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2013

Online at <https://mpra.ub.uni-muenchen.de/75668/>
MPRA Paper No. 75668, posted 22 Dec 2016 05:49 UTC

Access and Performance Inequalities – post-primary education in Northern Ireland

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Introduction

The education system in Northern Ireland is undergoing a radical review. In a key statement to the Northern Ireland Assembly in September 2011, the Education Minister claimed that the devolved government had ‘inherited a pattern of provision that is now both unsustainable educationally or financially’ (O’Dowd, 2011:2). He argued that the supply of school places outstripped demand and that there were some 85,000 spare places or the equivalent of 150 excess schools from an overall primary and post-primary school population of around 323,000 pupils (Department of Education, 2012a). By primary school pupils we mean pupils aged 5-11 years of age and by post-primary pupils we mean pupils aged 12-16 years (GCSE pupils) and 16-18 years (A level pupils). All of this must be set within the wider context of public expenditure cuts where Northern Ireland, as part of the UK spending review, is losing £4 billion over the period 2011-15 from an overall annual budget of approximately £10 billion. Specifically the Department of Education must make significant savings from its £2 billion annual budget over a 4 year period¹. Although the Department had a policy for sustainable schools in place since 2009, the Minister claimed that it had not been enforced and there was a need for immediate action.

To address the need for radical changes, a number of proposals were outlined. First, the Minister commissioned the five Education and Library Boards working closely with other education providers to conduct viability audits of all primary and post primary schools in Northern Ireland. The audits were to identify those schools which were experiencing ‘stress’ defined by three criteria: quality of the educational experience; enrolment trends; and the financial standing of schools. Second, the results of the viability audits were then used as the empirical basis for developing strategic plans across each of the five Education and Library Board areas. The main focus of this work is to develop a ‘planned network of viable and sustainable schools capable of delivering high quality education to meet the needs of all children and young people’ (Department of Education, 2012:4). Third, an integral aspect of planning the future education estate was not only the need to drive up educational standards but also to better target provision that would address social needs or schools drawing from socially deprived areas.

Apart from excess supply of school places, the Northern Ireland education system is characterised by a highly segregated system of education, a legacy of the conflict. For example in 2011/12 within the secondary (or non-grammar schools) only 2.1% of Catholic pupils attended Controlled or state schools (*de facto* Protestant schools). Even fewer, 0.8% of Protestant pupils attended Maintained or Catholic schools (Department of Education 2012b). Many pupils will never experience cross community education until they attend university. The segregated school system has resulted in ethno-religious isolation which reinforces ‘own group bias, stereotyping and prejudice’ (Hughes, 2010: 829). These circumstances promoted

¹ The shortfall between the Department’s anticipated spending requirements and the Budget 2011-15 outcome is some £101m / £177m / £214m / £291m across the 4-year Budget period and a Savings Delivery Plan has been developed to address this gap in funding.

an independent review of the education system in Northern Ireland to advise the Department of Education to help stakeholders improve collaboration, promote trust and mutual understanding, and work to develop collaboration and sharing (Bain, 2006).

Northern Ireland still retains voluntary academic selection for entry to grammar schools, an issue which is both socially and politically divisive. Grammar schools have fewer pupils with free school meal entitlements. There is also a large educational performance gap between grammar and non-grammar schools (Department of Education, 2012c). These facts also hide a high level of educational underachievement amongst the Protestant population validated by a recent study which noted that ‘there appears to be a tendency towards elitism, and socially imbalanced pupil intakes within schools predominantly attended by Protestants’ (Purvis, 2011:4).

In the light of this background, the purpose of this paper is to evaluate school performance against a number of indicators which popular wisdom would regard as important in terms of influencing performance. One of the important of such indicators is school size because a large part of the NI government’s education policy is based on the assumption that creating larger schools, by closing smaller schools, will result in better schools. Another indicator is financial viability because an assumption often made in NI education policy circles is that schools which are in financial difficulty are also schools which perform relatively badly. Another hypothesis we examine is that school performance is affected by the type of management which operates the school. In particular that the differing levels of performance in Catholic (Maintained) Protestant (Controlled), and Integrated schools are in part due to the fact that they embody different approaches to educating children. Yet another hypothesis examined is that the presence of free school meal (FSM) pupils and pupils with special educational needs (SEN) negatively affects school performance. (FSM pupils are, of course, a surrogate for pupils from disadvantaged backgrounds and, although one may think of other surrogates, the most commonly used is eligibility for free school meals). These hypotheses are subjected to testing in a multivariate framework which allows for controls to be imposed on associated variables while the relationship between two variables is being examined.

The recent viability audits in which each school had to provide the Education and Library Boards with up-to-date information on their education performance, enrolment trends and financial standing allowed the authors to construct a data base from these official statistics and interrogate the existing system in much greater detail. These data provided an opportunity to: construct an index of schools based on the variables deemed to be important by the Department of Education for future sustainable schools (quality of education, enrolments and finance); consider issues of access and performance inequality; and, highlight those factors associated with better educational performance. The paper concludes with a discussion on how this empirical analysis might inform the ongoing public policy debate on the future of the education system in Northern Ireland.

An Index of School Performance

The UN's Human Development Index (HDI) is used to rank countries in terms of the level of their "human development". For each country, the UN computes its achievements in the three "human development" areas of Education, Health, and Income (using the adult literacy rate as a measure of educational achievement, life expectancy for health, and per-capita GDP for income) to arrive at an Educational Attainment Index (EAI), a "life expectancy" index (LEI), and an "income index" (GDPI). The three indices are normalised so that their maximum and minimum values are, respectively, 100 and 0. Consequently, the value of an index for a particular country (say, an adult literacy rate of 70% in India) reflects the distance the country has travelled towards the maximum achievement in that area. The HDI is then constructed as a weighted average of the individual indices, all the indices being assigned the same weight (1/3).

In this study we use the concepts behind the HDI to construct a school performance index (SPI) which aggregates achievements in three areas relevant to schooling: *school educational outcomes*; *school financial outcomes*; and *school enrolment outcomes*. Suppose there are K schools, indexed $k=1\dots K$, where N_k is the number of pupils in school k . Schools "perform" at a number of levels:

1. **Educational Performance Index.** For post-primary schools in Northern Ireland this is measured by two indicators: (i) the proportion of pupils obtaining 5+ (that is, 5 or more) GCSEs at grades at A*-C; (ii) the proportion of pupils obtaining 5+ GCSEs at grades at A*-C, *including English and Mathematics*. We denote the first proportion as σ and the second as ρ where $\rho \leq \sigma$. Since, it is more desirable to have 5+ GCSEs at A*-C *with* English and Mathematics than *without*, we define the educational performance of school by the index EP whose value for school k is:

$$EP_k = [(\sigma - \rho) \times \beta + \rho] \times 100 = [\beta\sigma + (1 - \beta)\rho] \times 100 \quad (1)$$

In equation (1), $\sigma - \rho$ is the proportion of pupils obtaining 5+ GCSEs at A*-C *without English and Mathematics* and $\beta < 1$ is the weight assigned to this "achievement"; ρ is the proportion of pupils obtaining 5+ GCSEs at A*-C *with English and Mathematics* and this "achievement" is assigned a weight of 1. This means that if, say, $\beta=0.5$, then obtaining 5+ A*-C GCSEs *without* English and Mathematics is rated only half as highly as 5+ A*-C GCSEs *with* English and Mathematics. The maximum value of EP_k in equation (1) occurs when $\sigma = \rho = 100$, when $EP_k=100$ and the minimum value occurs when $\sigma = 0$ (and, therefore, $\rho = 0$), when $EP_k=0$. Consequently, $0 \leq EP_k \leq 100$.

2. **Financial Performance Index.** The schools audit for Northern Ireland rate the financial viability of a school (V_k) as: '4', if its budget deficit is within Local Management of Schools (LMS) limits; '3', if its budget deficit is greater than 5% or £75,000 and less than 25% of LMS limits; '2', if its budget deficit is 25% or more but less than 50% of LMS limits; '1' if its budget deficit is 50% or higher. Consequently,

we define the financial performance of a school by the index FP whose value for school k is:

$$FP_k = \left(\frac{V_k - 1}{3} \right) \times 100 \quad (2)$$

so that, from equation (2), $0 \leq FP_k \leq 100$.

