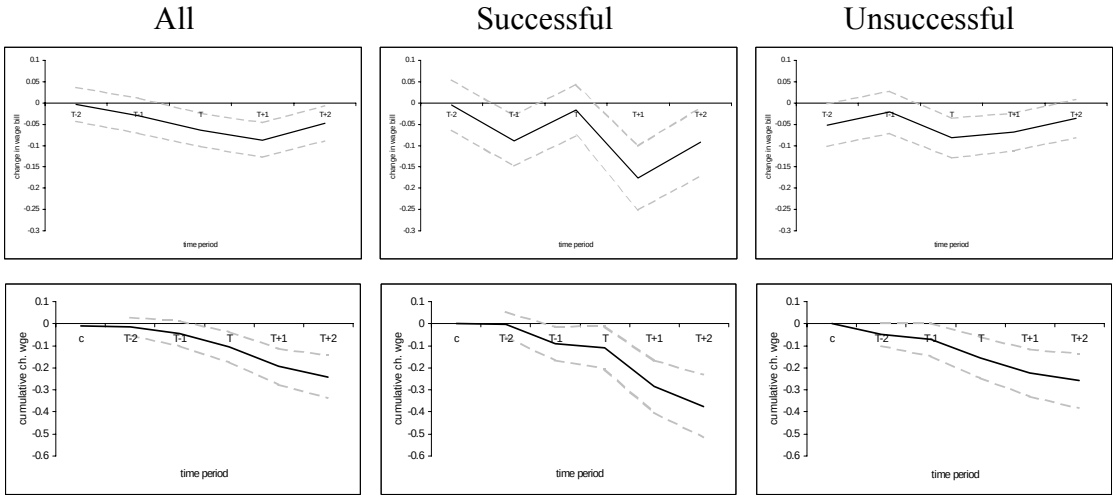


Figure 7: Sub-Central Government Wage Bill

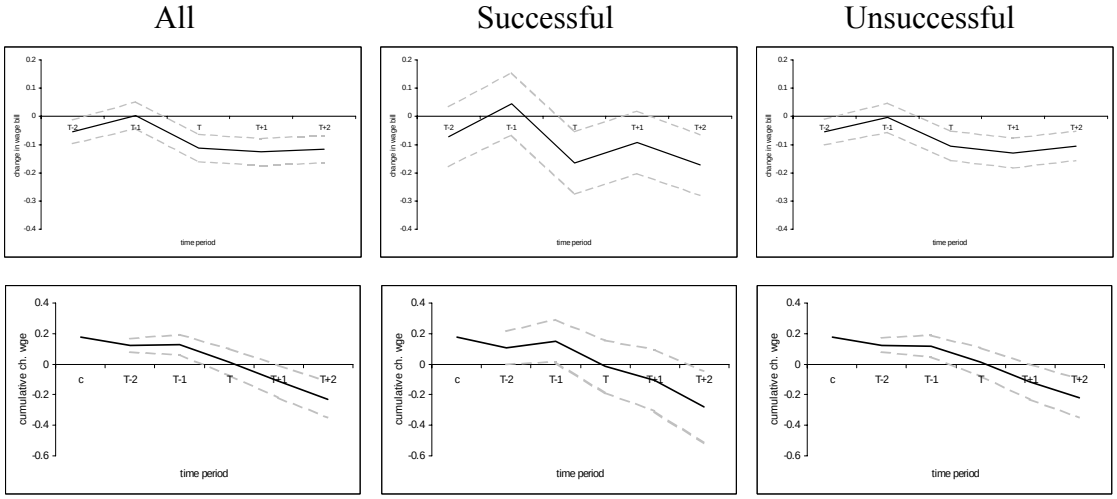


Figure 8: Central Government Social Transfers

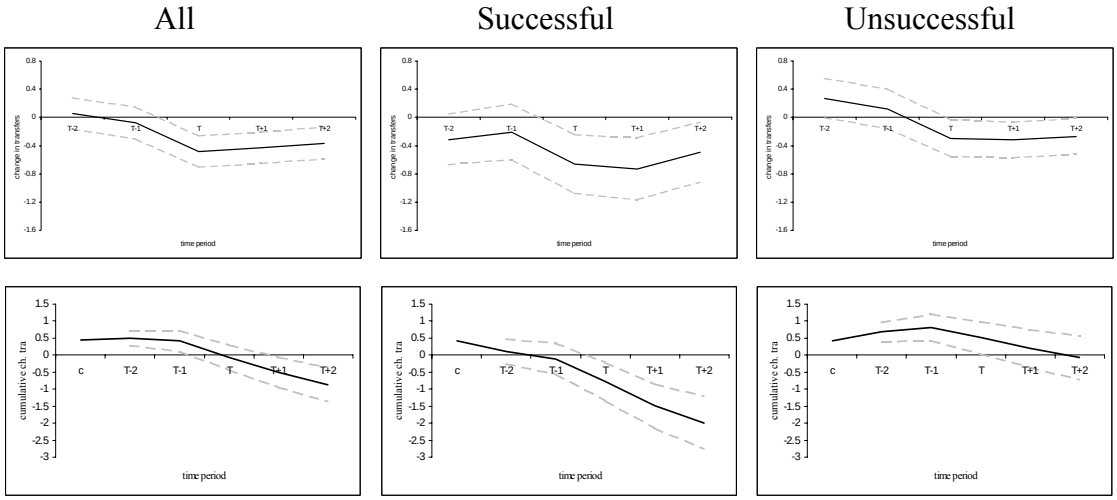


Figure 9: Sub-Central Government Social Transfers

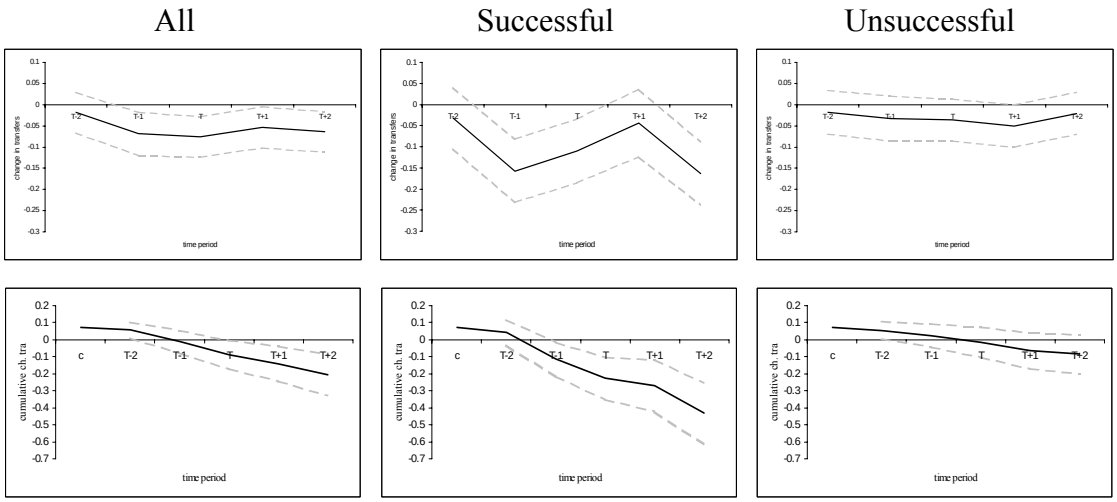


Figure 10: Central Government Expenditure on Goods and Services

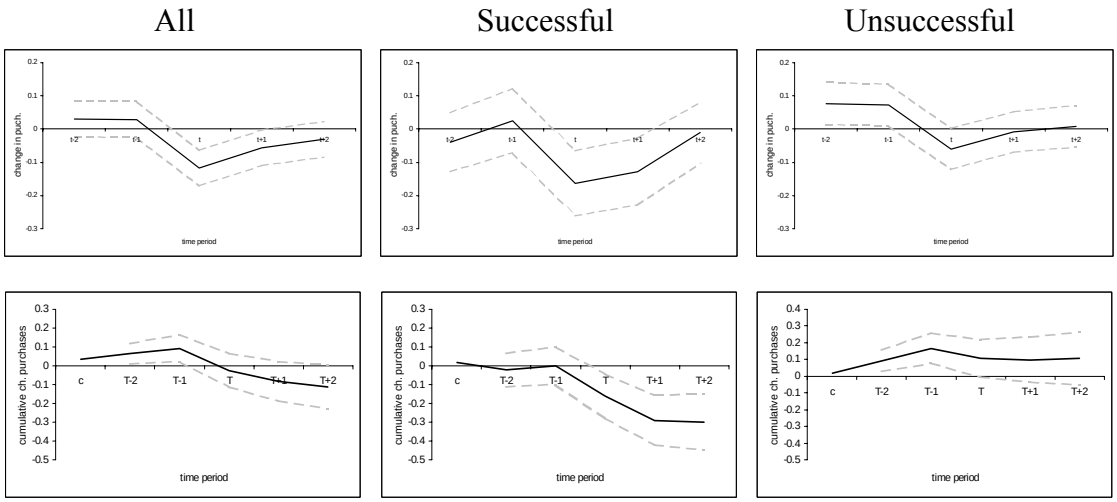


Figure 11: Sub-Central Govt. Expenditure on Goods and Services

