The use of needs based formulae in the allocation of public resources: literature review

Final Report

for

the Independent Commission

on Funding and Finance for Wales

LE Wales

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Summary & Conclusions

Introduction

This report has been produced by LE Wales under contract HC/2008/04 for the Independent Commission on Funding and Finance for Wales. The report reviews the literature on needs based formulae.

In this report we have aimed to provide a discussion of some of the key issues that are associated with constructing and using needs based distribution formulae and to provide an indication of the types of formulae in use. We have used examples of actual formulae in order to illustrate the points being made.

Objectives and purpose of needs based formulae

There are a number of different ways in which the objectives of redistribution mechanisms can be formulated in practice. Perhaps the key issue is whether the redistribution is aimed at equalisation of service outcomes across regions or at equalisation of regional capacities to provide services. In those countries where the lower tier of government has significant autonomy in the way it chooses to spend, then the objective is more likely to be the equalisation of regional capacities to provide services since, in this case, equalisation of service outcomes is a less realistic goal.

There is no clear and recent statement on the objectives for expenditure allocation across the devolved nations in the UK. Although HM Treasury publishes a regular Statement of Funding Policy, which includes a statement for principles for the allocation of funds, this does not provide an objective for expenditure allocation in the terms discussed here. It merely refers to the 'general' use of the Barnett formula for the allocation of funds to the devolved nations. However, in its 1979 assessment of needs across the UK, HM Treasury made the following statement in relation to the objectives for expenditure allocation.

> "*It is a long-established principle that all areas of the United Kingdom are entitled to broadly the same level of public services and that the expenditure on them should be allocated according to their relative needs.*" (HM Treasury, 1979)

The implication that there should be similar levels of public services across the nations now seems less realistic than perhaps it did in 1979. The devolved nations of the UK have considerable scope to change the levels of public service that they provide and there are already numerous examples of policy driven differences in the level of individual public services (e.g. in social welfare services, student funding and healthcare). Over time, it seems likely that there will continue to be further policy divergence.

Formula types

A number of different types of formulae, that could be described as needs-based, are used for the purposes of allocating funds from a higher tier of government to a low tier. We describe three broad types of formulae in this section: simple per capita based approaches; the highly complex approaches used in Australia, the UK and elsewhere; and intermediate approaches, often the outcome of bargaining processes, that draw on a number of needs drivers and do not rely solely on a per capita basis. Whichever approach is used, decisions need to be taken about:

- Which needs indicators to include in the formula;
- What weights to attach to each needs indicator.

The choice of weights to assign to each indicator is a difficult one and the different approaches include those based principally on statistical analysis and those based principally on judgement and/or negotiation. Even what might seem to be the relatively straightforward decision, about which indicators to include, is a difficult one. Smith et al (2001) describe it in the following way:

"*In practice, the selection of needs factors to be considered in a capitation has often been a highly complex and controversial process. At least six reasons can be put forward for this state of affairs:*

(a) Relevant data are often in short supply;

(b) Research evidence on appropriate needs factors is sparse, dated or ambiguous in its implications;

(c) There is great difficulty in handling covariances between needs factors;

(d) *It is very difficult to disentangle legitimate needs factors from illegitimate (supply) influences on utilisation;*

(e) *The recipients of public sector budgets often feel that they have a clear idea about which needs factors will favour their area and so will seek to influence the choice of needs factors through the political process;*

(f) *The national government (or distributor of funds) will often have a clear view on the result that it wishes to secure.*" (Smith et al, 2001)

Issues in the construction and application of formulae

In this report we discuss a range of issues relating to the way in which formulae are constructed (simplicity and transparency; choice of variables and weights; boundary between need and policy; use of fixed amounts in allocation formulae; and data sources) and relating to the way in which formulae are applied (pressures for hypothecation; adjustments to formula outcomes; incentives; and alternative decision-making mechanisms).

Overall, it is clear that achieving a widely accepted formula for expenditure allocation that is objectively based on expenditure needs is not easy.

Expenditure needs are complex. They are driven by variations in the need for services and by variations in the cost of providing those services. Often the distinction between need variation and policy variation is not clear. The factors that drive needs can vary considerably by expenditure function (e.g. education, health, social service etc). These complexities have led, in some jurisdictions, to the development of complex systems of formulae having different formulae for each of large numbers of expenditure functions, sometimes with many explanatory variables in each formula. Nevertheless, no formula will accurately capture all variations in need as each formula, or system of formulae, is inevitably a simplification of the real world.

As needs are complex, these complex approaches may more accurately target needs than simpler approaches, though there does not appear to be any clear evidence that this is the case. Complex approaches tend to be difficult to understand - even where there is a high level of transparency in the sense that much of the material associated with the approach is in the public domain. Simpler formulae may be much easier to understand in themselves but the processes underlying their development can be much less clear, particularly where they are the outcome of some form of negotiation between parties.

Decision making processes have an important bearing on formula outcomes. Those that involve a high level of political input risk leading to formulae that bear little relationship to variations in underlying need. Even where the contribution of expert and objective input is high there is wide scope for disagreement including on objectives, techniques and data sources.

Some mechanism needs to be found for allocating funds from higher tiers of government to lower tiers of government unless those lower tiers of government have significant revenue raising powers of their own. This is not currently the case for the devolved administrations in the UK. In spite of all of the potential difficulties, the evidence suggests to us that whilst there is no 'perfect' needs based expenditure allocation formula, there is likely to be a range of formulae that would more accurately reflect variations in expenditure need than does the Barnett formula. The problem facing policy-makers is to determine their objectives and then to find a way through the technical and political issues in order to decide which one of the many potential alternatives best meets their objectives.

1 Introduction and context

1.1 Introduction

This report has been produced by LE Wales under contract HC/2008/04 for the Independent Commission on Funding and Finance for Wales. The report reviews the literature on needs based formula.

In this report, we do not attempt to provide a comprehensive list and description of all of the needs based formulae that are in use, nor do we seek to provide a series of 'country case studies' showing how needs based formulae are used in those countries. We have aimed to provide a discussion of some of the key issues that are associated with constructing and using needs based distribution formulae and to provide an indication of the types of formulae in use. We have used examples of actual formulae in order to illustrate the points being made.

1.2 The Barnett formula

The current formula for allocating funds to the devolved nations of the UK is known as the Barnett Formula. It is a non statutory formula that is applied to increases in expenditure by Government departments in England.[1] Increases are allocated to the devolved nations (Scotland, Wales and Northern Ireland) in proportion to their relative populations.

There is much debate about the way in which the Barnett Formula operates in practice and about its advantages and disadvantages. We do not address this literature in detail, but note that the main advantages attributed to the formula are its stability, simplicity and the fact that it provides an alternative to potentially protracted annual negotiations with the Treasury on expenditure allocations. The main disadvantages attributed to the system include the lack of transparency in some aspects of the system (e.g. the way in which HM Treasury determines which expenditures are subject to the

[1] Where those expenditure functions are comparable to those in each of the devolved nations.

formula) and the fact that it does not adequately address variations in expenditure needs.[2]

1.3 Structure of this report

The remainder of this report is structured as follows:

- Chapter 2 discusses objectives for formula based expenditure allocation;
- Chapter 3 reviews the types of needs based formulae that are used, giving examples;
- Chapter 4 discusses a number of issues that arise in the construction of needs based formulae
- Chapter 5 discusses some issues that arise in the application of needs based formulae; and
- finally, a number of Annexes provide detailed material, often examples of specific formulae, that is referenced in the main text.

[2] For further details see McLean et al (2008) and HM Treasury (2007).

2 Objectives and purpose of needs based formulae

2.1 Fiscal relations between tiers of government

Most developed countries have two or more tiers of government with different policy, and hence expenditure, responsibilities and with different revenue raising (tax) and borrowing powers.

There is a wide literature on the impact and behavioural incentives for governments of the range of alternative options for allocating the various expenditure, taxation and borrowing powers and responsibilities. A common view is that responsibility for expenditure programmes should be allocated to the tier of government that most closely represents those that benefit from the expenditure. Often this will be lower tiers of government, where the expenditure might be on local public goods such as local streets and public open spaces. In other cases where expenditure is on national public goods, such as defence, or perhaps where there are significant network or scale economies at the national level, such as a national rail network, responsibility is allocated to the national government.

In practice, responsibilities and powers for raising taxes and borrowing are less likely to be devolved so extensively by central governments to lower tiers of government, though both are common. This mismatch between expenditure responsibilities and revenue raising powers is known as a vertical fiscal imbalance. Vertical imbalances need to be addressed through a mechanism for fiscal transfers between tiers of government.

Such mechanisms for fiscal transfers, aimed at addressing vertical imbalances, often seek to address horizontal imbalances at the same time. Horizontal imbalances arise, for example, where different regional governments have different capacities to meet their expenditure obligations. These variations in capacity may derive from differences in revenue raising capacity or from differing expenditure needs.

The focus of this research is on the horizontal equalisation mechanisms that are used specifically to measure and address differences in expenditure needs.

2.2 Efficiency and equity

There is a wide theoretical literature which examines the issues associated with vertical and horizontal equalisation. Boadway (2004) describes this literature as follows:

"The economics literature on equalisation, which is surprisingly dormant, has developed by and large separately from the practice, and in many cases addresses issues that have not been of primary concern to policy makers."

This review focuses on the practice of using needs based formulae for horizontal equalisation purposes. Nevertheless, in examining objectives for distribution formulae, it is useful to briefly consider what the more theoretical literature has said about the relationship between efficiency and equity objectives.

