

Applying the Scottish education GAE to the UK territories: method paper

Introduction

This paper describes the Scottish education GAE and explains how the education GAE was applied to Local Education Authorities (LEAs) in England, Wales and NI.

Scotland's education GAE

The Scottish Government's Green Book for Grant Aided Expenditure sets out the process by which grant is allocated to Scotland's local authorities in nine service areas. Education is by far the largest of these service areas, accounting for 45% of total grant aided expenditures allocated. In 2010/11, some £4.3 billion resources were allocated to Scotland's 32 local authorities for education. These resources were allocated through 22 separate components, shown in Table 1.

Each of the components in Table 1 are determined by a primary indicator and (usually) 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 they will be allocated 5% of the £902,523 available for this component. The secondary indicator is used to redistribute those initial shares between authorities based on additional needs over 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.

The way in which the education GAE is determined has largely remained the same since 2000, with similar components, component weights, and component indicators used.

Table 1: Components in the education GAE (2008/9 – 2010/11)

Component	Total allocation (£000)	Implied weight
Nursery school teaching staff	£26,215	0.62%
Primary school teaching staff	£902,523	21.20%
Secondary school teaching staff	£1,141,745	26.82%
Special education	£243,588	5.72%
School transport	£54,853	1.29%
School meals	£74,691	1.75%
School non-teaching staff, property etc	£859,543	20.19%
School hostels and clothing	£26,998	0.63%
School security	£15,173	0.36%
Gaelic education	£5,570	0.13%
Teachers for ethnic minorities	£8,317	0.20%
Education deprivation	£59,005	1.39%
Community education	£122,207	2.87%
Residual further education	£2,317	0.05%
Residual FE travel and bursaries	£5,492	0.13%
Childcare strategy	£44,556	1.05%
Sure Start Scotland	£59,912	1.41%
Adult literacy and numeracy	£12,482	0.29%
National Priorities Action Fund	£248,828	5.85%
Former Excellence Fund	£66,600	1.56%
Pre-School Education	£162,695	3.82%
Teacher pensions	£113,774	2.67%
Total	£4,257,084	100%

Applying Scotland's education GAE to the UK territories

In this section we describe how we applied the Scottish GAE to English LEAs. We have focussed on the elements of GAE that relate to primary and secondary schools; the relatively small amount relating to nursery education (<8% GAE) has not yet been applied.

We have applied the Scottish GAE to all state schools in the UK territories, whether these are LEA 'maintained' schools, academies, City Technology Colleges, or Free Schools. This is to ensure comparability with Scotland, where all state schools are funded through the GAE formula.

Nursery school teaching staff

The primary indicator is the population aged 3 and 4. In the Scottish GAE, £26.2m is allocated between 108,543 individuals, giving an amount of £242 per individual.

This element of the Scottish education GAE was not applied to the UK territories because this analysis focuses on the territories' spending needs for schooling over the compulsory school ages (5-15).

Primary school teaching staff

The primary indicator is the number of primary sector pupils. In the Scottish GAE, £902m is allocated between 369,495 pupils, giving an amount of £2,443 per pupil. Data on pupil numbers are available from the Pupil Census in each territory, although it was necessary to control for the fact that the different UK territories have different start and end ages for primary schooling.

Although there are some marginal differences in school start dates between Scotland and England (these amount to Scottish pupils being 6 months older on average at the mid-point of academic year 1 than English pupils at the mid-point of year 1), the main difference between Scotland and England is the transition from primary to secondary school. Scottish pupils complete seven years in primary education before going on to secondary, while English pupils have one less year in primary education and one more year in secondary education. In order to compare like-with-like when applying the Scottish GAE to English LEAs, it was assumed that English pupils also complete seven years in primary school (i.e. it was assumed that all English pupils in the first year of secondary school are actually in primary school). Similar assumptions were made for Wales. In NI, compulsory schooling begins a year earlier (so that year 2 in NI is equivalent to year 1 in Scotland and England). The data on NI pupil numbers was adjusted to be equivalent to Scottish policy (i.e. Year 1 pupils were excluded from analysis, and primary pupils were defined to be those in years 2-7 plus the first year of post-primary education, known as year 8 in NI).

The secondary indicator is the percentage of pupils in small schools. These are defined as 'schools with fewer than 70 pupils in remote and very remote areas rural areas', where rural areas are defined as those which require a drive of more than 30 minutes to get to a settlement of 10,000 people. Across all Scottish LAs, the average effect of the secondary indicator is to alter the allocation made by the primary indicator by around 8%. Western Isles sees its resources increased by 52% as a result of the secondary indicator (25% in Orkney; 18% in Argyll and Bute). This shift in favour of rural areas is compensated by small percentage reductions in urban areas (e.g. Glasgow, Edinburgh and Dundee all see reductions of 5% in their primary allocations as a result of this secondary factor).