3. **Enrolment Performance Index.** Although, in theory, a school can perform well or badly, in educational or in financial terms, independently of its size, size matters because low enrolments threaten the existence of a school, irrespective of its educational or financial performance. The critical size for post-primary schools, from the perspective of Northern Ireland's Department of Education criteria for *existential viability*, is a total of at least 500 pupils in years 8-12 ($N_k \geq 500$) and a total of at least 100 pupils in a sixth form. To take account of the enrolment threshold, we define the *enrolment performance* of a school, RP , the value of this index for school k being:

$$RP_k = 100, \text{ if } N_k \geq 500; \quad RP_k = \left(\frac{N_k}{500} \right) \times 100, \text{ if } N_k < 500 \quad (3)$$

4. **School Performance Index.** The overall performance of school k , is represented by the School Performance Index (SPI) which is a *weighted average* of the educational, financial, and enrolment performance indices of the schools, for weights λ , μ , and θ ($\lambda + \mu + \theta = 1$). The value of the index for the school k is:

$$SPI_k = \lambda EP_k + \mu FP_k + \theta RP_k \quad (4)$$

where: $0 \leq OP_k \leq 100$.

In the empirical results, reported below, the values of the various parameters were assumed to be: (i) $\beta = 0.65$ and (ii) $\lambda = 0.8$, $\mu = 0.1$, and $\theta = 0.1$. Tables 1 and 2 rank the post-primary schools in Northern Ireland in terms of their, respective, EPI and SPI values (top and bottom ranked schools shown for illustration purposes).

Salient Features of Post-Primary Schools in Northern Ireland

Schools and Financial Stress

Table 3 also shows that of the 212 post-primary schools for which the relevant data existed: 139 (66%) had a financial stress level of 4 (budget deficit is within Local Management of Schools (LMS) limits); 48 (22%) had a financial stress level of '3' (budget deficit greater than 5% or £75,000 and less than 25% of LMS limits); 10 (5%) had a financial stress level of '2' (budget deficit 25% or more but less than 50% of LMS limits); and 15 (7%) had a financial stress level of '1' (budget deficit 50% or higher than LMS limits). So, two-thirds of schools

did not have any budgetary problems and 88% of schools were either not in any budgetary difficulty or in any serious budgetary difficulty.

It is significant that schools which were financially stressed were smaller than schools which were unstressed (the average size of stress level 1 schools was 268 pupils compared to 719 pupils for stress level 4 schools) and they also carried a larger proportion of FSM and SEN pupils (the proportions of FSM and SEN pupils in level 1 schools were, respectively, 37% and 34% compared to, respectively, 15% and 16% for level 4 schools).

It is also noteworthy that schools which were financially stressed performed worse educationally than schools which were unstressed (the proportions of 5+ A*-C GCSE passes and of 5+ A*-C GCSE passes including English and Mathematics were, respectively, 44% and 21% in stress level 1 schools compared to, respectively, 77% and 65% in stress level 4 schools).

Schools and Education and Library Boards

The smallest schools were in the Western Education and Library Board (ELB) - average size 601 pupils - and the largest schools were in the Belfast ELB (average size 852 pupils). The proportion of FSM and SEN pupils in the total number of pupils in a school was highest in the Western ELB (24% and 19%, respectively) with the proportion of FSM pupils being lowest in the North-Eastern ELB and the South-Eastern ELB (14%) and the proportion of SEN pupils being lowest in the North-Eastern ELB (12%).

The Southern Board and South Eastern Boards had, respectively, the highest and the lowest proportion of 5+ GCSE passes at A*-C grade and 5+ A*-C grade GCSE passes including English and Mathematics (respectively, 82% and 64% for the Southern Board and, respectively, 68% and 54% for the South-Eastern Board).

Controlled and Maintained Secondary Schools

There were 57 *controlled*, and 71 *maintained*, secondary schools in Northern Ireland. The average number of pupils in controlled and maintained secondary schools was, respectively, 551 and 587. Controlled secondary schools averaged 116 FSM pupils (21% of total enrolment) and 121 SEN pupils (22% of total enrolment); the corresponding figures for maintained secondary schools were 183 FSM pupils (31% of total enrolment) and 144 SEN pupils (25% of total enrolment). So maintained secondary catered to FSM and SEN pupils much more than did their controlled counterparts.

In view of the greater propensity of maintained secondary schools to meet the educational needs of Northern Ireland's less privileged post-primary pupils, it is remarkable that they also recorded a better educational performance than controlled secondary schools. Of the average class of 95 year 12 pupils in maintained secondary schools, 61 pupils (64%) achieved 5+ GCSE passes at A*-C grade and 36 pupils (38%) achieved 5+ A*-C grade GCSE passes, including English and Mathematics. On the other hand, of the average class of 98 year 12 pupils in controlled secondary schools, 54 pupils (55%) achieved 5+ GCSE passes at A*-C

grade and 32 pupils (33%) achieved 5+ A*-C grade GCSE passes, including English and Mathematics.

Grammar versus Secondary Schools: Performance Inequality

In 2010, there were 217 post-primary schools in Northern Ireland of which 68 were Grammar schools and 149 were secondary schools (Table 3). The average size of grammar schools was 914 pupils with 663 pupils in years 8-12 and 137 pupils in year 12 (the year in which pupils sat their GCSE examination). The corresponding numbers for secondary schools, as Table 3 shows, were 576 (total enrolment), 478 (years 8-12), and 98 (year 12 pupils).

From the average year 12 class in grammar schools of 137 pupils, 133 pupils (97%) achieved 5+ GCSE at A*-C and 128 pupils (93%) achieved 5+ GCSEs at A*-C, including English and Mathematics. The corresponding figures for secondary schools were that, from their average year 12 class of 98 pupils, 58 pupils (59%) achieved 5+ GCSE at A*-C and 35 pupils (36%) achieved 5+ GCSEs at A*-C, including English and Mathematics.

Table 4 explores in greater detail the *performance inequality* between grammar and secondary schools. There were a total of 23,858 pupils in Year 12 classes in Northern Ireland of whom 9,316 (39%) were grammar school pupils and 14,542 (61%) were secondary school pupils. There were a total of 17,413 pupils in Year 12 classes in Northern Ireland who achieved 5+ GCSEs at A*-C grade in 2010. Of these 17,413 pupils, 9,017 pupils (52%) were grammar school pupils and the remaining 8,397 pupils (48%) were in secondary schools. Similarly, there were a total of 13,478 pupils in Year 12 classes in Northern Ireland who achieved 5+ GCSEs at A*-C grade, *including English and Mathematics*, in 2010. Of these 13,478 pupils, 8,724 pupils (65%) were grammar school pupils and the remaining 5,025 pupils (35%) were in secondary schools.

So, one indicator of *inequality in performance* in Northern Ireland's post-primary school system is that while only 39% of Year 12 pupils were in grammar schools (9,316 out of 23,858), grammar schools accounted for 52% of pupils achieving 5+ GCSEs at A*-C grades (9,017 out of 17,413) and for 65% of pupils achieving 5+ GCSEs at A*-C grades including English and Mathematics (8,724 out of 13,478). Conversely, while 61% of Year 12 pupils (14,542 out of 23,858) were in secondary schools, these schools accounted for only 48% of pupils achieving 5+ GCSEs at A*-C grades (8,397 out of 17,413) and for only 37% of pupils achieving 5+ GCSEs at A*-C grades including English and Mathematics (5,025 out of 13,478).

Grammar versus Secondary Schools: Access Inequality

On average, grammar schools had 61 "free school meal" (FSM) pupils and 61 special educational needs (SEN) pupils each group comprising, on average, only 7% of the total number of pupils in grammar schools. On the other hand, secondary schools averaged 150 FSM pupils and 138 SEN pupils with each group comprising, respectively, on average, 26% and 24% of the total number of pupils in secondary schools. So, half of the total number of

secondary school pupils - compared to only 14% of grammar school pupils - came from deprived backgrounds (FSM pupils) or had special educational needs (SEN).

Table 5 explores in greater detail the distribution of the different types of pupils between grammar and secondary schools. There were a total of 26,569 FSM post-primary pupils in Northern Ireland of whom only 4,150 (16%) went to grammar schools with the remaining 22,419 FSM pupils (84%) in secondary schools. Similarly, there were a total of 24,762 SEN post-primary pupils in Northern Ireland of whom only 4,147 (17%) were grammar school pupils with the remaining 20,615 SEN pupils (83%) in secondary schools. By contrast, of the 96,571 post-primary pupils in Northern Ireland *who were neither FSM nor SEN pupils*, 53,836 (56%) attended grammar schools while the remaining 42,735 pupils (44%) were secondary school pupils.

