

Replacing the Barnett Formula by needs assessment: lessons from school funding formulae in England and Scotland

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November 2012

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Abstract

The UK's devolved administrations (DAs) receive block grant to finance almost all their expenditure. The formula used to calculate the block grant is often criticised because it does not consider the DAs spending needs. However the feasibility of allocating block grant by needs assessment is often questioned, given the contestability of spending needs.

This paper compares the formula used within England to assess the education spending needs of local authorities there with the equivalent Scottish formula, by using each formulae in turn to calculate the spending needs of the UK territories. The rationale is to consider how similar the two formulae are in how they estimate the spending needs of UK territories for education, a major responsibility of the devolved governments.

Results show that the English and Scottish education allocation formulae produce similar estimates of the relative education spending needs of the UK territories. This suggests that it may be more feasible to allocate education resources to the UK's devolved territories based on spending needs assessment than some have suggested. The results also suggest some inequity in current patterns of education spending across the UK.

This research has been funded through ESRC Research Grant RES-062-23-2814, 'Development of needs-based funding models for the devolved territories in the UK'. The grant runs from March 2011 – February 2013.

1. Introduction

Since 1999, the UK has been embarking on a process of devolution which gives the devolved administrations (DAs) in Wales, Scotland and NI significant autonomy to determine policy and spending priorities across a wide range of policy areas, including education.

The DAs have little ability to raise tax and are almost wholly reliant on a block grant from the UK government to fund their spending. This block grant is determined by the Barnett Formula. The Barnett Formula determines the change to the DAs' budget based on changes in spending on comparable (i.e. devolved) services in England, and the population share of each DA (HM Treasury, 2010). For example, if the UK government announces a £100m increase in education spending, if 99% of all UK education spending is devolved, and if Scotland's population is 10% of England's, then the Scottish Government would see an increase in its budget of £9.9 million. The Barnett Formula makes no attempt to estimate the spending needs of the DAs for any other factors which might be expected to influence the level of spending required by each DA to enable it to provide a similar basket of public services as in other parts of the UK. And no consideration of spending needs was ever made in determining the DAs' historic baseline grant, on which all subsequent Barnett adjustments have been made.

The fact that the Barnett Formula makes no attempt to estimate spending needs arguably leads to inequity in funding levels across the UK territories (McLean & McMillan, 2003). Per pupil spending on education for example is 9% lower in NI – but 5% higher in Wales – than it is in England. These differences are largely driven by significant variation in the ratio of school-age children to adults in the UK territories¹, which is not compensated for by the Barnett formula.

The Barnett Formula block grant is un-hypothecated, so the DAs could theoretically increase (or decrease) the amount they spend on education. But changes in education spending inevitably lead to changes in spending on other policy areas, and it is not clear how much leeway the DAs have, to increase spending on education without having significant consequences for spending in other areas. Spending on primary and secondary schools accounts for between 15-23% of devolved spending in each of the DAs.

There have been increasing calls for the Barnett Formula to be replaced with an alternative allocation mechanism that makes some attempt to assess the spending needs of the DAs. The Holtham Commission (Independent Commission on Funding and Finance for Wales 2010)

¹ Throughout this paper, we use the expression DA to refer to the UK's three devolved administrations (Scotland, Wales and Northern Ireland), while the expression 'UK territories' refers to the four territories of the UK (England, Scotland, Wales and Northern Ireland).

recommended that the Barnett Formula should be replaced by a needs based spending assessment, as did the House of Lords Select Committee on the Barnett Formula (Select Committee on the Barnett Formula 2009) which argued that:

'Public spending per head of population should be allocated across the United Kingdom on the basis of relative need, so that those parts of the UK which have a greater need receive more public funds to help them pay for the additional levels of public services they require as a result.'(Paragraph 81).

Since the publication of the Holtham and House of Lords reports, the debate around the financing of devolution in the UK has moved on rapidly. Limited tax raising powers have been conferred to Scotland through the Scotland Act (2012), and there are ongoing investigations into the possibility of devolving some taxes to both Wales (through the Commission on Devolution in Wales) and NI (HM Treasury, 2011). Nonetheless, under most foreseeable arrangements for fiscal devolution in the near future, some level of block grant transfer from the UK to the devolved governments will continue to be necessary to address the imbalance between revenue raising and spending by the DAs.

It has often been suggested that the UK could, in place of Barnett, adopt a system of needs assessment similar to that used to allocate resources to Australian states (e.g. Kay et al. 2005), while others have argued in favour of a simpler approach to assessing the spending needs of UK territories (McLean et al. 2008; Independent Commission on Funding and Finance for Wales, 2010). At the same time however, many commentators argue that it will be politically infeasible to develop a needs assessment or formula that was acceptable to all stakeholders, given the normative judgements involved in assessing 'need' (Morgan 2001; Midwinter, 2002). Those against the replacement of Barnett with a spending needs based allocation mechanism often highlight the disputes and alleged political manipulation associated with local government funding formula, and use this to argue that needs assessment replacement for Barnett would be unworkable.

This paper aims to explore the arguments about the feasibility of developing a UK-wide needs allocation formula, looking specifically at compulsory school-age education. We choose to look at education because there is already a long-history of using needs formulae to allocate resources for education within the UK, a fact that forms the basis of our methodology. England has used a variety of school funding formulae since 1981 and is currently consulting a proposals for a new formula; Scotland has used its current system of formula-based allocations to local authorities since 2000. We compare a number of past, existing and proposed future formula by applying them to the territories of the UK. The aim is to consider how similar the formulae are in their estimates of the (school age) education spending needs of the UK territories.

