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Grants versus Tax Sharing: The Extent of Central Government Control

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Abstract

This paper contributes to the important literature on regional and local government finance. Evidence is presented which highlights that throughout the OECD, sub-central governments typically spend more than they themselves raise in revenue and are therefore, highly dependent upon central government transfers to meet their expenditure responsibilities. While grants remain the most popular method of transferring resources between central and sub-central governments, the possible greater use of tax sharing agreements has received considerable attention in many countries in recent years. One aspect of this debate that has been routinely overlooked, is the relationship between alternative sub-central financing regimes and the relative ability of central governments to intervene in sub-central fiscal policy during times of crises. In this paper we assess the extent of central government de facto control over sub-central fiscal policy under various decentralisation regimes demonstrating that, contrary to established thinking, grants and tax sharing imply two very different levels of central authority.

JEL Codes: H60, H70, H77

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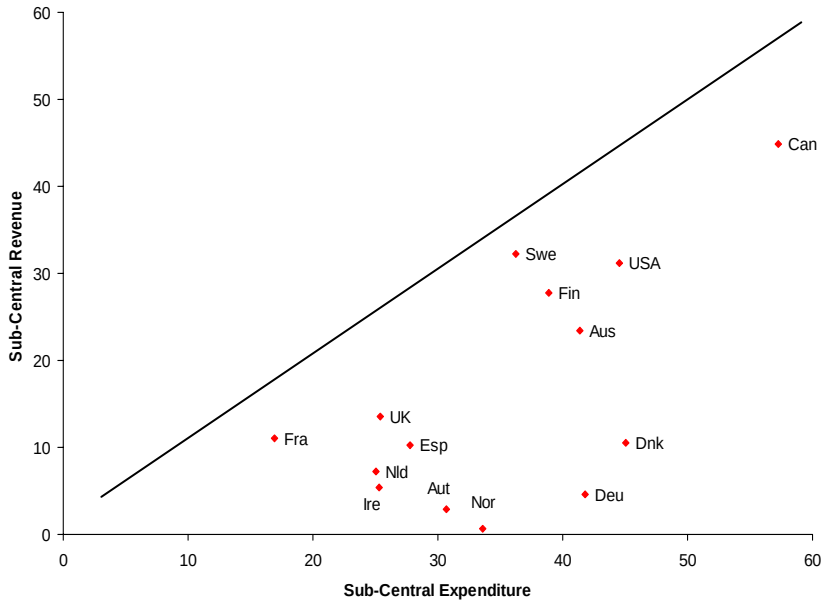
1. Introduction

The recent trend in many countries toward greater political and fiscal decentralisation has re-ignited the debate regarding balancing regional and local government autonomy vis-à-vis central government control. On the one hand, devolution can lead to more popular and efficient local public services but, as the recent fiscal crises' in Latin America have shown, any failure to monitor and discipline potentially profligate sub-central governments can lead to serious macroeconomic problems. At the heart of this issue are the financial linkages and interactions which exist between the respective tiers of government as it is here where the mix between sub-central autonomy and central control is determined.

Figure 1 highlights for 14 OECD countries the extent of sub-central government spending and the level of sub-central own-source tax and non-tax revenues. While there is substantial variation in the extent of fiscal decentralisation, without exception each country is located at a point below the 45^0 line; sub-central expenditure responsibilities outweigh own-source revenues. This 'gap', financed by intergovernmental transfers (i.e. grants and tax sharing revenues), implies that even in countries such as Germany and Denmark who appear at first glance to have large and powerful sub-central authorities, the central/federal government retains a sizeable degree of de facto or 'effective' control. By tightening these transfers, they are able to 'force the hand' of local politicians to cut their expenditure programs (or to increase the limited revenues at their disposal) while similarly, any significant fiscal expansion is often largely dependent on more generous levels of financial support.

Figure 1: Sub-Central Expenditure and Autonomous Revenue (% of General Government totals)



Source: IMF Government Finance Statistics (2002), Stegarescu (2005) and own calculations.

Given the current interest in devolution, it is surprising that while much of the recent literature has centred upon the balance between sub-central autonomy and central government control from a normative viewpoint (see Darby et al. (2003) for a survey), there has been very little discussion on the practical workings of such regimes. As a result, a number of important questions remain unanswered. Does the relationship between the centre and the sub-centre differ according to the financial regime? Are particular methods of sub-central finance more efficient than others? Is the level of central control dependent upon the type of transfer mechanism in place? In this paper, we attempt to address some of these issues.

As highlighted, the two key forms of intergovernmental revenue resource designed to assist sub-central governments in meeting their expenditure responsibilities are grants and tax sharing. Grants are a direct transfer of money from the centre to the sub-centre while tax sharing revenues are a shared revenue withdrawal by the centre and the sub-centre from a common tax base[1].

While there are clearly differences between the two with regard to incentives, targeting and administration, grants and tax sharing are widely seen as identical in terms of the degree of central control over sub-central expenditures – see EC (2005). In reality, with both grants and tax sharing, the ability of the sub-centre to influence the revenues they receive from these sources is heavily constrained – see for example Rodden (2002 & 2003) and Stegarescu (2005). Instead, it is the centre that controls the mechanisms which can increase or decrease the amount of money allocated to sub-central tiers[2].

In most cases under a system of grants, while it is possible for sub-central governments to request additional funding support, it is the centre which ultimately decides on the level of revenue to be transferred. In practice, with tax sharing even though the scenario is slightly different, the end result can be seen to be identical. In countries with substantial tax sharing regimes, such as Germany, Austria and Belgium, while the 'shares' of the total tax revenue each tier receives tend to be fixed either by formal legislation, constitutional amendments, means-tested formulas and/or historical allocations, the centre retains control over both the tax base and the tax rate of the commonly shared revenue source – see Stegarescu (2005). In practice, sub-central governments have little or no authority to alter these revenues, depending instead upon the annual decisions of the centre to maintain or alter the total tax take and the pre-determined formulas to allocate these revenues. Pola (1999), Ebel and

[1] See IMF (1997) for a survey.

[2] In addition, central governments can often exert influence on sub-central spending patterns through directives, expenditure targets, spending guidelines etc. These further reduce the autonomy of sub-central authorities. While important, the focus of this paper is on sub-central revenues and therefore we do not discuss such mechanisms in any great detail.

Yilmaz (2002), Rodden (2003) and others have therefore argued that simply looking at the total tax revenues 'collected' by sub-central tiers can give a gross exaggeration of the true extent of revenue decentralisation within a country. By cutting revenues from such tax sharing sources, the centre is able to 'force the hand' of sub-central governments into expenditure cuts. It would appear that at a first glance, tax sharing and grants appear to be identical.