So, one indicator of *inequality of access* in Northern Ireland's post-primary school system is that while the 26,569 FSM pupils comprised 18% of Northern Ireland's total enrolment of 147,902 post-primary pupils, the 4,150 FSM pupils in grammar schools comprised only 7% of the total grammar school enrolment of 62,113 pupils. Similarly, while the 24,762 SEN pupils comprised 17% of Northern Ireland's total enrolment of 147,902 post-primary pupils, the 4,147 SEN pupils in grammar schools comprised only 7% of the total grammar school enrolment of 62,113 pupils. In contrast, while the 96,571 post-primary pupils in Northern Ireland *who were neither FSM nor SEN pupils* (hereafter, referred to as *non-deprived* pupils) comprised 65% of Northern Ireland's total enrolment of 147,902 post-primary pupils, the 53,836 such pupils in grammar schools comprised 86% of the total grammar school enrolment of 62,113 pupils.

Access Inequality to Grammar Schools by Catholic and Protestant "Ethos"

Most of Northern Ireland's grammar schools (51 out of 67) are classed under the management type "Voluntary". However, under this veneer, there is a clear binary divide between the 67 grammar schools depending on whether they subscribe to a "Protestant ethos" (38 schools) or to a "Catholic ethos" (29 schools).

Table 6 shows that there is a clear and significant difference between Catholic and Protestant grammar schools in their intake of FSM pupils. Of the total of 35,090 pupils in Protestant grammar schools, only 1,476 (4.2% of the total) were FSM pupils. By contrast, of the total of 27,043 pupils in Catholic grammar schools, 2,674 (9.9% of the total) were FSM pupils. A t test showed that this difference in proportions between Protestant and Catholic grammar schools in their respective intakes of FSM pupils was statistically significant (t-value=5.19). The difference between Protestant and Catholic grammar schools in their intakes of SEN pupils - respectively, 6.6% and 6.8% of their pupil strengths - was not, however significant. *So, while children from deprived backgrounds have difficulty accessing grammar schools in Northern Ireland this is considerably more of a problem in Protestant, compared to Catholic, grammar schools.*

What Are the Factors Underpinning Educational Performance?

The "educational performance" of schools is judged by two indicators:

- I. The proportion of its pupils attaining 5+ A^{*}-C grades at GCSE defined as weighted average of its 2009 and 2010 proportions with weights of, respectively, 20% and 80%. **This proportion is, hereafter, referred to as P1.**
- II. The proportion of its pupils attaining 5+ A^{*}-C grades at GCSE, *including English and Mathematics*, defined as weighted average of its 2009 and 2010 proportions with weights of, respectively, 20% and 80%. **This proportion is, hereafter, referred to as P2.**

The values of P1 and P2 are shown in Table 7 for secondary schools and grammar schools. The most noticeable feature of these values, remarked upon earlier is the gulf in performance between grammar schools and secondary schools: 96.8% versus 58.6% for P1 and 93.6% versus 35.4% for P2. Given that one of the Northern Ireland's Department of Education criteria for school viability is size - a total of at least 500 pupils in years 8-12 - we analyse first the relationship between school size and performance.

Does Size Matter for GCSE Performance?

We divided schools into two groups: those that had at least 500 pupils in years 8-12 and were, therefore, on the DE's criterion, *size viable* and those that had less than 500 pupils in years 8-12 and were, therefore, on the DE's criterion, *size unviable*. At first blush, there appeared to be a strong association between size and performance: the mean values of P1 for size viable and unviable schools were, respectively, 77.7% and 63.0% and the mean values of P2 for size viable and unviable schools were, respectively, 64.1% and 43.0%. Both pairs of differences were statistically significant at the 5% level (hereafter, "significant") with t values of, respectively, 4.32 and 4.81, respectively.

However, this comparison is misleading because the group of 120 size viable schools contained 55 (of the total of 68) grammar schools and 65 secondary schools while the group of 97 size unviable schools contained only 13 grammar schools and 84 secondary schools. Since, compared to secondary schools, grammar schools had a much higher level of performance, in respect of P1 and P2, the observed relationship between size and performance is most likely more a "grammar school effect" rather than a "size effect" *per se*.

A fairer comparison would be to compare size viable *secondary* schools with size unviable *secondary* schools and to compare size viable and size unviable *grammar* schools. Table 8 shows the results from such a comparison.

1. There was a significant difference in P2, but *not* in P1, between size viable and size unviable *secondary* schools.
2. There was no significant difference in P2 between size viable and size unviable *grammar* schools.
3. P1 was significantly greater for *size unviable*, compared to *size viable*, grammar schools.

So, on the basis of these results, the evidence is mixed: compared to unviable secondary schools, viable secondary schools do significantly better in terms of P2 (5+ A*-C grades at GCSE, including English and Mathematics), but not significantly better in terms of P1 (5+ A*-C grades at GCSE) while, compared to viable grammar schools, unviable grammar schools do significantly better in terms of P1 (5+ A*-C grades at GCSE) but not significantly better in terms of P2 (5+ A*-C grades at GCSE, including English and Mathematics).

Does Financial Viability Matter for GCSE Performance?

Of the 68 grammar schools, 58 had a financial stress level of 4 (that is, no stress) and 10 had a stress level of 3 (mild stress). Almost all the variation in financial stress was between the 144 secondary schools: 80 had level 4 stress; 39 had level 3 stress, 10 had level 2 stress; and 15 had level 1 stress. Table 9 shows that there were some significant differences in school performance associated with differences in financial stress and they were all in the secondary school sector:

1. Compared to level 1 secondary schools (P1=44.3 and P2=21.8), level 4 secondary schools (P1=57.7, P2=34.6) - and, by implication, level 3 schools - performed significantly better in respect of P1 and P2.
2. Compared to level 2 secondary schools (P2=28.4), level 4 secondary schools (P2=34.6) - and, by implication, level 3 schools - performed significantly better in respect of P1 and P2.
3. There was no significant difference in either P1 or P2 between level 4 and level 1 secondary schools

In general, secondary schools at level 3 financial stress performed the best followed by secondary schools at level 4 financial stress though, of course, these differences between level 3 and level 4 schools were not significantly different from zero.

Does Management Type Matter for GCSE Performance: Secondary Schools?

Of the 149 secondary schools, 57 were "Controlled", 71 were "Maintained", 15 were "Direct Grant Integrated", 5 were "Controlled Integrated", and 1 was "Other Maintained". Ignoring the single "other maintained" school, Table 9 shows the performance of the secondary schools under the four management types: Controlled, Controlled Integrated, Direct Grant Integrated, and Maintained. Table 10 shows that:

1. The best performing secondary schools in Northern Ireland were in the *Maintained* sector (P1=64.1 and P2=37.7) and in the *Direct Grant Integrated* sector (P1=62.2 and P2=41.8).
2. The worst performing schools were in the *Controlled Integrated* sector (P1=49.2 and P2=28.2) and the *Controlled* Sector (P1=50.9 and P2=30.4).
3. These differences between the Controlled sector on the one hand, and the Maintained and Direct Grant Integrated sectors on the other, were significantly different from zero in respect of both P1 and P2.

4. Neither in respect of P1, nor in respect of P2, was there any significant difference between Maintained and Direct Grant Integrated Schools.
5. There was no significant difference between Controlled and Controlled Integrated Schools in respect of P1 or P2.

Does Management Type Matter for A-level Performance of Secondary Schools?

Performance at A-level is measured by the proportion of pupils achieving at least three A*-C grades at A-level. **This proportion is, hereafter, referred to as P3.** Table 11 shows the values of P3 for schools under the four management types with Maintained schools recording the largest value (46%) with the values for the other management types hovering around 40%. The difference in P3 between Controlled and Maintained schools was significant at the 10% level but not at the 5% level.

Does School "Ethos" Matter for Grammar School GCSE and A-level Performance?

Tables 12 and 13 shows the performance of Northern Ireland's 67 grammar schools, separated by "ethos", in terms of their GCSE (Table 12) and A-level (Table 13) performance.

1. Protestant grammar schools had a 96% success rate for 5+ GCSEs at A*-C level compared to a 97.8% rate for Catholic grammars. This difference *was* significantly different from zero.
2. In terms of 5+ GCSEs at A*-C level, including English and Mathematics, Protestant grammar schools had a 93.1% success rate compared to a 94.3% rate for Catholic grammars. This difference *was not* significantly different from zero.
3. In terms of 3+ A-levels at A*-C level, Protestant grammar schools had a 73.7% success rate compared to a 79.8% rate for Catholic grammars. This difference *was* significantly different from zero.