To calculate this indicator for the UK territories, it was necessary first to find out what proportion of pupils are in small schools, and then to estimate what proportion of these are in remote and very remote areas. For England and Wales, data was available on the number of small schools (those with up to 100 pupils), and it was assumed that 70% of these would meet the Scottish definition of a small school (fewer than 70 pupils), and that these schools would have an average of 60 pupils. To estimate what proportion of these small schools in each LEA would be likely to be in remote areas, we used data from the English and Welsh rurality definitions to identify what proportion of each LEA reside in remote rural areas as defined by the Scottish GAE, and then assumed that the proportion of small schools in remote rural areas was a function of the population living in remote areas. To be specific, it was assumed that twice as many pupils in small schools are in remote areas as for the population as a whole. For example, if LEA X has 1000 pupils in small schools and 10% of its population live in remote areas, we would assume that 20% of its small-school pupils (i.e. 200) would live in remote areas.

For NI not data on small schools was available. It was therefore assumed that in remote areas (data on remote areas available from the NI survey of rurality), half of pupils would attend small schools.

For example, if in a given LA 10% of the population live in remote areas, we would assume that 5% of the pupils went to school in small schools in remote areas.

Secondary school teaching staff

The primary indicator is the number of secondary sector pupils. In the Scottish GAE, £1.142 billion is allocated between 303,482 pupils, giving a per pupil allocation of £3,762. This per pupil amount was applied to pupil numbers in the UK territories. Pupil numbers were controlled to equate with Scottish schooling years S1-S4 (i.e. ages 12-15). This meant assuming that pupils in England, Wales and NI begin secondary school one year later than they do in reality.

The secondary indicator in the Secondary component is an 'Island adjustment'. As its name suggests, this indicator allocates resources in favour of Western Isles, Orkney and Shetland, and pays for this by reducing allocations to all other LAs. For the non-island LAs, the effect of the secondary indicator is to reduce the primary allocation by 0.34%. Thus to apply this to LEAs in England, Wales and NI, the primary allocation for each LEA was also reduced by 0.34%¹.

Special education

The primary indicator is the population aged 2-19. Figures for population by age group in LEAs in England, Wales and NI were available from ONS. The Scottish cost per head (£232) was applied to these pupil numbers.

School transport

The primary indicator is the population aged 0-15. The Scottish amount per individual (£87) was applied to LEAs in the UK territories.

The secondary indicator is a measure of population dispersion. The dispersion indicator is a measure of the degree to which the population of an authority is spread across its area in relation to (main) settlements. The expression is defined as 'the sum of the distances between census output areas that are outwith settlements of 7,000 or more and the nearest settlement of 7,000 or more. This is multiplied by the population of the output area relative to the non-settlement population of the authority.'

The secondary indicator has a substantial effect in reallocating the pattern of resources made by the primary indicator. Western Isles see the level of resource allocated to it by the primary indicator increase by 200% following application of the secondary indicator; Glasgow, Dundee and Edinburgh see their primary indicator allocations reduced by 25% (the average change in allocation between primary indicator and secondary indicator across all Scottish authorities is +/-37%). However it also must be remembered that the level of resources allocated to 'school transport' represent just 1.3% of all education GAE resources.

¹ Of course, if English LEAs were included in the Scottish formula, then the percentage reduction in resources across all (English and Scottish) non-island LEAs to compensate the island LAs would be significantly less. However for the purposes of this analysis we treat English LEAs as if their resources were determined by the precise set of rules that determined Scottish LAs' education resources in 2010/11.

Replicating the dispersion indicator exactly for the UK territories would require a vast amount of computation with GIS software. It was therefore necessary to develop a proxy for the dispersion indicator. To do this, we examined the relationship between the Scottish LAs' dispersion scores and various potential proxy measures. The proxies had to be indicators which are readily and consistently available for both Scotland and the other UK territories.

Population density was not strongly related to the Scottish dispersion indicator, but the measure of 'sparsity' used in the English formula provided a good proxy. The sparsity indicator used in the English education formula is calculated using data on population data at ward level. Specifically, the population of the LA living in wards with a population density of less than 0.5 persons per hectare (multiplied by 3.5) and the population living in wards with a population density of 0.5 – 4 persons per hectare, is expressed as a proportion of the total population of the LA. This sparsity measure for Scottish LEAs was regressed on the Scottish LEAs' score on the population dispersity measure to derive the proxy. The fitted equation is²:

$$PD_i = 0.09 + 1.96Sparsity_i \quad R^2: 0.92 \quad N: 26$$

(0.43) (16.75)***

Where PD_i is the population dispersion index for Scottish authority i and $Sparsity_i$ is the sparsity score used in the English formula. The estimated equation was fitted to LEAs in England, Scotland and Wales.