The formulae we examine include those developed and used separately by education departments in England and Scotland; they also include both the very ‘complex’ formula used in England until 2007 and some of the simpler formulae that have proposed for allocating resources in future. It might be expected that these different formulae, developed at different times in different territories by different political administrations, might result in quite different patterns of allocations of education resources across the UK territories. If proved, this hypothesis would support the arguments of those who argue against adopting a spending needs assessment for UK DAs. If on the other hand these different formulae produce similar estimates of the education spending needs of UK territories, then the development of a needs based allocation formula (covering education at least) may be feasible – and that the formulae developed for allocating grants to local authorities provide some useful lessons about how a UK-wide formula might be developed.

The remainder of the paper is structured as follows. Section 2 describes patterns of education spending across the UK territories. Section 3 describes the process for allocating education resources to local authorities (and subsequently, to schools), in England and in Scotland, and highlights some of the current debates around schools funding. Section 4 sets out in more detail the formulae used in England and in Scotland to allocate education resources to local authorities (LAs)² and Section 5 describes our approach to comparing these two formulae. The results are presented in Section 6, focussing on how the English and Scottish formulae estimate the relative education spending needs of the UK territories, and Section 7 concludes.

To preview our results, we find that all the English and Scottish education allocation formulae considered do produce very similar estimates of the education spending needs of the UK territories. This must be seen as good news by those who argue in favour of establishing a spending needs formula for the UK territories. The results, if the formulae are considered reliable, also confirm that there are significant inequities in the level of education spending across the UK.

2. Education spending in the UK territories

School-age education spending in England increased significantly during Labour’s period in office, both in real terms and as a percentage of GDP (West, 2009). The first ten years of the Labour Government (1997-2007) saw annualised growth of 6.4% in per pupil schools spending (Chowdry et al. 2008).

² In the remainder of this paper, we use the term LA to refer to local authorities which provide education services, of which there are some 150 in England, 32 in Scotland, 22 in Wales, and 5 in Northern Ireland.

This increase in spending on education in England fed through to increases in the Barnett-Formula grant allocations to the UK's devolved administrations. The Barnett Formula derived grant allocations are not hypothecated, but broadly they enable the DAs to increase spending on particular policy areas in line with any increase in spending on that policy area in England³.

Table 1 shows some statistics on education spending in the UK's devolved territories. Figures on total spending on primary and secondary schools are from the Treasury's Public Expenditure Statistics Analysis (PESA), and exclude spending on pre-primary and post-secondary education. Data on primary and secondary pupils enrolled in state schools are taken from the Pupil Censuses that are managed by the education departments in each territory. To ensure comparability, we have controlled for somewhat different start dates for compulsory school age education across the territories; these figures indicate the number of pupils in state schools between the ages of 5-15 years, including the various types of academies, faith schools, city technology colleges etc., but excluding special schools.

The results (Rows A and B) indicate that Scotland spends slightly more per pupil than England, and that Wales spends some 6% per pupil less than England. Northern Ireland, according to these figures, spends dramatically less. Its per pupil spend is almost 30% lower than that in England.

The results for NI might seem surprising. However, the robustness of the result can be checked in two ways. First, we consider whether an erroneous estimate of pupil numbers is driving these results. To do this, we repeated our calculations using ONS data on the population aged 5-15 in each territory as the denominator, in place of pupil numbers. Doing this results in a slight increase in estimates of spend per individual in all three DAs, relative to spending in England (row C). This is due to the fact that a higher proportion of pupils attend private (non-state funded) schools in England relative to the DAs (and therefore the difference between the estimates of state school pupils and all individuals aged 5-15 is greater for England than for the DAs), but it does not radically alter the estimate of NI's relative spending.

Second, we consider whether there may be inconsistencies in how spending on primary and secondary education, published in PESA, has been collated across the territories. To do this, we combine PESA's estimates of spending on primary and secondary education with its estimates of spending on 'subsidiary services to education', 'education not definable by level' and 'education not elsewhere classified' (we continue to exclude estimates of spending on pre-primary and post-

³ An interesting mathematical property of the Barnett Formula is that the grant allocations per capita made to the DAs should in theory converge towards per capita spending levels in England. However, there is debate around whether this convergence is observed in practice (Christie & Swales, 2010).

secondary education). With this wider definition of education spending, our estimated figures for spending per pupil, indexed to English per pupil spending (row D), fall to 1.01 for Scotland, rise to 1.05 for Wales, and rise substantially to 0.91 for NI. This indicates that a substantial part of the apparent per pupil funding ‘deficit’ identified above for NI is simply due to a higher proportion of NI’s education spending being classified in one of these more general spending categories.

Table 1: Spending on primary and secondary education (2009/10)

	England	Scotland	Wales	NI
A: Spending per pupil	£8,652	£8,806	£8,138	£6,115
B: Index of per pupil spending (England = 1)	1.000	1.018	0.941	0.707
C: Index of spending per individual aged 5-15 (England = 1)	1.000	1.059	0.985	0.748
D: Index of per pupil spending – wider definition (England = 1)	1.000	1.010	1.048	0.914
E: Index of education spending per head (England = 1) – wider definition	1.000	0.997	1.092	1.111

Source: Spend data from Public Expenditure Statistical Analysis (HM Treasury, 2012); Population estimates from ONS; Pupil data from individual territory Pupil Censuses

In summary, differences in education policy and data collection methods make definitive comparisons of spending per pupil across the UK territories difficult, a fact that has been noted by others (Bain, 2006). Nonetheless, it is apparent that NI is spending notably less on education per pupil than the other UK territories. This stems largely from the fact that the Barnett formula for allocating funding to the DAs is based on a per head of population basis with no other adjustment for spending need. NI’s education spending per head of total population is about 18% higher than that of England (row E), but this falls to at least 8% lower than English spending on a per pupil basis.

3. Allocating education resources within England and Scotland

School funding formulae have been used in the UK since the 1960s, and are now applied in at least 13 EU countries (Fazekas, 2012). This section reviews some of the recent changes to school funding in England and Scotland, and describes some of the current debates.