Empirical Analysis

Although the previous section established an association between the performance and variables like school size and financial stress - for example, higher levels of financial stress were associated with lower performance levels - it would be a mistake to make causal inferences from this because the focus was on just two variables (*bivariate analysis*) with the other factors being ignored. The mistake arises from the fact that the two variables being analysed, say X and Y, might be related to a third variable, Z and it is this common relationship of X and Y to Z which creates the association between X and Y. For example, schools which are highly stressed may have a disproportionate number of FSM pupils; at the same time, FSM pupils may impact negatively on a school's performance. So, by not taking account of the presence of FSM pupils, there is the danger of imputing causality to the observed association between stress levels and performance. So, in taking account of the association between X and Y, after controlling for the effects of Z, we do not mean to suggest that there is necessarily a causal relationship between X and Y, only that the probability of correlation implying causation is greater when the effect of Z has been controlled for than when it is not.

In order to correct for this, the analysis has to move from considering only two variables at a time to taking account of several variables simultaneously. So, rather than considering the two relationships separately - that is, (i) performance depends upon size and (ii) performance

depends upon stress level - we consider a relationship in which performance depends upon size *and* stress level. We can also add other variables to this, like the number of FSM and SEN pupils and the schools' management type and, thereby, conduct a *multivariate analysis* of the relationship between performance and several explanatory factors.

In Tables 14-6, below, the *dependent* variables are P1 and P2 (defined earlier); in Table 17, it is P3 (defined earlier). Table 14 shows the results from estimating the equations for P1 and P2 for *all* schools (secondary and grammar); Table 15 shows the results from estimating the equations for P1 and P2 for *secondary schools*; Table 16 shows the results from estimating the equations for P1 and P2 for *grammar schools*; Table 17 shows the results from estimating the equation for P3 for: all schools, secondary schools, and grammar schools. The following points should be noted in advance of discussing the empirical results:

- I. In each table, *inter-school* variation in the values of the dependent variables are sought to be explained in terms of differences between schools in their values of the *explanatory* variables.
- II. The coefficients associated with each variable are to be interpreted as the *estimated change* in the dependent variable for a *small change* in the explanatory variable.
- III. If the coefficient estimate is *positive*, the value of the dependent variable will *rise* for a small *increase* in the value of the explanatory variable.
- IV. If the coefficient estimate is negative, the value of the dependent variable will *fall* for a small *increase* in the value of the explanatory variable.
- V. For explanatory variables which take a *continuum* of values (for example, the number of FSM pupils), the coefficient captures the change in P1 (or P2 or P3, depending on the case) for a change in the number of FSM pupils from its mean value.
- VI. For explanatory variables which take categorical values (for example, the level of financial stress is either 4, 3, 2, or 1 or the Boards are either NELB, SELB, SELB, WELB, or BELB), the coefficient represents the change in P1 (or P2 or P3, depending on the case) for a change from the *reference category* (level 1 for financial stress or BELB for Boards) to the category in question.

Discussion of Results: Grammar School Status

When the equations for P1, P2, and P3 were estimated over *all* the schools (Table 14 for P1 and P2 and Table 17, panel 1 for P3), the largest effect on schools was made by *grammar school status*. The difference between grammar and secondary schools *ceteris paribus* was 28.7 percentage points (pp) for P1, 48.8pp for P2, and 25.9pp for P3.

Discussion of Results: School Size

In the equation for P3, the relevant *school size* was sixth form enrolment; for P1 and P2, school size was measured by three separate variables: (i) sixth form size (zero if no sixth form); (ii) Years 8-12 enrolment; and (iii) Year 12 enrolment.² A consistent feature of the

² The relevant figures are for 2011-12 and taken from the Audit reports.

results, for P1, P2, and P3 was that *it was sixth form size that mattered significantly for performance*. This was the case when the equations were estimated over all the schools (Table 14 and Table 17, panel 1) or separately for secondary schools and grammar schools (Table 15, 16, and Table 17, panels 2 and 3). The results can be encapsulated as follows;

1. Estimated over *all* the schools, an *additional ten* pupils in the sixth form was associated with a 0.5pp rise in P1, P2, and P3 (Table 14 and Table 17, panel 1).
2. Estimated over secondary schools, an *additional ten* pupils in the sixth form was associated with a rise of 0.8pp and 0.9pp in P1 and P2, respectively, and a 0.5pp rise in P3 (Table 15 and Table 17, panel 2).
3. Estimated over grammar schools, an *additional ten* pupils in the sixth form was associated with a rise of 0.3pp and a 0.4pp in P1 and P2, respectively, and a 0.3pp rise in P3 (Table 16 and Table 17, panel 3).

Why should sixth form size matter for GCSE performance? The answer probably is that a large and thriving sixth form allows for teacher specialism which has a favourable impact on GCSE teaching. This is analogous to a university department with a large postgraduate intake being able to provide better undergraduate teaching than a department without (or with only weak) postgraduate provision.

It should not be inferred from this that large sixth forms are the *cause* of good performance. The fact is that both good performance and large sixth-forms are related to a *third factor* which is good teaching. Large sixth forms are simply one way (and not necessarily the most efficient way) of attracting good teachers. If one could devise other ways of attracting good teachers to "challenging" schools then one could get better results without involving sixth-form size. The Training and Development Agency (TDA) in England has shown how this might be done launching a recruitment campaign directed specifically at filling posts in such schools but it's how the management supports those teachers that will make the difference to whether they stay (Tickle, 2011: 4). Ofsted has a *Teach First* scheme, which works in London, the North-West, and the Midlands, which recruits high-flying graduates to teach in tough secondary schools (Lipsett, 2008: 5).

The numbers enrolled in Years 8-12 had a significant influence on P2 *but not on P1* and for secondary schools *but not for grammar schools* (Tables 15 and 16): an *additional ten* pupils in Years 8-12 would lead to a rise of 0.2pp P2 in secondary schools (Table 15). Even here, the effect of Years 8-12 enrolment on P2 was considerably smaller than that of sixth form size. The size of the Year 12 class had no significant effect on GCSE performance either in terms of P1 or P2 (Tables 14, 15, 16).

Discussion of Results: Financial Stress

As the earlier discussion on financial stress showed, financial stress was experienced uniquely by secondary schools: most grammar schools were entirely stress-free (58 out of 68) with the remainder experiencing only mild (level 3) financial stress. Table 15 shows that, compared to being financially very stressed (level 1), not being financially stressed, or being

only mildly stressed, significantly improved GSCE performance: a change from level 1 to level 4 stress raised P1 by 11.3pp and P2 by 8.2pp while a movement from level 1 to level 3 stress raised P1 by 11.3pp and P2 by 9.2pp. On the other hand, a transition from level 1 to level 2 financial stresses did not significantly affect performance. Lastly, as Table 17 shows, *irrespective of stress level, financial performance did not have any significant effect on A level performance as measured by P3.*

There is the very real question of the direction of causation between educational performance and financial stress. Is financial stress the cause or the consequence of poor performance? Since only 15 of the 149 secondary schools in Northern Ireland experienced level 1 stress, the reasons for their stress could and should be explored in more detail.

Discussion of Results: Library Boards

Compared to the “reference Board”, BELB, *secondary schools* in the WELB had a significantly better P2 performance (by 10.7pp) and grammar schools in the SEELB had significantly better P1 and P2 performances (by, respectively, 3.0pp and 5.1pp). In terms of A level results as measured by P3, compared to BELB secondary schools, secondary schools in *all* the other Boards had significantly better results: the SELB by 22.5pp; the NELB by 19.84pp; the WELB by 16.8pp; and the SEELB by 10.9pp. There was, however no significant difference in the A level performance of the grammar schools in the different Boards.

Discussion of Results: Single Sex versus Co-educational Schools

Although most of Northern Ireland’s schools were co-educational schools, 24 of the 143 secondary schools, and 27 of the 68 grammar schools, were single sex schools. Of the 24 schools single sex schools in the secondary school sector, 13 were girls only and, of the 27 schools single sex schools in the grammar school sector, 14 were girls only. Single sex schools were largely a feature of the “Catholic” schools. Among grammar schools, 16 of the 29 Catholic grammars (55%), but only 11 of the 38 Protestant grammars (29%), were single sex. Among secondary schools, 20 of the 70 Catholic maintained schools (29%) were single sex compared to only 4 of the 49 controlled schools (8%).

The evidence is while there was no significant difference, in terms of GCSE performance, between the co-educational and the boys only secondary schools, the 13 *girls only* secondary schools did significantly *better* in terms of P1 (by nearly 14pp). In the grammar school sector, while there was no significant difference, in terms of GCSE performance, between the co-educational and the girls only schools, the 13 *boys only* schools did significantly *worse* in terms of P1 (by 2.9pp) and in terms of P2 (by 6.8pp). These differences between single sex and co-educational schools disappeared when A level results were analysed: now there were no significant difference in P3 between the three types of school either for secondary schools or for grammar schools.