All Successful Unsuccessful

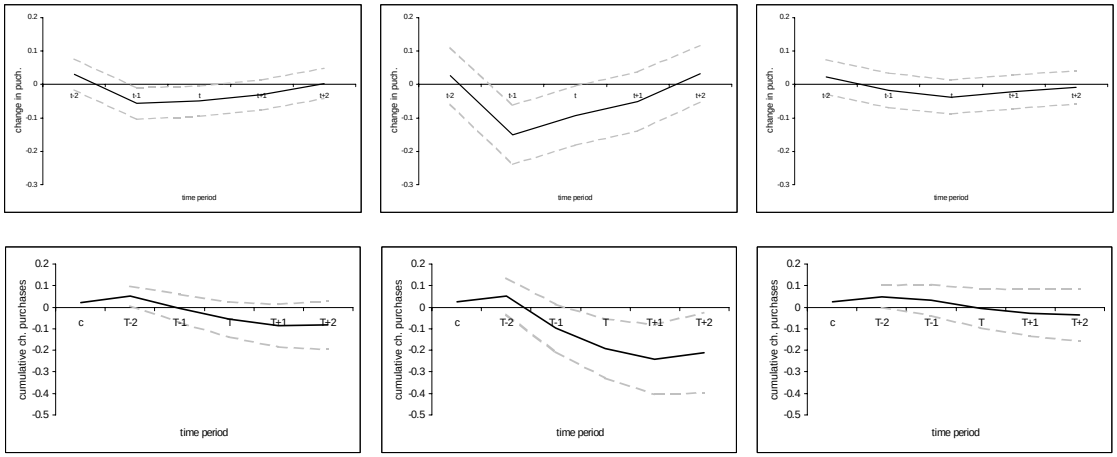


Figure 12: Central Government Capital Expenditure

All Successful Unsuccessful

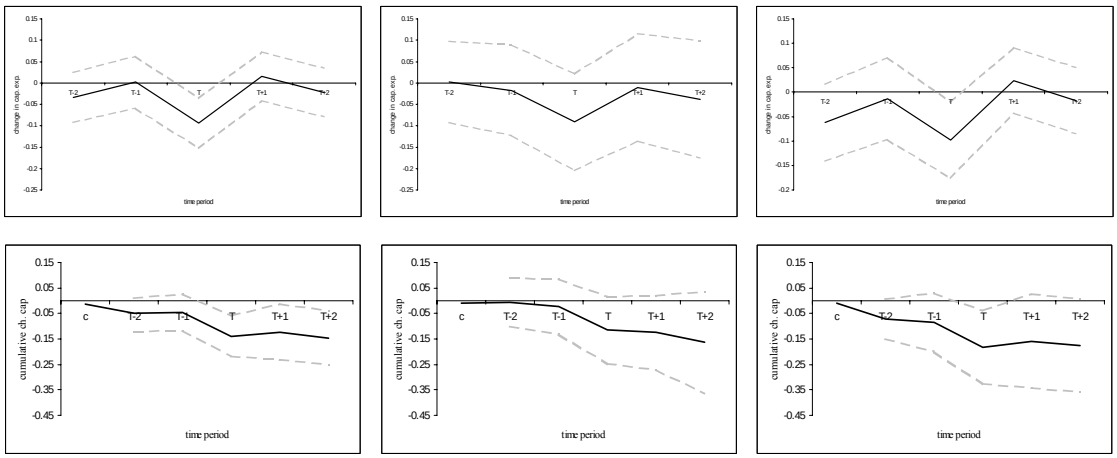
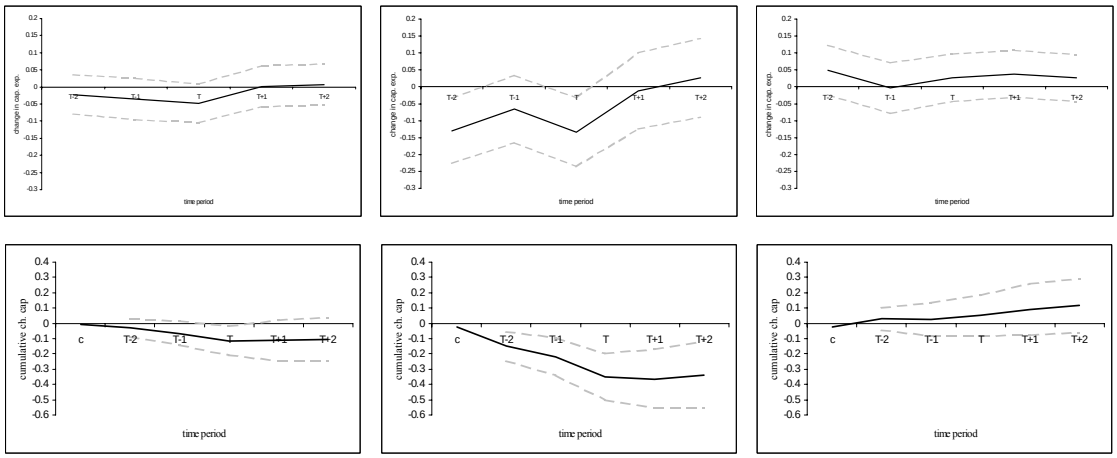


Figure 13: Sub-Central Government Capital Expenditure

All Successful Unsuccessful



Turning to the revenues, Figures 14-20 show the evolution of central and sub-central government revenues and their components.