Indeed this conclusion has been formally adopted in statute. On 19 January 2005, the Council of Europe's Committee of Ministers unanimously adopted Recommendation Rec(2005)1 (see EC (2005)) to member states on the financial resources of local and regional authorities. In a subsequent reform (see OECD (2006)), the explicit definitions of shared and own-source taxation for sub-central governments was formally established. One of these definitions highlighted in OECD (2006) is that "the type of shared taxes in which central government retains the control over the tax rate and tax base; according to Recommendation Rec(2005)1, these non exclusive fiscal resources are financial transfers; if they are not in direct relation to the amounts collected locally, *they are also considered as grants*." In short, tax sharing systems where the sub-centre has little or no autonomy to alter these revenues are deemed to be equivalent to grant systems.

This debate has important implications for academic research. In early empirical studies into the impact of fiscal decentralisation on economic outcomes, such as economic growth, fiscal deficits and inflation, no distinction was made between revenues from 'autonomous' sources and tax sharing – see Oates (1997) for a survey and Ebel and Yilmaz (2002) for a critique. More recently however, following the excellent improvements in the collation of data on tax sharing systems by the OECD (1999) and Stegarescu (2005) it has become commonplace to make this distinction between the two types of sub-central tax revenue (see for example Rodden (2002 & 2003) and Fiva (2005)). Consequently, in these studies revenues from tax sharing and grants are lumped together under a composite sub-central dependence and/or central control variable.

In this paper however, we argue that it is not always appropriate to view grants and tax sharing as equivalents. Instead we argue that while the degree of sub-central dependence upon the centre is similar irrespective of the source of intergovernmental transfer, the degree of effective central control can differ markedly between tax sharing and grants. This subtle distinction between sub-central dependence and central control has to our knowledge been largely overlooked in both the academic and policy literatures. To demonstrate this we compare and contrast the extent of central control and sub-central autonomy under various

decentralisation regimes, by focussing upon periods of economic reform[3]. More specifically, we examine fiscal consolidation attempts, where we define a fiscal consolidation as a deliberate effort by the central government to substantially reduce the national fiscal deficit or increase the surplus[4]. Our motivation for this approach is two fold. Firstly, by adopting this methodology we are best placed to highlight the subtle differences between the types of financial regime and secondly, by applying our conjecture to a particular case study we can clearly observe the important implications of our analysis at both a theoretical and practical level. We demonstrate via the construction of a stylised budgetary accounting framework that with the exception of a special case, for a given level of sub-central expenditure, central governments have a greater degree of effective control with a system of grant finance than under a system of tax sharing. While we recognise (and do not dispute) the previously identified similarities between these two methods of intergovernmental transfer, our analysis reveals that a key as yet unrecognised difference between the two, is the ability of the centre not only to 'force the hand' of the sub-centre into making expenditure cuts but also to 'force their hand' to generate a fiscal surplus. Under a tax sharing system, only the former is possible. In short, while tax sharing and grants both represent the same degree of dependence on behalf of sub-central governments toward the centre for fiscal resources, in contrast the extent of central control over the sub-centre is not symmetrical. Tax sharing regimes imply a lower degree of de facto central control than grant systems.

The outline of the paper is as follows. In Section 2 we present a brief discussion of grants and tax sharing while Section 3 provides the basis for our analysis and examines the degree of 'effective' central control to instigate a consolidation attempt across various decentralisation frameworks. Section 4 concludes.

2. Grants and Tax Sharing

While there are numerous 'types' of national grants, all of them share the key feature that they represent a direct transfer of revenues raised by the centre to the sub-centre. Block grants are typically aimed at addressing vertical (i.e. between tiers of government) and horizontal (i.e. between individual sub-central governments) imbalances. Matching and specific grants tend to be used by central governments to target specific policy areas which while not under their direct control, are deemed to be of social, economic or political importance at the national level. Under a system of block grants, the sub-central tier typically has relatively high discretion to allocate the money transferred as it sees fit. In contrast, with matching and

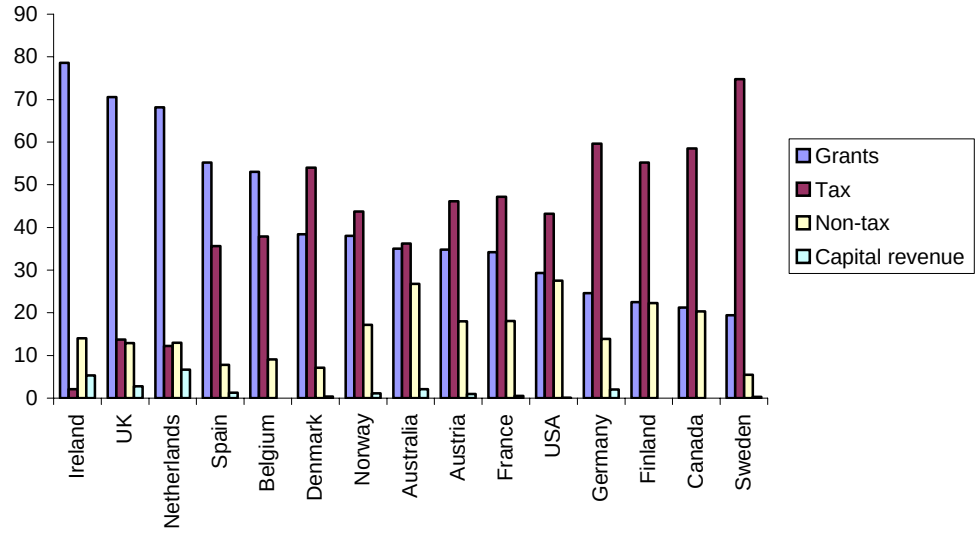
[3] The impact of decentralisation on economic reforms is discussed in Treisman (1999).

[4] In Europe especially, fiscal consolidations, their implications and the factors which contribute to their success remain highly relevant as countries tackle weakening fiscal positions and ageing populations.

especially specific grants, local and regional politicians have far less autonomy. Indeed in many cases they simply act as Agents in a Principal/Agent relationship with the institution allocating the funding.

Historically, grants have been the most popular method of transferring resources between governments and as Figure 2 demonstrates, this remains the case.

Figure 2: Composition of Sub-Central Government Revenues
(as a percentage of their Total Revenues)



Source: IMF Government Finance Statistics (2002 edition).[5]

Tax sharing exists when two or more tiers of government receive revenue from the total national tax yield from a particular tax. See Figure 3 for a summary of tax sharing and own source taxation in a selection of OECD countries. A hypothetical example is a national income tax whereby the centre receives 75% of all income tax receipts and the sub-centre 25%. The 25% share to sub-central governments can then be allocated to each sub-central unit on the basis of a 'needs' based formula (based on population, unemployment etc), a constitutional amendment or less commonly, through a bargaining process.