Discussion of Results: FSM and SEN pupils

There was no evidence that the presence of SEN pupils had any effect on the educational performance either at GCSE (neither P1 nor P2 was significantly affected by any change in SEN pupil numbers: Tables 14, 15, and 16) or at A-level (P3 was not significantly affected by any change in SEN pupil numbers: Table 17).

The findings with respect to FSM pupils were entirely different with the presence of FSM pupils adversely affecting the GCSE performance of secondary schools and adversely affecting the A level performance of both secondary and grammar schools. An additional 10 FSM pupils was associated with P1 and P2 falling by, respectively, 0.9pp and 1pp in secondary schools; *however, the presence of FSM pupils did not have any significant effect on the GCSE performance of grammar schools.* However, A-level performance was adversely affected *in both secondary and in grammar schools* by the presence of FSM pupils: an additional 10 FSM pupils was associated with a significant fall of 0.5pp in P3 for *both* secondary and grammar schools.

As with school size, it should not be inferred from this that FSM pupils were the cause of poor school results. There is the very real possibility of reverse causation. It may be that under-resourced schools - which, by that fact alone, would produce poor results - are disproportionately located in areas of greatest deprivation and which serve as the school catchment areas for FSM pupils.

Discussion of Results: Catholic versus Protestant Schools

Table 15 shows that in the secondary school sector, even after controlling for the other variables, the performance of maintained schools was significantly better (though only at 10% level of significance) than that of controlled schools: by 10.9pp with respect to P1 and by 8.3pp with respect to P2. Table 16 shows that in the grammar school sector, “Catholic ethos” schools significantly outperformed “Protestant ethos” schools by 2.0pp with respect to P1; there was, however, no significant difference with respect to P2 between the two sets of schools.

In terms of A-level performance, as measured by P3, maintained secondary schools significantly outperformed (though only at 10% level of significance) their controlled counterparts by 5.6pp and “Catholic ethos” grammar schools significantly outperformed “Protestant ethos” grammar schools by 8.8pp. This begs the question of what are the sources of the superior performance of Catholic schools, *particularly with respect to post-compulsory education* but it is beyond the scope of quantitative analysis to answer this.

Conclusions

The policy debate about post-primary education in Northern Ireland – as manifested by the recently conducted audit of post-primary schools by each of responsible Education and Library Boards – has been preoccupied with three issues: enrolment numbers and trends in

the different schools; their financial performance, as evidenced by their budgetary deficits; and their educational performance, as evidenced by the proportion of their pupils obtaining 5 or more GCSE grades at A*-C level preferably including English and Mathematics). When schools have been found wanting, in one more of these respects, the panacea proposed is school amalgamations to form large schools. It is the *hope* of those who favour this solution that large schools will, at a stroke, slay the triple-headed monster of small numbers, poor financial management, and low educational outcomes that plague Northern Ireland's post-primary schools.

As this paper shows, this hope is seriously misplaced. First, given that the Schools Funding Formula requires "money to follow the pupil", it is unlikely that the formation of large schools (with enrolments in excess of 500 pupils) would make more than a small dent in the Department of Education's budget. At the same time, school closures and amalgamations would significantly increase the travel time (and costs) of pupils who, because of the closure of their local schools, would now be required to travel further afield to a "large school". The evidence is that the net financial gain from school closures is likely to be small and perhaps even negative (Borooah and Knox, 2012).

In this paper we cast doubt on the prevailing belief in Northern Ireland's education circles that large schools make for better schools. There is little evidence that a large number of pupils in a school makes for a better GCSE performance. It is true that a large sixth form produces better GCSE results (in much the same way that a flourishing postgraduate program in a university department produces better undergraduate results) but (just as with a university's post graduate programme) it is not the sixth form *per se* but the sixth form as an instrument for attracting good teachers that does the trick. The policy point is that there are several, possibly cheaper and more effective, ways of attracting good teachers to a school than through a large sixth form.

Not only does schooling policy in Northern Ireland suffer from the defect of being unsupported by evidence it also suffers from the flaw that, through its blinkered focus on average performance, it misses several issues relating to inequality in Northern Ireland's schooling system:

1. There is a wide gulf between grammar and secondary schools in their educational performance with the consequence that pupils who attend the former type of school have considerably better life chances than those who attend the latter type.
2. FSM pupils are denied the proportionate access to grammar school education that their presence in the population of post-primary pupils would, on grounds of social justice, demand. However, this problem of access is considerably worse for Protestant, compared to Catholic, grammars.
3. There is also a considerable gap between the different secondary schools with some displaying grammar school levels of achievement while others are "sink schools".

4. There is also evidence that, in terms of GCSE results, FSM pupils in secondary schools do not perform as well as non-FSM pupils. However, it is not clear whether the roots of this underachievement of FSM pupils lies in the circumstances surrounding the pupils' lives or whether they lie in the nature of schools located in deprived areas.
5. Lastly, there is evidence that, on average, Catholic schools (secondary and grammar) outperformed their Protestant counterparts both in terms of GCSE and in terms of A-level results.

These issues - which, taken collectively, can be placed under the general rubric of "educational inequality" – point to the need for a *social justice* dimension to educational policy in Northern Ireland with a concomitant research agenda to facilitate this. Consistent with the above points, this research agenda should embrace the following areas:

- a) The sharing of educational experience, in the broadest sense, between the Catholic and Protestant sectors. The present proposals for school amalgamation are almost exclusively *intra*-sectoral and serve to fossilise the existing system in which pupils from the two communities live in complete isolation from each other. Yet, the evidence is (see above) that Protestant schools could benefit by learning how Catholic schools are able to deliver superior educational outcomes. The critical point is what these lessons are and how they might best be delivered?

However, in advance of answering this question, the general point is that the formation of larger schools within each sector is, in terms of delivering better educational outcomes, simply a distraction whose purpose is largely to allow Catholic and Protestant schools to remain within their separate educational ghettos. The interests of Northern Ireland's school pupils would be better served by forming "learning communities" which embrace both sectors (Gallagher *et al*, 2010). This may not necessarily lead to *bigger* schools but it is more likely to lead to *better* schools.

- b) The issue of access inequality is fundamental to Northern Ireland's post-primary educational problems. Although they are funded with public money, grammar schools *fail the community* by restricting admission in terms of the economic circumstances of its pupils. In effect, the tax payer pays grammar schools to transmit deprivation through generations.

In terms of how to improve access inequality to grammar schools, one could usefully look at the identical problem of Oxbridge admissions being disproportionately the preserve of pupils from independent schools. The *first* step in addressing the issue of access inequality is to be aware that it exists: Westminster is far more aware of the "Oxbridge problem" than Stormont is of its "grammar school problem". Indeed, it would not be an exaggeration to say that

Oxbridge colleges are themselves aware that they have a problem while Northern Ireland's grammar schools remain cocooned in complacency.

The next step towards solving the problem of access inequality is for the government to place it (preferably high) on its policy agenda. Unfortunately, the issue is not even a blip on the Northern Ireland government's policy radar. The last step is the willingness to devise panoply of measures that will raise the numbers of FSM pupils in grammar schools: outreach programmes, compensatory marks in entrance tests, and perhaps quotas.

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Table 1: Educational Performance of Post-Primary Schools in Northern Ireland