School meals

The primary indicator is 'pupils taking meals (paid or unpaid)'. In the Scottish GAE, £256 is allocated to each pupil taking school meals. Note that this indicator does not relate to pupils taking free school meals (FSM) but is instead designed to subsidise local authorities for providing meals in general. In Scotland, the number of pupils taking meals is informed by an annual Scottish Government publication 'School Meals in Scotland'. In 2010, some 45% of Scottish pupils took school meals (uptake is higher in rural areas, and higher in primary relative to secondary schools).

For England, Wales and NI, data on the total number of pupils taking lunches does not seem to be available. Data is available on eligibility for FSM and the percentage of those eligible for FSM who take them, but this is very different to the total number of pupils taking meals (paid or unpaid). In the absence of an alternative approach, our assumption is simply to assume that the same proportion of English/ Welsh/ Northern Irish pupils take school meals as is the case in Scotland.

The secondary indicator is 'income support dependents per 1,000 aged 0-19'. This indicator can be calculated for English and Welsh LEAs from ONS data and compared with the Scottish mean; LEAs above the Scottish mean are allocated additional resources, and those below the mean are allocated fewer resources. For NI, data on income support dependents is available from NINIS (Northern Ireland Neighbourhood Statistics). In Scotland the secondary indicator has the largest positive effect for Glasgow at +19% and the largest negative effect for Orkney at -12%.

² Scottish LAs with a sparsity score over 4.5 were excluded from the model, as their population dispersion scores are significant outliers. However, given that no LAs in England, Wales or NI have sparsity scores above 4.5, this exclusion does not effect the applicability of the results to LAs in those countries.

School non-teaching staff, property, etc.

The primary indicator is all local education authority pupils (including adults). The allocation is £1,114 per pupil. In applying the indicator to the UK territories, we applied it only to pupils of compulsory school age (5-15).

The secondary indicator is 'urban settlement pattern'. This is defined as the proportion of the population living outwith settlements of 10,000+. The indicator is weighted such that areas which have a higher than average proportion of their population in settlements of 10,000+ get proportionately more resources, while those with less than the average proportion of their population in settlements of 10,000+ get proportionately fewer resources. The secondary indicator has a relatively small effect on Scottish LEAs, ranging from -6% (Orkney) to +3% (Glasgow).

This indicator can be applied relatively accurately to LEAs in England, Wales and NI, as the urban-rural classifications in each territory demarcate the proportion of each LA population in populations of less and more than settlements of 10,000 people.

School hostels and clothing

The primary indicator is all local education authority pupils (excluding adults). The allocation is £35 per pupil (which, as previously, we applied only to pupils of compulsory school age).

There are two secondary indicators. The first is the number of hostel places per 1,000 pupils. Given difficulties in identifying reliable, comparable data on hostel places across the UK territories, we have not included this indicator in analysis. This exclusion is unlikely to have substantial effects on the overall needs estimates; in Scotland, only four authorities have hostel places (Argyll and Bute; Shetland; Orkney; Highland). The issue of hostel places therefore seems to relate only to the highland and island authorities (and these four authorities have just 480 hostel places between them).

The second secondary indicator is the number of income support dependents per 1,000 aged 0-19. This is applied in the same way as described above (for school meals).

School security

This element is equally weighted between two indicators, the number of LEA pupils and the number of LEA establishments. LEAs are allocated just under £10 per pupil and £1,171 per establishment (including LEA nursery establishments). These figures are applied to LEAs in the UK territories using data on pupil numbers and establishment numbers from the respective pupil censuses.

Gaelic education

In the Scottish GAE this is allocated as a specific grant. There is no indicator on which the allocations are based. Western Isles and Highland each receive 22% of the total grant, with Glasgow receiving 12%, Argyll and Bute receiving 8%, and the remaining 36% being spread between 19 LEAs. Nine Scottish LEAs receive no grant whatsoever. It is not clear from the GAE guidance documentation, why the teaching of Gaelic should require resources additional to those for the teaching of any other subject.

On average across Scotland, the allocations for Gaelic education are equivalent to £9.30 per pupil. We have assumed that, if the Scottish education GAE was applied to the UK territories by a benevolent planner, an equivalent sum would be allocated to the other territories which could be used to support Welsh language education in Wales, Gaelic education in NI, or some other additional educational need in England.