Horizontal equity is defined in many ways, but one of the more common approaches is to consider horizontal equity to exist where otherwise identical persons/households are treated the same wherever they live. This means that they have access to the same public services, pay the same taxes etc. Transfers then ensure that regional authorities are able to achieve this by taking account of differences in the underlying costs of service provision and the different demographic and economic circumstances. In practice, this is often what governments say that they are trying to achieve.

Horizontal equity is not necessarily consistent with horizontal efficiency. Social welfare maximisation may not be achieved through ensuring that similar people are treated the same in different regions. It may be very much more costly to provide public services in some areas such as offshore islands or in very densely populated urban areas. Shah (2007) and Boadway (2004) argue that it is inefficient for an equalisation programme to neutralise these cost differences and that a preferred outcome could be to provide lower levels of service in these areas.[3]

The balance between equity and efficiency considerations also depends on the form of Government. Efficiency can be encouraged where revenue raising responsibilities match expenditure responsibilities, as might be the case with

[3] Similar points have been made in the UK in resepct of London, where it is argued that the area cost adjustment used in the allcoation formuale for local authority funds reinforces the high cost (e.g. wages) nature of London.

more devolved powers for taxation than is currently the case in the UK. In this case however, the scope for movements of funds between the nations of the UK to reflect differences in spending need between the nations is more limited. Under the current devolved powers, the scope for revenue raising in Wales is limited to local taxation and so there is a greater role for the movement of funds between he nations of the UK to reflect differences in need (i.e. horizontal equity considerations).

2.3 Distribution objectives in practice

There are a number of different ways in which the objectives of redistribution mechanisms can be formulated in practice. Perhaps the key issue is whether the redistribution is aimed at equalisation of service outcomes across regions or at equalisation of regional capacities to provide services. In those countries where the lower tier of government has significant autonomy in the way it chooses to spend, then the objective is more likely to be the equalisation of regional capacities to provide services since, in this case, equalisation of service outcomes is a less realistic goal.

In Australia the focus is very much on the equalisation of regional capacities to provide services.

> *"State (and territory) governments should receive funding from the pool of GST[4] revenue such that, if each made the same effort to raise revenue from its own sources and operated at the same level of efficiency, each would have the capacity to provide services at the same standard."* (Commonwealth Grants Commission, 2004)

The assessment of expenditure needs for each expenditure category in each State in Australia is based on the estimated cost of providing the average level of service in that expenditure category across Australia. The actual level of service provided in each State may differ substantially from this.

In Sweden too the aim is for the redistribution system to equalise capacities to provide services. In other words, if they wished, local authorities would have the financial capacity to provide the same level of services irrespective of per capita incomes and other underlying cost and need factors. The intention is

[4] Goods and Services Tax – a sales tax similar to VAT.

that differences in local tax rates should reflect differences in efficiency and in levels of services and charges, and not differences in underlying cost and need conditions (see Tingvall, 2007).

There is no clear and recent statement on the objectives for expenditure allocation across the devolved nations in the UK. Although HM Treasury publishes a regular Statement of Funding Policy, which includes a statement for principles for the allocation of funds, this does not provide an objective for expenditure allocation in the terms discussed here. It merely refers to the 'general' use of the Barnett formula for the allocation of funds to the devolved nations. However, in its 1979 assessment of needs across the UK, HM Treasury made the following statement in relation to the objectives for expenditure allocation.

> "*It is a long-established principle that all areas of the United Kingdom are entitled to broadly the same level of public services and that the expenditure on them should be allocated according to their relative needs.*" (HM Treasury, 1979)

The implication that there should be similar levels of public services across the nations now seems less realistic than perhaps it did in 1979. The devolved nations of the UK have considerable scope to change the levels of public service that they provide and there are already numerous examples of policy driven differences in the level of individual public services (e.g. in social welfare services, student funding and healthcare). Over time, it seems likely that there will continue to be further policy divergence.

2.4 Other desirable characteristics of formulae

Needs-based formulae are often judged on other criteria as well. This list below provides some examples of the criteria commentators use:

- Simple and transparent
- Objectively based - not subject to partisan political influences
- Stable - does not lead to large and frequent fluctuations in expenditure allocations
- Be based on data from independent sources (that is not subject to manipulation)

- Does not provide perverse incentives (e.g. for authorities to take policy decisions purely for their impact on future allocations through the formula).

The issues associated with these characteristics are discussed in Chapters 4 and 5.

3 Formula types

3.1 Introduction

A number of different types of formulae, that could be described as needs-based, are used for the purposes of allocating funds from a higher tier of government to a low tier. We describe three broad types of formulae in this section: simple per capita based approaches; the highly complex approaches used in Australia, the UK and elsewhere; and less complex approaches that nevertheless draw on a number of needs drivers and do not rely solely on a per capita basis. Whichever approach is used, decisions need to be taken about:

- Which needs indicators to include in the formula;
- What weights to attach to each needs indicator.

The choice of weights to assign to each indicator is a difficult one and there are different approaches to choosing these weights outlined below. Even what might seem to be the relatively straightforward decision about which indicators to include is a difficult one. Smith et al (2001) describe it in the following way:

"*In practice, the selection of needs factors to be considered in a capitation has often been a highly complex and controversial process. At least six reasons can be put forward for this state of affairs:*

(g) Relevant data are often in short supply;

(h) Research evidence on appropriate needs factors is sparse, dated or ambiguous in its implications;

(i) There is great difficulty in handling covariances between needs factors;

(j) It is very difficult to disentangle legitimate needs factors from illegitimate (supply) influences on utilisation;

(k) The recipients of public sector budgets often feel that they have a clear idea about which needs factors will favour their area and so will seek to influence the choice of needs factors through the political process;

(l) *The national government (or distributor of funds) will often have a clear view on the result that it wishes to secure.*" (Smith et al, 2001)

3.2 Per capita-based approaches

The simplest type of approach is based on population only. An equal amount per head of population is allocated to each authority at the lower tier. Examples of this include:

- the Health Transfer and the Social Transfer in Canada, both of which are block transfers from the federal government to the provinces and territories.
- Allocation of fire service monies to local authorities in Wales.
- The Barnett formula could also be viewed as an elaboration of a simple per capita approach.

Whilst some commentators do not view per capita based approaches as needs based, they do reflect one important element of the need for expenditure – the size of the population.

Many of the other approaches discussed below rely on additional variations to a basic per capita amount. The structure of the formulae for allocating funds to local government in England, for example, involves a basic amount per person in the client group (e.g. older people) and then various adjustments to this to reflect other need and cost factors.[5]

3.3 Complex approaches

3.3.1 Introduction

Since expenditures at any tier of government generally include a very wide range of public services, expenditure on each of which may be driven by a wide range of different factors, there is considerable scope for the use of complex formulae for the purposes of assessing expenditure needs.

[5] See Annex 1 for further details of the formula for social services for older people.

In this section we outline four different approaches that we would describe as being at the complex end of the spectrum – an approach that we describe as a standard cost approach and which is used both in Australia and Japan; and the regression-based approaches that are used for the allocation of funds to the local authorities in the UK; an outcomes based approach that has been proposed for schools funding in Wales and a bottom up cost approach that is used in the Netherlands.

3.3.2 Standard cost approach

This approach is also sometimes known as the representative expenditure system (using direct imputation methods). It is based on total expenditure, disaggregated by function and by jurisdiction. Factors that determine variations in need and cost are then identified and weights are assigned to each of these factors.

This is similar to the expenditure regression approaches described below. The main difference being that the regression approaches determine (largely) which needs indicators are retained and the weights that are assigned to them. Under the standard cost approach the determination of needs and weights can vary according to the public service function, but can often be based on a population measure combined with a standard cost of providing services per capita. The standard cost might be assessed by calculating the average cost of service provision per capita across all jurisdictions. This process relies heavily on varied judgements about the needs indicators and weights.

The Australian approach has been described as a sophisticated version of this approach, though it is criticised for its complexity and for the arbitrary nature of many of the underlying processes (see Shah, 2007). The approach involves assessing what it would cost each State to provide the average level of service in a particular year. In order to make this assessment, the Australian Commonwealth Grants Commission break down expenditure into 39 categories and, for each category, assess the 'disabilities' that lead States to spend more or less than the average for Australia in order to provide the average level of service. More details on the Australian approach are provided in Annex 2.

A similar, though less complex, approach is also used in Japan (see Mochida, 2007) where a standard unit cost is estimated for each of a number of functions and then multiplied by a volume indicator relevant to the function

(e.g. numbers of elderly people, road length, total population etc). Additional adjustment coefficients are applied. These are intended to reflect additional factors that influence expenditure need, but which are not reflected in the unit cost and volume indicators.

The standard cost approach is also used in Sweden (see Tingvall, 2007). Here standard costs are estimated for each of a number of public service functions (eight functions for municipalities). They reflect the national average cost of providing each function and so reflect national average levels of service quality and efficiency. These standard costs are then related to a number of needs drivers (between 1 and 5) for each function. The needs drivers reflect factors such as age structure, socio-economic circumstances, and ethnicity.

3.3.3 Expenditure regression approaches

Expenditure regression approaches are used widely in the UK to allocate funds from the UK and devolved governments to local authorities. Regression based approaches have also been used elsewhere and under the current review of arrangements in Australia, some thought has been given to the used of a regression-based approach in Australia too.[6]

The general approach in the UK has been to use regression analysis to seek to explain past variations in expenditure using a number of explanatory variables. These explanatory variables are viewed as indicators of need and generally consist of variables that are viewed as being outside of the control of local authorities and measure factors such as the size of the population addressed by the policy in question, other factors that reflect their need for services, such as deprivation, and additional factors that reflect regional differences in the unit costs of providing services. The resulting model of expenditure is then used as the basis for a formula for allocating future expenditures.