| School | Town | Board | GCSE A*-C | GCSE A*-C (E&M) | Score | Rank |
|---|--------------|-------|-----------|-----------------|-------|------|
| Lumen Christi College | Londonderry | WELB | 100.0 | 100.0 | 100.0 | 1 |
| Our Lady's Grammar School | Newry | SELB | 100.0 | 99.4 | 99.8 | 2 |
| Thornhill College | Londonderry | WELB | 100.0 | 99.2 | 99.7 | 3 |
| St Mary's Grammar School | Magherafelt | NEELB | 100.0 | 99.2 | 99.7 | 3 |
| Aquinas Diocesan Grammar School | Belfast | BELB | 100.0 | 97.8 | 99.2 | 5 |
| Strathearn School | Belfast | BELB | 99.3 | 98.9 | 99.2 | 5 |
| Rathmore Grammar School | Belfast | BELB | 99.4 | 98.8 | 99.2 | 5 |
| Our Lady and St Patrick's College | Belfast | SEELB | 99.9 | 97.7 | 99.1 | 8 |
| Wallace High School | Lisburn | SEELB | 99.1 | 98.9 | 99.0 | 9 |
| Sacred Heart Grammar School | Newry | SELB | 99.2 | 98.6 | 99.0 | 9 |
| Ballymena Academy | Ballymena | NEELB | 98.9 | 98.4 | 98.7 | 11 |
| Assumption Grammar School | Ballynahinch | SEELB | 99.1 | 98.0 | 98.7 | 11 |
| Grosvenor Grammar School | Belfast | BELB | 99.3 | 97.3 | 98.5 | 13 |
| St Joseph's Grammar School | Dungannon | SELB | 99.4 | 97.1 | 98.5 | 13 |
| ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| Newtownabbey Community High School | Newtownabbey | NEELB | 34.8 | 13.1 | 26.7 | 201 |
| St Columban's College | Newry | SELB | 32.1 | 17.5 | 26.6 | 202 |
| St Paul's Junior High School | Craigavon | SELB | 35.2 | 11.3 | 26.2 | 203 |
| Dundonald High School | Belfast | SEELB | 29.3 | 15.0 | 23.9 | 204 |
| St Peter's High School | Londonderry | WELB | 32.7 | 8.5 | 23.6 | 205 |
| Lisnagarvey High School | Lisburn | SEELB | 31.7 | 6.1 | 22.1 | 206 |
| Drumcree College | Portadown | SELB | 24.7 | 14.8 | 21.0 | 207 |
| Ballee Community High School | Ballymena | NEELB | 23.2 | 6.9 | 17.1 | 208 |
| St Gemma's High School | Belfast | BELB | 17.4 | 10.8 | 15.0 | 209 |
| Movilla High School | Newtownards | SEELB | 14.1 | 9.0 | 12.2 | 210 |
| Dunmurry High School | Belfast | SEELB | 15.3 | 2.3 | 10.4 | 211 |
| Orangefield High School | Belfast | BELB | 12.0 | 7.0 | 10.1 | 212 |

Notes to Table 1: Educational Performance is computed as $0.65 \times (\text{proportion of pupils achieving 5+ GCSEs at A}^* \text{-C}) + \text{proportion of pupils achieving 5+ GCSEs at A}^* \text{-C, including English and Mathematics}$.

The proportion of pupils achieving 5+ GCSEs at A* -C is computed as a weighted average of the 2009 and 2010 proportions (the latest years for which data was available) the weights being 20% for 2009 and 80% for 2010.

Table 2: Performance of Post-Primary Schools in Northern Ireland, 2010

| School | Town | Board | Educational Performance (EPI) | Financial Performance (FPI) | Enrolment (RPI) | Overall (SPI) | Rank |
|---|--------------|-------|-------------------------------|-----------------------------|-----------------|---------------|------|
| Lumen Christi College | Londonderry | WELB | 100.0 | 100.0 | 100.0 | 100.0 | 1 |
| Our Lady's Grammar School | Newry | SELB | 99.8 | 100.0 | 100.0 | 99.8 | 2 |
| Thornhill College | Londonderry | WELB | 99.7 | 100.0 | 100.0 | 99.8 | 2 |
| St Mary's Grammar School | Magherafelt | NEELB | 99.7 | 100.0 | 100.0 | 99.8 | 2 |
| Aquinas Diocesan Grammar School | Belfast | BELB | 99.2 | 100.0 | 100.0 | 99.3 | 5 |
| Strathearn School | Belfast | BELB | 99.2 | 100.0 | 100.0 | 99.3 | 5 |
| Rathmore Grammar School | Belfast | BELB | 99.2 | 100.0 | 100.0 | 99.3 | 5 |
| Our Lady and St Patrick's College | Belfast | SEELB | 99.1 | 100.0 | 100.0 | 99.3 | 5 |
| Wallace High School | Lisburn | SEELB | 99.0 | 100.0 | 100.0 | 99.2 | 9 |
| Sacred Heart Grammar School | Newry | SELB | 99.0 | 100.0 | 100.0 | 99.2 | 9 |
| Ballymena Academy | Ballymena | NEELB | 98.7 | 100.0 | 100.0 | 99.0 | 11 |
| Assumption Grammar School | Ballynahinch | SEELB | 98.7 | 100.0 | 100.0 | 99.0 | 11 |
| Grosvenor Grammar School | Belfast | BELB | 98.5 | 100.0 | 100.0 | 98.8 | 13 |
| Dalriada School | Ballymoney | NEELB | 98.5 | 100.0 | 100.0 | 98.8 | 14 |
| Glenlola Collegiate | Bangor | SEELB | 98.4 | 100.0 | 100.0 | 98.7 | 15 |
| Friends' School | Lisburn | SEELB | 98.4 | 100.0 | 100.0 | 98.7 | 15 |
| ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| Coleraine College | Coleraine | NEELB | 34.6 | 0.0 | 36.6 | 31.4 | 200 |
| Garvagh High School | Coleraine | NEELB | 35.4 | 0.0 | 18.6 | 30.2 | 201 |
| Corpus Christi College | Belfast | BELB | 28.5 | 0.0 | 74.4 | 30.2 | 202 |
| Immaculate Conception College | Londonderry | WELB | 28.1 | 33.3 | 36.6 | 29.5 | 203 |
| Ballee Community High School | Ballymena | NEELB | 17.1 | 100.0 | 54.0 | 29.1 | 204 |
| Movilla High School | Newtownards | SEELB | 12.2 | 100.0 | 90.2 | 28.8 | 205 |
| Newtownabbey Community High School | Newtownabbey | NEELB | 26.7 | 0.0 | 46.0 | 25.9 | 206 |
| St Columban's College | Newry | SELB | 26.6 | 0.0 | 43.0 | 25.6 | 207 |
| St Gemma's High School | Belfast | BELB | 15.0 | 100.0 | 20.8 | 24.1 | 208 |
| Orangefield High School | Belfast | BELB | 10.1 | 100.0 | 42.8 | 22.4 | 209 |
| St Peter's High School | Londonderry | WELB | 23.6 | 0.0 | 32.2 | 22.1 | 210 |
| Drumcree College | Portadown | SELB | 21.0 | 0.0 | 33.8 | 20.2 | 211 |
| Dunmurry High School | Belfast | SEELB | 10.4 | 0.0 | 35.0 | 11.8 | 212 |

Notes to Table 2:

1. Educational Performance is computed as $0.65 \times (\text{proportion of pupils achieving } 5+ \text{ GCSEs at } A^*-C) + \text{proportion of pupils achieving } 5+ \text{ GCSEs at } A^*-C, \text{ including English and Mathematics}$. The proportion of pupils achieving 5+ GCSEs at A*-C is computed as a weighted average of the 2009 and 2010 proportions (the latest years for which data was available) the weights being 20% for 2009 and 80% for 2010.

2. Financial performance is defined as $[(\text{stress level} - 1)/3] \times 100$; it is 100 if stress level=4; 66.67 if stress level=3; = 33.33 if stress level= 2; 0 if stress level=1.

3. Enrolment score =1 if enrolment of classes 8-12 >499; = (enrolment/500)×100 if enrolment<500.

Table 3: Average Educational, Financial, and Enrolment Performance of Schools by Type of School, 2010

| | Number of Schools | Enrolment 2011/12 (years 8-12) | Total Enrolment | Free school meal pupils | SEN pupils | Year 12 pupils | 5+ GCSE, A*-C | 5+ GCSE, A*-C including E & M | Aggregate Educational Score | Financial Stress |
|----------------------|-------------------|--------------------------------|-----------------|-------------------------|------------|----------------|---------------|-------------------------------|-----------------------------|------------------|
| Grammar Schools | 68 | 663 | 914 | 61 | 61 | 137 | 133 | 128 | 95.6 | 3.9 |
| Secondary Schools | 149 | 478 | 576 | 150 | 138 | 98 | 58 | 35 | 48.6 | 3.3 |
| Financial Stress=4 | 139 | 561 | 719 | 109 | 114 | 114 | 88 | 74 | 69.1 | 4 |
| Financial Stress=3 | 48 | 616 | 776 | 174 | 127 | 129 | 89 | 64 | 60.0 | 3 |
| Financial Stress=2 | 10 | 322 | 380 | 117 | 111 | 88 | 48 | 25 | 48.4 | 2 |
| Financial Stress=1 | 15 | 210 | 268 | 98 | 90 | 57 | 25 | 12 | 36.1 | 1 |
| Western Board | 44 | 473 | 601 | 144 | 112 | 96 | 71 | 56 | 65.3 | 3.1 |
| Southern Board | 52 | 514 | 643 | 114 | 83 | 105 | 86 | 67 | 66.2 | 3.4 |
| Belfast Board | 35 | 639 | 852 | 173 | 199 | 129 | 100 | 79 | 66.0 | 3.6 |
| North-East Board | 49 | 529 | 664 | 94 | 80 | 111 | 79 | 62 | 62.5 | 3.5 |
| South-East Board | 37 | 558 | 695 | 99 | 125 | 114 | 77 | 62 | 58.0 | 3.8 |
| Controlled Secondary | 57 | 474 | 551 | 116 | 121 | 98 | 54 | 32 | 43.5 | 3.2 |
| Maintained Secondary | 71 | 470 | 587 | 183 | 144 | 95 | 61 | 36 | 52.0 | 3.2 |
| Voluntary Grammar | 51 | 673 | 926 | 67 | 6 | 136 | 132 | 127 | 95.4 | 4.0 |