Figure 14: Central Government Total Revenue

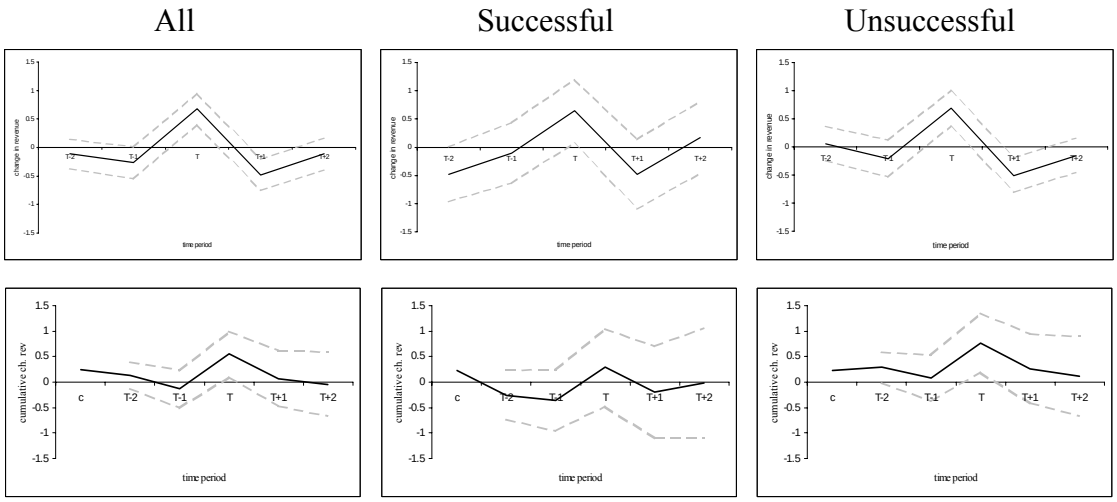


Figure 15: Sub-Central Government Total Revenue

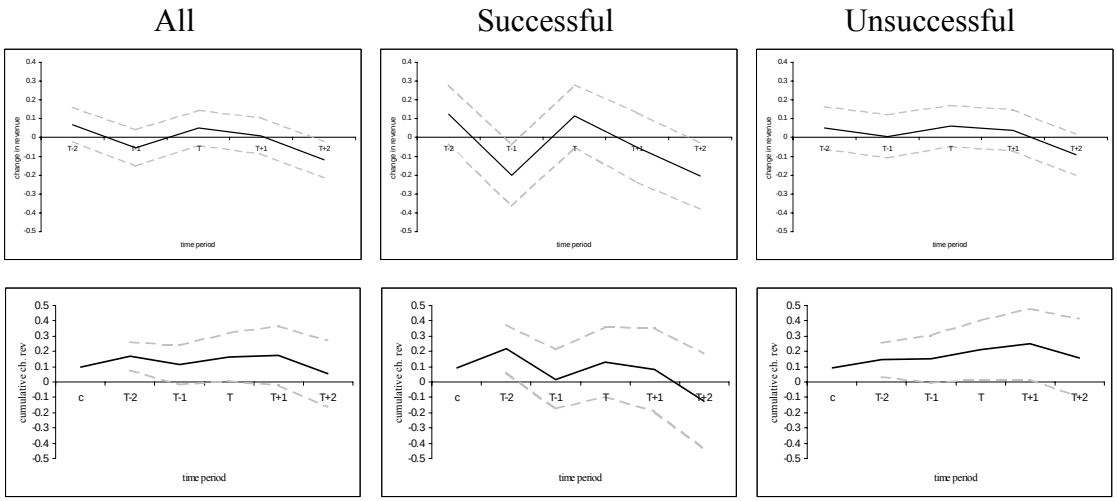


Figure 14 demonstrates another point made in Alesina and Perotti (1995, 1997) that, in the year of the consolidation, unsuccessful attempts are characterized by increases in fiscal revenues (rather than expenditure cuts). Note that while central government revenues rise during both successful and failed consolidation attempts, the size of this increase is larger in the failed attempts. In fact, the temporary increase in revenues is almost completely reversed in the following year, as indicated in the significant negative effect at T+1. The cumulative change in the profile of revenues is similar in

both successful and failed consolidation attempts. The temporary nature of the revenue hikes is not evident in the Alesina-Perotti studies because their analysis does not include the periods following the actual consolidation attempts.

Figure 15 shows that unsuccessful attempts seem to be characterized more by an increase in sub-central governments' revenues.

Breaking down revenues into taxation and other charges (including user charges), as shown in Figures 16-19, one can see that there is a tendency for sub-central governments to raise taxation[xiv] in the period of the consolidation. There is also a tendency for user charges and fees (non-tax revenues) to be somewhat lower in the case of successful consolidations, although the difference is barely significant. We conclude that revenue adjustments appear to contribute little to the cumulative profile of fiscal consolidations at central or sub-central levels. Furthermore, where revenue adjustments are present, they appear to be more likely to be associated with unsuccessful consolidation attempts and/or to be temporary measures.