Between 1997 and 2006, local authorities (LAs) in England received funding for school-based education via the Revenue Support Grant (RSG) from the government department responsible for local government. The amount of RSG allocated to each LA was based on an assessment of the spending needs of each LA for a range of service blocks – including education, social services, roads, etc. – and also on the LA’s ability to raise income through taxes on business and residential property. The RSG was not hypothecated, so LAs were not obliged to spend a specific amount on education.

Until 2003/4, spending needs were calculated via Standard Spending Assessments (SSAs). The SSA was replaced by the Formula Spending Share (FSS) approach to needs assessment in 2003/4. The main difference between the SSA and FSS approach to calculating education spending need is that the FSS uses a wider range of school-level data that was felt to more accurately reflect spending need (the SSA in contrast often relied on decennially collated census data) (West, 2009).

In 2006/7, there was a major change to the way education was funded, with the introduction of the Dedicated Support Grant (DSG), a specific (ring-fenced) grant which LAs are obliged to spend on education, and which is distributed by the Department for Education. Although they cannot spend less on education than they receive through the DSG, LAs are allowed to add to the amount they receive for DSG using other sources.

The DSG is calculated on the 'spend-plus' methodology, whereby grants are determined as a flat-rate increase on the previous year's allocation, plus an uplift which is formula determined. Thus although the DSG allocations are not directly informed by estimates of LA's education spending need, the pattern of allocations of DSG to LAs is implicitly predicated on the spending needs of the local authorities as estimated by the former FSS model.

Under both the DSG system and the preceding SSA/FSS approach, LAs, having been allocated grant, are free to allocate grant to schools within their jurisdiction as they see fit. On average around 13% of the DSG is spent on LA 'central services', with the remainder being allocated to schools by the LA, using their own formula for determining school-specific allocations. There have recently been moves to harmonise LAs own formula for distributing resources to schools (West, 2009; Chowdry and Sibieta, 2011). The government also allocates a number of specific grants, which LEAs must pass directly onto schools. Examples include Schools Standards Grant, School Development Grant, and other standards funds, although by 2011/12, most of these specific grants had been rolled-in to the DSG.

The operation of the school funding system, combined with differences in pupil characteristics, leads to wide variation in the level of per pupil funding across schools. Per pupil funding in primary schools varies from £3,000-6,000 across schools, while for secondary schools it varies from £4,000 - £7,000 (Chowdry and Sibieta, 2011).

A number of further changes were made to school funding in 2011/12, chief among these was the introduction of the pupil premium. The pupil premium is a fixed extra amount (i.e. additional to the underlying LA schools grants) of £488 per pupil eligible for free school meals. The pupil premium is usually allocated to schools (rather than LAs), and aims to address 'underlying inequalities between

children eligible for free school meals (FSM) and their wealthier peers' (Department of Education, 2012). In future years the government plans to increase the funding associated with the pupil premium – in 2012/13 the premium was increased to £600, and coverage was widened to include pupils who had received FSM at any point in the last six years.

This introduction of the pupil premium, which sees funding allocated directly to schools rather than LAs, can be seen as the first stage in a move towards a national funding formula for schools in England. The UK government has published proposals for the development of a 'fairer' system of national funding formula for schools, where funding for individual schools is based on the characteristics of pupils, schools and the local area, and LAs have more limited scope to deviate from these allocations when they pass these funds on to schools (Department of Education, 2012). This demonstrates the trade-offs that exist between transparency and simplicity on the one hand, and the pressure on formulae designers to incorporate a wide number of detailed indicators, that might influence cost differences at local level, on the other.

In Scotland, the system of funding education is similar to the system that operated in England prior to the introduction of the DSG. The Scottish Government allocates a block grant to the 32 Scottish LAs. These grant allocations are based on assessment of spending need, which in Scotland are known as Grant Aided Expenditures (GAE), and capacity to raise income through tax. The GAE is broken into a number of service areas, of which education is the largest. The sum of the GAEs from each service area indicate the total grant payable to the LA, but the block grant is not hypothecated, so LAs in Scotland can spend more or less on education than the figure calculated by the education GAE. As in England, LAs then allocate grant to schools within their jurisdiction, and it is up to schools individually to manage this expenditure.

In summary both England and Scotland have, until recently, allocated unhypothecated grant to LAs to spend on education, and allocate to schools, as they see fit. Although the schools grant in England is now ring-fenced, there are similar concerns in both countries as to the variation in resources received by schools of similar characteristics. These variations arise in part because of the different ways in which LAs allocate resources to schools, and in part because of the damping mechanisms that are built into the system (which in some cases lead to divergence between school funding and school characteristics over time). Both England and Scotland are therefore investigating the potential for more nationally-based allocation arrangements that would in effect reduce the level of freedom of LAs to determine how education resources are spent (Department of Education, 2012; Cameron, 2012).

In both England and Scotland, the school funding formula aim to achieve some notion of horizontal equity, reflected in the notion that populations with equal need should receive equal resources. But this leaves open the question of what is meant by need. Both the English and Scottish formulae have been developed by predicting existing expenditure patterns from need and cost influencing patterns, but it is clear that political bargaining and influence also plays a role in shaping the pattern of these allocations (Agyemang, 2010; John & Ward, 2001). Longer term, there is much interest in the possibility of allocating resources to schools in such a way as to achieve explicit outcome targets. Bramley et al. (2011) demonstrate how such an approach might be applied, but it is clear that there remain difficulties with the outcome-based approach both in terms of how outcomes are defined (Bramley et al. 2011), and perhaps more importantly the uncertainty of the causal relationship between education costs and student performance (Hanushek, 2008; Dearden & Vignoles, 2011; Gibbons et al. 2011; Machin et al. 2010; Holmlund et al. 2010). It is clear therefore that needs based formula funding will continue to be used in England and Scotland to allocate school resources to local authorities. The main debates are around the extent to which local authorities should have autonomy to deviate from national formulae when passing resources on to schools, and the extent to which there is an appropriate balance between transparency and sensitivity to local need.