The process for developing the formulae is complex and has varied over time and between formula and UK nation. Generally, in both England and Wales, formulae for individual expenditure functions are reviewed every few years with timescales depending on priorities and perceived problems with the formulae. Changes are discussed within working groups that include representatives from both local authority and central government/devolved

[6] See Chan et al (2007).

administration. Often, research into potential revised approaches is commissioned from external parties, usually academics. Typically, variables are chosen because they have some conceptual or research basis and because the statistical analysis suggests that they are relevant.

The regression based approach used in the UK is complex both in the sense that aggregate expenditure is broken down into a number of spending categories (15 in England, 58 in Wales)[7] and also in the sense that individual formulae can be very complex. Individual formulae tend to be more complex in England - an example is provided in Annex 1.

The main advantages and disadvantages of using standard regression approaches in this context are set out in the table below.

Table 1: Use of standard regression-based approaches

Advantages	Disadvantages
a. Produces directly what is required – a relationship between expenditure and needs indicators	f. Expenditure responses to need can often be constrained, suggesting that expenditure may not always be a good proxy for need
b. Leads to a pattern of expenditure that is similar to historic patterns and so reduces the extent of 'shocks' to the current system. (This might be a disadvantage if the current system is viewed as being significantly out of line with need)	g. The level of service provided (in quantitative and/or qualitative terms) may vary systematically across fund recipients. This is not captured in standard needs indicators.
c. Relatively neutral technical procedure that chooses both indicators and weights for them	h. Efficiency of service provision may vary systematically across fund recipients.
d. Where policy and efficiency differences are limited, regression can provide a reasonable estimate of 'the cost of a common standard of service'	i. Needs indicators are usually indirect or partial proxies for real underlying needs, sometimes as a result of problems in achieving good measures of actual need and sometimes as a result of concerns that fund recipients can influence these measures.
e. Compared to basing expenditure allocations directly on past expenditure, regression reduces the incentives to play the system – by basing the allocation on indicators outside the control of the recipients	

Source: LE Wales interpretation of Bramley and Wyatt (1998)

[7] This number of Welsh formulae includes formuale related to education expenditure, whereas this is treated separately in England.

In the Netherlands, the system of expenditure allocation to the municipalities was changed in the 1990s as a result of perceived problems with the expenditure regression approach that had been used previously. Problems with the expenditure regression approach[8] included the fact that it was based on previous expenditure and that was not correlated with need; and also that there was a focus on statistical correlations only without sufficient regard for underlying conceptual links.[9]

More sophisticated regression-based approaches have been proposed, and sometimes implemented, in attempts to address the disadvantages listed above. These are discussed below. In the Netherlands an alternative approach was taken in response to problems with expenditure regression approaches. This is discussed in the next section.

Multi-level modelling

As suggested in the table, previous expenditure may not always be a good proxy for need if the historic distribution of expenditure does not reflect the distribution of need. Whilst this may well be true at the level of aggregate expenditure[10] (e.g. for each local authority) it is even more likely to be true for individual service areas[11] where local authorities have choices about the allocation of expenditure between service areas. These allocations may be affected by budget constraints, historic precedent, cultural and political factors, as well as need. In addition, a statistical analysis at the level of a large geographic area may not capture the real underlying relationships that are present at smaller geographic levels (or at the level of the individual or household). This phenomenon is known as the ecological fallacy.

In the example shown in Figure 1, the expenditure responses of three local authorities to the needs of individuals in their areas (represented by the numbers) are shown by regression lines LA1, LA2 and LA3. These responses are similar as illustrated by the slopes of the three lines. If the regression analysis is undertaken using the data points from all three local authorities together, however, regression line SS is the outcome. This has a very different slope which bears little relation to the actual response to need in each local

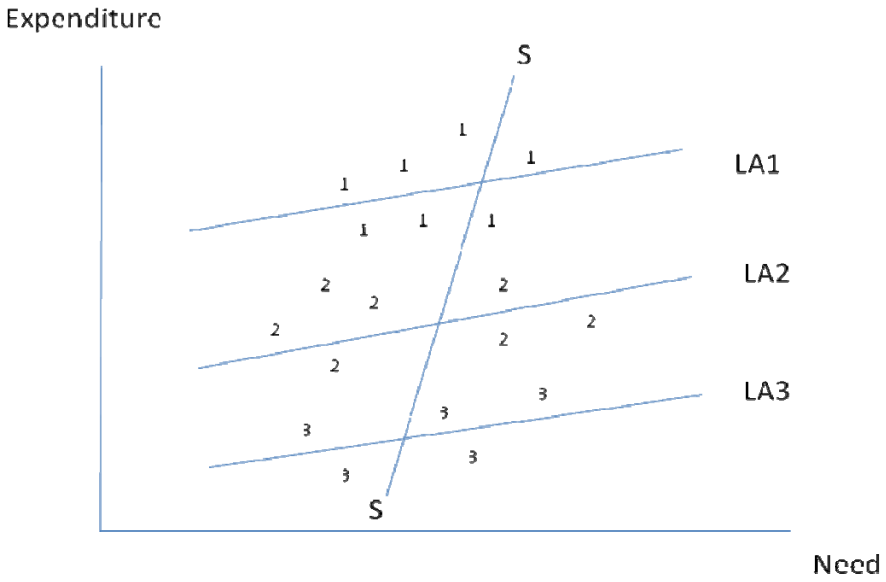
[8] Boerboom and Huigsluit (2007).

[9] Boerboom and Huigsluit (2007) provide the example of physical criteria such as the number homes being used as drivers for social security expenditure.

[10] Where previous allocation mechanisms did not reflect variations in need, for example.

authority area. The slope of SS is driven mainly by the differences in expenditure levels for each local authority.

Figure 1: Illustration of the Ecological Fallacy



Source: Smith et al (2001)

An alternative form of regression analysis, called multi-level modelling has been developed for these types of situations. In the local authority context, this uses small area data within local authority areas to analyse relationships, as well as data at the local authority level. The analysis uses small area information about the relationships between the indicator variables and the dependent variable for each local authority and combines this information to describe a relationship across all of the local authorities. The use of small area data within each local authority enables the establishment of relationships between the dependent variables and needs indicators that are not distorted by differences at the local authority level in policy or the historical development of services. This approach has been used in a number of instances in the UK, including, for example, in Wales for the development of the distribution formula for older people's personal social services.

Multi-level modelling may go some way towards addressing the problems inherent in using expenditure as the dependent variable. Nevertheless, the data requirements are more intensive, since data is required at the small area

[11] This is the level at which regression analysis is often applied.

level and, in some cases, relationships could be distorted by differences in policy or other factors at the small area level. For example, it may be the case that local authorities have focussed on the development of specific services in particular localities for historic reasons and that budget constraints have not enabled the expansion of services to other areas of the local authority in question, in spite of a need for such services elsewhere.

Single level regressions that include service/policy indicators

This approach would use the same single equation expenditure regression framework but would include explanatory variables intended to reflect differences in service levels. It might use direct measures of service quality or more indirect measures reflecting differences in preferences that might impact on service quality choices.[12]

These factors might influence expenditure through the demand side or the supply side, whereas the regression equation remains in a reduced form. More explicit modelling of separate demand and supply influences might better capture the relationships inherent in the underlying model. The potential for developing such a demand and supply model has been discussed in the context of the current review of the Australian system. Chan et al (2007) developed a theoretical model and undertook some empirical testing of the model, but found that they were unable to interpret the results properly because of problems with data availability. The main data problems were a small sample size and imprecise proxies for both demand and supply side disabilities.

3.3.4 Regression approaches based on outcome measures

The scope for more explicit modelling of outputs as a means of informing expenditure allocation decisions has been examined by Bramley and Watkins (2007). In a report for the Welsh Assembly Government they explore the scope for applying this approach in the context of schools funding in Wales.

The standard expenditure based regression seeks to explain expenditure variation through first considering various measures of need and unit costs. The output based approach seeks to explain outcomes (e.g. in terms of

[12] The scope for using such an approach is discussed by a number of authors including Bramley& Wyatt (2007); Dafflon & Mischler (2007); Pion Economics (2001); and Smith et al (2001).

educational attainments) through measures of needs and resources inputs and then by assessing what resources are needed in order to achieve specified outcome targets. Bramley and Watkins develop the approach in the context of schools funding in Wales and conclude that it is possible to develop robust models of this type in this particular context.

As this approach relies on setting outcome targets centrally, it is not likely to be directly relevant in the context of funding for the devolved administrations, as the devolved administrations decide how to spend funds and which targets they wish to achieve independently. Even if it were possible to agree some very high level outcome target, e.g. based on GDP per capita, it seems unlikely that it would be feasible to model this in a satisfactory way.

3.3.5 'Bottom up' cost analysis

In the Netherlands the allocation of funds by the central government to the municipalities was previously undertaken through the use of expenditure based regression approaches. During the 1990s it was felt that these approaches were failing to match funds with expenditure needs as they did not adequately account for differences between municipalities in terms of social structure (e.g. those on low incomes, migrants), nor did they take account of cross-border effects (the provision of services, such as art, sport and entertainment, by some municipalities for residents of other municipalities). There was also over reliance on explanatory variables that were not always conceptually plausible, even though they satisfied statistical criteria. The problem of circularity inherent in regression approaches being based on past expenditure was also recognised.[13]

In 1997 funding for some expenditure functions was allocated to the municipalities using a different approach – developed in the Netherlands - known as difference analysis. This approach was introduced for the remaining expenditure functions in 2001. The approach is based on a detailed analysis of costs, focussing first on achieving a clear definition of costs relevant to the expenditure function and then on analysing differences in costs between municipalities. The process is an iterative one that seeks to understand the exogenous factors that drive differences in expenditure and to

[13] For a further discussion of the Dutch approach, see Boerboom and Huigsloot (2007).

differentiate these from expenditure differences that derive from policy differences.