Table 4: Distribution of GCSE Performance by type of School

| | Grammar School | Secondary Schools | Total |
|--|----------------|-------------------|---------------|
| Pupils achieving 5+ @ A*-C | 9,017 | 8,397 | 17,413 |
| Pupils achieving 5+ @ A*-C (incl. E&M) | 8,724 | 5,025 | 13,478 |
| Total Year 12 Pupils | 9,316 | 14,542 | 23,858 |

Table 5: Distribution of FSM and SEN pupils by type of School

| | Grammar School | Secondary Schools | Total |
|--------------|----------------|-------------------|----------------|
| FSM Pupils | 4,150 | 22,419 | 26,569 |
| SEN Pupils | 4,147 | 20,615 | 24,762 |
| Other Pupils | 53,836 | 42,735 | 96,571 |
| Total Pupils | 62,133 | 85,769 | 147,902 |

Table 6: Distribution of FSM and SEN pupils by "Ethos" of Grammar School

| | Catholic Grammar Schools (29) | Protestant Grammar Schools (38) | Total |
|--------------|-------------------------------|---------------------------------|--------|
| FSM Pupils | 2,674 | 1,476 | 4,150 |
| SEN Pupils | 1,840 | 2,307 | 4,147 |
| Other Pupils | 22,529 | 31,307 | 53,836 |
| Total Pupils | 27,043 | 35,090 | 62,133 |

Table 7: Mean Proportions and Numbers of GCSE Successes by School Type*

| | Secondary Schools | Grammar Schools |
|---|-------------------|-----------------|
| Proportion of Year 12 pupils attaining 5+ GCSEs at A*-C | 58.6 | 96.8 |
| Proportion of Year pupils attaining GCSEs at A*-C (incl. E&M) | 35.4 | 93.6 |
| Average Number of pupils attaining 5+ GCSEs at A*-C | 58 | 133 |
| Average Number of pupils attaining 5+ GCSEs at A*-C (incl. E&M) | 35 | 128 |

*Proportions are computed as a weighted average of 2009 and 2010 proportions, weights 20% and 80% respectively.

Table 8: School Size and Educational Performance

| | Grammar | | | Secondary | | |
|----|--------------------------|----------------------------|----------|-------------|---------------|----------|
| | Size Viable (55 schools) | Size Unviable (13 schools) | t-value* | Size Viable | Size Unviable | t-value* |
| P1 | 96.6 | 98.1 | 2.65 | 60.4 | 55.0 | 1.86 |
| P2 | 93.7 | 93.5 | 0.14 | 37.0 | 31.5 | 2.24 |

*Using the *lincom* command in STATA; group proportions were calculated with weights

P1 is the proportion of Year 12 pupils obtaining 5+ GCSEs at A*-C grades

P2 is the proportion of Year 12 pupils obtaining 5+ GCSEs at A*-C grades, including English and Mathematics

Table 9: Financial Stress Level and Educational Performance

| | Grammar School | | Secondary School | | | |
|-----------------------|----------------|---------|------------------|---------|---------|---------|
| | Level 4 | Level 3 | Level 4 | Level 3 | Level 2 | Level 1 |
| P1 | 96.8 | 96.9 | 57.7 | 62.1 | 55.0 | 44.3 |
| P2 | 93.6 | 93.7 | 34.5 | 38.9 | 28.4 | 21.8 |
| P1: t-test, 4 against | | 0.15 | | 1.10 | 0.80 | 2.64 |
| P2: t-test: 4 against | | 0.01 | | 1.29 | 2.57 | 2.87 |
| P1: t-test, 3 against | | | | | 1.51 | 3.21 |
| P2: t-test, 3 against | | | | | 3.29 | 3.48 |

Table 10: Management Type and Secondary School GCSE Educational Performance

| | Controlled | Controlled Integrated | Direct Grant Maintained | Maintained |
|--------------------------------|------------|-----------------------|-------------------------|------------|
| P1 | 50.9 | 49.2 | 62.2 | 64.1 |
| P2 | 30.4 | 28.2 | 41.8 | 37.7 |
| P1: t-test: Controlled against | | 0.42 | 2.88 | 4.42 |
| P2: t-test: Controlled against | | 0.50 | 3.09 | 2.70 |

Table 11: Management Type and Secondary School A-level Educational Performance

| | Controlled | Controlled Integrated | Direct Grant Maintained | Maintained |
|----------------------------|------------|-----------------------|-------------------------|------------|
| 3 A*-C grades | 40.2 | 40.7 | 40.1 | 46.0 |
| t-test: Controlled against | | 0.03 | 0.01 | 1.75 |

Table 12: Ethos and Grammar School GCSE Performance

| | Catholic Ethos | Protestant Ethos |
|-------------------|-----------------------|-------------------------|
| P1 | 97.8 | 96.0 |
| P2 | 94.3 | 93.2 |
| P1: t-test | | 2.37 |
| P2: t-test | | 0.78 |

Table 13: Ethos and Grammar School 'A' level Performance

| | Catholic Ethos | Protestant Ethos |
|----------------------|-----------------------|-------------------------|
| 3 A*-C grades | 79.8 | 73.8 |
| t-test | | 2.50 |

Table 14: Regression Estimates GCSE Passes (All Schools)

| | | Proportion of 5+ GCSE passes at A*-C grades | | | | Proportion of 5+ GCSE passes at A*-C grades (including English and Mathematics) | | | |
|---------------------------|--|---|-------------|-------------|--------------|---|-------------|--------------|--------------|
| | | Coefficient | Std. Err. | t value | Prob>t | Coefficient | Std. Err. | t value | Prob>t |
| Grammar School | | 28.67 | 4.18 | 6.86 | 0% | 45.79 | 3.41 | 13.45 | 0% |
| Sixth form size | | 0.05 | 0.02 | 3.49 | 0% | 0.05 | 0.01 | 3.86 | 0% |
| Years 8-12 size | | 0.01 | 0.01 | 1.12 | 27% | 0.02 | 0.01 | 2.78 | 1% |
| Year 12 size | | -0.02 | 0.03 | -0.70 | 48% | -0.03 | 0.03 | -0.96 | 34% |
| Free school meals | | -0.06 | 0.01 | -4.57 | 0% | -0.07 | 0.01 | -6.69 | 0% |
| Special educational Needs | | 0.01 | 0.01 | 0.56 | 58% | 0.01 | 0.01 | 0.56 | 58% |
| Level 4 | | 12.00 | 4.45 | 2.69 | 1% | 9.37 | 3.63 | 2.58 | 1% |
| Level 3 | | 13.48 | 4.57 | 2.95 | 0% | 11.48 | 3.73 | 3.08 | 0% |
| Level 2 | | 10.35 | 6.34 | 1.63 | 10% | 5.72 | 5.17 | 1.11 | 27% |
| NEELB | | 3.35 | 3.07 | 1.09 | 28% | 4.16 | 2.50 | 1.66 | 10% |
| SEELB | | -1.44 | 2.90 | -0.50 | 62% | 2.14 | 2.36 | 0.91 | 37% |
| SELB | | 9.05 | 2.95 | 3.07 | 0% | 10.61 | 2.40 | 4.41 | 0% |
| WELB | | 6.37 | 2.91 | 2.19 | 3% | 10.32 | 2.37 | 4.34 | 0% |
| Controlled | | -0.58 | 2.59 | -0.22 | 82% | -0.94 | 2.11 | -0.44 | 66% |
| Grant-maintained | | 9.69 | 4.19 | 2.31 | 2% | 9.54 | 3.42 | 2.79 | 1% |
| Integrated | | 11.92 | 3.36 | 3.54 | 0% | 7.08 | 2.74 | 2.58 | 1% |
| RC Maintained | | | | | | | | | |
| Single sex (boys) | | -0.24 | 2.74 | -0.09 | 93% | -2.98 | 2.23 | -1.33 | 18% |
| Single sex (girls) | | 8.72 | 2.64 | 3.30 | 0% | 5.66 | 2.15 | 2.63 | 1% |
| Intercept | | 37.49 | 5.67 | 6.61 | 0% | 15.81 | 4.62 | 3.42 | 0% |
| Number of Observations | | | | | 211 | | | | 211 |
| Adjusted R ² | | | | | 0.776 | | | | 0.917 |

Residual categories: Level 1; BELB; Controlled Integrated; Co-educational schools.