4. Comparing the FSS and GAE

Both the English FSS and the Scottish GAE systems attempt to measure the relative spending needs of LAs for school education, and allocate grant to local authorities on the basis of these assessments. It is worth re-iterating that, although the FSS formula is no longer explicitly used to allocate grant to English local authorities, the level of Dedicated Schools Grant that is allocated each year to English LAs is heavily dependent on the LA allocations that were made by the FSS. An argument can therefore be made that the current pattern of LA education grant allocations continues to reflect the outcomes of the FSS. In this section we outline the structure of the English FSS and Scottish GAE formulae for allocating schools grants, and describe the data used by the two formulae. In section 6 we also briefly describe some of the proposals for a new simplified schools funding formula that are expected to be introduced in England in 2013/14.

The Scottish education GAE, as applied during the 2008/11 spending period, assesses LA spending needs for education across 22 separate components (Table 2). Three of these components (Primary teaching staff; secondary school teaching staff; and property) account for 68% of the total allocation. The remaining components include amounts for special education, school transport, school meals, education deprivation.

For each of these components, LA spending need is derived by reference to a primary indicator and a secondary indicator. The primary indicator is used to allocate the total level of resources available for a given component among Scotland's local authorities based on the authorities' respective shares of that indicator. For example, the primary indicator for the Primary School teaching staff component is the number of primary school pupils. If a given LA has 5% of Scotland's primary school pupils it will initially be allocated 5% of the £902 million available for this component. The secondary indicator is used to redistribute those initial shares between authorities based on needs additional to the per capita amount. In the primary school teaching staff component for example, the secondary indicator adjusts the initial per pupil shares based on a measure of rurality and school size. The strength of the secondary indicator relative to the primary indicator varies depending on the component in question. A LA's total spending need for education is derived by summing its need over each component.

In the English education FSS (last used in 2006) there are eight sub-blocks within the education service block. These are:

- Primary education
- Secondary education (up to age 15)
- Under-5 education
- High cost pupils
- Schools damping
- Youth and community
- Local Education Authority (LEA) central functions
- LEA damping

The two damping sub-blocks, schools damping and LEA damping, are designed to ensure that each school/ LEA receives a minimum increase in funding, taking into account previous grant, and are thus not directly measures of spending need per se.

Within each of these blocks, LAs receive a 'basic amount' for each individual of the respective client group, plus one or more 'top-ups' (Table 3). For the Primary education block for example, LAs receive a basic amount of £2,266 for each primary education pupil, plus top-ups for 'additional education needs' and 'sparsity'. The level of the top-up for each LA is calculated by reference to various indicators. The primary education additional needs top-up is calculated using data on the number of pupils whose mother tongue is not English, the number of children of income support or income based jobseekers allowance claimants, and the number of children of working families tax-

credit claimants. Additionally, the English FSS contains an area cost adjustment (ACA) which compensates LAs which face particularly high wage and other factor costs (largely those in London and the southeast region).

To summarise, both the English education FSS and the Scottish education GAE start by allocating a per client (i.e. pupil) amount and then make allowances for specific spending needs. These specific spending needs most often relate to deprivation but also to sparsity, with the English FSS (but not the Scottish GAE) also compensating LAs who face particularly high factor costs.

Table 2: Summary of indicators used in Scottish education GAE

Component	Indicators used
Nursery school teaching staff	Population aged 3 & 4
Primary school teaching staff	Primary sector pupils <i>Percentage pupils in small schools</i>
Secondary school teaching staff	Secondary sector pupils <i>Island LA adjustment</i>
Special education	Population aged 2-19
School transport	Population aged 5-15 <i>Population dispersion</i>
School meals	Pupils taking meals <i>Income support dependents per 1000 aged 0-19</i>
School non-teaching staff, property etc	All education authority pupils <i>Urban settlement pattern</i>
School hostels and clothing	All education authority pupils <i>Hostel places per 1000 pupils</i> <i>Income support dependents per 1000 aged 0-19</i>
School security	Number of pupils Number of establishments
Gaelic education	N/A
Teachers for ethnic minorities	Number of ethnic minority pupils
Education deprivation	Primary schools – weighted free meals registration Secondary schools – weighted free meals registration
Community education	Total population
Residual further education	Population aged 17 and above
Residual FE travel and bursaries	Actual expenditure
Childcare strategy	Population aged 0-14 RAW index Population living in settlements of less than 1000
Sure Start Scotland	Population living in settlements of less than 1000 Population aged 0-3 Dependents of income support/ JSA/ lone parents
Adult literacy and numeracy	Share of previous settlement
National Priorities Action Fund	Government-determined
Former Excellence Fund	Share of previous settlement
Pre-School Education	Population aged 3 & 4 Rural settlement pattern
Teacher pensions	Based on pension contributions and government actuary information

Notes: Indicators in italics are secondary indicators. Source: Scottish Government, 2008

Table 3: Summary of indicators used in English education FSS

Sub-block	Top-ups	Indicators
Primary education	Basic amount	Pupils aged 5-10
	Additional education needs top-up	Pupils whose mother tongue is not English Children of IS/ income based JSA claimants Children of working families tax-credit claimants
	Sparsity top-up	A function of population density
	Area Cost Adjustment (ACA)	Based on earnings data
Secondary education	Basic amount	Pupils aged 11+
	Additional education needs top-up	Pupils in low-achieving ethnic groups Children of IS/ income based JSA claimants Children of working families tax-credit claimants
	ACA	As above
Under-5 education	Basic amount	Pupils aged 3 and 4
	Additional education needs top-up	As for primary education
	ACA	As above
High-cost pupils	Basic amount	Low birthweight births Children of IS/ income based JSA claimants Population aged 3-15
	ACA	As above
Youth and community	Basic amount	Population aged 13-19
	Deprivation top-up	Children of IS/ income based JSA claimants
	Ethnicity top-up	Pupils in low-achieving ethnic groups
	ACA	As above
LEA central functions	Basic amount	Pupils aged 3-18
	Deprivation top-up	Children of IS/ income based JSA claimants
	Sparsity top-up	A function of population density
	LEA fixed cost amount	Fixed amount per LA
	ACA	As above