To illustrate the process, Boerboom and Huigsloot (2007) describe the approach applied to expenditure on domestic care for older and disabled persons. Comparisons of costs between different 'homogenous' groups of municipalities (e.g. those with older populations and those with younger populations) were made and comparisons of costs between municipalities within homogenous groups (e.g. those with older age structures) were made.

> *"An example: the level of spending of municipality X (highly aged population, low average income) and of the neighbouring municipality Y (with a relatively young population and a high average income) is low in comparison with the average of their own homogenous groups. X and Y make use of the same care provider. Other neighbouring municipalities with another care provider do not have such a relatively low level of spending. This indicates the influence of the care provider in X and Y. This influence can be verified by obtaining information about the mode of operation of the care provider involved which may show, for example, that poorly qualified domestic workers are assigned or that relatively few hours are provided per client."* (Boerboom and Huigsloot, 2007)

The process is iterative and aimed at understanding fully which exogenous factors are important for explaining expenditure variations. These factors are then used as the basis for funding allocations for each expenditure area to each municipality. Boerboom and Huigsloot report that the approach has resulted in the use of more plausible cost drivers in the formula and that it takes better account of exogenous factors that are only relevant for a small number of municipalities.

3.4 Intermediate approaches

There are a number of needs based formulae that seek to take account of a wider range of needs than a simple per capita approach but which are not as complex as the approaches described in the previous section.

Many of these formulae based on intermediate approaches do not appear to have a formal quantitative process for generating the needs indicator variables, or the weights that are applied to them, and in that sense they tend to be more similar to the Australian and Dutch approaches than to regression based approaches. It is frequently the case that the precise origin and

rationale underlying the formulae is unclear – in this sense many are similar to the Barnett formula.

The following are a number of examples of this type of formula. Some of these formulae are provided in the Appendices.

- The formula for allocating expenditure to the Spanish regions;[14]
- The provincial equitable share formula in South Africa;[15]
- The former Supporting People distribution formula in Scotland;
- Allocation of funds to the communes of the Canton of Fribourg in Switzerland;[16]
- The Big Lottery Fund formula for the allocation of funds to the nations and regions of the UK; [17]

We understand that the Spanish formula was 'politically' determined, but also that it was based on the expenditure shares immediately before the formula was introduced. The formula for allocating funds to the communes of Fribourg is also the outcome of a political negotiation process. This description of the process of allocating weights to the expenditure need ('local financial need') and fiscal capacity elements of the global formula provides an interesting insight into the process:

> "*The indicator of local financial needs is assigned a weight of 1/3, while the indicator of local fiscal resources counts with a weight of 2/3 within the global index value. According to the official argument, the choice of weights reflects the idea that the calculation of the fiscal resources indicator is expected to bring a relatively accurate result, whereas the proper quantification of local financial needs is much more difficult, if*

[14] See Annex 3.

[15] See Annex 4.

[16] See Annex 5

[17] The Big Lottery Fund in the UK also uses a formula for distributing its funds between Wales, Scotland, Northern Ireland and the English regions (Big Lottery Fund, 2007). The formula was developed in 1995 and is based on measures that reflect population size, deprivation and available resources. The level of social security benefits is used as the indicator of deprivation and GDP is used as the indicator for the level of resources available. The formula still uses the original data from 1995 – several reviews have suggested no reason for changes.

not straight away impossible. Nevertheless, the reasoning that underlies this particular weight distribution is fairly questionable. Instead of the ratio of 1/3 to 2/3, various other ratios could just as well have been chosen. The truth is that, again, the decision about these particular weights is an outcome of a lengthy political debate whereby some influential members of the decision-making committee have managed to carry their point in favour of the communes they were representing." (Dafflon and Tóth, 2003)

4 Issues in the construction of formulae

4.1 Simplicity and transparency

The concepts of simplicity and transparency are often viewed by commentators as positive aspects of formulae that have these characteristics. The reasons for this are not always clear, but there seem to be two elements. First, a formula that everybody understands is seen as being in some way more 'democratic' or equitable. If everybody sees it and understands it in the same way then everybody can argue (or vote) for or against it on the same basis and everybody can adjust/plan their behaviour in response to it on the same basis. The second element is the view that the more simple and transparent the formulae are, the more difficult it is for politicians to manipulate outcomes from the formula.

McLean et al (2008) describe 'procedural fairness' as one of the key principles (alongside equity, efficiency and accountability) that should underpin the distribution of expenditure funds. 'Procedural fairness' is essentially transparency and is proposed as a key principle on the basis that in order for an expenditure allocation method to be legitimate and sustainable in the long term in must not only be fair, but it must be seen to be fair as well.

There is a general view in the literature that the development of accurate needs based formulae is very difficult (more difficult, for example, than the development of formulae that reflect revenue raising capacity). This is because the factors that drive need are many and vary with the many different functions provided by public authorities. This is reflected in the highly complex systems used in some jurisdictions for allocating funds according to need. These complex approaches are often criticised for their 'black box' nature.

The need to strike a balance between simplicity and complexity is widely recognised, though policy responses vary with both very simple and very complex formulae in operation. One view (Boex et al, 2004) is:

> "*Ideally, the index formula should be based on a relatively limited number of factors as the inclusion of too many variables reduces transparency. It is also more costly and difficult to update a larger number of variables on a regular basis and large designs with many*

> *factors can introduce more opportunities for political manipulation. In short, a balance needs to be struck between simplicity and transparency, and the need to find factors that equitably reflect the true fiscal need of local government.*"

In developing needs based formulae, there are three relevant aspects to simplicity and transparency – the formula itself; and the process for choosing variables and weights for the formula.

In respect of the formulae themselves, the types of formula that tend to be simpler and hence more transparent are the per capita formulae and those that are developed using the intermediate approaches described in the previous Chapter. They are generally single formulae with relatively small numbers of variables. The process and reasoning underlying the development of the intermediate formulae tend to be the least transparent however – often relying on a bargaining process.

The complex approaches often develop systems of formulae and as a result these are the formulae that tend to be the most complex and the least transparent. The processes for developing formulae of this type are usually heavily documented (e.g. in the UK and in Australia) and so the processes can be more transparent.

It appears that in most cases the scope of funds to which the funding formulae apply is reasonably transparent. It may often be, for example, the revenues from a particular tax or group of taxes. The Barnett formula in the UK has frequently been criticised, however, for the way that decisions about the scope of funds to which the formulae is applied are taken 'behind closed doors' by HM Treasury. The recent decision to exclude the regeneration elements of expenditure on the London Olympics from the scope of the Barnett formula has been much criticised, for example.

4.2 Choice of variables and weights

Clearly the choice of variables and the weights applied to those variables has a key impact on any needs based formula.[18] Some of the processes for developing formulae described in the previous chapter rely solely on political

[18] These two issues form the basis of the differences in techniques discussed in the previous Chapter and so the differences in approach are discussed in that Chapter.

and/or expert judgement; others also make use of statistical relationships and tests in order to both choose indicator variables and to set weights for them.

4.2.1 Approaches based on statistical analysis

Even those approaches that make significant use of statistical techniques also rely heavily on judgement (e.g. judgements about the conceptual basis for the analysis, judgments about which statistical techniques to use, judgements about which data sources to use, judgements about how to interpret the results etc). Carr-Hill et al (2002) capture this point well and describe what they call a 'strategic approach' that combines both informed judgement and statistical analysis:

> *"We recommend an alternative strategic approach which combines such judgement with statistical criteria. It involves using modelling techniques to select which variables, from a long list of candidates, are included in the formula. The choice is not purely based on statistical criteria, but is constrained by a set of prior theoretical and empirically based judgements on the relative importance and causal priority of a wide range of candidate variables. These judgements are used to decide which variables are included and excluded from the modelling when the statistical criteria are ambiguous or the results are substantively implausible. They ensure that the final formulae are intuitively plausible as well as statistically optimal. The overall approach is sometimes known as a modelling strategy."*[19]

Whilst statistical theory and practice provides guidance on how to choose formulae that are 'statistically optimal', this guidance is not unambiguous to the extent that all statisticians would use the same approach and arrive at the identical result in any given formula situation. This, together with the important role of informed judgement in the process, means that there is generally not one 'correct' answer to the question - which is the most appropriate formula to use - in any given situation.

Generally statistical analysis relies on developing a conceptual model, implicitly or explicitly, and then using statistical techniques and real world data to test how realistic the conceptual model is. The conceptual model can be based on economic or other theory and would often be influenced by

[19] Carr-Hill et al (2002).

previous empirical evidence. In the context of expenditure based needs formulae, however, the relevant research evidence is often very limited and/or ambiguous (Smith et al, 2001) and in those circumstances informed judgement is more influential than it might otherwise be.

4.2.2 Other approaches

When less formalised approaches are used for choosing which variables are included, and for which weights are applied to those variables, there seems to be more opportunity for wider considerations, such as political factors and self-interest to play a role in decision-making. These approaches, with some examples, are outlined in the previous Chapter in Section 3.4. If the variables and their weights are the outcome of some bargaining process they may well not provide an accurate reflection of variations in expenditure need – they may instead reflect relative bargaining strength (Dafflon and Tóth, 2003).

4.3 Boundary between 'need' and policy

One key issue in the use of formulae for expenditure allocation is how to define needs and how to distinguish them from policy differences between the different horizontal governments.

At one of the recent sittings of the House of Lords Committee on the Barnett Formula this issue was discussed using the example of whether the higher costs caused by the high proportion of denominational schools in Scotland reflected an expenditure need or was a reflection of a policy difference with England.