Figure 16: Central Government Taxation Revenues

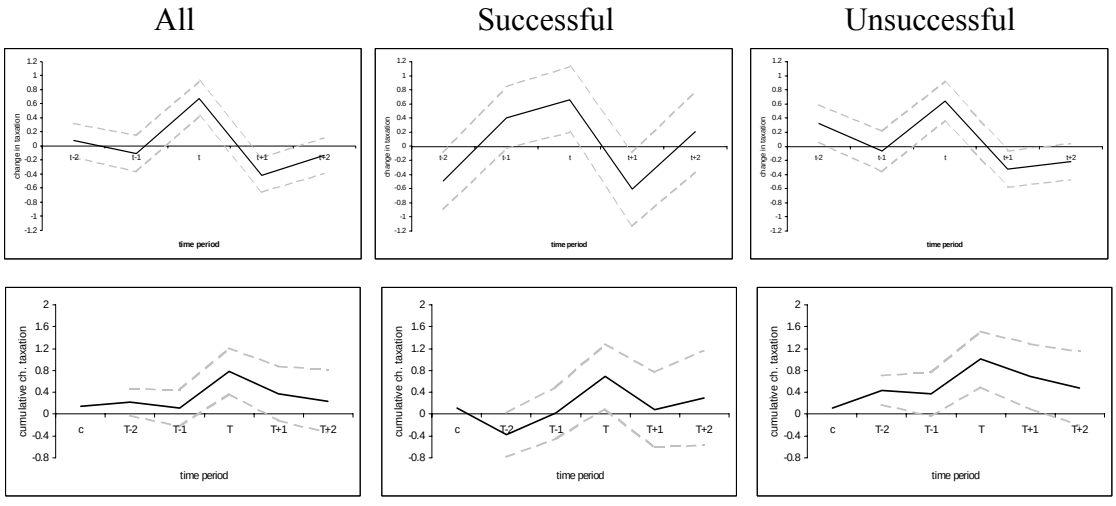


Figure 17: Sub-Central Government Taxation Revenues

All Successful Unsuccessful

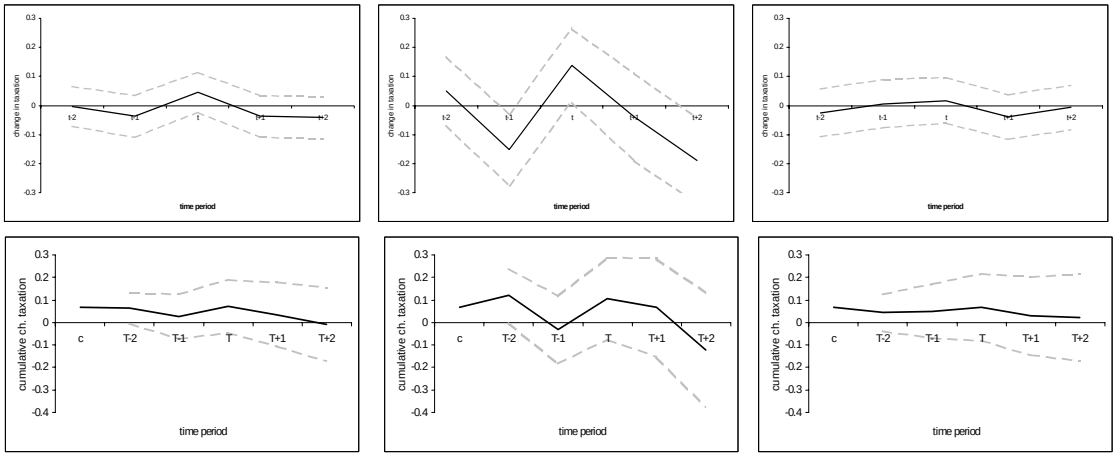