Notes: although the indicators used are often the same across different sub-blocks, the weights attached to indicators varies. In some cases, the top-up amounts are calculated as a non-linear function of the indicators. Source: ODPM, 2005

5. Approach

The analysis in this paper involves applying the English FSS and Scottish GAE education formulae in turn to all LAs in the UK. The aim is to consider how many resources a given LA would be allocated by the English formula if it was an English LA, and compare this estimate with the level of resources that same LA would be allocated by the Scottish formula, if it were a Scottish LA. We then consider what each UK local authority would be allocated under the proposals for a simpler schools funding formula that are being pursued in England.

To do this, the data shown in Tables 2 and 3 was collated for each LA and applied with the appropriate weightings. Most of the data required on pupil and school characteristics was available from the Pupil Censuses produced annually by the education departments in each territory (for example, data on pupil numbers, free school meal eligibility, pupil ethnicity, school size). Data on wider population and labour market characteristics (for example benefit claimant rates, earnings data) were available from national statistical offices, as was data on settlement pattern to inform various indicators of rurality/ sparsity. More information on our data sources and assumptions are available from our two methodology papers (Ball et al., 2012a; Ball et al. 2012b).

For each territory, the data on schools and pupil numbers relates to all publicly funded schools (including academies, foundation schools, etc.), but excludes special schools. The data excludes independent (private) schools and pupils studying at these schools. All data relates to the 2009/10 academic year, so the results indicate the level of resources that LAs would have received in that year, had the formulae been applied. The 'damping' elements of the formulae (i.e. the adjustments that are made to LAs' allocations so that LAs do not experience large shifts in funding from one year to the next) are excluded from the analysis as we are interested in estimating LAs' current spending needs, without the bias introduced by conditioning LA resource allocations on past levels of grant.

The data was applied to all local education authorities in the UK (of which there are 150 in England, 32 in Scotland, 22 in Wales, and five in NI). The rationale for applying the formulae at LA level was two-fold. First, there are elements of both the English and Scottish education formulae that are based on thresholds (i.e. where LAs above or below a particular threshold receive no resources, whilst other LAs receive a sum that is a function of a particular indicator). Thus the only reliable way of calculating the education resources that would be allocated to each *territory* is to aggregate the results from each *LA* within the territory (rather than calculating resources at territorial level in the first place). Second, having results at LA level potentially allows us to make more interesting comparisons about how the two formulae allocate resources.

When applying the Scottish formula, all LAs are treated ‘as if’ they were Scottish LAs, and it is assumed that the transition from primary to secondary school occurs at year 8. Similarly, when applying the English formula, LAs are treated ‘as if’ they are English, and the transition from primary to secondary school occurs in Year 7.

To re-cap, this paper is primarily motivated by the desire to understand the UK territories’ spending needs for compulsory-age school education (i.e. the spending needs associated with educating those aged 5-15). Given this, there are some elements of the FSS and GAE that we exclude from the analysis. In particular, elements of the two formulae relating specifically to pre-school nursery education, and funding associated with sixth-form colleges, is excluded. This enables the analysis to compare on a like-for-like basis the spending needs associated with compulsory age schooling, having abstracted from issues around pre-school and post-16 education.

The allocations made to LAs by the two formulae are based on the formulae’s estimates of LA spending need. Need in this case is of course a relative concept. If the English formula finds that LA X has 10% higher per pupil spending needs than the English average, it will allocate 10% more resources per capita to that LA relative to the English average per pupil. The Scottish formula however may estimate that the same LA has per pupil spending needs equivalent to the Scottish average, and not allocate that LA any additional resources. This illustrates the relative nature of the assessment of spending needs by the two formula – when we apply the English formula, we are implicitly comparing the spending needs of all UK LAs against some measure of average per pupil need in England; when we apply the Scottish formula, we are comparing the spending needs of all UK LAs against average per pupil needs in Scotland. In the results, we then rescale the Scottish formula’s estimates of relative need so that they are expressed relative to per pupil spending needs in England.

6. Results

FSS and GAE compared

Table 4 shows the results of applying the English and Scottish education formulae to the UK territories. The first column shows the relative *per pupil* spending need of the UK territories (expressed relative to English per pupil spending needs of 1) according to the English FSS formula.

The second column shows the per pupil spending needs of the UK territories according to the Scottish GAE formula (again expressed relative to English per pupil spending needs of 1)⁴.

The two formulae are reasonably similar in how they assess the per pupil spending needs of the devolved territories. Both formulae perceive there to be little overall difference in the range of per pupil spending needs across territories. The English FSS assesses the DAs spending needs to range from 0.977 to 0.988 (i.e. per pupil need in the devolved territories' ranges from 2.3% below England's to 1.2% below England's). The Scottish GAE assesses them to range from 0.984 to 1.004 (i.e. from 1.6% below England's to 0.4% above England's).

Furthermore, both formulae agree on the relative rank of the devolved territories with regard to per pupil spending need. Both formulae assess NI to have the lowest per pupil spending needs, Wales to have the second lowest spending needs, and Scotland to have the highest spending needs of the devolved territories.