Regression-based approaches assume that variations in past expenditure reflect variations in need. There is a strong element of circularity in this idea, as discussed above. In principle it is possible to adjust for differences in service quality or other policy differences using regression analysis, though this seems to be unusual in practice.[20]

Standard cost methods approach this issue slightly differently. In Australia, for example, the Commonwealth Grants Commission does this by assessing what it would cost each State to provide the average level of service in a particular year. It determines the average level of service for each expenditure

[20] The scope for this is discussed in Bramley and Watkins (2007).

category, based on the previous performance of the States. No account is taken of the extent to which the actual level of service provided in each State differs from the average.

In the UK, the funds distributed through the Barnett formula are not hypothecated. This means that there is scope for significant policy differences to evolve between the devolved administrations over time as they decide on different ways to spend their resources depending on local priorities and needs.[21] In these circumstances an approach that is based on an average level of service in each expenditure category is less likely to be relevant. Significant policy differences may arise both where horizontally related authorities have different levels of delegated power[22] and where they have the same level of delegated power but have taken very different policy paths. Heald et al (2002) also argue that any formula that included England, with 84% of the UK population, could lead to strong pressure for spending patterns in the devolved nations to conform to the English spending pattern.

Very few funds that pass from the UK Government to the Welsh Assembly Government are hypothecated though hypothecated grants are in widespread use in other countries. This type of grant can address the issue of differences between policy and need by specifying the levels of service that need to be achieved through grant expenditure and then, in any allocation formula, by taking account of those need factors that make achievement of that level of service more difficult in some regions. In effect this approach seeks to address the problem by preventing policy differences. In practice, differences in other related policy areas, in addition to differences in need, may still influence the achievement of objectives for the specific grant programme. By preventing or limiting policy differences widespread use of this type of approach for the devolved administrations would undermine the transfer of powers to those administrations and reduce the level of political accountability for that expenditure in those regions where the expenditure is incurred.

[21] This evolution is already apparent with policy differences being particularly noticeable in the areas of education (e.g. early years education, testing and student funding); social services (e.g. charges for non-residential care); and health (e.g. charges for prescriptions and hospital parking).

[22] The English local authorities as well as the devolved nations of the UK are examples of this.

4.4 Use of fixed amounts in allocation formula

The Barnett formula makes no provision for any costs that do not vary with population size, i.e. that are fixed in respect of population size. A number of other jurisdictions do make use of fixed amounts in expenditure allocation formulae. These reflect amounts of money that are given to all recipients equally regardless of variation in other needs factors.

In general these fixed amounts are intended to reflect the fixed costs of service provision that do not vary with the circumstances of the lower tier jurisdiction (e.g. size), i.e. they seek to take account of economies of scale in administration and service provision. Typically, the administrative costs of government are the main fixed cost that is considered.

The following jurisdictions include a fixed cost element in expenditure allocation formulae: Netherlands; South Africa; Spain; and Australia.[23] In Spain, for example, the fixed amount is set at 2.03% and in South Africa it is set at 5% (in the provincial equitable share formula). A range of different types of needs formulae are used in these countries and a fixed element could be used in any type of formula.[24]

4.5 Data sources

Data clearly is an important foundation for any needs based formula. In general the problem of finding sufficient data of reasonable quality increases as the complexity of the formula increases; as the sophistication of the statistical techniques used increases; and as the size of the relevant geographic area declines. Data for Wales, for example, is usually more widely available and of better quality than data for the Welsh local authorities;[25]

[23] Further details on the formulae for these jurisdications are included in the Annexes and, for the Netherlands, in Section 3.3.5.

[24] Though a per capita formula would no longer be a 'pure' per capita formula if a fixed element were added.

[25] Inadequacy of data for small geographic areas can be a particular problem when multi-level modelling is being used.

whilst there may be adequate data to use a per capita approach where there is insufficient data to undertake complex modelling of demand and supply.[26]

Types of problems with data include the availability of only poor proxies for real needs measures;[27] small sample sizes (e.g. where the number of regions in a country is small); lack of data at the small area level; and poor quality data at the small area level because, for example, of the significant impact of boundary effects.

The following list has been suggested as a list of desirable criteria for use in local authority (LA) expenditure regressions. [28]

- Indicator should be correlated with the 'target' measure and it should be possible to justify how the indicator is expected to relate to the level of need, and therefore expenditure;
- Indicator should be free from local authority influence – either independently collected or independently verified;
- Indicator should be measured consistently across LAs;
- Frequency of update of the indicator should also be considered;
- Availability of data for the indicator at LA level;
- Indicator should not exhibit excessive volatility;
- Indicator should not provide an incentive to local authorities to behave perversely – i.e. to undertaken activities only because they lead to a higher grant allocation.[29]

The extent to which these criteria are met by the indicators in any one formula depend on a number of factors including the type of formula used, the particular application of that formula type, the available data, and the wider institutional circumstances. We comment here on the relationship

[26] See Chan et al, 2007.

[27] The choice of variables and weights is discussed in Section 4.2.

[28] See LE Wales (2008).

[29] Incentive issues are discussed in Section 5.3.

between the formula types outlined in the previous Chapter and these characteristics. A review of some of the institutional issues is provided in Section 5.4 of this Chapter.

The advantage of the more complex formula types is that they enable, in principle at least, the more accurate targeting of need and so enable a more direct link between the indicator variable included in the formula and the need being measured. The potential disadvantage of this is that the data requirements are more onerous and so problems with the quality of the data are more likely to be highlighted, including factors such as availability, consistency, volatility etc.

For the simpler and intermediate formula types, however, the likelihood is that there will be a weaker link between indicators and specific expenditure needs because of the aggregate, higher level nature of the formula. The advantage of this is that it can provide more flexibility in the choice of indicator variable and so the problems of data quality mentioned above can be reduced. Incentive issues are discussed in Section 5.3.

5 Issues in the application of formulae

5.1 Pressures for hypothecation

Some of the advantages and disadvantages of hypothecation are discussed in Section 4.3. At present, the funds allocated to the devolved administrations are not hypothecated. This enables these elected bodies to distribute expenditure in the way that is most suited to local needs and priorities, in line with devolved powers and functions.

In other UK contexts however, it is apparent that the nature of the funding formula can lead to pressures for the hypothecation of funds even where hypothecation is not a formal requirement. The funding of schools in Wales is one area where Welsh local authorities have come under pressure to allocate funds to schools in line with the formula that the Welsh Assembly Government uses for allocating education funds to the Welsh local authorities – in effect, hypothecation.[30]

We understand that similar pressures have also arisen in England and that, as a result, the Department for Communities and Local Government no longer directly publishes data on modelled expenditure allocation by function to each local authority in England (though these amounts can be inferred from other published material). A further example is the introduction in England of the Dedicated Schools Grant in 2006-07 to replace the less hypothecated education element of the Revenue Support Grant.

Formula approaches based on outcome measures are directly linked to achieving specific policy outcomes and so these approaches imply central decision-making about policy outcomes (in effect, hypothecation). Pressures for hypothecation also arise, though in a less direct way, where systems of expenditure based formulae are used such that there are different formulae for different expenditure functions. By their nature these pressures could not arise where a single aggregate expenditure based formula is used, covering

[30] A recent Welsh Local Government Association (WLGA) press release, for example, rejects the suggestion in research funded by the National Union of Teachers in Wales (NUT Cymru) that "local authorities are not funding education in line with the levels of funding that are received from WAG". See WLGA (2009).

all expenditure functions, since there is no direct link between indicator variables and any one expenditure function.

5.2 Adjustments to formula outcomes

The extent of political interference is a frequent criticism of some needs based formulae. The criticism tends to focus on those intermediate formulae where the process for developing the formula is opaque or where it is the outcome of a bargaining process. As we have seen, this political input can occur in the development of the formula – choosing indicators and assigning weights to those indicators. It can also occur in the way that the formula is applied or in the way adjustments are made to formula outcomes.

In Spain there appear to have been many ad hoc adjustments to the formula in response to political pressures. In South Africa, it is claimed that the government has deviated many times from the annual recommendations of the Financial and Fiscal Commission on the allocation process, even though the system is set up so as to make this more difficult.[31]

Many formulae have a 'damping' mechanism in place. These take various forms and generally seek to limit the extent of year on year changes in formula allocations. They are also used when a formula is first introduced to limit any step changes in allocations.

One example of the use of a damping mechanism was the former Supporting People[32] distribution formula in Scotland (used between April 2005 and April 2008).[33] The Scottish SP distribution formula was applied in aggregate across all SP funds and was based on 4 measures of need –

1. Population aged over 65 [30%];

[31] See Shah (2006).

[32] Supporting People is a housing related support programme undertaken separately in each of the four nations of the UK. The allocation in Wales is currently based on historical expenditure allocations, though allocation through a needs based formula is currently under investigation (see LE Wales, 2008). In Northern Ireland, expenditure is allocated based on a process of stakeholder consultation.

[33] From April 2008, the ring fence around Supporting People grants is to be removed with the funding being absorbed into wider local authority funding. This change is taking place as part of a wider reorganisation of local authority funding in Scotland involving a reduction in the number of separate funding streams for local authorities.

2. Number receiving disability living allowance [20%];

3. Homelessness applications – three year average [30%];

4. Population in the worst 15% of SIMD data zones [20%].[34]

A damping mechanism was introduced such that in the first year of operation of the formula no local authority would receive less than 92.5% of the funds they had received in the previous year. This mechanism had very large impacts on some local authorities. One authority, for example, more than doubled its funding allocation as a result of the damping adjustment.[35] Another lost three quarters of its allocation from the damping adjustment. It would have gained significantly from the introduction of the formula it the damping adjustment had not been made.

Another damping mechanism forms the fourth component of the current four block model for the distribution of funds to English local authorities. The four blocks are:

- Relative needs block (equalises for need)
- Relative resources block (equalises for tax-base)
- Central allocation (a per head amount)
- Damping Block (guaranteed minimum increase in grant).