Teachers for ethnic minorities

The primary indicator is the number of ethnic minority pupils, with each ethnic minority pupil associated with an allocation of £197 (there is no secondary indicator). The definition of an ethnic minority pupil is any pupil not recorded as 'white-UK' or 'unknown'. In the Scottish GAE, Glasgow receives a quarter of Scotland's entire allocation, with Edinburgh receiving 14%.

Applying this indicator to LEAs in England, Wales and NI was relatively simple, with data available from the respective censuses on pupil numbers by ethnicity.

Education deprivation

The education deprivation component consists of two primary indicators, each of which is roughly equally weighted. The first is 'weighted free meal registration in primary schools' and the second is 'weighted free meal registration in secondary schools'.

The definition of the primary school indicator is: 'the number of pupils in the top 10% of schools ranked by the percent of pupils registered for free school meals³, expressed for each authority as a percentage of all Scottish pupils in the top 10%'. Thus rather being a linear function of the number (or proportion) of pupils receiving FSM, the indicator considers the number of pupils in the most needy schools nationally (in effect considering the concentration of FSM pupils within schools). This means that different local authorities in Scotland receive very different amounts per pupil eligible for FSM (and this is very different from the current situation in England, where local authorities receive a fixed amount per FSM pupil). The impact of this indicator is to concentrate resources in Glasgow, which receives 53% of the share of all resources attached to this indicator (£28 million nationally). Edinburgh receives 10%, Fife receives 6%, South Lanarkshire 4%, and the rest of Scotland's authorities receive 3% or less. Some authorities (East Lothian, Midlothian, Western Isles) receive no resources.

Replicating this indicator for the other UK territories is difficult. Although data is available on the numbers (and percentages) of pupils receiving FSM per authority, we do not have school level information which would allow us to rank schools individually.

It was therefore necessary to develop a proxy indicator. To do this, the Scottish allocations per FSM pupil by local authority were regressed on data at Scottish local authority level on the proportion of pupils eligible for FSM. Because the per FSM pupil allocations are an increasing function of the

³ Eligibility for FSM is essentially based on the same criteria in England and Scotland. Pupils entitled to free school meals are those within families who receive Income Support, Income-based Job Seekers Allowance, or income based Employment Support Allowance. Those within families who receive support under Part VI of the Immigration and Asylum Act 1999 may also be entitled. Also entitled are children whose parents or carers receive Child Tax Credit but do not receive Working Tax Credit and have an annual income that does not exceed £16,000.

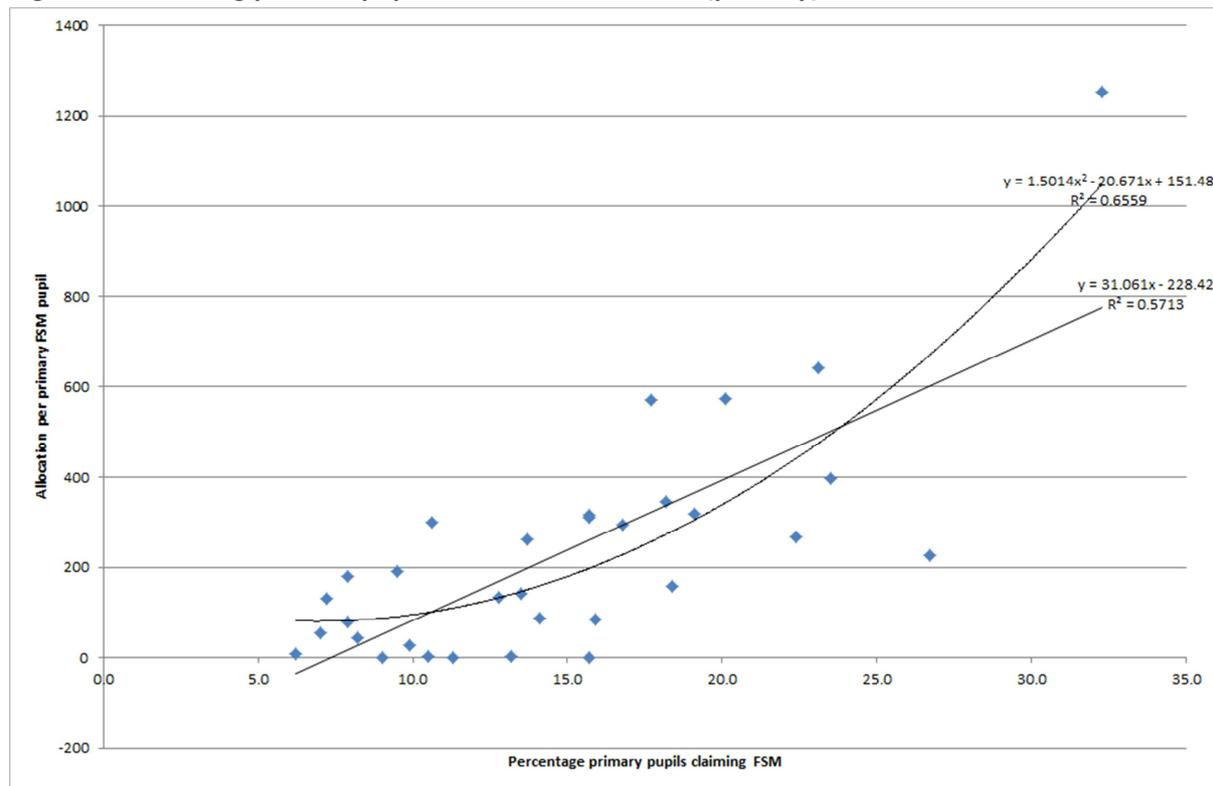
proportion of all FSM pupils in a local authority, the allocations per FSM pupils were regressed on a linear and quadratic terms. The following model (A) was estimated:

$$\text{PPFSMPA}_i = 151.5 - 20.67\% \text{PFMSM}_i + 1.5\% \text{PFMSM}_i^2 \quad (\text{A})$$

(0.95) (-1.04) (2.67)*** R²: 0.66 N: 32

Where PPFSMPA_i is the primary school per FSM pupil allocation to Scottish authority i and %PFMSM is the proportion of primary pupils eligible for FSM in authority i. The observations are plotted in Figure 1. The outlier Glasgow can be observed in the top-right of the graph. If Glasgow is excluded, the linear and quadratic functions perform equally as well.

Figure 1: Modelling per FSM pupil allocations in the GAE (primary)



To estimate the per primary FSM pupil allocation for LAs in England, Wales and NI, equation (A) was applied to LAs in these countries using data on primary pupil eligibility for FSM from the respective pupil censuses. However, the issue with a quadratic function is of course that, to the left of the turn-point, per pupil allocations increase with decreasing proportion of pupils eligible for FSM, which is perverse. To avoid this, we applied the linear function to LAs which have fewer than 11% of pupils eligible for FSM. Furthermore, to ensure that no LA receives a negative allocation, all LAs that have fewer than 7% of their pupils eligible for FSM were given an allocation of £0 per pupil.

To summarise, in applying the Scottish education deprivation formula for primary pupils to English LAs, the following rules were applied:

- For LAs with fewer than 7% of primary pupils eligible for FSM, allocation of £0 per FSM eligible pupil;

- For LAs with between 7-11% of primary pupils eligible for FSM, per FSM eligible allocation was calculated as a linear function of the proportion of pupils eligible for FSM;
- For LAs with more than 11% of primary pupils eligible for FSM, the per FSM eligible allocation was calculated as a quadratic function of the proportion of pupils eligible for FSM.

The results of applying this function to LAs are shown in Figure A1 (Annex).

The definition of the secondary school education deprivation indicator is similar to the primary school one, except that pupils in schools ranking in the top 5% receive a weighting of 4, between 5% and 10% receive a weighting of 3 and between 10% and 20% receive a weighting of 1. Thus the secondary indicator is even more heavily weighted towards areas where deprivation is concentrated, with Glasgow receiving 60% of all Scotland’s resources for this indicator, Edinburgh receiving 8%, Fife 5%, and other authorities 3% or less.