Table 15: Regression Estimates GCSE Passes (Secondary Schools)

| | | Proportion of 5+ GCSE passes at A -C grades | | | | Proportion of 5+ GCSE passes at A -C grades (including English and Mathematics) | | | |
|---------------------------|--|---|-------------|--------------|------------|---|-------------|--------------|------------|
| | | Coefficient | Std. Err. | t value | Prob>t | Coefficient | Std. Err. | t value | Prob>t |
| Sixth form size | | 0.08 | 0.02 | 3.66 | 0% | 0.09 | 0.02 | 5.07 | 0% |
| Years 8-12 size | | 0.01 | 0.01 | 0.85 | 40% | 0.02 | 0.01 | 2.46 | 2% |
| Year 12 size | | 0.01 | 0.04 | 0.32 | 75% | 0.01 | 0.03 | 0.28 | 78% |
| Free school meals | | -0.09 | 0.02 | -4.83 | 0% | -0.10 | 0.01 | -7.38 | 0% |
| Special educational Needs | | -0.01 | 0.02 | -0.29 | 77% | -0.01 | 0.01 | -0.90 | 37% |
| Level 4 | | 11.34 | 5.21 | 2.18 | 3% | 8.19 | 3.89 | 2.10 | 4% |
| Level 3 | | 11.30 | 5.54 | 2.04 | 4% | 9.16 | 4.15 | 2.21 | 3% |
| Level 2 | | 6.30 | 7.33 | 0.86 | 39% | 1.80 | 5.49 | 0.33 | 74% |
| NEELB | | -0.66 | 5.87 | -0.11 | 91% | -1.12 | 4.39 | -0.25 | 80% |
| SEELB | | -5.89 | 5.50 | -1.07 | 29% | -1.86 | 4.12 | -0.45 | 65% |
| SELB | | 7.42 | 5.65 | 1.31 | 19% | 7.40 | 4.23 | 1.75 | 8% |
| WELB | | 6.62 | 5.38 | 1.23 | 22% | 10.71 | 4.02 | 2.66 | 1% |
| Controlled | | -1.49 | 6.24 | -0.24 | 81% | 0.66 | 4.67 | 0.14 | 89% |
| Grant-maintained | | 8.69 | 7.27 | 1.20 | 23% | 10.60 | 5.44 | 1.95 | 5% |
| Integrated | | | | | | | | | |
| RC Maintained | | 10.92 | 6.64 | 1.65 | 10% | 8.31 | 4.97 | 1.67 | 10% |
| Single sex (boys) | | 0.75 | 5.18 | 0.15 | 89% | 1.39 | 3.87 | 0.36 | 72% |
| Single sex (girls) | | 13.97 | 4.89 | 2.85 | 1% | 5.27 | 3.66 | 1.44 | 15% |
| Intercept | | 40.51 | 9.21 | 4.40 | 0% | 16.91 | 6.89 | 2.45 | 2% |
| Number of Observations | | 143 | | | | 143 | | | |
| Adjusted R ² | | 0.397 | | | | 0.525 | | | |

Residual categories: Level 1; BELB; Controlled Integrated; Co-educational schools.

Table 16: Regression Estimates GCSE Passes (Grammar Schools)

| | | Proportion of 5+ GCSE passes at A*-C grades | | | | Proportion of 5+ GCSE passes at A*-C grades (including English and Mathematics) | | | |
|--|--|---|-------------|--------------|-----------|---|-------------|--------------|------------|
| | | Coefficient | Std. Err. | t value | Prob>t | Coefficient | Std. Err. | t value | Prob>t |
| Sixth form size | | 0.03 | 0.02 | 1.85 | 7% | 0.04 | 0.03 | 1.70 | 10% |
| Years 8-12 size | | 0.00 | 0.00 | 0.20 | 84% | 0.00 | 0.01 | 0.65 | 52% |
| Year 12 size | | -0.05 | 0.04 | -1.42 | 16% | -0.08 | 0.06 | -1.32 | 19% |
| Free school meals | | 0.00 | 0.01 | -0.27 | 79% | -0.02 | 0.02 | -1.21 | 23% |
| Special educational Needs Level 4 | | -0.01 | 0.01 | -0.75 | 46% | 0.01 | 0.02 | 0.35 | 73% |
| NEELB | | 1.03 | 1.39 | 0.74 | 46% | 3.31 | 2.28 | 1.46 | 15% |
| SEELB | | 2.99 | 1.23 | 2.42 | 2% | 5.08 | 2.03 | 2.51 | 2% |
| SELB | | 1.66 | 1.45 | 1.15 | 26% | 4.19 | 2.38 | 1.76 | 8% |
| WELB | | 2.01 | 1.35 | 1.50 | 14% | 4.39 | 2.21 | 1.99 | 5% |
| Single sex (boys) | | -2.94 | 1.08 | -2.73 | 1% | -6.82 | 1.77 | -3.85 | 0% |
| Single sex (girls) | | 0.21 | 1.01 | 0.20 | 84% | 1.62 | 1.66 | 0.98 | 33% |
| Catholic ethos | | 2.03 | 0.92 | 2.21 | 3% | 2.17 | 1.51 | 1.43 | 16% |
| Intercept | | 95.67 | 2.32 | 41.19 | 0% | 88.53 | 3.81 | 23.21 | 0% |
| Number of Observations | | 68 | | | | 68 | | | |
| Adjusted R² | | 0.356 | | | | 0.389 | | | |

Residual categories: Level 3; BELB; Co-educational schools; Protestant ethos.

Table 17: Regression Estimates for Three A level Passes at A-C grade (All, Secondary, Grammar)

| | All Schools | | | Secondary Schools | | | Grammar Schools | | |
|-----------------------------|--------------|-------------|-----------|-------------------|---------|--------|-----------------|---------|--------|
| | Coefficient | t value | Prob>t | Coefficient | t value | Prob>t | Coefficient | t value | Prob>t |
| Grammar School | 25.86 | 5.49 | 0% | | | | | | |
| Sixth form size | 0.05 | 3.81 | 0% | 0.07 | 2.72 | 1% | 0.03 | 2.02 | 5% |
| Free school meals | -0.04 | -2.23 | 3% | -0.05 | -2.57 | 1% | -0.05 | -1.75 | 9% |
| Special educational Needs | 0.00 | 0.04 | 97% | 0.02 | 0.92 | 36% | -0.01 | -0.24 | 81% |
| Level 4 | -7.73 | -0.73 | 47% | -13.28 | -1.37 | 18% | 5.55 | 1.47 | 15% |
| Level 3 | -7.45 | -0.70 | 49% | -8.59 | -0.84 | 40% | | | |
| Level 2 | -14.35 | -1.00 | 32% | -12.87 | -1.00 | 32% | | | |
| NEELB | 7.47 | 2.15 | 3% | 19.84 | 3.19 | 0% | 2.03 | 0.46 | 65% |
| SEELB | 3.59 | 1.11 | 27% | 10.93 | 1.85 | 7% | 1.48 | 0.38 | 71% |
| SELB | 9.89 | 2.97 | 0% | 22.54 | 3.68 | 0% | 1.23 | 0.27 | 79% |
| WELB | 4.67 | 1.43 | 16% | 16.79 | 2.83 | 1% | -0.31 | -0.08 | 94% |
| Grant-maintained Integrated | 0.98 | 0.20 | 85% | 4.11 | 0.88 | 38% | | | |
| RC Maintained | 5.87 | 1.63 | 10% | 5.58 | 1.61 | 11% | | | |
| Single sex (boys) | -1.98 | -0.64 | 52% | 7.50 | 1.08 | 28% | -4.77 | -1.35 | 18% |
| Single sex (girls) | 3.31 | 1.21 | 23% | 4.94 | 0.99 | 33% | 1.45 | 0.45 | 66% |
| Catholic ethos | | | | | | | 8.83 | 3.19 | 0% |
| Intercept | 41.24 | 3.76 | 0% | 31.07 | 2.84 | 1% | 62.44 | 8.81 | 0% |
| Number of Observations | | 157 | | | 89 | | | 68 | |
| Adjusted R ² | | 0.685 | | | 0.352 | | | 0.187 | |

Only two of the five Controlled Integrated schools reported A level results and, so, were not included in the estimation.
Residual categories (for secondary schools): Level 1; BELB; Controlled Secondary; Co-educational schools.
Residual categories (for Grammar schools): Level 3; BELB; Co-educational schools; Protestant ethos.