Damping mechanisms have the potential to have at least as much influence on allocation outcomes as the needs based formula itself. Damping can be justified because there can be real impacts from significant swings in expenditure allocations. In the Supporting People context, for example, local authorities can have long term contracts with independent service providers for the provision SP services as well as commitments to vulnerable service users. There is no doubt however that such damping mechanisms provide an opportunity for political interference. There is a risk that 'losers' from any formula change are over-compensated – they have, implicitly, been the

[34] The SIMD is the Scottish Index of Multiple Deprivation.

[35] Compared to application of the formula without the damping adjustment. It would have lost heavily through the introduction of the formula without this adjustment, but presumably its previous expenditure allocations were too high, when measured by relative need.

beneficiaries under the previous formula regime. Given a fixed sum of money for distribution, the 'losers' under the previous formula regime are likely to continue losing out for longer under any damping mechanism.

5.3 Incentives

The incentive effects of formulae, and the processes for developing them, are important. Elsewhere in this report there are references to two types of incentive effect. First, in relation to the data inputs for any formula and second in relation to policy responses to any formula.

The allocation of funds under a formula based system depends not only on the nature of the formula but on the data that underlies the indicator variables in the formula. If the recipients of the funds are also responsible for collecting the data that underlies some of the variables included in the formula, they may have an incentive to collect the data in such a way as to increase their allocation of funds under the formula. There may be scope to act in this way where the rules about the definition of the variable and the method of data collection are insufficiently specific to prevent this. In practice it can be difficult to define variables and processes in such a way as to completely avoid this risk.

The most straightforward way to avoid this problem is to ensure that none of the variables in the formula are based on data collected by the recipient bodies (or others who might have similar motivations). This is likely to be straightforward where relative simple high level formulae are used but may be more difficult to achieve where the more complex formula approaches are used because they require more detailed data and alternative sources for this data can be limited.

Aside for the incentives for efficiency that can be encouraged by matching revenue raising powers with expenditure functions (see Section 2.2), formulae can affect incentives by encouraging recipients to implement policies in order that they affect the expenditure allocation rather than to implement policies because they are the best policies per se.

For example, in a formula relating to funding for schools, a variable reflecting the proportion of schools that are of small size might be included on the grounds that the per pupil costs of small schools are greater. This might lead the fund recipient to be reluctant to merge smaller schools in order to avoid

the funding loss implied by the formula, even if it were the case that mergers were the best policy approach.[36]

It is difficult, a priori, to suggest that a specific type of funding formula is more likely to have adverse incentive effects than another. Incentives depend heavily on the specific institutional context and on the variables included in formula. However it may well be the case that simpler, highly aggregated formulae are less likely to lead to perverse incentive effects to the extent that they include explanatory variables that are harder for the fund recipients to influence directly through policy (e.g. population size, demographic characteristics, aggregate income levels).

5.4 Alternative decision-making mechanisms

There are a number of potential mechanisms for taking decisions about expenditure needs and horizontal equalisation processes. The four principal mechanisms are discussed in turn below.

5.4.1 The fund provider makes the decision with no (or limited) consultation.

It is common for the fund provider (e.g. the federal government) to make the decision about how the horizontal equalisation process will operate and, in particular, how expenditure needs will be assessed. This can take place with little or no consultation.[37]

There is a view that this may bias the system towards a highly centralised outcome even though grants are aimed at the facilitation of decentralised decision making.[38] This may suggest the involvement of others, including fund recipients, in the decision-making process – see below.

[36] They might be the best policy approach if they reduced the overall costs of schooling without impacting on the quality of education received by school pupils or having other wider adverse effects.

[37] The Barnett formula appears to be an example of this.

[38] See Shah (2007).

5.4.2 The fund provider makes the decision in close consultation with recipients (and sometimes others).

Arguably this might introduce some vertical equity into the process. The Welsh Assembly Government (WAG), for example, involves the Welsh local authorities closely in the decision-making process in respect of the formulae that are used to allocate WAG funds to the local authorities. Whilst this approach appears to be reasonably successful in Wales, it has led to problems elsewhere.

In the Canton of Fribourg in Switzerland, the formula for the allocation of funds to the communes is the outcome of a process of political negotiation between the communes and the cantonal authorities. The outcome of these negotiations is a combination of three indices that have the effect of largely cancelling out each others' effects, leaving little reason for using the 'needs based' index.[39]

The Spanish case is illustrative of how different regions (with high and low income) have negotiated a solution. The current formula system was established in 2001 on the basis that it was to be permanent – previously formula systems had been established for five year periods. Nevertheless, following political pressures, it is now understood that the current system of 2001 will be changed to reflect the recent changes in needs in the regions. For that reason, there are major confrontations between the different Spanish regions and discussions on the effects of the new system on the different regions. The principle of solidarity and how low-income regions should be organised to make the system equitable are the focus of the recent debate.

5.4.3 The fund provider makes the decision following statutory advice from an independent body

The introduction of 'external' advice into the process might be one way of resolving some of these political problems. This is the approach taken in Australia, South Africa and India.[40] In South Africa, for example, an independent body, the Financial and Fiscal Commission (FFC) advises the South African government on fiscal allocation methods. Legislation sets out

[39] See Dafflon et al (2003) for a discussion of this negotiation process.

[40] In Australia, independent advice is provided by the Commonwealth Grants Commission (CGC). Further details about the CGC are provided in Annex 2 and in Annex 6.

the requirement for the FFC to provide advice and the South African government is also required to explain why and where it deviates from the advice (which it is free to do).[41]

The idea behind this approach, which has been advocated by a number of commentators in the UK context, is that the advice of the independent Commission will be more objective and less susceptible to political considerations and, because the advice is statutory and is published, the central Government will find it hard to deviate from the advice without good reason. There appear to have been few deviations from Commonwealth Grants Commission (CGC) advice in Australia but deviations from the FFC advice seem to be rather more common in South Africa.[42]

5.4.4 The distribution formula is detailed in the constitution or in legislation.

In order to avoid continuing political interference in the parameters of needs based formulae, one option is to enshrine the formulae in legislation. In Brazil this idea is taken a step further and some formulae are enshrined in the constitution.[43]

The inclusion in legislation (or the constitution) makes amendments more difficult. Whilst this is the aim, in order to limit political interference, it also makes it more difficult to amend formulae for more objective reasons relating to changing economic circumstances. The approach in South Africa, where annual legislation (the Division of Revenue Act) is used to change the allocation formulae, is a compromise.

[41] For further details on the FFC, see Annex 6.

[42] It is difficult to judge the extent to which the deviations are justified without detailed analysis of South African decision-making over a period of time.

[43] See Shah (2007).

Annex 1 Older People's Social Services in England

The formula presented below is the formula for 2009-10 used to allocate UK government funds to English local authorities for the provision of social services to adults aged 65 and over.[44] It is one of 15 expenditure category based formulae used to allocate Formula Grant funds to English local authorities.

Main formula

(a) **Projected household & supported residents aged 65 and over**; *multiplied by:*

(Basic amount *plus* **Age top-up** *plus* **Deprivation top-up)**;

(b) The result of (a) is *multiplied by* **Low income adjustment**;

(c) The result of (b) is *multiplied by* **Sparsity adjustment for people aged 65 and over**;

(d) The result of (c) is *multiplied by* **Area Cost adjustment for older people's PSS**;

(e) The result of (d) is then *multiplied by* the scaling factor **1.00000006216191**;

(f) The result of (e) is then *divided by* **10,000,000,000**.

Definitions

Basic amount = 84.3299

Age top-up = **Household and supported residents aged 90 and over** *divided by* **Household and supported residents aged 65 and over**, rounded to 4 decimal places and *multiplied by* **978.3664**; *minus* **25.1440**.

[44] See Department for Communities and Local Government (2009) for more details.

Deprivation top-up =

282.5846 *multiplied by* **Older people receiving attendance allowance**; *plus*

54.6478 *multiplied by* **Older people in rented accommodation**; *plus*

73.1950 *multiplied by* **Older people living in one person households**; *plus*

219.7805 *multiplied by* **older people receiving pension credit guarantee/income based jobseeker's allowance**; *minus*

76.1189.

Low income adjustment =

The sum of:

(a) **0.1042** *minus*

(b) **0.102** *multiplied by* **Older people on income support/income based Job Seeker's Allowance/Guarantee element of Pension Credit**; *plus*

(c) 0.126281166

This sum is then *divided by* the **Area cost adjustment for Older peoples PSS** and *subtracted from* **1**.

This amount is then *divided by* **0.783105234** and calculated to 4 decimal places.

Sparsity adjustment for people aged 65 and over

The sum of:

(i) 2 multiplied by the resident population aged 65 years and over of those Lower Super Output Areas within the area of the authority at the 2001 Census with 0.08 or fewer residents per hectare, divided by the total resident population aged 65 years and over of the authority, calculated using information from the 2001 Census; and

(ii) The resident population aged 65 years and over of those Lower Super Output Areas within the area of the authority at the 2001 Census with more than 0.08 but less than or equal to 0.64 residents per hectare, divided by the total resident population aged 65 years and over of the authority, calculated using information from the 2001 Census.

The sum is then divided by 0.2051009, multiplied by 0.0043, and then added to 0.9957.

The indicator is the result of the above calculation divided by 0.9957, calculated to 4 decimal places.