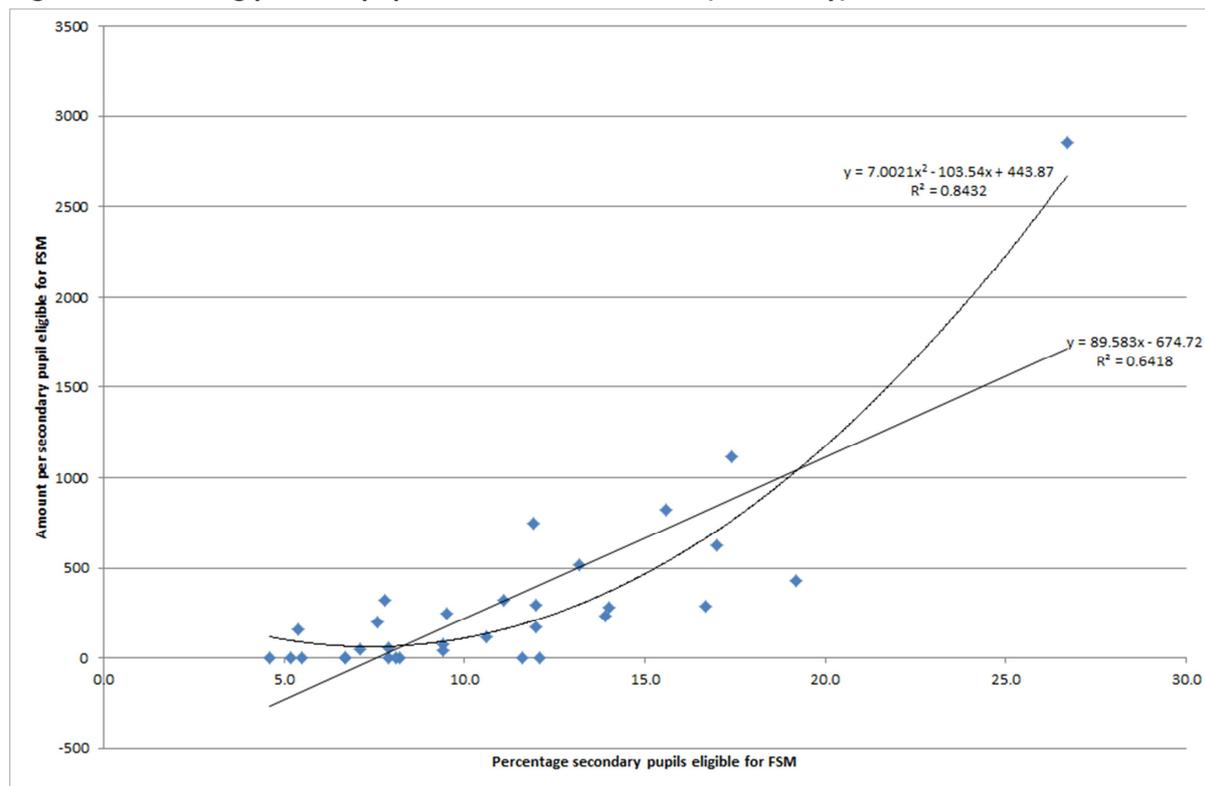
A similar approach to developing a proxy was for the secondary school deprivation indicator was adopted as for the primary indicator. The estimated model (B) is shown below, with the observations and plotted equation shown in Figure 2.

$$\text{SPFSMPA}_i = 443.9 - 103.54\%FSM_i + 7.0\%FSM_i^2 \quad (\text{B})$$

(2.13)* (-3.17)*** (6.1)*** R²: 0.84 N: 32

Where SPFSMPA_i is the secondary school per FSM pupil allocation to Scottish authority i and %FSM is the proportion of secondary pupils eligible for FSM in authority i. The secondary model fits the data somewhat better than the primary model. In applying this equation to LAs in the other countries, the quadratic equation (B) was applied to all LAs with greater than 8% of pupils eligible for FSM, whilst LAs with fewer than 8% of pupils eligible for FSM were allocation £0.

Figure 2: Modelling per FSM pupil allocations in the GAE (secondary)



Community education

The primary indicator is the total population of the LEA (no secondary indicator). Each member of the population is associated with an allocation of £24 per head. It was straightforward to apply this indicator to LEAs in England, Wales and NI.

Residual FE and residual travel and bursaries – not yet included

These two elements account for 0.18% of the allocations made by the Scottish GAE, and are largely made on the basis of actual expenditure. They were therefore not included in the analysis.

Childcare strategy and Surestart Scotland – not yet included

These two elements account for 2.46% of the allocations made by the Scottish GAE. Given that these allocations relate to pre-school age groups (and are allocated in England through separate specific grants), they have not been included in analysis.

Special funds

There are three special funds: adult literacy and numeracy (accounting for 0.29% of Scottish GAE allocations); National Priorities Excellence Fund (accounting for 5.85% total GAE); and Former Excellence Fund (accounting for 1.56%). The resources for all these funds are allocated on the basis of the previous 2005-8 settlement; in turn, the 2005-8 allocations were based on the 2003-4 settlement; the 2003-4 allocations were based on a 2001 Scottish Executive Finance Circular which has proved difficult to track down.