In the English formula, NI has relatively low needs because it has relatively few local authorities (and therefore gets a lower per pupil allocation from the LA fixed amount), it has a low proportion of ethnic minority pupils, and also because it receives no allocation from the area cost adjustment (ACA). In the Scottish formula, NI has relatively low need for a variety reasons – interestingly, although NI has a relatively high level of overall deprivation, it receives relatively fewer resources from the Scottish formula for deprivation, because the Scottish formula allocates more resources to areas where deprivation is most spatially concentrated. Comparing the results to actual per pupil spending on education (column 3) reveals that Welsh education spending per capita looks generous relative to need, but education spending in NI appears low relative to need.

Columns 4 and 5 of Table 4 express the results in terms of spending need per total population, as opposed to per pupil. The spending needs per population are markedly different, given differences in the demographic composition of the territories. NI in particular has a high proportion of school-age pupils relative to the rest of the UK, while Scotland has a relatively low proportion of school age pupils. On a per capita basis, Wales' education spending need rises to between 2.3% (English formula) to 3.8% (Scottish formula) higher than England. Scotland's per capita need is slightly below England's, while NI's is significantly above England's. There remains good comparability between the

⁴ The results of applying the two formulae can of course be expressed in currency terms (i.e. £ per pupil). However, because of differences in the total proportion of education funding that is allocated by formula (as opposed to specific grant) in England and Scotland, comparison of these raw per pupil funding amounts is rather meaningless. Hence our results are presented in terms of the allocation per pupil to each territory relative to the average English per pupil allocation.

two formulae – NI’s assessed need varies from 18.7% to 19.6% above England’s according to the two formulae, while Scotland’s need varies between 0.9% to 2.5% below England’s.

Table 4: Comparing the spending needs of the UK territories (England = 1)

	Per pupil need		Actual per pupil spend (3)	Per capita need	
	English FSS (1)	Scottish GAE (2)		English FSS (4)	Scottish GAE (5)
England	1.000	1.000	1.000	1.000	1.000
Wales	0.981	0.996	1.048	1.023	1.038
Scotland	0.988	1.003	1.010	0.975	0.990
NI	0.977	0.984	0.914	1.187	1.196

Given that the English formula contains an adjustment for factor costs, the ACA, but the Scottish formula does not, it is interesting to consider how different the English formula scores would be if the ACA was excluded. Excluding the ACA from all sub-blocks of the English formula raises the *relative per pupil* need scores of Wales, Scotland and NI to 1.017, 1.017 and 1.012 respectively (the relative need of the devolved territories rises because of the reduction in grant allocations made to local authorities in the south east of England).

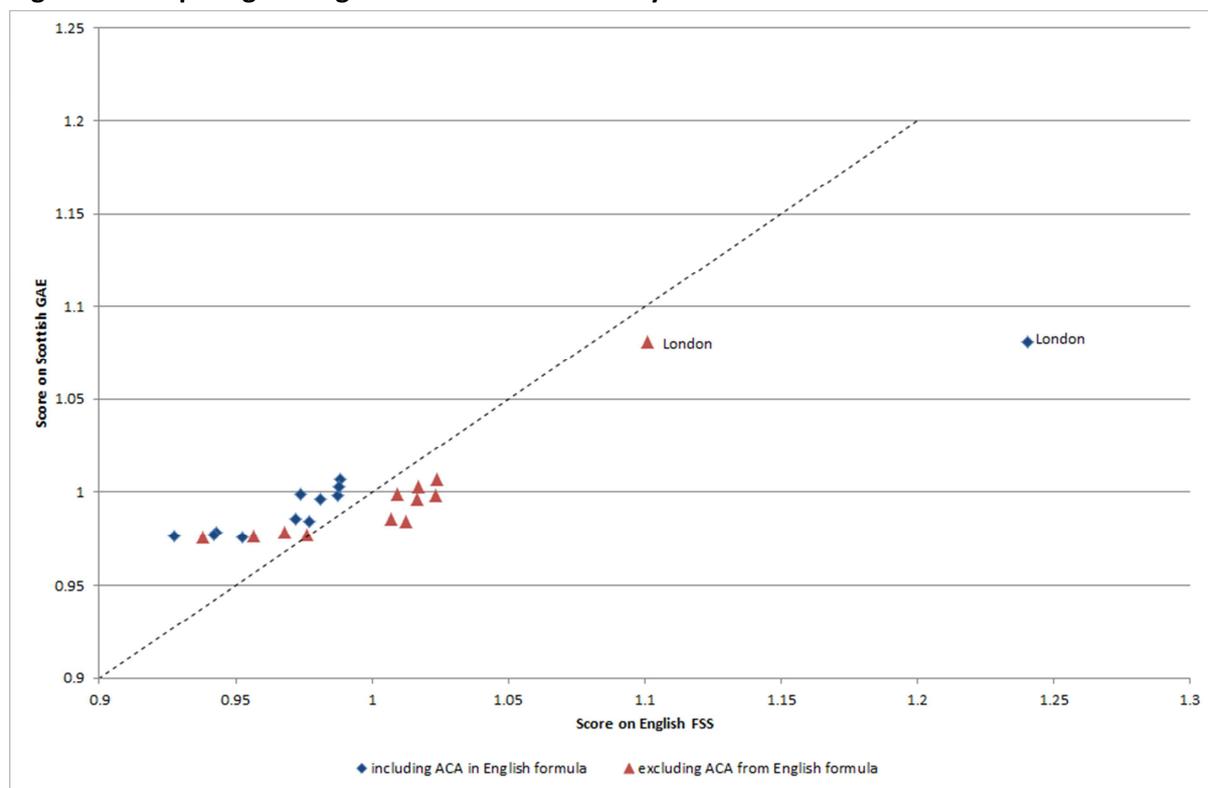
In order to further compare the similarity (or otherwise) of the pattern of allocations made by the two formulae, Figure 2 compares the per pupil allocations made to the UK territories and English regions by the GAE and FSS respectively⁵. Each regions’ need score according to the English FSS is plotted on the x-axis, while regions’ need scores according to the Scottish GAE are plotted on the y-axis. The dashed 45° line represents the line that regions would be located on if their per pupil spending needs were assessed equivalently by the two formulae; to the right of this line implies that the English formula assesses relative need to be greater than the Scottish formula does, while to the left of this line implies the Scottish formula assesses relative need to be greater than the English formula does. The blue points compare the two formulae when the ACA is included in the English formula; the red points compare the two formulae when the ACA is excluded from the English formula.