As we will demonstrate, the ability of the centre to alter these *shares of the total tax take* (i.e. the split of the tax revenue allocated to each tier; 50:50, 75:25 etc) is critical in determining the degree of effective control they have over the sub-centre. Stegarescu (2005) shows that in the OECD, virtually all tax sharing regimes involve 'fixed' tax shares. In fact, out of the 23 countries surveyed, Belgium was the only country where the central government was found to

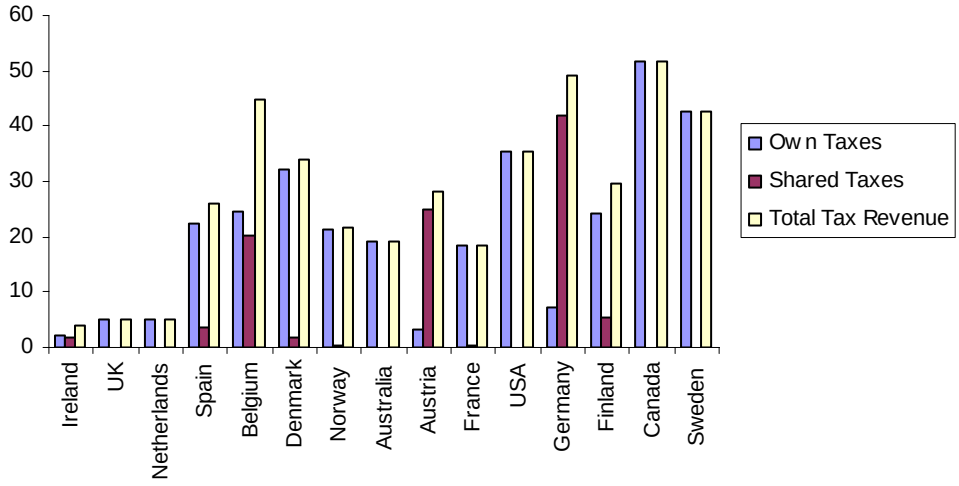
[5] Note, in Figure 2 the tax measure includes both tax sharing and 'own-source' tax revenues together.

be able to unilaterally alter the revenue-split over certain elements of taxation in the annual budget process. However, such revenues were found to only contribute 0.3% to the total sub-central revenue. In certain countries such as Greece, Portugal and Finland, the central government is able to alter the revenue-split but to do so requires primary legislation independent of the annual budget. Even then, the total contributions of such revenues to the overall sub-central budget tend to be small. Instead, the vast majority of significant "revenue-sharing flows are almost always determined by constitutional or other stable formulae" (Rodden (2002)) and legislation to alter these allocations often requires constitutional amendments and/or the agreement of the sub-central authorities – see Stegarescu (2005).

In fact there are very good reasons for imposing fixed long-term revenue splits in tax sharing arrangements. One argument in favour of tax sharing vis-à-vis grants is that such systems can better facilitate regional development by providing positive incentives for local politicians to boost the tax base/economic growth within their jurisdiction. Policies and innovations which improve the tax base within their region (for example policies which encourage inward migration, innovation, business start-ups etc) increase the revenues they receive. On the other hand, policies which harm the tax base only serve to reduce revenues. In contrast, a high reliance upon grants can create a dependency culture within local jurisdictions as no such incentive mechanisms are evident – see The Economist (2006) and Hallwood and MacDonald (2005).

When sharing revenues from key taxes such as Income Tax, Business Tax etc, improvements in local economic performance (and hence the tax base) bring about direct increases in local taxation revenues equal to the increase in the total tax take multiplied by the local government's respective 'share'. However, a critical component of this incentive mechanism is the belief on the part of local politicians that the potential additional revenues raised through improved local economic performance will <u>not</u> be fully captured by the centre. Without pre-determined fixed shares, the centre could continually alter the shares they and the sub-centre receive so that following any increase in the tax base (and hence total tax revenue for a given constant tax rate), the amount allocated to the sub-centre would remain fixed, with the centre capturing the additional resources. Clearly, in such a scenario, the incentive effects of tax sharing are lost. Indeed the EU recommends that "in general, [tax sharing systems] should be provided for by law or decided on in the light of clear criteria laid down by law. The government's discretion in calculating and effecting transfers should be reduced in order to avoid objectivity and credibility problems", EC (2005).

Figure 3: Degree of Tax Revenue Decentralisation 1999 – 2001
(as a percentage of their Total Revenues)



Source: Stegarescu (2005)

'Piggy-back' or 'overlapping' taxes as they are sometimes known, are sometimes referred to as tax sharing. With such taxes, which are common in Scandinavia, sub-central governments are permitted within some boundary to alter the tax rate (but not the tax base) set by the centre. For example in Norway, the Central government sets an 'upper' limit for local income tax rates[6]. However, strictly speaking these revenues are different from the 'true' tax sharing sources being looked at in this paper as under such frameworks, sub-central tiers have greater levels of autonomy. Nevertheless, as we will see our analysis can be extended to such taxes.

3. Measuring the Degree of Effective Central Control

3.1 The Basic Framework

In order to highlight the differences in effective central control under alternative decentralisation regimes we construct a simple stylised budgetary accounting framework. While many of the assumptions are undeniably unrealistic, their use serves to highlight any important differences between alternative financial regimes. More specifically, our motivation for building such a stylised model is to compare and contrast the level of 'effective' central government control in being able to eliminate a national fiscal deficit. More complex models are possible. However our framework clearly illustrates the issues involved without becoming immersed in discussion of unnecessary complications.

[6] Unfortunately, Figure 3 does not distinguish between such taxes and 'truly' autonomous taxes. Obtaining such information is an important issue for future empirical research.

We begin by assuming that there are two tiers of government, the centre (C) and the sub-centre (S)[7]. Each tier of government undertakes expenditure (E), denoted CE and SE respectively. We assume that central expenditure (CE) is comprised of two components: non-cyclical (or autonomous) expenditure α and cyclical expenditure $\beta(y)$: where y is the deviation in output from the natural rate ($y = \ln Y - \ln Y^*$). Thus, in this simple framework with a zero output gap, cyclical expenditures are zero. For simplicity we assume that the parameter β is fixed and that government expenditures do not impact on output. By implication, the central government only has discretionary control over the non-cyclical component of their expenditures α. Thus CE can be defined as:

$$CE = \alpha + \beta(y) \qquad (1.1)$$

$$\text{where, } \frac{\partial CE}{\partial y} = \beta'(y) < 0 \qquad (1.2)$$

We assume that while output directly affects the fiscal balance, changes in fiscal policy have no immediate impact on output. The inclusion of output in this way is simply to generate a negative fiscal position that requires action. We could for example let fiscal policy affect output but in a way in which would retain a negative fiscal balance or we could simply assume that the central fiscal position is negative at the outset and adjustment is necessary, perhaps to meet EMU criteria.

In contrast, and without loss of generality, we assume that sub-central expenditure (SE) is not influenced by the economic cycle[8]. Both SE and CE represent current expenditures; there are no capital investments.

The centre raises revenue through taxation CT, which can also be broken into non-cyclical and cyclical taxation components, δ and $\varphi(y)$ respectively[9]. Thus CT can be defined as

$$CT = \delta + \varphi(y) \qquad (1.3)$$

[7] For simplicity we assume that there is only one sub-central government; the number of sub-central governments is unimportant. Our goal is to demonstrate the level of central control over the sub-central tier as a whole, irrespective of the number of sub-central units.