Although there are no formula rules as such governing the allocation of the National Priorities Excellence Fund (NPEF), analysis reveals that it is allocated across LAs very closely with the pattern of pupil numbers. Comparing the share of grant allocated to LAs for NPEF with the LAs share of primary and secondary sector pupils reveals an almost perfect correlation ($r=0.99$). It is therefore straightforward to calculate an implicit funding amount per pupil for NPEF and apply this to all LAs in England, Wales and NI. Consequently of course there is no difference in 'relative need' per pupil between Scotland and England on this indicator.

The allocation shares for the 'Former Excellence Fund' are also closely related to the shares of pupils, but less strongly than for NPEF ($r=0.95$). There is no clear relationship between FEF allocations and deprivation to explain the remaining variation in allocations (for example, Glasgow receives 8.7% of allocations with 9.7% of pupils, while Edinburgh receives 8.4% of allocations even though it has just 6.5% of pupils). In the absence of further information, it is assumed that these allocations are also made on a per pupil basis, and implicit funding amounts are applied to LAs in England, Wales and NI.

Pre-school education

This element accounts for 3.82% of the Scottish education GAE. It was not applied in our analysis as it relates to specific pre-school grants rather than allocations associated with the 5-15 population.

Teacher pensions

This accounts for 2.67% of the education GAE. The allocations are based on pension contributions in 2006/7, and it has been excluded from analysis.

Results

The results for each element of the Scottish education GAE to the LAs in the UK territories are shown in Table 2. For each element, the results are expressed as an index of per pupil spending needs relative to Scotland, where Scotland's spending needs are 1.

Table 2: Applying the Scottish education GAE, results

Element	Allocation	Weight	Per pupil index			
			England	Wales	NI	Scotland
Nursery school teaching staff	£26,215	0.62%	.	.	.	.
Primary school teaching staff	£902,523	21.20%	0.949	1.000	0.989	1.000
Secondary school teaching staff	£1,141,745	26.82%	0.997	1.001	0.996	1.000
Special education	£243,588	5.72%	1.036	0.998	0.963	1.000
School transport	£54,853	1.29%	0.831	0.876	0.920	1.000
School meals	£74,691	1.75%	1.007	1.026	1.048	1.000
School non-teaching staff, property etc	£859,543	20.19%	1.009	0.995	0.990	1.000
School hostels and clothing	£26,998	0.63%	0.877	0.969	1.073	1.000
School security	£15,173	0.36%	0.955	1.057	1.058	1.000
Gaelic education	£5,570	0.13%	1.000	1.000	1.000	1.000

Teachers for ethnic minorities	£8,317	0.20%	3.750	1.020	0.407	1.000
Education deprivation	£59,005	1.39%	1.307	0.963	0.933	1.000
Community education	£122,207	2.87%	0.987	0.947	0.812	1.000
Residual further education	£2,317	0.05%	.	.	.	.
Residual FE travel and bursaries	£5,492	0.13%	.	.	.	.
Childcare strategy	£44,556	1.05%	.	.	.	.
Sure Start Scotland	£59,912	1.41%	.	.	.	.
Adult literacy and numeracy	£12,482	0.29%	.	.	.	.
National Priorities Action Fund	£248,828	5.85%	1.000	1.000	1.000	1.000
Former Excellence Fund	£66,600	1.56%	1.000	1.000	1.000	1.000
Pre-School Education	£162,695	3.82%	.	.	.	.
Teacher pensions	£113,774	2.67%	.	.	.	.

Comments on individual elements are as follows.

The allocations for primary school teaching staff are made on the basis of a per pupil amount which is adjusted based on the proportion of pupils in small schools in remote areas. On the basis of the assumptions made regarding the latter measure (described above), England's per pupil spending needs are around 5% lower than England's, while NI's are around 1% lower than England's. Wales is estimated to have identical spending needs per pupil for primary school teaching staff to Scotland.

The allocations for secondary school teaching staff are made on the basis of a per pupil amount which is adjusted upwards (by 22%) for island authorities and adjusted downwards (by 0.36%) for non-island authorities. Per pupil, Wales' need score is 0.1% higher than Scotland's because we have treated Anglessey as an island in the same way that Shetland, Orkney and Western Isles are, (and Anglessey's population as a fraction of Wales' population is higher than Shetland's, Orkney's and Western Isles' population as a fraction of Scotland's population). England and NI are allocated marginally less than Scotland per pupil because they have no island LAs⁴.

For special education, the allocation is based on the population aged 2-19. England's per pupil score is 3.6% higher than Scotland's. This might be explained by the fact that England has more pupils in independent schools and therefore a given allocation for the population aged 2-19 is divided by a smaller denominator (pupils in state schools). The same explanation may also explain the lower scores in Wales and NI (which have fewer pupils in independent schools relative to Scotland).