Figure 18: Central Government Non-Tax Revenues

All Successful Unsuccessful

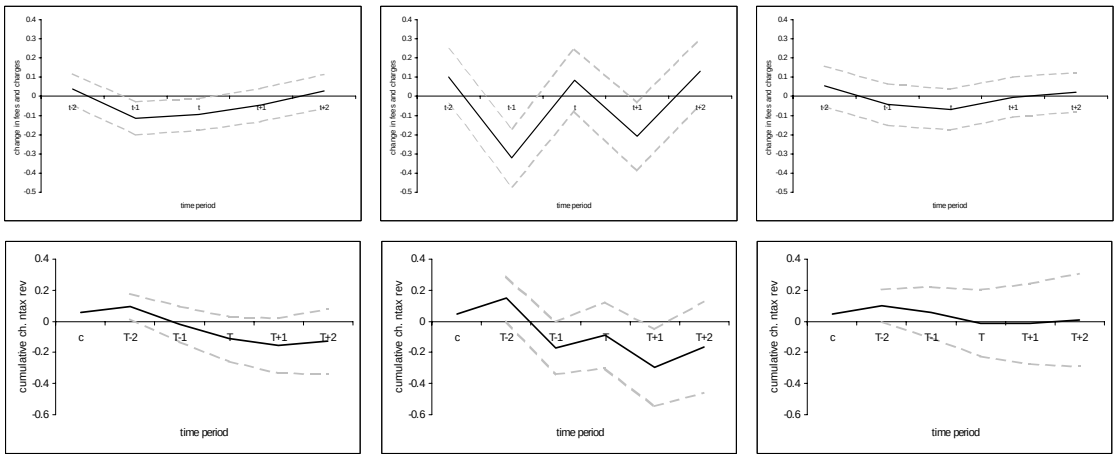
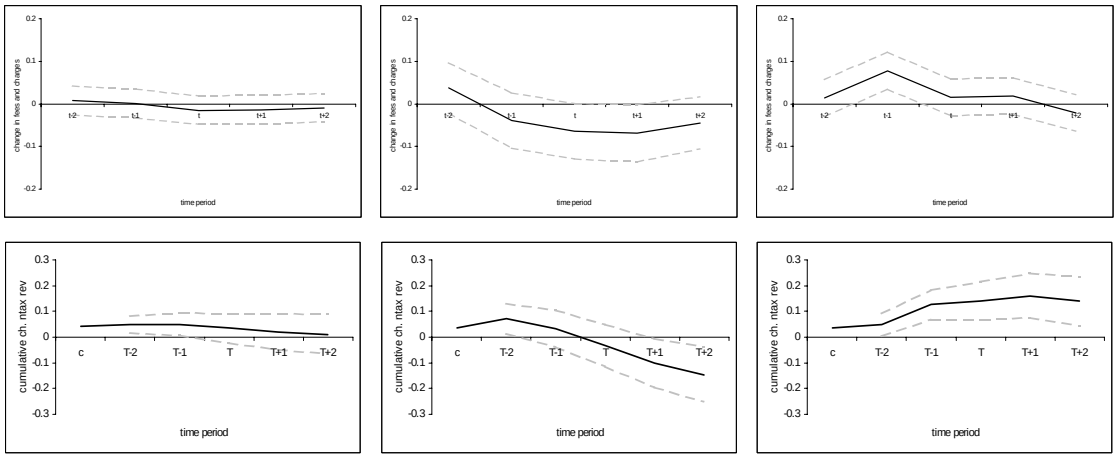


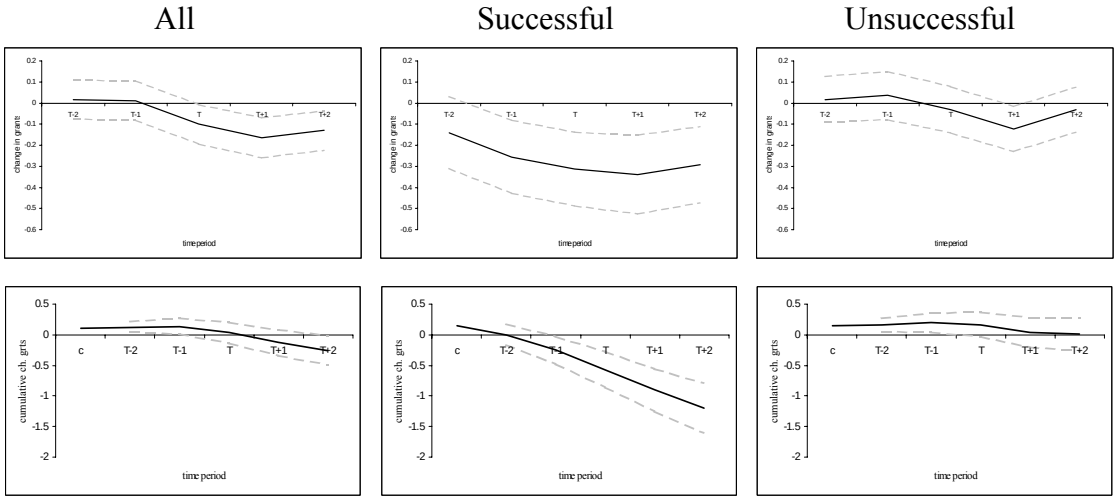
Figure 19: Sub-Central Government Non-Tax Revenues