[8] Again, this assumption aids simplification but does not alter they key parts of our analysis. The standard fiscal federalism literature (for example, Musgrave (1959), Oates (1972)) argues that sub-central fiscal policy should be a-cyclical, with the centre retaining complete responsibility for cyclical adjustment and macroeconomic stabilisation. For an empirical study of the cyclicality of sub-central fiscal policy see Wibbels and Rodden (2005).

[9] As with expenditure, we assume that y is the deviation in national income from the natural rate ($y = Y - Y^*$) and that the parameter φ is fixed.

where, $\frac{\partial CT}{\partial y} = \varphi'(y) > 0$ (1.4)

In contrast, the sub-centre raises their revenue (SR) either through own-source non-cyclical taxation (ST) or via inter-governmental transfers. The latter can either be in the form of grants (SG) or via revenues from tax sharing (ST_{share}) arrangements. For simplicity, we assume that under each scenario (e.g. grants, full decentralisation etc) all sub-central revenues (SR) are raised from a particular single source, e.g. autonomous taxation, grants etc.

To complete the budgetary framework we assume that the nation cannot issue debt. Given the assumption of zero capital goods and the lack of a dynamic framework, this translates itself into a simple balanced national/general budget requirement. However, a 'fiscal deficit' within a particular tier of government can be financed by a parallel surplus at the other tier. Thus for example, sub-central governments could run a deficit provided that the centre agreed to fully finance these excess expenditures by central revenues or vice versa[10].

We assume that the centre has a pre-determined 'optimal' level of both autonomous expenditure and revenue denoted $\overline{\alpha}$ and $\overline{\delta}$ respectively. They have a similar pre-determined 'optimal' level of sub-central expenditure ($S\overline{E}$) and revenue ($S\overline{R}$). Given that central governments are accountable to the national electorate and are the ultimate guarantors of macroeconomic stability, it is likely that they will have an optimal sub-central policy stance they would like as an implementation preference (even if this is inconsistent with the sub-centre's preferences). In the UK for example, much of the local government reforms over the last two decades have been in response to policies being pursued by local governments which were inconsistent with those of the centre. These reforms have been clearly designed to give the Westminster government greater control thereby reducing such conflict over policy[11].

In contrast, the sub-central tier is also assumed to have an 'optimal' level of their own expenditure and revenue, $S\hat{E}$ and $S\hat{R}$, but they have no concern for the level of central government expenditure and revenue. This final assumption is not critical and our analysis does not alter if we specify an optimal level of central expenditure/revenue from the viewpoint of sub-central politicians. In this case, sub-central politicians may favour higher or lower central expenditures etc but given that in practice any intergovernmental financial

[10] In such a scenario, the resources from the central government's fiscal surplus can be transferred to the sub-centre. Without this 'additional' transfer, sub-central expenditures (revenues) would have to be cut (increased) to balance their budget.

[11] The frequent use of powers of the centre to 'cap' the autonomous tax revenues of UK Local Governments is a prime example – see Emmerson *et al.* (1998).

transfers only flow from the centre to the sub-centre and not vice versa, they cannot influence in any way the fiscal decisions of the centre. In practice, sub-central politicians realise that they have little or no formal influence over central fiscal policy and are instead likely to be almost exclusively concerned with the expenditures/revenues within their local jurisdiction.

Given the likelihood of different preferences and political motivations etc, optimal sub-central expenditures as viewed by the sub-centre may not necessarily coincide with the equivalent optimal level preferred by the centre (i.e. $S\hat{E} \neq S\overline{E} and, S\hat{R} \neq S\overline{R}$). We assume that each government's preferences for expenditure and revenue are single-peaked[12].

The general government (or national) fiscal balance can be written as follows:

$$G_{bal} = CT + SR - CE - SE \qquad (1.5)$$

which by substituting 1.1 and 1.3 can be re-arranged to give:

$$G_{bal} = \delta + \varphi(y) + SR - \alpha - \beta(y) - SE \qquad (1.6)$$

To analyse the budgetary accounting implications of alternative fiscal decentralisation structures during consolidation attempts, we introduce a negative output 'shock'. This forces firstly the central and then by implication, the general government fiscal positions into deficit. Given our assumption that the general government fiscal position must always be in balance, consolidation is required.

To illustrate this, suppose that initially both the central and sub-central fiscal positions are balanced but there is a negative shock to output y^s where $y^s<0$[13]. Consequently, given equations (1.1) and (1.3), central government expenditures will rise (by the amount $\beta(y^s)$), while central tax revenues will fall (by the amount $\varphi'(y^s)$). Thus, G_{bal} given by (1.6) will be negative and hence a national consolidation to expenditures and revenues is necessary (either at the central, sub-central or both tiers of government) - i.e.

$$G_{bal} = \delta + \varphi(y^s) + SR - \alpha - \beta(y^s) - SE < 0 \qquad (1.6a)$$

[12] Thus if actual expenditure differs from optimal expenditure any policy option which has the potential to more closely align actual with optimal expenditure will be adopted.

[13] Given our simple framework there is no incentive for either government to run anything other than balanced budget at the outset.

In what follows we compare and contrast the ability of the centre to respond to this situation by examining the policy instruments available to them under alternative sub-central financial arrangements.

3.2 Centralisation

In the first scenario we assume that all fiscal instruments are assigned to the central level – i.e. there is no decentralisation. In this case, the expenditure and revenue denoted SE and SR are effectively individual components of non-cyclical central government expenditure and revenue. Thus, central government has direct control over both their 'own' instruments δ and α, but in addition, sub-central expenditure and revenue (SE and SR). Given the preferences of the central government discussed above, these expenditures and revenues will initially be set equal to $S\overline{E}$ and $S\overline{R}$ respectively.

Following the negative output shock the central fiscal balance will be negative:

$$C_{bal} = \overline{\delta} + \varphi\left(y^s\right) - \overline{\alpha} - \beta\left(y^s\right) < 0 \qquad (2.1)$$

which in turn feeds through to a negative general government balance:

$$G_{bal} = \overline{\delta} + \varphi\left(y^s\right) + S\overline{R} - \overline{\alpha} - \beta\left(y^s\right) - S\overline{E} < 0 \qquad (2.2)$$

In such a situation the central government has a number of fiscal instruments it can use to restore general balance. Firstly, the centre can adjust their 'own' non-cyclical expenditures and revenues denoted by δ and α respectively. By increasing δ and cutting α by appropriate amounts they can restore equilibrium. Secondly a surplus can be generated on the 'sub-central' balance, compensating for the deficit at the central level: i.e. –

$$SC_{bal} = SR^{new} - SE^{new} > 0 \qquad (2.3)$$

where it is possible that,

$$-C_{bal} = SC_{bal}^{new} \qquad (2.4)$$

Thus the centre has the ability to adjust both their 'own' expenditures and revenues together with those of the sub-centre. Clearly this simple framework cannot determine the actual composition of the adjustment (the exact change will depend upon utility costs associated

with moving away from 'optimal' levels of central and sub-central expenditures and revenues). It is sufficient to note however, that under a system of centralisation the centre is able to effectively control all instruments of national fiscal policy to assist in any adjustment.