When ACA is included, it can be seen that the English formula assesses London’s needs to be noticeably higher than the Scottish formulae does (the English formula assesses London’s needs to be 23% higher than the average for England, while the Scottish formula assesses London’s needs to be just 8% higher than the average for England). When ACA is excluded from the English formula,

⁵ The English regions we consider here are the nine Government Office regions. Together with the three devolved territories of Scotland, Wales and NI, these nine regions make up the 12 NUTS1 areas into which the UK is divided for statistical purposes. The regions are approximately the same size as the DAs in population terms. We consider how the formulae would allocate resources to these regions in order to further understand how similar (or otherwise) the two formulae are in how they assess education spending needs.

then the English formula's assessment of London's relative spending needs becomes much closer to the Scottish formula's assessment.

Figure 2: Comparing the regional allocations made by the GAE and FSS



Implications of a new, simplified formula

The Westminster government has been consulting on proposals for a new, simplified national funding formula for schools in England (Department of Education, 2012). It is instructive to consider how the use of such formulae might differ from either the English FSS or Scottish GAE formulae already discussed in how it would allocate education resources to the UK's devolved territories.

At a most basic level, the new funding formula is likely to include:

- A basic amount per pupil;
- Additional funding for deprivation;
- Flat-rate amounts per school (in order to favour small schools, relatively); and
- An adjustment for areas facing higher labour costs.

Table 5 shows the implications of applying two of the indicative proposals for new funding formulae to the LAs of the UK, from which the implied per pupil levels of funding for each territory have been calculated. We have used the same 2009/10 data as we used in the previous analysis, although this new formula will not be introduced until 2013/14 at the earliest – thus we are interested in

calculating the per pupil allocation that the UK territories would have received in 2009/10 were needs assessed by the new formula. Indicatively, two of the options for the new funding formula are the following (proposed and discussed in Chowdry and Sibieta, 2011):

- Option 1 makes a basic allocation of £2,390 per primary pupil and £3,670 per secondary pupil; a lump-sum of £95,000 per primary school (nothing per secondary school); and pupil premium amounts (i.e. for pupils eligible for FSM) of £4,340 for primary school pupils and £5,420 for secondary school pupils.
- Option 2 is weighted slightly more in favour of deprivation: the per pupil amounts are reduced to £2,750 and £3,500 for primary and secondary pupils respectively; the pupil premium amounts increase to £4,410 and £5,500 respectively; the primary school flat-rate remains at £95,000 and a secondary school flat-rate amount of £300,000 is introduced.

Both options include the ACA as discussed previously.

Under Option 1, Scotland's and NI's per pupil need is essentially no different from England's, while Wales' is just under 2% higher. Under Option 2, the effect of increasing the weight attached to deprivation increases the estimated per pupil need of all of the DAs, but NI particularly. It is interesting that under both versions of this new formula, the DAs are allocated more per pupil than they were under either the FSS or GAE approaches (shown again in columns 3 and 4). This is because both of the new formula options in Table 5 weight deprivation more highly than the FSS or GAE do.

Of course, it may be that neither Option 1 nor Option 2 is adopted as the definitive new education formula; other options have been proposed with slightly different weights attached to these indicators (and a proposed new approach to calculating the ACA). Nonetheless there appears relatively little difference in the assessed per pupil spending needs of the UK territories, and certainly less difference than is observed in actual per pupil spending.

Table 5: Per pupil relative allocations under two proposed options for a new funding formula

	English Option 1	English Option 2	English existing	Scottish existing
	(1)	(2)	(3)	(4)
England	1.000	1.000	1.000	1.000
Wales	1.017	1.023	0.981	0.996
Scotland	0.999	1.005	0.988	1.003
NI	1.004	1.028	0.977	0.984

7. Conclusions

A common objection to the replacement of the Barnett Formula by needs assessment is that, as spending needs are contestable, it is unlikely that any formula could be derived that all UK territories would find acceptable. This paper has considered the feasibility of developing a UK-wide needs assessment formula for school-age education, by comparing various school funding formulae used in both England and Scotland.

The English FSS and Scottish GAE education formulae provide very similar estimates of the relative per pupil spending needs of the UK's three DAs. This similarity between the formulae is perhaps surprising, given that they have been developed separately, in different territories, using different measures of spending need, and have potentially been subject to different degrees of political manipulation.

The results suggest that there is some inequity in the funding of education across the UK territories. NI for example spends around 13% per pupil less than Wales on education, even though the formulae suggest that NI's relative spending need is only around 1% per pupil less than in Wales. This finding is interesting in itself, as it appears to contradict a standard assumption that NI does relatively well from Barnett but Wales does relatively badly, and arises because NI has a particularly high proportion of school-age children, a fact that is not considered by the Barnett formula.

The fact that the English and Scottish formulae provide very similar estimates of the spending needs of the UK territories suggests that developing a UK-wide spending needs formula for education may be relatively feasible, in that it would be harder for politicians from one territory to argue that they face some unique need factor that does not apply in the other territories. Indeed, if the Barnett formula were to be replaced by a spending needs assessment, a formula along the lines of the new simplified formulae proposed by the Department of Education would arguably be the most acceptable to politicians from each of the UK territories. This is because, in addition to the transparency of the proposed new formula, it is relatively more generous to Wales and NI than either the FSS or GAE, while not making Scotland relatively worse off. And it would be difficult for English politicians to veto the use of a formula which they had just instigated for allocating resources to schools within their own territory!