All Successful Unsuccessful



What seems to matter more, in terms of the success of fiscal consolidation attempts, is the role played by intergovernmental grants and transfers. Figure 20 shows the extent to which central governments adjust sub-central grants around the time of fiscal consolidations. It is important to note that all the countries in our sample exhibit some degree of vertical imbalance in that expenditures at the sub-central tier exceed own-source revenues with the difference being financed by central government grants[xv]. It therefore seems likely that any changes in grants will impact heavily on sub-central governments.

Figure 20: Sub-Central Government Grants



The significant negative parameters on the T, T+1, and T+2 dummies in the upper row of panel T show that, relative to the reference category, substantial cuts are made to sub-central governments' grant allocations both during and after consolidation attempts. It is also apparent that this result is driven almost entirely by the experience of successful consolidations. The cumulative change in grants during successful consolidations is about -1.3% of GDP, while the average change outside the event window is 0.2%. In contrast, the cumulative change is not significantly different from the average fixed effect during unsuccessful consolidations. Clearly cuts in grants are central to fiscal consolidation efforts by central governments: by cutting the finance available in effect they force the hands of the decision makers within the lower tiers of government. In a companion paper Darby, Muscatelli and Roy (2005b), we examine cuts in grants more closely, to see whether, and when, sub-central governments respond to such pressures by cutting expenditures, and when instead they choose to

raise taxes. For the moment, at least while we focus on fiscal consolidations, there would appear to be evidence of a kind of reverse 'fly-paper effect', in that cuts in grants lead to cuts in sub-central expenditure.

Our final focus is on the extent to which the nature and stability of the central government impacts on fiscal decisions. To conduct this analysis we use data provided in Woldendorp et al. (2000) to differentiate the identified consolidation episodes according to the 'type of government' enacting the adjustment. Woldendorp et al. define six types of government but, given the constraints of our sample size, we aggregate these up to three classes: i) single party parliamentary majority, ii) coalition parliamentary majority and iii) parliamentary minority with a single party or a coalition. The type of government in the actual period of consolidation is used as the discriminating factor in the context of equation (3)[xvi].

Figure 21: Central Government Total Expenditure

Single Party Government Coalition Government

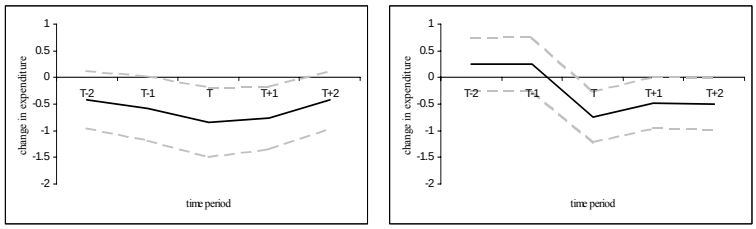
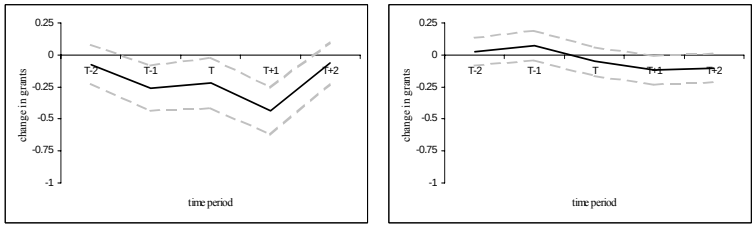


Figure 22: Sub-Central Government Grants

Single Party Government Coalition Government



Figures 21 and 22 show, respectively, the annual change in central government expenditures and cuts in grants made by single party and coalition central governments. As can be seen in Figure 21, there is only a slight difference in the expenditure-cutting behavior of these types of government. However, we note from Figure 22 that coalition governments seem less likely to cut sub-central grants. By

contrast, the single-party dummies are significantly negative at the 10% level. Cutting sub-central grants, like any other category of current expenditure is likely to be politically difficult. This is consistent with strong and less fragmented governments finding it easier to deal with the potential backlash from local government. The reluctance to address sub-central finances may partially explain the lower probability of success in fiscal consolidations of coalition governments often discussed in the literature[xvii].

6. CONCLUSIONS

Our paper has established an important role for sub-central government in fiscal adjustment. Using comparative data on sub-central government variables and on inter-governmental grants, we have provided a picture of how sub-central tiers of government play a role during periods of fiscal consolidation, and how grants play a key role in forcing sub-central governments to adjust. We use event study analysis to examine not only how governments react to these adjustment episodes, but also the time profile of the adjustment.

The results which emerge are varied and are set out in detail in the body of the paper. However, it is worth highlighting three general points which emerge from our empirical analysis. The first is that sub-central governments play a key role in successful fiscal consolidations. This provides support for the argument that understanding sub-central government behavior is important in overall macroeconomic stabilization. However, this result is tempered by the observation that fiscal decentralization does not seem to necessarily imply loss of control, as suggested by some observers (cf Rodden, 2002, Rodden and Wibbels, 2002), or to a higher degree of taxation (see Keen 1997). Sub-central governments do not appear to react to fiscal consolidation attempts by increasing own taxes. In future work, we hope to focus more closely on the implications of alternative forms of fiscal decentralization and the level of effective central government control on the nature and success of consolidation attempts.