The case of full centralisation is a useful benchmark against which alternative scenarios of decentralisation can be compared. We begin with the polar opposite case, full autonomous fiscal decentralisation.

3.3 Full Decentralisation

Under full decentralisation, the sub-central tier has complete fiscal autonomy in that their expenditures (SE) are financed entirely from own-source taxation (ST).

In this scenario, the sub-central government will set SE = $S\hat{E}$ in line with their pre-determined exogenous preferences. Consequently, given their inability to issue debt this implies an optimal level of revenue SR = $S\hat{T}$ so that, $S\hat{E} = S\hat{T}$. In such a scenario, the general government budget balance,

$$G_{bal} = \delta + \varphi(y) + SR - \alpha - \beta(y) - SE \qquad (3.1)$$

where, SR = $S\hat{T}$ and SE = $S\hat{E}$ can be re-written to give,

$$G_{bal} = \overline{\delta} + \varphi(y) + S\hat{T} - \overline{\alpha} - \beta(y) - S\hat{E} \qquad (3.2)$$

Given $S\hat{E} = S\hat{T}$, the general government fiscal position in equilibrium becomes,

$$G_{bal} = \overline{\delta} + \varphi(y) - \overline{\alpha} - \beta(y) \qquad (3.2')$$

As before, following a shock to output, the central fiscal balance is negative, forcing the general government balance (3.2) to also be negative:

$$G_{bal} = \overline{\delta} + \varphi(y^s) + S\hat{T} - \overline{\alpha} - \beta(y^s) - S\hat{E} < 0 \qquad (3.2a)$$

and given $S\hat{E} = S\hat{T}$,

$$G_{bal} = \overline{\delta} + \varphi(y^s) - \overline{\alpha} - \beta(y^s) < 0 \qquad (3.2b)$$

In contrast to the situation under full centralisation, the central government's ability to respond to the shock is more limited. The centre is unable to run a surplus on the sub-central fiscal position to help finance their deficit brought on by the negative shock to output. Under full fiscal autonomy, any such surplus is run at the discretionary will of the sub-centre. However, from the sub-centre's perspective, their fiscal policy has been unaffected by the shock and hence they face no direct incentive to run a surplus (either by cutting expenditures or increasing revenues), as this would mean moving away from their 'optimal' levels $S\hat{E}$ and $S\hat{T}$. In this instance, as can be observed from (3.2b), the only fiscal instruments available to the centre are autonomous expenditure (α) and revenue (δ). Consequently, the options available to the centre to implement a consolidation are significantly more limited than under centralisation.

In the following section we depart from these two polar cases and assess the level of effective central control in decentralised systems where the central government plays a key role in the financing of sub-central fiscal policy.

3.4 Grant Finance

For simplicity, we assume that all sub-central revenues are raised from central government block grants (i.e. no autonomous revenue raising power). Thus, SR = SG.

Under a system of grant finance, the level of grant assigned to the sub-centre is typically determined unilaterally by the centre or through some form of 'needs-based' formula. However, more often than not, even such 'formulas' are often highly dependent on the discretion of the centre – see Rodden (2003) and Stegarescu (2005). While certain sub-central governments may have limited influence or bargaining power regarding their grant allocation, the ultimate decision on how much each sub-central government receives, typically remains the sole prerogative of the centre. Rodden (2003) points out that unlike revenues that arise as tax sharing revenues, revenues from intergovernmental grants "are likely to be most subject to yearly central government discretion in their determination"[14].

To best capture the situation, we can interpret grant finance as a situation in which the centre raises an amount of revenue, via central taxation, to fund a pool of revenues (which we will denote X), which in turn, it transfers/redistributes to sub-central tiers in the form of grant allocations (SG). At the outset, we assume that the amount the centre raises in X is fully

[14] Rodden (2003).

transferred to the sub-centre (via grants SG)[15]. Given the centre's pre-determined preferences for SE, $S\overline{E}$ this yields:

$$X = SG = S\overline{E} \qquad (4.1)$$

when, $S\hat{E} \geq S\overline{E}$

Provided that the 'optimal' level of SE as viewed by the centre ($S\overline{E}$) is less than or equal to the optimal level of SE as viewed by the sub-centre ($S\hat{E}$), actual sub-central expenditure will equal $S\overline{E}$. Otherwise the sub-centre would set SE = $S\hat{E}$ and there would be a sub-central surplus of X - $S\hat{E}$ [16]:

$$X = SG > SE = S\hat{E}$$
$$X - S\hat{E} = S_{surplus} \qquad (4.1a)$$

when, $S\hat{E} < S\overline{E}$

Under a system of grant financed sub-central expenditure the general government budget constraint can be re-written as

$$G_{bal} = \overline{\delta} + \varphi(y) + X - \overline{\alpha} - \beta(y) - SG \qquad (4.2)$$

If $S\hat{E} \geq S\overline{E}$, given 4.1, the budget constraint in equilibrium is identical to that under full decentralisation – i.e.:

$$X = SG = S\overline{E} \qquad (4.1)$$

Hence,

[15] There is no reason to expect that the centre will set X>SG at the outset, as then the centre would be running a pointless surplus.

[16] We would expect that the optimal level of sub-central expenditure as viewed by sub-central politicians be higher than the equivalent central government optimal level. Empirical evidence of the 'flypaper' effect (see Hines and Thaler (1996) and Darby et al. (2005a)) shows that increases in grants bring about equal increases in expenditure, suggesting that the actual level of sub-central expenditure is lower than the optimal level from the viewpoint of sub-central governments. While the existence of 'targets' and guidelines suggests that the centre may be concerned about 'low' expenditure in certain areas, for the most part, we would expect that sub-central preferences for total expenditure will be higher.

$$G_{bal} = \hat{\delta} + \varphi(y) - \hat{\alpha} - \beta(y) + [X - S\hat{E}]$$
$$G_{bal} = \hat{\delta} + \varphi(y) - \hat{\alpha} - \beta(y) + [X - SG] \qquad (4.3)$$
$$G_{bal} = \hat{\delta} + \varphi(y) - \hat{\alpha} - \beta(y)$$

While if $S\hat{E} < S\overline{E}$, given 4.1a:

$$X = SG > SE = S\hat{E}$$
$$X - S\hat{E} = S_{surplus} \qquad (4.1a)$$

the general government budget constraint becomes –

$$G_{bal} = \overline{\delta} + \varphi(y) - \overline{\alpha} - \beta(y) + [X - S\hat{E}] \qquad (4.4)$$

Following a shock to output, as before both the central and general government fiscal balances move into deficit:

$$G_{bal} = \overline{\delta} + \varphi(y^s) + X - \overline{\alpha} - \beta(y^s) - SE < 0 \qquad (4.4a)$$

As above, in order to balance the budget a consolidation is necessary. Clearly, one option open to the centre is to adjust their own non-cyclical expenditure (α) and revenue (δ). However, in contrast to the full autonomy case discussed above, there is now an important additional instrument the centre can exploit. Following the shock, the centre can drive a wedge between the money raised in the revenue pool assigned for sub-central grant transfers (X) and the actual level of grant (SG) transferred. That is, $X \neq SG$. By cutting the level of grant SG (while holding X constant), the central government can in effect generate a fiscal 'surplus' at the sub-central level which can be used to compensate for the deficit at the central level.