Of course, school age education, whilst significant, only accounts for some 15-20% of devolved spending in the DAs. In similar work however (Ball et al. 2012c), it has been demonstrated that the English and Scottish health allocation formula also provide very similar estimates of the relative health spending needs of the UK territories, and health spending accounts for around a third of all

devolved spending. There is thus a growing body of evidence which suggests that, at a territorial (as opposed to local) level, there is less contestability about what constitutes spending need than some would suggest. This is important, given the increasing dissatisfaction with the Barnett formula, and the fact that block grants are likely to continue to play a major part in the financing of the DAs for the foreseeable future.

References

- Agyemang, G. (2010). Accounting for needs? Formula funding in the UK schools sector. *Accounting, Auditing and Accountability Journal*, 23(1), 82-110.
- Bain, G. (2006). *Strategic review of education (Schools for the future: funding, strategy sharing)*. Belfast: Department of Education Northern Ireland.
- Ball, R., Eiser, D., & King, D. (2012a). Applying the Education FSS to the UK territories: method paper. University of Stirling Working Paper. Retrieved from <http://www.barnett-or-needs.stir.ac.uk/documents/EnglishFSSmethodpaper.pdf>
- Ball, R., Eiser, D., & King, D. (2012b). Applying the Scottish education GAE to the UK territories: method paper. University of Stirling Working Paper. Retrieved from <http://www.barnett-or-needs.stir.ac.uk/documents/GAEmethodpaper.pdf>
- Ball, R., Eiser, D., & King, D. (2012c). Assessing relative spending needs of devolved government: the case of healthcare spending in the UK. *Working Paper, University of Stirling*. Retrieved from <http://barnett-or-needs.stir.ac.uk/Publications.html>
- Bramley, G., Watkins, D., & Karley, N. K. (2011). An outcome-based resource allocation model for local education services in Wales. *Environment and Planning C*, 29(5), 848-871.
- Cameron, D. (2012). *Devolved School Management Review*. Edinburgh: Scottish Government. Retrieved October 31, 2012, from <http://www.scotland.gov.uk/Resource/Doc/920/0121591.pdf>
- Chowdry, H., & Sibieta, L. (2011). *School funding reform: an empirical analysis of options for a national funding formula*. London: Institute for Fiscal Studies.
- Chowdry, H., Muriel, A., & Sibieta, L. (2008). *Level playing field? The implications of school funding*. Reading: CfBT Education Trust. Retrieved from www.ifs.org.uk/publications/4252
- Christie, A., & Swales, K. (2010). The Barnett allocation mechanism: formula plus influence? *Regional Studies*, 44(6), 761-755.
- Dearden, L., & Vignoles, A. (2011). Schools, markets, and league tables. *Fiscal Studies*, 32(2), 179-186.

- Department of Education. (2012). *School funding reform: next steps towards a fairer system*. London: Department for Education.
- Fazekas, M. (2012). School funding formulas: review of main characteristics and impacts. *OECD Education Working Papers, No.74*.
- Gibbons, S., McNally, S., & Viarengo, M. (2011). Does additional spending help urban schools? An evaluation using boundary discontinuities. *Discussion Paper 90, Spatial Economics Research Centre, London School of Economics*.
- Hanushek, E. (2008). Education production functions. In S. Durlauf, & L. Blume, *The New Palgrave dictionary of economics*. Basingstoke: Palgrave Macmillan.
- HM Treasury. (2010). *Funding the Scottish Parliament, Welsh Assembly Government and Northern Ireland Assembly: Statement of Funding Policy*. London: HM Treasury.
- HM Treasury. (2011). *Rebalancing the Northern Ireland economy*.
- Holmlund, H., McNally, S., & Viarengo, M. (2010). Does money matter for schools? *Economics of Education Review, 29*(6), pp. 1154 - 1164.
- Independent Commission on Funding and Finance for Wales. (2010). *Fairness and Accountability: a new funding settlement for Wales*. Cardiff: Welsh Assembly Government.
- John, P., & Ward, H. (2001). Political manipulation in a majoritarian democracy: central government targeting of public funds to English subnational government, in space and across time. *British Journal of Politics and International Relations, 3*(3), 308-339.
- Kay, A., Bristow, G., McGovern, M., & Pickernell, D. (2005). Fair division or fair dinkum? Australian lessons for intergovernmental fiscal relations in the United Kingdom. *Environment and Planning C, 23*, 247-261.
- Machin, S., McNally, S., & Meghir, C. (2010). Resources and standards in urban schools. *Journal of human capital, 4*(4), pp. 365 - 393.
- McLean, I., & McMillan, A. (2003). The distribution of public expenditure across the UK regions. *Fiscal Studies, 24*(1), 45-71.
- McLean, I., Lodge, G., & Schmueker, K. (2008). *Fair Shares? Barnett and the politics of public expenditure*. Institute for Public Policy Research.
- Midwinter, A. (2002). Territorial resource allocation in the UK: a rejoinder on needs assessment. *Regional studies, 36*(5), 563-567.
- Morgan, K. (2001). The new territorial politics: rivalry and justice in post-devolution Britain. *Regional Studies, 34*, 343-48.
- ODPM. (2005). *The local government finance report (England) 2005/6 - consolidated version following amending report*. London: The Stationary Office.

Scottish Government. (2008). *'Green Book' for Grant Aided Expenditure, 2008-2011*. Edinburgh: The Scottish Government.

Select Committee on the Barnett Formula. (2009). *The Barnett Formula*. London: Authority of the House of Lords.

West, A. (2009). Redistribution and financing schools in England under Labour. *Educational Management Administration and Leadership*, 37(2), pp. 158-179.