The second general theme is that we present some evidence that cuts in grants play an important role in fiscal consolidations. During successful consolidation attempts, central governments typically make pronounced and sustained cuts in grants which in

turn generate cuts in sub-central expenditure. This result is generally supportive of the presence of a reverse 'fly-paper' effect.

The third general point is that capital spending is an important adjustment mechanism for sub-central governments following fiscal. Although the nature of the adjustment does depend on the degree of success of the consolidation, what is striking is that capital spending does tend to suffer at sub-central level following a fiscal adjustment. This is despite the relatively small size of capital expenditure compared to total sub-central budgets, and possibly highlights a degree of short-termism on the part of local governments in adjusting their fiscal position.

DATA APPENDIX

All variables unless otherwise stated are from the IMF GFS [2002] database and are in current prices.

Total Expenditure = [All Current Expenditure (including Wages and Salaries, Employer Contributions, other Purchases of Goods and Services, Subsidies, Transfers to households and Transfers abroad) less Interest Repayments less Transfers to other tiers of national government] + [All Capital Expenditure (including acquisition of Fixed Capital Assets, Purchases of Stocks, Purchases of Land and Intangible Assets and Capital Transfers) less Capital Transfers to other tiers of national government.]

Total revenue = Tax revenue + Non-Tax revenue + Capital Revenue + Grants (total grants less grants received from other tiers of national government).

Tax revenue = Income, Corporate and Capital Gains taxation + Social Security Contributions + Payroll taxation + Property taxation + Domestic and International Indirect taxation.

Non-tax revenue = Entrepreneurial and Property Income + Administrative Fees and Charges + Fines and Forfeits + Other Non-tax revenue.

Grants = Grants received from other tiers of national government. Grants received from super-national authorities such as the EU are excluded.

Social Transfers = Transfers to households and non-profit organizations + Subsidies to firms.

Government Wage Bill = Expenditure on Wages and Salaries.

Purchases of Goods and Services = Non-Wage Expenditure on Goods and Services.

Capital Expenditure = Acquisition of Fixed Capital assets, Purchases of Stocks, Land and Intangible Assets + Capital Transfers.

Debt to GDP ratio = Gross National Debt as a percentage of GDP; source OECD Statistical Compendium 2002.

GDP = Gross Domestic Product (Expenditure approach) at current prices; source OECD Statistical Compendium 2002.

Blanchard Fiscal Impulse = $(\text{Blanchard Adjusted cyclical balance})_t$ – $(\text{Unadjusted Primary Balance})_{t-1}$.

Type of government = Based on 'Type of Government' variable in Woldendorp et al. (2000). For each year, central government classified either as single party majority (i.e. one party in government with a majority in the legislature), coalition majority (i.e. two or more parties in government where between the two they have a majority in the legislature), or minority (i.e. single or multi-party government without a majority in the legislature).

ENDNOTES

[i] 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].

[ii] Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, the Netherlands, Norway, Spain, Sweden, the UK and the USA.

[iii] Unfortunately, no such data appears to be readily available for Australia and France, so in the extensions to the basic analysis that involve fiscal autonomy data we have to drop some sample observations.

[iv] For a discussion, see Gramlich (1990), Bouthevillain and Quinet (1999), Bruni and Tujula (1999) and Chalk (2002).

[v] Bruni and Tujula (1999) compare the Blanchard measure of fiscal impulses with a cyclical adjustment of the primary balance that uses the Hodrick-Prescott filter. They find that the Blanchard measure corresponds more closely to periods of expansionary or tight fiscal stance as identified by economic commentators. It also has the merit of not relying on somewhat arbitrary measures of potential output and base years.

[vi] For similar subjective criteria see Giavazzi et al. (2000), von Hagen et al. (2001).

[vii] In practice, the results seem robust to different definitions of 'success', including the use of a success index. For an application using a particular four point success index, which makes a distinction between arresting the growth of debt, debt stabilization and debt reduction, see Darby et al. (2005a).

[viii] We find that the identification of consolidation attempts alters little if we adopt alternative methods to measure the discretionary fiscal impulse based on application of the Hodrick Prescott filter or the OECD's measure of the output gap.

[ix] See for instance MacKinlay (1997) and Campbell et al. (1997) where these methods are used to examine the impact of 'news', such as the announcement of profit figures, on share prices both in the immediate and surrounding periods.

[x] In a recent paper Bertrand et al. (2004) note that 'difference in differences' estimates might be affected by the presence of serial correlation. Although our study does not take a conventional 'difference in differences' approach, it is possible that the presence of serial correlation could result in inconsistently estimated standard errors. To explore this issue in our context we conducted two robustness checks: first, we added a lagged dependent variable to each regression; and second, we re-estimated our regressions using a GLS (Cochrane-Orcutt) estimator. In both cases we found only minor changes in the size of the coefficients and no qualitative changes in the significance of the time dummies. We continue to report the OLS estimates because of the difficulty in plotting

event windows in the presence of lagged dependent variables. We are grateful to Thiess Buettner, for pointing this issue out to us.

[xi] Note that the movement in the sub-central impulse will also be affected by any change in grants from central government.

[xii] The eight countries in the 'high' category are Australia, Denmark, Canada, Germany, Finland, Norway, Sweden and the USA, while the seven countries in the 'low' category are Austria, Belgium, Spain, France, the UK, Ireland, and the Netherlands. In addition, we also differentiated our sample along a related characteristic, whether the countries are federal or unitary. In practice there is a substantial overlap between these two categorisations. The results for 'federal' countries were similar to those for 'highly decentralised' countries.