To illustrate this point, consider the case where $S\hat{E} \geq S\overline{E}$ - i.e. the respective optimal sub-central expenditure levels are higher for sub-central as oppose to central administrations. As discussed above, this corresponds to $X = SG = S\overline{E}$. Consequently, any reduction in SG (below X) will bring about a corresponding fall in SE (as the starting point $S\overline{E}$ is below the sub-central's optimal level of expenditure $S\hat{E}$ and hence any expenditure smaller than that allowed for by the grant, will be sub-optimal given the assumption of single-peaked preferences). By reducing SG to SG^{new} and hence SE to SE^{new}, the central government can retain the difference $X–SG^{new}$ as a contribution to the consolidation attempt. Thus in effect,

the central government can generate a cut in national expenditure for the same level of national revenue with the cut in expenditure being purely limited to the sub-central tier. In an extreme case the government could set X–SG^{new} to be sufficient to eliminate the general government deficit generated by the output shock – i.e.

$$G_{bal} = \bar{\delta} + \varphi(y^s) - \bar{\alpha} - \beta(y^s) + [X - SG^{new}] = 0 \qquad (4.4b)$$

In essence, the centre is able to 'force the hand' of the sub-centre into adjusting their expenditures without requiring a similar cut at the central level or a reduction in national revenue. This result is consistent with empirical evidence. For example, in Darby *et al.* (2005b) strong evidence was found of central governments exploiting a reverse 'flypaper' effect during national consolidation attempts by forcing sub-central governments to cut their expenditures by significantly tightening their grant allocations.

Alternatively, by raising the amount of revenue located in the pool of resources for sub-central transfers (X), provided that this increase in revenue is not passed on to the sub-centre in the form of grants, the centre is again able to generate a surplus on sub-central finances[17]. That is, the centre could raise X to X^{new} and keep SG constant, retaining the difference X^{new} – SG as surplus. In an extreme case the government could set X^{new} – SG to be sufficient to eliminate the general government deficit generated by the output shock – i.e.

$$G_{bal} = \bar{\delta} + \varphi(y^s) - \bar{\alpha} - \beta(y^s) + [X^{new} - SG] = 0 \qquad (1.6b)$$

Thus under a system of expenditure decentralisation financed by grants the centre's effective control of aggregate national fiscal policy is identical to that under a system of full centralisation. By raising X they can in effect increase sub-central revenues for a given level of national expenditure or by cutting SG they can cut sub-central expenditures for a given level of national revenue.

In the unlikely case where $S\hat{E} < S\bar{E}$ (4.1a), cutting the grant will initially have no impact on SE as the level of grant provided by the centre exceeds the sub-centre's 'optimal' level of expenditure and hence a surplus is already being run. In this case, only when the cut in grants is sufficiently large so that SG < $S\hat{E}$ (i.e. the case outlined above in 4.1), will sub-central expenditures start to fall. However, given that a surplus exists in the first place there is no logic in adopting such a strategy. The centre could of course increase the sub-central surplus

[17] Any increase in X that is passed on to the sub-centre in the form of grants will lead to an automatic rise in sub-central expenditures SE.

in this scenario by raising the amount of revenue located in the pool of resources for sub-central transfers (X).

Note that when sub-central expenditures are financed by block grants, it is only the level of expenditure that can be controlled by the centre. The sub-centre will be able to alter the composition of this expenditure as they so wish. However, if instead the grants are specific grants then the centre is able to control both the total size of expenditure and the composition. In many instances, grants are tied to specific elements of sub-central expenditure such as education, health etc. By altering specific grants the centre can have direct control over particular elements of expenditure that they wish to target. This can be useful when profligacy in particular elements of sub-central fiscal policy has led to a deteriorating fiscal position or as found in Darby *et al.* (2005b) sub-central governments have a bias toward cutting capital expenditures during periods of consolidation. Thus, under a system of grants, with many tied to specific elements of expenditure, the centre is ideally placed not only to control the level of sub-central expenditure, but also the actual composition of any adjustment.

In summary, when sub-central expenditures are financed by grants, the level of central government effective control of national fiscal balances is similar to that under full centralisation. The centre is able to adjust not only their 'own' expenditures and revenues but also those of the sub-centre via manipulation of the grant system. In general, one can expect that cutting grants can lead to corresponding decreases in expenditure for a given level of national revenue. Alternatively, increasing revenue, provided such additional resources are not passed onto the sub-centre in the form of higher grant allocations (i.e. increase X but not SG), can generate an increase in general government revenue for a constant level of national expenditure. Thus, a central government wishing to undertake a consolidation attempt is not limited to their 'own' expenditures and revenues; they can in fact control sub-central expenditures and revenues even without the sub-centres' voluntary consent.

We next contrast this situation of a high level of effective central control with that observed under a system of central and sub-central tax sharing.

3.5 Tax sharing

As in the case of grants, we assume that the sub-centre receives its entire resource allocation from tax sharing revenues (i.e. they have no autonomous revenue raising power). Thus, SR = ST_{share}. Further, in line with the majority of tax sharing arrangements (for example, Germany and Austria) the centre and the sub-centre are assumed to raise these 'shared' revenues from a common pool of resources with the shares assigned to each tier of government pre-determined

and fixed[18]. Thus for example, a 50:50 split requires that 50% of all revenues raised from shared tax source be allocated to the sub-centre with the centre retaining the remaining 50%.

For simplicity we assume that the tax sharing arrangement is such that the common pool of resources is a non-cyclical revenue pool with the tax share division 1:0 in favour of the sub-centre[19]. In other words, all tax revenues received from this pool of resources are assigned to the sub-centre. Therefore, X (the pool of resources used to finance sub-central expenditure) equals $ST_{share.}$

To remain consistent with our earlier discussions, like most tax sharing arrangements, we assume that the centre unilaterally controls the size of the pool of resources that the sub-centre receives via the tax sharing arrangement. Therefore, the centre determines both the tax base and tax rate and hence ultimately the total revenue raised. The sub-centre is assumed to have no authority over the raising and collection of these revenues. It is therefore, quite clear why it is justifiable to view such revenues as purely a central to sub-central transfer of fiscal resources.

For instance, given the centre's pre-determined preferences for SE, $\overline{SE}$, the centre can determine the appropriate tax base and rate that will give:

$$ST_{share} = \overline{SE} \qquad (5.1)$$

provided, $\hat{SE} \geq \overline{SE}$.