For school transport, LAs are allocated an amount per population aged 0-15 which is then adjusted on the basis of a measure of population dispersion. A proxy measure of population dispersion was developed, based on population density (described above). Applying this formula to the other countries results in index scores of .83, 0.88 and 0.92 for England, Wales and NI respectively. Although the country scores on this element are sensitive to the assumptions underlying their estimation, this element is worth only 1.5% of all elements in the Scottish education GAE.

⁴ Isle of Wight was not treated as an 'island' as it is not remote or sparsely populated in the sense that the Scottish islands are. The population of Isles of Scilly is very small relative to the population of England that it makes no significant difference to England's relative score.

For the school meals element, LAs receive an amount for each pupil 'taking' school meals (not just those eligible for free school meals). As data was not available for England, Wales and NI on the proportion of pupils taking school meals, we have simply assumed that the same proportion of pupils in each country 'take' school meals relative to Scotland. This indicator is then adjusted to reflect the proportion of income support dependents per 1,000 aged 0-19. This indicator is marginally higher in England than in Scotland, and higher still in Wales and NI, hence these countries receiving higher allocations than Scotland for this element.

For property and non-teaching staff, LAs receive an allocation per pupil, which is adjusted slightly on account of 'urban settlement pattern', where this is defined as the proportion of the LA population living in towns of more than 10,000 population. The indicator is weighted such that more resources are allocated to areas which have a higher proportion of population in settlements of 10,000+, hence England scoring slightly higher than Scotland, and Wales and NI scoring slightly below Scotland.

For school clothing and hostels, an allocation per pupil is adjusted first to account for the number of hostel places and second to account for the number of income support dependents per 1,000 population aged 0-19. Given that data on hostel places was not available, all variation in indicator scores for this element comes from the income support variable. NI has the highest per pupil need, while England has the lowest.

The school security index is calculated as a function of two variables: the number of pupils and the number of premises. Wales and NI have slightly higher needs scores than Scotland because they have on average more schools relative to the number of pupils. England has the lowest need score on this element.

Across Scotland as a whole, some £9.30 per pupil is allocated for Gaelic education. We have assumed that a benevolent planner would allocate an equivalent amount per pupil to the other UK territories, which the territories could be spent on Welsh or Gaelic language provision, or on some other additional support need.

The teachers for ethnic minorities element allocates LAs a sum for each ethnic minority pupil. The scores on this index are extremely diverse, with England scoring 3.7 and NI scoring less than 0.5 relative to the Scottish index of 1. Although these index scores seem vastly different, they are commensurate with data on the ethnic minority status of the adult population. The Annual Population Survey 2010 shows that just 1.2% of the NI population is from an ethnic minority, compared to 3% of the Scottish population, 3.2% of the Welsh population, and 11% of the English population.

The allocations for education deprivation are calculated based on a complicated, non-linear function of the proportion of pupils receiving free school meals (FSM) for which a proxy indicator was developed, and described above. The results show a per pupil score for England of 1.3, while Wales and NI score below 1. This is a result of the non-linearity of the allocations. The GAE allocations per deprived pupil are an increasing function of the proportion of deprived pupils (where deprivation is measured by eligibility for FSM). Because there are places in England's inner-cities where eligibility for FSM is notably higher than elsewhere in the UK, these places receive much higher allocations per pupil than areas in other countries (where FSM eligibility may only be slightly lower).

For community education the allocations are simply an amount per population. England, Wales and NI all score less than Scotland in pupil terms because they have more pupils per head of total population than Scotland.

The National Priorities Excellence Fund (NPEF) and Former Excellence Fund (FEF) are essentially allocated on a per pupil basis.

Total assessed need

Table 3 below summarises the overall results from the application of the Scottish education GAE to the UK territories. England's per pupil need is only slightly less than Scotland's; Wales' per pupil need is also less than 1% lower than Scotland's. Perhaps surprisingly, NI has the lowest assessed spending need per pupil. Although NI has relatively high levels of deprivation (measured by income support dependents or eligibility for FSM), it actually receives a relatively low score for education deprivation from the Scottish formula because the deprivation is not particularly concentrated in individual LAs. Furthermore, NI scores relatively low on some elements of the Scottish GAE, notably Teachers for Ethnic Minorities, Community Education, and School Security.

Table 3: Total allocations per pupil from the Scottish education GAE

	Amount per pupil	Pupil index
England	5795	0.997
Wales	5774	0.993
NI	5704	0.981
Scotland	5813	1.000

Annex

Figure A3: Actual (Scottish) and fitted (English) per FSM pupil allocations (primary)