Area Cost adjustment for older people's PSS

A factor calculated to reflect differences in the cost of providing older people's personal social services across the country. It is generally based on information derived from the following sources: the 2004, 2005 and 2006 Annual Survey of Hours and Earnings provided by the Office for National Statistics; Subjective Analysis Return 2003-04 and 2005-06; Base Estimate Returns 1992-93; Trading Services Revenue accounts 2005-06; Council Personal Social Services Gross Expenditure PSS EX1 2005-06; and the total resident population as at 30 June 2006, as estimated by the Registrar General.

Annex 2 Australian standard cost approach

Overall approach to allocating funds

A funding distribution formula based on both expenditure needs and revenue capacity is used to allocate two elements of the Australian Commonwealth (federal) government's revenues to the Australian States and Territories. These two elements are known collectively as 'the pool'. These are:

- Revenues from Goods and Services Tax (GST); and
- Revenues from Health Care Grants (HCGs).

The Commonwealth Grants Commission (CGC) was established in order to advise the Commonwealth government on the appropriate 'per capita relativities' for distributing the pool among the States. The distribution is designed to provide all States with the same fiscal capacity to provide services to their populations — to achieve horizontal fiscal equalisation.

The formula used to distribute the pool is assessed periodically. A review is currently underway, for completion in 2010. The last review was completed in 2004. The formula is used to calculate 'per capita relativities' for each State, with each State's allocation of the pool calculated as follows:

State Allocation = State Per Capita Relativity x State Population x Average Per Capita Allocation for Australia

Each State's Per Capita Relativity is recalculated annually based on a formula designed by the CGC. The CGC calculates the relativities using data for the most recent five completed financial years. The relativities for each of the five years are then averaged. The stated purpose of this five year averaging is to reduce volatility in revenue distribution from year to year.

The main factors used to determine each State's funding allocation are: population; expenditure; own-source revenue; relative cost of providing services in each State; each State's revenue raising capacity; and the value of Specific Purpose Payments (SPPs) paid to the State. These are payments

made to State governments which are used for purposes specified by the Australian government.[45]

Variations in expenditure need

Our main interest for this research is in the way in which the need for expenditure on providing services in each state is calculated.

The CGC does this by assessing what it would cost each State to provide the average level of service in a particular year.[46] In order to make this assessment, the CGC break down expenditure into 39 categories and, for each category, assess the 'disabilities' that lead States to spend more or less than the average for Australia in order to provide the average level of service.

Disabilities relate to factors that lead to differences in the use of services and to differences in the unit costs of providing services. A summary of the main factors in each of these two categories is provided in the table below.

[45] More details on this formula are available at Commonwealth Grants Commission (2006).

[46] Commonwealth Grants Commission (2008).

Table 1: Main disability factors used in CGC analysis, 2004

Use of service disabilities	Unit service cost disabilities
Socio-demographic composition (age, gender, aboriginality, income) **Cross-border effects** (where services in one State are used extensively by residents in another State) **Economic environment** (e.g. where uneconomic for private sector to provide services in some areas) **Urban influences** (effects of higher costs arising from the concentration of population in urban centres)	**Administrative scale** (differences in fixed costs per capita in providing central admin functions) **Input costs** (e.g. wages, accommodation, energy, borrowing) **Dispersion** (Sparsity impacts on cost of services) **Isolation** (to reflect higher costs because some States are geographically and economically isolated from main interstate sources of supply in SE Australia) **Service delivery scale** (effect on unit costs of differences in the proportion of services provided from small outlets with high staff to client ratios) **Physical environment** (Impact of natural hazards on maintenance costs and depreciation)

The CGC only make allowance for those disabilities that are beyond the direct control of each individual State Government.[47] For disabilities relating to use, the general approach is to assume that the disability is in proportion to the ratio of the State population of the relevant user group to the Australian population of that user group. A more complex calculation is undertaken where there are multiple user groups and further adjustments are made, using average costs estimates, where some user groups are considered to be more expensive to provide services to than others. The methods that the CGC uses to make any adjustments to reflect the extent of these disabilities are varied, such that there is not one single method that is used.

[47] A table showing the disabilities taken into account for each spending category is provided at Annex 2.

The table overleaf indicates which types of expenditure 'disability' are used in each spending category for the purposes of allocating funds to the Australian States.

Table 2 Summary of disabilities applied

	Socio-demographic	Urban influences	Admin. scale	Input costs	Dispersion	Service del'y scale	Econ. environ.	Phys. environment	Isolation	Native Land rights	Cross-border	National capital	Other
Education													
4010 Pre-schools	*		*	*	*	*			*				
4020 Government primary education	*		*	*	*	*			*				
4030 Non-government primary education	*		*	*									(a)
4040 Government secondary education	*		*	*	*	*			*		*		(b)
4050 Non-government secondary education	*		*	*							*		(a)
4060 Vocational education and training	*		*	*	*	*			*		*		
4065 Higher education ##													
4070 Transport of rural school children	*				*								
Health and community services													
4110 Inpatient services	*		*	*	(c)	(c)	(e)		*				(d)
4115 Non-inpatient & community health	*		*	*	*		*		*		*		
4120 Population and preventive health	*		*	*	*		*		*		*		
4130 Family and child services	*		*	*	*				*		*		
4135 Aged and disabled services	*		*	*	*				*		*		
4140 Homeless and general welfare	*		*	*	*						*		
4160 Housing	*		*	*	*				*	*			(f), (g) & (h)
4164 First home owners scheme #													
4180 Services to Indigenous communities	*		*	*	*	*			*	*			
Law, order and public safety													
4440 Police	*	*	*	*	*	*			*		*	*	
4450 Administration of justice	*		*	*	*		*		*	*	*		
4465 Corrective services	*		*	*	*				*		*		
4470 Public safety		*	*	*	*			*	*			*	
Culture and Recreation													
4710 Culture and recreation			*	*	*		*		*		*	*	
4720 National parks and wildlife services	*		*	*	*		*	*	*	*		*	(i)
Economic activities													
5415 Electricity and gas	*		*	*	*		*						
5420 Water sanitation & environ. protection	*		*	*	*		*		*	*			(m) & (s)
5425 Non-urban transport	*		*	*	*		*						
5430 Roads		*	*	*	*			*	*	*		*	(j) & (k)
5435 Urban transit			*	*								*	(h), (n) &(q)
5440 Primary industry			*	*	*		*	*	*	*			(l)

	Socio-demographic	Urban influences	Admin. scale	Input costs	Dispersion	Service del'y scale	Econ. environ.	Phys. environment	Isolation	Native Land rights	Cross-border	National capital	Other
5450 Mining fuel and energy			*	*	*		*		*	*			
5455 Tourism			*	*			*		*				
5490 Manufacturing and other industry			*	*			*						
5491 Subsidies – petroleum products ##													
5492 Subsidies – alcohol products													(p)
General Public Services													
5505 Superannuation													(o)
5520 GST administration #													
5525 General public services		*		*	*	*		*		*	*	*	
5530 Debt charges													(r) & (t)
5540 Depreciation		*	*	*		*	*						(g) & (h)

Other includes:

a non-government school costs
b grade cost
c the hospital costs factor measures dispersion and service delivery scale
d cost of patient travel/transport factor
e the socio-demographic composition factor also measures the impact of economic environment
f dispersion construction cost factor
g natural hazards
h wages input costs
i marine parks factor
j includes bridge operations, local roads, national highways, road length and road use factors
k urban traffic management factor
l NAPSWQ payments and State expense factors
m water and sewerage cost factor
n factors were assessed for pricing and capital subsidies
o the factors assessed were accrued expenses, historical factor, cost of borrowing and quantity of borrowings
p cellar door subsidy, low alcohol wine subsidy and other subsidies
q concessional passenger use factor
r ACT phase in adjustment
s salinity factor
t the factors assessed were cost of borrowing and quantity of borrowings

\# actual per capita assessment
\## equal per capita assessment

Annex 3 The Spanish allocation formula

The current model of regional financing involves different steps and adjustments, so, although a formula for needs plays a role at some point, the mechanism is more complex and should be described as a system of regional financing.

Since 1986, public funding was regulated every five years by multilateral agreements of different stakeholders. The current system was agreed in July 2001 and is regulated by ley 21/2001, 27 December.

The current system allows for two very different models for allocating public funds to the regions (the Autonomous Communities). The foral (or privileged) and the common system.

In the foral system, the foral regions (the Basque Country and Navarra) collect almost all tax contributions (with the exception of social security contributions) and pay to the State a quota for the services not transferred and which are provided by the government. Given that these are regions with high income, they benefit from a higher level of public funds (around 60% or 70% above the average common system region).[48]

The common system works in the following way. First, public funds are allocated according to a formula for needs that is based on demographic and territorial characteristics (such as population, ageing, land area, dispersion of the population, and insularity), referred to a base year (the year chosen as the starting point for the system). For future years, funds are allocated using some rules to account for the evolution over time of the Autonomous Communities ("normas de evolución del sistema"). After applying the formula, a number of ad hoc corrections are introduced to account for several factors (so called: guarantee of minimum, modulations, special funds, specificities of Canary Islands, adjustments for social security funds). As a result, the Autonomous Communities end up with a different allocation to

[48] de la Fuente, A. (2008): "El sistema de financiación regional: problemas y propuestas de reforma".Colección Estudios Económicos, 22-08. Serie Economía Regional. CÁTEDRA Fedea – CajaMadrid.

the one that would have been provided with the formula (de la Fuente and Gundín, 2007). [49]

An interesting feature of the current system of 2001 is that 1) it was established to last indefinitely, 2) funding for health and social services is integrated with the rest of competencies for the first time, and 3) there is an increment of taxes transferred to the Autonomous Communities and a reduction of the transfers from the central Government.[50]

The common system allocates funds to the regions according to three different broad service areas:[51]

- common competencies (55%);
- health (43%); and
- social services (1%).

The total funds for allocation through this mechanism were €53,137 million in the base year, 1999.