If the centre's 'optimal' level of SE ($\overline{SE}$) is less than or equal to the optimal level of SE as viewed by the sub-centre ($\hat{SE}$), actual sub-central expenditure will equal $\overline{SE}$. That is, the pool of resources assigned to the sub-centre equals the amount spent by the sub-centre $ST_{share} = \overline{SE}$. Therefore, as under a system of grants (and full centralisation) the centre is able to determine the exact level of sub-central expenditure even if this falls short of what the sub-centre would ideally like. Moreover, by cutting ST_{share} the centre can (just like under a system of grants) 'force the hand' of the sub-centre into cutting expenditure (SE). Clearly, in the alternative scenario where the centre's optimal level of SE ($\overline{SE}$) exceeded the sub-centre's optimal level ($\hat{SE}$) sub-central politicians would set SE = $\hat{SE}$ generating a surplus equal to the difference $ST_{share} - \hat{SE}$:

[18] See Section 2 for a discussion.

[19] More complicated allocations (e.g. 75:25 etc) are possible but they do not alter our conclusions.

$$ST_{share} > SE = S\hat{E}$$
$$ST_{share} - S\hat{E} = S_{surplus} \qquad (5.1a)$$

Therefore, at a first glance, tax sharing and grants appear to be very similar. However, in the context of a national fiscal consolidation attempt there are in fact important differences which we outline below.

Under a system of tax sharing the general government budget constraint 1.6 can be re-written as

$$G_{bal} = \delta + \varphi(y) + ST_{share} - \alpha - \beta(y) - SE \qquad (5.2)$$

If $S\hat{E} \geq S\overline{E}$, the budget constraint is identical to that under full decentralisation – i.e.:

$$ST_{share} = S\overline{E} \qquad (5.1)$$

Hence,

$$G_{bal} = \overline{\delta} + \varphi(y) - \overline{\alpha} - \beta(y) \qquad (5.3)$$

While if $S\hat{E} < S\overline{E}$, given 5.1a:

$$ST_{share} > SE = S\hat{E}$$
$$ST_{share} - S\hat{E} = S_{surplus} \qquad (5.1a)$$

the general government budget constraint becomes –

$$G_{bal} = \overline{\delta} + \varphi(y) - \overline{\alpha} - \beta(y) + [ST_{share} - S\hat{E}] \qquad (5.4)$$

As above, following a shock to output both the central and general government fiscal balances (5.2) move into deficit:

$$G_{bal} = \overline{\delta} + \varphi(y^s) + ST_{share} - \overline{\alpha} - \beta(y^s) - S\hat{E} < 0 \qquad (5.5)$$

As in the previous examples, one option open to the centre is to adjust their 'own' non-cyclical expenditure (α) and revenue (δ). However, unlike the situation of grants (or indeed full centralisation) these are likely to be the only policy options available.

Under a system of tax sharing with fixed pre-determined shares, provided that $S\hat{E} \geq S\overline{E}$ (the most realistic case), the centre is unable to alter their fiscal instruments/elements of sub-central control in such a manner so as to generate a sub-central fiscal surplus. While the centre can 'force the hand' of the sub-centre to determine the actual level of expenditure they cannot force the creation of a fiscal surplus.

To illustrate this, when $S\hat{E} \geq S\overline{E}$ this corresponds to $ST_{share} = S\overline{E}$ (so $S\hat{E} > ST_{share}$) and the general government balance can be re-written as:

$$G_{bal} = \overline{\delta} + \varphi(y^s) + ST_{share} - \overline{\alpha} - \beta(y^s) - S\overline{E} < 0 \qquad (5.6)$$

Suppose the centre tried to increase the pool of resources from which ST_{share} is drawn from (i.e. increase X to X^{new}), keeping the ST_{share} constant and hence retaining the additional revenue for itself (i.e. X^{new}–ST_{share}); in effect, attempting to drive a wedge between the pool of resources for sub-central transfers (X) and the amount actually redistributed (ST_{share}). Such action is however, not possible. In doing so the central government would violate the tax sharing agreement, which requires that the share of revenues from the common pool distributed between the central and sub-central tiers remain fixed. While the centre has full authority to alter the size and composition of the common pool of resources used in the tax sharing arrangement, it cannot alter the shares assigned to each tier. In our case the tax share was assumed to be set at 1:0 in favour of the sub-centre (so $X = ST_{share}$ at all times). If the centre retained an amount of this additional revenue, their share of the shared tax would be non-zero.

If $S\hat{E} > ST_{share}$, any attempt to raise revenues by increasing ST_{share} will fail to improve the general government balance (G_{bal}). The increase in ST_{share} would be matched by a compensating increase in SE as sub-central politicians more closely align actual expenditure with their own desired expenditure $S\hat{E}$ [20]. Thus, any sub-central fiscal surplus generated from increased revenues would be cancelled out by the increased expenditures. In effect, if $S\hat{E} > ST_{share}$ then up to the point where $ST_{share} = S\overline{E}$ the general government budget balance (5.6) following the output shock can be re-written as:

[20] This implication is discussed in a different context in De Mello (2000). He points out that "in the case of revenue sharing arrangements, every time a central government raises taxes to improve its own fiscal position, sub-national governments receive a corresponding revenue benefit which they are free to spend."

$$G_{bal} = \bar{\delta} + \varphi\left(y^s\right) - \bar{\alpha} - \beta\left(y^s\right) < 0 \qquad (5.7)$$

Therefore, the fiscal instruments available to the central government are limited to their 'own' autonomous expenditure (α) and revenue (δ). Note that this is identical to the situation under full decentralisation. Ultimately, if $ST_{share} = S\hat{E}$ then any increase in ST_{share} would improve G_{bal} as the additional revenues would no longer be spent on higher expenditures as optimality has been reached. As mentioned above however, if $S\hat{E}$ exceeds $ST_{share} = S\bar{E}$ by a substantial amount (which is quite possibly the case), this option may be unrealistic.

An alternative strategy for the centre, instead of increasing revenue, is to 'force the hand' of the sub-centre to cut their expenditures. Applying the same reasoning as in the case of grants, the centre can cut ST_{share}. While this will bring about a corresponding fall in SE (as the starting point $S\bar{E}$ is below the sub-central's optimal level of expenditure $S\hat{E}$), it in turn implies a cut in national revenue given the pre-determined fixed tax shares (i.e. $X = ST_{share}$). Therefore, both X and ST_{share} must fall. The two effects (cut in expenditure and cut in revenue) cancel each other, leading to no improvement in the general government deficit (G_{bal}). Therefore, under a system of tax sharing with pre-determined or fixed tax shares, the centre cannot instigate a cut in sub-central expenditures for a given level of national revenue.

It is clear that this result is driven by the assumption of pre-determined or fixed tax shares. If the centre could unilaterally alter the revenue split between themselves and sub-central governments (i.e. $X \neq ST_{share}$) then a similar outcome to grants would be reached. In the context of the above analysis, the centre would be able to drive a wedge between the total amount raised (X) and the amount 'allocated' to the sub-centre (ST_{share}). However, as previously discussed this is not the case in practice and without fixed shares, the primary motivation for tax sharing (i.e. improved incentives for local politicians) would be lost.