[xiii] Alesina and Perotti (1997) also argue that outside of consolidation periods social transfers and wages have a strong tendency to automatically increase. This is supported by the average fixed effects in our estimated model, for both wages and social trensfers they tend to be positive.

[xiv] Although it should be remembered that we do not distinguish at this point between taxation increases where the base and yield is under the control of sub-central government and increases in shared taxation revenues.

[xv] See Figure 4.

[xvi] It is possible that changes in the type of government in power can take place within a particular event window. In practice this happens only rarely in our dataset and has little impact on our results.

[xvii] In addition, we have examined whether or not differences in central government ideology have an impact on the consolidation attempts by dividing our observations along partisan lines (i.e. Left, Right and Center). We found no significant differences between the groups and our results are available on request.

REFERENCES

Alesina, A. and Drazen, A. (1991) “Why are Stabilizations Delayed?” American Economic Review, vol.81, pp.1170-88.

Alesina, A. and Perotti, R. (1995) "Fiscal Expansions and adjustments in OECD countries", Economic Policy, Vol. 21, pp. 207-247.

Alesina, A. and Perotti, R. (1997) "Fiscal Adjustment in OECD Countries: Composition and Macroeconomic Effects", IMF Staff Papers, Vol. 44, Number 2, pp 210-248.

Alesina, A., R. Perotti and J. Tavares (1998) "The Political Economy of Fiscal Adjustments", Brookings Papers on Economic Activity 1, pp. 197-266.

Bertrand, M., E. Duflo and S. Mullainathan (2004) "How much should we trust difference in differences estimates?" Quarterly Journal of Economics. Vol. 119, pp. 249-275.

Blanchard, O., (1993) "Suggestions for a New Set of Fiscal Indicators", OECD Working Paper, Number 79, OECD: Paris.

Bouthevillain, C. and Quinet, A. (1999) "The Relevance of Cyclically Adjusted Public Balance Indicators - The French Case", Paper presented at Indicators of Structural Budget Balances Conference, Banca D'Italia Perugia 26-28 November 1998.

Bruni, A. and Tujula, M. (1999), "Indicators of the Cyclically Adjusted Budget Balance", Paper presented at Indicators of Structural Budget Balances Conference, Banca D'Italia Perugia 26-28 November 1998.

Campbell, J Y., A W. Lo and A C Mackinlay (1997), "The Econometrics of Financial Markets", Chapter 4, Princeton University Press, Princeton, New Jersey.

Chalk, N., (2002) "Structural Balances and All That: Which Indicators to Use in Assessing Fiscal Policy", IMF Working Paper, Number WP/02/101, International Monetary Fund: Washington D.C

Darby, J., A. Muscatelli and G. Roy (2003) "Fiscal Decentralization in Europe: A Review of Recent Experience." in J. Monnesland (ed.), Regional Public Finance: European Research in Regional Science, vol. 13, London: Pion.

Darby, J., A. Muscatelli and G. Roy (2005a) "Fiscal Consolidation and Fiscal Decentralization: A Tale of Two Tiers", Fiscal Studies, 26(2), 169-196.

Darby, J., A. Muscatelli and G. Roy, (2005b) "How do Sub-Central Governments React to Cuts in Grants Received from Central Government: Evidence from a Panel of 15 OECD Countries”, mimeo.

Ebel, R. and Yilmaz, S. (2002) "On the Measurement and Impact of Fiscal Decentralization", World Bank: Washington.

Giavazzi, F., T. Jappelli and M. Pagano (2000) "Searching for Non-Linear Effects of Fiscal Policy: Evidence from Industrial and Developing Countries", European Economic Review, Number 44 (7), pp. 1259-1289.

Gramlich E. M. (1987) "Federalism and Federal Deficit Reduction", National Tax Journal, 40, n.3, pp. 299-313.

Gramlich, E. M., (1990) "Fiscal Indicators", OECD Working Paper, Number 80, OECD: Paris.

Keen, M. J., (1997) "Vertical tax externalities in the theory of fiscal federations." IMF Working Paper n. 97/173.

MacKinlay, A. C. (1997) "Event Studies in Economics and Finance", Journal of Economic Literature, Vol. 35, Issue 1.

McDermott, C. J. and Wescott, R. F. (1996) "An Empirical Analysis of Fiscal Adjustments", IMF Staff Papers, Vol. 43, Number 4, 725-753.

OECD (1999) "Taxing Powers of State and Local Government", OECD Tax Policy Studies, Number 1, Paris: OECD.

Rodden, J. (2002) "The Dilemma of Fiscal Federalism: Grants and Fiscal Performance Around the World", American Journal of Political Science, Volume 46, 670-687.

Rodden, J. and Wibbels, E. (2002) "Beyond the Fiction of Federalism: Macroeconomic Management in Multitiered Systems", World Politics, Volume 54, July, pp. 494-531.

Roubini, N. and Sachs, J. (1989) "Political and Economic Determinants of Budget Deficit in the Industrial Democracies", European Economic Review, vol. 33, pp.903-38.

Tanzi, V. (2001) "Pitfalls on the Road to Fiscal Decentralization", Carnegie Endowment for International Peace, Working Paper 19, Washington DC.

Tornell, A. and Westermann, F. (2002) "Boom-Bust Cycles in Middle Income Countries: Facts and Explanation", IMF Staff Papers, Vol. 49 Special Issues, International Monetary Fund.

Von Hagen, J., A. Hughes-Hallett and R. Strauch (2001), "Budgetary Consolidation in EMU", Economic Papers, Number 148.

Woldendorp, J., H. Keman and I. Budge (2000), Handbook of Democratic Government: Party Government in 20 Democracies, Kluwer Academic Publishers.