The following formulae are used:

- Common competencies:
    - Fixed amount per region (2.03%);
    - Population (92.09%);
    - Island (0.59%);
    - Land area (4.11%);
    - Dispersion measure (number of population centres) (1.18%).
- Health:

[49] de la Fuente, A and Gundín, M, (2007): "El sistema de financiación de las comunidades autónomas de régimen común: un análisis crítico y algunas propuestas de reforma". Investigaciones Regionales.

[50] So the Autonomous Communities use the transferred taxes as a complementary source of funding.

[51] For further details see de la Fuente and Gundín (2007).

  - Protected population (75%);
  - Population >65 (24.5%);
  - Island (0.50%).

- Social services:
  - Population >65 (100%).

The total allocation is therefore a combination of the following seven variables:

- Fixed amount per region (1.12%);
- Population (50.79%);
- Protected population (32.57%);
- Population >65 (12.07%);
- Island (0.54%);
- Land area (2.27%);
- Dispersion measure (0.65%).

After applying the formula, a number of *ad hoc* corrections are introduced to account for several factors (so called: guarantee of minimum, modulations, special funds, specificities of Canary Islands, and adjustments for social security funds).

In addition, some extra funds are distributed to account for additional services (such as prisons, police force, administration of justice,…) for those regions that directly manage such services. At the present time, this amount is small compared to the rest of funds.

Annex 4 South African Equitable Share Formula

The formula, known as the 'provincial equitable share formula', used to allocate funds to the nine South African provinces is provided below.[52] The weight for each main component is also shown in **bold** and the weights for the sub-components, within each main component, are shown in *italics*.

- **Education (51%)** based on size of school age population (*50%*) and the number of learners enrolled in public ordinary schools (*50%*);
- **Health (26%)** based on the population with (*20%*) and without (*80%*) access to medical aid;
- **'Basic' (14%)** based on share of national population;
- **Institutional (5%)** equal amount across provinces – to reflect the view that some costs of government administration and service provision are fixed relative to population size;
- **Poverty (3%)** based on provincial percentage of population in lowest two income quintiles;
- **Economic output (1%)** based on GDP. This is seen as a proxy for provincial tax capacity.

[52] Source: Republic of South Africa (2009).

Annex 5 Indicator of local financial needs in Fribourg

The Canton of Fribourg, in Switzerland, uses a formula approach to allocate funds to the communes within the Canton. The formula approach takes account of both the revenue raising capacity of the communes and the expenditure needs (or 'local financial needs'). The indicator for local financial needs is presented below.[53]

Indicator of local financial needs (LFN_i) = $(PD_i + EA_i + DG_i)/3$

Where,

PD_i is an indicator of **population density** in commune i. This is intended to reflect the higher per capita costs of providing services in communes where the population is sparsely distributed. The measure reflects the average population density of each commune as a proportion of the average population densities of all communes in the Canton.

EA_i is an indicator of **economic activity** in commune i. This measure is inversely related to the number of jobs per resident in each commune as a proportion of the number of jobs per resident in all communes. It is intended to reflect the higher costs of public service provision in those communes that are regional centres where people from other communes travel to work.

DGi is an indicator of **demographic growth** in commune i. It takes into account half of the difference between the actual demographic growth in a commune for the last ten years and the average demographic growth in the canton for the same period. A higher communal growth rate leads to a higher expenditure allocation.

[53] Source: Dafflon and Tóth (2003).

Annex 6 Independent institutions

Introduction

In this annex we provide a brief overview of the financial and staff resources available to two of the independent bodies involved in the setting of needs based formulae – the Commonwealth Grants Commission in Australia and the Financial and Fiscal Commission in South Africa. We also provide an indication of the composition and appointments process for Commissioners.

Although we focus here on the Australian and South African examples, similar Commissions do also exist elsewhere.

Commonwealth Grants Commission in Australia

Table 3 below shows the revenues received by the CGC from the commonwealth government between fiscal year 2005-06 and 2008-09, as well as the number of staff over the same period.

Table 3: Australian Commonwealth Grants Commission Budget and Number of Employees, Fiscal Years 2005-06 to 2008-09

Indicator	**2005-06**	**2006-07**	**2007-08**	**2008-09**
CGC Revenue from Government (AUD '000)	6,910	7,769	7,989	7,809
(GBP Equivalent '000)	2,905	3,158	3,565	3,577
Number of Employees	41	44	47	50

Source: Commonwealth Grants Commission Annual Report (various issues)

Note: Fiscal Year runs from 1st July to 30th June

Table 4 below lists the five members of the CGC as at March 2009. These are statutory appointments and all members of the current Commission operate on a part-time basis.

Table 4: Members of Australia's Commonwealth Grants Commission as at March 2009

Name	Position	Term of Office	Status
Mr. Alan G. Morris	Chairperson	1st July 1999 to 30th June 2009	Part-Time
Prof. Ross Williams	Commission Member	April 2002 to March 2011	Part-Time
Mr. Glenn Appleyard	Commission Member	June 2004 to June 2009	Part-Time
Ms. Jennifer Westacott	Commission Member	July 2006 to July 2011	Part-Time
Mr. Greg Smith	Commission Member	August 2006 to August 2011	Part-Time

Source: Commonwealth Grants Commission website [accessed 25th March 2009]

A more detailed profile of each Commission member is provided in Table 5 overleaf.

Table 5: Brief Profile of Australia's Commonwealth Grant Commission Members as at March 2009

Member	Current Occupation(s)	Previous Positions
Mr. Alan G. Morris	CGC Chairperson	Executive Director of the European Bank in London Secretary of the Chief Minister's Department in the Northern Territory Secretary of the Premier's Department in Tasmania Has worked in three Commonwealth Departments
Prof. Ross Williams	Professorial Fellow at the Melbourne Institute	Dean of the Faculty of Economics and Commerce at the University of Melbourne Previous appointments at Monash University, Australian National University and the World Bank
Mr. Glenn Appleyard	Economic Consultant Member of the Australian Accounting Standards Board Member of Tasmanian State Grants Commission	Deputy Secretary in the Tasmanian and Victorian Departments of Treasury and Finance Regional Director for the Australian Bureau of Statistics in Tasmania General Manager of the Food, Agriculture and Fisheries Division of the Tasmanian Department of Primary Industries, Water and Environment
Ms. Jennifer Westacott	Partner with KPMG Member of the Board of Advice Faculty of Economics, University of Sydney Adjunct Professor at the City Futures Research Centre, University of NSW	NSW Department of Housing NSW Department of Community Services NSW Health Council NSW Department of Infrastructure, Planning and Natural Resources Housing Victoria Education and Training Victoria
Mr. Greg Smith	Adjunct Professor in Economic and Social Policy at Australian Catholic University Governor of the Australian Tax Research Foundation Consultant in public policy	Executive Director of the Australian Treasury

Source: Commonwealth Grants Commission website [accessed 25th March 2009]

Financial and Fiscal Commission in South Africa

The FFC is an independent body that does not directly determine expenditure allocation formulae, but advises the South African Government on those formulae.

Every year the South African Government introduces a Division of Revenue Bill into Parliament. This Bill sets out legislative proposals for the division of federal revenues amongst the provinces and local authorities of South Africa. Every year the FFC produces a report called the Submission for the Division of Revenue which advises the government on the changes that should be made to revenue allocations. Whilst the government does not have to accept the FFC proposals it must, in an explanatory memorandum to the Bill, explain whether it has departed from the FFC recommendations, and if so, how and why.[54]

Details of the Financial and Fiscal Commission's income and staffing levels between fiscal years 2004-05 and 2007-08 are shown in Table 6 below.

Table 6: South Africa's Financial and Fiscal Commission Income and Number of Employees, Fiscal Years 2004-05 to 2007-08

Indicator	**2004-05**	**2005-06**	**2006-07**	**2007-08**
Total Income (Rand '000)	18,435	20,107	21,705	27,496
(GBP Equivalent '000)	1,599	1,759	1,621	1,923
Number of Employees	22	29	39	31

Source: Financial and Fiscal Commission Annual Report (various issues)

Note: Fiscal Year runs from 1st April to 31st March

Table 7 below provides details of the current composition of the Commission. There are a total of 9 Commissioners and they are appointed for a maximum term of 5

[54] As required by section 10(5) of the Intergovernmental Fiscal Relations Act 1997.

years. The appointment are made as follows:

- The Chairperson and Deputy Chairperson, who serve in an executive capacity, are appointed by the President.
- Two additional commissioners are appointed directly by the President.
- Three commissioners are appointed by the President from a list of nominations compiled by the Premiers of the nine provinces.

Two commissioners are appointed by the President from a list of nominations compiled by the South African Local Government Association (SALGA).

Table 7: Members of South Africa's Financial and Fiscal Commission at March 2009

Name	Position	Term of Office	Appointment Type
Dr Bethuel Setai	Chairperson/Chief Executive	September 2008 to August 2010	Presidential Appointee
Mr. Bongani Khumalo	Deputy Chairperson	March 2008 to February 2013	Presidential Appointee
Ms.Tania Ajam	Commissioner	July 2004 to June 2009	Provincial Nominee
Mr. David Savage	Commissioner	March 2008 to February 2011	Presidential Nominee
Mr. Martin Kuscus	Commissioner	July 2004 to June 2009	Provincial Nominee
Ms. Nelisiwe Shezi	Commissioner	December 2006 to June 2009	
Mr. Blake Mosley-Lefatola	Commissioner	To June 2009	SALGA Nominee
Mr. Risenga Maluleke	Commissioner	July 2004 to June 2009	Provincial Nominee
Mr. Krish Kumar	Commissioner	March 2008 to February 2011	

Source: Financial and Fiscal Commission website [accessed 25th March 2009]

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