As an important aside, more generally it could be the case that central governments may be less willing to interfere with revenues from tax sharing arrangements than they are with grant allocations. It is possible that the revenues received by sub-central governments from tax sharing may be interpreted differently by both governments than revenues received from grants. From the fiscal illusion literature[21], it is argued that individuals may view intergovernmental transfers and 'own-source' revenues through different lenses. It is highly plausible that the revenue raised from tax sharing is interpreted as having been 'earned' by a

[21] The Fiscal Illusion literature argues that certain 'types' of fiscal policy may be viewed differently from each other by the private sector even if they have the same effect on the economy. For a discussion and theoretical application to intergovernmental grants see Oates (1979).

particular region/government rather than a fiscal handout from the centre. Grants on the other hand, create the appearance of funding by non-residents. This is especially likely to be the case if the shared tax-base relates to income or corporation profits; two of the most commonly shared taxes.

In our case above, while the sub-centre cannot control the tax rate or what the actual tax base is, they can boost revenues by increasing the size of the tax base that the revenues are drawn from. Thus, to the extent that revenues from tax sharing are believed to have been 'earned' by a particular sub-central government, the degree of practical central control may be less than that under grants. Being seen to take resources from a particular region as opposed to reducing resources given to this region can be interpreted quite differently by voters. For example, one of the main motivations behind the decision to share revenues from income tax in Norway was to "encourage sub-central governments to increase their tax base by implementing 'good government', in order to gain from high revenues in the future"[22]. Consequently, the Norwegian central government is likely to be relatively averse to altering the amount of revenue sub-central tiers can raise from this source for fear of eroding these performance incentives.

If $S\hat{E} < S\overline{E}$ (i.e. optimal sub-central expenditures were less than the centre would like) any increase in ST_{share} to ST_{share}^{new} could lead to an automatic improvement in G_{bal}. In this situation, the increase in revenue would fail to generate an increase in sub-central expenditure as it is already at optimum. The difference between the new higher ST_{share}^{new} and $S\hat{E}$ could be retained as surplus (i.e. $ST_{share}^{new} - S\hat{E}$). In an extreme case the government could set $ST_{share}^{new} - S\hat{E}$ to be sufficient to eliminate the general government deficit generated by the output shock – i.e.

$$G_{bal} = \overline{\delta} + \varphi(y^s) - \overline{\alpha} - \beta(y^s) + [ST_{share}^{new} - S\hat{E}] = 0 \qquad (5.8)$$

However, it is still the case that the centre is unable to bring about a cut in sub-central expenditures without altering ST_{share}. In this case, a cut in SE will only occur when ST_{share} falls by a sufficiently large amount such as to generate $ST_{share} < S\hat{E}$. Once again, with fixed tax shares, any attempt by the centre to cut sub-central expenditure requires a corresponding fall in national revenue.

It is therefore, clear that tax sharing and grant based sub-central financing systems imply very different degrees of effective central government control over sub-central fiscal policy in the

[22] See IMF (1997).

context of a fiscal consolidation attempt. Only in the special and probably unrealistic case of optimal expenditure from the perspective of sub-central politicians being less than that which the central government would like, can the centre use sub-central balances to assist in any consolidation attempt under a system of tax sharing. Even then, any adjustment is limited to increases in sub-central revenue, changes in sub-central expenditure cannot be induced by the centre's actions. This inability of the centre to generate a sub-central fiscal surplus is more akin to the situation under a system of full decentralisation[23].

The tax sharing structure that we have outlined in the above is such that the sub-centre has no control to alter the tax rate or the tax base. In certain countries, the sub-centre is able to set (within limits) an autonomous tax rate on a tax base which they share with the centre. This is the system of income tax sharing common in Scandinavian countries. In practice, nearly all sub-central governments set their tax rates at the 'ceiling' level – see Joumard, and Suyker (2002). In such a situation, the analysis discussed above still holds. In order to increase sub-central taxation revenues the centre must lift the 'ceiling' level so that the sub-centre can set a higher tax rate, however increased revenues are likely to be passed on to increased expenditures (provided of course sub-central governments have a preference for higher spending). If the centre wished to cut sub-central expenditures, a lowering of the 'ceiling' is possible but this would also result in declining national revenues[24]. Therefore, under this system of tax sharing, an analogous result is obtained; the level of effective central control is relatively limited.

In summary, via some simple budgetary accounting we have shown that while both grants and tax sharing result in a degree of central control over sub-central expenditure and revenue, there is an important difference between the two in the context of a national consolidation attempt. Under a system of grant finance the centre is able to 'force the hand' of the sub-centre to cut their expenditure for a given level of national revenue. In contrast, this is not possible in a tax sharing system. Provided that sub-central politicians have a preference for expenditures that exceed the level of resources the centre is willing to transfer (i.e. $ST_{share} < S\hat{E}$), any attempt to lower sub-central expenditure requires a reduction in national revenue. Thus, while a system of grants can be closely aligned to a system of full centralisation, a tax sharing

[23] Moreover, revenues from tax sharing are block transfers and are not tied to specific elements of expenditure. Therefore, unlike specific grants the centre is unable to control either the level of expenditure or its composition.

[24] A similar result holds under the UK system of 'capping' local authorities council tax bills. Capping alone will be insufficient to assist any consolidation as any curtailment of revenue will only bring expenditure in line with this new level of revenue.

arrangement substantially reduces the de facto power of the central government to consolidate national fiscal policy.

4. Conclusion

The presence of vertical imbalances and intergovernmental transfers, imply that central governments retain a degree of de facto control over sub-central fiscal policy that would not be possible under complete fiscal decentralisation. While there are clearly issues of diluted local responsibility and accountability, central control can be beneficial in preventing fiscally profligate sub-central authorities from de-stabilising the national economy. Ultimately, the balance between these two concerns has to be assessed relative to the political and economic factors of a particular country and/or region.

It is clear that any relationship between tiers of government is critically dependent upon the financial relationship and linkages that exist between them. It has been widely assumed that any form of intergovernmental transfer whether it stems from a block grant, matching grant or tax sharing, implies a similar degree of effective central control over sub-central fiscal policy. In this paper however, we have shown that this is not the case. While the differences between full centralisation and decentralisation are relatively obvious, the contrasts between grants and tax sharing are more subtle. With grants, the centre has the ability to 'force the hand' of sub-central governments not only to cut their expenditures, but also to run a 'surplus'. This is not possible under tax sharing provided that the revenue split between the centre and the sub-centre cannot be unilaterally altered by the centre during the setting of the annual budget. As discussed in the text, this scenario is uncommon.

In addition to providing important implications for academic research, such as guidance on appropriate comparisons of decentralisation levels across countries, our analysis has more practical implications for the design of fiscal institutions. Both tax sharing and grants represent a reduction in sub-central financial autonomy relative to full tax autonomy, but the degree of effective central control is higher under a system of grants than under tax sharing. Therefore, switching from grant finance to tax sharing on the grounds of improved incentives for sub-central governments, something which has been advocated in many countries including the UK (see for example Hallwood and McDonald (2005)) does, contrary to established thinking, represent a reduction in central effective control. This may or may not generate positive outcomes but a full discussion of this issue is best left for future research.

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